



**2013**

**MacDill AFB**  
**General Design Guidelines**  
**For**  
**Facility Construction and Renovation**

22 July 2013

NOTE: An attempt was made to mark all modifications to the pervious MacDill AFB *General Design Guide*, dated 14 May 2012 in “**RED**”. It will be the guide user’s responsibility to carefully review the *General Design Guidelines* for verification of deleted / or revised information.



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# MacDill AFB General Design Guidelines

22 July 2013

This design guide provides information regarding facility and infrastructure design at MacDill AFB. It is not intended to be all encompassing. There are additional documents that determine project specific final design and construction requirements. This document does, however, provide guidance for frequently asked questions as well as basic design elements and concepts that have evolved at MacDill AFB. Brand names, or the basis of design products, are often used in order to establish a minimum acceptable level of quality, finish, size, thickness, durability, testing agency compliance, and code compliance. Equally qualified, alternate products will be considered if the products meet or exceed all the salient characteristic attributes of the basis of design.

**NOTICE TO DESIGNERS:** The designer shall be aware that any information (including information marked as as-built or record drawings) provided to the contractor or the contractor's engineer will require independent verification. The government cannot confirm that all documentation has been completed. All information provided will require independent field verification to include: field surveys, soft-dig investigation, ground penetrating radar (GPR) or other means. Further, in the older developed area of the base it is highly recommended that the engineer execute a GPR survey to detect abandoned foundations that have been terminated below grade, the location of abandoned utilities or even verify the location of existing utilities.

The project specific documents, specifications and drawings take precedence over these *General Design Guidelines*.

## I. MACDILL AFB REFERENCES

MacDill AFB provides the information below as design guidance. Unless more stringent / restrictive design and construction requirements have been called for in the specific project design package documents provided by MacDill AFB, the references below shall be used to establish a minimum level of performance.

This document as well as all codes and other references, will change over time. It is incumbent up the designers to verify they have the current applicable references for the particular project. Designers must visit the appropriate web sites in order to verify applicability.

The following requirements are listed in order of relevant priority. If there is a conflict, then the requirements will be considered in the order listed below with the highest priority listed first. The website <http://www.wbdg.org/> can be accessed for the various documents listed.

1. UNIFIED FACILITY CRITERIA (UFC),
2. ENGINEERING TECHNICAL LETTERS (ETL),
3. AIR FORCE INSTRUCTIONS (AFI),
4. AIR FORCE MANUALS (AFM),
5. AIR FORCE HANDBOOKS (AFH),
6. AIR FORCE DESIGN GUIDES, OCCUPANCY SPECIFIC (AFDG),
7. Other relevant references. A few of these publications are referenced below as well as elsewhere in the project documents

Some documents referenced are marked “For Official Use Only” (FOUO). If restricted documents are needed for your particular design, please notify your designated POC for assistance.

- A. The Department of Defense has established the International Building Code, 2009 and all associated references as the overall general code see UFC 1-200-01.
- B. MacDill AFB, due to its location and unusually severe climate conditions, requires the design and construction to comply with the following references in order to reduce long term repair and maintenance costs:
  1. The latest edition of the Florida Building Code, Chapter 13, Energy.
  2. The latest edition of the Florida Building Code, Exterior claddings, attachments, and appurtenances shall meet Miami-Dade notice of acceptance requirements.
- C. Noted References due to our requirement the following UFCs will be strictly enforced:
  1. UFC 4-021-01            DESIGN AND O & M: MASS NOTIFICATION SYSTEMS
  2. UFC 4-010-01            DOD MINIMUM ANTITERRORISM STANDARDS FOR BUILDINGS
  3. UFC 4-020-01            DOD SECURITY ENGINEERING FACILITIES PLANNING MANUAL
  4. UFC 4-023-03            DESIGN OF BUILDINGS TO RESIST PROGRESSIVE COLLAPSE
  5. DCI                        DIRECTOR OF CENTRAL INTELLIGENCE DIRECTIVE No. 6/9 – Physical Security Standards for Sensitive Compartmented Information Facilities (SCIF)
  6. MACDILL AFB TRAFFIC CONTROL STANDARDS, revised Nov 2009 (see **APPENDIX 4**)
- D. For compliance to energy related design guidelines, meet applicable standard requirements in the following order of priority:
  1. Energy Policy Act 2005
  2. Applicable USAF UFCs (Unified Facility Criteria) and (ETLs (Engineering Technical Letters).
  3. Florida Building Code, latest version, Chapter 13.
  4. MacDill Air Force Base Energy Management Policy
  5. LEED for New Construction and Major Renovations. See **APPENDIX 12** for guidance and minimum program requirements.

## II. ARCHITECTURE: (INTERIOR)

### A. GENERAL

1. Government provided project documents are not assembly drawings or instructions. The sample list below outlines the many items a successful design/build or design/bid/build contractor is expected to be able to expertly perform. Every project may not require each item listed below:
  - a. Install all items or elements level, true, plumb, square, true to line without warping, binding, kinking, bends, or twisting.
  - b. Anchor and adhere items or elements securely.
  - c. Sealants and weatherproofing must be appropriate for substrates, joints, and specific conditions.
  - d. Clean and protect items or elements from damage.
  - e. Equalize margins.
  - f. Scribe and trim neatly eliminating burrs, snags, and splits.
  - g. Protect existing elements from damage.
  - h. Protect new work and 'existing to remain' from damage, soiling, or pilfering.
  - i. Verify that substrates are in appropriate condition prior to installing new materials such as moisture content, cleanliness, primer, and temperature.
  - j. New material shall be acclimated to jobsite conditions.
  - k. Verify that room temperature and humidity are correct for intended work.
  - l. Fill and seal all annular spaces around pipes, ducting, and various penetrations with appropriate materials such as behind plumbing escutcheons, trim, and flanges. UL listed foams/sealants are required where penetrations of rated assemblies occur.
  - m. Final cleaning, dusting, polishing, touch up, and adjustments are required.
  - n. Use the correct type and length of fasteners for any particular application. When a fastener is used to anchors an item located in an area subject to water exposure, the hole into which the fastener is installed shall be filled with sealant prior to fastener insertion.
  - o. Install appropriate solid blocking in walls and ceilings to support various attachments.
  - p. Properly brace tops of walls where door jambs are located to provide solid, vibration-free door operation.
  - q. Fill, seal, finish all gaps, cracks, and seams with appropriate materials such as filling the gap between the suspended ceiling perimeter angle and the wall, the gap between the water closet and the floor, the gap between the door frame and the wall, and the gap between cabinetry and the wall, perimeter joint at windows, grills, louvers and so forth.
  - r. Removal of any existing slab on grade requires the treatment of the exposed soil with properly applied termidor termiticide, and installation of a minimum 6 mil visqueen vapor barrier prior to slab replacement.
  - s. New door openings in existing CMU walls shall require new precast lintels for support of the remaining wall, and the new lintel must be tied into the existing wall with filled cells and #5 rebar continuous vertically minimum. The designer of record shall provide specific requirements.
  - t. All visible surfaces, except concrete walkways, roofs, and glazing, shall require, as a minimum, a painted finish (i.e., appropriate prime and preparation with a minimum three brush applied coats of paint).
  - u. Install transition strips of appropriate material at all floor finish changes. Tile to tile may require an accent tile to accommodate color transitions.
  - v. Wax, buff, polish, and burnish all VCT flooring as part of final cleaning and protect until final acceptance.
  - w. All demolition of existing materials for access to concealed or obstructed elements, such as plumbing, will require that the demolished material be replaced with matching or like-kind material (i.e., CMU with CMU or plaster with plaster), unless otherwise noted (UON).
  - x. Prior to any demolition (e.g., saw cutting), a thorough investigation and verification of existing conditions must be performed in order to avoid damage to concealed elements such as electrical, plumbing, fire sprinklers, and gas lines.
  - y. Typically, the distance from a gypsum board wall 90 degree corner to the edge of a door frame/trim should be 2 to 3-inches.

- z. All edges of visible elements are expected to be finished and sealed even though that particular edge may not be readily visible such as tops and bottoms of doors.
- aa. The exterior perimeter envelope of the building must be completely sealed and air tight in order to prevent infiltration of warm humid air or exfiltration of interior air.
- bb. The exterior thermal envelope of the building must be continuous and uniform, from floor slab to insulated roof deck. As needed, UL rated foamed insulation with comparable R-value must be installed in order to fill and seal gaps, cracks, and annular rings. When project work disturbs existing envelopes, the new work must comply with these requirements.
- cc. Materials, assemblies, and products shall be American made, and shall comply with all appropriate requirements of the Federal Acquisition Regulation (FAR).
- dd. As appropriate for any given material, finishes shall be of maximum coating thickness, durable, scrubbing tolerant, cleanable, soiling resistant, low maintenance, and mold and mildew resistant.
- ee. All materials are to be asbestos and lead free.
- ff. Unless otherwise noted, all interior window sills should be Corian, price group "F".\

#### B. FINISHES, COLORS, MATERIALS

1. For all designs, the design/build team must prepare complete finish/color/material schedules as well as presentation boards. They must review with the Government / user at the 65% design stage, at the latest.

#### C. WOOD & PLASTICS

1. Custom built cabinetry shall be all plywood construction. Wet location approved particle board may be used for cabinet doors only if laminate selection dictates. Cabinets shall, as a minimum, be constructed as specified, and shall meet the requirements of AWI's Architectural Woodwork Quality Standards latest edition for premium grades of interior architectural wood work, construction, finishes, and other requirements, and shall be test report verifiable.
2. Wall and base cabinet assemblies shall consist of individual units joined into continuous sections. Fastenings and anchorage shall be accomplished to permit removal and replacement of individual units without affecting the remainder of the installation.
3. Drawers shall be removable, equipped with extra heavy duty, full extension guides, and shall be equipped with position stops to avoid accidental complete withdrawals. Shelves shall be ¾-inches thick minimum and be fixed or adjustable as indicated. Cabinetry construction is typically flush overlay.
4. Cabinet door hardware shall be premium grade and allow for multi directional adjustments.
5. Countertops and 4-inch high back splashes are to be Corian, price Group "F" or equivalent.

#### D. SOUND ATTENUATION MATERIAL

1. Gypsum board walls required to be sound attenuated shall be filled with mineral wool batts, 2.0 pcf density, UON. Fiberglass batts are not acceptable due to density deficiencies.
2. Specific STC requirements shall dictate exact construction.

## E. INTERIOR PARTITION CONSTRUCTION

1. Typically, interior gypsum board walls shall be floor to deck above, and be constructed of one layer of 5/8-inch gypsum board on each side of 3-5/8-inch, 24 gauge, galvanized steel studs at 16-inches on center maximum. Attachment must be according to the US Gypsum Association as well as the building code, minimum.
2. Walls which do not extend to the deck above shall terminate at 12 inches above the highest adjacent wall.
3. Gypsum board wall finish shall be Level 5, UON. ASTM requirements must be followed in order to achieve the specified Sound Transfer Coefficient (STC).
4. Gypsum board shall be installed according to manufacturer specifications and ASTM C 840-99.
5. Imported board is not allowed. All wet areas subject to water build up, splashing, condensate, or tile require Dense Shield or cement board. Green board can be allowed when not subject to the preceding conditions.

## F. INTERIOR DOORS

1. Typically, interior wood door slabs shall be 1 & 3/4-inch thick, solid core, particleboard core, 1LD2, 32 lbs/cu ft, hardwood rails & stiles, birch veneer, white birch, (all sapwood), custom grade, stain grade, and book matched.
2. The basis of design for interior steel doors shall be as manufactured by Steelcraft. Slabs to be 16 gauge, cold rolled G60 galvanized steel, seamless with appropriate foamed insulated core to enhance sound control. Doors shall be factory primed /ANSI a224.1.
3. Hardware must be able to accept the Best cores that are MacDill standard requirements. All proposed hardware schedules must be reviewed by the base locksmith for compliance as well as keying. The base is to receive two finished keys and three blank keys per lock. The designer and the user must review all functions and determine master keying requirements. The review cannot occur later than the 65% design review.
4. Hinges must be heavy duty, 5 knuckle, stainless steel base metal and finish with NRP. Best hardware: 45H Series; interchangeable cores; stainless steel base metal lever style 14; escutcheon J; compatible strike; 630 satin stainless steel.
5. Lock sets and cores shall be purchased by the contractor. The contractor shall install lockable construction cores to be used during the construction phase. After the facility is accepted by the base, the base locksmith will remove the construction cores and install the Best cores, which have been provided under the construction contract. UON, the final cores are to be sent directly to the base locksmith from the manufacturer. For projects with 80 or more doors, the contractor must supply a certified hardware installer under the employ of an Architectural Hardware Consultant (AHC).
6. The basis of design for steel frames shall be as manufactured by Steelcraft, 16 gauge, G60 galvanized steel, and primed for jobsite finishing. Reinforce at all hardware locations with galvanized steel: 7 gauge at hinges; 14 gauge at strike. Kerfed frames for gasketed sound and air infiltration control.
7. The designer must provide a complete door hardware and accessories schedule as well as cut sheets for all items. This information must be carefully reviewed with the user no later than the 65% design stage.



## G. CERAMIC AND PORCELAIN TILE

1. All tile work shall be performed only by companies that are members of the Tile Council of America and shall comply with the latest TCNA installation handbook.
2. All floor tile grout should typically be pigmented Laticrete Spectralock Pro Grout.
3. Do not install porous surfaces in high traffic areas.
4. Use lower absorption level tiles to have a greater resistance against stains.
5. Install larger tiles, 12-inch x 12-inch in high traffic areas to minimize grout lines.
6. Basis of design for public areas shall be Daltile 12-inch x 12-inch. Continental Slate, color Asian Black, to be verified. The base should typically match the tile and be 4-inches tall.
7. Restroom floor tile basis of design shall be Daltile Mosaics Unglazed Porcelain Keystones, 2-inch x 2-inch top range of cost chart. Exact color TBD.
8. Restroom wall tile basis of design shall be Daltile 4 inch X 4 inch wall tile, semi-gloss, Mayan White D400. A 3 tile accent border/band consisting of 3 additional, different color tiles installed in checker-board fashion will be required starting at 5 feet above the finished floor.

## H. CARPET

1. All work to be performed by contractors/installers who are Certified Floor covering Installers (CFI) from the International Certified Flooring Installer Association or manufacturer approved installer.
2. All carpeted areas must conform to CFR Part 1630, Standard for the Surface Flammability of Carpets and Rugs (FF 1-70) (pill test) and performance characteristics.
3. Federal agencies are required by law, Executive Orders (EO), FAR, Defense Federal Acquisition Regulation (DFAR), and Air Force Policy to consider environmentally preferable products (Electronic Transmittal Letter (ETL) 07-04: Air Force Carpet Standard).
4. Provide low volatile organic compound (VOC) products for carpet, adhesives, sealants, and carpet cushions.
5. Install solid colored carpets only in commanders' suites, chapels, DV suites, and family housing units or as borders.
6. Basis of design shall be Shaw Connect Tile, Style 59342, color; Harboring Desire, color 40485, multi level pattern loop, with SSP monolithic installation. The wall base should typically be Johnsonite 1/8-inch thick vinyl and be 4-inches high.
7. Static free Carpet: Computer Room, etc.

## I. PAINT

1. New paints and coatings basis of design shall be low VOC as manufactured by ICI Paints Dulux (now a Glidden Company).
2. All surfaces exposed to view must be properly primed and painted. This includes some items which may be factory finished, but not be of the appropriate color. Dark bronzed finishes are specifically excluded as well as any Kawneer exterior doors.

3. Partial or spot painting is not acceptable. If part of a surface requires painting, then the entire surface will have to be painted or repainted in order to reach a corner or a different material.
4. Typically, interior paint colors should be a subtle off white (ICI White on White) or light grey (ICI Crystal) depending on the interior color scheme. Exact color must be verified with user via color submittals.
5. Paint categories are listed below (draw downs to be submitted for all paints/colors):
  - a. P1 Dulux ultra eggshell acrylic 1403: Three coats, brush or roller, minimum over properly prepared and primed substrate with color to be determined by exact location. This application includes elements/areas such as interior gypsum board walls, both new and patched, interior gypsum board soffits, ceilings, except in wet areas, and interior exposed concrete elements.
  - b. P2 Dulux professional acrylic semi-gloss: Three coats, brush, minimum over properly prepared and primed substrate with color to be determined by exact location. This application includes elements/areas such as interior wood trim, wood shelves, wet area gypsum board walls, ceilings, janitor closets, storage rooms, electrical, mechanical, communication, interior steel doors, interior steel door frames, and interior steel window frames.
  - c. P3 Dulux professional exterior 100% acrylic semi-gloss finish: Three coats, brush applied, minimum over properly prepared and primed substrate, color to be determined by exact location. This application includes elements/areas such as exterior sheet metal, flashings, and parapet caps.
  - d. P4 Dulux ultra-hide durus exterior acrylic flat masonry finish: Three coats, brush or roller, minimum over properly prepared and primed substrate with color to be determined by exact location. This application will include elements/areas such as cement stucco, exposed concrete, and generally the exterior of the entire building vertical and horizontal appropriate surfaces.
  - e. P5 Dulux ultra-hide durus alkyd gloss exterior house and trim paint – Three coats, brush only, minimum over properly prepared and primed substrate with color to be determined by exact location. This application will include elements/areas such as exterior steel doors, exterior steel frames, interior & exterior steel railings, exterior steel grills/louvers, d.i.p. downspouts and brackets, and miscellaneous steel.

#### J. SUSPENDED CEILINGS

1. Ceiling system shall be installed in strict compliance with the particular manufacturers' specifications as well as ASTM C 636-96, with the following exceptions: lay-in light fixtures and HVAC grills will be supported independently of ceiling grid; support wire shall be plumb to within 1-inch horizontal for each 12-inches vertical, 4 degrees (use steel cross members of proper size as needed to achieve this requirement).
2. Tiles shall be snug to grid, and the grid shall be square and level. Penetrations shall be centered in tiles and the system shall be centered within room.
3. Install hold down clips as noted.
4. Ceiling type ACT 1 (general areas):
  - a. Armstrong Dune; 24-inch x 24-inch x 5/8-inch; angled tegular; ASTM 1264 classification Type III, Form 2, pattern CE; white on white, Armstrong, Prelude XL, 15/16-inch exposed tee.
  - b. Upon completion of the work, provide the user with replacement tiles at the rate of 2 percent of the total installed area. Coordinate delivery of these tiles with the IAP inspector.

**K. RESTROOM ACCESSORIES**

1. Restrooms require complete array of accessories, to be coordinated with the user.
2. Toilet accessories shall be provided and installed by the contractor. Toilet accessories will include toilet paper holders, paper towel dispensers, and soap dispensers. Paper towel holders shall be sized to fit "Big 8" rolls and toilet paper holders shall be able to use "Jumbo Roll JRT". All mounting locations shall receive reinforcement as required to ensure secure installation of toilet accessories.

**L. TOILET PARTITIONS**

1. The toilet partitions and urinal screens basis of design shall be Bradmar as manufactured by Bradley Corporation. Install in strict accordance with manufacturer's requirements.
2. Partitions shall be floor mounted and overhead braced.
3. Color to be S406, desert stone (to be verified at time of submittal). Continuous wall brackets and color coordinated accessories are required.

**M. SIGNAGE**

1. Identification signage basis of design shall be a product of Scott Sign Systems Inc, ([www.scottsigns.com](http://www.scottsigns.com)).
2. Interior signs identifying the men's and women's restrooms shall be ADA compliant, ADA blue, and shall be 8-inch x 6-inch molded plaques (apmena68 and apwoma68).
3. Interior signs identifying all specifically designated rooms such as janitors closets, communication, storage, break room, electrical, conference room (two required, one at each door) shall be interior ADA appliqué, square edge, 6-inches high x 8-inches wide with 'rm xxx', 'janitor closet,' and braille. Lettering shall be 1-inch Helvetica caps lettering, stacked as needed. Clear non-glare acrylic back painted. Color TBD.
4. Interior signs identifying all offices to be series s2100 with 3-inch header, 'rm xxx', 1-inch Helvetica and Braille with four insert slots at 1-inch high for each location. In addition to the partitioned offices, provide these signs for any open office/work station areas. 1 slot per person/work station.
5. Exterior signs identifying exterior accessed rooms shall be exterior photopolymer, approximately 8-inches wide x 6-inches high, 1-inch letters, with room name, room number, and Braille. Color TBD.
6. Installed sign location is typically on the strike side of the room door, approximately 3-inches from the steel jamb edge and approximately 44-inches from the floor to the sign top.
7. Signs are typically square edge.
8. Air Force Sign Standard must be consulted for latest additional requirements.
9. LED lighting for exit signs and bulletin boards is required.

### III. ARCHITECTURE (EXTERIOR)

#### A. GENERAL

Government provided project documents are not assembly drawings or instructions. The sample list below outlines some of the many items that the successful design/build or design/bid/build contractor is expected to be able to expertly perform. Every project may not require each item listed below:

1. Install items or elements level, true, plumb, square, true to line without warping, binding, kinking, bends, or twisting.
2. Anchor and adhere items or elements securely.
3. Sealants and weatherproofing must be appropriate for substrates, joints and specific conditions.
4. Clean and protect items or elements from damage.
5. Equalize margins.
6. Scribe and trim neatly eliminating burrs, snags, and splits.
7. Protect existing elements from damage.
8. Protect new work and 'existing to remain' from damage, soiling, or pilfering.
9. Verify that substrates are in appropriate condition prior to installing new materials such as moisture content, cleanliness, primer, and temperature.
10. New material shall be acclimated to jobsite conditions.
11. Fill and seal all annular spaces around pipes, ducting, and various penetrations with appropriate materials such as behind escutcheons, trim, and flanges. UL listed foams or sealants shall be required where penetrations of rated assemblies occur.
12. Final cleaning, touch up, and adjustments shall be required.
13. Install appropriate type and length of fasteners for any particular application. All exterior fasteners shall be type 316 stainless steel, except where specifically noted otherwise; is critically contrary to; or invalidates the warranty of a particular manufactured system or element. When a fastener anchors an item located in an area subject to water exposure, the hole into which the fastener is installed should be filled with sealant prior to fastener insertion.
14. Fill, seal, finish all gaps, cracks, and seams with appropriate materials such as the gap between the window frame and the wall, trims and walls, door frame and the wall, and all thresholds to be set in a full sealant bed.
15. New door openings in existing CMU walls require new precast lintels for support of the remaining wall, and the new lintel must be tied into the existing wall with filled cells and #5 rebar continuous vertically minimum. The designer of record shall provide specific requirements.
16. All visible surfaces, except concrete walkways, roofs, and glazing, shall be, as a minimum, a painted finish with appropriate prime/preparation and minimum three coats of paint.

17. All demolition of existing materials for access to concealed or obstructed elements, such as plumbing, will require that the demolished material be replaced with matching or like-kind material (i.e., CMU with CMU or plaster with plaster), UON.
18. Prior to any demolition (e.g., saw cutting), a thorough investigation and verification of existing conditions must be performed in order to avoid damage to concealed elements such as electrical, plumbing, fire sprinklers, and gas lines.
19. All visible surfaces, except concrete walkways, roofs, and glazing, shall require, as a minimum, a painted finish (i.e., appropriate prime and preparation with a minimum three coats of paint).
20. The exterior perimeter envelope of the building must be completely sealed and air tight in order to prevent infiltration of warm humid air or exfiltration of interior air. All new penetrations must comply with this requirement.
21. The exterior thermal envelope of the building must be continuous and uniform, from floor slab to insulated roof deck. As needed, UL rated foamed insulation with comparable R-value must be installed in order to fill and seal gaps, cracks, and annular rings. When project work disturbs existing envelopes, the new work must comply with these requirements.
22. Materials, assemblies, and products shall be American made, and shall comply with all appropriate requirements of the FAR.
23. Finishes shall be maximum coating thickness, durable, scrubbing tolerant, cleanable, soiling resistant, low maintenance, and mold and mildew resistant, where appropriate, for any given material.
24. All materials shall be asbestos and lead free.
25. If existing openings are to be filled in, the filled opening must match the adjacent building construction materials and finish. Partial painting is not permitted.
26. Existing nonconforming fabric canopies are to be replaced with conforming canopies.

#### B. FINISHES, COLORS, MATERIALS

1. For all designs, the design/build team must prepare complete finish/color/material schedules as well as presentation boards. They must review with the Government / user at the 65% design stage, at the latest.

#### C. COLORS

1. Refer to the base Architectural Compatibility Plan (ACP) (**APPENDIX 3**) color scheme for exterior building colors (i.e., two colors: one base color and one color for roof and trim).
2. All colors, interior and exterior, must be submitted for Government approval.

#### D. EXISTING BUILDINGS, GENERAL

1. Representative examples of period architecture are to be preserved and used.
2. Rehabilitate and maintain buildings in a manner consistent with the original character. Where possible, eliminate incompatible appendages, such as exterior stairs, awnings, and canopies that were not part of the original structures.
3. Limit size of new additions to be in scale with original building.

4. Avoid alterations that detract from the design integrity of a building or that negatively impact adjacent buildings.
5. When possible, locate additions to form spaces, develop views, or screen poor views as described under guidelines for new construction.
6. Locate additions to minimize intrusions on character defining features such as massing, rhythm, setbacks, elevations, rooflines, or primary entrances.
7. When appropriate, match original materials and construction techniques where structural and decorative elements of the building façade need repair or replacement.
8. Clean and repair exposed and visible surfaces. Paint only materials that were originally painted, such as fascias, cornices, trims, or doors. Do not paint concrete, copper, brass, glass, brick, stone and slate.
9. Remove, where possible, all extraneous elements (such as utility lines, support brackets, pipes and vents), that detract from the building facades. When this is not possible, paint an appropriate color to minimize visual impact.
10. Locate equipment (such as transformers, HVAC apparatus, telephone cabinets, dumpsters) in areas where they will have minimum detrimental effect on the appearance of existing structures. Provide screening where necessary.

#### E. NEW CONSTRUCTION

1. Exteriors of new buildings shall be split-faced CMU, stucco, or a combination of the two. Thought must be given to match surrounding areas. When appropriate, select material, finishes and details to be consistent and compatible with existing materials, finishes, and details in their respective districts.
2. When appropriate, make new buildings compatible in style, scale, proportion, orientation, and directional emphasis with existing structures in their respective districts.
3. Locate new structures to visually define space, to reinforce spatial enclosure, create vistas, frame views, and guide the eye to landmarks.
4. Avoid intrusions into positive open spaces

#### F. WALL SURFACE TREATMENT

1. Existing Buildings
  - a. Clean brick, stone, wood, and metal surfaces by appropriate method. Investigate alternatives, and choose the least harmful cleaning method. Never sandblast old brick, stone or wood surfaces.
  - b. Repair walls, where necessary, by removing loose material and patching holes and cracks with new material to match adjoining surfaces.
  - c. Repair joints in masonry walls by pointing. Joints should be raked tooled, struck, or otherwise treated to match original joint techniques.
  - d. Avoid cosmetic application of new synthetic materials resembling original materials; such materials will not weather and age the same as existing natural materials. When new synthetic materials must be used, avoid combining with existing materials to achieve resemblance with original appearance.

2. New Construction
  - a. Use split face CMU or stucco as a unifying material in all districts, if suitable as exterior cladding for a particular new structure. Match colors in the tan or buff range.
  - b. Match new surfaces with existing ones in size, texture, color, and use the same bonding patterns.

#### G. MISCELLANEOUS ROOF ITEMS

1. All roof top elements on sloped standing seam metal roofs, which can be viewed, shall be coated to match the roof color.
2. Downspouts are to be painted to match the background color against which they are viewed. This often results in the downspout being painted more than a single color.
3. New roofs and major roof replacements shall meet or exceed the following Solar Roof Reflectance Index (SRI) for a minimum of 75% of the roof surface.
  - a. SRI > 78 for low slope roofs (<2:12)
  - b. SRI > 29 for high slope roofs (>2:12)

#### H. DOORS, EXTERIOR

1. Main entrances to facilities shall be designed to be readily discernible.
2. Primary entrance doors are typically aluminum and glass, dark bronze anodized frames.
3. All exterior doors shall be protected from the direct effects of weather to the extent reasonable. The main entrance(s) shall generally include a building canopy that is part of the building architecture for new facilities and major renovations.
4. Typically, the aluminum and glass exterior door basis of design shall be the Kawneer 350IR, blast tested to 5.8 psi, wet glazed, insulated, bronzed, 3-inch x 1/2-inch cross rail., thermally broken frames.
5. Hardware must be able to accept the Best cores that are MacDill standard requirements. All proposed hardware schedules must be reviewed by the base locksmith for compliance as well as keying. The base is to receive two finished keys and three blank keys per lock. The user must review all functions, and determine master keying requirements. The review cannot occur later than the 65% design review.
6. All exterior doors must comply with Antiterrorism/Force Protection (ATFP) requirements. See Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, includes Change 1.
7. All exterior doors are expected to also comply with Miami-Dade Notice of Acceptance (NOA) and pass large and small projectile testing. ATFP requirements may override NOA requirements where no other options exist.
8. Typically, exterior steel doors and frames basis of design shall be as manufactured by Steelcraft. Slabs to be 16 gauge, cold rolled G60 galvanized steel, seamless with appropriate foamed insulated core. Doors shall be factory primed/ANSI a224.1. The steel frames basis of design shall be as manufactured by Steelcraft, 16 gauge, G60 galvanized steel, primed for jobsite finishing. Reinforced at all hardware locations with galvanized steel: 7 gauge at hinges; 14 gauge at strike. Kerfed frames for gasketed sound and air infiltration control. Hinges must be heavy duty, 5 knuckle, stainless steel, base metal and finish with NRP. Best hardware: 45H Series; interchangeable cores; stainless steel base metal lever style 14; escutcheon J; compatible strike; 630 satin stainless steel.

9. Locksets and cores
  - a. Locksets and cores shall be purchased by the contractor.
  - b. The contractor shall install lockable construction cores to be used during the construction phase. After the facility is accepted by the base, the base locksmith will remove the construction cores and install the Best cores, which have been provided under the construction contract. The final cores are to be sent directly to the base locksmith from the manufacturer.
  - c. For projects of 30 or more doors, the contractor must supply a certified hardware installer under the employ of an AHC.
10. At 'existing to remain' exterior doors, all weather stripping and sealants shall be replaced.
11. The designer must provide a complete door hardware and accessories schedule as well as cut sheets for all items. This information must be carefully reviewed with the Government / user no later than the 65% design stage.

#### I. WINDOWS, EXTERIOR

1. Generally, dark bronze Class I anodized, tinted, insulated, single hung windows, with thermally broken frames (exterior glazed muntins and screens to be determined where operable windows are utilized).
2. All windows shall be double paned with tinting.
3. Minimum performance requirements for aluminum windows, terminology, and standards of performance, fabrication, and workmanship are those specified and recommended in AAMA/NWWDA 101/i.s.2 - 97 and applicable general recommendations published by AAMA. Conform to more stringent requirements as indicated in specific project documents.
4. Blast Resistance:
  - a. ASTM F1642-04: *Standard test method for glazing and glazing systems subject to air blast loadings*: Minimal hazard response at a 4 psi pressure, 30 psi-msec impulse, blast load.
  - b. US General Services Administration (GSA) test protocol GSA-TS01-2003: *Standard test method for glazing and window systems subject to dynamic overpressure loadings*: Level 2 protection at a 4 psi pressure, 30 psi-msec impulse, blast load.
  - c. Department of Defense (DOD) ATFP construction standards, UFC 4-010-01: Medium level of protection at a 4 psi pressure, 30 psi-msec impulse, blast load.
5. New window installation shall require shop drawings that are engineered, signed, and sealed by a Florida registered structural engineer. The drawings should show anchors, anchor holes in frames, hardware, operators, and other components as appropriate if not included in manufacturer's standard data.

#### J. HVAC EQUIPMENT

1. Existing Structures:
  - a. Avoid placement of window air conditioning units on the facades of buildings in the Campus District. Where air conditioning equipment is required, a central system should be installed.
  - b. Avoid placing HVAC equipment (e.g., heat pumps and cooling towers) outside of existing structures. Where such equipment must remain, shall be screened from view, but not to restrict air flow. Screen walls must meet ACP requirements.
  - c. Hose bib and receptacle are required in screened mechanical yards for future maintenance by base support shops.



2. New Structures:
  - a. Avoid installation of HVAC or other utility equipment such as transformers and telephone cabinets on the exterior of new structures. Install such equipment in a mechanical room.
  - b. Where required on facades, mechanical rooms should be simple in design and finished to match adjoining surfaces.
3. General Levels of Improvement for Existing Buildings.
  - a. It is recognized that achievement of stated design objectives will not always be completely possible in degree of visibility, use, or importance.
  - b. Three levels of improvement are proposed for existing buildings. These are the following:
    - i. Level 1: Painting and renovation of existing finishes. Improvements typically consist of maintaining existing cladding materials but using a more compatible color scheme in the future. Improvements incorporate at least one element of the Base/District unifying characteristics, and help achieve a degree of visual coherence.
    - ii. Level 2: Changing existing cladding material and/or revisions to existing doors and windows. Improvements would typically consist of the changing the existing cladding material to ACP compatible material. Improvements will enhance appearance, extended period of maintenance cost benefit, and can also accommodate energy saving measures. Replace windows and doors to further enhance energy conservation, and to help achieve a degree of visual coherence. Exterior appurtenances, such as HVAC equipment or antennas, shall be screened or removed. Careful consideration must be given to the screening of HVAC equipment so as not to create a short cycling of condenser air circulation.
    - iii. Level 3: Alteration of building form/style or revision to existing doors and windows. Improvements involve major alterations to the building form, and style to make the structure compatible with the ACP. The following alterations are recommended: change flat roof to pitched hipped roof with large overhangs; add entry portico compatible with pitched roof; horizontal treatment of new windows and materials; resurfacing with more permanent and compatible materials; provide new casement windows.
  - c. While the highest level of improvement may be the ultimate objective, a lower level of implementation is preferable to be partially attained.
  - d. Implementation of the highest improvement level may cost more initially but may be worth the expense if reduced maintenance and energy consumption can be obtained (use life cycle cost analysis according to the Energy Policy Act 2005) and NIST BLCC, latest version.
  - e. Not all Level 3 improvements are appropriate to each district.

#### IV. LANDSCAPE ARCHITECTURE

- A. Refer to the MacDill AFB ACP for landscaping requirements at MacDill AFB. See **APPENDIX 3** and **APPENDIX 5**.
- B. UFC 4-010-01, page B-7 B-1.2 Standard 2 for unobstructed space: It is assumed that aggressors will not attempt to place explosive devices in areas near buildings where these explosive devices could be visually detected by building occupants observing the area around the building. Therefore, ensure that obstructions within 10 meters (33 feet) of inhabited buildings or portions thereof do not allow for concealment from observation of explosive devices 150 mm (6-inches) or greater in height. This does not preclude the placement of site furnishings or plantings around buildings. It only requires conditions such that any explosive devices placed in that space would be observable by building occupants.
- C. For existing buildings where the standoff distances for parking and roadways have been established at less than 10-meters (33-feet) in accordance with paragraph B-1.1.2.2, the unobstructed space may be reduced to be equivalent to that distance.
- D. Plant growth should not allow for the concealment of explosive devices for up to three years from the planting date. Selected plant growth should be such that quick visual detection of a potential explosive device is possible through the plant growth. Also, remember everything around a facility becomes part of the blast when it occurs.
- E. Plant selection takes into account a variety of elements:
  - 1. See the list of plants suitable for MacDill AFB compiled as part of the ACP
  - 2. Take into consideration the MacDill AFB guidelines as described in the document titled: *Landscape Theme and Design Procedures* (**APPENDIX 5**).
  - 3. The Florida Cooperative Extension Service (University of Florida) publications website (<http://edis.ifas.ufl.edu/TOPICLandscapePlants>) is a good source of information for landscaping in Florida. Utilize xeriscape plantings using Florida native plants where possible.
  - 4. White House memorandum #W50737 (dated 26 April 1994) mandates the use of regionally native plants at federal installations. Exotic species are not authorized.
  - 5. Plants must be tolerant and capable of withstanding the full range of potential climate conditions located in south, central Florida.
  - 6. Select plants that require little or no maintenance (trimming/shaping).
  - 7. Consider the sun and shade conditions where each plant is to live—most plants have very specific sun and shade requirements.
  - 8. Poisonous plants and plants with thorns are not authorized in Military Family Housing areas.
  - 9. Take into account the plant's mature size.
- F. Soil quality is fairly consistent across the base. It is very sandy, which means excellent drainage and little organic content. Remember that shoreline areas have increased soil salinity and saltwater spray.
- G. An automatic irrigation system is highly recommended for any landscaping. Use controllers and spray heads compatible with and approved by MacDill AFB.

- H. All rock beds shall be treated with a pre-emergent herbicide and then top-dressed with 10 ml of weed fabric.
- I. All plant beds and tree rings shall be treated with a pre-emergent herbicide and then top-dressed with 3" cypress mulch. All new trees shall have a tree ring with a minimum of 24" radius. All new trees and palms shall be staked. All existing trees to remain shall have a 6' radius mulch ring at a depth of 3".
- J. Shredded cypress mulch is normally installed in a 3-inch layer in all plant beds, except in certain areas near the flight line because of Foreign Object Debris (FOD). Coordinate with Airfield Operations for landscaping near the airfield perimeter.
- K. Provide an 18" wide mulch area between a building and its foundation planting.
- L. Mowing strips installed around new construction shall be concrete.
- M. Grasses
  - 1. Argentine Bahia grass (preferred unless stated otherwise):
    - a. Excellent drought tolerance
    - b. Requires little or no maintenance after it is established
    - c. Poor salt tolerance
  - 2. St. Augustine grass:
    - a. Requires irrigation
    - b. Highly tolerant to soil salinity
  - 3. Seashore Paspalum
    - a. For ditch banks, shoreline and wet areas
    - b. Excellent salt tolerance
  - 4. Site areas disturbed as a result of construction shall be resodded with Argentine Bahia sod unless the site has special sod requirements.
  - 5. Seeding with grass and cover crop seed may be permitted in remote locations if prior approval is obtained from the contracting officer. The contractor shall assure good growth and at least 90% coverage after 3 months. In order to prevent erosion the contractor shall provide mulch in potential erosion prone areas. Any site erosion within a 3 month period following the installation shall be repaired and the area reseeded (or sodded).
- N. Irrigation Systems: Install only temporary irrigation system to establish sod, tree, and/or flowers initial growth. Only install a permanent irrigation system if required per the project statement of work. All irrigation systems will require a backflow device.
- O. Irrigation meters: Install water meter on the irrigation systems to measure the amount of potable water used. Meters must meet the same requirements as for potable water services and shall be remote readable from EMCS or automated meter reading program.

## V. FIRE SUPPRESSION

### A. GENERAL

1. All buildings shall be designed per NFPA 13, Life Safety Code and UFC 3-600-01.
2. Specifications for fire suppression systems shall include a statement requiring the design of the sprinkler system be under the direct supervision of a Professional Engineer experienced in the design of this type of work and licensed in the State of Florida. Shop drawings for fire suppression systems shall be required and shall bear the seal of the engineer of record.
3. Fire flow testing for the water supply shall be performed in accordance with NFPA 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants. Coordinate the operation of any fire hydrants with the utility privatization authority (FGUA).
4. Existing conditions, such as as-built drawings or existing design drawings shall be reviewed and integrated into the new design drawings, calculations, and specifications as necessary to show all components of the existing suppression system.

### B. Plumbing shall incorporate the following:

1. Use only Type K or L copper piping for the domestic water piping inside facilities.
2. Dielectric unions shall be used where dissimilar metals are in contact.
3. MacDill AFB does not allow the use of waterless urinals
4. Minimum Sanitary main from building shall be 4" minimum, with not less than a 2.5fps hydraulic velocity flow.
5. Provide a two-way ground cleanout (GCO) on all sewer – soil or waste lines which enter the building.
6. Furnish minimum plumbing fixtures as indicated in the International Plumbing Code.
7. Provide branch isolation valves for branch piping serving multiple fixtures.

### C. Plumbing Fixture Types:

1. Water Closets - Flushometer Valve as specified below, siphon jet, elongated bowl, top supply spud, floor or wall mounted. Seat: plastic, elongated, open front.
2. Water Closets (handicapped) -Top rim of bowl shall be 18 inches above the floor. All other characteristics shall be the same as (a) above.
3. Lavatories - Enameled cast iron or vitreous china.
4. Wheelchair sinks - Vitreous china, 20 inches by 27 inches deep.
5. Urinal - Wall hung. Siphon-jet or washout. Flushometers as specified below.
6. Kitchen Sinks - Single or double bowl, ledge back with holes for faucet and spout, stainless steel.
7. Service Sinks - Enameled cast iron. 3" minimum Trap standard, wall mounted or floor mounted.
8. Food Service - Stainless steel with drain board. Faucet: As required.

9. Water Coolers - Self-contained. Exposed surfaces shall be stainless steel. Wall mounted surface. Wall mounted semi-recessed. Wall mounted recessed. Handicapped. Free standing.
10. Showers - Wall mounted for stall or bath tub.
11. Bathubs - Straight front recessed. Enameled cast iron, porcelain enameled. Formed steel, plastic without wall, plastic with high wall.
12. Flushometers shall be specified as dual flush flushometers, or approved equal, to match the base standard

## VI. MECHANICAL (HVAC)

### A. GENERAL

1. Mechanical (HVAC) shall incorporate the following:
  - a. All ductwork must be sheet metal, no fibrous duct board is allowed.
  - b. HVAC mechanical rooms for EMCS controls shall have network connections including two phone lines and one LAN.
  - c. Applicable HVAC units shall be connected to the LAN per Section VI herein: EMS.
  - d. HVAC units must have connections to the Fire Alarm system
  - e. Ensure that space is available for alarm panel connections.
  - f. Avoid placing HVAC units and any other mechanical equipment on top of roofs (i.e., no penetrations through roofs) due to problems with roof leaks, accessibility, and maintainability requirements. If rooftop equipment is necessary, use existing roof warranty holder to perform the work, if applicable.
  - g. All HVAC equipment, such as air handler units, VAV boxes, and air terminals, shall be accessible for maintenance via removable ceiling tiles or access panels.
  - h. Access points shall be located and large enough to allow for filter replacement.
  - i. Place all utilities underground, if possible, especially laterals to buildings. All exposed piping, insulation, and supports must be painted to match the structure. Protective sleeves must be used if pipe or insulation must be run above ground.
  - j. Observe ASHRAE Std. 62, latest edition. Ensure buildings maintain a positive air pressure at all times. Air handlers should be cleanable and accessible for proper maintenance. All ductwork, supply, and return, shall be insulated and constructed of material that is cleanable.
  - k. Provide either copper or aluminum fin and tube condensers with factory applied coating to prevent corrosion of outdoor air cooled air conditioning equipment.
  - l. Make sure durability, availability of replacement parts in the local area, maintainability, type of warranty, and service from the local manufacturing representatives are taken into consideration. Typically, the basis of design for HVAC is McQuay, Carrier or Trane.
  - m. Maintain space humidity at 50% +/- 10% unless humidity control is stated otherwise by building user.
  - n. Building pressurization of approximately 8% greater than the exhaust volume is recommended to offset infiltration.
  - o. Provide proper specifications for air filters to ensure indoor air quality requirements are met.
  - p. Verify that existing space is sufficient to properly route ductwork (i.e., ceiling plenums and chases) and piping. Coordinate with other disciplines
  - q. Install isolation valves for all equipment and proper air venting for all piping systems as required. Isolation valves should be located at all branches serving two or more fixtures.
  - r. Use double wall, insulated air handling units.
  - s. Pre-treat ventilation air when feasible and perform a NIST BLLC analysis, latest version as documentation.
  - t. Verify that size and connection methods are compatible with existing systems.
  - u. Include vibration isolation on all supply and exhaust fans, energy recovery units, and when needed elsewhere.
  - v. A-E shall thoroughly coordinate mechanical and electrical coordination between sheets for motor sizing and electrical loads.
  - w. Use double-walled, pre-insulated pipe for buried, chilled water piping between the mechanical room and the chiller.
  - x. Obtain permits for air pollution emissions for boiler and incinerator installation.
  - y. Install a sufficient number of volume dampers to allow a constant volume system to be balanced as required. All outlets require a volume damper.
  - z. Use a four pipe system with provisions for heat recovery on HVAC condensers (Desuperheaters, Heat recovery, etc.) for pre-heating hot water.
  - aa. Toilet room areas shall be properly ventilated according to the International Mechanical Code, or ASHRAE, whichever is greatest. All toilet room ventilation systems shall be controlled by

- lighting occupancy sensors. All building automation controls are to be DDC type. No pneumatic controls shall be used.
- bb. All dorm designs shall comply with ETL 93-2 *Dorm Design in Humid Areas* or latest version.
  - cc. To meet SMACNA recommendations the designer should indicate the operating pressure in the various elements of the duct system on the plans.
  - dd. The duct aspect ratio should be kept as low as possible to reduce duct cost.
  - ee. Seal duct to SMACNA high and low pressure duct construction. This will add approximately 5% of ductwork first cost. If the sealing of an average low pressure duct system is eliminated, an allowance of a minimum of 15% duct leakage should be used for calculations.
  - ff. IBC or FL State Building Code states rooms containing boilers, central heating plant, or hot water supply boilers shall have a one hour rated separation, except where the large piece of fuel equipment does not exceed 400,000 Btu/hr.
  - gg. Verify that the expansion tank is on suction side of circulation pumps.
  - hh. Heating systems shall use 50% by volume Ethylene Glycol.
  - ii. All exterior equipment shall be concealed to improve facility aesthetics while still providing ease in access for maintenance and repair.
  - jj. UFC 4-010-01 “DOD *Minimum Antiterrorism Standards for Buildings*” requires emergency air intake shutoffs and that building air intake be located 10-feet or greater above the adjacent ground surface.
  - kk. The primary method of space conditioning will be ducted HVAC systems using a building-wide chilled water loop for cooling and a building-wide hot water loop for heating. Individual split systems, window units, fan coil units, are not preferred.
  - ll. Demand controlled ventilation (DCV) will be designed and installed in all air handling units. CO<sub>2</sub> sensors will be installed in the return air duct and will control the position of the outdoor air damper based on occupancy.
  - mm. If not controlled by the EMCS, programmable thermostats should be installed to reduce space temperatures to requirements listed in the Energy Management Policy Manual. Zone air sensors will have the capability to monitor temperature, humidity, and CO<sub>2</sub>
  - nn. Pump and fan motors over 10 hp will be controlled with VFD’s. Pump VFDs will respond to downstream system pressure and Fan VFD will respond to downstream static pressure.
  - oo. Any rooftop air conditioning systems shall utilize heat pump technology for building heating. Electric heat strips shall only be used as secondary heating.
  - pp. Air-side HVAC system design will include dedicated outdoor air AHUs on systems with design outdoor air flow rates above 1000 CFM to pre-condition outdoor air before serving distribution AHUs or conditioned space. The dedicated outdoor air handler will be equipped with an energy recover ventilator utilizing a desiccant heat wheel or flat plate heat exchanger to transfer load between exhaust air and outdoor air.
  - qq. Chilled water systems over 100 tons will be water cooled chillers using a cooling tower. If an existing water-cooled chilled water system already existed at the facility, a load analysis will be completed to understand the potential to add load to the existing chilled water system.
  - rr. Chilled water pumping systems will be primary only systems (using one chilled water loop) with one set of pumping systems. Pumping systems greater than 10 hp will be controlled with VFD with the use of two way valves at air handling units. Pressure transducers will be installed at AHU farthest away from the pumping system and will control pump VFD.
  - ss. Chilled water delta T (difference between the supply and return chilled water temperature) will be designed to be 15 °F at all times or the maximum allowable per the chiller manufacturer’s specifications.
  - tt. Chilled water supply temperature will be designed to be no lower than 45 °F at all times. Increasing the chilled water temperature during mild outdoor air temperature (chilled water temperature reset) will be enabled when the control system allows.
  - uu. Chilled water shall be used for server room cooling unless otherwise noted.
  - vv. Refrigerant ownership cannot be sold or transferred outside of the Department of Defense (DOD). The Air Force has a Refrigerant Management Handbook that governs the use of refrigerants and all work shall conform to this policy.

## B. ENERGY CONSERVATION

Shall comply with ASHRAE 90.1A as Energy Standard for equipment efficiency:

1. Specify maximum chiller and condensing unit efficiencies consistent with equipment that is at or near the top of industry standards. Select units that operate at maximum efficiency at predominant load condition.
2. Use chiller waste heat recovery where applicable particularly where dehumidification is required.
3. Energy performance must meet or exceed the requirement of ETL 94-4, Energy Usage Criteria for Facilities in the Military Construction Program. Additionally, energy performance must meet the Energy Policy Act of 2005 (LCCA exceed ASHRAE 90.1 by 30%).
4. Use premium efficiency rating for all motors.
5. Use variable speed fans and pumps unless another alternative provides a lower life-cycle cost or if a special system constraint requires constant speed equipment.
6. All installed equipment shall adhere to the Energy Efficiency Equipment Guidelines located in **APPENDIX 13**.



## VII. EMCS (ENERGY MANAGEMENT CONTROL SYSTEM):

The base Civil Engineering Energy Management Control System (EMCS) section controls all HVAC and integrated lighting controls systems.

### A. METERING – GENERAL

1. Civil engineering will be notified if any work will require an electric, water or gas meter to be out of service, disconnected, or temporarily removed. Readings from before the meter is out of service will be taken and provided to the construction inspector. If the meter is to be permanently removed, then a new meter complying with the base's meter policy will be installed and the cost will be incorporated in the cost of the project. If the meter will not be replaced then the existing meter will be reinstalled and programmed correctly.
2. All projects, renovation or construction exceeding the amount of \$200,000 per facility will be required to install a new electric, water, and gas meter compliant with the bases approved meter installation.
3. Contractor will provide civil engineering with information from all newly installed and replaced meters:
  - Building number served
  - Location in/on building
  - Manufacturer
  - Model Number
  - Multiplier (if applicable)
4. New electric meters will be programmed with the correct CT (current transformer) and/or PT (potential transformer) so that display readings will accurately show the utility usage. New meters (electric, water or gas) will be zeroed out or the initial meter reading at the time of installation reported.
5. Electric, gas and water meters will be fully commissioned onto the base Utility Management Control System (UMCS) via the wireless metering communications system. Electric meters will collect pulse signal outputs from the gas and water meters located at the facility so that this information will be collected by the Base UMCS.
6. See Electric, Water and Gas sections for specific information on meter type and installation requirements.

### B. Front End

1. All new construction or any renovated DDC system must be fully compatible with the unified MacDill AFB LCS 8520 server. Any modifications to this front end server must be fully compatible with UFGS 25 10 10 and use open LON Works.
2. All new construction or major renovation projects must be fully integrated into this front end system.
3. Communication between the Building UNC or equivalent and the central console in the Energy Management Section shall be via a LAN connection.

### C. Communication

1. A CAT6 line shall be installed from the EMCS main control panel to the closest COMM room for communication to the (CEOV) EMS Section.

2. The building automation system shall be open source non-proprietary such that the Government or its agents are able to perform repair, replacement, upgrades, and expansions of the system without further dependence on the original Contractor. This includes, but is not limited to the following:
    - a. Install hardware such that individual control equipment can be replaced by similar control equipment from other equipment manufacturers with no loss of system functionality.
    - b. Necessary documentation (including rights to documentation and data), configuration information, configuration tools, programs, drivers, and other software shall be licensed to and otherwise remain with the Government.
    - c. At MacDill AFB the following systems are prohibited for new installation:
      - i. BACNet
      - ii. Proprietary DDC Systems
      - iii. Pneumatic systems or combination Direct Digital Control (DDC)/Pneumatic systems
    - d. Gateways may be used for the following:
      - i. A single major component (chiller, boiler, etc)
      - ii. Legacy or existing equipment in a building that is to remain
  3. As stated in the HVAC section, two phone lines and one LAN connection **shall** be run to the mechanical room to all controlled unit(s).
- D. DDC Hardware (controller) Requirements:
1. For new construction, only the following manufacturer's will be used unless otherwise noted:
    - a. Carrier
    - b. Tekplan (Invensys)
    - c. Trane
    - d. Johnson Controls
  2. For work on existing DDC systems the new equipment must be the same manufacturer and type as the existing system. Alternatively, the existing system may be entirely replaced with a new system of acceptable type. All points that are monitored and controlled by the existing system shall be present on the new system.
  3. DDC Hardware Requirements
    - a. All field level controllers are to comply with UFGS 23 09 23 and must be able to be programmed with Lon Maker Turbo or other equivalent non proprietary software.
    - b. Be connected to a TP/FT-10 ANSI/EIA 709.3 control network.
    - c. Communicate over the control network via ANSI/EIA 709.1B exclusively.
    - d. Communicate with other DDC hardware using only SNVTs.
    - e. Conform to the LonMark® Interoperability Guidelines.
    - f. Be locally powered; link power (over the control network) is not acceptable.
    - g. Be fully configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (nci), or hardware settings on the controller itself to support the application. All settings and parameters used by the application shall be configurable via standard or user-defined configuration parameter types (SCPT or UCPT), standard network variable type (SNVT) network configuration inputs (nci), or hardware settings on the controller itself.
    - h. Provide input and output SNVTs required to support monitoring and control (including but not limited to scheduling, alarming, trending and overrides) of the application. Required SNVTs include but are not limited to: SNVT outputs for all hardware I/O, SNVT outputs for all set points.

SNVT inputs for overrides of all set points, and SNVT inputs for overrides of all hardware Outputs.

4. Application Specific Controllers have a fixed factory-installed application program (i.e. Program ID) with configurable settings and do not have the ability to be programmed for custom applications. In addition to the requirements for all DDC Hardware ASCs shall:
  - a. Be LonMark Certified unless otherwise approved.
  - b. Be configurable via an LNS plug-in unless otherwise approved.
5. Application Generic Controllers (AGCs) have a fixed application program which includes the ability to be programmed for custom applications. In addition to the requirements for all DDC Hardware AGCs shall:
  - a. Have a fixed Program ID and fixed XIF file.
  - b. Be fully programmable and configurable for the application through one or more LNS plug-in unless otherwise approved.
  - c. General Purpose Programmable Controllers (GPPCs) are not installed with a fixed factory-installed application program and must be programmed for the application.
  - d. At MacDill AFB, Local Display Panels (LDPs) shall be installed at a minimum in each mechanical room where an AHU exists and programmed as per the Point Schedules.

#### E. Graphics

1. Provide dynamic graphic displays for use on the central console in the Energy Management Section. Maintain consistent graphical displays with already established programming (See **APPENDIX 10 – EMCS DIAGRAMS** for accepted graphic displays of system components including AHU's, VAV's, FTU's, Chillers, Boilers, Meters, Etc.).
  - a. Provide a main graphic for the overall building that displays thermostat locations, static pressure sensors, Shelter-in-Place shut-off switch, outside air temperature/humidity, Time/Date stamp, and other general information. The main graphic shall also contain links to other graphic screens for individual systems. Include room numbers if possible.
  - b. Provide a dynamic point for each system component (e.g., air handling units, chiller plants, boilers, and utility meters). All inputs and outputs for each component shall be displayed on the graphic. Each graphic shall contain links to the main graphic and other related graphics. Each graphic shall represent the type of equipment displayed with sensors, relays, status, or alarms.
  - c. For variable speed AHU's, provide VAV index page separate to include space temperature, active space temperature, airflow set points, actual airflows and discharge temperatures. Graphics shall represent the type of equipment displayed.

#### F. Accessibility

1. Specification must contain a statement that requires that all DDC field panels, subpanels, and microcontrollers shall be completely programmable through the central console in Building 247 via the LAN. Specification must also contain statement that requires that the central console in Building 247 has override capabilities on all analog and digital outputs.
2. There shall be no devices that contain features that can only be accessed in the field with special equipment or connectors.

#### G. Points to monitor or control

1. See **APPENDIX 2** for general points to consider for monitoring.
2. Provide override capabilities of all end devices (i.e., actuators and Start/Stop relays).

3. User adjustable set points shall be on equipment page (e.g., airflow, temperature, static pressures, and CO2). Additional points may be needed for each specific project such as a system with an emergency generator may have certain chillers interlocked.
4. Prior to DDC system installation the following should be submitted for Government Approval:
  - a. Points Schedules: Submit Points Schedules using the Points Schedule template located at <https://eko.usace.army.mil/fa/bas/> for each piece of DDC Hardware. Points Schedules shall be submitted in hard copy (11"x17") and electronic format. Electronic submission shall be in [AutoCAD] [Microstation] [Excel] format and submitted on CD or DVD.
  - b. Control System Schematic diagram and Sequence of Operation for each HVAC system.
5. Deliverables: Upon completion of project the following should be delivered to the Government for acceptance:
  - a. Final (as-built) commissioned Turbo LONWORKS® Network Services (LNS®) database with Lon Credits transferred to the Government.
  - b. eXternal Information Files (XIF), Resource files and Plug-ins for the completed system.
  - c. Point Schedules: Final (as-built) Points Schedules
  - d. Control System Schematic diagram and Sequence of Operation for each HVAC system.
  - e. Programming Software: All software, including licensing information and user manuals, necessary to program GPPCs installed under this contract.
  - f. GPPC and AGC Application Source Code: Copies of the installed application programs (all software that is not common to every controller of the same manufacturer and model) as source code compatible with the supplied programming software.
  - g. Operation and Maintenance Instructions including procedures for system start-up, operation and shut-down, a routine maintenance checklist, and a qualified service organization list.
  - h. Quality Control (QC) checklist completed by the Contractor's Chief Quality Control (QC) Representative

## VIII. CIVIL

### A. GENERAL

1. The Contractor performing the construction or any party performing any field work that involves any type of excavation shall process a **Civil Engineering Work Clearance Request** (AF Form103) prior to performing any work that requires excavation. All base utilities shall have been marked by the Base CE Shops and Utility Companies. The utility marking shall be protected and any required remarking may result in additional cost to the requestor of the markings.
2. It is the contractors responsibility to validate the utility location within 5' of the utility/ground markings. This may be accomplished by performing a test hole or series of holes using equipment that will not damage the underground utility if it is within 5' of the marking. If the contractor is unsure, they are to contact the coordinating office for the utility in question and receive documented approval before proceeding with their excavation/dig.
3. Hand digging to locate utilities shall be mandatory. These utility locations shall be left uncovered until that portion of the installation is beyond that particular utility location, and the construction inspector has observed the intersection of the conflicting utilities, and approves continuation of the installation.
4. Any construction project utilizing a crane needs to have a FAA form 7460-1 filled out . An aeronautical determination by the FAA is required for the crane. Coordinate with Planning. (45 days)
5. Any project on the airfield needs to be coordinated with Planning for a Temporary airfield construction waiver prior to start of the project. (30 days)

### B. SELECTED UFC REFERENCES (Additional UFCs may apply):

#### a. **UFC 3-201-01 Civil Engineering**

- b. UFC 3-250-01FA Pavement Design for Roads, Streets, Walks, and Open Storage Areas
- c. UFC 3-250-03 Standard Practice Manual for Flexible Pavements
- d. UFC 3-250-04 Standard Practice for Concrete Pavements, with Change 2
- e. UFC 3-250-08FA Standard Practice for Sealing Joints and Cracks in Rigid and Flexible Pavements
- f. UFC 3-260-01 Airfield and Heliport Planning and Design
- g. UFC 3-260-02 Pavement Design for Airfields
- h. UFC 3-270-01 Asphalt Maintenance and Repair
- i. UFC 3-270-07 O&M: Airfield Damage Repair

### C. ROADWAY UTILITY CROSSINGS

1. Install utilities under pavement using horizontal directional bore. This will apply to communications ducts, electrical power ducts, force main piping, water main and similar installations.
2. Open cut will be considered for the following items:
  - a. Gravity sewer piping where the slope of the piping is critical.
  - b. Storm sewer piping
  - c. The installation of large piping or ducts where horizontal directional bore may not be practical. The approval to open cut the roadway pavement will require prior government approval.

### D. ROADS AND PARKING LOTS

1. Use FDOT Standard Specifications for Road and Bridge Construction (FDOT Specifications) and the FDOT Roadway and Traffic Design Standards (FDOT Indexes) unless specifically amended herein.

2. MacDill AFB Traffic Control Standards (**APPENDIX 4**) shall apply.
3. Curbs: Install Miami Type curbs, FDOT Type-F or FDOT Type-D curbs as applicable to meet field conditions.
4. **Driving Lane Delineators: The delineators shall be permanently mounted, round, and white with two reflective bands. Basis of Design shall be TAPCO Super Duck delineators or government approved equal.**
5. Public sidewalk curb ramps: Construct curb ramps in accordance with FDOT Index 304. The installed tactile surface material shall be an approved FDOT product and the material color shall be black.
6. Utility crossings: All utility crossing shall be installed using jack-and-bore or by horizontal directional bore. If an open cut is approved the compaction shall be in accordance with FDOT Specification. Base material shall be replaced two times the original thickness or 12 inches, whichever is greater.
7. Repair sidewalks between contraction and expansion joints only. Narrow cuts across sidewalks will not be accepted.
8. New sidewalks shall be constructed in accordance with FDOT Index 310.
9. UFC 4-010-01 "*DOD Minimum Antiterrorism Standards for Buildings*" provides specific standoff requirements for parking area and roadways from buildings.

#### E. AIRFIELD PAVEMENTS

1. Placing asphalt in sinkhole-prone areas:
  - a. Certain areas of the airfield are prone to sinkholes. In these areas, airfield repaving operations have resulted in additional sinkholes or areas of surface subsidence. It has been determined that the use of a standard vibratory compactor may exacerbate the problem. For future pavement work, including base construction or asphalt surface construction, standard vibratory compactors shall no longer be allowed. As an alternate, it is recommended that the contractor use a heavy static roller or possibly an oscillation type vibratory roller (e.g., HAMM Model HD 0120V) to achieve the required compaction requirements stated in the specifications. The use of these rollers produces less ground vibrations.
  - b. This statement only addresses one piece of equipment. The contractor shall use all other equipment and incidentals required to complete the project construction. The main concern is the desire to reduce excessive ground vibration.

#### F. STORM WATER SYSTEM

1. **Prior to any construction, hand digging to locate utilities shall be mandatory. These utility locations shall be left uncovered until that portion of the installation is beyond that particular utility location. The construction inspector must observe the intersection of the conflicting utilities, and approve continuation of the installation.**
2. **Use FDOT Standard Specifications for Road and Bridge Construction (FDOT Specifications) and the FDOT Roadway and Traffic Design Standards (FDOT Indexes).**
3. **Pipe shall be concrete Class III (meeting FDOT Specification Section 941) or ribbed polyethylene (meeting FDOT specification Section 948) designed for traffic loading (AASHTO H-20). The inside surface of all pipe shall be smooth.**
4. **Manholes and drainage structures shall be manufactured in accordance with FDOT Indexes.**

5. All manhole covers shall be cast iron and have the word "STORM" marked in each cover.
6. Provide a minimum cover of 3 feet from the top of the pipe unless otherwise specified. Shallower installations (if required to meet site conditions) will require encasement of the pipe or use of Class IV concrete pipe.
7. Storm system piping shall be sized using the rational method using the FDOT "Rainfall Intensity-Duration-Frequency Curves" for Zone 6 or SCS Method all for a 5 year/24 hour return period storm event.
8. Storm water systems that increase impervious areas will require permitting through the Southwest Florida Water Management District (SWFWMD), for additional information see the Base Environmental Section of this General Design Guide.
9. Design shall limit developed site runoff to pre-developed 5 year/24 hour and 25 year/24 hour storm events peak rates.
10. Storm water treatment pond control structures shall include a 4-inch thick concrete apron installed under the skimmer and to about 6-inches outside the limits of the skimmer. The engineer shall assure that there is adequate capacity for the design flow under skimmer and between the skimmer and the control structure.

## IX. UTILITY PRIVATIZATION

The Water and Wastewater systems at MacDill AFB are owned and operated by the Florida Governmental Utility Authority (FGUA). See **APPENDIX 8** and **APPENDIX 9** for more information.

### A. WATER and WASTEWATER (Private Utility)

1. On 21 June 2010 the MacDill AFB utilities privatization (UP) contract for water and wastewater was awarded to Florida Governmental Utility Authority (FGUA) by DLA Energy (formerly DESC). On 1 March 2011 the water chlorination and distribution system, and the wastewater collection, treatment, and reuse systems (excluding golf course irrigation lines) at MacDill AFB was transferred to Florida Governmental Utility Authority (FGUA) by means of a Utility System Bill of Sale. Water and wastewater services are provided to MacDill by means of the UP contract. Therefore, FGUA is the sole provider of these utility services to the installation. In addition FGUA is the Permittee for the wastewater system and holds the identification number for the public water system. The Government has entered into a fifty-year contract with FGUA for utility services provided via their water and wastewater systems. Over the course of the fifty year contract, FGUA is responsible for provision of utility services, to include operation, maintenance, repair, renewals, and replacements for the systems. This includes all exterior and underground pipes, manholes, water towers, pump and lift stations (interior and exterior), valves, backflow preventer devices, and other related conveyance infrastructure. Each facility will have points of demarcation (PODs) for FGUA owned infrastructure.

#### 2. FGUA Contact Information:

Florida Governmental Utility Authority  
Glenn E. Forrest, P.E., Utility Manager, MacDill AFB  
280 Wekiva Springs Road, Suite 2000  
Longwood, FL 32779  
407-629-6900 office  
(407) 803-3478 cell  
[gforrest@govmserv.com](mailto:gforrest@govmserv.com)

3. **Planning:** FGUA is required to submit annually an Annual System Deficiency Corrections/Upgrades/Connections and Renewals and Replacements Plan. The 6 CES Contracting Officer Representative (COR), with input from 6 CES/CEP, is responsible for providing information to FGUA on MacDill's planned programs, such as MILCON. The purpose is to define projects which could alter demands placed on the water and wastewater systems, or which could modify or relocate existing infrastructure.
4. **Design:**
  - a. **Project Design for 3<sup>rd</sup> Party Construction:** All agencies that design projects for construction on MacDill AFB must coordinate with FGUA on all proposed actions that might impact the utility systems. Projects that cause impact include: temporary connections, such as connecting to a fire hydrant for water; disconnections due to demolition; new connections due to facility construction; replacing existing lines and components; any project that involves work on utilities past the PODs, which demarcate Government ownership. 6 CES is the primary agency designing projects, accomplishing work through 6 CONS via the MACC contract. Also the US Army Corps of Engineers designs and oversees MILCON projects. Because FGUA owns the utility systems, these project designs must be coordinated with FGUA. Coordination is also necessary because FGUA must ensure the utility systems provide adequate system capacity as the water and wastewater systems are repaired and/or replaced. FGUA must also ensure utility systems are not compromised or damaged. Requests for design coordination will typically have a set of 30 percent design plans. These requests must be forwarded to FGUA via the COR, who will have set



up parallel notification processes. FGUA shall have a minimum of two weeks to review the project and provide comments. FGUA comments are to be incorporated to the extent that FGUA will accept the utility components after construction is complete.

- b. Design Standards:** Designs that install, alter, disconnect or connect (temporary or permanently), or cause adverse impacts to the systems must incorporate FGUA's design standards, and are subject to FGUA inspection during construction. For water and wastewater systems FGUA follows Hillsborough County design standards, or equivalent. Hillsborough County design standards are located at: <http://www.hillsboroughcounty.org/index.aspx?nid=2067>
5. **Project Review:** Please note that FGUA requires a minimum of two weeks review time. Comments from FGUA will be transmitted to the COR and other appropriate individuals. The design must meet FGUA's approval to the extent that FGUA will accept the utility components after construction is complete.
6. **Fees:** As the utility owner and sole utility service provider to MacDill under the UP contract, FGUA can charge fees. Per the UP contract, FGUA has the right to reasonably inspect 3<sup>rd</sup> party construction projects (\$150/hour for Contract Operator and \$120/hour for Systems Manager). FGUA will prepare a Water & Sewer Utility Construction Fees Letter specific for the project. This letter will list the construction and inspection fee lump sum, and the temporary construction water meter cost. This letter will be used in developing the government cost estimate and 3<sup>rd</sup> party construction solicitation. FGUA costs will be identified in the solicitation. Also FGUA required forms will be identified in the solicitation. The 3<sup>rd</sup> party construction contractor shall pay FGUA these costs and submit completed forms to FGUA.
7. **Meters:** Please note that per AFCESA policy meters on privatized water and wastewater systems shall not be AMR type that can be connected to the Air Force network.
8. **Construction:** Only FGUA can connect/disconnect into FGUA owned utilities. No 3<sup>rd</sup> party contractor can connect/disconnect to a FGUA owned utility unless authorized by FGUA.
  - a. **3<sup>rd</sup> Party Construction:** The 3<sup>rd</sup> party construction contractor must coordinate with FGUA prior to the start of utility work. This coordination involves payment of fees and submission of the following forms: FGUA Form 427, FGUA Form 11, and FGUA Form 301. The construction contractor is expected to notify FGUA at the appropriate times for inspection during the course of the project. Please note that if new sewer and water infrastructure is constructed by a 3<sup>rd</sup> party contractor, the new infrastructure belongs to the Government (6 CES) until the new infrastructure can be officially conveyed to FGUA and the UP contract modified. FGUA has the right not to accept infrastructure that is installed by others if the construction does not meet FGUA standards. In the meantime, the Government will own and provide for the operation and maintenance of the new infrastructure until it can be brought up to acceptable standards. The COR is responsible for initiating the process to transfer the new infrastructure to FGUA.
9. **Connection:** Utility construction may also be accomplished through the UP contract using the connection contract clauses. The COR provides a project description, government cost estimate, and arranges for a MIPR to be sent to DLA. Upon award by DLA, the UP contractor constructs the infrastructure and owns it.

## B. NATURAL GAS (Private Utility)

The Natural Gas System at MacDill AFB are owned and operated by TECo Peoples Gas (PGS). See **APPENDIX 16** for more information.

1. On 26 March 2012 the MacDill AFB utilities privatization (UP) contract for natural gas was awarded to TECO Peoples Gas (PGS) by DLA Energy (formerly DESC). On 23 September 2012 the natural gas system at MacDill AFB will be transferred to PGS by means of a Utility System Bill of Sale. Natural gas services will be provided to MacDill by means of the UP contract. PGS also provides the

commodity. Therefore, PGS is the sole provider of these utility services to the installation. The Government has entered into a fifty-year contract with PGS for utility services provided via their natural gas system. Over the course of the fifty year contract, PGS is responsible for provision of utility services, to include operation, maintenance, repair, renewals, and replacements for the system. This includes all exterior and underground pipes, meters, valves, and other related conveyance infrastructure. Each facility will have points of demarcation (PODs) for PGS owned infrastructure.

**2. PSG Contact Information:**

TECO Peoples Gas  
James Billington, Division Supervisor  
1400 Channelside Drive  
Tampa, FL 33605  
813-275-3819 office  
727-423-7618 cell  
[JJBILLINGTON@tecoenergy.com](mailto:JJBILLINGTON@tecoenergy.com)

- 3. Planning:** PGS is required to submit annually an Annual System Deficiency Corrections/Upgrades/Connections and Renewals and Replacements Plan. The 6 CES Contracting Officer Representative (COR), with input from 6 CES/CEP, is responsible for providing information to PGS on MacDill's planned programs, such as MILCON. The purpose is to define projects which could alter demands placed on the natural gas system, or which could modify or relocate existing infrastructure.

**4. Design:**

- a. Project Design for 3<sup>rd</sup> Party Construction:** All agencies that design projects for construction on MacDill AFB must coordinate with PGS on all proposed actions that might impact the utility system. Projects that cause impact include: temporary connections; disconnections due to demolition; new connections due to facility construction; replacing existing lines and components; any project that involves work past the PODs, which demarcate Government ownership. 6 CES is the primary agency designing projects, accomplishing work through 6 CONS via the MACC contract. Also the US Army Corps of Engineers designs and oversees MILCON projects. Because PGS owns the utility system, these project designs must be coordinated with PGS. Coordination is also necessary because PGS must ensure the utility system provides adequate capacity as lines are repaired and/or replaced. PGS must also ensure the utility system is not compromised or damaged. Requests for design coordination will typically have a set of 30 percent design plans. These requests must be forwarded to PSG via the COR, who will have set up parallel notification processes. PGS shall have a minimum of two weeks to review the project and provide comments. PGS comments are to be incorporated to the extent that PGS will accept the utility components after construction is complete.
- b. Design Standards:**
- i. Designs that install, alter, disconnect or connect (temporary or permanently), or cause adverse impacts to the natural gas system must incorporate PGS's design standards, and are subject to PGS inspection during construction. PGS design standards are provided as an attachment to this design guide.
  - ii. Please note that PGS requires a minimum of two weeks review time. Comments from PGS will be transmitted to the COR and other appropriate individuals. The design must meet PGS's approval to the extent that PGS will accept the utility components after construction is complete.

- 5. Fees:** As the utility owner and sole utility service provider to MacDill under the UP contract, PGS can charge temporary and permanent connection fees. The Per the UP contract, PGS has the right to reasonably inspect 3<sup>rd</sup> party construction projects. PGS will prepare a Natural Gas Utility Construction Fees Letter specific for the project. This letter will list the construction fee lump sum. This letter will

be used in developing the government cost estimate and 3<sup>rd</sup> party construction solicitation. PGS costs will be identified in the solicitation. Also PGS required forms will be identified in the solicitation. The 3<sup>rd</sup> party construction contractor shall pay PGS these costs and submit completed forms to PGS.

6. **Meters:** Please note that per AFCESA policy meters on privatized natural gas systems shall not be AMR type that can be connected to the Air Force network.
7. **Construction:** Only PGS can connect/disconnect into PGS owned natural gas lines. No 3<sup>rd</sup> party contractor can connect/disconnect to a PGS owned line unless authorized by PGS.
  - a. **3<sup>rd</sup> Party Construction:** The 3<sup>rd</sup> party construction contractor must coordinate with PGS prior to the start of utility work. This coordination involves payment of fees and submission of PGS forms. The construction contractor is expected to notify PGS at the appropriate times for inspection during the course of the project. Please note that if new natural gas infrastructure is constructed by a 3<sup>rd</sup> party contractor, the new infrastructure belongs to the Government (6 CES) until the new infrastructure can be officially conveyed to PGS and the UP contract modified. PGS has the right not to accept infrastructure that is installed by others if the construction does not meet PGS standards. In the meantime, the Government will own and provide for the operation and maintenance of the new infrastructure until it can be brought up to acceptable standards. The COR is responsible for initiating the process to transfer the new infrastructure to PGS. Construction categories are listed below.
    - **New Connection with Meter and Equipment that Uses Natural Gas:** If the project meets the MACC provisions, the letter from PGS will state the fee is zero, and PGS will construct the new utility line to the POD. The letter will state exactly what work PGS will perform, including site preparation and finish work. This will enable the 3<sup>rd</sup> party construction contractor to properly phase the construction so that both parties work as a team. The 3<sup>rd</sup> party construction contractor is responsible for utility construction from the POD on. PGS will own the new utility line to the POD.
    - **New Connection with Meter and Equipment that Uses Natural Gas:** If the project does not meet the MACC provisions, PGS will prepare a letter that describes two scenarios. The 1<sup>st</sup> scenario will state the fee PGS will charge to construct the new line to the POD, and will detail exactly what work is included. The 3<sup>rd</sup> party construction contractor will pay the fee to PGS. PGS will own the new line to the POD. The 2<sup>nd</sup> scenario addresses the case where the 3<sup>rd</sup> party construction contractor builds the new line. The letter will state the fee PGS will charge for making the final connection of the new line to the PGS owned natural gas main. The 3<sup>rd</sup> party construction contractor will pay the fee to PGS. The government will own this new line until it can be transferred to PGS.
    - **Temporary Connections/Disconnections:** For any project requiring temporary natural gas connections and eventual disconnections, the PGS letter will state the fee to make the temporary connection and eventual disconnection. The letter will state exactly what work PGS will perform, including site work. An example of this would be connecting a thermal oxidizing unit-which may operate for several years- to a PGS owned main. The 3<sup>rd</sup> party construction contractor will pay the fee to PGS.
    - **Permanent Disconnections, including Removing/Abandoning Natural Gas Lines:** PGS will prepare a letter that describes two scenarios. The 1<sup>st</sup> scenario will state the fee PGS will charge to disconnect from the main and remove/abandon the line up to the POD. The letter will detail exactly what work is included. In this case it is very important that the 3<sup>rd</sup> party contractor understands his scope regarding clearing obstructions out of the way for PGS, such as removing pavement. The 3<sup>rd</sup> party construction contractor will pay the fee to PGS. The 2<sup>nd</sup> scenario addresses the case where the 3<sup>rd</sup> party construction contractor removes /abandons the line after PGS has disconnected it from the main. The letter will detail exactly what work is included. The 3<sup>rd</sup> party construction contractor will pay the fee to PGS.
    - **Altering Existing Natural Gas Lines (such as location, size, material):** PGS will prepare a letter that describes two scenarios. The 1<sup>st</sup> scenario will state the fee PGS will charge to construct the alteration up to the POD. The letter will detail exactly what work is included. In

this case it is very important that the 3<sup>rd</sup> party contractor understands his scope regarding clearing obstructions out of the way for PGS, such as removing pavement. The 3<sup>rd</sup> party construction contractor will pay the fee to PGS. PGS will own the new line to the POD. The 2<sup>nd</sup> scenario addresses the case where the 3<sup>rd</sup> party construction contractor constructs the alteration, keeping in mind that only PGS can connect/disconnect to PGS owned lines. The letter will detail exactly what work is included. The 3<sup>rd</sup> party construction contractor will pay the fee to PGS. The government will own this new line until it can be transferred to PGS.

8. **Connection:** Utility construction may also be accomplished through the UP contract using the connection contract clauses. The COR provides a project description, government cost estimate, and arranges for a MIPR to be sent to DLA. Upon award by DLA, the UP contractor constructs the infrastructure and owns it.

## X. ELECTRICAL

### A. GENERAL

1. All design and installation shall be prepared and executed in accordance with the most current edition of the following:
  - National Electric Code
  - National Electrical Safety Code
  - International Building Code
  - National Safety Code NFPA 70E
  - NFPA 101
  - UFC 3\_520\_01 – Interior Electrical Systems
  - UFC 3\_501\_01 – Electrical Engineering
  - UFC 3\_550\_01 – Exterior Electrical Power Distribution
2. Electrical equipment identification tags and schematics - All electrical distribution components and units shall be designated and numbered (i.e. power distribution panels “PP-4” or transformer “XR-12”), and labeled with an etched plastic laminate identification tag reflecting abbreviated designation. A framed one-line schematic drawing of the electrical system, measuring no less than 11” x 17”, shall be mounted in the electrical room. All labor, equipment, materials and rentals/fees required to provide all electrical identification tags and schematics shall be at no additional cost to the Government and is considered field overhead; therefore part of the Contractor’s coefficient.
3. For high voltage overhead and underground lines, follow Tampa Electrical Company (TECO), the local power company’s Construction Specifications and AMC ETL 07-1 Design Criteria for Underground Electrical Distribution Systems Using Directional Boring (DB) Methods for Installing High Density Polyethylene Electrical (HDPE) Conduit. All roadways and paved areas will be bored. No paved areas will be cut and trenched to install electrical or communication lines, UON. Refer to ETL 07-1 for additional requirements.
4. **ALL specifications and design criteria listed within this document are required to be met as a minimum standard on ALL projects, U.O.N.**
5. Fault current available at the MacDill Ave substation (East or West 13.2kV bus) is as follows:
  - a. Three Phase 8500 A
  - b. Single Phase - Ground 8900 A

### B. POWER ANALYSIS AND REQUIRED CALCULATIONS:

1. **All load analysis and calculation requirements listed within** shall be performed in accordance with UFC 3-501-01 Chapter 3. **The load analysis shall be provided for all projects and for the entire electrical distribution system associated with the facility** and provided with the 95% design submitted for approval by the contractor, U.O.N. The calculations and power analysis shall be performed with Easy Power (latest suite) or equal software which is fully compatible with Easy Power (latest Suite). The contractor shall provide the calculations and incorporate the findings from the analysis within the 95% design submittal. All calculations shall be performed utilizing the selected equipment to be installed for both primary (13,200V) and secondary voltage distribution systems and equipment associated with the project. If actual equipment installed differs from the basis of design, the contractor shall be required to submit new calculations for approval. When additional equipment or load is being added to a primary conductor/circuit associated with a project, the analysis shall be performed to the furthest most upstream device, in most cases, this would be to the substation Relay/Breaker. The

contractor is responsible for changing/updating all settings on both new and existing equipment. A list of the required calculations are as follows:

- a. FAULT CURRENT (AIC) CALCULATIONS
- b. PRIMARY LOAD ANALYSIS
- c. SECONDARY LOAD ANALYSIS
- d. COORDINATION STUDY
- e. ARC FLASH STUDY

#### C. UNDERGROUND ELECTRICAL DISTRIBUTION

1. All three phase underground medium/high-voltage shielded cable shall be 15 kV, 133% EPR, 1/3 concentric neutral, MV-105, copper. All single phase underground medium/high-voltage shielded cable shall be 15 kV, 133% EPR, Full concentric neutral, MV-105, copper. All electrical medium voltage lines shall be in a minimum schedule 40 PVC, UON, conduit and encased in red-dyed concrete.
2. All new cables shall be installed with fault indicators. **Basis of design – Raychem.**
3. Cable/conductor field testing shall be performed in accordance with the current edition of IEEE Std 400.2.

#### D. PRIMARY TERMINATION/SPLICES

1. Use cold shrink or heat shrink type splices and pole-top terminations.
2. Neither “T” nor “Y” splices are allowed on any underground medium/high voltage feeders.
3. Pre-molded elbow-type or bolt-together terminations (200 or 600 A) for underground cables are not acceptable (UFC 3-550-01). Only 600 A Bolt-T and 200 Load break terminals are allowed within above grade transformers, sectionalizing cabinets and switchgear UON.
4. Terminations and splices shall not limit the ampacity of the cable.
5. All conductors shall be INDIVIDUALLY fire wrapped in accordance with UFC 3-550-01. **Basis of design – 3M Scotch 77 Fire and Electric Arc Proofing Tape.**

#### E. OVERHEAD ELECTRICAL DISTRIBUTION

1. All new poles shall be concrete (A-type construction unless otherwise directed by the base).
2. All down guys shall be covered at ground level with tamper proof guy guards.
3. Pole grounds shall be externally mounted. Do not ground any pole mounted devices unless required by the manufacturer.
4. For Triplex type overhead secondary lines, aluminum may be used.
5. All pole mounted devices shall be constructed of a non-metallic material, such as, fiberglass.
6. Use non metallic cutouts and 10 kV (8.4 MCOV) heavy duty distribution type lightning arrestors and external ground wire.
7. High voltage insulators shall be clamp type-rated at 25 kV.

8. All new power distribution construction shall be below grade, no new overhead power lines will be constructed, UON.

#### F. VAULT TYPE PAD-MOUNTED DISTRIBUTION SWITCHES

1. All pad mounted switches shall be of the FR3 Biodegradable oil type, 316, stainless steel components and 316 stainless steel enclosure, with dead-front construction only.
2. Each switched way shall have all three phase, three position (Open, Closed, Grounded), single-handle gang operated with switch position viewing window. The operating handles shall be located on the opposite side of the tank from the cable entrance bushings such that switch operating personnel will not be exposed to the switch cable entrance bushings, terminations and cable during switching.
3. All switch gear ways shall be lockable by penta bolt and provided with a Best 7 pin format padlock keyed to the base standard transformer key.
4. All Variable Fault Interrupter (VFI) protected way controllers shall be electronic and have multiple trip options computer programmable in field to adjust for future settings. All ways shall be protected with an electronic trip control re-programmable in the field without additional equipment required, and shall include all necessary software and interface cables if applicable.
5. All switchgear shall be base standard factory painted brown color.
6. . Do not install any switchgear below grade. Switchgear shall be installed on a vault type pad with a rectangular spring loaded lockable galvanized, 2-piece access lid. Switchgear pads are to be set at 6-inches above grade.
7. All unused Load Break and dead break bushings shall be protected with a load break protective cap with drain wire, basis of design will be Cooper
8. All unused load break and dead break bushing wells shall be protected with an insulated bushing well plug, basis of design will be Cooper.

#### G. VAULT TYPE PAD MOUNTED SECTIONALIZING CABINETS

1. Sectionalizing cabinets shall be constructed of 316 stainless steel enclosure with dead front construction only.
2. All gear shall be lockable by penta bolt and provided with a Best 7 pin format padlock keyed to the base standard key.
3. Equipment shall be factory painted manor house brown, and shall meet corrosion resistant specifications.
4. Sectionalizing cabinet shall be installed on a vault type pad 4 feet deep minimum and shall extend a minimum of 6 inches beyond each side of the gear and shall be set at 6 inches above grade.
5. All unused load break and dead break bushings and bushing wells shall be protected with either a protective cap with drain wire or insulated bushing well plug, Basis Of Design (BOD) Cooper.

## H. ELECTRICAL DISTRIBUTION MANHOLES

1. Electrical Primary distribution manholes shall be octagonal precast concrete set at grade (8'x8'x6' minimum, UON) with a traffic grade rectangular, two piece galvanized spring loaded lockable access lid.
2. Electrical Secondary distribution manholes shall be sized per NEC with a traffic grade rectangular, two piece galvanized spring loaded lockable access lid.
3. Round entry rings and lids are not allowed.
4. Manhole access lids shall be bonded to ground via a ground strap tied to the manhole grounding system.
5. All manholes will be grounded and will have an appropriately sized ground cable around the inside of the manhole. Ground rod shall be installed outside the manhole, with the grounding conductor penetration no lower than 18-inches below the top of the manhole.
6. Access lids will be clearly marked "Electric" in a permanent method.
7. All manholes will be supplied with high strength plastic (non-metallic) cable racks and rails.
8. All manholes will have a sump pit with removable cover similar to communications manholes.

## I. SERVICE ENTRANCES

1. New service entrances shall be underground in conduit.
2. All concrete encased duct banks shall be dyed red.
3. Conductors rated 600 volts and below may be in direct buried conduit.
4. Metal caution tape shall be provided 12-inches above conduit.
5. All existing and new services modified/installed shall be provided a placard indicating the new calculated available AIC Rating permanently affixed to the outside of the equipment
6. All new and existing services/equipment associated with a projects shall be provided with the current UFC 3-501-01 Arc Flash Warning labeling.

## J. METERS

1. Advanced meters are required at all facilities that meet the feasibility criteria of the current AF Facility Metering Policy, latest version and the DOD 4170.11 criteria, and must meet the UFGS 26 27 13.10 30 requirements of being MV-90 compatible. Meter location shall be coordinated with the Base.
  - a. UP TO AND INCLUDING 400 Amp BUILDING SERVICE:
    - Meter BOD: Square D PM 820 - shall be of the microprocessor based intelligent type, with communications capabilities including Ethernet gateway, radio frequency, and fiber optic modem. Ethernet/RF accessory or an equivalent poly-phase electricity meters suitable for billing, allocation of cost, and recording of data for energy management and control applications



- **Meter Enclosure:** If noted to be mounted on the exterior, all devices shall be enclosed in a NEMA 3R, 316 stainless steel box with hinged door. Provide meter bypass switch. Provide split core type current transformers for the service, sized for the service amps or larger.
  - **Wireless Antennae and Enclosure:** 316 Stainless Steel NEMA 3R (if mounted on exterior) Air Guard Radio 2.4 & 5.8 GZ secure wireless Ethernet radio with FIPS140-2 compliant and dual power supply. 10DBI Omni antenna with lightning arrester included. The antenna is to be mounted on side of meter enclosure by the Contractor. Where remote antenna mount is indicated additional cable is to be provided..
  - **If the Meter/Antennae enclosures are to be mounted either near the transformer or free standing the meter shall be concrete post mounted, and supported by stainless steel unistrut. The meter/antennae enclosures and associated equipment shall be powder coated to the manor house brown standard, the conduit shall be painted. If mounted to exterior of the facility, the meter/antennae enclosures, all associated equipment and conduit color shall match the surrounding area.**
  - **All Current Transformer (CT) cabling shall be installed below grade when installed within the secondary or primary compartment of a transformer.**
- b. ABOVE 400 Amp BUILDING SERVICE:
- **Meter BOD:** ION 8600 Advanced Revenue Socket Meter with FIPS Approved Wireless Radio with factory assembled enclosure. The meter needs to meet additional specifications below and shall meet EPACT 05 criteria. (Part Number #9788E860CRADIO).
  - **Enclosure (Total):** 316 Stainless Steel NEMA 3R rated (if mounted on exterior), total dual compartment dimensions: 38" x 12" x 53".
  - **Enclosure top compartment:** ION S8600C0C0E6E0B0K , Form 9S, 3 element, 4 wire, 60Hz system frequency, with 2MB onboard memory, 2 data recorders 32 channels), sag/swell detection, Ethernet, RS-232/485, MV-90, Infrared Optical Port, 4 Form C Digital Outputs, 3 Form A Digital Inputs, Password protected. Input disconnect for meter voltage connection, CT shorting block for current transformers (CTs not included).
  - **Enclosure bottom compartment:** Air Guard Radio 2.4 & 5.8 GZ secure wireless Ethernet radio with FIPS140-2 compliant and dual power supply. 10DBI Omni antenna with lightning arrester included. The antenna is to be mounted on side of meter enclosure by the Contractor. Where remote antenna mount is indicated additional cable is to be provided.
  - **If the Meter/Antennae enclosures are to be mounted either near the transformer or free standing the meter shall be concrete post mounted, and supported by stainless steel unistrut. The meter/antennae enclosures and associated equipment shall be powder coated to the manor house brown standard, the conduit shall be painted. If mounted to exterior of the facility, the meter/antennae enclosures, all associated equipment and conduit color shall match the surrounding area.**
  - **All Current Transformer (CT) cabling shall be installed below grade when installed within the secondary or primary compartment of a transformer.**
2. Temporary electric meters shall be installed at each construction site (for monitoring purposes only). Civil engineer squadron shall be notified when a temporary meter is installed at a construction site.
3. **Commissioning and Line of Sight (L.O.S) surveying shall be completed for all newly installed wireless meters and antennae to ensure a fully operational system. The meter shall properly report to building 347 head end wireless network prior to acceptance. The L.O.S. survey shall be done prior to the 95% design submittal and the results provided with the 95% design submittal. The antennae shall be properly installed at the location indicated by the L.O.S. survey results.**

#### K. PRIMARY TRANSFORMERS

1. Primary transformers shall be Delta primary, Wye secondary, 200 A dead front feed through type with 10 kV Heavy duty lightning arrester elbows on the feed through side. Adapters shall be supplied as necessary to accommodate surge arrestors when feed through side is being utilized.

2. All transformers shall be filled with biodegradable oil, i.e. FR3.
3. All new single phase pad mounted transformers shall be connected as Delta primary, Wye secondary with fully rated concentric neutral.
4. All new service transformers shall be mounted on a 10-inch pad (5 inches above finished grade and 5-inches below).
5. All pad mounted transformer shall be lockable by penta bolt and provided with a Best 7 pin format padlock keyed to the base standard transformer key.
6. All pad mounted transformers shall be a NEMA 4X constructed of 316 stainless steel (Tank, Tank base, Cabinet, Fins), and painted the base standard factory manor house brown color.
7. All transformers shall come equipped with 3 – load-break on-off internal liquid emersed switches to allow for all switch options: A, B, A and B, and C. All transformers shall have a five position no load tap changer, with normal tap plus two each 2.5% taps above and below, a pressure relief and a drain valve within.
8. No rebuilt or re-manufactured transformers are allowed.
9. All transformers shall be internally fused and include bay-o-net fusing. If the transformers are fed from an overhead line, 200A rated fused cutouts (minimum) and 10KV distribution class, heavy duty lightning arrestors shall be provided so that fuses and arrestors can be standardized.

#### L. LOW VOLTAGE TRANSFORMERS

1. Facilities with computer loads shall have 220 degrees F, UL listed transformers with a K-factor of not less than 4.0 according to ANSI/IEEE C57.1986 or 220 degrees F or UL listed harmonic mitigating transformer according to ANSI/IEEE standards including C57.12.91, C57.96, C57.110 with secondary neutral rated 200% of phase or Environment Potential harmonic mitigating and surge suppression device BOD: 2800 Series.
2. No rebuilt or re-manufactured transformers are allowed.

#### M. MOTORS/EQUIPMENT

1. DISCONNECT SWITCHES: Fusible disconnect switches should be used only where special considerations require its use. Provide heavy duty type safety switches on systems rated for greater than 240V and general use for those rated below 240V. Use fused switches, when necessary, that utilize Class R fuse holders and fuses. Use NEMA 4X stainless steel switch enclosures for switches located outside or on building exteriors. Utilize non-fused disconnect switches as local disconnects only, properly protected by a HACR rated upstream protective device.
2. MOTOR CONTROL CIRCUITS (STARTERS): Provide motor starters when required by the manufacturer or where specifically required. Provide manual control capability for all installations having automatic control that operates the motor directly. Use a double-throw, three-position switch or other suitable device (marked MANUAL-OFF-AUTOMATIC) for the manual control of motors. All motors shall have premium efficiency ratings per the Energy Policy Act of 2005 (EPACT 2005).
3. VOLTAGE/WIRING: Use three-phase motors if more than 5 horsepower rating when such service is available. If three-phase service is not available, operate motors 5 horsepower and larger at phase-to-phase voltage rather than phase-to-neutral voltage. Motors smaller than 5 horsepower should be single phase, with phase-to-phase voltage preferred over phase-to-neutral voltage. Do not use 230V motors on 208V systems because the utilization voltage will commonly be below the -10% tolerance on the

voltage rating for which the motor is designed (a 230V motor is intended for use on a nominal 240V system).

#### N. GROUNDING

1. All grounding shall be in compliance with AFI 32-1065.
2. All lighting protection and static ground systems shall be designed and installed in accordance with UFC 3-575-01.
3. Upon completion of a lightning protection system installation/modification, the contractor shall provide a third party certificate of compliance indicating that the entire facility complies with all of the requirements of both the AFI 32-1065 and UFC 3-575-01.
4. Ground rods, where used, shall be 3/4-inch copper clad, minimum length of 10 feet.
5. Ground resistance shall be no more than 5 ohms through certain Air Force facilities, and may require ground resistance to be less than the minimum specified in the NEC (UFC 3-550-01).
6. Switchgear and transformer grounds shall be a 4-rod grid, 2 feet from the pad.
7. All below grade connections shall be exothermically welded.
8. Grounding for lightning arrestors on distribution lines shall be 15 ohms or less.
9. Equipment ground conductors shall be an insulated conductor sized according to the NEC. Secondary distribution grounding system resistance shall be no more than 5 ohms.
10. Test Wells shall be installed at ground level points to access ground grid. Periodic testing is required by DoD.

#### O. SECONDARY LIGHTNING/SURGE PROTECTION

1. Provide UL 1449, 3rd Edition listed lightning/surge protection for all phase and neutral conductors at service entrance and branch panels for the appropriate category as defined in ANSI C62.1, and C62.45 and tested as defined in ANSI/IEEE C62.41.
2. Selected device shall meet or exceed with the requirements of UFC 3\_520\_01 – Interior Electrical Systems - Section 3-4.

#### P. CONDUIT

1. Conduit selection and usage shall be in accordance with UFC 3-520-01.
2. Whenever possible, all exterior mounted conduit/conductors shall be placed below grade.
3. Underground primary conduit shall be no less than 4-inches schedule 40 PVC concrete encased in red-dyed concrete. **UL listed Schedule 80 High Density Polyethylene (HDPE) with tape and wall thickness of .432" shall be used for all directional boring, which shall be installed and only utilized in accordance with ETL 07-1.**
4. **All primary below grade schedule 40 PVC conduit shall be installed with GRS 90 degree elbows, U.O.N.**

5. All conduits shall be painted to match surrounding area. Additionally, all exposed conduits to free standing electrical equipment shall be painted to match equipment.
6. For transitions from underground to above ground, the 90 degree elbow and beyond shall be Galvanized Rigid Steel conduit.
7. Galvanized Rigid Steel (GRS) conduit shall be specified when installed within masonry or concrete walls and slabs, wherever exposed to weather, and whenever exposed to physical damage.
8. Electrical Metallic Tubing (EMT) shall be specified for branch circuits and feeders above suspended ceilings or exposed where not subject to physical damage within the interior of the building. Do not use EMT underground, encased in concrete, mortar or grout, hazardous locations, outdoors nor in pump rooms. Use die-cast compression connectors and couplings.
9. Polyvinyl Chloride (PVC) shall be specified as Schedule 40 PVC for service entrance conduits from the service utility to the substation to the service entrance or underground below floor slabs. Do not use PVC above the ground level slab of buildings.
10. Surface Metal Raceways (not PVC Raceway) shall only be used for building improvements or renovations where surface mounting interior conduits is a must. Surface Metal Raceways shall be two-piece painted steel, totally enclosed with snap-cover.
11. Multi-outlet assemblies are only allowed for applications where a variety of cord and plug connect equipment will be utilized in a limited space, such as in certain areas of medical facilities, shops and laboratories.
12. Flexible Metallic Conduit (FMC) shall only be used for recessed and semi-recessed lighting fixtures or equipment subject to vibration and as a whip connection to motors.
13. Electrical Non-Metallic tubing (ENT) and Flexible Non-Metallic Conduit (FNC) and associated fittings are prohibited to be installed in any base installation.
14. Metal-Clad Cable (MC) shall only be used as a whip from a junction box to a light fixture or a wiring device. The maximum length for a single run of MC is 10 linear feet.

#### Q. SECONDARY CONDUCTORS

1. Copper (no aluminum) with THHN/THWN insulation, UNO.
2. Minimum wire size shall be #12.
3. All circuits shall have dedicated, full sized neutral wire.
4. All secondary below grade termination/splices shall be listed for use in wet locations and shall comply with 310.8C of the NEC.
5. Romex style conductors are not allowed within commercial construction.

**R. DISTRIBUTION SWITCHBOARDS****1. 1200AMP RATED AND LARGER MAIN DISTRIBUTION SWITCHBOARDS**

- a. If there will be three or more 400A or larger breakers installed due to large equipment demand requirements then the main switchboard shall be of the Power-Style QED-6 type, or equal.
- b. If there will be less than three 400A or larger breakers installed due to large equipment demand requirements then the main switchboard shall be of the QED-2 type, or equal.
- c. The equipment and breakers shall be accurately rated and sized for the building demand per NEC requirements.
- d. Main switchboard breakers shall be PowerPact with Micrologic molded case circuit breakers, or equal. Breaker options and style shall be determined and set in compliance with the EasyPower study provided by the engineer of record.
- e. 25% spare breaker spaces shall be provided when deciding the number of available circuit breakers.
- f. All buses shall be copper.

**2. UP TO 1200A MAIN DISTRIBUTION SWITCHBOARDS**

- a. Shall be Power-Style QED-2 or equal, and accurately rated and sized for the building demand per NEC requirements,.
- b. Main switchboard breakers shall be PowerPact with Micrologic molded case circuit breakers, or equal. Breaker options and style shall be determined and set in compliance with the EasyPower study provided by the engineer of record.
- c. 25% spare breaker spaces shall be provided when deciding the number of available circuit breakers.
- d. All buses shall be copper.

**S. BRANCH/SUB ELECTRICAL PANELS**

1. Bolt-on breakers with trip indicators shall be specified.
2. Hinged Door.
3. Provide 25% minimum spare breakers and 25% spaces for electrical distribution panels.
4. Provide at least two spare 1-inch stubbed-out conduits to above ceiling at panel location.
5. Use only copper buses.
6. Provide 200% neutral bus for all computer loads.

**T. LIGHTING**

1. All design and installation shall be prepared and executed in accordance with the most current edition of the following: UFC 3\_530\_01 – Interior, Exterior Lighting and Controls.
2. Contractor shall perform photometric calculations during the 65% design phase and submit as part of the 65% submittal drawings unless otherwise noted. Photometric foot candle levels shall be in accordance with UFC 3-530-01.
3. All installed lamps, fixtures, ballast, and lighting control equipment must comply with the Energy Efficient Equipment Guide in **APPENDIX 13**.

4. For most applications, interior lighting color temperature must be rated to 3500K. Exterior lighting color temperature must be rated to 4100K.
5. Incandescent lighting is prohibited unless given authorization by 6 CES.
6. Low or high pressure sodium fixtures are prohibited.
7. LED Requirements
  - a. Must comply with ETL 12-15.
  - b. The contractor is responsible for providing a signed letter of acceptance and agreement that the lighting manufacturer used (whether BOD or not) is supplying LED technology that meets the specifications as required in the MacDill Guidelines (Including amendment one) and ETL 12-15
  - c. Must be rated to operate +40 degrees C or above.
  - d. Must be rated to a minimum of 60 lumens per watt driven at 350 mA
  - e. Must be rated to a minimum of 50 lumens per watt driven at 525 mA
  - f. Fixtures, lamps and drivers must be purchased with a warranty of at least 5 years.
8. Fluorescent Requirements
  - a. Fluorescent lighting is the minimum standard for MacDill AFB but specific applications require more advanced lighting technologies such as LED or induction. See sections below for more information.
  - b. Use T-8 or T5 lamps with  $\leq 10\%$  THD Programmed start electronic ballast designed to operate with low mercury, energy efficient lamps. Lighting shall be the most efficient lighting compliant with energy star and justifiable through NIST BLCC, latest version.
9. Lighting Controls:
  - Controls shall comply with UFC 3-530-01.
  - Dual Technology occupancy sensors shall be used in all areas, UON, including but not limited to break rooms, bath rooms, offices, conference rooms and corridors. Corridor lighting levels will be decreased by half when unoccupied using ceiling mounted occupancy sensors. Reduced lighting levels can be accomplished by turning off every other fixture or by the use of dimmable or dual ballasts configuration. Occupancy control coverage plans shall be provided to ensure proper coverage of both technologies of all space within the area of work.
  - Timer Switches: Provide and install push button timer switches in exterior task lighting, mechanical and electrical rooms. Switches shall be set to the option to have lights flash 5 minutes prior to off. Basis of Design – Wattstopper – TS-400.
  - Bi-Level Switching shall be in compliance with UFC 3-530-01.
10. Specific Lighting Requirements: All LED lighting fixture manufacturers are required to fill out, sign and submit with closeout documents the ETL 12-4 LED Lighting – Specification Compliance documents located in Appendix 13. This is a binding document of compliance to ensure that all LED products are constructed and perform as stated by the manufacturer.
  - a. Airfield Lighting Requirements
    - Use UFC 3-535-01, Visual Air Navigation Facilities
    - LED products are only allowed/required in accordance with ETL 11-29.
  - b. Street lighting Requirements
    - Use cobra head fixture unless otherwise noted.
    - Must be LED
    - Fixture color must be dark bronze
    - Consult **APPENDIX 13** for basis of design

- c. Post Top requirements
  - Shall be LED
  - Fixture color must be dark bronze
  - Lamp posts are anodized aluminum, Dark Bronze color. Refer to the Base ACP plan for design style.
  - Pole and base shall be 296 style, 16-ft, with Hubbell Helix Screw type base T1120566 with poured in place 24"x16" round pad, UON.
  - Consult **APPENDIX 13** for basis of design
- d. Parking lot Requirements
  - Shall be shoe box style fixture
  - Shall be LED.
  - Shall have Bi-Level option, controlled by motion detection. Utilize 360° motion detectors, pattern shall cover all parking lot area.
  - Fixture color must be dark bronze.
  - Consult **APPENDIX 13** for basis of design
- e. Wall pack Requirements
  - Shall be LED
  - Shall have emergency backup battery when required
  - Shall have Bi-Level option, controlled by motion detection. For fixtures over 25 watts, utilize motion detectors, detection pattern shall cover all lighted area. Consult **APPENDIX 13** for basis of design.
- f. Landscape Lighting
  - Shall be LED.

#### U. FIRE DETECTION/MASS NOTIFICATION SYSTEMS:

1. All design and installation shall be prepared and executed in accordance with the most current edition of the following:
  - UFC 3\_600\_01 - Fire Protection Engineering for Facilities – CHAPTER 5,
  - UFC 3\_601\_02 – Operation and Maintenance: Inspection, Testing, and maintenance of Fire Protection systems
  - UFC 4\_021\_01 – Mass Notification Systems
2. All new systems shall be fire alarm/mass notification combination systems.
3. All fully renovated systems (more than 50% of fire detection system value) shall be converted to fire alarm/mass notification combination systems.
4. The standard is heat detectors vice smoke detectors unless otherwise noted or specifically required by code.
5. Systems must report to central alarm center via FM radio transceiver/receiver operating on 165.1375 MHz and must be completely compatible with Monaco BT-XM Radio Fire Alarm Reporting Transceiver/receiver and controller.
6. Contractor to provide all commissioning and any additional equipment necessary to properly report to the fire station network, including by not limited to, transceiver/receiver, surge suppression, omni-directional antenna, and cable.

## V. EMERGENCY GENERATORS

1. Generators shall be in compliance with AFI 32-1063.
2. All generators shall be added to the MAFB Air Permit prior to installation by the contractor.
3. The contractor must maintain a usage log for all portable/temporary generator use to implement task associated with this specification.
4. Diesel only generators with fuel on site to operate a minimum of 72 hours. Use caution during design to ensure that generator fueling access is included. Base refueling vehicles have a limited hose length and adequate fueling access (within 50 feet of the tank) is critical. If the capability exists, generators shall be dual fuel capable where justifiable per NIST BLCC, latest version.
5. Auto transfer switches shall be 4-pole only (switched neutral), with maintenance bypass isolation. No exercise timer. Transfer switch to operate by linear solenoid. Exterior mounted in NEMA 4X stainless steel enclosure.
6. Manufacturer basis of design for generators: Cummins, Caterpillar or Kohler. Manufacturer basis of design for Transfer Switches: GE/Zenith, Cummins, ASCO or Russelectric.

## W. HANGARS

1. Existing electric distribution voltages vary within every hangar. Contractor shall verify equipment voltage requirements with available voltages. Contractor shall provide all additional equipment necessary for proper operation, i.e. 240/416 volt and/or 277/480 volt.

## X. ENERGY CONSERVATION

1. Energy performance must meet or exceed the requirement of ETL 94-4, Energy Usage Criteria for Facilities in the Military Construction Program & Energy Policy Act of 2005, as well as, UFC 3-400-01, Energy Conservation, with Change 4.
2. Use premium efficiency on all motors.
3. Use variable speed fans and pumps unless other alternatives provide a lower life-cycle-cost or special system constraints require constant speed equipment.
4. Lighting:
  - a. Security and Non-security outside lights: Utilize astronomical time clocks with battery backup in conjunction with a lighting control panel connected to the EMCS system (if existing), UON. Program the non-security lights to shut off when not needed.
  - b. Exit signs: Use LED type.
5. Plug Loads
  - a. Flat screen monitors will be LED and energy star approved.
  - b. Appliances will not be installed in individual offices for personal use only.
  - c. Data center and server room temperatures will be designed for 75 degrees F.



## XI. COMMUNICATIONS

- A. Communications equipment and wiring installations shall meet the requirements of the following ETLs:
  - 1. ETL 02-12: Communications and Information System Criteria for Air Force Facilities
  - 2. ETL 02-12 MacDill AFB Supplement:, Communications and Information System Criteria for Air Force Facilities ( **APPENDIX 11**)
  - 3. UFC 3-580-01: Communications Building Cabling systems Planning and Design

## XII. SECURITY FORCES

- A. Work that Security Forces are generally concerned with:
  - 1. Any work being conducted in restricted or controlled areas.
  - 2. All flight line projects regardless of location or degree of work require **airfield escorts**. Escort requirements will be identified in the statement of work. Escorts will be provided by the construction contractor. Contact Security Forces for specific escort qualifications and training requirements.
  - 3. Special purpose construction: armories, munitions, fund storage areas; drug vault or storage areas; secure rooms or vaults for classified storage.
  - 4. Facilities requesting or requiring alarms.
  - 5. Special purpose fencing.
  - 6. The effect a project will have on traffic flow or road closures.

XIII. SAFETY

A. GENERAL

The safety guide outline is provided for use by 6 AMW Safety, 6 CES Fire Department, and 6th Medical Group Bioenvironmental Engineering. **Additional compliance shall be adherence to Safety and Health Requirments Manual, US Army Corps of Engineers EM 385-1-1 latest revision.** The guide provides a general overview of safety items or issues for the A-E to consider when developing a project as well as specific, supplemental information to serve as a quick reference, only, when used at the job site. The guide includes the following:

1. Contractors shall comply with the safety requirements as stipulated in the applicable contract and requirements applicable to the environment and the work being performed. Applicable standards and regulations are available at Civil Engineering and the above agencies.
2. Wing Safety and Fire Department personnel may periodically visit the work site. If a discrepancy of a minor nature is discovered, it will be brought to the attention of the government representative who has been assigned to monitor the project. The inspector will advise the contractor of the problem in need of corrective action. Contractors shall comply with this request as soon as possible. In the event of a serious discrepancy and safety hazard found on the job, the Safety Office/Fire Department Inspector will notify the government representative (Contracting Officer) for immediate corrective action.
3. The Occupational Safety and Health Agency (OSHA), which administers the Williams-Steiger Occupational Safety and Health Act of 1970, has a regional office in Tampa, Florida. Contractors shall abide by all federal regulations, especially, Public Law 91-596, Sect. (5)(a)(1); 29 CFR 1910; and 29 CFR 1926. Contractors are additionally open for a safety inspection by OSHA representatives.
4. Emergency Telephone Numbers:

<u>Operation</u>	<u>Number</u>
Fire	911
Police	911
Medical	911

5. Business Telephone Numbers and Locations

<u>Operation</u>	<u>Number</u>	<u>Location</u>
6 AMW Safety	828-4652	Bldg 299 (MacDill AFB)
Bioenvironmental	827-9570	Bldg 1078 (MacDill AFB)
Fire Department	828-4236	Bldg 26 (MacDill AFB)
Security Forces	828-2000	Bldg 528 (MacDill AFB)
6 AMW Hospital	828-2333	Bldg 171 (MacDill AFB)

B. GENERAL SAFETY REQUIREMENTS

1. Study the job from a safety angle:
  - a. Think before starting work.
  - b. Look around and search for hazards, then take precautions to prevent accidents from happening.
  - c. Be sure all necessary protective equipment is obtained before the start to work. If there is doubt about hazards or the proper protective clothing or equipment, consult project's foreman.

2. Practice good housekeeping in the work area:
  - a. Pick up tools.
  - b. Do not leave materials and scrap where they will be hazardous to other personnel (e.g., tripping hazards or sharp objects).
3. Obey all warning signs such as “KEEP OUT,” “NO SMOKING,” “EYE PROTECTION REQUIRED,” “AUTHORIZED PERSONNEL ONLY,” and “RESTRICTED AREA.”
4. Report any unsafe conditions or acts to the project’s foreman immediately. Contact the 6 AMW Safety Office at 828-4652, if assistance is required.
5. Fighting or horseplay is not tolerated.
6. Never jump from any elevated surface.
7. The handling of explosives is extremely dangerous. On all work of this nature, consult the project’s foreman.
8. Ensure that all personnel performing work are advised of the heavy traffic at MacDill AFB. Contractor and contractor’s personnel shall be briefed on abiding by the posted speed limits, respect “NO PARKING” signs, yield to emergency vehicles, and obey other appropriate road signs which govern traffic flow. Failure to obey will result in a driving citation issued by the MacDill Security Forces Squadron on a DD Form 1805.
9. Ensure that all personal protective equipment that is needed is provided and used by the contractor’s employees.
10. Confined Space Entry: Permits must be approved and signed by the 6 AMW Safety Office, 6 AMW Fire Department, and the 6 AMW Bioenvironmental Engineering Office prior to entry. Also, the Contractor must provide atmospheric monitoring capability as needed. 6 AMW will not provide this service.

**XIV. GENERAL BIOENVIRONMENTAL ENGINEERING REQUIREMENTS**

1. The contractor shall be responsible for OSHA compliance at the job site. Sometimes the contractor's activities may pose a health risk to Air Force Personnel in the area. If such a potential health threat should occur, the Bioenvironmental Engineering Office will work through the contractor monitor to help resolve the problem.
2. Many areas on MacDill have been designated as Hazardous Noise Areas. DOD personnel are required to wear hearing protection in these areas. The Air Force noise standard is more conservative than OSHA's (29 CFR 1910.95). Please contact the Bioenvironmental Engineering Office for noise level information.
3. Contractors must send in a chemical inventory and a material safety data sheet (MSDS) for all chemicals that will be brought onto the installation. This inventory must be coordinated through the HAZMART (828-2582). In the same manner, if the contractor has any concerns of Air Force chemical use in the construction area, that information can be obtained through the Bioenvironmental Engineering Office or the HAZMART.
4. If the contractor is going to bring any radioactive material, ionizing radiation producing equipment, non-ionizing radiation producing equipment or lasers, coordination through the base Radiation Safety Officer (at the Bioenvironmental Engineering Office) prior to entering the installation is required. Also, compliance with all Nuclear Regulatory Commission (NRC) regulations is the contractor's responsibility.
5. All asbestos and lead-based paint abatement, contact, disturbance, and demolition must be done in agreement with all applicable Federal, State, and Local regulations and guidelines. All contract workers must be trained in the proper handling of asbestos and lead based paint if the workers are performing this type of work. If, during the completion of the contract, workers come across a material that has not been identified as non-asbestos, and it cannot be assumed that the material is not asbestos containing (e.g., wood or glass), the contract monitor must be notified prior to disturbance.
6. All repairs and construction that affect potable water lines in child care facilities must be tested to ensure all requirements of the 1988 Lead Contamination Control Act (LCCA) are met.

**XV. EMERGENCY MEDICAL SERVICES**

1. The 6 AMW Medical Group (Base Medical Clinic) will respond to medical emergencies on base. For contractor personnel needing emergency treatment, service will be provided, but service are limited to stabilization of the injured.
2. The contractor must provide for ongoing treatment at an off base facility.
3. Services provided by the Base Medical Clinic must be reimbursed by the contractor.

**XVI. BASE ENVIRONMENTAL****A. COMPLIANCE**

CEV prepared a guidance document that includes additional and detailed information for regulatory requirements and project planning during project design and execution. This document is incorporated as part of this design guide document in **APPENDIX 6**.

**1. STORM WATER & WATER UTILITY PERMITS:**

- a. The regulatory authority for storm water permits is Southwest Florida Water Management District (SWFWMD). Storm water permits are required anytime a project includes construction of impervious surfaces (e.g., parking lots, buildings) or the construction, demolition or alteration of storm water managements systems of any significance.
- b. The regulatory authority for wastewater permits is the Environmental Protection Commission of Hillsborough County (EPC-HC). In general, wastewater permits shall be required anytime a project has a lift station constructed or, in other words, there is a connection to the sanitary sewer system that involves more than a single service lateral (i.e., construction of a collection system serving more than one facility).
- c. The regulatory authority for potable water is the Hillsborough County Health Department (DOH). A drinking water permit shall be obtained for construction of any water main. Building service line permitting is evaluated on a case-by-case basis.
- d. The regulatory authority for permitting storm water discharge from construction sites is the Florida Department of Environmental Protection (FDEP). A permit Notice of Intent and Storm water Pollution Prevention Plan shall be obtained for any construction project that disturbs one 1 acre or more of land.
- e. The A-E shall sign and seal the permit application prior to 6 AMW/CC or 6 CES/CC signatures. The permit shall include the agency required number of copies of permit application, 65% design plans, specifications, and required calculations.
- f. Ensure the 6 AMW/CC or 6 CES/CC name is current and spelled correctly. Also confirm the correct address for 6 AMW/CC or 6 CES/CC is included on the permit application (contact 6 CES/CEVT for examples of correct permit applications)
- g. Include in the design (A-E) cost the permit application fees.
- h. Permit Processing Time: It takes an average of 1 weeks to get the permit application signed by 6 CES/CL, and then the regulators have 30 days to “respond”, not “approve”, the application. Another 1-2 weeks is needed for permits requiring coordination through FGUA. This whole process takes 2 ½ months to get a permit in-hand for the contractor once the permit application package has been received from the A-E. In most instances, there are questions from the regulators that must be addressed before a permit is issued, further delaying the approval process. (Note: every time the regulators have questions, the processing clock resets.)
- i. For MACC contracts the final permits shall be submitted to 6 CES/CEVC as part of the 95% design submittal. A construction notice to proceed will not be issued until the final permit has been received.
- j. With respect to storm water permits: The A-E shall bear full responsibility to accurately conceive and design the water quality treatment system based on acceptable practices for design as endorsed by SWFWMD and the Florida Department of Environmental Protection (FDEP). The water quality treatment system shall incorporate design guidelines set forth in the SWFWMD

Environmental Resource Permitting Basis of Review Manual (most current edition). Modeling of existing and proposed conditions shall be accomplished through the use of a locally accepted storm water modeling program.

- k. With respect to sanitary sewer and drinking water permits: The A-E shall bear full responsibility to accurately conceive, and design the proposed utility system and/or modifications to the existing system(s) based on acceptable practices for design as required by Environmental Protection Commission of Hillsborough County (EPC-HC), Department of Health and the Florida Department of Environmental Protection (FDEP). A-E shall bear full responsibility for providing timely and accurate responses to requests from EPC-HC, DOH and FDEP upon receipt of permit application. By law the A-E has 30 days to respond to the requests, after which time the permit may be denied if a response has not been received by EPC-HC, DOH and FDEP.
- l. Certain requirements apply to the discharge of produced groundwater from sites that are not subject to Environmental Restoration Program (ERP) regulations. Please see section B.2. for information on dewatering in restoration/contaminated sites. Produced groundwater from non-contaminated sites may not be discharged to the storm sewer system or surface water without coverage under the Generic Permit for the Discharge of Produced Groundwater from any Non-Contaminated Site Activity. Produced groundwater may be allowed to infiltrate back into the soil in proximity to the withdrawal location. To discharge produced groundwater to the storm sewer or surface water, the water must meet the coastal waters screening values outlined in the table below. The water must be sampled before commencement of discharge and again within thirty days after commencement, and then once every six months for the duration of the project. All discharges must be free from floating solids, visible foam, turbidity, or visible oil.

## 2. ASBESTOS

- a. Design firms designing projects that involve constructing new buildings or other structures, or potentially modifying existing buildings or other structures (demolition and/or renovation) at MacDill AFB shall comply with EPA-NESHAP, OSHA, and Hillsborough County EPC regulations regarding asbestos containing materials.
- b. New projects plans and specifications shall stipulate that no asbestos containing materials (ACM) will be used in any construction at MacDill AFB.
- c. The design phase of projects for modifying existing structures located at MacDill AFB shall include a complete or partial asbestos survey of the facility to determine if ACM is present in any part of the structure that will be modified or disturbed.
- d. The construction phase of projects for modifying existing structures located at MacDill AFB shall include: abatement, encapsulation, enclosure or repair of ACM as necessary.
- e. All asbestos design projects concerning MacDill AFB shall be coordinated with the Civil Engineer Squadron Environmental Flight, 6 CES/CEVH.

## 3. AIR QUALITY:

- a. Air pollution sources include, but are not limited to, external combustion sources (boilers), internal combustion sources (gas, diesel, propane, natural gas – fired generators and other internal combustion driven types of equipment), woodworking shops, paint spray booths, fuel storage and dispensing operations, welding operations, abrasive cleaning, degreasers, users or emitters of ozone depleting substances and/or hazardous air pollutants (HAPS).
- b. Design firms working on projects that involve the creation or changing, in any way, of an air pollution source located at MacDill AFB shall coordinate with the Environmental Protection Commission of Hillsborough County (EPCHC) through 6 CES/CEVC to modify the existing air

operating permit or, for a new air source, apply for a construction permit. The cost of any fees and permit application involved shall be included in the design firm's proposal with MacDill AFB for the particular project.

- c. No person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor. No person shall store, pump, handle, process, load, unload or use in any process or installation, volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems.
  - d. General Visible Emissions Standard. No person shall cause, let, permit, suffer or allow to be discharged into the atmosphere the emissions of air pollutants from any activity, the density of which is equal to or greater than that designated as Number 1 on the Ringelmann Chart (20 percent opacity).
  - e. Requirements for Fugitive Dust (unconfined emissions of particulate matter): Any project that may cause fugitive dust shall comply with the requirements in **APPENDIX 15**. Examples include, but are not limited to, demolition, site preparation and land clearing, pavement construction, street sweeping, abrasive blasting, open burning, grinding operations.
  - f. Requirements for Internal Combustion Engines (ICE): Any project that involves the installation or modification of an ICE shall comply with the requirements in **APPENDIX 15**.
  - g. Requirements for Natural Gas-Fired Heating Units or other External Combustion Units: Any project that involves the installation or modification of an external combustion unit shall comply with the requirements in **APPENDIX 15**.
  - h. Requirements for Refrigerants/Ozone Depleting Substance: The use of any Class I Ozone Depleting Substance (ODS) on MacDill AFB is prohibited. The use of any II ODS for any new HVAC unit on MacDill AFB is prohibited. Any project that involves performing any service, maintenance, repair and/or disposal of any appliance containing a refrigerant shall comply with the requirements in **APPENDIX 15**.
4. LEAD-BASED PAINT (LBP):
- a. Contracts/Contractors engaged in demolition, construction, renovation, or any other services involving LBP surfaces shall comply with Air Force Standards, applicable Federal, State and Local codes and regulations.
  - b. The design phase of projects for modifying existing structures located at MacDill AFB shall include a complete or partial lead-based survey of the facility to determine if LBP is present in any part of the structure that will be modified or disturbed.
  - c. The construction phase of projects for modifying existing structures located at MacDill AFB shall include abatement, encapsulation, enclosure, or repair of LBP as necessary.
  - d. The contractor shall ensure workers are informed of and protected with the necessary protective equipment, in accordance with OSHA regulations 29 CFR1926.62, 1910.1025 and 1910.134.
  - e. All work shall be accomplished by trained and certified personnel in LBP operations.
  - f. All contractor work plans shall address abatement/encapsulation requirements, paint removal, material storage, containing and controlling lead dust and debris, daily and final cleanup, worker and occupant protection, inspecting and testing requirements, waste storage and disposal requirements, and recordkeeping and notification requirements.



- g. Coordination with 6 CES/CEV is mandatory prior to initiating any contract involving lead-based paint.

## 5. GREEN PROCUREMENT

- a. All Contracts/contractors providing goods or services to MacDill AFB shall be reviewed for EPA Comprehensive Procurement Guideline items, USDA Bio-Preferred Program, Department of Energy Federal Energy Program (Energy Star, standby power, water efficiency), EPA Significant New Alternatives Program (SNAP), and EPA Priority Chemicals (PROACT) regarding building materials, supplies, products, and specify percentages of recycled-content being used/supplied to the government.
- b. The contractor shall complete and submit a Green Procurement Determination Form to identify products that are subject to these purchasing requirements and/or claim an exemption from the requirements if appropriate.
- c. Service contract managers shall also review all contract specifications that apply to EPA Guideline Items in accordance with The Air Force Affirmative Procurement Program, Executive Order 12873 Section 6002 of Resource Conservation and Recovery Act, and the FAR prior to the implementation of the contract.

## 6. HAZARDOUS MATERIALS MANAGEMENT

- a. Federal Standard 313, Material Safety Data Sheets (MSDS): For each DO issued against this contract, the Contractor must identify and report hazardous material usage to the contracting officer or designated field representative using the Contractor HazMat List (APPENDIX 14). Contractors are required to maintain copies of MSDSs for all hazardous materials used on MAFB at the job site. Installation of new or replacement of existing Uninterruptible Power Supplies (UPS) requires completion of the UPS data sheet to the contracting officer or designated field representative. The contractor shall remove all unused hazardous materials from MAFB, in accordance with applicable laws, regulations and standard, upon completion of work.
- b. Definition of Hazardous Materials: Refer to hazardous and toxic materials/substances included in Subparts H and Z of 29 CFR 1910 as well as Federal Standard. 313.
- c. Hazardous Materials Inventory Report: Contractors shall complete and submit a Contractor Hazmat Profile Work Sheet contained in **APPENDIX 14**. Projects that will only involve the use of items contained on the exempt list, (**APPENDIX 14**) contains “Exempt items” listing) the Contractor shall sign the certification statement on the Contractor Hazmat Profile Work Sheet. Contractors shall identify all the “non-exempt” hazardous materials they intend to use on the project in advance. The contractor shall develop a list of these materials with “not to exceed” quantities in the format provided in **APPENDIX 14**. The report shall list, with regard to the subject delivery order, all anticipated hazardous materials usage on MAFB to comply with 40 Code of Federal Regulations (CFR) Protection of Environment, Parts 355, 370 and 372. The spreadsheet and electronic copies of the associated MSDS’s shall be provided as a submittal to the CEC representative and the designated Government Quality Assurance Personnel. Material Safety Data Sheets that were previously submitted and approved are not required to be resubmitted for each use however the materials and anticipated quantities will be listed and submitted on the materials list (**APPENDIX 14**).
- d. If the base deems a contractor’s proposed material line item inappropriate because of safety or environmental concerns, CEC shall advise the contractor that he/she must refrain from using that material on the project. The contractor shall be required to provide an alternative material or process that meets the contract requirements.

- e. The base shall complete its review of the contractor's proposed HAZMAT list and respond within 5 business days. If the base fails to respond within 5 work days from receipt of the submittal, the contractor shall assume the list of non-exempt HAZMAT items is approved.
  - f. If the contractor determines he/she will need additional HAZMAT materials after project initiation, he/she shall send an email with the requested item(s) to the CEC and CEV representative. The CEV representative shall expedite base coordination with the goal of responding within 1 business day.
  - g. The contractor shall not use supplemental HAZMAT items on the project until they are reviewed. Costs for delays caused by the contractor requiring review after contract start for items not identified in their HAZMAT items submittal, shall be the responsibility of the contractor.
  - h. The contractor shall maintain a copy of the original and supplemental item list and associated MSDS's at the work site in accordance with 29 CFR 1910.1200.
  - i. CEC shall make periodic checks of the contractor's HAZMAT records and materials on hand to ensure he/she is staying within the reviewed list and quantities.
  - j. At completion of his/her work, the contractor shall remove all unused HAZMAT from the worksite and dispose of it off base in accordance with all environmental laws and regulations.
7. HAZARDOUS WASTE
- a. Contractors are responsible for the identification, characterization, storage, and disposal of any waste that may be regulated under the Resource Conservation and Recovery Act (RCRA), hazardous waste regulations, 40 CFR 260-279.
  - b. 6 CES/CEVC must be coordinated with prior to the generation of any hazardous waste. Any shipments of hazardous waste will be coordinated and approved through 6 CES/CEVC prior to shipment off-base for disposal.
  - c. All manifests/land disposal restrictions must be signed by 6 CES/CEVC prior to shipment off-base.
8. UNDERGROUND AND ABOVEGROUND STORAGE TANKS:
- a. USTs and ASTs shall comply with all requirements for new systems as stated in Florida Administrative Code (FAC) 62-761, Underground Storage Tank Systems and 62-762, Aboveground Storage Tank Systems. All tanks, piping, and associated equipment shall be FDEP approved.
  - b. Unless otherwise noted, USTs shall not be installed.
  - c. ASTs shall be double walled.
  - d. Installation of storage tanks greater than 550 gallons requires a permit from the Environmental Protection Commission of Hillsborough County (EPCHC) and registration with the State of Florida. Contractor is responsible for preparing the permit application package, including all necessary supporting data and the permit application fee. Permit package shall be provided to 6 CEV for review prior to submittal to the EPCHC.

**9. SOLID WASTE / RECYCLING:**

- a. All construction contractors shall use appropriately-sized dumpsters. Construction and demolition waste comprises approximately 20% to 30% of all the solid waste generated at MacDill AFB. A large part of this waste stream is recyclable such as the metal, dry wall, wood and the concrete.
- b. All demolition debris that can be salvaged and resold shall be included in the construction contract specifications. The proceeds from the sales shall go to reducing the cost of the construction contract. The total tonnage recycled from the project shall be reported to CEVC.
- c. Construction and demolition contractors shall provide the base with their proposal a recycling plan to properly dispose of this valuable material.
- d. The contractor shall submit construction and demolition (C+D) disposal tonnages and cost data using the MacDill AFB Construction & Demolition Debris Disposal Form at 50% and 100% construction.

**10. NATURAL CULTURAL RESOURCES:**

- a. The contractor shall be in compliance with compliance with the National Environmental Policy Act.
- b. MacDill AFB aims to protect their natural resources, which usually involves building preservation, archeological site protection, protection of endangered species, protection of wetlands, protection of 100-yr flood plain, etc. CEV can assist the contractor with developing a work approach that ensure the protection of natural and cultural resources and compliance with Air Force, local, state, federal regulations and how these items must be considered and dealt with. The requirements will vary dependent upon the project location and scope. Construction within wetlands shall be avoided.
- c. Generally, all new construction should require the completion of section I of an AF Form 813 by the proponent (user/requester).
- d. Any project involving the demolition of a building constructed before 1989 shall require coordination with the State Historic Preservation Office. Likewise, any project involving the renovation of a (APPENDIX 1) building shall require coordination with State Historic Preservation Office (SHPO). Before 6 CES/CEV can coordinate with the SHPO, they will require from 6 CES/CEC an engineering assessment.

**B. ENVIRONMENTAL RESTORATION:**

If construction is planned for an area that is located within the boundary of (a) known contaminated site(s), the Contractor shall be provided with Site Summary document that includes information on the nature of the contaminant(s) at the site(s), as well as the media affected (groundwater, soil, or sediment). Depending on the nature of the contaminant, the Contractor shall comply with the following procedures:

1. When excavating on (a) site(s) known to have soil/sediment contamination, any material excavated as a result of construction activity must be backfilled to the location from which it was removed. If there is not enough space in the excavation area to replace all the removed material, the soil/sediment must be stockpiled in a manner as not to spread contamination; i.e., staging in a roll off container or piling on a layer of polyethylene plastic sheeting (if this method is used, soil must also be covered with plastic to prevent rain from spreading contamination). Prior to removal from site, the staged material must be analyzed, at the Contractor's expense, by a certified lab. The attached Site Summary document lists the contaminant information for the site and should be provided to the lab when arranging for analysis. The Contractor shall provide the results of lab analysis to 6 CES/CEVR for interpretation prior to any action. The soil/sediment resulting from construction activity on a

contaminated site may never be placed on another area of the site or used for backfill anywhere else on the installation. Upon notice from 6 CES/CEVR, the Contractor will be required remove the stockpiled material from the site and arrange for transport to an appropriate receiving facility;

- a. If test results are below FDEP Soil Cleanup Target Levels (SCTLs), the soil/sediment must be hauled off-site and transported, at the Contractor's expense, to a landfill/facility that accepts Class III wastes, in accordance with Florida Administrative Code (F.A.C.) 62-701, Solid Waste Management Facilities;
  - b. If soil/sediment is found to exceed FDEP SCTLs, the soil/sediment must be hauled off-site and transported, at the Contractor's expense, to a landfill/facility that accepts Class II waste, in accordance with F.A.C. 62-701, Solid Waste Management Facilities. In addition, the Contractor must coordinate with 6 CES/CEVR for signatures on the non-hazardous waste profiles/manifests that are required for transport.
2. When excavating on (a) site(s) known to have groundwater contamination, groundwater extracted as a result of excavation must be contained and analyzed, at the Contractor's expense, by a certified lab. The attached Site Summary document lists the contaminant information for the site and should be provided to the lab when arranging for analysis. In addition, the Contractor may wish to test for the parameters outlined in XVI.A.1.1 at this time. If the known contaminants come back below GCTLs, the water may be discharged into the storm sewer system or surface water if these additional criteria are met.

The Contractor shall provide the results of lab analysis to 6 CES/CEVR for interpretation prior to any action. Produced groundwater is never to be discharged back to the site. Upon notice from 6 CES/CEVR, the Contractor will be required to dispose of dewater product in one of the following ways:

- a. If the test results are below FDEP Groundwater Cleanup Target Levels (GCTLs) and DOES NOT EXCEED the parameters for Coastal Waters (referenced in XVI.A.1.1), in accordance with F.A.C. 62-621.302, the Contractor may discharge the groundwater to stormwater drainage system;
  - b. If the test results are below FDEP Groundwater Cleanup Target Levels (GCTLs), but EXCEEDS the parameters for Coastal Waters, in accordance with F.A.C. 62-621.302, the contaminated groundwater must be transported off-site for disposal/treatment at the Contractor's expense, in accordance with the MacDill AFB Basewide Environmental Restoration Work Plan, Appendix A, Standard Operating Procedure (SOP) Number 4, Investigation Derived Waste (IDW) Management. In addition, the Contractor must coordinate with 6 CES/CEVR for signatures on the non-hazardous waste profiles/manifests that are required for transport;
  - c. If the test results are above FDEP GCTLs, the contaminated groundwater must be transported off-site for disposal/treatment at the Contractor's expense, in accordance with the MacDill AFB Basewide Environmental Restoration Work Plan, Appendix A, Standard Operating Procedure (SOP) Number 4, Investigation Derived Waste (IDW) Management. In addition, the Contractor must coordinate with 6 CES/CEVR for signatures on the non-hazardous waste profiles/manifests that are required for transport;
  - d. If the test results are above FDEP GCTLs and there is only petroleum contaminates in the groundwater, than a Generic Permit for Discharge from a Petroleum Contaminated Site may be obtained from FDEP in order to treat the contaminated groundwater and discharge it to the stormwater drainage system in accordance with the requirements of the FDEP.
3. The Contractor shall consider any drill cuttings or slurries generated from excavation activities within a known contaminated site to be Investigation Derived Waste (IDW), and must be disposed of in accordance with the MacDill AFB Basewide Environmental Restoration Work Plan, Appendix A, Standard Operating Procedure (SOP) Number 4, Investigation Derived Waste (IDW) Management. In

- addition, the Contractor must coordinate with 6 CES/CEVR for signatures on the non-hazardous waste profiles/manifests that are required for transport.
4. Groundwater monitoring wells may be located in the project area. Approximate well locations are provided upon project design; however, more wells may exist in the project area than are shown. The Contractor shall survey the site prior to start of work for exact locations of all wells. Great care must be taken to protect all the wells found in the project area; as such wells must be identified and clearly marked;
    - a. If any of these wells are damaged during this project, the Contractor shall either repair or abandon and reinstall the well at the Contractor's expense, in accordance with the MacDill AFB Basewide Environmental Restoration Work Plan, Appendix A, Standard Operating Procedure (SOP) Number 6, Well Installation, Development, and Abandonment Procedures. The determination as to whether the well can be repaired or must be properly abandoned and a new well installed will be made by MacDill AFB Environmental Restoration Personnel;
    - b. If the work is such that damage to a well is unavoidable, the well must be properly abandoned prior to construction activities and a new well installed at the Contractor's expense upon completion of construction activities. The Contractor shall coordinate the well abandonment and reinstallation activities with MacDill AFB Environmental Restoration Personnel (ERP) to ensure that well locations are acceptable to regulators before construction activities take place;
    - c. Wells must be abandoned/reinstalled by a Florida licensed driller and surveyed by a Registered Land Surveyor in the State of Florida. Well locations are to be surveyed to within 1 foot accuracy using Florida State plane, West Zone, North American Datum, 1983 (NAD 83). Ground surface elevations and top of concrete pad elevations will be surveyed to within 0.1 ft accuracy; and top of casing elevations will be surveyed to within 0.01 ft accuracy. Elevations will be referenced to the National Geodetic Vertical Datum of 1929 (NGVD-29);
    - d. All field logs, permits and survey forms must be provided to 6 CES/CEVR at the completion of well abandonment/installation. The Contractor must coordinate with 6 CES/CEVR to obtain well tag specifications and ordering information.
  5. See **APPENDIX 7** for more information.

**XVII. CONTRACTOR'S REQUIREMENTS FOR GIS AND CADD DELIVERABLES**

The following are specifications to add to contracts to ensure the organization receives products that will seamlessly integrate with existing GIS and CADD data models. The MacDill AFB Civil Engineer squadron may define specific data model as it applies to the contract.

**A. CONTRACT SERVICES**

1. These deliverables include, but are not limited to:

- Site plans
- As-built drawings
- Engineering designs, plans, or surveys
- Topographic surveys or studies
- Boundary or cadastral surveys
- Master plan drawings
- Utility (e.g., water, sewer, power, storm) designs, plans, surveys, and studies
- Pavement, grading, or excavation plans

**B. MINIMUM DRAWING REQUIREMENTS**

1. Use the MacDill AFB cover sheet, haul route, and general notes / symbols sheets as part of the drawing set.
2. The Contractor/Engineer is permitted to add their company name to the cover sheet and other plan sheets.
3. Drawing fonts shall be legible at a reduced print size of 11" X 17".
4. All plans shall have a graphic scale and north arrow (where necessary).
5. All drawings shall have the project number (NVZR xx-xxxx), approved project title and Facility Number.
6. For clarity all civil projects shall contain as a minimum demolition plan, site plan, grading/drainage plan and utility plan sheets.
7. All As-Built drawings shall be clearly marked as "As-Built."
8. At a minimum 100% Design CADD drawings shall be submitted.
9. For projects that involve multiple facilities, As-Built shall be submitted as each facility or milestone is completed. For example, building renovation, demolition, and new construction.

**C. GIS DATA**

The contractor shall provide GIS deliverables in the following format:

1. All locational (point, line, and polygon feature(s)) data collected shall be delivered in ESRI 10.x format along with the original source files. The Geospatial files shall have an external spatial reference (.prj) file attached specifying the parameters of the coordinate system used (as provided by the government). All topologically correct geospatial data shall overlay on the installations latest orthorectified imagery provided by the government. All accuracy errors shall be reported to the contract program manager.

2. All graphic and non-graphic data will be collected in the format defined by the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) release 2.600, except where modified by the Government. This standard can be found at: <http://www.sdsfie.org/>
3. The contractor shall provide a quality control (QC) report that must state whether all inconsistencies in the data generated were corrected, or it must detail the remaining errors by case. The contractor shall utilize a topology build and clean routine to assure that there are no overshoots or undershoots in the line work, slivers or dangles in polygons, and that there is complete closure of polygons with a maximum fuzzy tolerance value of 10-9. The quality report must identify the software (name and version) and satisfy these conditions:
  - a. The edges of all digitized vector data or raster imagery must exactly match digitally with those of all adjacent maps.
  - b. The digital representation of the common boundaries for all graphic features must be exactly the same, regardless of feature layer. Each feature within a theme must be represented by a single graphic element (e.g., polygon, line, or line string).
  - c. Lines and line strings which represent the same graphic element must be continuous (i.e., not broken or segmented), unless that segmentation reflects a specific visual line type. Lines or line strings representing the same type of data must not cross except at intersections.
  - d. Polygons must be closed (i.e., the first x- and y-coordinates must *exactly match* the last x- and y-coordinates). Each polygon must have a single unique centroid to which attributes (i.e., an attribute table) can be attached. Polygons of the same coverage must not overlap and must cover the area of interest completely (i.e., have no gaps in coverage).
  - e. All graphic elements that connect must exactly connect digitally, without overlaps or gaps.
  - f. Straight lines must be represented by only the beginning and ending x- and y-coordinate points. Line strings must not cross back on themselves or be of zero length.
4. Feature Attributes: The contractor shall identify the classification, type, size, location, ID number, and any other necessary attributes (specified by the Government) for all surveyed, mapped, designed, or proposed features.
5. Facility floor plan data to include the room perimeter and building lines. Information shall include only the area of the facility affected by the project. For new facilities the data shall also include the interior building footprint.
  - a. Room and hallway areas in a polygon layer.
  - b. Building floor plan in a polyline layer, to include exterior and interior walls, door swings, stairs, openings, columns, and floor level changes.
  - c. Interior building footprint in a polygon layer (where required).
6. All symbol libraries, font libraries, text size, text format, and text placement shall be prepared in accordance with and conform to the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) Release 2.6 (or most current available).
7. The contractor shall not develop new libraries without prior written approval from the Government.

#### D. CADD DATA

The contractor shall provide CADD deliverables in the following format:

1. All data deliverables shall be in a digital (electronic information) format and shall be delivered in AutoCAD 2007 (or higher) or Microstation Version V8 2004, XM or V8i. Drawings shall be delivered in .DWG or .DGN file formats. Each electronic file shall contain no more than one sheet file. Electronic files shall be delivered in their original format. No converted files will be accepted.

2. The contractor shall use the A/E/C CADD Standard 3.0 (or latest version) when creating or revising any CADD data deliverables. These standards can be found or reviewed at: <https://caddim.usace.army.mil/CAD>.
3. The Industry Standard model file and sheet naming conventions, consisting of a Discipline/Code Designator, Drawing Type Code, Sheet Type Code/Designator, and Sheet Sequence Identifiers shall be used for all submissions - diagrams of this naming convention can be found in the A/E/C CADD Standard.
4. The coordinate system used for CADD files shall be State Plane Coordinates North American Datum 1983 (NAD83) Projection, Florida West 0902 Feet.
5. Graphics depicted in all submitted plan drawings shall occupy their actual geographic coordinates. Acceptable orientation of plans on the sheet files ranges from North appearing straight up (preferable) with regard to the top of the sheet or within 90 degrees to the left or right (9 o'clock to 3 o'clock).
6. Text on **all** files shall be depicted straight up with regard to the top of the sheet or generally within 90 degrees to the left (9 o'clock), and be to the minimum text height according to the A/E/C CADD Standard 3.0.
7. All submittals should include any standards sheets (abbreviations, symbols, fonts, etc.) necessary for a complete project, and document any nonstandard fonts, tables, symbols, etc. that are used.
8. All drawing files, unless otherwise specified, will use units of feet and inches.
9. Acceptable drawing scales depend on the type of drawing and the size of area the drawing encompasses. A detailed description of which drawing scale to select can be found in the A/E/C CADD Standard Release 3.0 (or latest version). Similar drawing layouts shall be produced using the same standard scale.

#### E. DELIVERABLE FORMAT

*Note: No deviations from the Government's established standards will be permitted unless prior written approval of such deviation has been issued by the Government. All linkages of non-graphical data with graphic elements, relationships between data objects and attributes, and report formats shall be maintained.*

All data deliverables (i.e., plans, surveys, studies, imagery, and designs) shall be in a **digital** (electronic information) **format** and shall be delivered in a format that is directly compatible with the *Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) version 2.600*. Digital format shall include CD/DVD ROM. No flash drives, thumb drives, etc., will be accepted.

The following procedures must be performed before a file is placed on the delivery media:

1. Include all files, both graphic and non-graphic, required for the project. Make sure all files are in the same directory, and that references to those files do not include device or directory specifications.
2. Ensure all required reference (external reference) files are attached and without device or directory specifications, and unnecessary reference (external reference) files are detached.
3. Remove all extraneous graphics/text outside the project border area, and set the active parameters to a standard setting (or the setting contained in the seed or prototype file).



4. Include any standard sheets (e.g., abbreviations, symbols, etc.) and files (e.g., symbol libraries, font libraries, color tables, pen tables, plot configuration files, and user command files) necessary for a complete project.
5. Digital Media must have an external label with project NVZR number, a short description of contents, and a sequence number if there are multiple volumes.
6. A transmittal sheet must accompany the media containing the information included on the external labels, total number of volumes being delivered, and a list of file names and file descriptions on each volume.

#### F. GOVERNMENT FURNISHED REFERENCE MATERIALS

The Government shall provide the contractor with data and information concerning all necessary and pertinent functions and principal features of the identified project. These items will include:

1. The installation's latest geo-referenced digital planimetric data and/or base map in ESRI Arc/Info 10.x format or best format available, with associated data files.
2. The installation's latest orthorectified imagery and specified geospatial parameters (coordinate system, datum, projection, distance units).
3. Any pertinent and necessary prototype or seed files.
4. Any other data or schematics deemed necessary for project completion, pending approval from the Government.

**XVIII. APPENDICES**

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- B. APPENDIX 2: EMCS MONITORING POINTS (General)
- C. APPENDIX 3: MACDILL AFB ACP
- D. APPENDIX 4: MACDILL AFB TRAFFIC CONTROL STANDARDS
- E. APPENDIX 5: MACDILL AFB LANDSCAPE THEME & DESIGN PROCEDURES
- F. APPENDIX 6: ENVIRONMENTAL ACTION INFORMATION FOR PROJECT PLANNING AND EXECUTION
- G. APPENDIX 7: ENVIRONMENTAL RESTORATION
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- I. APPENDIX 9: FGUA FORMS
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- P. APPENDIX 16: PEOPLES GAS STANDARDS

## APPENDIX 1: HISTORIC BUILDINGS:

Building Number	Address	Description
11		Storage Facility
12		Maintenance Shop
26		Fire Station
27		Community Facility
28		Product Plt
29		Maintenance Shop
30		Engineering Adm
31		Maintenance Shop
32		Maintenance Shop
33		Maintenance Shop
34		CE Storage Shed
35		Maintenance Shop
37		Water Tower
41		Theater
42		Pme Laboratory
45		Fuel Station
68		Storage Facility
111		Storage Facility
117		Garage
172		Joint use—Disaster Prep/Boy Scouts
205		Support Group Hq
227		Storage Facility
241		Thrift Shop
249		Civil Air Patrol
297		Warehouse
311		Library
347		Office
397		Officer's Club
398		Garage
401		Gen Quarters
402		Gen Quarters
403		Gen Quarters
404		Gen Quarters
405		Gen Quarters
521		NCO Housing
522		NCO Housing
523		NCO Housing
527		Vehicle Shop
552		Storage Facility
731		Storage Facility
927		Water Pump Station
Hangar 1		Aircraft Hangar
Hangar 2		Aircraft Hangar
Hangar 3		Aircraft Hangar
Hangar 4		Aircraft Hangar
Hangar 5		Aircraft Hangar

## APPENDIX 2: EMCS MONITORING POINTS (GENERAL)

<b>DESCRIPTION</b>		<b>COMMENTS</b>
<b><u>Chiller/Condensing Units</u></b>		
Entering water temperature	AI	
Leaving water temperature	AI	
Motor amps	AI	
Unit watts	AI	Chillers greater than 50 tons
Refrigerant suction pressure	AI	Chillers greater than 50 tons
Refrigerant discharge pressure	AI	Chillers greater than 50 tons
Water GPM	AI	Chillers greater than 50 tons
Alarm Status	DI	
Control output	DO	
<b><u>Boilers</u></b>		
Entering water temperature	AI	
Leaving water temperature	AI	
Unit status	DI/AI	Relay in parallel with gas valve or flue stack temperature
Water GPM	AI	Boilers greater than 500,000 Btu
Control output	DO	
<b><u>Air Handlers</u></b>		
Entering water temperature	AI	Air handlers greater than 50 tons
Leaving water temperature	AI	Air handlers greater than 50 tons
Cold deck temperature	AI	
Hot deck temperature	AI	
Outside air temperature	AI	
Return air Temperature	AI	
Mixed air temperature	AI	
Return air CO <sub>2</sub>	AI	
Return air humidity	AI	
Outside air humidity	AI	
Motor amps	AI	
Unit watts	AI	Variable volume units only
Coil section static pressure drop	AI	
Filter section static pressure drop	AI	
Water GPM	AI	Air handlers greater than 50 tons
Alarm Status	DI	
Outside air flow	AI	
Supply air CFM	AI	Variable volume units only
Space temperature	AI	
Control output	DO	
<b><u>Multi zones</u></b>		

<b>DESCRIPTION</b>		<b>COMMENTS</b>
Control output	AO	
Actuator position	AI	Use actuator with feedback potentiometer unless a temperature sensor is installed downstream of damper/valve
Space temperature	AI	
Discharge air temperature	AI	
<b><u>VAV</u></b>		
Control output	AO	
Supply air CFM	AI	
Space temperature	AI	
<b><u>Fan Terminal Units</u></b>		
Control output	AO	AO for hot water valve, DO for strip heaters
Space temperature	AI	
Discharge air temperature	AI	
Control output	DO	AO for hot water valve, DO for strip heaters
<b><u>Pumps</u></b>		
Motor amps	AI	
Unit watts	AI	Variable speed units
Control output	AO	DO for constant speed/two position, AO for variable speed/modulating
Control output	DO	DO for constant speed/two position, AO for variable speed/modulating
<b><u>Valves/Dampers</u></b>		
Control output	AO	DO for constant speed/two position, AO for variable speed/modulating
Control output	DO	DO for constant speed/two position, AO for variable speed/modulating
<b><u>Lights, interior</u></b>		
Control output	DO	
Occupancy sensor	DI	
Photocell	DI	
<b><u>Irrigation</u></b>		
Control output	DO	
Rain sensor switch	DI	



# MacDill Air Force Base

## architectural compatibility plan





## VISION

The vision for MacDill Air Force Base is an "Architecture of Community." This vision is of excellent architecture that displays a high quality corporate image and blends the values and character of place into the environment. The vision for this installation is founded on examples of historic and contemporary buildings, and a subtropical landscape. It is intended to reflect a central Florida regionalism and acknowledge the richness of its military and cultural past. Achieving the Architecture of Community will result in buildings of the highest quality, complimented by and compatible with their surroundings.



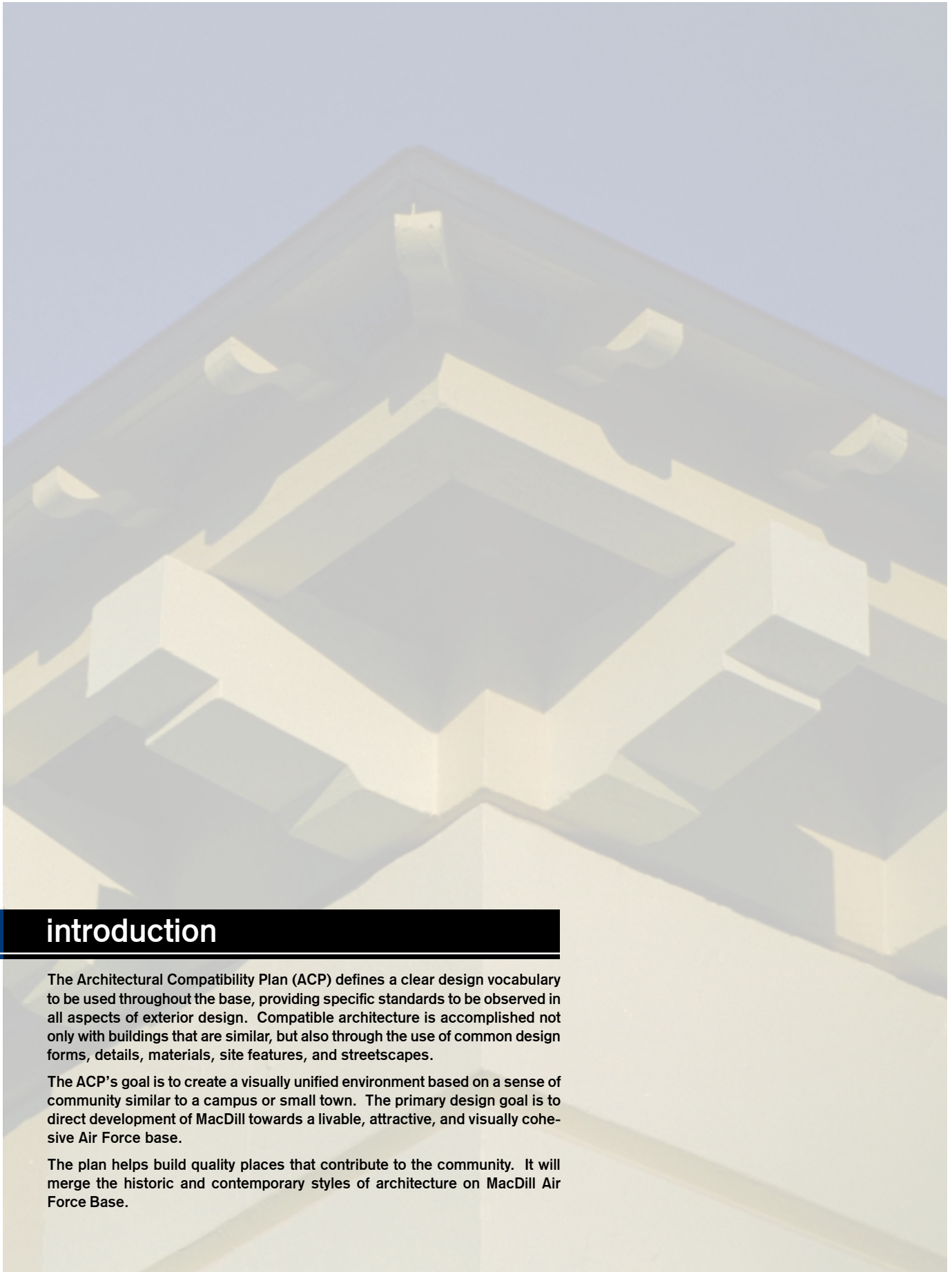


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## introduction

The Architectural Compatibility Plan (ACP) defines a clear design vocabulary to be used throughout the base, providing specific standards to be observed in all aspects of exterior design. Compatible architecture is accomplished not only with buildings that are similar, but also through the use of common design forms, details, materials, site features, and streetscapes.

The ACP's goal is to create a visually unified environment based on a sense of community similar to a campus or small town. The primary design goal is to direct development of MacDill towards a livable, attractive, and visually cohesive Air Force base.

The plan helps build quality places that contribute to the community. It will merge the historic and contemporary styles of architecture on MacDill Air Force Base.





## Purpose

The purpose of the ACP is to define specific design standards for buildings, site development, and streetscapes that serve to integrate the visual character throughout the base.

The ACP will help ensure consistent quality design decisions by commanders, planners, architects, engineers, maintenance staff, and residents. It promotes clear, concise communication between MacDill AFB as the client and design professionals.

This plan applies to self-help initiatives, small projects, and operations and maintenance activities as well as large construction efforts.

The ACP is referenced from and supports the MacDill General Plan as a key component plan.



## How to Use This Plan

The Building Design Standards Section gives requirements for facilities within each of the architectural settings and special use areas. For special use areas, refer to the community setting standards and then the special use area standards for more specific information.

The Site Design Standards Section provides information on site development and amenities to be applied throughout the installation.

The Implementation Section of the booklet highlights key elements to help ensure success in designing and constructing excellent facilities. The implementation section is used to facilitate the coordination and approval of design submittals. It discusses the traditional design process, highlights the importance of site analysis, and describes the role of the Architectural Compatibility Review Board (ACRB). All future construction and renovation efforts for all customers and funding sources will adhere to the guidelines in this ACP. Designs must be approved by the ACRB prior to contract advertising.

Finally, the appendices provide additional information including a general index, lists of building materials, site amenities, paint colors, landscape materials, and review checklists for the ACRB and project personnel. Use the appendices in conjunction with the booklet as a quick desk reference to specific materials and color specifications.

A poster is available upon request that displays photographic examples of community at MacDill Air Force Base.



*Note: Not all photos in this ACP are taken from MacDill AFB. Some photos are from off-base locations, which demonstrate the intended standard / vision.*





## Architectural Settings

The architectural settings are geographically defined areas having a particular visual character.



### community

This architectural setting encompasses the majority of the installation supporting a number of different functions and architectural styles. Within this setting are three special use areas (the Commercial Area, the Industrial / Flightline Area and the NAVCENT Compound) and several Historic Structures.

The commercial area supports mostly retail oriented facilities from the very massive BX / commissary building to smaller structures including a filling station and a fast food outlet. This area has a distinct visual character unto itself with few visual connections to the rest of the installation.

The industrial / flightline area contains a mix of large hangar and warehouse structures along with a few smaller administrative facilities.

The NAVCENT compound supports a small number of buildings that have a strong visual continuity and provide subtle, visual ties to the rest of the installation.

There are several structures interspersed throughout the community setting that have been identified as having historical value. These are further identified in the Historic structures section. These structures should be protected and maintained as focal points of interest.



### family housing

The architectural style of the Family Housing setting is of a coastal character reflecting

the unique climate of the southeastern United States. Buildings are mostly multi-family structures organized into neighborhoods similar to suburban areas. New housing units are typically duplex units, set high above grade with large overhangs and hipped or gabled roofs. Unaccompanied and transient housing is located within the Community Setting.



# Architectural Settings Delineation Map

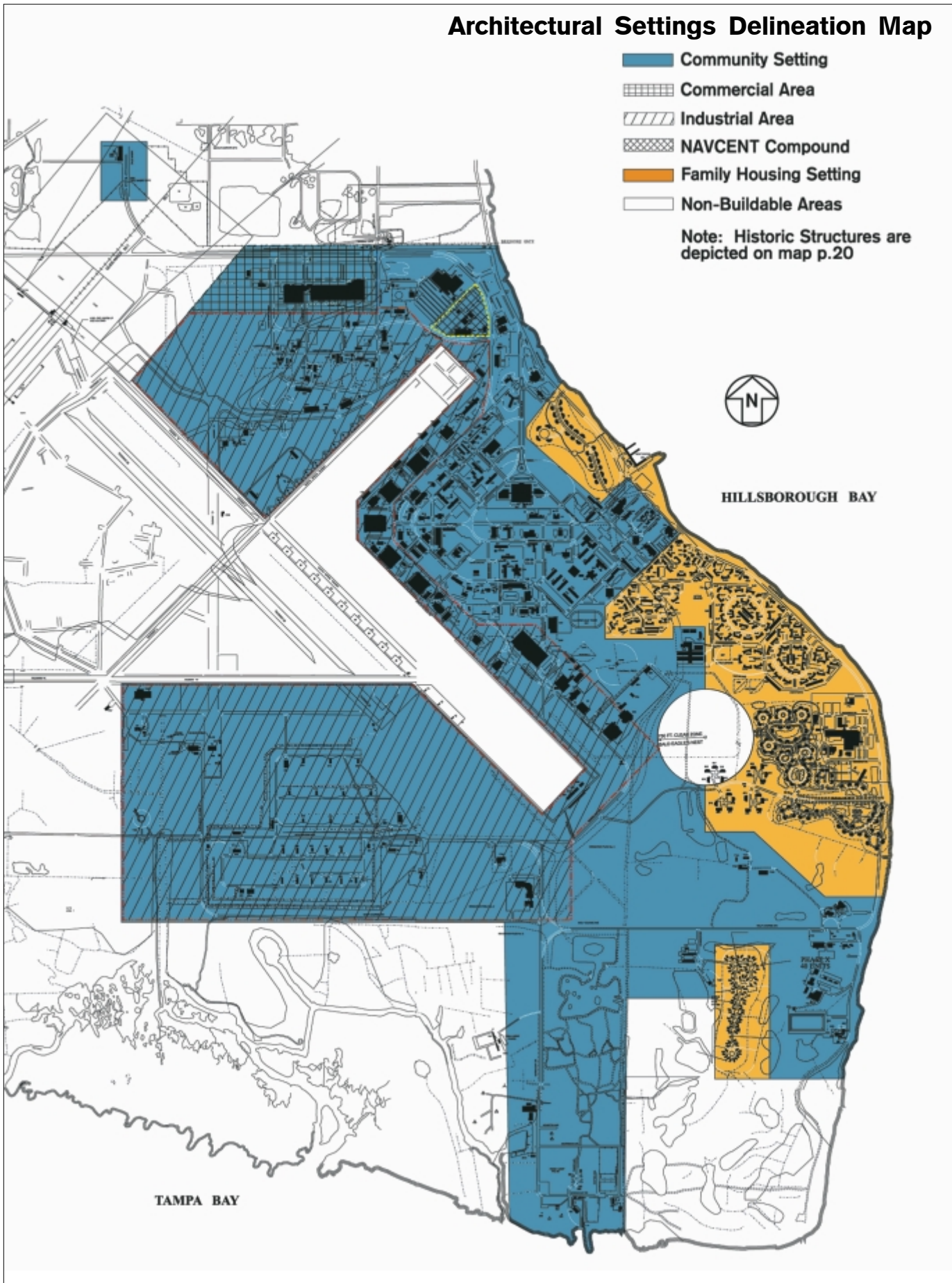
- Community Setting
- Commercial Area
- Industrial Area
- NAVCENT Compound
- Family Housing Setting
- Non-Buildable Areas

Note: Historic Structures are depicted on map p.20



HILLSBOROUGH BAY

TAMPA BAY







## building design standards

Color, material, form, scale, massing, and detailing are important elements in establishing style and visual continuity. Creating unity, not conformity, is the goal. Of the many different existing architectural styles at MacDill AFB, Florida Coastal and International are the two predominant styles, and are quite different in appearance. The overarching vision for MacDill is to create a common visual character, which ties, merges, and blends these existing styles together yet relates individually to both.





## community



Application of the following standards will link all the community facilities together and create a uniform architectural image. The three special use areas and the many historic structures included in this setting have additional criteria to be used in lieu of, or in addition to, the general Community criteria. Limited adjustments in the application of the standard materials and details will be required to blend the new style with existing adjacent facilities. Some areas may rely more on site features than architectural elements to create a common connection.



### ■ CHARACTER

Tampa has an architectural character specific to the region and climate. The desire for MacDill facilities is to strengthen the tie to this regional image. Incorporate traditional elements of the historic vernacular such as horizontal building expressions, stucco walls, louvered vents, pedimented porches with recessed entryways, and hipped roofs with projecting eaves. It will also combine these with select expressions of other existing styles on base characterized by quoins, modern horizontal forms, and expressed structure of pilasters and beams. The resulting architectural character is a contemporary Florida Coastal style.



### Style / Form

- Compliment historic features on high-visibility facilities without duplicating.
- Emphasize horizontal proportions on Building elements.
- Combining historic features with exposed skeletal frame is encouraged.
- Rectangular elements are the standard for major building masses. Use clean, simple, contemporary forms and avoid curves or angular elements.
- Develop a strong relationship between buildings and exterior spaces.
- Articulate building facades to create areas of shade and shadow.

### Scale / Massing

- Incorporate amenities such as plazas, loggias, arcades, covered entries, trellis structures, and landscaping.
- Combine functions whenever possible to avoid a proliferation of small independent structures.





- Use submassing for larger structures.
- Break up facades with windows, recessed panels, horizontal banding, or by expressing the skeletal structure.
- Break up the mass of large structures to allow for sloped roofs to the maximum extent.

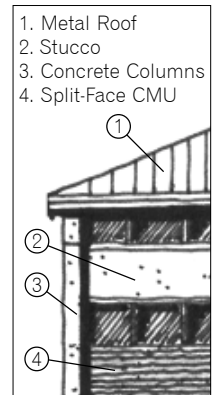
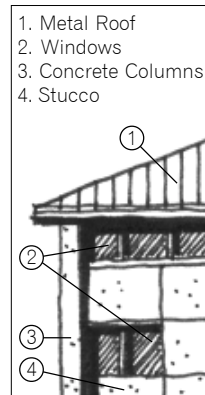
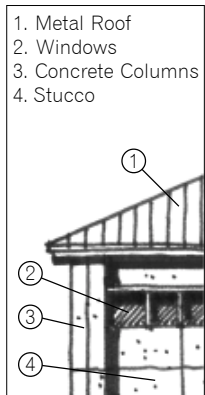
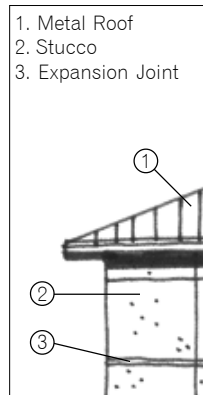
**WALL SYSTEMS**

Wall materials must be chosen based on the function of the facility and the materials of the adjacent structures. The goal is to limit the pallet of materials used on base and ease the transition between the wide variety of existing materials by adjusting the proportions and details of the approved materials. Consistent application of colors and materials will bind the base together and reduce visual clutter caused by too much diversity.



**Materials and Color**

- Use only base standard materials and colors. Minimize surfaces requiring painting and cleaning. (See Appendix A-1).
- Use integral colored materials and factory finished building products to reduce maintenance.
- Use only corrosion-resistant, factory finished fasteners and exterior metals except for Historic preservation projects.
- Brazil Nut, sand finish stucco walls with Seed Pearl highlights and details are the standard.
- Pebble colored split-face block is acceptable as an accent on a limited basis.
- Pebble colored split-face block as an accent to respond to an adjacent facility's wall material is also allowed on a limited basis.
- Use sealant to match or blend with surface materials and color.
- High-visibility facilities shall demonstrate a greater application of historic detailing.
- Limit pre-finished metal wall panels to larger industrial buildings.



**Accents / Detailing**

- Architectural accents such as quoins, horizontal banding, medallions, friezes, vaulted openings, recessed areas or other adapted detailing are encouraged on high-visibility facilities.
- Use accents such as medallions, stucco joints, patterns, etc. to highlight entries and to enliven otherwise featureless facades.





- Do not “over decorate” or duplicate in total, historic styles for new facilities.
- Accents such as quoins, medallions, and friezes shall be factory finished colors.
- Use expansion joints, reveals, recessed panels, and expressed pilasters to break up flat facades and add visual interest.

#### **Building Base**

- Soften (minimize) the visual impact of raising floor level to +11.5 feet above sea level.
- Distinguish the base from the facade where earth berms are not utilized.
- Consider overall building height and proportion on detailing.
- Protect stucco from damage by lawn maintenance equipment.

#### **Parapets and Copings**

- Use horizontal parapets at all buildings with low-sloped roofs.
- Use a narrow metal coping finished to match the wall color.

#### **Wall Components**

- Aesthetically organize all mechanical, electrical, and other building components as design elements of the facade and coordinate with other architectural features.
- Finish of wall components, such as gas meters, fire bells, vents, louvers, electrical boxes, and communication equipment, shall match wall color.
- Do not expose conduits, cables, and piping on walls.
- Locate equipment such as gas meters to minimize visual impact.
- Integrate all mechanical, electrical, and other building components into the overall architectural design.
- Do not expose conduits, cables, and piping on exterior walls.
- All gas meters, fire bells, vents, louvres, and electrical / communications boxes shall match the painted wall surface on which equipment is mounted.

#### **Windows and Doors**

- Use aluminum windows doors and door frames with thermal break construction on all exterior surfaces.
- Use combination of windows or mullion design to emphasize a horizontal character in window openings.
- Incorporate operable windows where possible.
- Use bronze tinted, low-emissivity (not mirrored) glazing.





- Secondary doors, utility doors, security doors, overhead doors, and outlying facility sites shall match the wall color (normally Brazil Nut). These doors and frames shall be anodized aluminium.
- Door and frame colors shall match.
- Use dark bronze sealant next to bronze windows and doors.
- Do not use glass block for openings or as an exterior wall system.
- Translucent fiberglass glazing is allowed for clerestory windows and for hurricane protection. (Normally use Brazil Nut colored frames).
- Clerestory windows normally use Brazil Nut colored frames.
- Transom windows / elements above doors / windows are encouraged.
- Sealant color shall match adjacent wall color.



**Transition Buildings**

- Transition buildings are those that lie on the border between two visually distinct areas.
- Integrate the color and materials of adjacent areas as accents on transition buildings, only with ACRB approval.



**Existing Buildings**

- Match the existing materials for addition / alteration projects unless a significant change to the exterior envelope is included.
- Whenever possible bring existing facilities into compliance.

**APPLIED COLORS**

Coastal architecture employs the use of lighter tones in response to the intense sunlight common to this region and the vivid colors of the abundant flora and fauna. Coastal architecture at MacDill is expressed through a common field color “Brazil Nut,” and a lighter colored highlight “Seed Pearl.” This accent is used on architectural features such as quoins, lintels, recessed panels, or horizontal banding.

A limited palette is essential in creating compatibility. Facilities should have individual character, but should also have a greater sense of community.

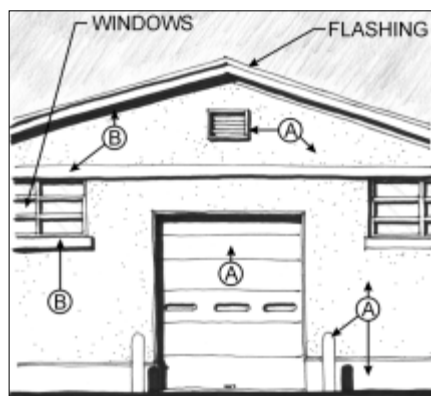
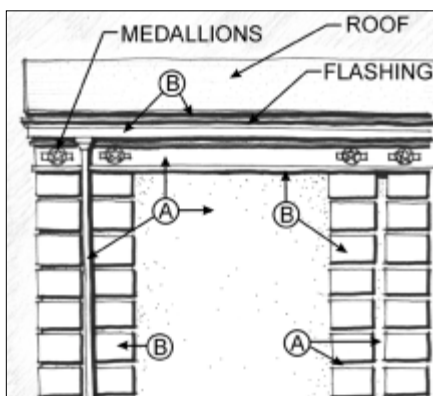
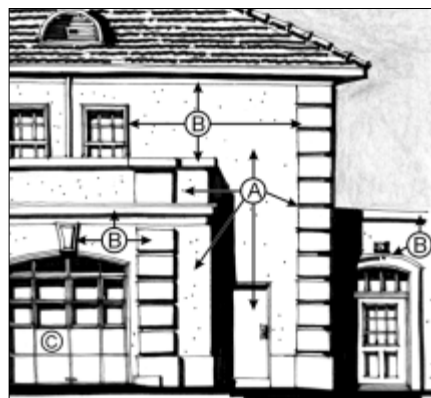
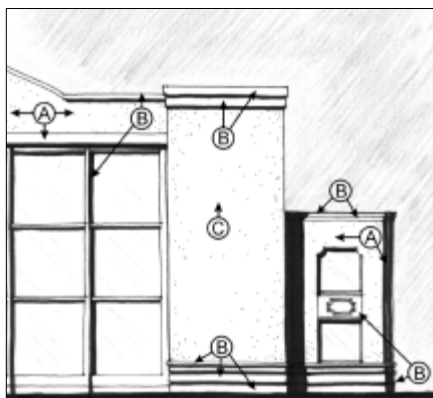
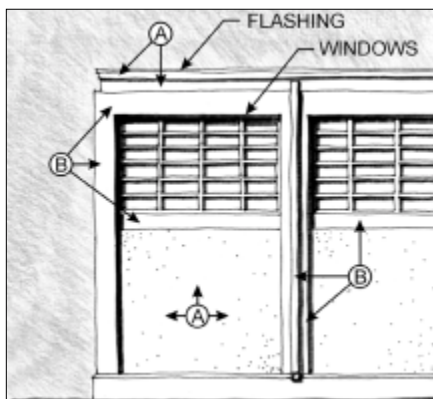
**General Paint Guidelines**

- Use factory finished building products to reduce maintenance costs.
- Consider individual paint schemes in context to the community.
- Consistently apply paint colors to similar elements.





Original color samples are on file in the Base Civil Engineering office.



- Use a single color per field, trim, or accent element on a facade.
- Paint to visually enhance architectural details, reduce mass, and blend with the surrounding environment.
- Keep paint schemes simple and do not "over detail" accents.
- Do not create false architectural features such as quoins, lintels, bases, and capitals through painting.
- Do not paint over factory finishes unless the existing colors do not comply.
- Downplay service buildings by minimizing accent and trim painting.
- Remove building lettering, signs, and other architectural elements of contrasting colors, prior to painting.
- Do not use yellow hazard markings on buildings.
- Painting insignias or other supergraphics on buildings or tanks is discouraged.
- Paint wall mounted equipment to match adjacent surface.
- Do not accent downspouts, vents, louvers, or gable ends.
- Do not paint curbing.
- Do not paint concrete elements and remove any existing paint on concrete.

### Specific Paint Application

- Variations are subject to ACRB approval.
- Paint wall surfaces Brazil Nut and accents, such as trim, quoins, and fascias Seed Pearl.
- Painting individual building masses Worsted Tan as an accent to the primary color is acceptable to break up larger buildings.
- Paint tanks and supporting equipment Seed Pearl.
- Fascias on metal roofed buildings shall match standing seam metal roof color (PPG 5LR53975 - Terra Cotta).
- Soffit color to match field color (normally Brazil Nut.)
- Fascias on clay tile roof buildings shall be Seed Pearl.
- Paint primary entry doors and frames Manor House. If painting a facility with black window frames – ICI #1674 Deep Onyx may be used with ACRB approval.
- Paint secondary entry doors and frames Brazil Nut where no attention is to be drawn.
- At facilities with multi-number of doors that face no apparent main entry (i.e. VQ, Dorms, etc.) paint doors and frames





## ■ ROOF SYSTEMS

As one of the most visually formidable pieces of a building, the roof color, material, and form play a large role in architectural compatibility. Terra cotta colored standing seam metal hipped roofs are the standard. Terra cotta tile hipped roofs are allowed on high-visibility facilities with ACRB approval.

Decision shall be based on facility location on base, function of building, adjacencies, priority / hierarchy of facilities within base community.

### Configuration

- Use hipped roofs with pitches between 3:12 and 5:12 as the primary building form for all facility types.
- Open gabled elements may be used to accent entries.
- Use large overhangs between 2 feet and 3 feet proportional to the size and height of the building.
- Break up overall roof massing on larger structures.
- Minimize thickness of roof edge to express a thin edge.
- Low-sloped roofs are only allowed for larger structures in combination with hipped roofs, or to match existing conditions on add / alt projects.

### Materials and Color

- Use only the approved Terra Cotta (PPG 5LR53975) colored standing seam metal, 16 inch wide panel with 2 inch raised seam.
- Ancillary buildings will use terra cotta tile on hipped roofs.
- Use speckled terra cotta tile to reflect the historic structures.
- Use membrane roofing with a minimum slope of 1/2 : 12 for low-sloped roofs.

### Gutters, Fascias, and Downspouts

- Generally, the depth of fascias shall be no larger than 8 inches.
- Fascia finish shall match the roof color when occurring with metal roofing.
- Flashing color shall match roof color.
- Stepped flashing at the intersection of roofs and walls shall match wall color.
- The use of gutters is encouraged.
- Gutters on sloped roofs shall be factory finished to match the roof color.
- Minimize the negative visual impact of downspouts by coordinating placement with architectural features.

- Downspout finish shall match the wall color.
- Do not use exposed angled leaders.

### Vents / Equipment

- Minimize, consolidate, and organize roof penetrations on the least visible side of the building.
- PVC pipes and other roof elements must be finished to match the roof color.



PPG 5LR53975 Terra Cotta





- Do not use rooftop mechanical units unless mandatory. When used, minimize the negative visual effects.
- Consider the use of dormer vents to conceal and screen exhaust fans.

### ■ ENTRANCES

Entrances not only act as the transitional element from exterior to interior, they also provide opportunities to create a focal point on a facade. They establish a user's first impression and delineate the importance of the building by the size and architectural detailing of the entrance structure.

#### Primary

- Recess entries to distinguish them on the facade and to provide shade and protection from the elements.
- Create enclosed vestibules and weather-protected transition spaces at entrances.
- Use open gabled roof elements at high-visibility entries.
- Incorporate courtyards and / or entry plazas into the design.
- Use accent pavers in approach walkway or at entry plaza feature.
- Integrate handicap ramps into overall design.
- Light colored canvas canopies and stand-alone pavilion entries are allowed with ACRB approval.
- Locate magazine racks and other similar elements out of view to avoid visual clutter.

#### Secondary

- Secondary entrances for pedestrian access are to reflect the character of the primary entry but to a lesser extent.
- Recess entries to provide areas of shade and weather protection.
- Provide a small courtyard or seating area near secondary entries.

#### Service and Emergency Egress

- Minimize visual impact with proper location.
- Provide unobtrusive service entrances that are physically and visually separated from primary and secondary entrances.
- Incorporate emergency egress structures into design.
- Use landscaping and screen walls to screen and separate loading docks.
- Minimize visual impact of exit-only doors.
- Do not use canopies at emergency egress doorways.





### Handrails

- Use dark bronze, pre-finished metal handrails.
- Terra cotta colored handrails are allowed as an accent with ACRB approval.
- Integrate handrails with facility design.

### Drop-offs

- Limit use of covered drop-offs to high visibility buildings.
- Covered drop-offs shall be an integral part of the building entrance using the same style, form, and materials.
- Treat these sites as special, high-profile design areas with corresponding amenities, design accents, and formal landscaping.

### Trellises

- Incorporate trellises into the design of high-visibility facilities to create areas of shade and interest.
- Construct trellises of low maintenance, materials.
- Incorporate vines or other landscape materials in the design.
- Integrate with building design / style and entry plazas or outdoor spaces.

### Arcades and Loggias

- Arcades and / or loggias as an extension of the building entrance are encouraged.
- Integrate with the building's design, style, form, and materials.

### Plazas and Courtyards

- The use of plazas and courtyards is encouraged.
- Use concrete surfacing with terra cotta colored concrete paver accents.
- Integrate handicap access ramp into plaza.
- Integrate planters into plazas, courtyards, and formal building entries.

### ■ SCREENS AND ENCLOSURES

Screens and enclosures help to minimize the visual impact of undesirable features as well as provide separation and security where necessary. Both solid and landscape screens, separately and in combination, can be applied to achieve visual continuity throughout the installation. See p. 39 for landscape screens.

### General

- Locate utility components in the least visible area with adequate access to minimize the need for screening.

### Screen Walls

- Use Pebble colored, split-face block for facility walls and equipment screen walls adjacent to facilities.
- Screen walls adjacent to historic buildings shall be stucco.
- Ensure that screen walls are a minimum of six feet high and a maximum height required to conceal equipment, vending machines, and utilities.
- Generally, do not attach screen walls to buildings.





- Construct free-standing garden walls of buff colored split-face block with pebble colored accents.
- Do not place screen walls immediately adjacent to roadways or sidewalks.
- Use landscaping to soften walls.

### Fencing

- Fencing adjacent to high-visibility facilities, such as the Child Development Center, must be of high quality materials such as decorative metal fencing.
- Use stucco columns with black metal fence infill for screen walls that don't require visual separation.
- Dark brown, vinyl-covered chain link fence in industrial and low-visibility sites is allowed with ACRB approval.
- Perimeter fencing shall respond to the site context.
- Use decorative metal and stucco, split-faced block, or stucco with accent.

### Dumpster Enclosures

- Locate dumpsters to minimize visual impact.
- Construct dumpster enclosures in all settings of buff colored split-face block with pebble colored accents.
- In high-visibility locations provide Worst Tan colored metal gates to screen dumpsters.
- Provide Brazil Nut colored protective bollards.
- Design enclosures as part of building service areas for new facilities.
- Provide concrete pads and access aprons.
- Include landscaping areas and provisions for pedestrians access.

### Force Protection

- Integrate security walls with the building architecture.
- Use a combination of walls, bollards, and tension cables with landscape beds.
- Do not paint Jersey Barriers.
- Minimize the visibility of all force protection devices with landscaping and integral designs.





## ■ ANCILLARY STRUCTURES

Similarity in ancillary structures, color, and materials provides a thread of continuity in the outdoor spaces on the base and reduces overall visual clutter.

### General

- Centrally locate and combine smaller structures to reduce visual clutter.
- Use non-weathering, corrosion resistant materials.
- Landscape ancillary structures consistent with larger structures.
- Do not use temporary buildings.
- Minimize the use and number of storage buildings, and consolidate in low-visibility areas.

### Pavilions

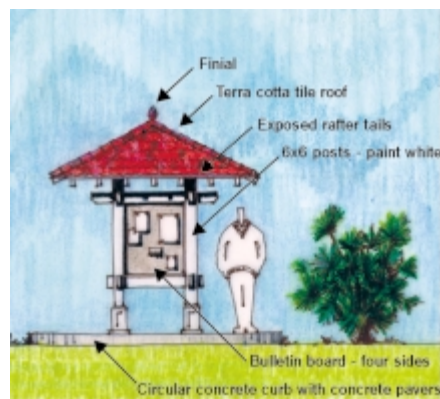
- Construct pavilions of stucco columns and terra cotta clay tile, hipped roofs.
- Construct pavilions in industrial/flightline area of concrete encased metal posts and standing seam hipped roofs.
- In locations where multiple pavilions will be constructed, organize structures to create gathering areas with an internal focal point.
- Gazebos are not allowed.

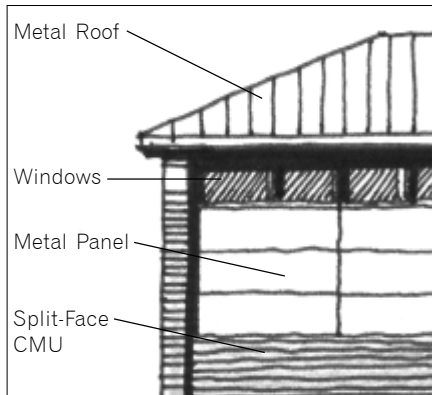
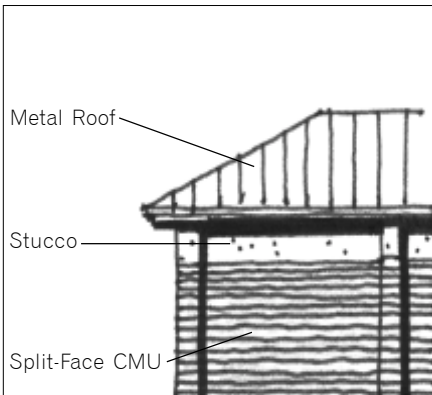
### Waiting Shelters

- Use stucco walls with dark bronze mullioned infill windows and a terra cotta tile, hipped roof.
- Locate shelters in convenient locations with proper allowances for bus, automobile traffic and pedestrian access. Do not overuse.
- Use accent pavers in the walkway to distinguish the area.

### Kiosks

- Construct kiosks of galvanized metal posts supporting inset bulletin board panels covered by a terra cotta tile hipped roof.
- Color shall be Seed Pearl.
- Locate kiosks at high public use areas such as shopping areas, housing areas, and recreation areas.





## ■ INDUSTRIAL / FLIGHTLINE AREA

This area comprises mostly industrial type facilities adjacent to the airfield. Maintain the aesthetic of the Community Setting amongst the typically larger, more massive structures that are found there.

### Character

- Consolidate functions where possible to eliminate smaller, individual buildings.
- Use forms, materials, and colors similar to community but with simplified detailing.
- Lower the apparent height of hangars and warehouses by arranging single-story spaces along the perimeter.
- Modulate building elevations with submasses, clerestories, openings, material changes, and architectural detailing.
- Avoid large flat facades addressing the street.
- All industrial facilities require curbs and bollard protection.

### Wall Systems

- Approved wall systems include stucco, split-face block, and flat metal panels.
- Use stucco or a combination of stucco and split-face block on smaller administrative facilities.
- Use split-face block or a combination of block and metal panel on larger maintenance facilities.
- Do not use metal panel as the sole material for any structure.
- Locate visible vents and louvres as planned design elements.
- Clerestory windows are encouraged to increase natural light and to break up the mass of the facade.
- Use dark bronze window and door frames with thermal break construction.

### Roof Systems

- Low-sloped roofs are allowed for larger buildings.
- Do not use terra cotta tile roofs.
- Lower appendages and entries shall have hipped roofs.





## ■ NAVCENT COMPOUND

This special use area is well established in its aesthetic character and retains an individual image separate yet compatible with that of the community setting. Guidelines involve maintaining and fostering that image.

### Character

- Buildings are to be single story with Dutch-hipped roofs.
- Incorporate the use of raised planters or retaining walls to ease the transition between grade and floor elevation.

### Wall Systems

- Fluted block on a limited basis may be used as accents or details to relate new facilities with existing.
- Walls are to be buff colored, split-face block with limited architectural detailing or accents.
- Windows and primary doors are to be dark bronze, storefront systems with clear glazing.
- Use punched, recessed window openings of vertical proportion.
- Use dark bronze metal railing at raised areas around buildings.
- Use punched recessed windows of a vertical proportion.

### Roof Systems

- Roofs are to be dark bronze, standing seam metal with Dutch hips.
- Roofs are to be 5 : 12 pitch with 2 foot overhangs.
- Use dark bronze gutters and finish downspouts to match wall color.

### Additions and Alterations

- Given the site constraints, additions are preferable to new structures within this compound.
- Keep additions and alterations to existing structures consistent with the architectural character of the original building.
- New structures outside of the designated area must be approved by the ACRB.





## ■ COMMERCIAL AREA

The existing visual character of this area is quite different than the rest of the community setting. The goal is to acknowledge the commercial aesthetic while providing site amenities, signs, walls, and landscaping that will soften the difference and visually link the area to the remainder of the installation.

### Character

- Buildings in this area are to be single story structures.
- The use of arcades, loggias, or other entry features is encouraged.

### Wall Systems

- For new buildings use the community standards with accents of dark brown stucco to reflect the adjacent structures.
- Additions and alterations shall match existing materials / colors.
- Windows are to be dark bronze storefront systems with clear glazing.
- A greater proportion of window to wall area is appropriate for this area.

### Roof Systems

- Low-sloped roofs may be used for larger volume buildings.
- Lower appendages and entries shall use hipped roofs.
- The use of terra cotta tile roofs for entries and arcades is encouraged.

### Screens and Enclosures

- Screen walls are to use Buff colored split-face block with Pebble colored accents.

### Service Areas

- Do not locate service areas or delivery docks in locations visible from North Boundary Boulevard.
- Collocate service areas of adjacent buildings to minimize impact.





## HISTORIC STRUCTURES

Buildings that have historic significance should stand as focal points within the community giving evidence of the base's heritage. These structures are unique, displaying materials, construction methods, and detailing that is not easily replicated. For this reason, maintenance and protection of these cultural assets to original condition is encouraged.

### General

- Forms, elements, and materials from Mediterranean Revival and Art Deco architecture are the hallmarks of the historic buildings at MacDill. Terra Cotta tile roofs, stucco exterior walls, pedimented pilasters, with recessed entryways, arched openings, quoins, pilasters, and coping are unifying architectural themes.
- Where possible protect, retain, and adapt historic properties rather than replace with new construction.
- Design rehabilitation of historic properties consistent with the original character of the properties as outlined in the Secretary of the Interior Standards for Rehabilitation of Historic Properties.

### Historic Properties

- Design new construction to be compatible with adjacent historic properties in terms of massing, scale, and architecture to protect the integrity of those properties and their surroundings.
- Consult with the State Historic Preservation Office and Advisory Council on Historic Properties when working on historic structures and follow procedures outlined in the National Historic Preservation Act.

### Character

- Work on or around historic structures is to follow the original intent as portrayed in drawings, writings, and / or archival photographs.
- Avoid both the removal of historic features and the addition of false or conjectural historic elements into designs for rehabilitation of historic structures.
- Preserve original historic materials, finishes, details, and architectural accouterments where possible.
- Use accent lighting on desirable architectural features.



Facility Numbers			
1	Hangar	34	Storage Shed
2	Hangar	35	Maintenance Shop
3	Hangar	37	Water Tower
4	Hangar	41	Theater
5	Hangar	42	Instrument PME Laboratory
11	Warehouse	45	Storage Facility
12	BCE Shops	47	Swimming Pool/ Clubhouse
26	Fire Station	68	Storage Facility
27	Community Facility	111	Storage Facility
28	Product PTL/ Storage	117	Garage
29	Maintenance Shop	172	Warehouse
30	Engineering Administration	227	Warehouse
31	Maintenance Shop	249	Training Facility
32	Maintenance Shop	297	Warehouse
33	Maintenance Shop	311	Library
		347	Engineering Administration
		397	Officers' Club
		398	GOQ Garages
		401	Family Housing GOQ
		402	Family Housing GOQ
		403	Family Housing GOQ
		404	Family Housing GOQ
		405	Family Housing GOQ
		521	NCO Housing
		522	NCO Housing
		523	NCO Housing
		527	Vehicle Shop
		552	Warehouse
		731	Storage Facility
		927	Pump Station
		928	Pump Station
		1050	Maintenance Shop





**Wall Systems**

- Existing walls are cast-in-place concrete or stucco.
- Repair and maintain architectural detailing as per historic precedent.
- Use dark bronze storefront systems with clear glazing for doors and windows in facility 1-5, 11, 12, 27-35, 41, and 45.
- Smaller residential character window and door openings are to be replaced with historic reproduction wood windows and doors painted white in facility 26, 401-405, 521-523.
- Use translucent fiberglass panels for larger hangar-like windows and openings in hangar doors.

**Roofing Systems**

- Roofs shall be terra cotta tile except for the hangar buildings, which are light gray rolled asphalt.
- Tile color and profile to match existing.

**Additions and Alterations**

- Additions and / or exterior alterations to historic structures are discouraged.
- Restore and maintain the original intent as established by historic precedent where possible.
- Colors are to follow established criteria for community buildings.
- Carefully integrate into the character of the historic building while preserving the facility's original character and defining features.







## family housing

The structures within the Family Housing architectural setting are distinct from those of the Community setting in their character and presence. Both settings portray Coastal architectural aesthetics, such as broad overhangs, raised buildings, stucco walls, and hipped roofs. However, the Family Housing structures use an expanded color palette (coordinated with community colors) and building forms that are more residential in character. In addition to the general style characteristics, similar roof forms and wall materials create strong visual links to the rest of the installation.

Achieving architectural compatibility relies on common materials, site furnishings, and landscaping. Residential settings shall use site furnishings and landscaping compatible with the rest of the base. Residents are afforded some opportunity to express individual pride of place in and around their homes through the Self-Help program. This work will be controlled through the use of a Self-Help materials and color palette that is also complementary throughout the base.



### ■ CHARACTER

Family Housing units will portray a strong Florida Coastal architectural character that clearly defines a separation between the work and home environments. Style and quality are to be comparable to those found in the public neighborhoods outside of MacDill AFB. Generally, homes shall be raised stucco bungalows in pastel colors and light accents with large overhangs and screened porches.

#### Style / Form

- Organize units into cohesive neighborhoods with curvilinear streets and cul-de-sacs.
- Construct elevated homes 11.5 feet above sea level on natural concrete piers to prevent flooding.
- Match existing styles in housing renovation / alteration projects.
- Construct new common use facilities following the Community Setting design standards.

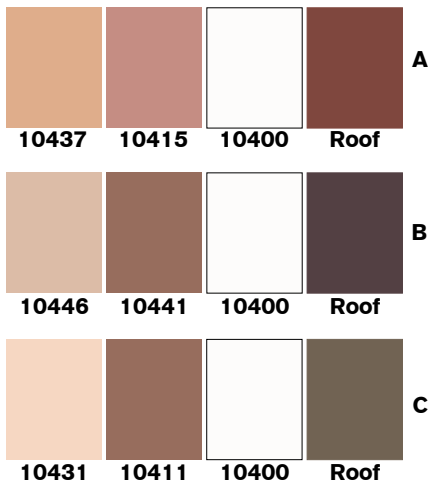
### ■ WALL SYSTEMS

Using stucco with varied color schemes between the units will add individuality and reduce the institutional appeal of monochromatic color schemes. The addition of vernacular accents will help to express a sense of regionalism in the architecture.

#### Materials and Color

- Use color enhanced stucco as the primary wall material for all units.
- Use trim and accent colors from the three approved color schemes.
- Alternate color schemes to create diversity along the streetscape.
- Use expansion joints as architectural elements on the facade.





**Color Palette**

Original color samples are on file in the Base Civil Engineering office.

- Paint existing housing (not historic) to match new housing color schemes.
- Do not paint exposed concrete piers or foundations, windows and doors.
- Use vinyl or vinyl-clad wood windows in white for all applications.
- Use factory finished aluminium doors at all entry points.
- Incorporate glazing in all primary entry doors.
- Provide hurricane protection at openings with laminated glass or operable shutters.
- Use wood, shadowbox fencing for trash enclosures and backyard privacy only in Family Housing.

**ROOF SYSTEMS**

Use roof configuration and color to link the Family Housing setting to the rest of the installation.

**Configuration**

- Use hipped roofs with between 4 :12 and 6 : 12 pitch.
- Consider the use of dormers or louvered Dutch hips.

**Materials and Color**

- Use shingles with an architectural profile.
- Alternate established color schemes to increase the visual diversity.
- Use fascias, gutters, downspouts, and soffits finished to match the trim.
- Use factory finished, corrosion resistant materials.

**ENTRANCES**

Design entrances and porches that express the unique coastal climate while promoting outdoor activities and community interaction.

**Primary**

- Emphasize the public nature of the primary entry by creating a porch for neighborhood or family interaction.
- Provide limited opportunities for personal expression at the front porch with furnishings, planters, flags, etc.

**Secondary**

- Provide a stoop or patio at all secondary entrances when units are at grade.
- The use of bug screens to enclose porches is encouraged.

**Lighting**

- Provide adequate lighting for safety and comfort without allowing light pollution.
- Use recessed or consistently styled wall-mounted light fixtures.

**ANCILLARY STRUCTURES**

- All ancillary structures shall be consistent with Community setting.

**STREET LIGHTING**

- Follow Housing Community Plan for type and placement of lighting within the Family Housing Setting.







## site design standards

A sense of community relies heavily on the character of the landscape and the elements within it. Site elements and development methods used consistently throughout the installation provide a common thread of visual continuity to the base as a whole. They bring consistency to the landscape between the different architectural settings and special use areas as well as a blending of the various aesthetics of the existing structures on base.

Circulation systems such as roadways, walkways, and parking areas and support systems such as signage, lighting, and utilities are visual constants throughout the base that link the individual settings and areas together.





## site development



To make the most of a building's functionality and architectural character, its placement and relationship to other facilities must be properly addressed prior to design. Consistency in how the building addresses the street or other buildings is as important to architectural compatibility as the physical appearance of the building itself. Separations, vistas, and the relationship between building and the ground plane also play important roles in the visual appearance of the buildings.



### ■ SITING

Proper placement of facilities according to function, style, and size is essential. A building's function is a determining factor in the aesthetic character of the resulting facility. For example, a more utilitarian building such as a warehouse or maintenance facility would be visually out of place amongst a group of administrative buildings. It is equally important to allow for the possibility of expansion or alteration of facilities as mission requirements change.

### General

- Site and configure buildings to reflect project requirements and to respond to conditions identified with a proper and complete site analysis.
- Locate primary entrances to face parking areas. Provide additional entrances to address the street or building drop-offs when functionally necessary.
- Avoid siting service or storage yards along primary or secondary street fronts whenever possible.
- Include force protection requirements and blend measures into facility and site design.
- Avoid locating buildings in transition spaces.
- Use sites to infill where possible and avoid "urban sprawl"
- Follow the land use plan.
- Avoid locating buildings in low-lying areas.
- Provide a landscape transition space between visually discordant settings and special use areas.





### Setbacks

- Consider adjacencies when establishing the front yard setback.
- Generally maintain a front yard setback of not less than 30 feet where possible.
- Maintain a side yard setback of not less than 40 feet between buildings.

### Expansion Areas

- Locate facilities and develop the site to allow for future expansions.
- Maintain that area free from permanent development.
- Designate future expansion in design floorplans and siteplans.

### ■ LANDFORM

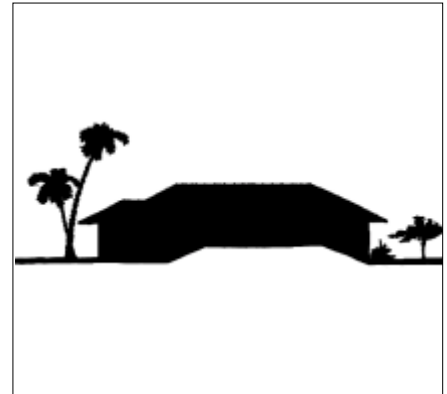
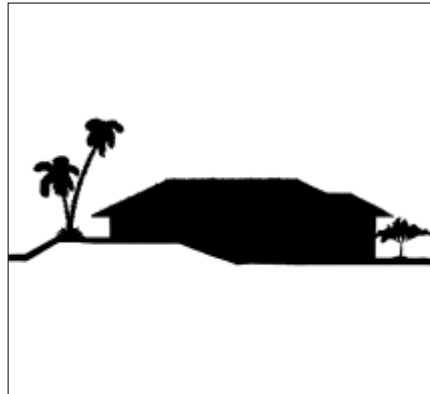
Contouring the land to accommodate buildings and other facilities can help to minimize the negative impacts of certain large or unattractive elements within the landscape.

### Topography

- Set floor elevations at no less than 11.5 feet above sea level, to avoid flooding.
- Integrate building design with the topography.
- Use berms to soften / screen views of parking areas or to reduce the visual height of buildings with raised floor elevations.
- Use stepped earth berms to reduce the impact of elevated floors. Avoid a flat platform approach.
- Add berms at selected open areas to counteract the flatness of the peninsula and to add interest.

### Drainage

- Grade sites to provide positive drainage away from buildings and traffic areas.
- Provide a crushed rock drainage area around the perimeter of buildings that do not have gutters.
- Shape retention / detention ponds in a natural, curvilinear manner.





## ■ SITE FURNISHINGS

Color, style, and placement of site furnishings can significantly contribute to a unified base image. They provide consistent elements throughout the base regardless of where they occur.

Using the selected site furnishings adds constancy to the landscape in form and style. Certain elements can also complement architectural features or styles within the community. (See A-2 for listing).

### General

- Follow the ACP for all new facilities and replace old dissimilar elements when possible by refinishing and re-siting in accordance with ACP recommendations.
- Use dark bronze color for all site furnishings as a general rule. Terra Cotta color PPG 5LR53975 may be used by exception with ACRB approval.

### Benches and Seats

- Use factory finished metal benches and seats in all settings.
- Incorporate seats at locations where short-term seating is required, such as formal building entries or plazas.
- Incorporate benches at locations where longer-term seating is required such as parks, playgrounds, or waiting shelters.
- Provide mid-morning to late-afternoon shade for all benches and seats.

### Litter / Ash Receptacle

- Use factory finished metal litter and ash receptacles in all settings.
- Locate litter receptacles at building entrances, waiting shelters, picnic pavilions, playgrounds, and other areas of public concentration (near benches and seats).
- Locate ash urns at building entrances and designated smoking areas.
- Locate out of view near entries to avoid visual clutter.

### Planters

- Use factory finished metal, free standing planters in limited applications throughout the base.
- Locate freestanding planters in conjunction with other exterior elements.





### Drinking Fountains

- Use pre-manufactured, factory finished, dark bronze drinking fountains.
- Locate fountains near recreation areas, picnic pavilions, recreation trails, and near specific / appropriate facilities such as youth centers and fitness centers.
- Place free standing fountains on concrete pads with open access on all sides. Do not place on buildings.



### Bike Racks

- Use factory finished, metal, bollard type bike racks that can accommodate a minimum of two bicycles.
- Provide bicycle-parking areas for all facilities. Combine areas for densely sited buildings.
- Place bike racks on concrete pads in accessible locations near established bike routes and near secondary entrances to buildings.
- Increase the numbers of available bike racks in residential and recreational areas.
- Screen bicycle parking areas with landscaping or screen walls.



### Playground Equipment

- Provide pre-manufactured play equipment.
- Locate play equipment at parks, family housing areas, child development centers, community centers, and recreational areas.
- Place play equipment in designated areas complete with safe ground surfacing, benches, litter receptacles, and landscaping for shade.
- Provide adequate pedestrian circulation paths to and from the play areas.



### Picnic Tables

- Use factory finished, recycled plastic picnic tables with metal frames at all pavilions and recreation areas.
- Group tables to allow for large parties or individual family outings.
- Do not use at administration yard areas or industrial facilities.
- Provide mid-morning to late-afternoon shade for all picnic tables.





### Barbecue Grills

- Use pedestal-rotating grills on galvanized pipe posts.
- Limit built-in grills to recreational areas, dormitories, and fire stations.
- Use materials that compliment adjacent facilities, such as stucco or split-face block.
- Integrate built-in grills with screenwalls, plazas, and courtyards.
- Placement and design of built-in grills must be approved by the ACRB.

### Flag Poles

- Use brushed aluminum pole, mounted on a concrete base.
- Create a “sense of place” at flagpole locations with landscaping or plaza designs.

### Bollards

- Use bollards to protect buildings, equipment, and people from potential damage caused by vehicle impact and to restrict access.
- Use an 8-inch diameter, factory finished Architectural Brown aluminum, domed-top bollard as the base standard.
- Use same style bollard with single-function luminaire to enhance pedestrian areas, pathways, and building entrances.
- Use historic style bollards for high-visibility facilities with ACRB approval.
- For force protection use an 8-inch diameter, concrete filled, steel pipe. Finish bollards in Architectural Brown and domed-top plastic covers.
- For lighted force protection bollards use same style bollard capped by a pre-manufactured, domed top, single luminaire.
- For bollards protecting equipment or buildings from vehicle damage, paint to match adjacent surfaces.

### Tree Grates

- Use black cast iron tree grates with upright holes set in concrete paving.
- Accent opening with terra cotta colored concrete pavers.
- Use tree grates at formal plazas, building entries, and courtyards.





## ROADWAYS

The transportation network should provide a common experience throughout the base from a vehicular perspective; clean, neat, and orderly. Establish a hierarchy of roadways to define and organize traffic flow throughout the installation while providing a consistent visual experience.

### Primary

- Primary roadways are the widest and fastest arterials and will often contain two lanes of traffic in each direction.
- Minimize stops and turns, and eliminate on-street parking.
- Individual curb cuts are discouraged.
- Keep adjacent on-street parking, parking areas, and buildings away from the road edge.

### Secondary

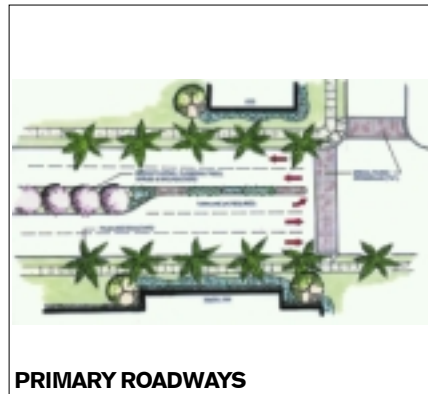
- Secondary roadways are feeder streets from access roads to primary roads.
- On-street parking is not recommended.
- Keep adjacent on-street parking and parking areas away from the road edge.
- Minimize the number of curb cuts from driveways and area entrances.

### Tertiary

- Tertiary roadways are the narrowest and the slowest and provide access to individual facilities or parking areas.
- On-street parking is discouraged. Driveways, parking lot entrances, and service drive entrances are allowed.
- Maintain capability for large vehicles such as fire trucks and moving vans.

### Service Drives

- Service drives provide access for service vehicles to certain parts of a building or site.
- Combine service drives for several facilities where possible.
- Minimize the visual impact of service drives through correct placement and landscape screening.





### Intersections

- Incorporate crosswalks at all intersections within the Community setting.
- Provide a 45-foot clear zone for vision at uncontrolled intersections.
- Parking is not allowed within 40 feet of intersections
- Reduce corner radiuses at lower hierarchy roadways to reduce traffic speeds.
- Intersect roadways at 90-degree angles and avoid "offset" intersections.

### Paving, Curb and Gutter

- Use asphalt paving for all primary, secondary, and access roadways.
- Use concrete paving in loading areas and sites used by heavy vehicles.
- Gravel surfacing may be used on patrol roads and outlying sites only.
- Incorporate a concrete apron where gravel roads meet paved roads.
- All patching shall match adjacent materials.
- Provide a 6-inch integrated concrete curb and gutter for all roadways in developed areas.
- Patrol roads and service drives in outlying areas may not require curb and gutter, with ACRB approval.
- Wheel stops in lieu of curbs are not allowed.
- Do not paint concrete curbs.

### ■ PARKING AREAS

Develop functional lots with clear circulation and a positive appearance that complements the facility. Provide a pleasant transition from vehicle to facility. (Also see Landscape Section).

#### General

- Minimize the visual impact of parking by using small, well-screened parking lots.
- Combine parking areas for adjacent facilities.
- Limit reserved parking.
- Avoid parking automobiles directly in front of primary building entrances.

#### Setbacks

- Maintain a 20-foot setback from streets where possible.
- Provide a 10-foot minimum separation between building and parking area.





### Medians and Islands

- Provide planting medians for every four rows of vehicles and planting islands for every 20 stalls.
- Provide designated areas for pedestrian cross traffic.
- Use coordinated lighting standard layout within island placement.
- Use the minimum number of light poles to provide required illumination.

### Lot Layout

- Use the 90-degree parking configuration when possible. Adjustments are allowed if space is inadequate or if turnover is high.
- Coordinate entries with other adjacent drives or roads to assure well designed circulation patterns.
- Keep parking angles consistent within each parking area.
- More than 35 spaces require more than one access point.
- The standard stall size is 9 feet by 19 feet.

### Reserved Parking

- Minimize designated parking spaces by name, rank, or title.
- Reserve consolidated parking sections instead of individual stalls.
- When required, use curb-mounted signs.
- Provide handicap parking and access.
- Incorporate designated motorcycle parking within each parking area.

### Recreational Vehicle Parking

- Keep all recreational vehicles on combined lots located away from the heart of the installation.
- Visually screen storage areas from public spaces.

### Painting and Striping

- Paint stall separation lines with a white, 4-inch wide single stripe.
- Use reflective traffic paint for crosswalk stripes and acrylic paint for parking stripes.

### Paving, Curb, and Gutter

- Provide asphalt paving as the standard.
- Use concrete where required for heavy vehicles, motorcycle parking, and where fuel spills may occur.
- Use 6-inch integrated concrete curb and gutter for parking areas. Asphalt curbs, wood timbers, and pre-cast wheel stops are not allowed.



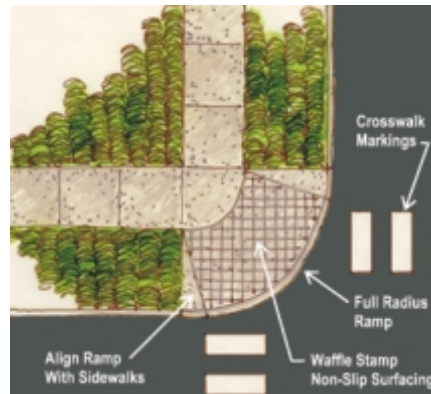


## ■ PEDESTRIAN CIRCULATION

Create convenient and pleasant pedestrian circulation pathways that will help promote walking as a real alternative to vehicular transportation.

### Sidewalks

- Provide walkways five feet wide and not less than 5 feet from all primary, secondary, and access roadways.
- Provide curvilinear / meandering walks for dormitory and housing areas.
- Maintain a minimum 3-foot wide landscaped parkway between curb and sidewalk at primary, secondary, and access roadways.
- Provide sidewalk access to all facilities for visual scale and proportion considerations as well as to accommodate traffic volume.
- Do not make any sidewalk smaller than 3 feet wide.
- Use natural colored concrete with a broom finish and troweled edges for all walkways in developed areas.
- Use terra cotta colored concrete pavers, refined joint patterns, or scoring in high-visibility special areas.



### Crosswalks and Ramps

- Ensure that all paths lead to the safest crossing point possible, and cross roadways at 90-degree angles.
- Incorporate ADA access curb ramps and crosswalk markings into all crosswalks.
- Construct crosswalks of terra cotta colored concrete pavers with natural gray concrete edging at high-visibility locations to improve safety.
- Construct all concrete curb ramps with a waffle stamp pattern and flared curb ramps.
- Provide for adequate drainage away from the ramp or by drainage grates.



### Recreational Trails

- Provide a minimum, 6-foot paved width in a free form configuration that follows the contours or other natural features.
- Separate the trail system from vehicular traffic by a minimum of 10 feet when running parallel to roadways.
- Take advantage of natural environments such as the golf course, wetland areas, and the beachfront. Make the walk pleasant by incorporating activity generators, interpretive signs and recreation opportunities along the trail.





- Provide a 5-foot by 10-foot paved rest area approximately every mile along the trail system, including a bench and litter receptacle at each location.
- Use asphaltic concrete for trail systems except in highly natural settings such as wetlands and wooded areas; then cover the trails with compacted, crushed fines.

## ■ SIGNAGE

Signs are an important and positive element in the overall base appearance. Their purpose is to clearly communicate necessary or helpful information concerning directions or identification without adding visual clutter.

### General

- Use concise clear signing in accordance with MacDill AFB, AMC, and Air Force Sign Standards.
- Minimize the number of signs used for each facility.
- Signs must be consistent in style, color, language, and placement.

### Color

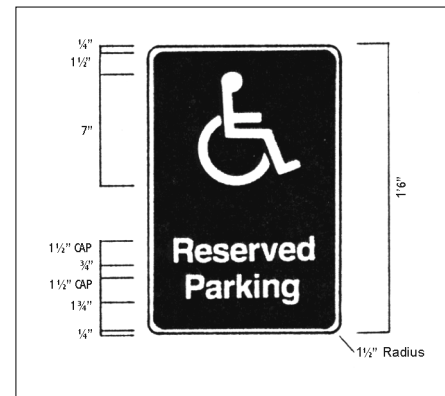
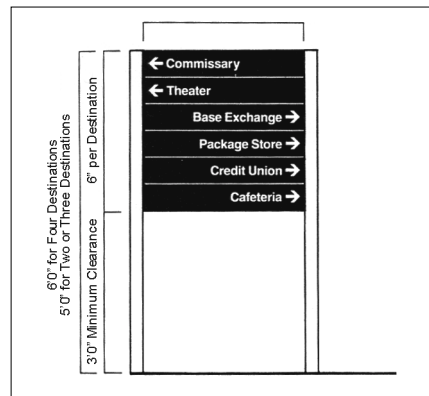
- Use Architectural Brown backgrounds with reflective white lettering on metal placards for all identification and directional signs unless otherwise noted.
- Use square metal posts finished Architectural Brown.
- Finish back of sign and fastening devices Architectural Brown.

### Typeface

- Use Helvetica Medium in upper and lower case, for primary information and Helvetica Light for secondary information.
- A serif typeface may be used for special identification signs associated with community facilities, key intersections, and special entrances.

### Identification Signs

- Limit the use of monument signs to entry gates, headquarters buildings, housing neighborhoods, and special use areas / facilities with ACRB approval.
- Construct monument signs of cast concrete with a Brazil Nut colored stucco finish. Use pin mounted Helvetica letters.
- Limit the use of mottoes, individual titles, or insignia.
- Incorporate landscaping, accent lighting, and / or paving into the design.





- Facility identification signs normally identify individual facilities and are generally free standing and not applied to facility facades.
- Street addresses are displayed near the formal, primary entry of the facility.
- Facility numbers are displayed in one location, either the back or side corner of buildings, coordinated with architectural features.
- Building-mounted signs or individual letters with corporate logos are allowed for commercial facility signs only with ACRB approval.

#### Direction Signs

- Use to identify highly frequented or special interest destinations and street names.
- Display the Air Mobility Command logo decal on the left of all street name signs.

#### Regulatory Signs

- Use for traffic control, parking, and base warnings.
- Traffic control signs must follow the *Manual on Uniform Traffic Control Devices* administered by the Federal Highway Administration for color and display requirements.
- Handicapped parking signs must follow AMC Sign Standards for color and display requirements.
- Base warning signs must adhere to AFP 32-1097 for display requirements.

#### LIGHTING

Exterior lighting is a system that directly impacts the visual qualities of the base. By day, the fixtures and poles add visual character and rhythm to the streetscape. By night, these amenities become a dominant force in the perception of safety and comfort. The use of common components and the removal of overhead lines will help to improve and unify the base appearance.

#### General

- All classifications of roadways will use the same luminaries, poles, and mounting height.
- Bury all utilities serving lighting fixtures.

#### Lamp Types

- Use high-pressure sodium lamps for all applications.
- Photometrics are required for all applications.





**Luminaires and Poles**

- Use antiqued brown, factory finished, historical reproduction luminaires and poles for all roadways.
- Equally space poles on alternating sides of all roadways.
- Provide fixtures at all four corners of intersections.
- Provide pedestrian-scaled lighting fixtures throughout housing area and along recreation trails and sidewalks not adjacent to roadways.
- Equally space light fixtures for side walks on same side of walk.

**Mounting Heights**

- Control spillover light near residential areas.
- Mount luminaires at 20 feet high.

**Parking Areas**

- Use arm mounted, square, shoebox-type luminaires in factory finished, dark bronze.
- Use multiple luminaires on dark bronze, square poles to reduce the number of poles needed.
- Coordinate pole placement with parking island locations.

**Architectural and Accent**

- Incorporate recessed, wall-mounted luminaires to wash light across plaza, paving, and stairs.
- Uplight landscaping and architectural features to emphasize importance and hierarchy.
- Minimize the use of building mounted fixtures for general illumination of service yards and outdoor spaces.





## ■ UTILITIES

Utilities are an unavoidable visual liability in the built environment. Reducing the negative impact of utilities reduces the visual clutter of the base thereby allowing the eye to focus more clearly on the other, more aesthetic elements of the landscape.

Removing or relocating utility lines and equipment from the most visible areas of the installation will improve the overall character.

### Utility Lines

- Place all pole mounted utility lines and building feeds underground.
- Use every opportunity to bury utilities.
- Exposed conduits, cables, and wires are not permitted.

### Utility Structures

- Avoid free standing utility structures where possible.
- Use underground vaults for equipment where possible.
- Locate pad mounted equipment in less visible areas and screen with landscaping or screen walls.

### Fire Hydrants

- Locate fire hydrants at least 5 feet away from other structures. Maintain a 30-inch clear area around the hydrant.
- Paint hydrants Architectural Brown with color-coded cap-band to indicate pressure.

### Mechanical Equipment / Components

- Carefully place and organize equipment and services.
- Locate mechanical equipment on the least public side of the building.
- Screen all mechanical equipment with landscaping materials or screen walls. (Refer to Screen Walls).
- If mechanical equipment is placed within 10 feet of a building, paint to match the wall color. If placed farther than 10 feet, paint Architectural Brown.
- Minimize the use of all externally attached meters and control devices. If used, paint to match the wall color.
- Externally attached utility conduits, lines, or equipment (except meters and control devices) are not allowed.

### Communications

- Collocate coaxial and telephone exterior components at entry points into buildings.
- Align all communications components with one another on the horizontal and vertical plane.







# l a n d s c a p e

A properly designed and implemented landscape enhances all facilities and the community in general. It also provides a significant opportunity to unify a functionally and aesthetically diverse community by providing a visual constant throughout. Through careful selection of plant materials, the landscaping will reinforce and enhance the semi-tropical character of the area. Creating continuity and reducing the negative visual impact of unsightly features are some of the primary goals of landscaping. In the application of these goals, the designer should strive towards sustainability (low maintenance). Apply three-tiered planting schemes of ground cover, shrubs, and trees using a variety of species in lush combinations to provide seasonal color.



## ■ GENERAL

Develop the Florida Coastal look with regional plant materials in curvilinear layouts. Include landscaping with all new facilities and use it to enhance / unify existing non-conforming facilities.

### Maintenance

- Use only approved planting materials as specified on the Plant Material List in Appendix A-3.
- Follow plant material provider's installation recommendations for planting depth, spacing, soil conditioning, staking, fertilizing, and watering.
- Do not unnaturally alter planting materials in any way, such as painting the bases of palms.
- Use shredded cypress mulch in planting beds to reduce the need for weeding and to conserve water.
- Reduce maintenance costs by using proper plant materials in configurations that do not require pruning.
- Install sprinkler systems to reduce maintenance costs.
- Use timers and electronic water gauges to avoid over-watering.
- Refer to plant material providers for recommendations on salt tolerance. Plants in certain locations will be impacted by ground water.







### Edging

- Provide poured concrete edging at planting beds as the standard.
- Separate and define all planting areas with sod cut edging at a minimum.
- Use concrete paver edging in the most visible and important locations.
- Use spade cut edging for Self-Help projects.
- Do not use wood timber edging in any applications.

### Landscape Screens

- Where possible use landscaping instead of walls for screening.
- Use a three-tiered landscape screen that combines ground covers, shrubs, and small trees with walls and fences.
- Use shrubs or vines on trellis structures to hide unsightly equipment or otherwise control the visual environment.

### ■ OPEN SPACE

Low lying areas between facilities, even though less visually important, still require careful consideration. Use the proper ground cover to visually tie the larger pieces of the landscape together and to help prevent soil degradation.

### Ground Covers

- Use turf for all recreation areas, parade grounds, lawns, and open fields.
- Create undeveloped natural areas using native grasses and shrubs.
- Incorporate no-maintenance ground cover materials in areas of steep slope or areas that are difficult to maintain.



## ■ STREETSCLAPING

Landscaping along streets plays many roles in enhancing the installation. It helps to establish the hierarchy of the roadway system, it embellishes the driving experience, and it creates a visual characteristic that carries throughout the base.

### Roadways

- Primary roadways use same species, deciduous street trees equally spaced to coordinate with light standards.
- Use palms on high-profile primary streets equally spaced to coordinate with light standards.
- Secondary and access roadways use a more random spacing of mixed species in clusters and / or groupings at focal points.
- Plant deciduous street trees on the building side of sidewalks.
- Reduce the density of plantings in the Industrial / Flightline area.

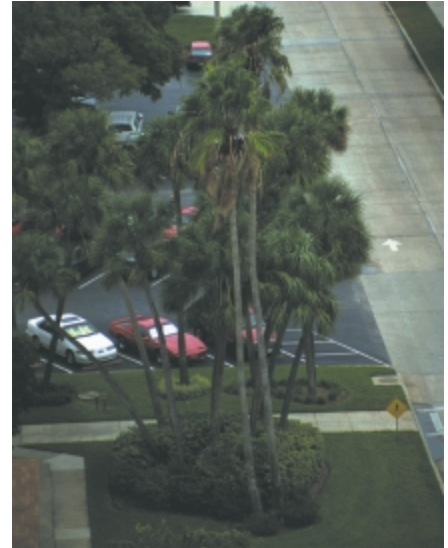
### Parking Areas

- Reduce visual impact of large parking areas with landscape buffers and parking islands.
- Use deciduous street trees in medians and islands to create shade and interest.
- Fill in between trees with low shrubs, flowers, and ground covers. Allow areas for pedestrian cross circulation.
- Use shrubs in groupings around the perimeter of parking areas to soften views from the street.
- Avoid the use of hedges outlining parking areas.

### Recreational Trails

- Incorporate formal plantings at high visibility areas along the trail system.
- Use informal groupings of trees, shrubs, and flowers at rest stops, play areas, and intersections.

## ■ FACILITY LANDSCAPING







The goals of facility landscaping are to provide a soft transition from the horizontal ground plane to the vertical building plane, to highlight building entries and features. Hide unattractive building features such as utility risers or service areas.

**Community**

- Use landscaping elements that compliment building architectural features and proportions.
- Design randomly spaced plantings and tree massing to fill-out areas between facilities.
- Front facades, especially along Florida Keys Ave., are to have a consistent landscaping of a limited palette.
- Limit the use of palms to entries and high-visibility areas by framing desired views.
- Use ground covers within planting beds.

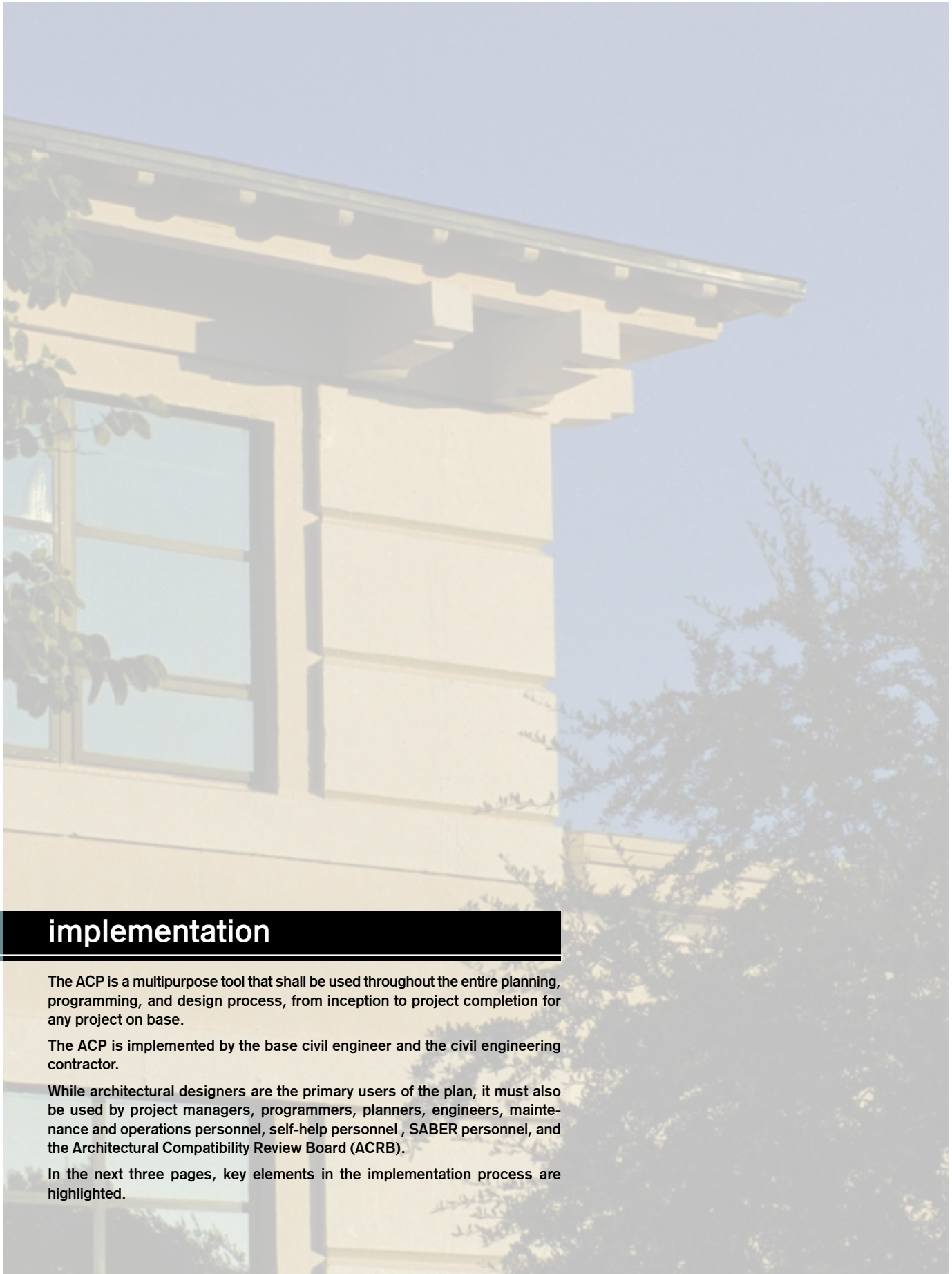
**Industrial / Flightline**

- Use landscaping to soften and reduce the scale of larger facilities.
- Minimize the use of deciduous trees and shrubs to prevent leaf buildup along the apron and runway.
- Reduce the quantity of landscaping by grouping landscape elements at entries and high-visibility areas.

**Residential**

- Provide a transition from the elevated housing units to the ground plane and hide unattractive elements such as HVAC units.
- Use mixed species in an informal planting style.
- Use randomly spaced plantings and tree massing.
- Reinforce pedestrian routes with landscaping to add user appeal.
- Provide accent plantings at neighborhood entries.





## implementation

The ACP is a multipurpose tool that shall be used throughout the entire planning, programming, and design process, from inception to project completion for any project on base.

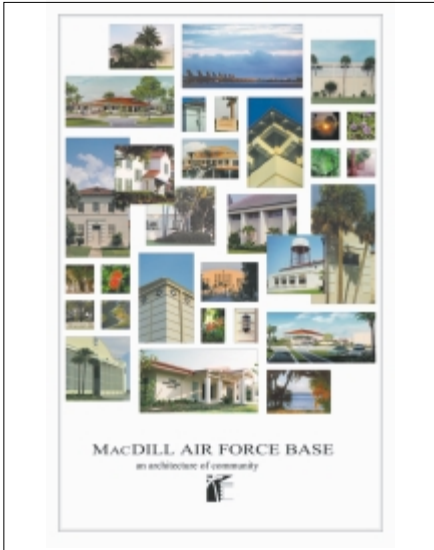
The ACP is implemented by the base civil engineer and the civil engineering contractor.

While architectural designers are the primary users of the plan, it must also be used by project managers, programmers, planners, engineers, maintenance and operations personnel, self-help personnel, SABER personnel, and the Architectural Compatibility Review Board (ACRB).

In the next three pages, key elements in the implementation process are highlighted.







**Key Elements**

Adhering to key elements of the implementation process leads to success in designing excellent facilities that will be compatible with and a part of the whole community.

- Distribute the ACP.
- Establish the Architectural Compatibility Review Board (ACRB).
- Hire good designers.
- Respect the General Plan.
- Process proper submittals.
- Cross-reference all planning and design documents to the ACP.

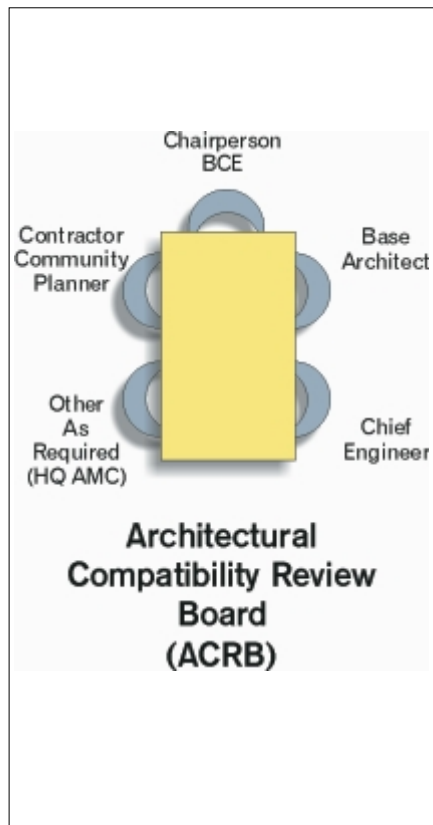
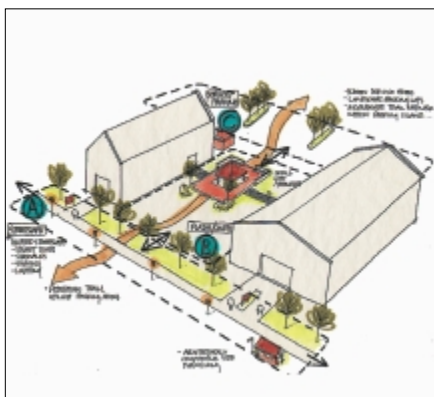
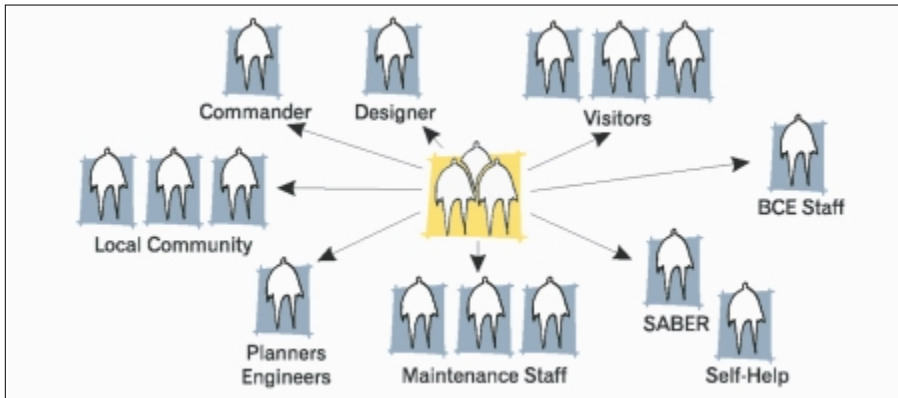
**Distribute the ACP**

Distribution of the plan should be as wide as possible. On base, provide copies to commanders of all major units and tenants, the civil engineering squadron commander, branch chiefs, base architect, and master planner. Provide copies to the major command and headquarters representatives. The Public Affairs Office maintains extra copies for general distribution, distinguished visitors, and other guests.

**Establish the ACRB**

The ACRB is the installation approval authority for all designs and visual features on the installation.

- The ACRB is organized and chaired by the Base Civil Engineer (BCE).
- Members include the base architect, landscape architect, community planner, chief engineer, and others as determined by the chairperson (such as HQ AMC personnel).
- The base architect and project manager review designs regardless of ACRB involvement.
- The ACRB meets as required or as a subgroup of the installation Facilities Board (FB).
- Most projects, regardless of size, are approved by the ACRB (the chairperson makes the determination on review requirements).
- Design projects are submitted to the ACRB by the Base project manager (see project checklists in Appendix A3 for submittal requirements).



**Hire Good Designers**

- Ensure the involvement of the design-oriented personnel in the A-E selection process.
- Select A-E firms that are sensitive to, and understand architectural compatibility
- The AF project manager provides copies of the ACP to the designer before design starts.

**Respect the General Plan**

All new projects must agree with the goals and objectives outlined in the installation master plan to ensure compatibility with project siting and adjacent facilities.

**Process Proper Submittals**

All design projects are reviewed by the ACRB. This includes Requirements Documents, Concept Design, and Final Design submittals.

Submittals shall include the required information and data at the appropriate times, and the process shall allow adequate review time.

**Requirements Document**

In this initial submittal, the A-E defines, with the help of the AF, the requirements for the project. It may explore potential solutions, but more importantly, it includes "bubble diagrams", relationships of major functional elements, and site / facility development options. This submittal is reviewed by the ACRB.

Each submitted package will comprise the following.

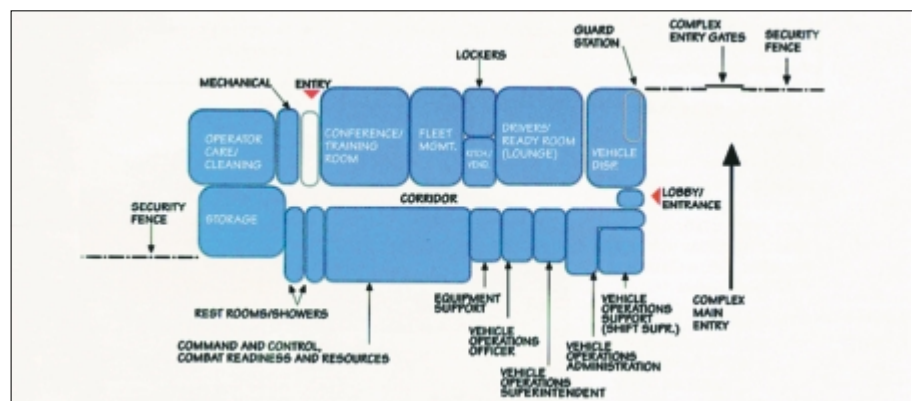
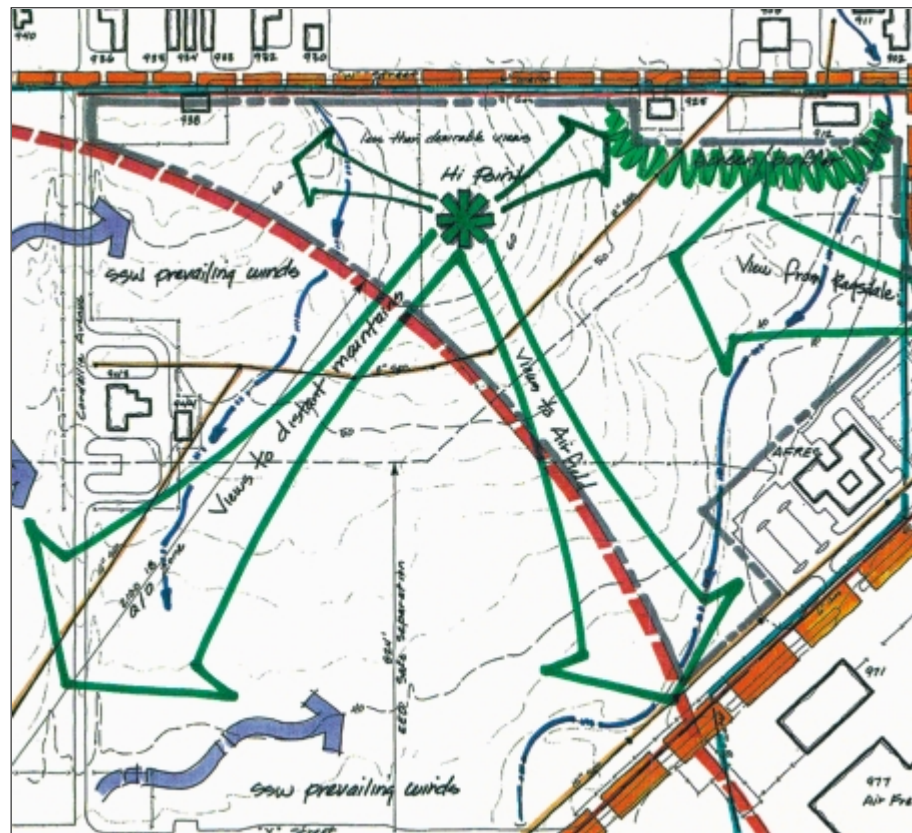
- Scope / Programming Requirements
- Project Description
- Goals and Objectives
- Subarea Development Plans
- Site Inventory / Site Analysis
- Spatial Relationship Analysis (i.e., relationship to site)
- Adjacent Facilities and Project Site Photos

Site Inventory / Site Analysis includes (but is not limited to): vehicular traffic patterns, view, climatic conditions, environmental, safety, utility constraints, and geographic conditions. Refer to sketch below.

**Concept Design**

This submittal must include adequate information to fully describe the project design, allowing customers / clients to easily comprehend the proposed solution. The goal is to achieve AF customer understanding and approval early in this process. Multiple submittals may be

required for large or complex projects. Generally, completion of concept design requires two submittals. The first is a more schematic approach to the solution, while the final concept presents a refined and more detailed design. These submittals shall be design presentation documents, not construction documents (CADD). Develop site plan, floor plans, roof plan, and building massing / elevations concurrently to ensure the proposed solution is a comprehensive design (not piecemealed). Do not develop a floor plan without consideration of site and building massing.







The ACRB reviews the packages as part of the concept development process. If the initial submittal is not approved, or if there are significant concerns or comments, a resubmittal is provided prior to proceeding to the next design stage.

Each submittal will be comprised of a complete comprehensive package including:

- Concise Verbalized Design Concept
- Systems Description
- Adjacent Facilities and Project Site Photo
- Site Plans (colored)
- Floor Plans
- Composite Elevations (with color and shadows)

- Mechanical / Electrical / Communication Entrances and Equipment Locations / Configuration.
- Building Sections
- Roof Plan
- Massing or Perspective Sketches
- Study Model (as required)
- Cost Estimate

**Final Design**

The final design shall demonstrate that the project remains consistent with the approved concept design. It includes highly developed drawings that further refine and detail the visual and functional quality of the design.

Each submittal will be comprised of a complete comprehensive package that includes but is not limited to:

- Formal Colored Rendering (early in this phase)
- Material / Color Boards (interior and exterior)
- Catalog Cut (photos)
- Design Analysis
- Cost Estimate
- Construction Documents

Contract documents must be in AutoCADD and include comprehensive drawings and specifications to ensure that a project can be constructed to meet all of the requirements and standards defined by the ACP.

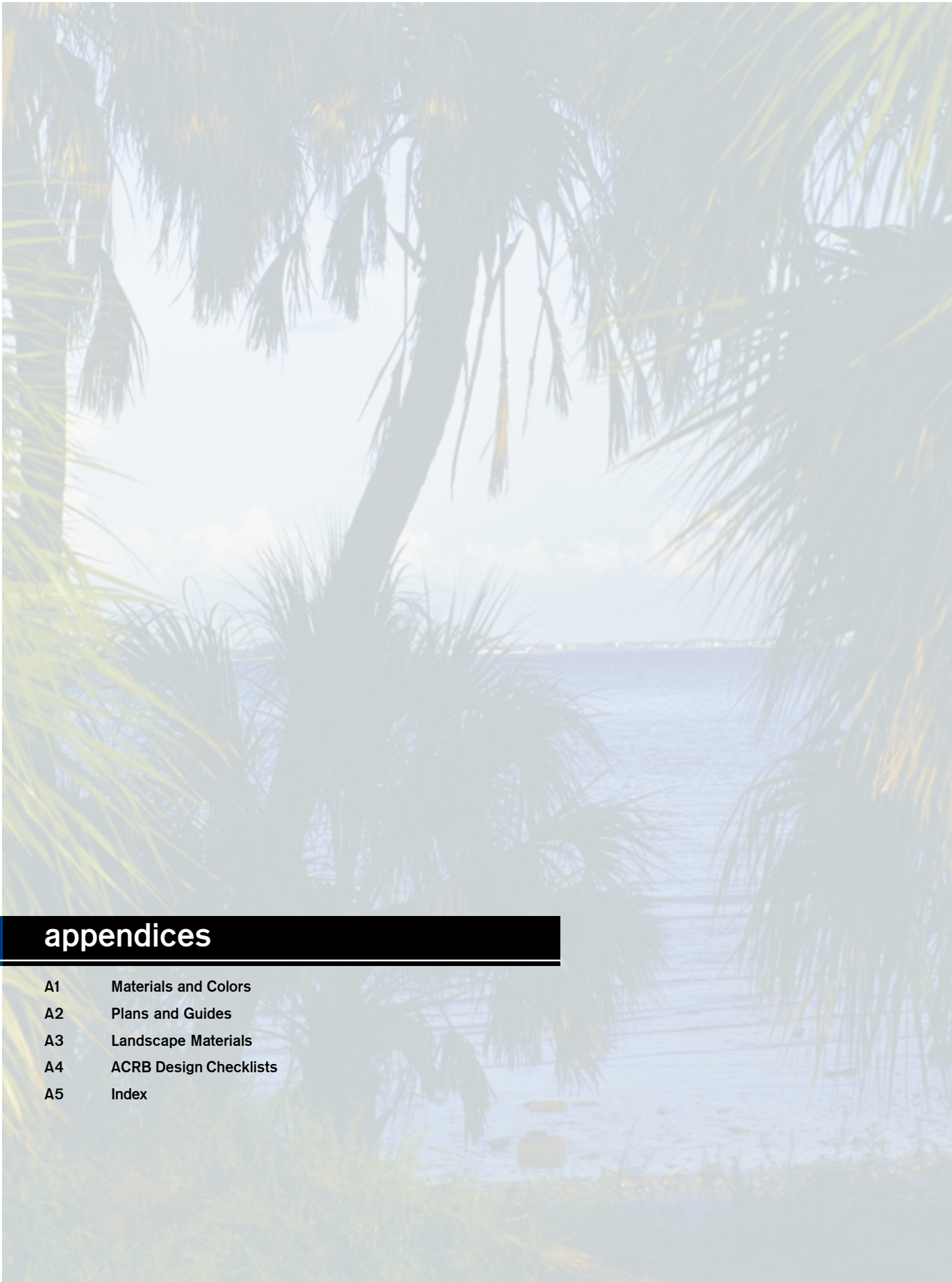
All mechanical and electrical drawings must be consistent with the architectural drawings. All utility elements such as light fixtures, transformers, panels, grilles, vents, piping, etc., must be shown on the architectural drawings.

**ACRB Checklists**

Smaller projects and service contracts are reviewed by the BCE using the checklist, located in the Appendix, and are submitted to the ACRB as required. The Base project manager is responsible for providing the design checklist to the ACRB for completion.

The design checklist will assist the design review agencies in conducting consistent architectural reviews for ACP compliance. The project checklist is designed for use with major projects including military construction, nonappropriated funds, maintenance, and family housing projects requiring professional design services. Smaller projects include simplified acquisition contracts, in-house operations and maintenance projects, self-help, and housing projects that do not require contract design services.





## appendices

- A1 Materials and Colors
- A2 Plans and Guides
- A3 Landscape Materials
- A4 ACRB Design Checklists
- A5 Index







**Building Design Standards**

**Community**

**Architectural Design Features**

mfg: Pineapple Grove  
 style: SculptStone - medallions / friezes  
 color: Pure Pearl or  
 ICI Seed Pearl #2009

**Architectural Lettering**

style: Helvetica Medium  
 color: Dark Bronze

**Doors - Storefront**

mfg: Kawneer Company Inc.  
 style: Aluminum Insulated 260  
 color: Classic Bronze (dark)

**Doors / Frames - Secondary**

mfg: Kawneer Company Inc.  
 style: Aluminum/Insulated  
 color: ICI Brazil Nut #554

**Glazing**

mfg: PPG  
 style: Duel Pane Insulated Low-E  
 color: Bronze Tinted

**Paint**

mfg: ICI  
 field color: Brazil Nut #554  
 accent color: Seed Pearl #2009  
*(Architectural feature and details)*

*Downspouts*

*(match color of surface attached to)*  
 color: Brazil Nut #554 - (normally)  
 Seed Pearl #2009 *Limited Use*  
*(by approval only)*  
 color: Worsted Tan #423

**Pavers**

style: Brick  
 color: Terra Cotta

**Precast Concrete / GFRC Tint**

color: match ICI Seed Pearl #2009

**Roofs - Clay Tile**

mfg: Ludowici Roof Tile  
 style: 18" Spanish Tile  
 color: multi-colored

**Roofs - Metal**

finish: Kynar 500 or Wylar 5000  
 style: Flat profile 16" wide; 2" seam, 20  
 GA UL 90 rated  
 color: PPG #5LR53975, Terra Cotta  
 coating: Duranar

**Screen Walls - Facilities**

mfg: TARMAC  
 style: Split Face / Running Bond  
 color: Pebble (field)

**Screen Walls - Gardens**

mfg: TARMAC  
 style: Split Face / Running Bond  
 color: Macadamia (field); Pebble  
 (accent)

**Stucco**

tint mfg: Parex  
 field color: Brazil Nut - 23237  
 accent color: Seed Pearl - 26236  
 sand finish: Fine #324; Coarse #325

**Windows**

tint mfg: Kawneer Company Inc.  
 style: Equiline 8350T-L  
 color: Dark Bronze

**Community - Industrial / Flightline**

**Concrete Masonry Unit**

mfg: TARMAC  
 style: Split Face / Running Bond  
 color: Pebble

**Metal Panel**

mfg: Una-Clad Copper Sales, Inc.  
 style: series 4000 Una-Fab / Alum Plate  
 color: Brazil Nut

**Stucco**

tint mfg: Parex  
 color: Worsted Tan - 26238

**Vert / Horz Translucent Panels**

mfg: Kalwall  
 style: Sandwich Panel  
 frame color: Minuette - #03  
 panel color: White

**Community - NAVCENT**

**CMU**

mfg: TARMAC  
 style: Split Ribbed / Running Bond  
 color: Macadamia

**Roofing**

style: standing seam metal  
 color: dark bronze

**Community - Commercial**

**Roofing**

style: standing seam metal  
 color: dark bronze

**Stucco**

tint mfg: Parex  
 color: MacDill - Brazil Nut - 26237 (field)  
 Clay Powder - 10453(35) (accent)

**Community - Historic**

**Architectural Lettering**

style: Clarendon Medium  
 finish: Dark Bronze

**Roofs - Clay Tile**

mfg: Ludowici Roof Tile  
 style: 18" Spanish Tile  
 color: multi-colored

**Screen Walls**

tint mfg: Parex  
 color: MacDill - Brazil Nut - 26237

**Windows and Doors**

style: Historic Reproductions  
 material: wood  
 color: ICI Seed Pearl #2009

**Family Housing**

**Lighting - Housing Unit**

mfg: Progress Lighting  
 style: Santa Barbara P5443-31  
 base: PLC-28 Quad Comp Flou GX32d-3  
 color: Black

**Lighting - Street**

mfg: Moldcast  
 style: Traditional Series 73000  
 color: Black

**Roofing (GOQ)**

mfg: MCA Ceramics of America  
 type: Clay  
 style: One piece "S" Mission  
 color: Natural Red

**Roofing**

mfg: GAF  
 style: asphalt T-lock class A  
 color: scheme  
 A - Sunset Brick  
 B - Weathered Wood  
 C - Driftwood

**Stucco**

Field:  
 tint mfg: Parex  
 color scheme: A - Peachtree Frost - 10437  
 B - Moonstone - 10446  
 C - Clear Linen - 10431

Trim:

color scheme: A - Spice Tan - 10415  
 Snowball - 10400  
 B - Chamois - 10441  
 Snowball - 10400  
 C - Cahmere - 10411  
 Snowball - 10400

sand finish: fine - #324; coarse - #325

**Windows**

style: double hung vinyl  
 color: white





## materials and colors

### Site Furnishings

#### ■ Benches and Seats

mfg: Victor Stanely, Inc.  
 style: Steelsites RB-28  
 color: Dark Bronze

#### ■ Bike Racks

mfg: Timberform  
 style: Bollard 2173  
 color: Dark Bronze

#### ■ Bollard Covers

mfg: Idealshield  
 style: BPD-YL8-60-5  
 color: Architectural Brown

#### ■ Bollards - Force Protection

style: 8" Steel Pipe, Concrete Filled  
 color: Dark Bronze

#### ■ Bollards

mfg: Kim Lighting  
 style: 8" VRB1  
 color: Dark Bronze

#### ■ Bollards - Historic

mfg: Hanover Lantern  
 style: Round Fluted  
 color: Dark Bronze

#### ■ Drinking Fountains

mfg: Most Dependable Fountain  
 style: 440  
 color: Dark Bronze

#### ■ Free Standing Planters

mfg: KI  
 style: galleria, tempe C  
 color: PPG #5LR53975, Terra Cotta

#### ■ Fencing - Perimeter Security

style: vinyl covered chain link  
 color: Dark Bronze

#### ■ Fencing - Attached To Facilities

mfg: Omega Architectural Fences  
 style: hinged  
 color: Black

#### ■ Gates

mfg: Ametco  
 style: Hinged  
 color: Worsted Tan #423

#### ■ Litter / Ash Receptacles

mfg: Victor Stanely, Inc.  
 litter style: Ironsides S-35  
 ash urn style: Ironsides S-20  
 color: Dark Bronze

#### ■ Lighting - Parking Lot

mfg: KIM  
 style: EKG 501 w/ round tapered pole  
 color: Anodized Dark Brown

#### ■ Lighting - Florida Keys Ave

mfg: SITESCAPE  
 style: Grande Manor  
 color: Dark Bronze

#### ■ Lighting - All Other Streets

mfg: Hubbell's Lighting Inc.  
 style: RL  
 color: grey

#### ■ Picnic Tables

mfg: Fairweather  
 style: F-5P (recycled plastic)  
 color: Dark Bronze

#### ■ Playground Equipment

mfg: Iron Mountain Forge  
 style: Kb45  
 color: primary colors

#### ■ Tree Gates

mfg: Urban Accessories Inc.  
 style: Chinook  
 color: low luster black

Note: Actual color samples can be seen at BCE office



## plans and guides

Use the most recent version of the following documents.

<b>General</b>	Commander's Guide to Facility Excellence, Air Mobility Command Installation Design, AFM 88-43 General Plan - MacDill Air Force Base
<b>Landscaping</b>	MacDill Air Force Base, Florida, Landscape Assistance Landscaping Design Guide, Air Mobility Command Landscaping Planning and Design, AFP 86-10
<b>Family Housing</b>	USAF Family Housing Community Guidelines for Environmental Improvement USAF Commander's Guide to Family Housing Excellence
<b>Historical Buildings</b>	Secretary of the Interior's Standards for Historic Preservation Projects (36 CFR 68) Archaeological and Historic Resources Management, DoD Directive 4710.1 Cultural Resources Management, AFI 32-7065
<b>Signs</b>	Sign Standards, AFP 32-1097 AMC Sign Standards (ETL 93-02) Manual on Uniform Traffic Control Devices, Federal Highway Administration
<b>Individual Facility Design Guidance</b>	AMC Design Guides
<b>Interior Design</b>	Interior Design Guide, Air Mobility Command
<b>Force Protection</b>	AF Force Protection Guide Interim Anti-Terrorism / Force Protection (ATFP) - Tri-Services
<b>Roads</b>	MacDill Traffic Control Standards





**Large Trees**

Botanical Name:	Common Name:	Use:
<i>Acer rubrum</i>	Red Maple	Buffer, Open Space, Screen, Walks
<i>Cinnamomum camphora</i>	Camphor Tree	Buffer, Open Space, Screen
<i>Ficus retusa "nitida"</i>	Cuban Laurel	Walks, Open Space
<i>Koelreuteria bipinnata</i>	Chinese Flame Tree	Parking Lot, Walks, Tertiary Street
<i>Koelreuteria paniculata</i>	Golden Rain Tree	Parking Lot, Walks, Tertiary Street
<i>Magnolia grandiflora</i>	Southern Magnolia	Feature, Secondary Street
<i>Paulownia tomentosa</i>	Empress Tree	Feature, Parking Lot, Open Space
<i>Pinus taeda</i>	loblolly Pine	Buffer, Open Space, Screen
<i>Quercus palustris</i>	Willow Oak	Buffer, Parking Lot, Open Space
<i>Quercus virginiana</i>	Live Oak	Buffer, Parking Lot
<i>Taxodium distichum</i>	Bald Cypress	Buffer, Open Space, Screen
<i>Ulmus paravifolia</i>	Drake Elm	Buffer, Secondary Streets, Tertiary Streets
<i>Palms Varieties</i>	Palms	Primary Streets, Entries, Feature

**Small Trees**

<i>Cyathea australis</i>	Australian Tree Fern	Feature, Entry, Open Space
<i>Cycas revoluta</i>	Sago Palms	Feature, Open Space
<i>Ilex "Nellie R. Stevens"</i>	Nellie Stevens Holly	Barrier, Buffer, Screen
<i>Ilex vomitoria</i>	Weeping Holly	Barrier, Buffer, Screen
<i>Lagerstromia indica</i>	Crape Myrtle	Feature, Foundation, Screen
<i>Murraya paniculata chalcus</i>	Orange Jasmine	Feature, Foundation, Screen
<i>Sapium sebiferum</i>	Chinese Tallow	Buffer, Parking Lot, Screen
<i>Vitex agnus-castas</i>	Chaste Tree	Feature, Foundation, Screen

**Large Shrubs**

<i>Abelia grandiflora "sherwoodii"</i>	Glossy Abelia	Buffer, Open Space, Screen
<i>Bougainvillea</i>	Bougainvillea	Entries, Trellises
<i>Callistemon</i>	Bottle Brush	Foundation, Feature, Parking Lot
<i>Hibiscus rosa sinensis</i>	Hibiscus	Foundation, Buffer, Mass, Screen
<i>Ilex vomitoria</i>	Yaupon Holly	Barrier, Screen, Hedge
<i>Jasminum nitidum</i>	Shining Jasmine	Foundation, Open Space, Feature
<i>Lantana camara</i>	Flowering Lantana	Foundation, Hedge, Embankment
<i>Ligustrum Japonica</i>	Japanese Privet	Hedge, Screen, Barrier
<i>Michelia figo</i>	Banana Shrub	Feature, Parking Lot, Secondary Street
<i>Myrica cerifera</i>	Wax Myrtle	Buffer, Screen, Open Space
<i>Nandina domestica</i>	Heavenly Bamboo	Hedge, Screen, Foundation
<i>Nerium oleander "hardy red"</i>	Oleander	Screen, Windbreak, Tertiary Street
<i>Osmanthus fragrans</i>	Sweet Olive	Screen, Hedge, Parking Lot
<i>Pittosporium tobria variegata</i>	Varigated Pittosporium	Screen, Mass, Feature
<i>Viburnum odoratissimum</i>	Sweet Viburnum	Buffer, Open Space, Screen
<i>Viburnum suspensum</i>	Sandankwa Viburnum	Buffer, Open Space, Foundation

**Small Shrubs**

<i>Agapanthus africanus</i>	Agapanthus	Accent, Foundation
<i>Carissa grandiflora</i>	Natal Plum	Barrier, Screen, Hedge
<i>Cuphea hyssopifolia</i>	False Mexican Heather	Bedding, Borders, Edging
<i>Hedychium coronarium</i>	White Ginger Lily	Foundation, Bedding, Accent
<i>Ilex crenata "helleri"</i>	Helleri Holly	Border, Ground Cover
<i>Ilex crenata "stokes"</i>	Stokes Holly	Border, Bedding
<i>Ilex vomitoria nana</i>	Dwarf Yaupon Holly	Edging, Hedge
<i>Ilex crenata "compacta"</i>	Compact Holly	Hedge, Accent
<i>Ixora "nora grant"</i>	Ixora	Foundation, Screen
<i>Justicia brandegeana</i>	Shrimp Plant	Patios, Screen, Border
<i>Nephrolepis biserrata</i>	Ferns	Bedding, Ground Cover
<i>Pentas lanceolata</i>	Egyptian Star Cluster	Foundation, Buffer, Mass
<i>Rhaphiolepis indica "alba"</i>	India Hawthorn	Foundation, Buffer, Hedge
<i>Rhododendron species</i>	Variety of Azaleas	Specimen, Foundation
<i>Strelitzia (varieties)</i>	Bird of Paradise	Specimen, Parking Lot, Accent

**Ground Cover / Vines**

<i>Ficus pumila</i>	Creeping Fig	Trellises, Fence, Walls
<i>Liriope muscari "evergreen giant"</i>	Big Blue Lilly Turf	Border, Understory, Natural Turf
<i>Liriope muscari "varigata"</i>	Varigated Liriope	Understory, Bedding
<i>Mandavilla "alice du pont"</i>	Pink Mandevilla	Bedding, Trellises
<i>Ophipojon japonicus</i>	Mondo Grass	Border, Understory, Natural Turf
<i>Plumbago capensis</i>	Cape Plumbago	Embankment, Fence
<i>Trachelospermum jasminoides</i>	Star Jasmine	Embankment, Trellises, Understory
<i>Trachelospermum asiaticum</i>	Asian Jasmine	Parking Lot, Borders, Embankment





# architectural compatibility review board project checklist

This checklist applies to all projects large and small including self-help projects. Before building, purchasing, or installing items, the project manager will submit the following documentation for review and approval by the Architectural Compatibility Review Board (ACRB). Large projects requiring professional design services must submit this form along with the design package at each phase of the project. The list of items below the phase title is representative of what must be submitted at each phase. Project continuation is contingent on phase approval. Smaller projects not requiring full design services must submit project documentation as designated by the ACRB chairperson. All projects must comply with the ACP standards as verified by this checklist and the ACRB, unless a specific exception is approved by the chairperson.

Project Title: \_\_\_\_\_

Project Number: \_\_\_\_\_ Project Address: \_\_\_\_\_

Submitted By: \_\_\_\_\_

Type of Project  SABER  MILCON  O&M  Self-Help  Housing  Other: \_\_\_\_\_

Full ACRB Review Required?  Yes  No ACP Provided to Designer?  Yes  No

Programming Documents Reviewed by ACRB?  Yes  No

## REQUIREMENTS DOCUMENT / PROGRAMMING PHASE

<input type="checkbox"/> Scope	<input type="checkbox"/> Project Description	<input type="checkbox"/> Adjacent Facilities Photos	<b>Date Submitted:</b> _____
<input type="checkbox"/> Goals	<input type="checkbox"/> Objectives	<input type="checkbox"/> Future Project Considerations	<b>Date Resubmitted:</b> _____
<input type="checkbox"/> Site Inventory / Site Analysis	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Design Complies with ACP Standards	
<input type="checkbox"/> Coordinated with Subarea Development Plans		<input type="checkbox"/> Resubmittal Requested	
<input type="checkbox"/> Coordinated with Other Planning Documents and Policies		<input type="checkbox"/> Comments Attached	
<input type="checkbox"/> Preliminary Solutions Allow for Full Compliance of ACP (design not finalized until concept design is complete)		<b>By:</b> _____ <b>Date:</b> _____	
<input type="checkbox"/> Budget	<input type="checkbox"/> Materials	<input type="checkbox"/> Furnishings	<b>User Approval:</b>
<input type="checkbox"/> Colors	<input type="checkbox"/> Equipment		<b>By:</b> _____ <b>Date:</b> _____

## CONCEPT DESIGN

<b>Building</b>			<b>Date Submitted:</b> _____
<input type="checkbox"/> Style / Form	<input type="checkbox"/> Scale	<input type="checkbox"/> Massing	<b>Date Resubmitted:</b> _____
<input type="checkbox"/> Proportions	<input type="checkbox"/> Materials	<input type="checkbox"/> Colors	<input type="checkbox"/> Design Complies with ACP Standards
<input type="checkbox"/> Wall Systems	<input type="checkbox"/> Details	<input type="checkbox"/> Ancillary Structures	<input type="checkbox"/> Resubmittal Requested
<input type="checkbox"/> Lighting	<input type="checkbox"/> Signs	<input type="checkbox"/> Roof Systems	<input type="checkbox"/> Comments Attached
<input type="checkbox"/> Entrances	<input type="checkbox"/> Windows / Doors		<b>By:</b> _____ <b>Date:</b> _____
<b>Site Development</b>			<b>User Approval:</b>
<input type="checkbox"/> Site Selection	<input type="checkbox"/> Setbacks	<input type="checkbox"/> Utilities	<b>By:</b> _____ <b>Date:</b> _____
<input type="checkbox"/> Lighting	<input type="checkbox"/> Signs	<input type="checkbox"/> Screens / Enclosures	
<input type="checkbox"/> Furnishings	<input type="checkbox"/> Landscape	<input type="checkbox"/> Future Expansion Considered	
<b>Circulation</b>			
<input type="checkbox"/> Roads / Service Drives	<input type="checkbox"/> Parking	<input type="checkbox"/> Signs	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Lighting	<input type="checkbox"/> Paths / Walks	<input type="checkbox"/> Landscape	<input type="checkbox"/> Other: _____

## FINAL DESIGN

<input type="checkbox"/> Final design remains consistent with approved concept design and elements listed above		<b>Date Submitted:</b> _____
<input type="checkbox"/> Materials / Color Board (interior and exterior)	<input type="checkbox"/> Rendering	<b>Date Resubmitted:</b> _____
<input type="checkbox"/> Catalog Cuts	<input type="checkbox"/> Landscape Development	<input type="checkbox"/> Design Complies with ACP Standards
<input type="checkbox"/> Construction Documents	<input type="checkbox"/> Fascia / Gutters / Downspouts	<input type="checkbox"/> Resubmittal Requested
<input type="checkbox"/> Architectural Details		<input type="checkbox"/> Comments Attached
<input type="checkbox"/> Cost Reduction Proposal (if necessary) Comply with ACP		<b>By:</b> _____ <b>Date:</b> _____
<input type="checkbox"/> Coordinated with Other Planning Documents and Policies		<b>User Approval:</b>
<input type="checkbox"/> Coordination / Organization of Mechanical and Electrical Elements		<b>By:</b> _____ <b>Date:</b> _____
<input type="checkbox"/> Other: _____		

## JUSTIFICATION FOR NONCOMPLIANCE

Explain: \_\_\_\_\_ **Design Does Not Comply with ACP Standards**

\_\_\_\_\_ **By:** \_\_\_\_\_ **Date:** \_\_\_\_\_





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January 2001





# TRAFFIC CONTROL STANDARDS

6th AIR MOBILITY WING



**MACDILL AFB**

19 MAY 2003

REVISION 2

# CROSSWALKS



There are two standard types of crosswalks currently in use at MacDill Air Force Base.



Type 1 - Pictured to the left.

This crosswalk is used exclusively in high visibility areas. It consists of an 8-foot wide red brick crosswalk with 12-inches wide concrete strips on either side. The brick color will be a Hollandale Red/Tan or equivalent laid in a basket weave pattern.



The foundation material for this crosswalk will be a 1-inches thick sand base over 12-inches of crushed concrete or 6-inches of Portland cement concrete. The individual bricks will have sand filler between the brick. The concrete border strips (10-inches thick by 12-inches wide) will be constructed on a crushed concrete base. Adjustments in the base thickness or border strip thickness may be required to adjust for traffic volume.

# CROSSWALKS



Type 2 Crosswalk

This is a standard crosswalk to be used throughout the base. This crosswalk will be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), Part 3b-18.



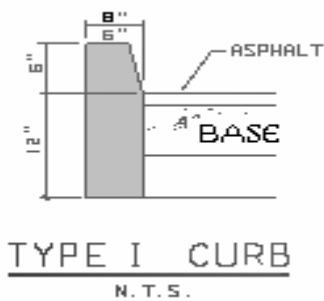
Crosswalks will consist of 12-inch wide bars spaced 48-inches apart from outside edge to outside edge. Side bars will be 12-inches wide and spaced 6-feet apart from outside edge to outside edge. Crosswalks will be made of white reflective thermoplastic material.

# CURBS



There are four standard types of curbs used at MacDill AFB.

Specifications for curbing will be according to the current Base Pavements Contract. All curbing will be reinforced per the project specifications.



Pictured to the left is a schematic of a Type 1 curb. Type 1 curb will be constructed to Florida Department of Transportation (FDOT), "Roadway and Traffic Design Standards".



A Type 1 curb is pictured on this page. This curb is used in the historic areas of the base and is used to match existing curbing in these locations.

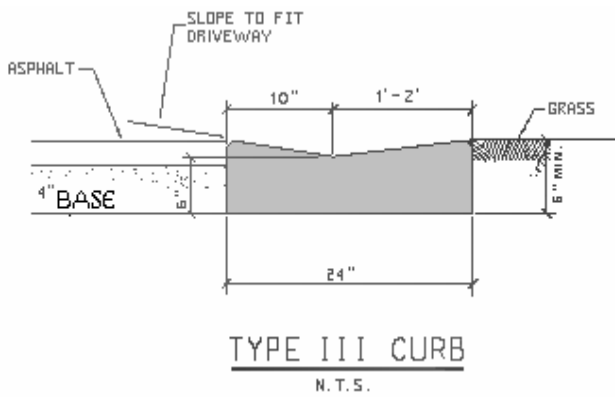




# CURBS



Type 3 curbs will be constructed per FDOT Roadway and Traffic Design Standards, FDOT Drop Curb.



Pictured to the left is a schematic of a Type 3 curb.



Type 3 curbs are used at driveways or in residential areas.

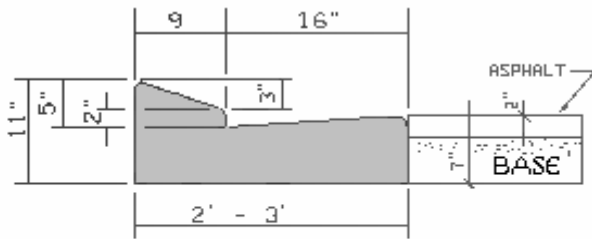
A type 3 curb is pictured on this page.

# CURBS



A Type 4 curb is pictured on this page.

Type 4 curbs will be constructed per FDOT Roadway and Traffic Design Standards, Type E FDOT Standard Curb.



Pictured to the left is a schematic of a Type 4 curb.

TYPE IV CURB

N. T. S.



A Type 4 curb is typically used in the median of a divided roadway.

# SIGNS



## REGULATORY INFORMATION AND STREET

### SIGNS:

Regulatory signs will be mounted to a uniform height of 7-feet to the bottom of the sign, per the Manual on Uniform Traffic Control Devices (MUTCD).

As pictured to the left, information signs will be mounted below regulatory signs.



Signposts will be Qwik-punch 2-inches square steel posts with rain cap. Posts will be hot-dip galvanized, with an architectural brown anodized baked enamel finish.

(UNISTRUT PART NO. 20 DIZP-10-QP)

Signs will be installed using 36-inches break-away with 12 gauge anchor sleeve. All signposts will be installed in concrete footings.



Sign fronts will be aluminum panes with baked enamel finish.



# SIGNS



Sign backs will be black vinyl as shown at left. Sign backings will be pre-coated pressure sensitive adhesive or tack-free heat activated adhesive.



Street signs will be mounted at 7-feet to the bottom of sign unless mounted on top of a regulatory sign as shown at the left. All new signs shall be made with a decal made of Engineer Grade reflective sheeting to prevent peeling.

Decals will be in color as shown.

Signs will be aluminum panes with baked enamel finish front.

Signposts and backs will be identical to regulatory signs.

# ROADWAY MARKINGS



As shown at the left, stop bars will be utilized at intersections in addition to stop signs



Stop bars will extend from the center of either the single or double yellow line to the roadway edge and will be located on the intersection side of the stop sign.



Stop bars will be fabricated using white thermoplastic paint and be 24-inches wide in accordance with the MUTCD.

# ROADWAY MARKINGS



Roadway centerlines will be yellow thermoplastic as shown at the left, unless approval is granted for an alternate type of marking by the Pavements Engineer. In “No Passing” zones, double solid yellow lines are required.

Roadway edge lines will be solid white 6-inches wide reflective painted lines.



Lines dividing two lanes of traffic in the same direction will be white thermoplastic dotted lines in accordance with the MUTCD.



Shown at the left are examples of directional arrows used to control traffic entering intersections. Directional arrows must be white reflective thermoplastic and in accordance with MUTCD standards.

# PARKING LOTS



Parking area designs will be reviewed by the Pavements Engineer to ensure they meet the established standards for these facilities. The Pavements Engineer will review the design for: Type and strength of materials. Functionality and traffic flow. Handicap accessibility and appearance as related to base standards, environmental permit approvals, and safety.



Markings in parking lots will be white. Spaces will be delineated with 5-inches wide lines. Arrows and stop bars will be applied to the pavement using reflective white thermoplastic, and will be used where appropriate. Painted, non-reflective lines will be used in parking lots except for arrows and stop bars.



Parking lots will include lighting if used during hours of darkness. Lighting shall be both functional and architecturally compatible with the surrounding area. Lighting and light poles will be approved by the Base Electrical Engineer and by the Base Architect.



# PARKING LOTS



Parking lots will normally include sidewalks to provide all weather access to the parking. Lots will have handicap access and will have reserved spaces for handicapped drivers.



Parking areas will normally be curbed to control drainage and to provide a positive stop for vehicle wheels. The use of bumper blocks in parking lots is not permitted. All environmental permit requirements must be satisfied prior to initiating construction on new parking areas.



Parking on MacDill AFB will be constructed to blend with surrounding areas. A conscious effort will be made to avoid a "sea of asphalt" effect.

# PARKING LOTS



Landscaping plants will be compatible with other plantings on MacDill AFB. Automatic sprinkler systems must be provided in areas where grass or plants require regular watering.



For MacDill AFB, the normal lane width in parking lots is 24-feet for 90 degree parking spaces. The normal dimensions of the individual parking spaces are 19-feet x 9-feet. Consult ARCHITECTURAL GRAPHICS STANDARDS, Chapter 1, “Automobiles, Roads and Parking” for other acceptable lane widths and parking stall dimensions for specific lot configurations



Parking areas will use landscaping and green spaces within the parking area to “screen” vehicles from view. Sidewalk access will be provided where parking areas are detached from facilities.

# HANDICAPPED ACCESSIBILITY



Handicap spaces will be identified by painted markings on the pavement as shown. Parking spaces will have a double 5-inch wide non-reflective white line on either side of the parking area. The “Chair” symbol will not be used nor will any blue markings be used. The handicapped sign will have a brown background with white letters. It will be mounted on the Vinyl coated Unistrut 2”x2” pole approved for MacDill AFB. Signs backs will be black vinyl.



Another example.



# HANDICAPPED ACCESSIBILITY



Handicap ramps must comply with the ADA guide requirements as well as FDOT Roadway and Traffic Design Standards. These ramps are required whenever newly constructed sidewalks intersect roads or driveways.



Examples of acceptable handicap ramps are shown at the left.



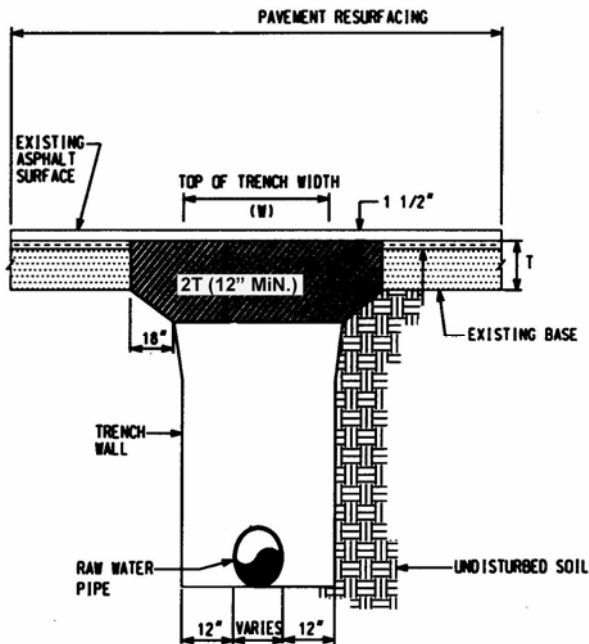
Handicap ramps similar to that shown at the left help to provide better traction for pedestrians and handicapped persons alike.



# ROADCUTS



Road cuts are to be used as a “last resort” and will be avoided whenever possible. Unless unusual circumstances dictate otherwise, horizontal boring will be used to cross roadways without damaging the roadway and marring its surface. Prior to any work of this sort, coordination will be made with the Pavements Engineer. The Pavements Engineer will generally approve all requests for horizontal boring but will require the user to "show cause" why a road cut is necessary.



If a road cut is unavoidable, the Pavements Engineer will specify the repair materials, material densities and thicknesses to be employed in the repair.

Specifications for both road cuts and horizontal boring are in the Army Corps of Engineers Guide Specifications. A detail of a MacDill approved road cut repair is shown.

# SIDEWALKS

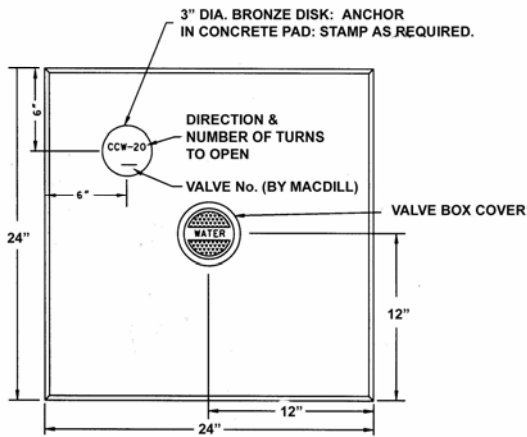
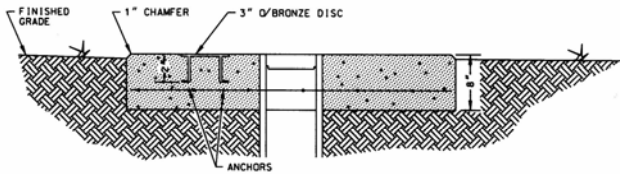


Sidewalks will be employed where pedestrian traffic is likely. Sidewalks will provide handicap access where appropriate.



Normally sidewalks are 4-feet wide and 4-inches thick. They may use wire mesh reinforced; fiber mesh reinforced or unreinforced concrete. Sidewalks which receive a high volume of pedestrian traffic may be 6-feet wide. Sidewalks that are likely to receive vehicular traffic will be at least 6-inches thick to prevent breakage. Design mix for concrete will be approved by the Project Engineer.

# MISCELLANEOUS



VALVE BOX DETAIL WITH DISK



DISKS SET IN CURB/SIDEWALK

Water and Gas valves on MacDill will be marked using a brass disk, which is depicted to the left. Valves, which lie in grassed areas, shall have a concrete pad around the valve box constructed to the dimensions shown. Valves, which lie in paved areas, are to have the disk placed in an adjacent curb. Disks mounted in existing curbs are to be fixed in place with epoxy.

Disks are to be 3-inches in diameter brass. The top line of printing will indicate whether the valve turns clockwise (CW) or Counterclockwise (CCW) and how many turns. The second line will provide the valve number, which can be obtained from the project engineer. The stamped lettering will be at least 1/4-inches high block letters.

# Landscape Theme and Design Procedures

## General Landscape Theme

Develop the Florida Coastal look with regional plant materials in curvilinear layouts. Include landscaping with all new facilities and use it to enhance and unify existing non-conforming facilities. Sustainability and low maintenance are the dominant goals for a properly designed landscape. In order to achieve these goals it is critical to select the right plant for the right location. This can be achieved by understanding the level of maintenance a particular site will receive and by visiting the site to analyze its critical functional and aesthetic issues. Once this is accomplished, the designer can create a landscape plan that will reinforce and enhance the semi-tropical character of the area. Creating continuity and reducing the negative visual impact of unsightly features are some of the primary goals of the designer.

## Maintenance and Design Procedures

- Conduct a site analysis to record the site's existing conditions. There may be established plant material that can be saved.
- Determine the site's ground category located on the Grounds Categories Map on page 13.
- Use only approved planting material as specified on the Landscape Material List located on page 14. Note the plant characteristics and ground categories given on this list indicate the ground category that a plant can be used in. Ground categories are based on the amount of maintenance an area will receive. It is critical that the designer specify the right plant material based on the amount of maintenance that a site will receive.
- Follow the Landscape and Irrigation Specifications located on page 27.
- Reduce maintenance by using proper plant materials in configurations that reduce or eliminate pruning.

- Review the typical planting examples provided for different grounds categories located on pages 6-11.
- Install an irrigation system for new plant material. When irrigation cannot be installed, provide a hand-watering schedule to establish planting growth and provide a soil polymer to retain water at the plants root system.
- All rock beds shall be treated with a pre-emergent herbicide and then top-dressed with 10 ml of weed fabric.
- All plant beds and tree rings shall be treated with a pre-emergent herbicide and then top-dressed with 3" cypress mulch. All new trees shall have a tree ring with a minimum of 24" radius. All new trees and palms shall be staked. All existing trees to remain shall have a 6' radius mulch ring at a depth of 3".
- Provide an 18" wide mulch area between a building and its foundation planting.





# General Landscape Standards

## Edging

- Separate and define all planting areas with sod cut edging.
- Provide polyethylene edging at all rock beds.

## Landscape Screens

- Where possible use landscaping instead of walls for screening.
- Use large shrubs and trees that are appropriate for each site.
- Use shrubs, vines and trellis structures to screen mechanical equipment.

## Open spaces

- Use a minimal plant palette, which provides pedestrians with excellent sight visibility and ties adjacent landscapes together.
- Use plant material to focus and direct pedestrian and vehicular traffic.
- Use turf for all recreation areas, parade grounds, and open fields.
- Create sustainable natural areas using native plant material.
- Use plant material to control erosion problems where steep slopes may occur.

## Streetscaping

- Landscaping along streets plays many roles. Landscaping establishes the hierarchy of the roadway by creating a uniform theme. It should focus and direct pedestrian and vehicular traffic, and enhance security for sensitive facilities.



# General Landscape Standards

## Roadways (Route of Excellence and Improved/ Semi-improved areas)

- For primary roadways, plant evergreen street trees equally spaced to coordinate with light standards (see improved areas example on page 6). New trees should match existing species and specifications to create a uniform appearance.
- Use palms on high-profile primary streets equally spaced to coordinate with light standards. New palms should match existing species and specifications to create a uniform appearance.
- Reduce the density of plantings in the industrial and flightline areas.



## Parking Areas (Route of Excellence and Improved/ Semi-improved areas)

- Reduce negative visual impact of large parking areas with landscape buffers and parking islands. Evergreen shade trees should be used in parking islands when irrigation is provided. Limestone boulders and red cedar barkstone should be used in small parking islands where irrigation may not be provided.
- Use shrubs in groupings around the perimeter of parking areas to soften and buffer views from the street or facility. Use evergreen trees or palm clusters to provide shade to the parking area.
- Avoid the use of large trees and shrubs where sight visibility and safety is a concern.

## Recreational Trails

- Incorporate formal plantings at high visibility areas along the trail system.
- Use informal groupings of trees, shrubs, and flowers at rest stops, play areas and intersections.



# General Landscape Standards

## Facility Landscaping

- The goals of facility landscaping are to provide a soft transition from the horizontal ground plane to the vertical building plane, to highlight building entries and features. Hide unattractive building features such as utility risers or service areas.

## Community (Route of Excellence and Improved areas)

- Use landscaping elements that compliment building architectural features and proportions.
- Limit the use of palms to entries and high-visibility areas by framing desired views.
- Apply three-tiered planting schemes of ground cover, shrubs, and trees using a variety of species in lush combinations to provide seasonal color at building entries and other areas of focus.
- Provide security buffer when necessary (see pages 10-11).

## Industrial and Flightline (Improved and Semi-improved areas)

- Minimize the use of deciduous trees and shrubs to prevent leaf buildup along the apron and runway.
- Reduce the quantity of landscaping by grouping landscape elements at entries and high-visibility areas.
- Provide security buffer when necessary (see pages 10-11).





# General Landscape Standards

## General Officers Quarters

- Use landscaping elements that compliment building architectural features and proportions.
- Limit the use of palms to entries and high-visibility areas by framing desired views.
- Apply three-tiered planting schemes of ground cover, shrubs, and trees using a variety of species in lush combinations to provide seasonal color at building entries and other areas of focus.
- Provide security buffer when necessary (see pages 10-11).



## Military Family Housing

- Use palms or accent trees on the corners of the front facade.
- Use evergreen shade trees to line the roadways.
- Limit the use of shrubs and ground cover due to limited irrigation.
- Provide irrigation bubblers at trees or a hand-watering schedule to establish growth.
- Lawn areas must be bahia sod due to limited irrigation.
- Provide accent plantings at neighborhood entries and signs





# Landscape Design, Route of Excellence

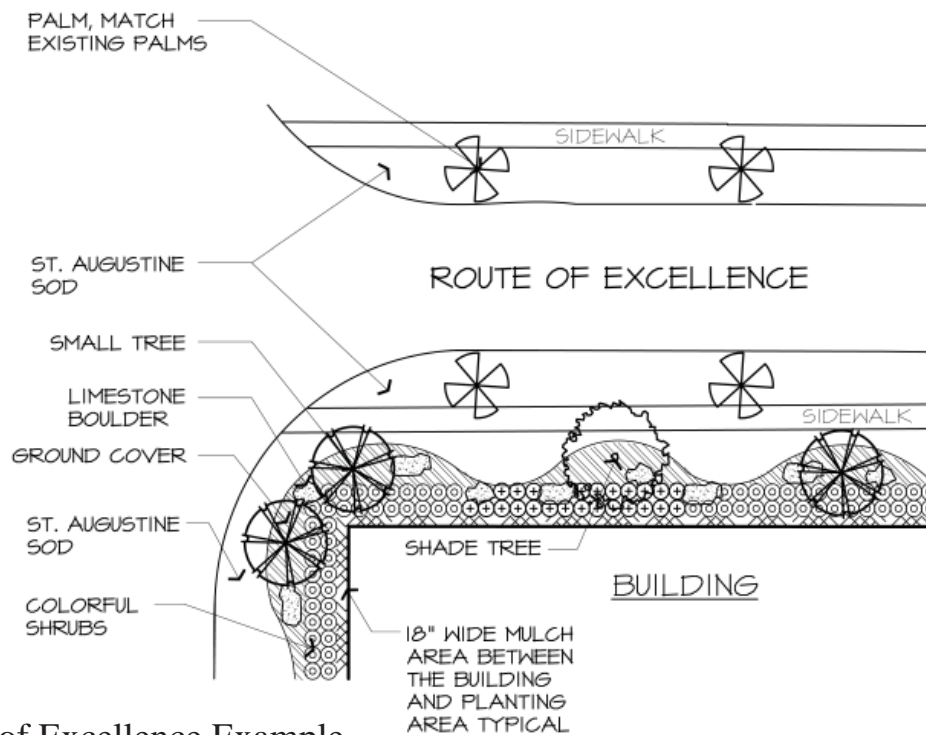
## Road right of way

- The primary goal is to create scenic roadways and facilities by establishing a landscape theme.
- Use palms equally spaced to coordinate with light standards. New palms must match existing species and specifications to create a uniform appearance.
- Use St. Augustine or Bermuda grass in right of way, match existing conditions.
- Provide excellent sight visibility for pedestrians and vehicular traffic.



## Facility Landscape

- Create a three-tiered planting scheme of trees, shrubs and ground covers.
- Develop the Florida Coastal look using the approved plant list (see Route of Excellence Example).
- Plant evergreen trees between the facility and sidewalk to provide shade, coordinate spacing with lighting standards and existing site conditions.



Route of Excellence Example

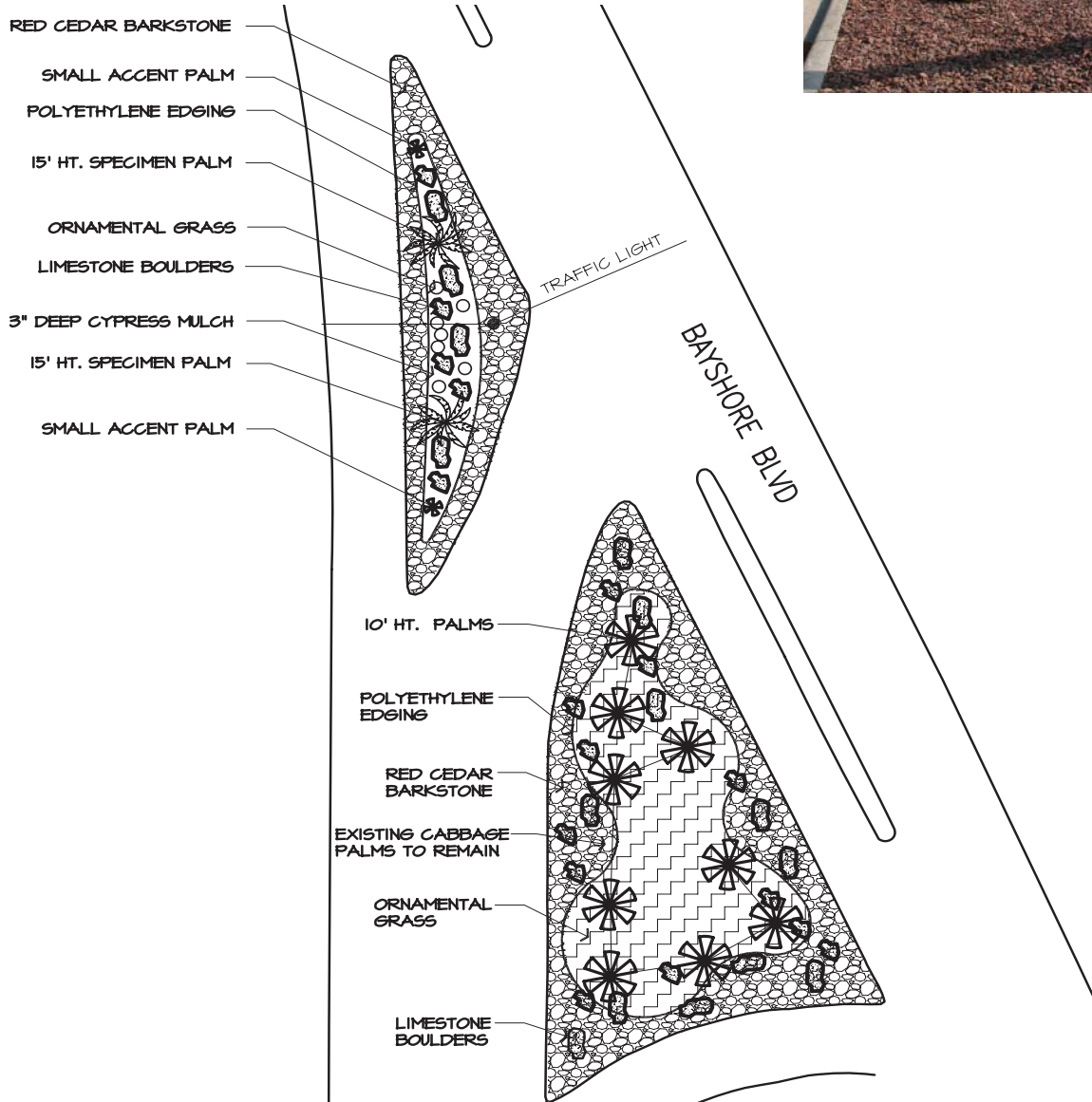
# Landscape Design, Road Medians

## Landscape Theme

- Create a sustainable low maintenance landscape with visual continuity (see median example).
- Develop the Florida Coastal look with regional plant materials in a curvilinear layout.

## Landscape Material

- Use red cedar barkstone and limestone boulders along the perimeter of the median.
- Create a curvilinear planting bed in the middle of the median.

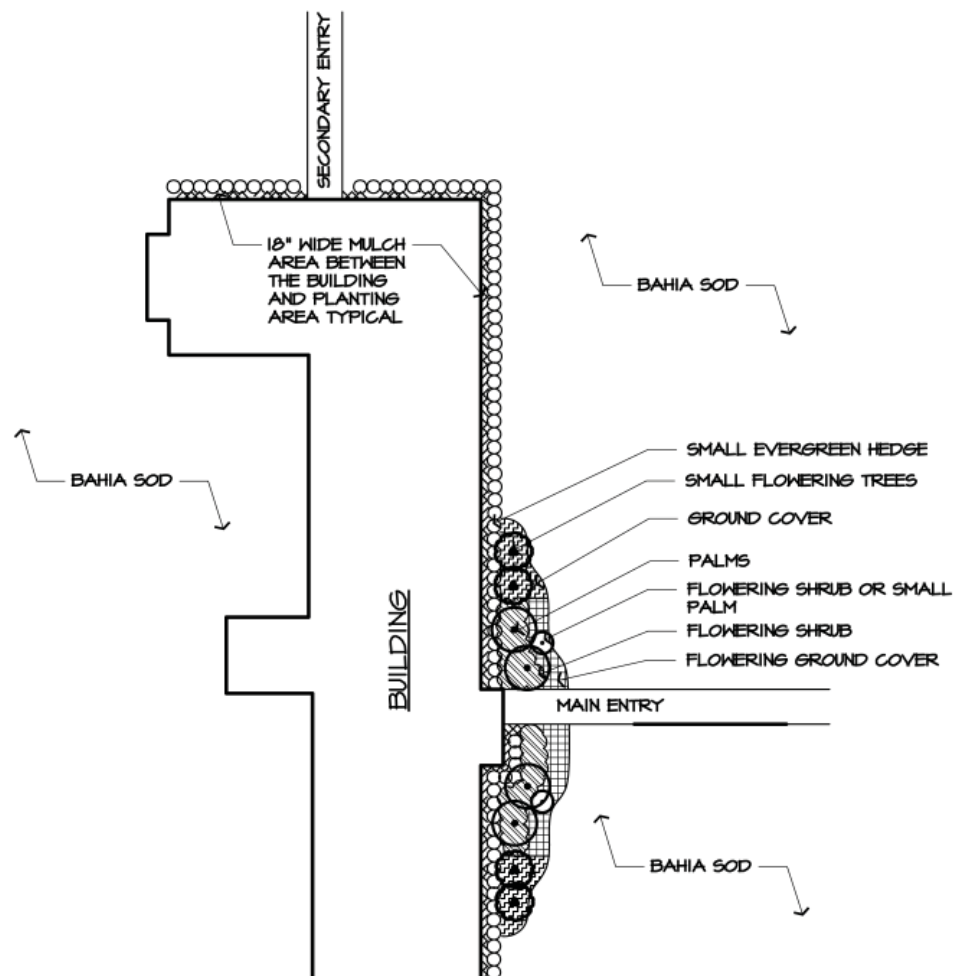


Median Example

# Landscape Design- Improved Areas

## Improved Facility Landscaping

- Provide a soft transition from the horizontal ground plane to the vertical building plane.
- Highlight building entries and features.
- Hide unattractive building features such as utility risers or service areas.
- Develop the Florida Coastal look with regional plant materials in a curvilinear layout.
- Minimize plant material in areas of low visibility.

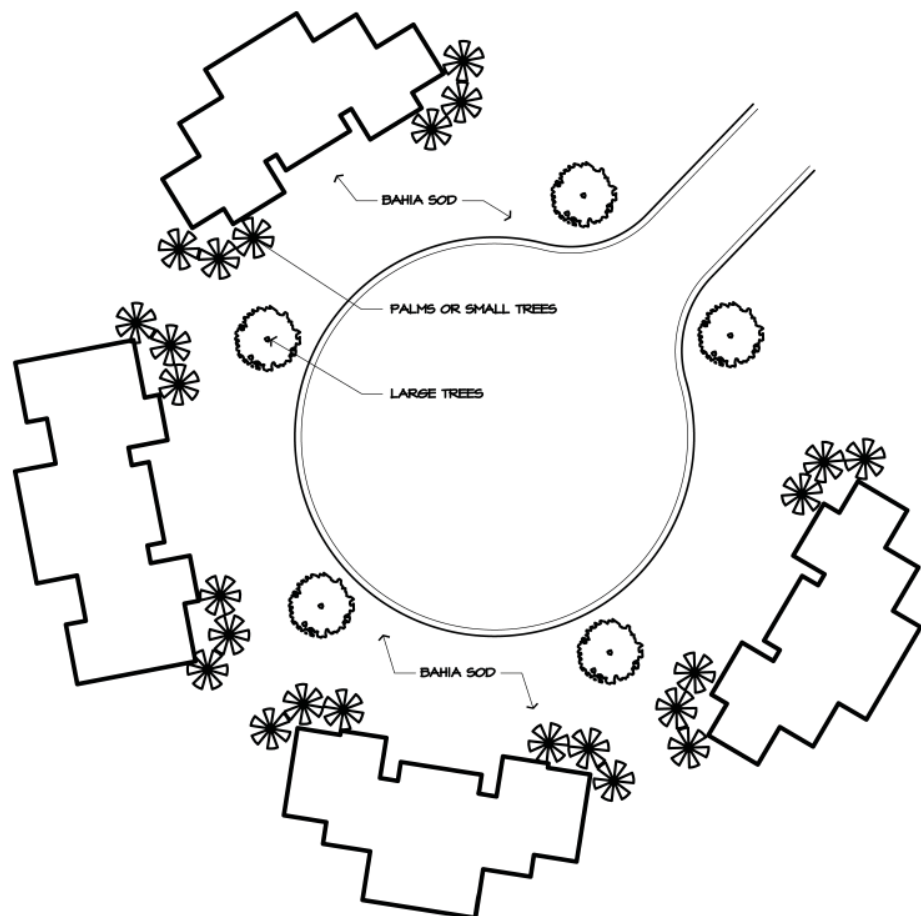


Improved Facility Example

# Landscape Design- Military Family Housing

## Landscaping Theme

- Develop the Florida Coastal look with regional plant materials in a curvilinear layout.
- Minimize plant material in areas of low visibility.
- Use palms or accent trees on the corners of the front facade (see housing example)
- Use evergreen shade trees to line the roadways.
- Limit the use of shrubs and ground cover due to limited irrigation.
- Use Bahia sod in turf areas
- Use colorful plantings at neighborhood entries and signs.



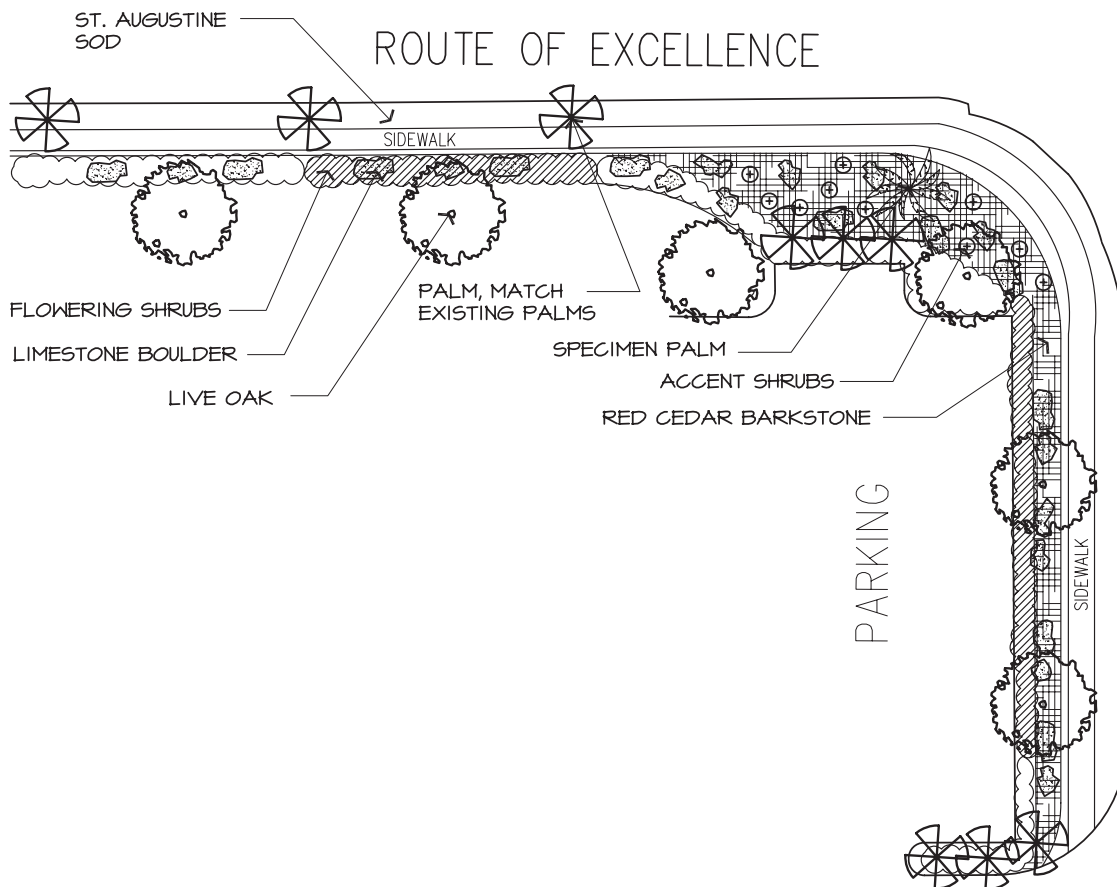
Housing Example



# Landscape Design- Security Buffers

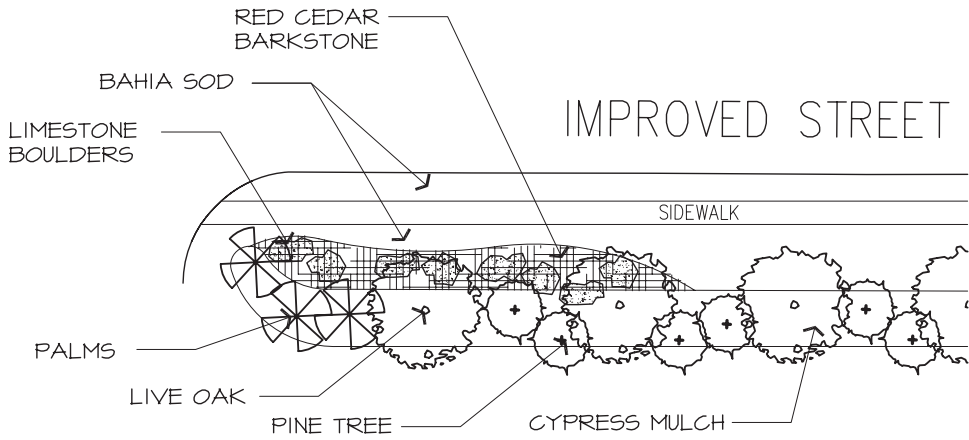
## Landscape Design Approach

- Analyze existing conditions and determine the most critical areas to protect.
- Create a tight linear buffer that a vehicle cannot penetrate (see linear buffer example page 11).
- Utilize existing plant material and enhance existing features.
- Use large trees with a minimum eight-inch caliper, and seven gallon minimum shrubs.
- Use limestone boulders approximately 3'x5' and 2'x3' in size.
- Maintain sight visibility at entry drives.
- Create earth berms with landscape plant material when possible (see earth berm example page 11).

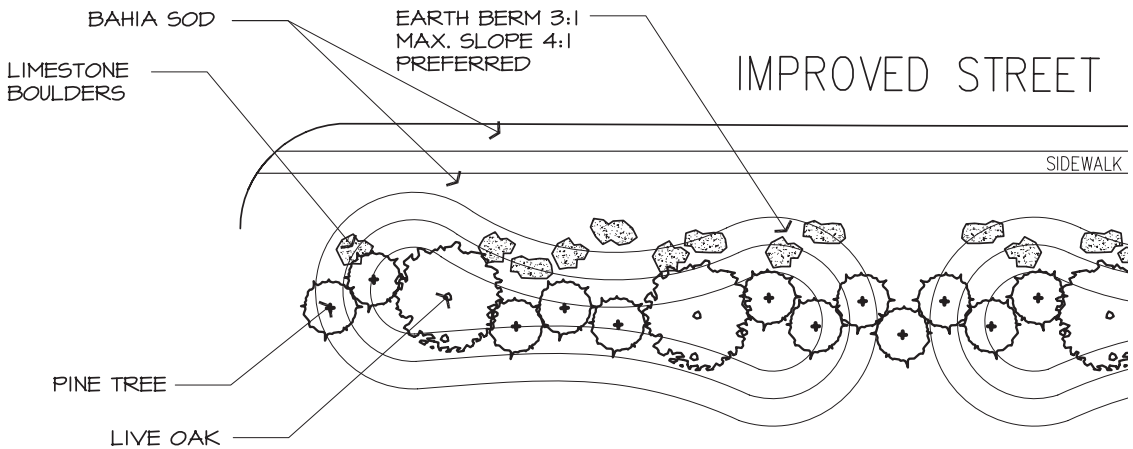


Linear buffer example

# Landscape Design- Security Buffers



Linear buffer example

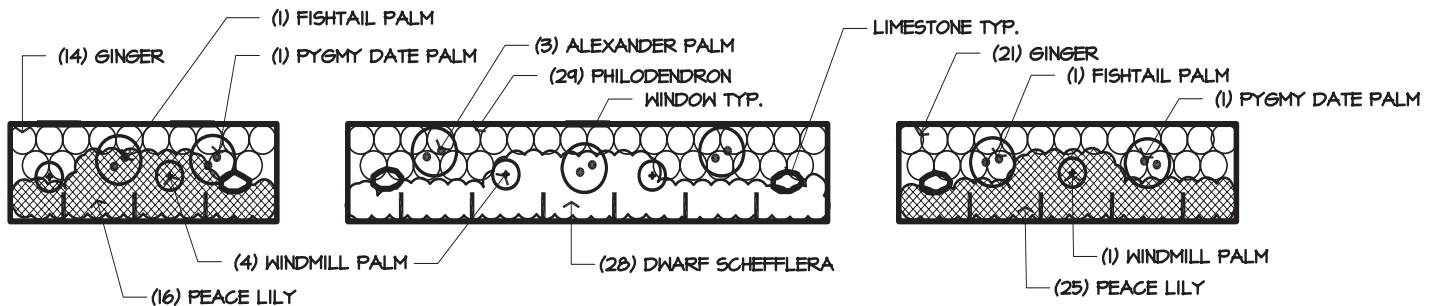


Earth berm example

# Landscape Design- Special Interest Areas

## Landscape Design Approach

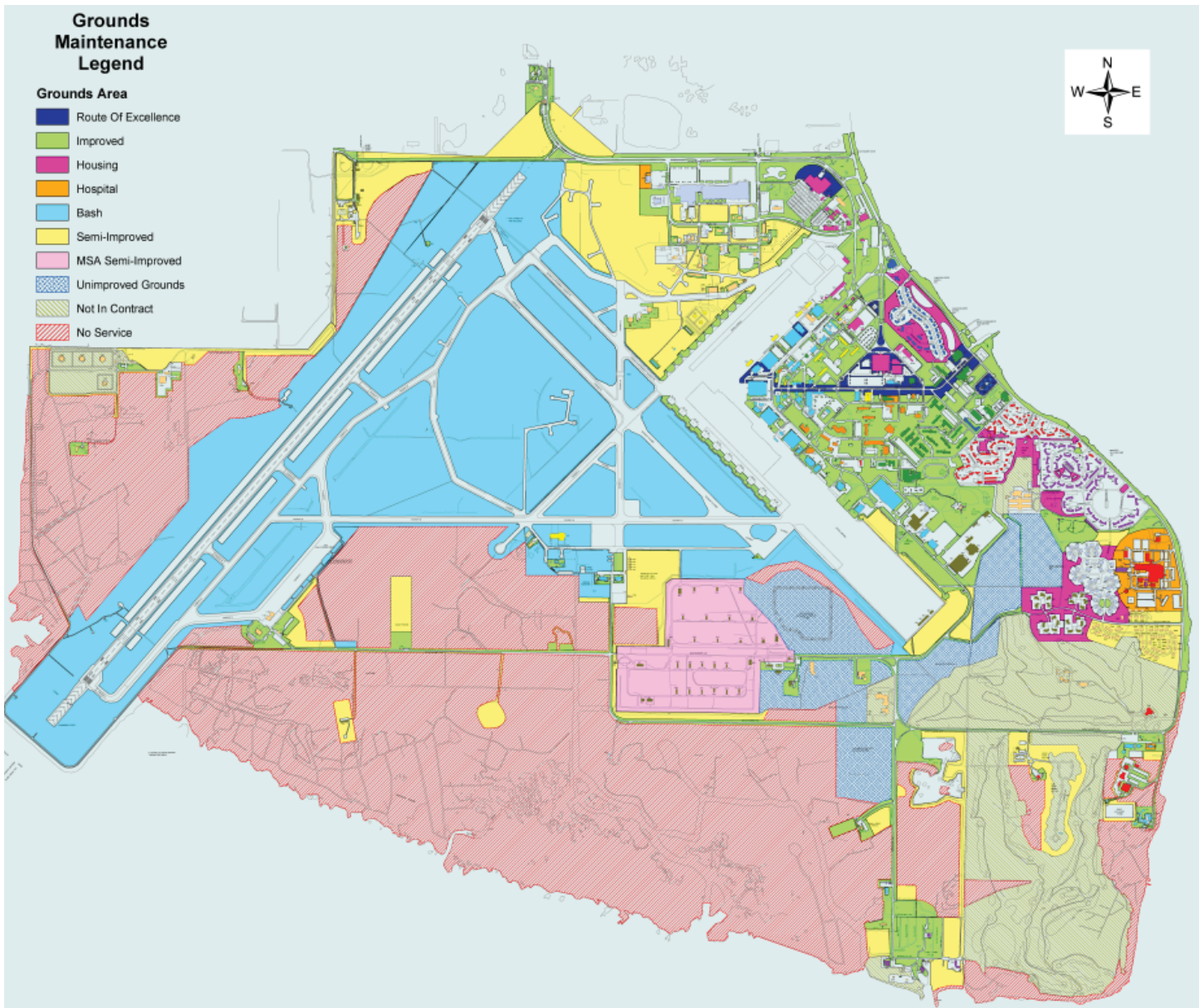
- Develop the Florida Coastal look with regional plant materials in curvilinear layouts.
- Use landscape elements that compliment the buildings architectural features and proportions.
- Apply three-tiered planting schemes of ground cover, shrubs and trees using a variety of species in lush combinations to provide seasonal color at building entries and other areas of focus.



Special Interest example (Interior Courtyard)



# Grounds Categories Map





# Landscape Material List

	Botanical Name:	Common Name:	Characteristics:
Palms	<i>Sabal palmetto</i>	Cabbage Palm	N, E, ST, DT, 1, 2, 3, 4, 5
	<i>Washingtonia robusta</i>	Washington Palm	DT, 1, 2, 3, 4
	<i>Phoenix canariensis</i>	Canary Island date	DT, S, 1, 2, 3,
	<i>Phoenix dactylifera</i>	Medjool date Palm	ST, DT, S, 1, 2, 3
	<i>Bismarckia nobilis</i>	Bismarck Palm	DT, ST, S, 1, 2, 3
	<i>Caryota mitis</i>	Fishtail Palm	S, A, 1, 2, 3
	<i>Wodyetia bifurcata</i>	Foxtail Palm	S, 1, 2, 3
	<i>Veitchia merrillii</i>	Christmas Palm	A, 1, 2, 3
	<i>Ptychosperma elegans</i>	Alexander Palm	A, 1, 2, 3
	<i>Phoenix roebelenii</i>	Pygmy Date Palm	A, 1, 2, 3, 4
	<i>Syagrus romanzoffiana</i>	Queen Palm	DT, 1, 2, 3, 4, 5
	<i>Acoelorrhaphe wrightii</i>	Paurotis Palm	N, 1, 2, 3
	<i>Serenoa repens</i>	Saw Palmetto	N, ST, DT, 1, 2, 3, 4, 5
	<i>Zamia furfuracea</i>	Cardboard Palm	A, ST, DT, 1, 2, 3, 4, 5
Large Trees	<i>Magnolia grandiflora</i>	Southern Magnolia	N, F, E, ST, DT, 1, 2, 3, 4, 5
	<i>Pinus elliottii</i>	Slash Pine	N, E, DT, 4, 5
	<i>Quercus virginiana</i>	Live Oak	N, E, ST, DT, 1, 2, 3, 4, 5
	<i>Taxodium distichum</i>	Bald Cypress	N, D, DT, 3, 4
	<i>Juniperus siliciola</i>	Red Cedar	N, E, ST, 1, 2, 3, 4
Small Trees	<i>Ilex "Nellie R. Stevens"</i>	Nellie Stevens Holly	A, E, 1, 2, 3, 4
	<i>Ilex vomitoria</i>	Yaupon Holly	N, E, ST, DT, 1, 2, 3, 4, 5
	<i>Ilex cassine</i>	Dahoon Holly	N, E, ST, DT, 1, 2, 3, 4, 5
	<i>Lagerstromia indica</i>	Crape Myrtle	A,F, D, DT, 1, 2, 3, 4
	<i>Ligustrum japonica</i>	Ligustrum Tree	A,E, DT, 1, 2, 3, 4
	<i>Magnolia grandiflora</i>	Little Gem Magnolia	A,F, 1, 2, 3
	<i>Callistemon rigidus</i>	Erect Bottle Brush	A,F, E, ST, DT, 1, 2, 3, 4
	<i>Eriobotrya Japonica</i>	Loquat Tree	A,F, E, 1, 2, 3
Large Shrubs	<i>Bougainvillea</i>	Bougainvillea	A, F, DT, 1, 2, 3, 4, 5

# Landscape Material List

	<i>Hibiscus rosa sinensis</i>	Hibiscus	A, F, ST, 1, 2, 3
	<i>Jasminum multiflorum</i>	Downy Jasmine	A,F, 1, 2, 3, 4
	<i>Myrica cerifera</i>	Wax Myrtle	ST, DT, 4, 5
	<i>Nerium oleander</i> "hardy red"	Oleander	A,F, ST, 1, 2, 3
	<i>Osmanthus fragrans</i>	Sweet Olive	A,F, 1, 2, 3
	<i>Viburnum odoratissimum</i>	Sweet Viburnum	DT, 1, 2, 3, 4, 5
	<i>Viburnum suspensum</i>	Sandankwa Viburnum	DT, 1, 2, 3, 4, 5
	<i>Coccoloba uvifera</i>	Sea Grape	N, ST, DT, 1, 2, 3, 4, 5
	<i>Viburnum obovatum</i>	Walter Viburnum	N, DT, 2, 3, 4, 5
	<i>Allamanda schottii</i>	Bush Allamanda	A,F, ST, 1, 2, 3, 4
	<i>Alpinia zerumbet</i> 'Variegata'	Variegated Shellflower	A, F, DT, 1, 2, 3, 4
	<i>Galphimia glauca</i>	Thryallis	A,F, DT, 1, 2, 3,
	<i>Philodendron selloum</i>	Selloum	A, DT, 1, 2, 3, 4, 5
	<i>Podocarpus macrophyllus</i>	Yew Podocarpus	DT, ST, 1, 2, 3, 4, 5
	<i>Strelitzia reginae</i>	Bird-of-Paradise	A, F, 1, 2, 3, 4
	<i>Ligustrum japonica</i>	Japanese Privet	DT, 1, 2, 3, 4, 5
	<i>Plumbago auriculata</i>	Plumbago 'Leadwort'	A,F, DT, 1, 2, 3, 4, 5
	<i>Philodendron xanadue</i>	Xanadue	A, 1, 2, 3
Small Shrubs	<i>Agapanthus africanus</i>	Agapanthus	A, F, 1, 2, 3
	<i>Illex vomitoria nana</i>	Dwarf Yaupon Holly	N, DT, ST, 1, 2, 3, 4, 5
	<i>Illex crenata</i> "compacta"	Compact Holly	DT, 1, 2, 3, 4, 5
	<i>Ixora</i> "nora grant"	Ixora	A,F, DT, ST, 1, 2, 3, 4, 5
	<i>Pentas lanceolata</i>	Pentas	A,F, 1, 2, 3
	<i>Rhaphioleis indica</i>	Dwarf Indian Hawthorn	F, DT, ST, 1, 2, 3, 4, 5
	<i>Strelitzia</i> (varieties)	Bird of Paradise	A, DT, 1, 2, 3, 4
	<i>Codiaeum Variegatum</i> 'Mammey'	Croton	A, DT, 1, 2, 3, 4, 5
	<i>Schefflera Arboricola</i> 'Trinette'	Dwarf Schefflera	A, 1, 2, 3, 4
	<i>Zamia floridana</i>	Coontie	A, N, DT, ST, 1, 2, 3, 4, 5
Ornamental Grasses	<i>Tripsacum dactyloides</i>	Fakahatchee Grass	A, N, DT, 1, 2, 3, 4, 5
	<i>Tripsacum floridana</i>	Dwarf Fakahatchee Grass	N, DT, 1, 2, 3, 4, 5
	<i>Spartina bakeri</i>	Marsh Grass	A,N, ST, DT, 1, 2, 3, 4, 5
	<i>Pennisetum alopecuroides</i>	White Fountain Grass	A, DT, 1, 2, 3, 4, 5
	<i>Pennisetum setaceum</i>	Red Fountain Grass	A, DT, 1, 2, 3, 4, 5

# Landscape Material List

	Muhlenbergia capillaris	Muhly Grass	A, N, DT, ST, 1, 2, 3, 4, 5
Ground Cover /	Liriope muscari “evergreen giant”	Big Blue Lily Turf	1, 2, 3, 4
Vines	Liriope muscari “variegata”	Varigated Liriope	1, 2, 3, 4
	Ophipojon japonicus	Mondo Grass	1, 2, 3, 4
	Jasminum nitidum	Star jasmine	1, 2, 3, 4
	Trachelospermum jasminoides	Confederate jasmine	DT, 1, 2, 3, 4
	Trachelospermum asiaticum	Minima jasmine	DT, 1, 2, 3, 4, 5
	Dietes vegeta	African Iris	A, 1, 2, 3, 4
	Evolvulus glomerata	Blue Daze	A, 1, 2, 3, 4
	Lantana montevidensis	Weeping Lantana	A, ST, DT, 1, 2, 3, 4, 5
	Lantana camara ‘new gold’	Gold Lantana	A, 1, 2, 3, 4
	Tulbaghia violacea	Society Garlic	A, 1, 2, 3
Sod	St. Augustine ‘Floritam’	Stenotaphrum secundatum	1, 2, 3, 4
	Bermuda Sod	Cynodon dactyloids	1, 2, 3, 4
	Paspalum Sod	Paspalum vaginatum	ST, DT, 1, 2, 3, 4, 5
	Argentine Bahia	Paspalum notatum	DT, 4, 5

## Characteristics and Grounds Categories

### Characteristics:

N= Native, F= Flower, E= Evergreen, D= Deciduous, ST= Salt Tolerant, DT= Drought Tolerant, S= Specimen, A= Accent

### Grounds Categories:

1= Route of Excellence: one annual shrub pruning, turf and shrub fertilization.

2= General Officers Quarters: one annual turf and shrub fertilization. Monthly shrub pruning.

3= Special Interest Areas: one annual shrub pruning, turf fertilization and turf/ shrub pest treatment.

Note: this category is not shown on the Grounds Categories Map. This category is given to areas that require higher maintenance and can be located in a variety of grounds categories.

4= Improved, Semi-improved and Hospitals: Mowing, edging, line trimming and one annual fertilization/ pest treatment (Bermuda only)

5= Military Family Housing: Mowing, edging, line trimming.

# Palms



Cabbage Palm (N, E, ST, DT, 1, 2, 3, 4, 5)



Medjool Date Palm (S, ST, DT, 1, 2, 3)



Bismarck Palm (S, DT, ST, 1, 2, 3)



Foxtail Palm (S, 1, 2, 3)



Fishtail Palm (A, 1, 2, 3)



Christmas Palm (A, 1, 2, 3)



# Palms



Queen Palm (DT, 1, 2, 3, 4, 5)



Cardboard Palm (A, ST, DT, 1, 2, 3, 4, 5)



Saw Palmetto (N, ST, DT, 1, 2, 3, 4, 5)



Paurotis Palm (N, 1, 2, 3)



Pygmy Date Palm (A, 1, 2, 3, 4)



# Large Trees



Live Oak (N, E, ST, DT, 1, 2, 3, 4, 5)



Southern Magnolia (N, F, E, ST, DT, 1, 2, 3, 4, 5)



Red Cedar (N, E, ST, 1, 2, 3, 4)



Bald Cypress (N, D, DT, 3, 4)



Slash Pine (N, E, DT, 4, 5)



# Small Trees



Nellie Stevens Holly (A, E, 1, 2, 3, 4)



Yaupon Holly (N, E, ST, DT, 1, 2, 3, 4, 5)



Dahoon Holly (N, E, ST, DT, 1, 2, 3, 4, 5)



Crape Myrtle (A, F, D, DT, 1, 2, 3, 4)



Little Gem Magnolia (A, F, 1, 2, 3, 4)



Ligustrum Tree (A, E, DT, 1, 2, 3, 4)



Bottle Brush (A, F, E, ST, DT, 1, 2, 3, 4)



Loquat Tree (A, E, DT, 1, 2, 3, 4)



# Large Shrubs



Bougainvillea (A, F, DT, 1, 2, 3, 4, 5)



Hibiscus (A, F, ST, 1, 2, 3)



Downy Jasmine (A, F, 1, 2, 3, 4)



Wax Myrtle (ST, DT, 4, 5)



Oleander (A, F, ST, 1, 2, 3)



Sweet Olive (A, F, 1, 2, 3)



Sweet Viburnum (DT, 1, 2, 3, 4, 5)



Sandankwa Viburnum (DT, 1, 2, 3, 4, 5)



# Large Shrubs



Sea Grape (N, ST, DT, 1, 2, 3, 4, 5)



Downy Jasmine (A, F, 1, 2, 3, 4)



Alamanda (A, F, ST, 1, 2, 3, 4)



Variegated Shell Ginger (A, F, DT, 1, 2, 3, 4)



Thryallis (A, F, DT, 1, 2, 3)



Philodendron (DT, 1, 2, 3, 4, 5)



# Large Shrubs



Podocarpus (DT, ST, 1, 2, 3, 4, 5)



Bird of Paradise (A, F, 1, 2, 3, 4)



Plumbago (A, F, DT, 1, 2, 3, 4, 5)



Xanadue (A, 1, 2, 3)



# Small Shrubs



Agapanthus (A, F, 1, 2, 3)



Dwarf Indian Hawthorn (N, DT, ST, 1, 2, 3, 4, 5)



Croton (A, DT, 1, 2, 3, 4, 5)



Dwarf Yaupon Holly (N, DT, ST, 1, 2, 3, 4, 5)



Dwarf Schefflera (A, 1, 2, 3, 4)



Ixora (A, F, DT, ST, 1, 2, 3, 4, 5)



Coontie (A, N, DT, ST, 1, 2, 3, 4, 5)



# Ornamental Grasses



Fakahatchee Grass (A, N, DT, 1, 2, 3, 4, 5)



Dwarf Fakahatchee (N, DT, 1, 2, 3, 4, 5)



Sandcord grass (A, N, ST, DT, 1, 2, 3, 4, 5)



Muhly Grass (A, N, DT, ST, 1, 2, 3, 4, 5)



White Fountain Grass (A, DT, 1, 2, 3, 4, 5)



Red Fountain Grass (A, DT, 1, 2, 3, 4, 5)



# Ground Covers



Liriope (1, 2, 3, 4)



Varigated Liriope (1, 2, 3, 4)



Mondo Grass (1, 2, 3, 4)



Confederate Jasmine (A, DT, 1, 2, 3, 4)



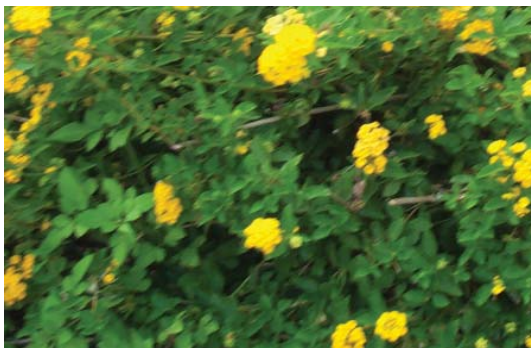
Society Garlic (A, 1, 2, 3)



Minima Jasmine (DT, 1, 2, 3, 4, 5)



African Iris (A, 1, 2, 3, 4)



Gold Lantana (A, 1, 2, 3, 4)



Purple Lantana (A, ST, DT, 1, 2, 3, 4, 5)

# Landscape Specifications

## Part one – general

- 1.01 Extent of landscape development work is shown on the drawings and in the notes and schedules
- 1.02 Provide trees, palms, shrubs, and ground cover of quality, size, genus, species and variety shown. Described in grades and standards for nursery, latest edition, published by the Florida department of agriculture and consumer services. Provide healthy, vigorous stock, free of disease, insects, eggs, larvae, and defects such as knots, injuries, abrasions or disfigurement. Do not make substitutions. If specified landscape materials are not obtainable, submit proof of non-availability to landscape architect or project manager, together with proposal for use of equivalent material.
- 1.03 Provide protective covering during delivery of plant materials. Plant stock immediately, or store in a shaded area, keep rootballs moist at all times. Do not remove stock from containers until planting time. Time delivery so that sod will be installed within 24 hours after arrival at site.
- 1.04 Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate if required, when conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify the landscape architect or project manager before planting. Contractor shall examine subgrade, verify elevations, observe overall site conditions and notify project manager of any unsatisfactory conditions. The contractor shall not proceed with work, until conditions have been corrected.
- 1.05 Warranty trees, palms, shrubs and ground cover, for a period of one year after date of substantial completion, against defects including death and unsatisfactory growth, except for defects resulting from neglect by owner, abuse or damage by others, or unusual phenomena or incidence which are beyond the contractor control. Remove and replace trees, palms, shrubs, and ground cover found to be dead or in unhealthy condition during warranty period. Warranty lawns through specified lawn maintenance period, and until final acceptance.

## Part two – products

- 2.01 The contractor shall have a sample of site soil tested to determine soil analysis. Tests results shall determine appropriate soil amendments for lawn and landscape areas. Contractor shall submit copies of test results and proposed soil amendments to the owner and the landscape architect for approval. Soil testing and soil amendments approval shall be accomplished.
- 2.02 Landscape mix - 60% peat humus, 20% wood chips, 20% compost, N.P.K. 3.2.1, As manufactured by hillary peat or approved equal.
- 2.03 Mulch - organic mulch free from deleterious materials and consisting of the following: shredded - grade a, cypress mulch or red cedar barkstone
- 2.04 Fertilizer - for trees, palms, shrubs, and ground cover, provide “agriform” tables by sierra chemical co., Slow release tablets, 20 - 10 - 5 formulation or approved equal. Tablet amounts shall be as follows:



# Landscape Specifications

1 Gallon - 1 tablets	7 gallon - 3 tablets	30 gallon - 6 tablets
3 Gallon - 2 tablets	15 gallon - 4 tablets	b&b palms - 6 tablets

- 2.05 For lawns, provide fertilizer with 16-4-8 formulation. Fertilize at a rate of 12 pounds per 1,000 S.F. Fertilizer shall be delivered to the site in the original containers and bear the manufacturer's guarantee.
- 2.06 Pre-emergent herbicide - "Surflan" pre-emergent herbicide or approved equal.
- 2.07 Stakes and guys - provide pressure treated wood stakes in the sizes indicated. Provide arbor ties.
- 2.08 Trees and palms - provide trees and palms of height and caliper specified and with branching configuration recommended by Florida number one standards for species required. Provide single stem trees except where special forms are specified.
- 2.09 Shrubs and ground cover - provide plants of the height and spread specified and with branching configuration and minimum number of canes or runners recommended by Florida number one standards.

## **Part three – execution**

- 3.01 Preparation of planting soil - before mixing clean existing soil of roots, plants, stones. And other extraneous materials harmful or toxic to plant growth. Mix landscape mix with existing soil at the ratio by volume 1:1. Install agriform fertilizer tablets during backfill operations.
- 3.02 Excavations for plants - excavate pits twice as wide as the plant rootball and loosen subsoil on bottom of excavation. Fill excavations with water and allow to percolate out before planting. Set stock in the center of pit with the top of ball at the same elevation as adjacent finish grade. Place planting soil backfill around sides of rootball, and work each layer to eliminate voids and air pockets. Place agriform tablets in plant pits during backfill operations, repeat watering until no more water is absorbed. Mulch all tree rings and planted areas with a 3" deep layer of mulch.
- 3.03 Apply pre-emergent herbicide to all areas to be mulched, according to the manufacturer's recommended rate. Contractor is responsible for reapplying appropriate herbicide to maintain a weed free condition in all areas throughout all landscape operations.
- 3.04 Guy and stake all trees and palms immediately after planting, as indicated in the details.

## **Part four – maintenance**

- 4.01 Tree, palm, shrub, and ground cover maintenance - begin maintenance immediately after planting. Maintain plant stock until final acceptance but in no case less than 30 days after substantial

# Landscape Specifications

completion. Maintain by pruning, weeding, and adjusting irrigation as required for healthy growth. Tighten and repair stake and guy supports and reset trees and palms to proper grades or vertical position as required. Spray as needed to keep plant stock free of insects and disease.

4.02 During landscape work, keep pavements clean and work area in an orderly condition. Protect landscape work and materials from damage due to operations by other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

4.03 Contractor shall remove staking and guying materials after one growing season.

## **Part five - inspection and acceptance**

5.01 When landscape work is completed, landscape architect or project manager will make an inspection to determine acceptability. When landscape work does not comply with requirements, replace rejected work and continue maintenance until reinspected by the landscape architect or project manager. Remove rejected plants and materials promptly from the project site.

## **Part six - existing plant material fertilization**

6.01 For shrubs and ground cover the fertilizer applications shall be as follows March, June, September, and December. Use a 8-10-10 formulation at a rate of two pounds per 100 sf.

6.02 For trees the fertilizer applications shall be as follows: March, June and September. Use a 13-6-10 formulation at a rate of two pounds per inch of caliper of less than 6" caliper and five pounds per inch of caliper over 6" caliper.

6.03 For palms the fertilizer applications shall be as follows: March, July and October. Use a palm special 10-5-5 formulation at a rate of seven pounds per palm trunk. Apply palm foliar spray mix to all foliage surface as follows: April, August and November.

6.04 For lawns the fertilizer applications shall be as follows: February, April, June September and December. Use a 16-4-8 formulation at a rate of 5 -6 pounds per 1,000 sf.

6.05 Do not allow chemicals to fall on, or translocate on, off-site area. Do not allow water containing toxic amounts of chemicals to pool or puddle after completion of operations.



# Irrigation Specifications

## Part one – general

- 1.01 Extent of irrigation work includes irrigation system for landscape areas as shown on the drawings. Work includes installation of underground irrigation system for project site, ready to permanently operate, in compliance with all applicable codes.
- 1.02 Product data - submit for approval, manufacturer's technical data for the following items: backflow preventer, electric valve, gate valve, valve box, wire, controller, rain check, spray, rotor heads and drip irrigation equipment.
- 1.03 Record drawings - following completion and acceptance of irrigation installation furnish "as-built" drawings showing all irrigation heads, valves, controllers, and pipe locations to scale. Contractor shall provide a diagram of list of zones, inside each controller cover.

## Part two – products

- 2.01 Pressure pipe - comply with the following for pressure piping: ANSI/ASTM a 120. Schedule 40.
- 2.02 Lateral pipe - comply with the following for lateral piping: ANSI/ASTM a 120, schedule 40. Provide galvanized pipe where required by local code or as indicated in drawings.
- 2.03 Pipe fittings - comply with the following: ASTM d2466 socket fittings with ASTM d2564 solvent cement.
- 2.04 Solvent cement and cleaner - provide quick drying and fast holding products such as manufactured by arrow or approved equal. Pipe cleaner shall be. Purple.
- 2.05 Electric valves shall be globe valves operated by low-power solenoid, normally closed, with manual flow adjustment.
- 2.06 Gate valves shall be bronze, threaded, and of line size. Gate valves shall be installed in a plastic valve box, in the same manner as electric valves.
- 2.07 Spray and rotor heads shall be pop-up type or installed on risers, as indicated .On the irrigation plan. Heads shall be connected to pipes with flex pipe attachments. Spray and rotor heads shall be Rainbird and Hunter.
- 2.08 Valve boxes shall be green plastic 10" round, with lid. Valves in boxes shall be set in a 3" deep, clean gravel bed.
- 2.09 Controller shall include transformer and wiring to hardwire into building electrical system. Controller shall have power backup to maintain settlings at least eight hours without building power. Provide lockable cover.
- 2.10 Wiring shall be type UF, control cable, with PVC insulation, color coded. Common wire shall be white.

# Irrigation Specifications

2.1 1 Rain check shall be installed on outside of building, as per the state of Florida regulations.

## **Part three – execution**

3.01 Install irrigation heads in the approximate locations. Make minor adjustments as necessary to avoid plant material and other obstructions.

3.02 Locate gate valve downstream of backflow preventer.

3.03 Utilize PVC schedule 40 sleeves for all crossings of walks, paving, walls or foundations by piping or control wiring.

3.04 Provide 18” minimum cover over main line and 12” cover over all other irrigation sleeves, wires and pipes. Excavate trenches to a depth of 3” below invert of pipe. Backfill trenches to within 6” of grade with clean material from excavation. Remove organic materials as well as rocks and debris larger than 1” diameter. Place acceptable backfill material in 6” lifts, compacting each lift.

3.05 Location of existing and proposed underground utilities, structures and plantings shall be the responsibility of the contractor. Any damages occurring due to irrigation installation shall be replaced or repaired to the original condition.

3.06 Install circuit valves in valve box, set in 3” deep drainage backfill, arranged for easy adjustment and removal. Adjust valve flow rate to match that required for each zone.

3.07 Lay pipe on solid subbase, uniformly sloped with out humps or depressions. All joints shall be attached using PVC cleaner and glue. Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable means when pipe installation is not in progress.

3.08 Adjust settings of controller for proper plant material establishment. After establishment period, reset controller as per local watering restrictions. Connect rain check to controller.

3.09 Flush circuit lines with a full head of water and install heads after hydrostatic test is completed. Install lawn heads at manufacturer’s recommended heights. Install heads on risers at 28” height or 4” above adjacent shrubs. Locate part circle heads to maintain a minimum distance of 4” from walks and walls and 12” from pavement with no curbs.

## **Part four – testing**

4.01 Notify landscape architect or project manager when testing will be conducted. Conduct tests in the presence of the landscape architect or the owner’s representative.

4.02 After completion of lawn installation and mulching, carefully adjust sprinkler heads so they will be flush with or not more than 1/2” above adjacent soil or mulch. Perform operational testing

# Irrigation Specifications

after sprinkler heads have been adjusted to their final positions. Contractor shall demonstrate that each zone meets coverage requirements and that automatic controls function properly. Contractor shall uncover pipe and valve connections as directed by the owner's representative. Proper spray patterns, correct nozzle radius, and clean nozzles will all be required for final system approval.

4.03 After system testing approval, contractor shall instruct the owner's personnel in the operation and maintenance of the system, including spray pattern and valve adjustments, and programming the controller.

## **Establishment Period Watering Schedule (for areas with no irrigation)**

1.01 During landscape installation the contractor shall water-in installed landscape materials and continue watering until substantial completion. At substantial completion the contractor shall begin the following 90 day watering schedule. The landscape contractor shall water all plant materials shown on the landscape planting plans, for a thirteen week, ninety day watering period based on the following plant establishment period schedule.

30 gallon container plants:	25 gallon water/each application
15 gallon container plants:	10 gallon water/each application
3 gallon container plants:	5 gallon water/each application
1 gallon container plants:	2 gallon water/each application

1st 4 weeks at 3 applications per week =	12 events
2nd 4 weeks at 2 applications per week =	8 events
3rd 5 weeks at 1 application per week =	5 events
Total number of applications =	25 events

# Glossary Terms

**Earth Berm-** is a mound of earth typical used on a security buffer to protect a structure from vehicular impact.

**Florida Coastal-** is the general landscape theme for the Base. The theme focuses on using regional plant material in curvilinear layouts to create a semi-tropical appearance.

**Foundation Planting-** is the landscape located adjacent to the structures foundation.

**Grounds Categories-** indicates the amount of maintenance a particular grounds area will receive. See page 13 for Grounds Categories Map.

**General Officers Quarters-** is not shown on the Grounds Categories Map. This is where the highest-ranking military personnel live.

**High Visibility Area-** are areas seen frequently by the public and require more aesthetic consideration.

**Improved/ Semi-improved areas-** is identified on the Grounds Categories Map on page 13. The amount of maintenance for these areas is defined in the Characteristics and Grounds Categories located on page 16.

**Industrial/ Flightline areas-** are industrial type facilities adjacent to the airfield.

**Linear Buffer-** is a landscape security buffer that is designed in a linear layout without earth berms.

**Maintenance Category-** indicates the amount of maintenance of a site.

**Pre-Emergent Herbicide-** is a herbicide that is applied before seed germination to control seeding of weeds.

**Route of Excellence-** scenic roads and facilities that require higher standards of design and maintenance. The following roads are designated as part of the Route of Excellence: Florida Keys Avenue, Tampa Point Boulevard, Administrative Avenue and Staff Circle. See Grounds Categories Map on page 13 for locations.

**Security Buffer-** is a landscape buffer that protects a structure from vehicular impact.

**Soil Polymer-** are gels that can absorb hundreds of times their weight in water, releasing it as the soil dries. Add soil polymers to plant material when irrigation is not provided.

**Special Interest Areas-** is not shown on the Grounds Categories Map. This category is given to areas that require higher maintenance and can be located in a variety of grounds categories. The amount of maintenance for these areas is defined in the Characteristics and Grounds Categories located on page 16.

**Weed Fabric-** is a fabric that blocks weeds from penetrating through to the surface. Use weed fabric only in rock beds.





**DEPARTMENT OF THE AIR FORCE  
6TH AIR MOBILITY WING (AMC)  
MACDILL AIR FORCE BASE, FLORIDA**

MEMORANDUM FOR 6 CES/CP/CEP/CEPE/CEC/CEO/CCS/CELC

FROM: 6 CES/CEV

SUBJECT: Environmental Action Information for Project Planning and Execution

1. Please review and disseminate the following information regarding environmental issues and potential necessary actions for projects at MacDill AFB. The intent of this information is to ensure all personnel are aware of potential environmental requirements during the planning and execution phases of all projects. To better serve our customers, we have developed the attached "Environmental Awareness Quick Look List" for typical project activities and their area of potential regulatory concern. This list is intended to provide the personnel that are responsible for planning future projects an early indication that environmental regulations may apply to the proposed project and that coordination with 6 CES/CEV is required. This document provides minimal required guidelines. It is not intended to replace and/or supersede existing associated regulatory and USAF publications. In addition, tabs A-G provide more detailed information that will help you identify additional requirements for specific areas of regulatory concern.
2. Coordination with the Environmental Flight may be simple and only involve a review to determine regulatory applicability or exemption from National Environmental Policy Act (NEPA) planning (AF Form 813). Projects may require outside coordination with a local regulatory agency for permitting, sampling and/or laboratory analysis. Some projects require Environmental Assessment (EA) preparation and HQ AMC approval prior to implementation or construction. In all cases, early coordination with the Environmental Flight will reduce delays, enable smooth project execution and help MacDill AFB stay in compliance with the various Federal, State and local regulations.
3. Please contact Bill Herr, 6 CES/CEV, at 828-0465 if you have any questions or require assistance identifying environmental requirements for future projects. The Environmental Flight is available to provide training upon request.

Michael G. Flach, GS-12  
Govt. Chief, Environmental Flight

**ENVIRONMENTAL AWARENESS QUICK LOOK LIST FOR PROJECT PLANNERS (Jan 2011)**

**Note: Please be aware that this list may not be all-inclusive and other projects not identified below may also require environmental coordination. If in doubt, please refer to the contacts in Table 1.**

TABLE 1

<b>Project Activity</b>	<b>Regulatory Concern</b>	<b>Environmental Flight POC</b>
Digging/Excavation	NEPA Process, Soil or Ground Water Contamination/IRP	Andy Rider, 828-2718 Tish Matty, 828-0776
Building Demolition	NEPA Process, Historic/Cultural Resources/SHPO Asbestos/Lead Based Paints (LBP) Solid Waste/Recycling	Andy Rider, 828-2718 Jason Kirkpatrick, 828-0459 Rob Ritch 828-3393 Eric Vichich 828-0460
Structural Modifications to Building	NEPA Process Historic/Cultural Resources/SHPO Lead Based Paint (LBP), Asbestos Water or Sewer line modification	Andy Rider, 828-2718 Jason Kirkpatrick, 828-0459 Robert Ritch, 828-3393 Mike Harrison, 828-0458
New Building/Facility/Parking Lot Construction	NEPA Process, Storm Water Permitting (SWFWMD, NPDES) EPA CPG and Green Procurement compliance Water or Sewer line installation	Andy Rider, 828-2718 Eric Vichich 828-0460  Mike Harrison, 828-0458
Roof Replacement/Repair	Historic/Cultural Resources/SHPO Asbestos	Jason Kirkpatrick, 828-0459 Robert Ritch, 828-3393
Pressure Washing	Storm Water Pollution, LBP	Eric Vichich, 828-0460 Robert Ritch, 828-3393
Painting	LBP	Robert Ritch, 828-3393
Mechanical Room Repair/Demolition	LBP, Asbestos	Robert Ritch, 828-3393
Interior Repair/Demolition	LBP, Asbestos	Robert Ritch, 828-3393
Water Line Work/ Replacements/Extensions	Safe Drinking Water Act (SDWA) Construction Standards and Florida Administrative Code (FAC), Permitting, Asbestos Piping Cutting/Removal	Michael Harrison, 828-0458  Robert Ritch, 828-0462
Sewer Line Repair/Extension	Permitting, FAC, 10 State Standards	Michael Harrison, 828-0458
Lift Station Modification/Addition	Permit Requirements, FAC, 10 State Standards	Michael Harrison, 828-0458
Septic Tank/Drain Field Installation	Permitting, FAC, Department of Health Construction Standards	Michael Harrison, 828-0458
Natural Gas-Fired Boiler/Hot Water Heater/Heat Pump/etc. Installation	Title V Air Permit Requirements/Notifications	Andy Rider, 828-2718
Paint Booth/Bead Blast Installation	Title V Air Construction Permit	Andy Rider, 828-2718
Emergency Generator Modifications & Installations	Title V Air Permit Fuel Tank Registration/Permitting	Andy Rider, 828-2718 Jason Kirkpatrick, 828-0465
UST/AST Installation	Fuel Tank Registration/Permitting, Title V Air Permit Requirements/Notification	Jason Kirkpatrick, 8-0465 Andy Rider, 8-2718
Hazardous Material Purchases, Contractor HazMat Usage Uninterruptable Power Supplies (UPS)	Hazardous Materials Management Review Process, EPCRA Compliance	Rick Frahn, 8-0462

## LIST OF ATTACHMENTS

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Air Quality Design/Planning Review Checklist.....	A
National Environmental Policy Act (NEPA) & State Historic Preservation Office (SHPO).....	B
Actions Which Trigger Review/Consultation.....	B
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Petroleum, Oil, Lubricants & Storage Tanks.....	C
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ATTACHMENT A  
AIR QUALITY



## Air Quality (Title V Permit) Design/Planning Review Checklist

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MacDill AFB may add new insignificant emissions units/activities only after providing the EPCHC and USEPA with at least 7 days written notice prior to construction. The 6 CES/CEV Air Quality Specialist must be provided the following:

- Description of the unit/activity (Make/Model and Rating [kW, BTU/hr, volume, etc.])
- Product Technical Data Sheet (if available)
- Date on which the unit/activity will be added

In general, any material or product that is being burned or is volatilized/sprayed into the air is a source of air pollution and requires a permit. Examples include burning of natural gas, diesel, unleaded gasoline, JP8, used oil, propane, etc. The following list contains the most common types of insignificant emissions units found on MacDill AFB that are contained in our Title V Permit and data needs for inclusion in the permit beyond those stated above.

- Natural Gas Fired Space and Hot Water Heating Units
  - Building Number and Facility Name
  - Rating in (BTU/hr)
- Storage Tanks and Fuel Dispensing
  - Building Number and Facility Name
  - Under or Above ground tank
  - # of tanks
  - Volume (gallon)
  - Product (i.e. diesel)
- Portable Diesel-Fired Emergency Generators
  - Building Number and Facility Name
  - Rating (kW)
- Parts Washers/Degreasers
  - Building Number and Facility Name
  - Contents (i.e. solvent)
  - Tank Capacity
- Gasoline Rewind Engines
  - Building Number and Facility Name
  - Rating (kW)
- Aerospace Ground Equipment
  - Type of Unit
  - Horsepower (Hp)
  - # of Units
  - Fuel (i.e. diesel)
- Paint Spray Booths
  - Building Number and Facility Name
  - Type of Unit
  - Booth Technical Data
- Stationary Diesel-Fired Emergency Generators
  - Building Number and Facility Name
  - Rating (kW)
  - Generator Technical Data
  - USEPA Generator Compliance Statement
- Abrasive Cleaning (small cabinets)
  - Building Number and Facility Name
  - Type of Unit
  - # of Units
- Diesel-Fired Fire Pumps
  - Building Number and Facility Name
  - Rating (kW)
- Aircraft Fiberglass Operations (Touchup Activities)
  - Building Number and Facility Name
- Fume Hood
  - Building Number and Facility Name
- Woodworking
  - Building Number and Facility Name
  - Control Device
- Fire Training
  - Type of operation
- Welding
  - Building Number and Facility Name
- Small Arms Firing Range
  - Building Number and Facility Name

# ATTACHMENT B

NATIONAL ENVIRONMENTAL POLICY ACT  
(NEPA) & STATE HISTORIC PRESERVATION  
OFFICE (SHPO)

## **Actions that trigger detailed Environmental Impact Analysis Process documentation**

1. Construction of a new permanent facility or temporary facility
2. Substantial renovation of an existing facility, particularly if it includes demolition
3. Increasing impervious surfaces by 5,000 SF (parking lots, roads, storage areas or facilities, sidewalks, etc.)
4. Projects being completed on undeveloped lands (forest, open field, etc.)
5. Projects being completed over or immediately adjacent to water bodies (bay, pond, canal, etc.)
6. Project being completed on or immediately adjacent to Environmental Restoration Program site (soil or groundwater contamination)
7. Renovation of any “historic” building (see attached list)
8. Substantial infrastructure repair, particularly if it involves earth moving, trenching or excavation

## **Actions that may trigger Environmental permitting requirements**

1. Construction over or adjacent to a water body (bay, pond, canal, etc.)
2. Construction in a low lying area, within standing water, an open field with tall grass like vegetation or a drainage swale
3. Construction on a site with “holes in the ground”

## **Actions that may trigger consultation with the State Historic Preservation Office**

1. Renovation or demolition of any of the buildings listed in the attached “historic buildings list

**Table 2-3. Historic Architectural Properties on MacDill AFB**

Building Number	Building Name/Description	Year Constructed	NRHP Eligibility		HABS Level	Study <sup>a</sup>
			Indv.	District		
0001	Hangar	1941	Yes	MacDill Field	I	E-S 1993
0002	Hangar	1941	Yes	MacDill Field	I	E-S 1993
0003	Hangar	1941	Yes	MacDill Field	III	E-S 1993
0004	Hangar	1941	Yes	MacDill Field	III	E-S 1993
0005	Hangar	1941	Yes	MacDill Field	III	E-S 1993
0011	Maintenance Shop	1941	No	MacDill Field	III	Hardlines 1994
0012	Maintenance Shop	1941	No	MacDill Field	III	Hardlines 1994
0026	Fire Station	1941	Yes	MacDill Field	I	Hardlines 1994
0027	Community Fac.	1941	No	MacDill Field	II	Hardlines 1994
0028	Product PLT	1942	No	MacDill Field	II	Hardlines 1994
0029	Maintenance Shop	1941	No	MacDill Field	II	Hardlines 1994
0030	Engineer Admin.	1941	Yes	MacDill Field	I	Hardlines 1994
0031	Maintenance Shop	1941	No	MacDill Field	III	Hardlines 1994
0032	Maintenance Shop	1941	No	MacDill Field	III	Hardlines 1994
0033	Maintenance Shop	1941	No	MacDill Field	III	Hardlines 1994
0034	CE Storage Shed	1941	No	MacDill Field	III	Hardlines 1994
0035	Maintenance Shop	1941	No	MacDill Field	II	Hardlines 1994
0037	Water Tower	1941	No	MacDill Field	IV	Hardlines 1994
0041	Theater	1941	Yes	MacDill Field	I	Hardlines 1994
0042	PME Laboratory	1942	No	MacDill Field	II	Hardlines 1994
0045	Fuel Station	1941	No	MacDill Field	III	Hardlines 1994
0068	Storage Facility	1941	No	MacDill Field	III	Hardlines 1994
0297	Warehouse	1943	No	MacDill Field	III	Hardlines 1994
0347	Engineer Admin.	1944	No	MacDill Field	III	Hardlines 1994
0401	Housing (Loop)	1941	Yes	SOQ	I	Hardlines 1994
0402	Housing (Loop)	1941	Yes	SOQ	I	Hardlines 1994
0403	Housing (Loop)	1941	No	SOQ	I	Hardlines 1994
0404	Housing (Loop)	1941	Yes	SOQ	I	Hardlines 1994
0405	Housing (Loop)	1941	Yes	SOQ	I	Hardlines 1994
0501	USSOCOM Headquarters	1968	Yes	No	none	Patterson <i>et al.</i> 1994
0540	USCENTCOM Headquarters	1982	Further eval.	No	none	Patterson <i>et al.</i> 1994
0552	Storage Facility	1945	No	MacDill Field	III	Hardlines 1994

Note: <sup>a</sup> Studies. E-S: Engineering-Science, 1993. *Cultural Resources Report for MacDill Air Force Base, Florida*. Hardlines: Wang et al. 1994. *Historic Building Survey for MacDill Air Force Base, Florida*. Patterson et al. 1994. *MacDill Air Force Base Cold War Material Culture Inventory*.



**ATTACHMENT C**

**PETROLEUM, OIL, LUBRICANTS AND  
STORAGE TANKS**

MEMORANDUM FOR 6 CES/CEC

FROM: 6 CES/CEVN

SUBJECT: Storage Tanks Permitting Information Brief

1. MacDill AFB is required by the State of Florida to obtain permits for the installation of any regulated underground or above ground storage tank systems. The following lists identify our permit requirements:

Permit Needed

- Installation of Underground Storage Tank greater than 110 gallons for storage of:
  - Vehicular Fuel
  - Pollutants or Hazardous Substances
  - Regulated Substances in Unmaintained Storage Tanks
- Installation of Aboveground Storage Tank greater than 550 gallons for storage of the above listed materials

Permit Not Needed

- Storage tank for Heating Oil less than 30,000 gallons in size
- Storage tanks storing solid or gaseous materials, such as LP gas
- Storage tanks for Wastewater Treatment Systems or Septic systems
- Storage tanks for Emergency Spill Containment
- Storage tanks for equipment or machinery, such as hydraulic systems
- Mobile storage tanks

*Note: Permit or no permit required, any type of storage tank system must be designed in accordance with good engineering practices which insure protection of the environment. Any tank larger than 55 gallon requires secondary containment.*

2. Required submittals/notifications to the Storage Tank Compliance Department of the Environmental Protection Commission of Hillsborough County (EPC/HC) include the following:

- Submittal of an Application for the Installation or Upgrade of Pollutant Storage Tank Systems at least 30 days prior to initiation of the installation/upgrade of a storage tank system.
- Notify the EPC/HC at least 10 days prior to the inspection of newly installed or closed storage tank system
- Submittal of a Storage Tank Registration form no more than 30 days after the installation, upgrade or closure of a storage tank system.

3. If you have any questions, please contact Mr. Jason Kirkpatrick at 828-0459.

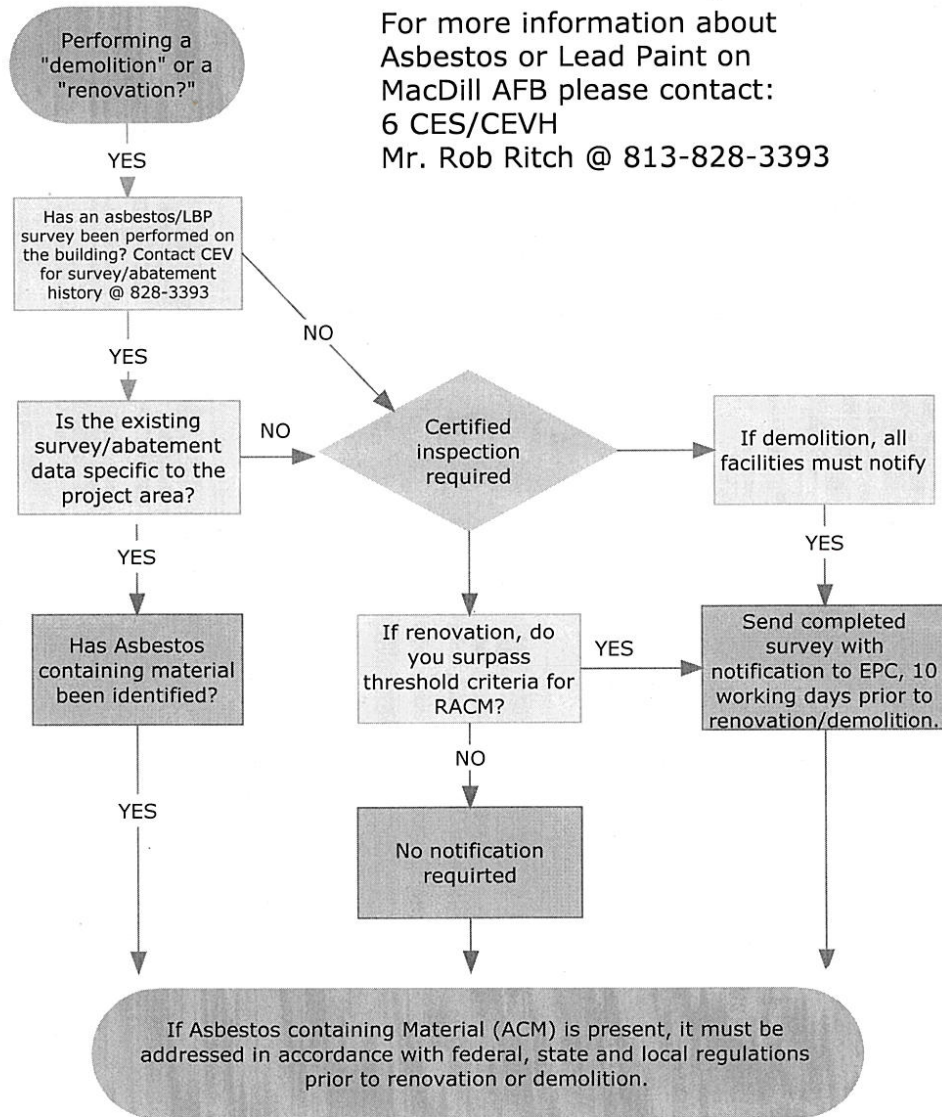
**ATTACHMENT D**

**TOXICS**

**ASBESTOS AND LEAD BASED PAINTS**

# Decision Tree for Asbestos NESHAP Notification (Pre-Demolition/Renovation Activity)

For more information about  
Asbestos or Lead Paint on  
MacDill AFB please contact:  
6 CES/CEVH  
Mr. Rob Ritch @ 813-828-3393





Business and Professional Regulation (DBPR) requirements. All employers of workers who require employees to handle asbestos must comply with OSHA asbestos regulations (29 CFR Part 1910.1001 and 1926.1101).

**If I obtain a building permit, does this meet the federal asbestos notification requirement?**

No, the receipt of a city or county permit is not the same as providing the federally required asbestos notification to the EPC. A copy of the state notification form [DEP 62-257.900(1)] can be obtained from the EPC or from the following website address:

[http://www.dep.state.fl.us/air/forms/asbestos/dep62\\_257\\_900\(1\).pdf](http://www.dep.state.fl.us/air/forms/asbestos/dep62_257_900(1).pdf)

**What if I have an emergency project?**

Notification is required as soon as possible before, but not later than, the following working day for any emergency renovation operation or emergency demolition (if the building has been declared structurally unsound and in danger of imminent collapse by a State or local governmental agency). The asbestos NESHAP requirements for a thorough asbestos inspection (survey) prior to the start of the demolition or renovation activity and disposal of waste debris in an appropriate landfill are still applicable for all emergency projects. If a thorough asbestos inspection is not done prior to the start of the activity and a means of complying with this requirement is not possible, then all of the building waste materials must be treated as RACM and disposed of in an appropriate regulated landfill per the provisions of 40 CFR 61.154. Contact our office for more information.

**Where can I obtain additional information about asbestos-related issues?**

For more information please contact the Air Division of the Environmental Protection Commission at (813) 272 - 5530. Our office is located at 1410 N. 21st Street in Ybor City. Or visit these websites:

- EPA Asbestos Home Page:  
<http://www.epa.gov/asbestos/>

- EPA NESHAP Regulation:  
<http://www.epa.gov/opptintr/asbestos/40cfr61.pdf>
- EPC Asbestos Home Page:  
<http://www.epchc.org/Asbestos.htm>
- OSHA Asbestos Safety and Health  
<http://www.osha.gov/SLTC/asbestos/index.html>

**POLLUTION PREVENTION TOPICS**

Pollution prevention is the reduction or elimination of discharges or emissions to the environment. This can be achieved by reducing the generation of waste at the source (source reduction) or by using, reusing or reclaiming wastes after generation (recycling).

**Minimize the hazards of demolition**

Inventory and list materials that may be hazardous prior to demolition (ACM, lead pipes and paint waste, drums or other containers of unknown type and origin). Ensure non-recyclable waste material is disposed of in accordance with all local, state and federal regulations.

**Material Reuse and Recycling**

Inspect the site before demolition and list materials that should be saved and select the appropriate methods and procedures that will promote reuse. This will reduce disposal costs and reduce materials costs at the construction site where they are used. These materials may include bricks and block; doors and windows; plumbing fixtures and pipes; electric fixtures and wiring.

Recycling is the use, reuse or reclamation of waste after it has been generated. Special precautions should be taken to ensure any materials that are reused or recycled do not contain, or have not been contaminated by, hazardous materials (such as asbestos).

Examples of opportunities to recycle demolition waste include the recycling of glass and plastic; the creation of mulch or chips from wood; the use of milled asphalt from road construction; the use of crushed concrete as aggregate or base material; and the removal and recycling of scrap metal before demolition.

## ASBESTOS NOTIFICATION REQUIREMENTS FOR HILLSBOROUGH COUNTY



## AN INFORMATIONAL GUIDE FOR RENOVATION AND DEMOLITION PROJECTS

Environmental Protection Commission  
of  
Hillsborough County

Air Management Division

(813) 272-5960

# Guide to Asbestos NESHAP Notifications for Demolitions and Renovations

## What projects require notification?

Only single, isolated, family residential structures with four dwelling units or less are **exempt** from the asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements for notification (40 CFR 61, Subpart M).

All other structures, or multiple residences, demolished as part of a single project and located on one site, are subject to the notification requirements for demolition whether or not asbestos-containing material (ACM) is present.

Only renovation projects involving regulated asbestos-containing material (RACM) above certain threshold amounts require notification. Written notification is not required for renovation projects where asbestos containing materials are not disturbed or made regulated during the planned activity.

## What is Asbestos-Containing Material (ACM) and Regulated Asbestos-Containing Material (RACM)?

ACM is any material containing more than 1% asbestos as determined using Polarized Light Microscopy (PLM). There are two types of ACM. Category I nonfriable ACM means asbestos-containing packings, gaskets, resilient floor covering and asphalt roofing products. Category II nonfriable ACM means any material, excluding Category I nonfriable ACM.

RACM is any friable asbestos-containing material containing more than 1% asbestos as determined using PLM material that can be crumbled, pulverized or reduced to

powder by hand pressure when dry. RACM also includes Category I or Category II non-friable asbestos material that has become friable prior to, or during, demolition or renovation operations.

In addition, Category I or II ACM that has a high probability of becoming RACM (crumbled, pulverized or reduced to powder) during demolition must be removed prior to the start of the demolition activity.

## What are the notification requirements?

Written notification is to be mailed or hand-delivered:

- Ten (10) working days prior to a **demolition**,

*even if there is no asbestos present*

- Ten (10) working days prior to a **renovation** activity, if the amount of RACM to be stripped, removed, dislodged, cut, drilled or disturbed is greater than 160 square feet (SF) on facility components or 260 linear feet (LF) on pipes, or 35 cubic feet off facility components where the length or area could not be measured previously

Written revisions, including changes to the start date, may be faxed to our office at (813) 272-5605 and must be submitted no later than the originally notified start date if the activity will fall after the original start date. Otherwise the 10 working day requirement must be met for any proposed activities to start earlier than the originally notified start date.

## When is an asbestos inspection required?

A thorough asbestos inspection (survey) is required by a state Licensed Asbestos Consultant before *any* renovation or demolition activity begins, regardless of the age of the building or the building materials. This requirement also applies to buildings that are damaged by fire or water. Attach a copy of the asbestos inspection or asbestos survey report to all demolition notifications. In addition, a copy of the asbestos (survey) report should be maintained at the job site during all renovation or demolition activities.

## Where do I send notification?

All asbestos notifications for projects to be performed in Hillsborough County must be mailed or hand-delivered to the Environmental Protection Commission (EPC), along with the appropriate Hillsborough County fee and a copy of the Asbestos Inspection Report or Asbestos Survey:

EPC Air Management Division Attn:  
Asbestos Program Coordinator 1410 N.  
21<sup>st</sup> Street Tampa, FL 33605

## What are the county asbestos fee requirements?

Fees are due at the time of notification. The fee may cover multiple structures, as long as the structures are located on a single site and the project demolition or renovation activities are not phased. *For projects involving renovation and demolition activities, separate fees are due for each activity performed at the site.* Make checks payable to the EPC. The Hillsborough County fee schedule for asbestos is as follows:

- Demolition of structure less than 50,000 SF: \$200.00
- Demolition of structure greater/equal to 50,000 SF: \$300.00
- Renovation 160 SF/260 LF up to 1000 SF/LF: \$300.00
- Renovation greater than 1000 SF/LF: \$500.00

## Who can remove asbestos-containing material?

A Florida Licensed Asbestos Contractor must perform all activities involving the removal or handling of ACM and RACM. Licensure is **not** required if certain criteria are met for moving, removal, or disposal of asbestos containing roofing materials, resilient flooring materials, and exterior conduit or piping as specified under F.S. Chapter 469.002. Supervisors and/or workers must be trained in accordance with Florida Department of Environmental Protection.

## **Where can asbestos be found and when can it be a problem?**

Most products made today do not contain asbestos. Those few products made which still contain asbestos that could be inhaled are required to be labeled as such. However, until the 1970s, many types of building products and insulation materials used in construction contained asbestos. Common products that might have contained asbestos in the past and conditions which may release fibers include:

- STEAM PIPES, BOILERS and FURNACE DUCTS insulated with an asbestos blanket or asbestos paper tape. These materials may release asbestos fibers if damaged, repaired or removed improperly.
- RESILIENT FLOOR TILES (vinyl asbestos, asphalt and rubber), the backing on vinyl sheet flooring and adhesives used for installing floor tile. Sanding, scraping, or grinding can release asbestos fibers.
- CEMENT SHEET, MILLBOARD and PAPER used as insulation around furnaces and wood burning stoves. Repairing or removing appliances may release asbestos fibers. So may cutting, tearing, sanding, drilling or sawing.
- DOOR GASKETS in furnaces, wood stoves and coal stoves. Worn seals can release asbestos fibers during use.
- SOUNDPROOFING or DECORATIVE MATERIALS sprayed on walls and ceilings. Loose, crumbling or water damaged materials may release asbestos fibers. Sanding, drilling or scraping will also result in the release of asbestos fibers.
- PATCHING and JOINT COMPOUNDS for walls and ceilings and some TEXTURED PAINTS. Sanding, scraping or drilling these surfaces may release asbestos fibers.
- ASBESTOS CEMENT ROOFING, SHINGLES and SIDING. These products are not likely to release asbestos fibers unless sawed, drilled or cut.
- ARTIFICIAL ASHES and EMBERS sold for use in gas-fired fireplaces. Also, other older household products such as FIREPROOF GLOVES, STOVE-TOP PADS, IRONING BOARD COVERS and certain HAIR DRYERS.
- AUTOMOTIVE BRAKE PADS and LININGS, CLUTCH FACES and GASKETS.

**ATTACHMENT E**  
**WASTEWATER AND WATER QUALITY**

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MEMORANDUM FOR 6 CES/CEC/CEO

FROM: 6 CES/CEVW

SUBJECT: Drinking Water Permitting Information Brief

1. MacDill AFB, as a regulated Public Water System is required by the State of Florida/Department of Health to obtain permits for the construction of various water system components. The following lists identify our permit requirements:

Permit Needed

- New water mains/distribution lines
- Service lines to multiple buildings
- New service lines not located in “typical right-of-way” that could potentially be used as a distribution main for future water line tie-ins.
- Extensions to existing water mains/distribution lines
- Construction of drinking water storage facilities
- Installation of new drinking water booster pump stations
- Installation of drinking water treatment systems (chlorination, corrosion control, filtration)
- Any water service connection to a child care facility, school, hospital, health care facility

Permit Not Needed

- Construction of a new or replacement of a service line (see exception above)
- In-kind replacement of water mains/distribution lines
- Existing water meter, valve, hydrant, booster pump, or backflow prevention device repair or replacement
- Point of use water treatment units (water softeners) - although there are other environmental/permit issues with these units such as backwash/brine disposal
- Interior plumbing

Note: Permit or no permit required, any type of drinking water work still requires design in accordance with good engineering practices/industry standards and disinfection in accordance with AWWA C651.

2. Two different permit forms are available, long and short. The short form does not allow DOH to ask for additional info via letter; they are only allowed to approve or flatly deny the permit within 30 days (and we wind up paying an additional fee to resubmit). With the short form, the permittee is only able to request clearance approval after all of the water system construction work is completed. The long form provides an administrative procedure for comments and responses as well as multiple clearance approvals as the construction work progress.

3. If you have any questions, please contact Mr. Mike Harrison at 828-0458.

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MEMORANDUM FOR 6 CES/CEC/CEO

FROM: 6 CES/CEVW

SUBJECT: Sanitary Sewer Permitting Information Brief

1. The Environmental Protection Commission of Hillsborough County is our regulatory authority in regards to permitting for sanitary sewer components. The following lists identify our permit requirements:

Permit Needed

- Any new domestic sewage lift station or force main
- New domestic sanitary sewer collection systems (e.g., gravity or force mains, manholes) that serve multiple buildings
- Modification of any existing domestic sewage lift station (e.g., pump size increase, additional connections, increase wet well capacity)
- Move or relocate any domestic sewage lift station

Permit Not Needed

- Construction of any sewage service lateral to a single building
- Any industrial sewage system
- In-kind replacement of sanitary sewer facilities
- Existing equipment repair or maintenance
- Interior plumbing

3. If you have any questions, please contact Mr. Michael Harrison at 828-0458.

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MEMORANDUM FOR 6 CES/CEC/CEO

FROM: 6 CES/CEVW

SUBJECT: Utility System Certification of Completion Information Brief

1. All contractors that install wastewater, stormwater, or drinking water utility systems at MacDill AFB shall ensure that the following procedures are followed. The purpose of these procedures is to maintain 100 percent compliance with Florida Administrative Codes, including all related construction permits issued to the base under these codes.
  2. All contractors shall complete the installation of the utility systems only in accordance with approved project specifications and design drawings issued for construction. When complete (including all manholes, electrical connections, sediment removal, cleaning, bacteriological analysis, or pressure testing), the contractor shall have the work inspected by the designated project construction manager. The construction manager shall determine if the work is complete and the system can operate in accordance with the engineering design
  3. After the construction manager accepts the utility system as complete and operational, the engineer of record for the project shall immediately complete the Certification of Completion of Construction form. Two copies of the form (including all supporting documentation) and as-built drawings shall be submitted to the base Environmental Flight (6 CES/CEVW) for signature by the base authorities (6 AMW/CC and 6 CES/CC) and submission to the appropriate regulatory agency **prior to placing the system into operation**. The engineer of record shall ensure that any substantial deviations from the approved plans and specifications are noted in the appropriate section and the forms and drawings are signed and sealed.
  4. The construction manager also shall notify 6 CES/CEVW that the utility system is ready for regulatory inspection. 6 CES/CEVW will contact the appropriate regulatory agency and schedule an inspection. This step can occur before the entire construction project is complete as long as the utility system is accepted as ready for operation. **The contractor shall ensure that all required regulatory inspections are completed and the systems approved for use before the utility systems are placed into operation.**
  5. These actions shall not exceed 30 days from the date the system was inspected by the project construction manager and deemed complete and operational.
  6. Please contact Mr. Michael Harrison of the base Environmental Flight at 828-0458 if you have any questions regarding these procedures.
-

MEMORANDUM FOR 6 CES/CEC/CEO

FROM: 6 CES/CEVW

SUBJECT: On-Site Septic System Information Brief

1. It is 6 CES/CEV policy to connect all domestic wastewater discharges to the existing wastewater collection system and base wastewater treatment plant. However, the WWTP service area does not completely encompass the base and, therefore, MacDill AFB needs to use on-site septic systems for wastewater treatment and disposal. This memo provides information for personnel that will design new, repair/upgrade, or maintain existing on-site septic systems.
  2. The regulatory agency responsible for on-site septic systems is the Florida Department of Health (including the local Hillsborough County office) with information and permitting forms posted at <http://www.doh.state.fl.us/Environment/ostds/index.html>. Permits are required for the following activities:
    - Drainfield Replacement
    - Tank resize/upgrade
    - New tank and drainfield
  3. Most State-licensed on-site septic system contractors will obtain the required (the recommended approach) permit with the required site and facility information and can obtain the permit the same day it is applied for. There is a permit fee of about \$120. As-builts and a final inspection by DOH are requirements of the permit (typically contractor accomplished).
  4. If you have any questions, please contact Mr. Michael Harrison at 828-0458.
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MEMORANDUM FOR 6 CES/CEC/CEO

FROM: 6 CES/CEVT

SUBJECT: Southwest Florida Water Management District (SWFWMD) Stormwater Management System Permitting Information Brief

1. The SWFWMD requires Environmental Resource permits (ERPs) for construction of impervious surface (e.g., pavements, buildings), stormwater management systems (retention ponds, swales, stormwater pipes/culverts), or work in wetlands. The ERPs must include design drawings and a drainage report that meets their Basis of Review requirements before construction begins. For more information please refer to <http://www.swfwmd.state.fl.us/permits/erp/>.

2. To prevent project delays, 60-90 days should be allowed for the permitting process, although more time may be required if SWFWMD requests additional information. MacDill AFB is the permittee for all projects on base. Application forms will be signed by 6 CES Director. CEV can provide the most recent version of application forms. It is imperative that CEV be included in the permit application process and receives copies of all submittals and communications. Contractors/consultants may not engage SWFWMD without prior CEV approval. Current application fee information can be found in the attached excerpt from Chapter 40D of the Florida Administrative Code.

3. 6 CES is responsible for the operation and maintenance of all constructed and permitted stormwater management systems. The following O&M instructions should be included in SWFWMD applications:

WET POND

The system, as designed, will require minimal maintenance, however, the following is noted:

1. Remove all construction sand and silt from detention pond prior to finalizing the construction.
2. Remove sand and silt from around the outfall piping into the pond as may be required. (Frequency will depend upon how roadway and grassed areas of contributing drainage areas are maintained). Care is to be exercised so that sand & silt is removed before it infringes on the littoral shelf.
3. Check orifice or weir at the control structure at least yearly to assure that it is free of debris, which may have an effect on hydraulic functions.
4. Do not use herbicides or other chemicals in the pond, which will damage or kill vegetation on the littoral shelf.
5. Monitor the littoral shelf including submittal of brief report to SWFWMD every 3 months for the first year and every 6 months for the following 2 years. The report submitted is to be brief and is to include a photograph along with a status report on the shelf condition. At the end of the 3-year reporting period the planted littoral shelf species shall show an 85% survival rate. Modifications to the shelf shall be made if it is found that this survival rate cannot be met.

DRY POND

The system, as designed, will require minimal maintenance, however, the following is noted:

1. Remove all construction sand and silt from treatment / detention pond prior to finalizing the construction.
2. Remove sand and silt from around the outfall piping into the pond as may be required (frequency will depend upon how roadway/parking lot and grassed areas of contributing drainage areas are maintained). Care is to be exercised so that sand & silt is removed before it interferes with the control structure operation and pond treatment volume.
3. Inspect the operation of the underdrains. If treatment volume is not restored within 72 hours following a storm event the underdrain may require maintenance.
4. Check the skimmer and weir at the control structure at least yearly to assure that it is free of debris, which may have an effect on hydraulic functions.

3. If you have any questions, please contact Mr. Eric Vichich at 828-0460.

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#### **40D-1.607 Permit Processing Fee.**

A permit application processing fee is required and shall be paid to the District when certain applications are filed pursuant to District rules. These fees are assessed in order to defray the cost of evaluating, processing, advertising, mailing, compliance monitoring and inspection, required in connection with consideration of such applications. Fees are non-refundable in whole or part unless the activity for which an application is filed is determined by the District to qualify for a permit with a lower fee or not require a permit. Failure to pay the application fees established herein is grounds for the denial of an application or revocation of a permit. The District's permit application processing fees are as follows:

(1) Environmental Resource or Management and Storage of Surface Waters Permit Applications

(a) The fee for a permit application for activities reviewed pursuant to Chapters 40D-4, 40D-40, and 40D400, F.A.C., are as follows:

1. Application for Conceptual Permit \$ 4,550.00
2. Application for Conceptual Permit Modification \$ 2,275.00
3. Application for Individual Permit \$4,550.00
  
4. Application for Individual Permit and General Permit for Incidental Site Activities \$ 3,861.00
  - Application for Individual Permit Modification \$ 2,275.00
  - Application for General Permit pursuant to Chapter 40D-40, F.A.C. \$ 2,912.00
  - Application for General Permit Modification \$ 1,456.00
  - Application for General Permit for Minor Surface Water Systems \$ 364.00
  - Application for General Permit for Minor Surface Water System Modification \$ 182.00
  - 10. Application for General Permit for an activity which has less than 10 acres of project area and impacts 5,000 square feet or less of wetlands or other surface waters \$ 1,456.00
  - 11. Application for permit modification for an activity which has less than 10 acres of project area and impacts 5,000 square feet or less of wetlands or other surface waters \$ 728.00
  - 12. Application for general permit for a public highway project which has less than 10 acres of project area and has less than two acres of new impervious surface area \$ 316.00
  - 13. Application for permit modification for a public highway project which has less than 10 acres of project area and has less than two acres of new impervious surface area \$ 158.00

14. Application for a noticed general permit pursuant to Chapter 40D-400, F.A.C. \$ 250.00

(b) The fees for permit applications concerning the establishment and operation of a mitigation bank under Chapter 40D-4, F.A.C., are as follows:

- Individual Mitigation Bank Permit \$ 3,632.00
  - Individual Mitigation Bank Permit Modification \$ 1,816.00
  - Mitigation Bank Conceptual Permit \$ 3,632.00
  - Mitigation Bank Conceptual Permit Modification \$ 1,816.00
  - (c) Transfer of permit to another entity \$ 91.00
  - (d) Verification that an activity is exempt from regulation under Part IV of Chapter 373, F.S., or Section 403.813, F.S. \$ 100.00
- (2) Application fees for proprietary authorization under Chapters 253 and 258, F.S., are in accordance with the fee schedule provided in Chapter 18-21, F.A.C.

(3) The following types of applications are exempt from the fees identified in subsection (1):

(a) APPLICATIONS FOR PERMITS OR PERMIT MODIFICATIONS WHICH INVOLVE;

1. Less than one-half acre of new project area for non-agricultural projects or less than ten acres of new project area for agricultural projects; and
2. No new impacts to wetlands or surface waters or new impacts only to those wetlands less than one-half acre in size, unless such wetlands are regulated pursuant to Chapter 40D-4, 40D-40 or 40D-400, F.A.C.

(b) PERMIT MODIFICATIONS USING MODIFICATION SHORT FORM: Applications for permit modifications using the Modification Short Form authorized pursuant to paragraph 40D-4.331(2)(b) or subsection 40D-40.331(2), F.A.C.

**ATTACHMENT F**  
**GREEN PROCUREMENT PROGRAM**

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# MACDILL AFB

## GREEN PROCUREMENT PROGRAM

### Fact Sheet



Most projects require compliance with MacDill’s Green Procurement Program. The GPP mandatory purchasing lists include such common items as: carpet, insulation, cement, paint and roof coatings.

*The Green Procurement Program*, also known as the GPP, is a purchasing program to protect the environment and reduce energy consumption with environmentally friendly goods and services. The GPP includes six mandatory program elements and one voluntary element. The mandatory programs are:



Products manufactured from **recycled and reclaimed materials** as identified in EPA’s Comprehensive Procurement Guideline (CPG).



**Biobased products** identified by USDA are made from rapidly renewable plant materials (usually agricultural products). Examples include straw-board construction panels, soy inks, vegetable-based lubricating oils, and “plastics” made from starch.



Energy Star® labeled lighting equipment, roofing products, heating and cooling systems and appliances, or Low Standby Power office equipment that switches into a “sleep” mode, are examples of **energy-efficient products**.



The EPA SNAP Program lists alternatives to **ozone-depleting substances**.



**Substitutes for the EPA Priority Chemicals** (lead, PCB, mercury, naphthalene, and cadmium) are identified by the base pollution prevention program.

#### Why “buy green”?

- Benefit the environment by conserving resources, preventing waste, reducing landfill space, conserving energy and water, and reducing pollution.
- Reduce life cycle costs and stimulate recycling markets.
- Close the recycling loop by purchasing products made from materials that have been recycled.
- Show the USAF’s commitment to environmental stewardship.
- Demonstrate compliance with laws, regulations and executive orders.



Purchases of **alternative fueled vehicles** (AFV), alternative fuels and fuel efficient vehicles are required for Federal fleets and supported by GSA and DLA.



The voluntary program element, Environmentally Preferable Purchasing, promotes purchase of goods and services that have **lesser or decreased effects on human health and the environment** compared to competing goods that serve the same purpose.

#### *It’s the Law!*

GPP was originally authorized under the **Resource Conservation and Recovery Act (RCRA)**, which requires federal agencies to “give preference in their purchasing programs to products and practices that conserve and protect natural resources and the environment.” **Executive Order (EO) 13423, “Strengthening Federal Environmental, Energy, and Transportation Management”**, fully explains the GP program elements. The **2002 “Farm Bill”** requires us to purchase biobased products. The **Energy Policy Act and EO 13123** require us to purchase energy efficient products and AFVs. The **Federal Acquisition Regulations (FAR) Subparts 23.2, 23.4, 23.7 and 23.8** support these requirements. GPP applies to commodity purchases, construction contracts, service contracts, items bought from base supply stores, items used for in-house construction and services, and everything else purchased by Air Force personnel and their contractors.



## Are there any exemptions from having to buy compliant recycled-content or biobased products?

**Yes.** The following are acceptable reasons for not buying a compliant product:

- Product costs more than a comparable non-recycled/biobased product
- Product does not meet reasonable technical requirements
- Product is not available competitively within a reasonable period of time

It is everyone's responsibility to comply with GPP requirements. Government-wide Purchase Card (GPC) purchases, purchase orders, and contracts must all address the procurement or use of GPP items, regardless of the amount of money to be spent. Contract statements of work (SOWs) and specifications and service contract Performance Work Statements must require the use of GPP-compliant items. The GPP requirements are outlined in the base GPP Plan. **Training and documentation** are critical elements in achieving compliance with these requirements. See the [Air Force Guide to Green Purchasing](#) (at AFCEE web link below) for more information.

**Where can I buy GPP-compliant products?** Many GPP-compliant goods are available from the purchasing programs already known to you, and other resources that are relatively new:

- √ Javits-Wagner-O'Day (JWOD) Procurement List products can be purchased from office supply stores or online. In the JWOD Catalog, <http://www.nib.org/JWOD%20Catalog/index.html>, look for the recycling symbol and the earth-friendly JWOD logo.
- √ The Biobased Manufacturers Association offers an online catalog of biobased products: [www.thefarmdepot.com/tfd/bma/departments.jsp](http://www.thefarmdepot.com/tfd/bma/departments.jsp)
- √ For Federal Prison Industries, Inc. (UNICOR) products and services, see [www.unicor.gov](http://www.unicor.gov). Visit <http://www.unicor.gov/about/erecycle.htm> for information on their environmental initiatives.
- √ Energy Star® and FEMP computers and other information technology products are available through the AFWay Computer Store purchasing system. See [www.energystar.gov/products](http://www.energystar.gov/products) for information about other energy efficient products.
- √ Visit the Alternative Fuels Data Center for information about AFVs and alternative fuels: <http://www.eere.energy.gov/afdc/>
- √ EPA's EPP Database is a comprehensive source of information about environmentally preferable products: <http://yosemite1.epa.gov/oppt/epstand2.nsf>

Here are additional resources for more information on the GPP:  
MacDill Environmental POC: Eric Vichich, 828-0460, [Eric.Vichich.ctr@macdill.af.mil](mailto:Eric.Vichich.ctr@macdill.af.mil)  
The "USAF Guide to Green Purchasing:" <http://www.afcee.brooks.af.mil/eq/ap/gg/guide.doc>

Additional information by program element:

- Recovered/recycled materials: <http://epa.gov/cpg>
- USDA Biobased: <http://www.biobased.oce.usda.gov/fb4p/Default.aspx>
- EnergyStar items: <http://www.energystar.gov/products>
- FEMP Low Power Standby devices: <http://oahu.lbl.gov>
- ODSs (Ozone Depleting Substances): <http://www.epa.gov/ozone/snap/lists/index.html>

# Green Procurement Requirements Reference Sheet

## Select Sources of Supply

GSA: <http://www.gsa.gov/environ>

DLA:

<http://www.dscr.dla.mil/catalogs/catalog.htm>

Energy Star®: <http://www.energystar.gov/> (note: Energy Star® does not sell products, but provides a list of manufacturers and their certified products)

JWOD:

<http://www.nib.org/JWOD%20Catalog/index.html>

UNICOR: [www.unicor.gov/about/erecycle.htm](http://www.unicor.gov/about/erecycle.htm)

FEMP: [http://oahu.lbl.gov/cgi-bin/search\\_data.pl](http://oahu.lbl.gov/cgi-bin/search_data.pl)

## Determining EPP Attributes for Specific Purchase Types

• For paints, carpet, office supplies, cleaners and particle board purchases:

<http://www.greenseal.org/recommendations.htm>

• For cleaners:

<http://www.epa.gov/opptintr/epp/cleaners/select/>

For construction projects:

<http://www.epa.gov/opptintr/epp/tools/bees.htm>

## GPP Compliant Product Listings

• CPG: <http://www.epa.gov/cpg/products.htm> (see reverse side of this page for the 2004 list of recycled-content products)

• Biobased:

<http://www.biobased.oce.usda.gov/fb4p/Default.aspx>

• FEMP: <http://oahu.lbl.gov>

• Energy Star:

[http://www.energystar.gov/index.cfm?fuseaction=find\\_a\\_product](http://www.energystar.gov/index.cfm?fuseaction=find_a_product).

• Alternatives to Ozone-Depleting Substances:

<http://www.epa.gov/ozone/snap/lists/index.html>

## Resources for EPP Product Selection

EPA Database of Environmentally Preferable Products and Services:

<http://yosemite1.epa.gov/oppt/eppstand2.nsf>

The EPA-designated CPG items are:

### Construction Products

Carpet

Carpet Cushion

Cement and Concrete

Floor Tile/Patio Blocks

Flowable Fill

Insulation

Latex Paint

Laminated Paperboard

Modular Threshold Ramps

Non-Pressure Pipe

Railroad Grade Crossing Surfaces

Roofing Materials

Shower/Restroom Dividers

Structural Fiberboard

### Landscaping Products

Compost from Yard/Food Waste

Compost from Manure/Biosolids

Garden/Soaker Hoses

Fertilizers

Lawn and Garden Edging

Plastic Timbers and Posts

### Non-Paper Office Products

Binders

Clipboards (Plastic)

Plastic File Folders

Plastic Clip Portfolios

Plastic Presentation Folders

Office Furniture

Office Recycling Containers

Office Waste Containers

Plastic Desktop Accessories

Plastic Envelopes

Plastic Trash Bags

Remanufactured Printer Ribbons

Remanufactured Toner Cartridges

**Paper and Paper Products**

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Printing and Writing Paper | <input type="checkbox"/> General Purpose Industrial Wipers           | <input type="checkbox"/> Misc. (book covers, mailing tubes, pad backs) |
| <input type="checkbox"/> Newsprint                  | <input type="checkbox"/> Corrugated Containers                       | <input type="checkbox"/> Padded Mailers                                |
| <input type="checkbox"/> Bathroom Tissue            | <input type="checkbox"/> Solid Fiber Boxes                           | <input type="checkbox"/> Carrierboard                                  |
| <input type="checkbox"/> Paper Towels               | <input type="checkbox"/> Folding Cartons                             | <input type="checkbox"/> Brown Papers (Wrapping Paper and Bags)        |
| <input type="checkbox"/> Paper Napkins              | <input type="checkbox"/> Industrial Paperboard (tubes, cores, drums) | <input type="checkbox"/> Tray Liners (Place Mats)                      |
| <input type="checkbox"/> Facial Tissue              |  |  |

**Park and Recreation Products**

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Benches and Picnic Tables | <input type="checkbox"/> Playground Equipment          | <input type="checkbox"/> Rubber/Plastic Playground Surfaces |
| <input type="checkbox"/> Plastic Fencing           | <input type="checkbox"/> Rubber/Plastic Running Tracks |   |

**Transportation Products**

- |                                       |   |  |
|---------------------------------------|---|--|
| <input type="checkbox"/> Channelizers | <input type="checkbox"/> Flexible Delineators | <input type="checkbox"/> Traffic Cones |
| <input type="checkbox"/> Concrete     | <input type="checkbox"/> Parking Stop         |  |
| <input type="checkbox"/> Delineators  | <input type="checkbox"/> Traffic Barricades   |  |

**Vehicular Products**

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Engine Coolants         | <input type="checkbox"/> Re-refined Lubricating Oils | <input type="checkbox"/> Retread Tires |
| <input type="checkbox"/> Rebuilt Vehicular Parts |  |  |

**Miscellaneous Products**

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Awards/Plaques | <input type="checkbox"/> Industrial Drums       | <input type="checkbox"/> Pallets         |
| <input type="checkbox"/> Bike Racks     | <input type="checkbox"/> Manual-Grade Strapping | <input type="checkbox"/> Signs and Posts |
| <input type="checkbox"/> Blasting Grit  | <input type="checkbox"/> Mats                   | <input type="checkbox"/> Sorbents        |

The **USDA-designated biobased** items are:

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Mobile Equipment Hydraulic Fluid      | <input type="checkbox"/> Water Tank Coatings                   | <input type="checkbox"/> Penetrating Lubricants              |
| <input type="checkbox"/> Roof Coatings                         | <input type="checkbox"/> Diesel Fuel Additives                 | <input type="checkbox"/> Bedding, Bed Linens and Towels      |
| <input type="checkbox"/> Adhesive and Mastic Removers          | <input type="checkbox"/> 2-Cycle Engine Oils                   | <input type="checkbox"/> Bath and Tile Cleaners              |
| <input type="checkbox"/> Insulating Foam for Wall Construction | <input type="checkbox"/> Lip Care Products                     | <input type="checkbox"/> Clothing Products                   |
| <input type="checkbox"/> Hand Cleaners and Sanitizers          | <input type="checkbox"/> Biodegradable Films                   | <input type="checkbox"/> Concrete and Asphalt Release Fluids |
| <input type="checkbox"/> Composite Panels                      | <input type="checkbox"/> Stationary Equipment Hydraulic Fluids | <input type="checkbox"/> Cutting, Drilling and Tapping Oils  |
| <input type="checkbox"/> Fluid-filled Transformers             | <input type="checkbox"/> Biodegradable Cutlery                 | <input type="checkbox"/> De-icers                            |
| <input type="checkbox"/> Biodegradable Containers              | <input type="checkbox"/> Glass Cleaners                        | <input type="checkbox"/> Durable and Plastic Films           |
| <input type="checkbox"/> Fertilizers                           | <input type="checkbox"/> Greases                               | <input type="checkbox"/> Firearm Lubricants                  |
| <input type="checkbox"/> Metalworking Fluids                   | <input type="checkbox"/> Dust Suppressants                     | <input type="checkbox"/> Floor Strippers                     |
| <input type="checkbox"/> Sorbents                              | <input type="checkbox"/> Carpets                               | <input type="checkbox"/> Laundry Products                    |
| <input type="checkbox"/> Graffiti and Grease Removers          | <input type="checkbox"/> Carpet and Upholstery Cleaners        | <input type="checkbox"/> Wood and Concrete Sealers           |

The **EnergyStar** and/or **FEMP Low-Power Standby** Devices are:

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Battery Chargers         | <input type="checkbox"/> Air-source Heat Pumps | <input type="checkbox"/> Home Sealing (Insulation and Air Sealing) |
| <input type="checkbox"/> Clothes Washers          | <input type="checkbox"/> Boilers               | <input type="checkbox"/> Roof Products                             |
| <input type="checkbox"/> Dehumidifiers            | <input type="checkbox"/> Central AC            | <input type="checkbox"/> Windows, Doors & Skylights                |
| <input type="checkbox"/> Dishwashers              | <input type="checkbox"/> Ceiling Fans          | <input type="checkbox"/> Cordless Phones                           |
| <input type="checkbox"/> Refrigerators & Freezers | <input type="checkbox"/> Furnaces              |  |



- \_\_\_ Room AC
- \_\_\_ Room Air Cleaners
- \_\_\_ Water Coolers
- \_\_\_ Computers
- \_\_\_ Copiers
- \_\_\_ Fax Machines
- \_\_\_ Laptops
- \_\_\_ Mailing Machines
- \_\_\_ Monitors
- \_\_\_ Multifunction Devices
- \_\_\_ Printers
- \_\_\_ Scanners
- \_\_\_ Water Coolers

- \_\_\_ Geothermal Heat Pumps
- \_\_\_ Home Sealing (Insulation)
- \_\_\_ Light Commercial
- \_\_\_ Programmable Thermostats
- \_\_\_ Ventilating Fans
- \_\_\_ Compact Fluorescent Light  
Bulbs (CFLs)
- \_\_\_ Residential Light Fixtures
- \_\_\_ Ceiling Fans
- \_\_\_ Exit Signs
- \_\_\_ Traffic Signals
- \_\_\_ Transformers
- \_\_\_ Vending Machines

- \_\_\_ Combination Units (TVs)
- \_\_\_ DVD Products
- \_\_\_ External Power Adapters
- \_\_\_ Home Audio
- \_\_\_ Televisions
- \_\_\_ VCRs
- \_\_\_ Commercial Fryers
- \_\_\_ Commercial Hot Food Holding  
Cabinets
- \_\_\_ Commercial Solid Door  
Refrigerators and Freezers
- \_\_\_ Commercial Steam Cookers





**ATTACHMENT G**  
**HAZARDOUS MATERIALS AND UPS**

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### CONTRACTOR MSDS SUBMITTAL EXEMPT LIST

The items cited on the list below do not require MSDS submission if used and managed within the limitation indicated. This exemption applies only to the Hazmat MSDS submittal clause in the contract. It does not exempt these items from any applicable environmental, safety, occupational health or federal acquisition regulation requirements cited elsewhere in the contract.

ITEM NAME	*Household Quantity	ITEM NAME	*Household Quantity
Administrative supplies (white out, ink pads, etc.)		Gasoline, unleaded, diesel, etc.	X
Air Freshener		General Purpose cleaners (Lysol, Pine-sol, etc)	X
Alkaline Batteries (AA,AAA,C,D,Etc.)		Glass Cleaners, windex, etc.	X
Anti-Seize (Teflon) Tape		***Glue Sticks, Elmer's Glue	X
Armor All Protectant	X	Grout/Mortar	
Automobile Wax		Hardware (nuts, bolts, screws, nails, washers, etc.)	
Bleach (Clorox, etc.)	X	Insect Repellent, Back Woods Off, etc.	
Carpet / upholstery cleaner		Insect Sprays, Black Flag, Raid, Wasp Spray etc.	
Ceiling Tiles		Leak Detector (Soapy Water)	
Charcoal Starter Fluid	X	Marker Board Cleaner (pump spray)	
Concrete and concrete mix		Metal Polish (Brasso, etc.)	
Common Household detergents, cleaning products	X	Metal wire, framing, girders, I-beams, window frames, etc.	
Dessicant		Printer Cartridges, Ink Cartridges, Printer ribbons	
Dish/Hand Soaps (Ivory, Go-Jo, Etc.)		Shredder Oil	
Drywall/Wallboard		Stamp Pad Ink	
Eye Wash Solutions for personal protection		Sun Block	
**Fire Extinguishers		Superglue	
Floor Wax / Remover / Sweeping Compound	X	Treated Lumber or lumber products	
Furniture Polish (Pledge, Min Wax, Etc.)	X	Toner Cartridges	
		Water, distilled, de-ionized	

\* The term "Household quantities" is defined as quantities one could reasonably assume to be found / used by the normal consumer. It does not include industrial or bulk quantities such as 30 or 55 gallon drums.

\*\* Halon fire extinguishers are not exempt.

\*\*\* Industrial adhesives are not exempt

6 AMDS Bio-Environmental <i>Joann E. Herstek</i> 6 AMDS/SGPB MacDill AFB, FL 33621 813-827-9589 Joann.Herstek@macdill.af.mil	6 CES Environmental (Gov't) <i>Robert J. Clark</i> 6 CES / CEV	6 AMW Safety Donald J. Washington GS-11 Safety Specialist 6 AMW/SEG 828-3385 <i>[Signature]</i>
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## Uninterruptible Power Supply Data Sheet

Building #	Room #	Org	UPS Make / Model	Battery Make/Model	Total Quantity of Batteries



**APPENDIX A**  
**STANDARD OPERATING PROCEDURES**

**SOP NO. 1**  
**FIELD SAMPLING PROCEDURES**

**STANDARD OPERATING PROCEDURE NO. 1  
FIELD SAMPLING PROCEDURES  
REVISION 5**

**Prepared For:**

**U.S. AIR FORCE  
MACDILL AIR FORCE BASE  
FLORIDA**

**Prepared By:**

**EARTH TECH , INC.  
GREENVILLE, SC**

**Under Contract To:**

**U.S. ARMY CORPS OF ENGINEERS  
OMAHA, NE/MOBILE, AL  
CONTRACT NO. DACW45-94-D-0002**

**MAY 2003**

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## STANDARD OPERATING PROCEDURE NO. 1 FIELD SAMPLING PROCEDURES

### 1.0 OBJECTIVES

The objective of this Standard Operating Procedure (SOP) is to provide instructions for soil, soil vapor, and groundwater sampling to ensure that samples are obtained in a consistent manner which accurately assesses and monitors contamination at MacDill Air Force Base (MAFB), Florida.

### 2.0 PROCEDURES

The five types of media which will be investigated at MAFB are soil, sediment, groundwater, surface water, and vapors. Various methodologies will be used in collecting samples for the five media. These procedures are outlined in the following sub-sections. Quality control samples will be collected in accordance with the site-specific work plans.

Regardless of the sampling method, make adequate preparations for sampling trips to ensure that sampling will be performed as efficiently and cost effectively as possible. Follow proper sampling protocol to ensure that representative samples of groundwater are provided for analysis and to ensure that the act of sampling does not contribute to further contamination at the site or cross-contamination of samples. Thoroughly document all techniques employed to ensure the legal defensibility of the data.

Order sample bottles from the laboratory at least one week prior to the sampling date. When ordering sampling bottles, bottles for trip blanks, duplicates, matrix spike, and matrix spike duplicates must be obtained.

At least one day prior to the scheduled sampling date, the equipment to be used should be gathered together and checked. Check sample bottles obtained from the laboratory to ensure that all necessary sample bottles have been provided. Determine the distance and travel time to the nearest Federal Express office from the sampling location to allow time for same day shipment of samples. In the event that a local laboratory is used, discuss the transportation schedule of the sample kits with the laboratory representative.

On the day of sampling, evaluate on-site weather conditions to determine whether they are suitable for sample collection. Groundwater samples must not be collected in weather conditions that may affect the

integrity of the samples (e.g., heavy rain, which could lead to dilution of samples, or high winds, which could lead to volatilization of volatile organic compounds (VOCs)).

## 2.1 Soil Sampling

Soil samples will be collected at the site using a variety of methodologies, depending on the targeted sample depth and the soil type encountered. Surface soil samples (normally 0 to 1 foot interval) will be collected using a stainless steel hand auger or a split core sampler (drive spoon). The advantage of the drive spoon is that it yields undisturbed soil samples for soil classification purposes. Subsurface soil samples will be collected using a stainless steel hand auger, a split-spoon sampler, or a Shelby tube sampler. Bedrock core samples will be obtained using Rotasonic coring techniques, if required by the scope of work. (If another method is more appropriate for a specific project, the technique will be described in the site-specific work plan.) Test pit samples will be collected directly from the bottom or side wall of an open excavation or from the backhoe bucket, depending on the depth of the trenches, which could impact the safety of the sample collection personnel.

All soil samples collected for VOC laboratory analysis must be collected in an EnCore™ Sampler. Use of this sampler is described in Section 2.1.1.

In some cases, soil vapor headspace screening for VOCs may also be required for sample selection. Soil vapor headspace screening methods are described in SOP No. 2 (Field Screening Procedures).

### 2.1.1 EnCore™ Sampling

Environmental Protection Agency (EPA) amendment of SW-846, Update III put a new focus on the issue of data defensibility, quality assurance/quality control (QA/QC), and the acceptability of data collected and analyzed under prior updates to SW-846. As a result, the recent amendments to SW-846 affect regulated entities substantially. Following is a detailed description of the sampling procedures using EnCore™ samplers.

- Remove EnCore™ sampler from the foil package.
- Attach the completed tear-off label (from EnCore™ sampler label) to cap on coring body.
- Label the EnCore™ package completely, including sample identification, sampler's initials, sampling date, and the exact time the sample is acquired.



- Before taking the sample:
  1. Hold the coring body and push plunger rod down until the small o-ring rests against tabs. This will ensure the plunger moves freely.
  2. Depress locking lever on the EnCore™ T-handle. Place coring body, plunger end first, into the open end of the T-handle, aligning the slots on the coring body with the locking pins in the T-handle. Twist coring body clockwise to lock pins in T-handle slots. After checking to ensure the EnCore™ sampler is locked, the sampler is ready for use.
  
- Acquiring the sample:
  1. Turn T-handle with T-up and coring body down. This positions plunger bottom flush with bottom of coring body.
  2. Ensure that the plunger bottom is in position.
  3. Using T-handle, push sampler into the soil until the coring body is completely full.
  4. When full, the small o-ring at the top of the plunger will be centered in the T-handle viewing hole.
  5. Remove the sampler from soil.
  6. Wipe off all soil and foreign materials from the outside of the coring body.
  7. Turn the coring body, while still attached to the T-handle, in an upright position (open end of coring body facing up).
  8. View the open end of the EnCore™, ensuring that no soil or non-soil materials are protruding above the plane of the coring device. If necessary, remove any materials by wiping across the top of the open end of the EnCore™ device with a decontaminated instrument (such as the handle of a spoon). Protruding materials will prevent the EnCore™ cap from seating correctly.
  
- Capping the coring body:



1. Cap the coring body while the EnCore™ is still on the T-handle.
  2. Push cap onto the coring device with a twisting motion. The prongs should be pushed through the flat portion of the ridge located towards the top of the coring device. Forcing the prongs over the ridge may cause damage to the prong or may break the prong off.
  3. The cap must be seated (prongs over top of ridge) to seal the EnCore™ sampling device.
- A total of three 5-gram soil samples must be collected for each sampling location.
  - A 4-oz glass jar of soil must also be collected from the same location for the determination of percent moisture.
  - Preparing sampler for shipment:
    1. Remove the capped EnCore™ sampler by depressing locking lever on the T-handle while twisting and pulling EnCore™ sampler from the T-handle.
    2. Lock plunger by rotating extended plunger rod fully counterclockwise until the wings rest firmly against tabs.
    3. Place in a ziploc bag, seal, and put immediately on ice. Label, store, and transport the sample containers according to the procedures defined in the Quality Assurance Project Plan (QAPP), Section 3.0 of the Basewide Environmental Restoration Work Plan (Basewide ERWP).

The three Encore™ samples will be used by the laboratory to prepare samples for high and low level VOC analysis.

Note: Presently, and at the time this work plan was written, the laboratory has only 48 hours to preserve the sample stored in the Encore™ devices. Holding times must not be exceeded. Samples must be shipped the same day they are collected or picked up by courier the same day or the following morning.

Details regarding the collection of surface soil samples will be documented in the field log book. Information recorded in the field log book will include the following:

- sample identification, date, and military time when sample was collected;

- depth samples were taken; and
- quantity and description of each collected subsample.

### 2.1.2 Surface Soil Sampling

Surficial soil samples (normally 0-1 foot sample interval) at the site will be obtained by using either a hand auger (or stainless steel spoon or shovel) or drive spoon. Procedures for both of these techniques are described below.

#### 2.1.2.1 Hand Auger Sampling

A stainless steel hand auger may be used to collect samples from depths of up to 5 feet below ground surface (or greater depths if torque or caving do not prevent collection of deeper samples). A stainless steel spoon or shovel may be used in the same manner to collect surface soil samples. The hand auger sampling procedure is as follows:

1. Prior to sampling, decontaminate the stainless steel hand auger using the procedures contained in SOP No. 3.
2. Complete labeling procedures contained in the QAPP, Section 3.0 of the Basewide ERWP.
3. Advance the boring to the top of the sample interval.
4. Decontaminate the stainless steel hand auger (SOP No. 3) and then advance the auger through the sample interval to collect the sample. To minimize the potential of sample contamination or cross-contamination, decontaminate the stainless steel hand auger bucket between sample intervals and sampling locations using the decontamination guidelines presented in SOP No. 3. It is recommended that two stainless steel hand auger buckets be decontaminated prior to the start of sample collection.
5. Collect sample aliquots to be analyzed for VOCs using an EnCore™ Sampler. For soil samples at depths greater than 2 feet, collect the soil in the auger and push the EnCore™ (connected to T-handle, typically) directly into the bottom of the auger.
6. Place the soil collected for all other analyses in a decontaminated stainless steel or glass bowl and mix with a decontaminated stainless steel spoon before transferring to the sample containers.
7. Pack the soil into the sample container with the spoon to eliminate voids in the container as much as possible.

8. After filling the sample container with soil, remove excess soil from the container mouth (Wiping the rim of the jar with a disposable glove, taking care to minimize contact with the soil sample, would be acceptable; disposable gloves should be changed between each sampling point.) so that the lid will properly seal.
9. After the sample is collected, store and transport the sample containers according to the procedures defined in the QAPP, Section 3.0 of the Basewide ERWP.
10. If no map of the sampling locations is available prior to sampling, include a simple drawing of the site (not to scale) in the field log book to provide an illustration of all sampling points. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for field documentation procedures.
11. Decontaminate equipment after each sampling event as described in SOP No. 3.
12. Discard contaminated personal protective clothing (e.g., nitrile gloves, tyveks, etc.), as specified in SOP No. 4, Investigation-Derived Waste (IDW) Management.
13. In order to maintain an accurate record of sample collection, transport, analysis, and disposal, the Chain-of-Custody Form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for Chain-of-Custody labeling procedures.

#### 2.1.2.2 Split Core Sampling

Undisturbed surficial soils may be collected by driving a 2-inch nominal diameter 12-inch-long split stainless steel core sampler into the ground surface using a slide hammer. The split core sampling procedure is as follows:

1. Prior to sampling, decontaminate the stainless steel split core sampler using the procedures outlined in SOP No. 3.
2. Complete labeling procedures contained in the QAPP, Section 3.0 of the Basewide ERWP.
3. Attach the slide hammer to the split core sampler.
4. Drive the split core sampler the full length of its body into the ground.
5. Upon reaching the target depth, retrieve the sampler and place it on a clean surface (i.e., foil or plastic) when sampling for chemical analysis.



6. Once the sampler is opened, immediately collect the sample for VOCs using an EnCore™ Sampler; then describe the sample (e.g., major soil type, percentages of secondary constituents, color, texture, etc.).
7. Remove remaining sample aliquots from the split core sampler using a decontaminated stainless steel spatula, trowel, or spoon and place the soil in the appropriate sample containers in order of suspected volatility (e.g., semivolatiles, pesticides/polychlorinated biphenyls (PCBs), inorganics)).
8. Store and transport the sample as described in the QAPP, Section 3.0 of the Basewide ERWP.
9. If no map of the sampling locations is available prior to sampling, include a simple drawing of the site (not to scale) in the field log book to provide an illustration of all sampling points. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for field documentation procedures.
10. Decontaminate equipment after each sampling event as described in SOP No. 3.
11. Discard contaminated personal protective clothing (e.g., nitrile gloves, tyveks, etc.), as specified in SOP No. 4, IDW Management.
12. To maintain an accurate record of sample collection, transport, analysis, and disposal, the Chain-of-Custody Form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for Chain-of-Custody labeling procedures.

### **2.1.3 Soil Sampling During Drilling Activities**

Subsurface soils will be obtained by driving standard split-spoon samplers or by pressing or driving thin-wall tubes (Shelby tubes) in accordance with approved procedures.

Unless otherwise specified in site-specific plans, obtain soil samples for lithologic description (i.e., split-spoon samples or Shelby tubes) a minimum of every 2.5 feet for the first 10 feet and every 5 feet for the remaining depth of each boring or until material is encountered which cannot be sampled with split spoons. On the basis of the site-specific sampling plan, samples may be collected for geotechnical testing to verify field classifications and to obtain additional information on the physical characteristics of subsurface materials. Geotechnical testing may consist of Grain Size Distribution (ASTM D 421 and 422), Atterberg Limits (ASTM D 4318), and moisture content (ASTM D 2216). Select samples that are as representative of site materials as possible. Collection of soil samples from the subsurface necessitates the use of a variety of pieces of equipment. To minimize the risk of cross-contamination between discrete sample intervals, follow the procedures described below during the sample collection process.



### 2.1.3.1 Sampling with a Split-Spoon

If split-spoon sampling is used to obtain soil samples, collect the samples as specified in ASTM D 1586 using a stainless-steel split-spoon sampler. Collect each split-spoon sample according to the following procedures:

1. Decontaminate the sampler as specified in SOP No. 3.
2. Complete labeling procedures contained in the QAPP, Section 3.0 of the Basewide ERWP.
3. Advance the drill string to the desired sampling depth by the drilling method described in the site-specific work plan.
4. Carefully measure the length of the split-spoon sampler, drill rods, subsidiary attachments, and drill bit to ensure that the sample is collected from the designated interval.
5. Attach the split-spoon sampler (decontaminated if sampling for chemical analysis) to the drill rods and lower the sampler to the bottom of the borehole without penetrating undisturbed soil or sediments.
6. Attach the hammer to the drill rods. If excessive drill cuttings are encountered, remove the drill rods and sampler and clean the borehole.
7. Mark the drill rods in 6-inch increments (24 inches total) prior to driving the split-spoon sampler.
8. A 2-inch diameter sampler is driven with a 140-pound hammer falling 30 inches, and a 3-inch sampler is driven with a 300-pound hammer falling 30 inches (or an automatic hammer may be used if available). Record the number of blows required to penetrate every 6 inches. The first 6-inch increment is considered the seating blow, the second and third are totaled to obtain the N-value, and the last 6-inch blows are recorded but are not used.
9. After the sampler has been driven 24 inches, remove the sampler from the borehole and place it on a clean surface (i.e., foil or plastic) when sampling for chemical analysis. Open the sampler, discard slough materials, record the length of remaining sample recovered, and describe the sample (e.g., major soil type, percentages of secondary constituents, color texture, sedimentary structures, accessory minerals, fossils, moisture content).
10. Immediately collect VOC samples using an EnCore™ Sampler, and transfer soils intended for headspace screening to the appropriate sample containers.

11. Remove sample aliquots for all other parameters from the split-spoon sampler using a decontaminated stainless steel spatula, trowel, or spoon. Place the soil collected for all other analyses in a decontaminated stainless steel bowl or glass bowl and mix with a decontaminated stainless steel spoon before transferring to the appropriate sample containers. The preferential order of sample collection is VOCs (using EnCore™ Sampler), headspace screening sample (which can be used for geotechnical purposes), semivolatile organic compounds (SVOCs), PCBs/pesticides, and metals.
12. After the sample is collected, store and transport the sample containers according to the procedures defined in the QAPP, Section 3.0 of the Basewide ERWP.
13. If no map of the sampling locations is available prior to sampling, include a simple drawing of the site (not to scale) in the field log book to provide an illustration of all sampling points. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for field documentation procedures.
14. Decontaminate equipment after each sampling event as described in the SOP No. 3.
15. Discard contaminated personal protective clothing (e.g., nitrile gloves, tyveks, etc.), as specified in SOP No. 4, IDW Management.
16. In order to maintain an accurate record of sample collection, transport, analysis, and disposal, the Chain-of-Custody Form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for Chain-of-Custody labeling procedures.

#### 2.1.3.2 Shelby Tube Sampling

Undisturbed soil samples for geotechnical analyses will be obtained as specified in ASTM D 1587. Collect the undisturbed sample in a 36-inch-long, 3-inch outside diameter, 16-gauge, steel tubing known as a Shelby tube sampler. Attach the sampler to the drill rods and push it into the bottom of the borehole in one continuous motion. Withdraw the sampler and carefully store and ship it to the laboratory performing the analysis. Collect soil samples with a Shelby tube according to the following procedures:

1. Advance the drill string to the desired sampling depth by a drilling method described in the site-specific work plan.
2. Carefully measure the sampler tube, sampler head, drill rods, drill bit, and subs to ensure accurate depths are maintained throughout all phases of drilling and sampling.



3. Connect the tube to the drill rods and rest the bottom of the tube at the bottom of the borehole.
4. Mark the drill rods in 1-foot increments (3 feet total) prior to pushing the Shelby tube.
5. Advance the sampler in a continuous motion without rotating and record the length of penetration and the maximum amount of pressure exerted during the push.
6. Carefully withdraw the Shelby tube from the borehole to minimize disturbances, which may dislodge some of the sample.
7. After removing the tube, measure the amount of sample recovered. If Shelby tubes are not successful in collecting samples, split-spoons or other options will be used.
8. Remove 1/2 inch of soil from each end with a stainless steel spatula or putty knife, and level the sample surface within the tube. Be sure that any cuttings or slough have been removed from the sides of the Shelby tube.
9. The space at each tube end should now be filled with hot paraffin or wax, expandable packers, Teflon™ plugs, or stainless steel plugs.
10. After the airtight seal has been set, fill any remaining void space with clean sand or paper.
11. Close the tube ends with metal or plastic caps and securely tape the caps to the tube with duct tape. If it is considered necessary to ensure the seal on the tube, the sample collector may dip the taped ends of the tube in hot wax to complete the sealing process.
12. Label the top one foot of the tube in indelible ink. Information on the tube should include “TOP” and “BOTTOM” references, the project number, project name, date sample collected, boring number, sample number, and sample depth interval.
13. Tubes should be stored and transported upright in a vertical position to minimize disturbance to the sample. The tube will be transported to a designated soils laboratory for analysis. Tubes will be stored and shipped in padded boxes.

#### **2.1.4 Rock Core Sampling**

Continuous rock core will be sampled using Rotasonic drilling techniques during bedrock monitoring well installations. Rotasonic drilling is performed by coring through the rock for maximum 20-foot intervals using a 3.5-inch diameter inner coring barrel. The rock core remains inside the barrel while a 6-

inch over-ride casing is subsequently advanced around the outside of the 6-inch boring, at which time the inner barrel is retrieved and the core sample is exposed. An additional 8-inch steel casing may be utilized to create a secondary temporary surface casing. This procedure is duplicated until the target depth is reached. The rock core is retained for classification purposes and to determine fracture zones. Because coring techniques vary depending upon the specific installation being performed, detailed procedures will be included in each site-specific work plan.

### **2.1.5 Soil Sampling from Open Excavations**

When necessary or appropriate, soil samples can be collected from open excavations or test pits. The following procedures describe the techniques used to obtain soil samples from open excavations.

1. If it is safe to enter the excavation (less than 4 feet in depth), collect the designated samples from the bottom and/or sidewall of the excavation with a stainless steel spoon and bowl, stainless steel push tube, or stainless steel hand auger bucket. If a sample is to be collected from the side wall of an excavation, the surface should be dressed to remove smeared soil. This is necessary to minimize the effects of cross-contamination due to smearing of material from other levels. If it is not safe to enter the excavation, collect the sample material from the bucket of a backhoe, or use a stainless steel hand auger with extensions to collect the sample. If the backhoe bucket is used to retrieve a definitive sample, pressure wash the bucket prior to collecting the sample. All samples will be collected, as practicable, from soils that have not come into contact with the blade or sides of the bucket (i.e., soil at the top of the load). Sample collection from the backhoe bucket is appropriate for use in treatability studies or for general characterization purposes.
2. When an adequate volume of material has been collected from the sample point or the backhoe bucket, use a stainless steel spoon to fill the appropriate bottles.
3. Collect VOC samples using an EnCore™ Sampler either directly from the sample point or as soon as possible after the backhoe bucket is removed from the excavation area.
4. Place the soil collected for all other analyses in a decontaminated stainless steel bowl or glass bowl and mix with a decontaminated stainless steel spoon before transferring to the sample containers. The preferential order of sample collection is SVOCs, PCB/pesticides, and metals.
5. After the sample is collected, store and transport the sample containers according to the procedures contained in the QAPP, Section 3.0 of the Basewide ERWP.



6. If no map of the sampling locations is available prior to sampling, include a simple drawing of the locations of the excavation and samples (not to scale) in the field log book to provide an illustration of all sampling points. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for field documentation procedures.
7. Decontaminate equipment after each sample as described in SOP No. 3.
8. Discard contaminated personal protective clothing (e.g., nitrile gloves, tyveks, etc.), as specified in SOP No. 4, IDW Management.
9. The test pit or trench will be backfilled to original grade and compacted according to contract specifications after collection of the designated soil samples unless the work plan specifies otherwise.
10. In order to maintain an accurate record of sample collection, transport, analysis, and disposal, the Chain-of-Custody Form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for Chain-of-Custody labeling procedures.

## **2.2 Groundwater Sampling**

Groundwater samples may be collected from existing wells or newly installed wells or may be collected using a direct sampling method. Wells may be sampled using a peristaltic pump/drop tube, electric/variable speed submersible pumps, or bladder pump. Pumps used for purging and sampling shall meet the requirements as specified in DEP-SOP-001/01, FS 2200 Groundwater Sampling (Revision Date: January 1, 2002 or most recent revision). Direct sampling methods will consist of either the Direct Push Technology or the HydroPunch II.

### **2.2.1 Well Sampling**

Groundwater samples will be collected from monitoring wells as specified in the field sampling plans for each site.

A minimum period of 48 hours between well development and well sampling is required. (EPA Region 4 EISOPQAM, November 2001; & FDEP Memorandum "Monitoring Well Construction Specifications and Related Issues", August 16, 1993).

### 2.2.1.1 General Procedures

The following general procedures apply to all well sampling methods:

#### 1. Monitoring Well Inspections

During groundwater sampling events, the contractor field technician will fill out fields on the *Field Data Information Log for Groundwater Sampling* to record the current physical condition of each well sampled. This form can be found in Appendix E. The following information will be recorded during each well inspection:

- Record the site and well number.
- Record the date and time of the inspection.
- List all field personnel performing the inspection.
- Indicate if the well was located or not located.
- Record the well casing diameter.
- Measure and record the total well depth, after purging the well and collecting samples.
- Record the condition of the well cap. Note if cap was replaced.
- Is a lock present? If so, is it in good working condition? If not, was the lock replaced?
- Is a well tag present? If so, record all information from the tag.
- Record the condition of the well pad, vault or protective casing, and protective posts (if applicable).
- Record any additional comments and/or observations.

The contractor field technician will determine the overall condition of the well, usable or not usable, based on field observations. This information and the above information recorded during the inspection will be entered into a form on the Well Management and Maintenance System (WMMS, SOP No. 6, Section 5.0) web page. This information will interface with the Environmental Resources Program Information Management System (ERPIMS) database of existing historical data so that Base and contracting personnel can compile and retrieve automated reports of basewide well inventories and current well condition to schedule well maintenance activities in a timely manner.

2. Measure the water level in the well using an electric tape. If the well is suspected of containing non-aqueous phase liquids (NAPLs), measure all fluid levels using an oil/water interface probe. Report the presence of NAPLs to the project or task manager immediately. Their presence may dictate the sampling program and method.



3. Following sample collection, measure the depth of the well using a decontaminated water level indicator or weighted, disposable line. Do not sound the well prior to sample collection. Use well construction records or previous sounding data to calculate required purge volumes.
4. Purge the monitoring well according to the purging procedures described below.
5. Collect QC samples according to the procedures described in the QAPP, Section 3.0 of the Basewide ERWP.
6. Use a bound, project-specific log book to record all information relating to the sampling activities. Record the information in the log book as described in the QAPP, Section 3.0 of the Basewide ERWP.

#### 2.2.1.2 Well Purging

Purge all monitoring wells before taking samples in order to remove stagnant water from the well casing and to ensure that water removed for analysis is representative of the true water quality in the aquifer. Wells may be purged using a peristaltic, electric/portable submersible, or bladder pump. For moderate to high yield wells (i.e., wells that are not purged to dryness), purge a minimum of three well volumes. Purge additional water from the well, if necessary, until three consecutive measurements of temperature, oxidation-reduction potential (ORP), dissolved oxygen (DO), pH, turbidity, and specific conductivity (SC) vary by no more than  $\pm 0.2^{\circ}$  C,  $\pm 0.2$  pH units,  $\pm 5\%$  for SC, and  $\pm 10\%$  for the other parameters, or until five well volumes have been removed. If a well is evacuated to dryness, sample the well following recovery to 90 percent of the original water column in the well. Field personnel shall contact the field team leader for further instructions if the turbidity does not stabilize within five well volumes and all other parameters vary less than the tolerances specified above or if the DO is not at or below 20% saturation (refer to Table FS 2200-2 in DEP-SOP-001/01).

To determine the volume of water standing in the well, use the following formula:

$$V = 0.041 d^2 h$$

where: h = water column depth (feet) [well depth - depth to water]  
d = diameter of well (inches)  
V = volume of water (gallons)

The volume calculations for some common well diameters are presented below:

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1.5" diameter	V = 0.09225h,
2" diameter	V = 0.164h
4" diameter	V = 0.656h
6" diameter	V = 1.476h

The specific purging procedures are included along with the sampling methods in the following sections.

### 2.2.1.3 Low-Flow Sampling with Peristaltic Pumps

Monitoring wells may be purged with a peristaltic pump, equipped with Teflon, polyethylene, or polypropylene tubing inserted down the well and other interior tubing in the pump head (typically silicone). Samples cannot be collected directly from the peristaltic pump interior tubing into the sample jars with the exception of collecting groundwater samples for inorganic analysis only. After the monitoring well is purged, as described in Section 2.2.1.2, samples collected for VOC analysis must be collected using the pipette method using the Teflon™, polyethylene, or polypropylene drop tube located within the monitoring well. All other parameters must be collected using a pump and trap method where the sample container is the trap (per DEP-SOP-001/01 FS 2200). Samples MUST NOT be collected directly from the peristaltic interior tubing (typically silicone), and intermediate containers MUST NOT be used. Samples can only be collected directly from the pump IF the tubing in the pump head is polyethylene, polypropylene or is Teflon lined. All equipment that comes in contact with the groundwater will be decontaminated according to SOP No. 3, Decontamination Procedures, or will be properly disposed of between sample locations.

The peristaltic pump sampling method is as follows:

1. Prior to purging the well, calculate the volume to be purged using the procedures outlined in Section 2.2.1.2.
2. Decontaminate any non-dedicated pump tubing and any other materials which will contact the groundwater according to SOP No. 3. Note: It is recommended that Teflon™ drop tubing be dedicated to monitor wells, in which case decontamination is not required after the first time.
3. Wearing new disposable gloves, install a Teflon™ or stainless steel check valve on the bottom of the drop tube, then lower the Teflon™, polyethylene, or polypropylene drop tube into the well.
4. Lower the DO probe into the well to the center of the well screen (if the flow-through meter is not used to monitor DO).



5. Set the bottom of the tubing either at a depth which approximates the drawdown elevation once purging begins (if known) or approximately 0.5 – 1.0 feet below the initial water level in the well. Note: the intent is to purge the well from the top of the water column. If the drawdown is excessive (even at a flow rate of 100 milliliters per minute (ml/min)), lower the tubing intake as the water level drops.
6. Connect the tubing to the peristaltic pump. Once the tubing is set and secured in the well, record the start time and initial DO. Turn the pump on and begin purging at a rate that prevents excessive drawdown (nominally 0.5 feet). The purge rate should be between 100 and 500 ml/min and may be determined in the field. Do not exceed 500 ml/min. Record all drawdown measurements on the appropriate purging and sampling log/form.
7. After removing one casing volume of groundwater, record the time and calculate the purge flow rate (volume/time). Measure field analytical parameters as required in the site-specific work plan and/or as described in Section 2.2.1.2 using flow-through meters. Once the field measurements are recorded on the Field Data Information Log for Groundwater Sampling, purge the second and third casing volumes, and measure and record the field parameters. Calculate and record the average purge flow rate for each well volume removed.
8. Upon stabilization of field parameters or removal of five casing volumes (whichever is less), reduce the pumping rate to 100 ml/min and fill the sample containers directly from the discharge, if using a peristaltic pump equipped with Teflon, polyethylene, or polypropylene interior tubing in the pump head. (Inorganics can be collected directly from the discharge even if using silicon tubing in the pump head). If samples will be collected using the pump and vacuum trap assembly, turn the pump off. Remove the tubing from the pump, and insert the tubing into the vacuum trap, which should be the sample container. Connect a second length of tubing from the vacuum trap to the peristaltic pump. Turn the pump back on to establish a vacuum within the chamber to re-establish flow into the sample bottle. (If the pump and trap sampling option is specified in the site-specific field sampling plan/work plan, samples will be collected directly into sample containers in accordance with DEP-SOP-001/01 FS 2200.) Continue this process for all sample containers, except for volatile organic samples. Volatile organic samples should be collected directly from the Teflon, polyethylene, or polypropylene drop tube using the pipette method.
9. When purging is complete and the flow-through cell has been disconnected from the pump discharge, fill the sample containers for the following parameters, in the order indicated (as applicable)
  - Ferrous iron (for Hach kit analyses in the field)\*

- Extractable SVOCs (EPA Method 8270C)
- Polynuclear aromatic hydrocarbons (PAHs, EPA Method 8310)
- Ethylene dibromide (EDB, EPA Method 8011)
- Total petroleum hydrocarbons (TPH, EPA Method 8015B)
- Benzene, toluene, ethylbenzene, xylenes (BTEX) and methyl tert-butyl ether (MTBE) (EPA Method 8021B)
- Pesticides (EPA Method 8081A)
- Dioxins (EPA Method 8290)
- PCBs (EPA Method 8082)
- Chlorinated herbicides (EPA Method 8151A)
- Metals (EPA Methods 6010B/7000s)
- Cyanide (EPA Methods 9010B/9012A)
- Alkalinity (Method 310.2)
- Sulfate (Method 375.4), chloride (Method 325.2), and fluoride (Method 340.2)
- Nitrate (Method 353.2)
- Total organic carbon (TOC, EPA Method 9060)
- Total organic halogens (TOX, EPA Method 9020B)

\* Collect first if analyzed immediately. Otherwise, collect last to minimize time between sample collection and performing the test.

If any split samples are required, fill all split sample containers concurrently with the primary sample.

10. Prior to sample collection, label the sample containers following procedures contained in the QAPP, Section 3.0 of the Basewide ERWP.
11. After these constituents have been sampled, collect volatile constituents (listed below) using the drop-tube or pipette method as follows: remove the tubing from the well, remove the Teflon™ or stainless steel check valve, and fill the sample jars by draining from the bottom end of the tubing. Take special care to ensure that bubbles do not form in the tube as the sample bottles are filled. If additional sample volume is required, replace the check valve, return the empty drop tube to the well, reconnect the discharge end to the pump and slowly draw additional water through the pump (take care to place the bottom end of the drop tube to same level in the water column as before). Once all bubbles have passed through the pump, turn off the pump and resume the filling of the remaining sample containers. Care must be taken to completely empty the drop tube to prevent backcharge to the well. Collect volatile samples using the drop-tube method in the following order (as applicable).

- VOCs (EPA Method 8260B)



- aromatic and halogenated volatile organics (EPA Method 8021B)
  - methane, ethane, and ethene (RSK 175)
12. Label, store, and transport the samples in accordance with the QAPP, Section 3.0 of the Basewide ERWP.
  13. Containerize and properly dispose of the water as specified in the site-specific work plan (see SOP No. 4, IDW Management, and the site-specific work plan).
  14. Discard contaminated personal protective clothing (e.g., nitrile gloves, tyveks, etc.) and disposable equipment as specified in SOP No. 4, IDW Management.
  15. When possible, tubing should remain dedicated to the well.

#### 2.2.1.4 Low-Flow Sampling with Electric/Variable Speed Submersible and Bladder Pumps

Monitoring wells may be purged and sampled using a positive displacement bladder pump and/or an electric/variable speed submersible pump that is constructed and composed of the materials as specified in DEP-SOP-001/01 FS 2200. An oil-less air compressor/controller or bottled nitrogen gas is used to drive the bladder pumps. Perform sampling with a bladder or electric/variable speed submersible pump as follows:

1. Prior to purging the well, calculate the casing volume as described in Section 2.2.1.2.
2. Decontaminate the pump and any other non-disposable materials which will contact the groundwater.
3. Connect Teflon™, polyethylene, or polypropylene discharge tubing to the pump and tie a nylon or stainless steel safety rope to the pump when applicable. The electrical cord for the submersible pumps and any cabling MUST either be sealed in Teflon, polyethylene, or polypropylene, or be constructed of stainless steel.
4. Slowly lower the pump into the well to the appropriate depth interval and secure. In wells with fully submerged screens, the pump intake shall be placed in the well casing above the well screen, near the top of the water column. In wells with partially submerged screens, the well intake shall be placed approximately midway between the measured water level and the bottom of the screen.
5. Lower the DO probe into the well above the pump (if the flow-through meter is not used to monitor DO).
6. Start the pump.

7. Record the time at which purging begins, and record the DO reading.
8. Begin purging at a rate that prevents the drawdown from exceeding 0.5 – 1.0 foot. This rate should be between 100 ml/min and 1.0 liter per minute (l/min), and may be determined in the field. Do not exceed 1.0 l/min. Monitor the water level in the well during purging and adjust the purging rate to minimize water level drawdown. Record all drawdown measurements on the appropriate purging and sampling log/form.
9. Measure and record the purge volume. Record the time required to obtain the desired purge volume to calculate the purge flow rate.
10. Measure and record indicator parameters after evacuation of each casing volume.
11. Upon stabilization of field parameters or removal of five well volumes (whichever is less), reduce the pumping rate by turning down the flow throttle to the lowest setting that still produces the necessary lift to move the water column. Disconnect the tubing from the flow-through cell and begin sample collection. The desired flow rate for sampling is 100 ml/min. Do not exceed 500 ml/min.
12. Prior to sample collection, label the sample containers following procedures contained in the QAPP, Section 3.0 of the Basewide ERWP.
13. Collect groundwater samples in the following order of parameters (as applicable):
  - VOCs (EPA Method 8260B)
  - Aromatic and halogenated volatile organics (EPA Method 8021B)
  - Methane, ethane, and ethene (RSK 175)
  - Ferrous iron (for Hach kit analyses in the field)\*
  - Extractable SVOCs (EPA Method 8270C)
  - PAHs (EPA Method 8310)
  - EDB (EPA Method 8011)
  - TPH (EPA Method 8015B)
  - BTEX and MTBE (EPA Method 8021B)
  - Pesticides (EPA Method 8081A)
  - Dioxins (EPA Method 8290)
  - PCBs (EPA Method 8082)
  - Chlorinated herbicides (EPA Method 8151A)
  - Metals (EPA Methods 6010B/7000s)
  - Cyanide (EPA Methods 9010B/9012A)
  - Alkalinity (Method 310.2)



- Sulfate (Method 375.4), chloride (Method 325.2), and fluoride (Method 340.2)
- Nitrate (Method 353.2)
- TOC (EPA Method 9060)
- TOX (EPA Method 9020B)

\* Collect after VOC sampling if analyzed immediately. Otherwise, collect last to minimize time between sample collection and performing the test.

14. All equipment that comes in contact with the groundwater will be decontaminated according to SOP No. 3, Decontamination Procedures, or will be properly disposed of between sample locations. Store and transport sample containers in accordance with the QAPP, Section 3.0 of the Basewide ERWP.
15. Containerize and properly dispose of the water as specified in the site-specific work plan (see SOP No. 4, IDW Management, and the site-specific work plan).
16. Discard contaminated personal protective clothing (e.g., nitrile gloves, tyveks, etc.) and disposable equipment (line and tubing) as specified in SOP No. 4, IDW Management.

### **2.2.2 Sampling with Direct Push Technology**

Groundwater screening samples will be collected using Direct Push Technology (DPT). In some instances the DPT method can be used to install temporary monitoring wells (“pre-packed” wells) which are then sampled using low-flow sampling methods as described in Section 2.2.1.3. This section describes sampling directly from the DPT discrete-level groundwater sampling device. All equipment shall conform to ASTM D 3441 and the contractor’s standard operating procedures outlined in the contractor’s QAPP.

Groundwater screening samples obtained using DPT method will be collected using a discrete-level groundwater sampling device constructed of stainless steel with chemically inert seals (e.g., Teflon™ or equivalent). The sampling device is capable of collecting a groundwater screening sample at a discrete depth using a surface actuated valve or check ball. The chamber in which the groundwater sample is collected provides for groundwater collection without contact with the atmosphere or ambient air.

Groundwater screening samples obtained using DPT methods will be collected using a sealed sampling device specifically designed for the collection of groundwater samples under in-situ conditions (e.g., the Hydrocone HC-1 groundwater sampler or equivalent device). The sampler is constructed of 316 stainless steel and Teflon™ to ensure high-quality groundwater samples. Filling of the sampler will be regulated by the controlled release of an inert gas (argon or nitrogen) from the sample chamber, and the entire

filling process will be monitored in real time using a computer. In addition, the downhole sensor package is capable of measuring hydraulic conductivity at the sampling point. Operating procedures for the sampler are provided below:

1. Disassemble and clean the sampler. Disassembly consists of removing the retractable tip, lower unit valve mechanism, and upper unit sensor package. See SOP No. 3 for details on decontamination procedures.
2. Place a new or decontaminated stainless steel screen on the stainless steel mandrel. See SOP No. 3 for details on decontamination procedures.
3. Assemble the lower valve unit and the mandrel and screen units, and retract the lower unit. In the retracted position, the stainless steel screen is contained within the sampler such that it does not come into contact with the soil during advancement of the sampler to the sampling depth.
4. Install the downhole sensor package in the upper portion of the sampler.
5. Check the operations of the sampler using the on-board computer system to ensure that inert gas pressure in the sampler is monitored properly. This check is determined by varying the inert gas pressure and monitoring the response on the computer.
6. Check the sampler for leaks and to ensure that the tip opens on pressurization. Retract the sample tip inside the sampler.
7. Hydraulically push the sampler to the required sampling depth using the hydraulic load frame.
8. When the sampler is at the depth required for sampling, increase the inert gas pressure to greater than the hydrostatic pressure in the aquifer. At this point, the hydraulic load frame pulls upward on the rods to expose the stainless steel screen. The sampler is now ready for filling.
9. Lower the inert gas pressure within the sampler to less than hydrostatic, or apply a vacuum, and water flows into the sampler while monitoring on the computer.
10. When sufficient sample volume has been obtained (as monitored on the computer), re-pressurize the sample to greater than hydrostatic (this will close the check valves and retain the sample) and withdraw it to the surface.
11. Pull the sampler to the surface and hold it vertically within the load frame. Remove the tip and disassembled it for cleaning. The sampler is now ready for evacuation.



12. Remove the groundwater sample from the sampler by utilizing the sample release valve. The sample release valve regulates the flow of water from the sampler into the sample containers. Fill the sample containers in the order of volatility.
13. Label, store, and transport the samples in accordance with the QAPP, Section 3.0 of the Basewide ERWP.
14. Discard contaminated personal protective clothing (e.g., nitrile gloves, tyveks, etc.) and disposable equipment as specified in SOP No. 4, IDW Management.

NOTE: Once each DPT boring has been advanced and the groundwater screening sample collected, the boring will be backfilled with low permeability grout. The backfill material will be placed into the borehole from the bottom to the top by pressure grouting using the tremie method. The backfill material will consist of a bentonite grout mix which will be prepared according to manufacturer's instructions.

### **2.2.3 Sampling with HydroPunch II**

The HydroPunch II™ (HPH) will be used as a groundwater sampling tool. Conduct HPH sampling as described below:

1. Decontaminate the HPH and the bailer used to collect the sample (if a disposable bailer is not used), as well as the drill rod through which the sample is collected, according to the procedures outlined in SOP No. 3. The disposable HPH screen is factory-cleaned and packaged and does not require field decontamination.
2. Use hollow stem augers (HSAs) (typically 3 1/4-inch inside diameter) to advance a borehole to the static water table.
3. Attach the HPH to the drill rod and lower it through the HSAs. Drive or push the HPH 5 feet, if possible, below the bottom of the augers. Pull the sampler back 6 inches in order to expose the internal PVC screen. Attach the bailer to a disposable nylon cord by a Teflon™-coated stainless steel wire and lower it through the rod into the exposed HPH screen to collect the sample.
4. Once the bailer has filled, pull it up and transfer the groundwater sample into the appropriate sample containers in order depending on their susceptibility of volatilization (i.e., VOCs first, SVOCs second, and metals last.)
5. Follow the sample custody procedures established in the QAPP, Section 3.0 of the Basewide ERWP.

6. Label, store, and transport the samples according to the QAPP, Section 3.0 of the Basewide ERWP.
7. Discard contaminated personal protective clothing (e.g., nitrile gloves, tyveks, etc.) and disposable equipment as specified in SOP No. 4, IDW Management.

NOTE: Once each HPII boring has been advanced and the groundwater screening sample collected, the boring will be backfilled with low permeability grout. The backfill material will be placed into the borehole from the bottom to the top by pressure grouting using the tremie method. The backfill material will consist of a bentonite grout mix which will be prepared according to manufacturer's instructions.

#### **2.2.4 Filtered Samples**

No groundwater samples will be filtered prior to collection. Filtered samples, if required by a site-specific work plan, would be a variance from this SOP. "Total metals" will be specified on the chain of custody to distinguish sampling methodology.

### **3.0 SURFACE WATER SAMPLING**

Surface water bodies may be grouped into three types: (1) canals, streams, and creeks; (2) ponds and impoundments; and (3) estuarine environments. The selection of the surface water sample locations will depend on the type of surface water body being sampled. Sampling locations where mixing is incomplete should be avoided if an average composition is required. Often, areas of poor lateral or vertical mixing can be visually identified. For example, color or turbidity differences may be apparent immediately below the confluence of a tributary and the main river or at a wastewater discharge point. Use of a field conductivity meter is recommended for determining the uniformity of the water composition across the width and depth of the water body. Once the sampling point has been selected, it must be fixed by detailed description maps or with the aid of stakes, buoys, or other landmarks so that subsequent visits to the site will allow the identification of the sampling point. When locating sampling points in a stream or river, the reference to the bank of the river will be from the vantage of looking upstream.

#### **3.1 Streams and Creeks**

##### **3.1.1 Shallow Stream and Creek Sampling**

When sampling a small stream or creek (less than 20 feet wide and three feet deep), areas with relatively homogenous cross-sectional channels will be sampled. The sampling site should be located immediately downstream from areas where turbulent flow exists to ensure vertical mixing of the water column has



occurred. Unless otherwise specified in the project sampling program, samples should be collected at mid-depth in the mid-section or deepest flow channel of the stream. In addition, samples should be collected from the downgradient sample location to the upgradient location to prevent sediment disturbance and sample contamination.

When collecting samples from shallow surface waters, the following procedures will be followed:

1. Don personal protective clothing (for example, nitrile gloves and tyveks) as required and slowly wade to sample location. Wading procedures will be in accordance with the Basewide Site Safety and Health Plan (SSHP).
2. Remove the sample bottles to be used at the site from the coolers. Label the sample containers according to the procedures defined in the QAPP, Section 3.0 of the Basewide ERWP.
3. Do not mix the caps or rinse the sample containers.
4. Measure in-situ field parameters (pH, SC, temperature, DO, turbidity, salinity, and tidal stage and depth) and record data in the field log book.
5. Surface grab samples may be collected directly in the sample container. Reduce risk of sample contamination by sampling against the stream flow with the sampling personnel located in a downstream position from the sample bottle. If the sample jars are pre-preserved, a non-preserved laboratory clean jar can be used as the sampling device to transfer the sample from the stream to the actual jars. The preferential order of sample collection is as follows:
  - VOCs
  - Dissolved gases and TOC
  - Purgeable organic halogens (POX)
  - TOX
  - Extractable SVOCs
  - Total metals
  - Dissolved metals
  - Phenols
  - Cyanide
  - Sulfate and chloride
  - Turbidity
  - Nitrate and ammonia
  - Radionuclides

6. Replace cap and seal container tightly.
7. After the sample is collected, store and transport the sample containers according to the procedures defined in the QAPP, Section 3.0 of the Basewide ERWP.
8. If no map of the sampling locations is available prior to sampling, a drawing of the site (not necessarily to scale) will be included in the field log book to provide an illustration of all sampling points. Care should be taken to reference distances to a sampling point from a fixed, permanent location (for example, building corner or a road intersection). Refer to the QAPP, Section 3.0 of the Basewide ERWP, for field document procedures.
9. Decontaminate equipment after each sample is collected, as described in SOP No.3.
10. Discard contaminated personal protective clothing (e.g., latex gloves or tyvek) as specified in SOP No. 4, IDW Management.
11. In order to maintain an accurate record of sample collection, transport, analysis and disposal, the Chain-of-Custody form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for Chain-of-Custody labeling procedures.

### **3.1.2 Deep (Stratified) Canal and Stream Sampling**

In deep canals or larger streams, use of a boat or raft will usually be required to obtain a representative sample. A vertical composite sample consisting of subsamples collected just below the surface, at mid-depth, and just above the bottom will be collected from the center of the channel. For large rivers, several vertical composites across the channel may be required to characterize the water quality. Generally, sample locations will be closer together towards the mid-channel where most flow occurs as opposed to the edges where less flow occurs.

Stratified/deep waters will be sampled using a Teflon™, glass, and/or stainless steel Kemmerer bottle, Van Dorn, or equivalent method as indicated below:

1. Don personal protective clothing (for example, nitrile gloves and a tyvek) as required by SSHP.
2. Prior to sample collection, label the sample containers in accordance with the QAPP, Section 3.0 of the Basewide ERWP.
3. Decontaminate the sampling vessel between each vertical composite sampling location in accordance with SOP No. 3.
4. Inspect vessel thoroughly to ensure that the sample drain valve is closed (if bottle is so equipped).



5. Measure and then mark sample line at the desired sampling depth.
6. Open sampling vessel by lifting top stopper-trip head assembly.
7. Gradually lower bottle until desired level is reached (predesignated mark from Step 5).
8. Place messenger on sample line and release. This causes the stoppers to close the cylinder, trapping the discrete sample.
9. Retrieve sampler; hold sampler by center stem to prevent accidental opening of bottom stopper.
10. Rinse and wipe off exterior of sampler body (wear proper gloves and protective clothing).
11. Recover sample by grasping lower stopper and sampler body with one hand, and transfer sample by either (a) lifting top stopper with other hand and carefully pouring contents into sample bottles, or (b) holding drain valve (if present) over sample bottle and opening valve.
12. Allow sample to flow slowly down inside of sample bottle with minimal disturbance.
13. Preserve the sample as appropriate.
14. Check that a Teflon™ liner is present in the cap if required. Secure the cap tightly.
15. After the sample is collected, store and transport the sample containers according to the procedures defined in the QAPP, Section 3.0 of the Basewide ERWP.
16. If no map of the sampling locations is available prior to sampling, a drawing of the site (not to scale) will be included in the field log book to provide an illustration of all sampling points. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for field documentation procedures.
17. In order to maintain an accurate record of sample collection, transport, analysis, and disposal, the Chain-of-Custody form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for Chain-of-Custody labeling procedures.
18. Decontaminate equipment after each sample is collected, as described in SOP No. 3.
19. Discard contaminated personal protective clothing (e.g., latex gloves, tyvek, etc.), as specified in SOP No. 4, IDW Management.

### **3.2 Ponds and Impoundments**

Lakes, ponds, and impoundments are more likely to have stratified water columns than rivers and streams because of temperature differences. A single vertical composite surface water sample will be collected from the center of small ponds and impoundments. In lakes and large impoundments, several vertical

composite subsamples may be collected along a transect or grid and combined to form a single composite sample. Depending on the desired depth of the water sample to be collected in the lake, pond or impoundment, the sample collection procedures will follow those defined in SOP No. 1, Section 3.1.1 or Section 3.1.2.

### **3.3 Estuarine Environment**

In an estuarine environment, samples will be collected at mid-depth in areas when the total depth is less than 10 feet. In deeper areas, samples will be collected 1 foot below the surface, at mid-depth, and 1 foot from the bottom. Depending on the desired depth of the water sample to be collected in the estuarine environment, the sample collection procedures will follow those defined in SOP No. 1, Section 3.1.1 or Section 3.1.2.

## **4.0 SEDIMENT SAMPLE COLLECTION**

Sediment or benthic material may be obtained directly from small streams using stainless steel trowels or spoons. A dredge type sampler is used to collect sediment samples from lakes and ponds. In every case, all water sampling should be performed prior to disturbing the sediment. The sediment samples will be obtained from the same location as the surface water samples (if applicable).

Sediment samples will be collected from the upper 1/2 foot of bottom sediment. Samples from small streams will be collected by a technician standing on the bank or wading into the stream and will be collected from the stream bottom in depositional areas. Sediment samples from ponds, deep canals, or streams will be collected from a boat, and ideally, the position will be located with a Global Positioning System (GPS) as described in SOP No. 7. At a minimum, the position will be established by triangulation with surface features and approximated distances.

Where sample collection using trowels or spoons is inappropriate, sediment samples may be collected using a core barrel/hand auger device for shallow water and a Ponar<sup>®</sup> dredge or gravity corer for deep water sampling. Samplers will be constructed of stainless steel.

### **4.1 Core Barrel/Hand Auger Sample Collection Procedures**

The following procedures outline the collection of shallow water sediment samples using a core barrel/hand auger device.

1. Don personal protective clothing (for example, nitrile gloves and tyvek), and flotation as required by the SSHP.
2. Prior to sample collection, label the sample containers in accordance with the QAPP, Section 3.0 of the Basewide ERWP.



3. Using a weighted measuring tape (if necessary), make detailed measurements of the sampling location and record in the field log book. Details should include the following: location references, depth of water, turbidity, stream velocity estimates (stagnant, slow, moderate, or fast), bottom description, litter, vegetation, wildlife, and any other field observations that may be used to help interpret the data.
4. Wading into the stream, or from the bank, advance the core barrel/hand auger sampler into the stream bottom a distance of 6 to 12 inches. Use a smooth, continuous motion to advance the sampler.
5. If using a core sampler, close the air escape vent and retract the sampler from the stream bottom. To retrieve sampler, twist and remove smoothly.
6. Place sample onto a stainless steel, glass, or Teflon™ tray and remove the sediment contents with a pre-cleaned stainless steel lab spoon or equivalent. Immediately place sample into the appropriate containers.
7. Check for a Teflon™ liner in cap if required and secure cap tightly.
8. After the sample is collected, store and transport field sample containers according to the procedures defined in the QAPP, Section 3.0 of the Basewide ERWP.
9. If no map of the sampling locations is available prior to sampling, a drawing of the site (not to scale) will be included in the field log book to provide an illustration of all sampling points. Refer to the QAPP, Section 3.0 of the Basewide ERWP for field documentation procedures.
10. In order to maintain an accurate record of sample collection, transport, analysis, and disposal, the Chain-of-Custody form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP for Chain-of-Custody labeling procedures.
11. Decontaminate equipment after each sample is collected in accordance with procedures outlined in SOP No. 3.
12. Discard contaminated personal protective clothing (e.g., latex gloves, tyvek, etc.), as specified in SOP No. 4, IDW Management.

#### **4.2 Ponar® Dredge Sample Collection Procedures**

Sediment samples collected with the stainless steel Ponar® dredge sampler will be collected in the following manner:

1. Don personal protective clothing and flotation as required.

2. Prior to sample collection, label the sample containers in accordance with the QAPP, Section 3.0 of the Basewide ERWP.
3. Using a weighted measuring tape (if necessary), make detailed measurements of the sampling location and record in the field log book. Details should include the following: location references, depth of water, stream velocity estimates (e.g., stagnant, slow, moderate, fast), bottom description, litter, vegetation, wildlife, etc.
4. Place the jaws of the Ponar<sup>®</sup> dredge in the lock-open position. The Ponar<sup>®</sup> dredge should be used for the first sampling attempt at each point.
5. Secure a rope, cord, or cable to allow the dredge to reach from the sampling personnel to the sediment being sampled. When the interval to be sampled is greater than 3 feet below the water surface, the end of the cord or cable should be fixed to the boat or dock from which the sampler is being lowered.
6. Position the dredge directly above the point where the sample will be collected.
7. Check to be sure that the jaws of the dredge are open and that the connection cord or line is free to follow the dredge. Lower the dredge into the water and allow it to descend until it reaches the sample point.
8. When the dredge is in position to collect the sample, the connection cord should be tugged sharply three times. The dredge should be raised slowly at a constant rate by the sample collector. Care should be taken not to let the dredge bounce while being raised to the surface.
9. When the dredge has been raised, it should be placed in a clean stainless steel or glass basin. Position the dredge on its side and slowly open the sample container.
10. Remove the sediment contents with a pre-cleaned stainless steel lab spoon or equivalent into the stainless steel or glass basin. If the dredge does not contain enough material or is empty, repeat steps one through seven until the sample has been obtained. Place the sample into the appropriate containers after mixing the total sample collected to ensure homogeneity.
11. After the sample is collected, store and transport the sample containers according to the procedures defined in the QAPP, Section 3.0 of the Basewide ERWP.
12. If no map of the sampling locations is available prior to sampling, a drawing of the site (not to scale) will be included in the field log book to provide an illustration of all sampling points. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for field documentation procedures.
13. Decontaminate equipment after each sample is collected in accordance with procedures outlined in SOP No. 3.



14. Discard contaminated personal protective clothing (e.g., latex gloves, tyvek, etc.), as specified in SOP No. 4, IDW Management.
15. In order to maintain an accurate record of sample collection, transport, analysis, and disposal, the Chain-of-Custody form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for Chain-of-Custody labeling procedures.

### **4.3 Gravity Corer Sample Collection Procedures**

Sediment samples collected with the stainless steel gravity corer sampler will be collected in the following manner:

1. Don personal protective clothing and flotation as required.
2. Using a weighted measuring tape (if necessary), make detailed measurements of the sampling location and record in the field log book. Details should include the following: location references, depth of water, stream velocity estimates (stagnant, slow, moderate, fast), bottom description, litter, vegetation, wildlife, and any other applicable field observations.
3. Secure a rope, cord, or cable to allow the corer to reach from the sampling personnel to the sediment being sampled. When the interval to be sampled is greater than 3 feet below the water surface, the end of the cord or cable should be fixed to the boat or dock from which the sampler is being lowered.
4. Insert a new acetate liner into the corer. Inspect the check valve on the top of the corer.
5. Position the dredge directly above the point where the sample will be collected.
6. Lower the dredge into the water and allow it to free-fall to the bottom.
7. Retrieve the sampler at a smooth, constant rate. Care should be taken not to let the corer bounce or bump while being raised to the surface.
8. When the corer has been raised, it should be placed in a clean stainless steel basin.
9. Release check valve, remove corer nosepiece, and extract sediment contents with a pre-cleaned stainless steel lab spoon or equivalent and place the sample into the appropriate container. If the corer does not contain enough material or is empty, repeat steps one through seven until the sample has been obtained. Additional weights may be added to the corer as needed.
10. After the sample is collected, store and transport the sample containers according to the procedures defined in the QAPP, Section 3.0 of the Basewide ERWP.

11. If no map of the sampling locations is available prior to sampling, a drawing of the site (not to scale) will be included in the field log book to provide an illustration of all sampling points. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for field documentation procedures.
12. Decontaminate equipment after each sample is collected in accordance with procedures outlined in SOP No. 3.
13. Discard contaminated personal protective clothing (e.g., latex gloves, tyvek, etc.), as specified in SOP No. 4, IDW Management.
14. In order to maintain an accurate record of sample collection, transport, analysis, and disposal, the Chain-of-Custody form will be completed. Refer to the QAPP, Section 3.0 of the Basewide ERWP, for Chain-of-Custody labeling procedures.



## **5.0 REFERENCES**

ASTM Standards D 421, D 422, D 2216, D 4318, D 1586, and D 1587.

Base Environmental Contractors Florida Comprehensive Quality Assurance Plan (CompQAP), updated annually.

USACE General Geology Scope of Services.

U.S. Environmental Protection Agency, 1996. "Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual." USEPA, Region IV, Environmental Services Division, Athens, GA.

EPA Region 4 EISOPQAM, November 2001; & FDEP Memorandum "Monitoring Well Construction Specifications and Related Issues", August 16, 1993.

Florida Department of Environmental Protection, 2002, "DEP-SOP-001/01, FS 2200 Groundwater Sampling", (Revision Date: January 1, 2002).

**SOP NO. 2**

**FIELD SCREENING AND ANALYTICAL METHODS**

**STANDARD OPERATING PROCEDURE NO. 2  
FIELD SCREENING PROCEDURES  
REVISION 5**

**Prepared For:**

**U.S. AIR FORCE  
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**Prepared By:**

**EARTH TECH ENVIRONMENT & INFRASTRUCTURE  
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## STANDARD OPERATING PROCEDURE NO. 2 FIELD SCREENING PROCEDURES

### 1.0 OBJECTIVE

The objective of this Standard Operating Procedure (SOP) is to provide instructions for field screening methods for water pH, temperature, specific conductivity, turbidity, dissolved oxygen (DO), oxidation/reduction redox potential (Eh), and natural attenuation parameters (ferrous iron); immunoassay methods (PCBs and TPH); soil sample headspace screening; and vadose zone soil vapor screening.

### 2.0 SCREENING PROCEDURES

This section describes the field screening procedures for various water (groundwater/surface water), soil, and vapor parameters. Field equipment calibration procedures are provided in Section 3.11.2.2 of the Basewide ERWP. Equipment specific calibration frequencies are presented in Table 3-7 of the Basewide ERWP.

#### 2.1 Water Analyses

Several field screening methods are typically used at the time of sampling for groundwater and/or surface water. Screening methods for these parameters are described in the following sections. The Horiba Water Quality Checker U-10 (or equivalent) is used to measure pH, specific conductivity, turbidity, salinity, and temperature. DO is measured separately using a down-well probe. The Horiba Water Quality Checker U-22 is used to measure the above parameters as well as Eh. If the U-10 is being used, a separate meter, Orion Quikchek ORP Meter, is used to measure Eh.

##### 2.1.1 pH

To field screen aqueous samples for pH, the pH meter will be inspected and allowed to equilibrate to ambient temperatures. The pH probe will be rinsed with deionized water and immersed in the water sample, and the meter reading will be allowed to equilibrate. The pH values will be sensed instantaneously by the instrument and read directly off the analog or digital scale (to  $\pm 0.1$  pH units), as the log (to the base 10) of the hydrogen ion concentration of the sample. Some probes may require storage in deionized water while not in use.

### **2.1.2 Specific Conductance**

To field screen aqueous samples for specific conductance, the analog meter will be inspected for cracks and allowed to equilibrate to ambient temperatures. After calibration, the probe sensor will be immersed in the sample and the reading allowed to equilibrate. For results less than 1000 micromhos/centimeter, the values will be read to the nearest 10 units; for results greater than 1000 micromhos/centimeter, the values will be read to the nearest 100 units.

### **2.1.3 Temperature**

A NIST-certified analog thermometer or analog thermometer that has been compared against a NIST-certified thermometer will be used for field screening. To field screen aqueous samples for temperature, the thermometer will be cleaned and inspected for cracks and gaps in the liquid. The thermometer will then be immersed in the sample and swirled in the liquid so that the thermometer bulb is completely covered by the sample. The thermometer will remain in the sample until the temperature reading stabilizes. The temperature will be read directly off the instrument in degrees Celsius to the nearest 0.5 degree. These data are recorded on the Field Data Information Log for Groundwater Sampling.

### **2.1.4 Turbidity**

Turbidity will be measured using a nephelometric turbidity meter. The meter should be calibrated to set standards (included with the meter) prior to sample analysis. The sample volume will be shaken to ensure fully mixed conditions. The test vial will be completely filled with a water sample and the outside of the vial will be wiped until it is fully dry. No micro-bubbles should be present on the inside walls of the test vial. The vial will be placed in the turbidity meter and the turbidity reading will be allowed to equilibrate. The turbidity meter should equilibrate within 5-15 seconds. Equilibration periods longer than 15 seconds may result in low readings due to the settling of particles to the bottom of the test vial.

### **2.1.5 Dissolved Oxygen**

Dissolved oxygen will be measured using a dissolved oxygen meter and probe; however, if technical problems are encountered using the dissolved oxygen meter, a colorimetric analysis will be available for use. Refer to the manufacturer's instructions for specific procedures for measuring the dissolved oxygen colorimetrically.



Dissolved oxygen measurements can be taken using down-hole dissolved oxygen probes. The probes must be thoroughly decontaminated between wells. DO readings are taken prior to beginning the purge process and after each well volume is purged. Dissolved oxygen measurements can also be taken immediately after sample acquisition. (Because most well purging techniques can allow aeration of collected groundwater samples, it is important to minimize potential aeration by using a peristaltic pump to purge the well as described in SOP No. 1, Section 2.2.1.2.) Allow the dissolved oxygen meter reading to equilibrate and then record the reading.

Prior to use of the dissolved oxygen probe, check for air bubbles in the end of the probe. If air bubbles exist, repair the probe per the manufacturer's instructions. The probe should be calibrated at the beginning of each day according to manufacturer specifications, at times of changes in air temperature, and/or on an as-needed basis (i.e., system problems).

#### **2.1.6 Oxidation/Reduction Potential**

To field screen aqueous samples for oxidation/reduction potential, an ORP meter will be inspected to make sure the probe and meter are clean and undamaged. If dirty, the probe will be cleaned per the manufacturer's instructions (usually isopropanol will serve as a safe cleaning reagent). Per the manufacturer's instructions, the meter will be calibrated using a redox solution standard. The probe will be placed in the water sample and the readings will be allowed to equilibrate.

#### **2.1.7 Salinity**

To field screen aqueous samples for salinity, the salinity meter will be inspected for cracks and calibrated per the manufacturer's specifications. The probe should then be immersed in the sample and slowly stirred. The salinity reading will then be allowed to equilibrate. Units are reported as a percentage.

#### **2.1.8 Natural Attenuation Parameters – Ferrous Iron**

Groundwater or surface water concentrations of ferrous iron will be field analyzed using a portable colorimeter such as the HACH DR700 or equivalent. The colorimeter measures the amount of light which passes through a vial of specially prepared water sample and reagent mixture. The reagent reacts with the constituent of concern (ferrous iron) in the water sample causing coloring of the water. Light from a lamp in the colorimeter passes through the sample and a specific filter to be measured by a photo diode. The colorimeter can also be used for screening for other parameters such as nitrate, sulfate, manganese, etc., using different reagent mixtures.

The Hach ampuls for the ferrous iron colorimeter test are “AccuVac ferrous iron reagent” Catalog number 25140.

General steps for using the colorimeter are as follows:

1. Install the correct filter module in the instrument.
2. Select the proper program number from the display.
3. Prepare the sample as indicated in the applicable test procedure. Be sure to use the correct reagent for the analysis (ferrous iron).
4. Place the sample vial with blank solution in the sample compartment.
5. Zero the instrument by pressing the ZERO key.
6. Place the sample vial with the prepared sample into the sample compartment.
7. Press the read key and read the results.

## **2.2 Soil Vapor Headspace – Organic Vapor Analyzer**

An Organic Vapor Analyzer (OVA) equipped with a Flame Ionization Detector (FID) will be used to assess the qualitative concentration of VOCs present in soil sample headspace vapors and in vadose zone soil vapors. The OVA/FID will be calibrated on a daily basis using a methane gas standard. Refer to the manufacturer’s instructions for specific calibration procedures.

Soil sample screening procedures will be conducted in accordance with Rule 62-770, Florida Administrative Code, as described below:

1. Readings will be obtained at the site with the OVA/FID in the survey mode.
2. Each soil sample for headspace analysis will be split into two half-filled, 16-ounce jars and covered with aluminum foil; the two samples will be brought to a temperature of between 20°C (68°F) and 32°C (90°F) and the readings will be obtained five minutes thereafter. To get this reading, the probe from the FID will be inserted through the aluminum foil into the headspace of the jar.



3. One of the readings will be obtained with the use of an activated charcoal filter unless the unfiltered reading is less than 10 parts per million (ppm). A total corrected hydrocarbon measurement will be determined by subtracting the filtered reading from the unfiltered reading.

### **2.3 Immunoassay Kits**

Soil screening and groundwater screening for parameters such as PCBs and TPH can be accomplished using immunoassay kits manufactured by Strategic Diagnostics, HACH, or equivalent. The test kits for each project will be supplied with a customized standard equal to the proposed clean-up levels.

Detailed instructions are provided in the manuals supplied with the individual test kits.

### **2.4 Vapor Analysis**

Vadose zone soil vapors extracted by SVE systems will be analyzed for oxygen, carbon dioxide, VOCs, and/or total petroleum hydrocarbons. Concentrations of oxygen, carbon dioxide and total petroleum hydrocarbons will be determined using a GasTech GTCO<sub>2</sub> portable infrared gas analyzer (or equivalent). Vadose zone soil vapors will be analyzed for VOCs (filtered and unfiltered) using an OVA/FID.

#### **2.4.1 Vadose Zone Soil Vapors – Infrared Gas Analyzer**

Instructions for calibration and instrumentation are contained in the unit's instruction manual. The battery charge level will be checked daily to ensure proper operation. The air filters will be checked and, if necessary, be cleaned or replaced before the investigation is started. The instrument will be turned on and equilibrated for at least 30 minutes before conducting calibration or obtaining measurements. The sampling pump of the instrument will be checked to ensure that it is functioning. Low flow of the sampling pump can indicate that the battery level is low or that some fines are trapped in the pump or tubing.

Meters will be calibrated each day prior to use against purchased CO<sub>2</sub> and O<sub>2</sub> calibration standards. Calibration for TPH detection will be against methane calibration gas using Tedlar™ bags. These standards will be selected to be in the concentration range of the soil gas to be sampled.

The CO<sub>2</sub> calibration will be performed against atmospheric CO<sub>2</sub> (0.05%) and a 5% standard. The O<sub>2</sub> will be calibrated using atmospheric O<sub>2</sub> (20.9%) and against a 5% and 0% standard. Standard gasses will be purchased from the equipment supplier. To calibrate the instrument with standard gasses, a Tedlar™ bag

(capacity ~ 1 liter) is filled with the standard gas, and the valve on the bag is closed. The inlet nozzle of the instrument is connected to the Tedlar™ bag, and the valve on the bag is opened. The instrument is then calibrated against the standard gas according to the manufacturer's instructions. Next, the inlet nozzle of the instrument is disconnected from the Tedlar™ bag and the valve on the bag is shut off. The instrument will be rechecked against atmospheric concentration. If recalibration is required, the above steps will be repeated.

To analyze vapor samples, use a portable air pump or other means to fill a Tedlar™ bag with a vapor sample and close the valve on the bag. Connect the bag to the inlet nozzle of the instrument and open the valve on the bag. Allow the instrument to sample and analyze the vapor in the bag. Record the instrument reading.

#### **2.4.2 Vadose Zone Soil Vapors – Organic Vapor Analyzer/Flame Ionization Detector**

Vadose zone soil vapors will be analyzed in the following manner with a calibrated OVA/FID:

1. A sample of vadose zone vapors will be extracted from a monitoring point or well after proper well purging (refer to SOP No. 1).
2. If the sample is contained in a Tedlar™ bag, the OVA/FID probe will be placed in the bag nozzle and the reading will be allowed to equilibrate. OVA/FID monitoring will be conducted with and without an activated carbon filter for each sample taken.
3. If the vapor sample is extracted with a pump and sent through a moisture trap, the OVA/FID probe will be placed in the vapor stream after the moisture trap and the reading will be allowed to equilibrate. OVA/FID monitoring will be conducted with and without an activated carbon filter for each sample taken.

#### **2.5 Pressure/Vacuum Monitoring**

Air pressure during injection for the in-situ respiration test will be measured with a pressure gauge with a minimum range of 0 to 30 psia. Changes in soil gas pressure during the air permeability test will be measured at monitoring points using Magnehelic™ or equivalent gauges. Tygon™ or equivalent tubing will be used to connect the pressure/vacuum gauge to the fitting on the top of each monitoring point. Pressure and vacuum gauges will be positioned before and after the blower unit to measure pressure/vacuum across the blower and at the head of the venting well. Pressure/vacuum gauges are available in a variety of pressure/vacuum ranges, and the same gauge can be used to measure either



vacuum or pressure by simply switching inlet ports. Gauges are sealed and calibrated at the factory and will be re-zeroed before each test. The following pressure ranges (in inches H<sub>2</sub>O) will typically be available to monitor pressure/vacuum at the in-ground monitoring points: 0±1", 0±5", 0±10", and 0±20".

Monitoring of pressures will be performed as follows:

1. The piezometer wells will be capped with a secure polyvinyl chloride (PVC) end cap fitted with a barbed brass fitting. A three-foot length of flexible tubing will be attached to the barbed fitting. The flexible tubing will be securely pinched at the end with a clothes-pin style clamp or equivalent fitting in order to isolate the piezometer well from atmospheric pressure.
2. A portable vacuum gauge with the vacuum range anticipated for the piezometer well will be selected and flexible tubing will be securely attached to the vacuum gauge port.
3. The hose will be unclamped and the vacuum reading allowed to stabilize. The vacuum for the well location will be recorded on the air sparge/SVE blower vacuum/pressure standardized log.
4. The hose will be resealed and the vacuum gauge removed. The PVC cap with barbed fitting and the flexible tubing should remain on the well throughout the pilot test.

### **3.0 EQUIPMENT CALIBRATION**

#### **3.1 pH Meter, Conductivity Meter, Turbidity Meter, Salinity Meter, and DO Meter**

The Horiba Water Quality Checker U-10 or Equivalent can be used to measure pH, redox, conductivity, turbidity, DO, salinity, and temperature. Temperature and salinity are not to be calibrated except by the manufacturer. The calibration procedure for other parameters is provided below. This is a 4-parameter auto-calibration procedure.

1. Fill the calibration beaker to about 2/3 with the standard solution. Note the line on the beaker.
2. Fit the probe over the beaker.
3. With the power on, press the MODE key to put the unit into the MAINT mode. The lower cursor should be on the AUTO sub-mode; if it is not, use the MODE key to move the lower cursor to AUTO.
4. With the lower cursor in AUTO, press the ENT key. The readout will show "CAL". Wait a moment, and the upper cursor will gradually move across the four auto-calibration parameters one-by-one: pH,

COND, TURB, and DO. When the calibration is complete, the readout will briefly show "END" and then will switch to the MEAS mode.

5. The upper cursor will blink while the auto-calibration is being made. When the auto-calibration is stabilized, the upper cursor will stop blinking.
6. After calibration, the dissolved oxygen reading for a reference solution such as sodium sulfate should be checked to insure that the meter can read in the less than 1 mg/L range.

Additionally, the pH meter should be allowed to equilibrate with ambient temperatures, and then be calibrated using two pH points (either pH 4 and 7, or 7 and 10).

### **3.2 Organic Vapor Analyzer (OVA)**

The Foxboro OVA Model 128 or Equivalent is used for this activity. The OVA Flame Ionization Detector (FID) is calibrated by the factory every six to nine months, or whenever the instrument is serviced by the manufacturer. Shop and field calibration using methane gas is conducted by the Contractor. The instrument is zeroed daily to background levels. Procedures for this daily calibration are included in the operating instructions.

### **3.3 Explosimeter**

Industrial Scientific Model HMX 270 or 271 or Equivalent can be used for this activity. The Industrial Scientific Model HMX 270 or 271 is calibrated whenever the instrument is serviced by the manufacturer or licensed representative. Shop and field calibrations using methane is conducted by the Contractor. The instrument is zeroed daily to background levels. Procedures for this daily calibration are included in the operating instructions.

### **3.4 Field Equipment Calibration Frequency**

Calibration frequencies and acceptance/rejection criteria are shown in Table 3-7. At a minimum, calibration and maintenance intervals for field instruments will be those recommended by the respective manufacturers, unless experience dictates a shorter interval. When the manufacturer does not specify a calibration interval for the equipment, the interval will be established in writing by the user of such equipment and approved by the QA Task Manager. Adherence to the calibration schedule is mandatory. The fact that these calibrations may be performed by an outside source does not exempt the user from the responsibility for identifying, monitoring, and controlling calibration intervals and ensuring that maintenance checks are made on time.



Documentation of field instrument calibrations will be the responsibility of the Field Task Manager. All calibration records shall be maintained in the field log book. In addition, the following information shall be recorded in the log book:

- Equipment type (e.g., pH meter),
- Manufacturer and model number,
- Serial number,
- Recommended calibration frequency,
- Date of latest calibration,
- Dates of field measurement (use),
- Name of person who calibrated instrument,
- Calibration standards used, and
- Source of calibration standards.

Entries in the log book will be made at the beginning of each sampling or measuring effort and when each instrument is calibrated. All documentation in the log book will be made in ink. If an error occurs, corrections will be made by crossing a line through the error and entering the correct information. Changes will be dated and initialed. No entries will be obliterated or rendered unreadable. Records will be kept for all instruments requiring calibration.

#### **4.0 REFERENCES**

EnSys Inc., Product Literature.

HACH Comp., Product Literature.

Wiedemeier, T.H., Wilson, J.T., Kampbell, D.H., Miller, R.N., and Hansen, J.E., 1995. Technical Protocol for Implementing Intrinsic Remediation with Long-Term Monitoring for Natural Attenuation of Fuel Contamination Dissolved in Groundwater, Vol. 1.

**SOP NO. 3**  
**DECONTAMINATION PROCEDURES**

**STANDARD OPERATING PROCEDURE NO. 3  
DECONTAMINATION PROCEDURES  
REVISION 5**

**Prepared For:**

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## STANDARD OPERATING PROCEDURE NO. 3 DECONTAMINATION PROCEDURES

### 1.0 OBJECTIVE

This document presents procedures for the decontamination of equipment used at MacDill Air Force Base (MAFB). All equipment used for investigation and/or remedial action activities will be decontaminated following these procedures. Decontamination procedures are provided for both sampling devices and large equipment. Small equipment will typically consist of equipment such as sampling bailers and field analytical probes. Large equipment will include such items as backhoes and drill rigs.

### 2.0 REFERENCES

None

### 3.0 MATERIALS

**Laboratory detergent** will be a standard brand of phosphate-free laboratory detergent such as Liquinox. The use of any other detergent must be justified and documented in the field log books and inspection or investigative reports.

**Tap water** may be used from any municipal water treatment system. The use of an untreated potable water supply is not an acceptable substitute for tap water.

**De-ionized water** is defined as tap water that has been treated by passing through a standard de-ionizing resin column. The de-ionized water should contain no heavy metals or other inorganic compounds (i.e., at or above analytical detection limits) as defined by a standard inductively-coupled Argon Plasma Spectrophotometer (ICP) scan.

**Hexane** will be laboratory-grade.

**Scrub brush** will be a bristle brush for use on smaller equipment. A steel brush may be used to scrub larger equipment such as the auger bit.

**Aluminum foil**

**Impermeable Liner** will be made of polyethylene plastic, 4 or 6 mil thickness. (only needed for larger equipment).

**Power washer or steam jenny** will only be needed for decontamination of larger equipment.

**Pressure washer** will be capable of spraying water at 200°F and 1500 psi. A pressure washer will only be needed for well installations.

**55-Gallon Drums** will be suitable for collection of decontamination water.

**Analyte-free water** is defined as ASTM Type II water.

## 4.0 PROCEDURES

When practical and economically feasible, disposable equipment will be used. Any non-disposable equipment used for remedial activities at MAFB will be decontaminated prior to each use. Decontamination procedures for sampling devices and large equipment are described separately in the following two sections. Decontamination procedures will be consistent with methods described in the Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Appendix B (EPA, May 1996).

### 4.1 Decontamination Of Sampling Devices

Decontamination of all equipment that comes into contact with samples intended for laboratory analysis will be performed in an area of the site considered to be free from contamination. Sampling devices (generally sampling equipment such as scoops, bailers, pumps, flow lines, etc.) will be decontaminated prior to each use following the procedures outlined below. Sampling equipment will be decontaminated prior to use and between each sampling point.

1. Clean with tap water and a phosphate-free laboratory detergent, (Liquinox or equivalent) using a bristle brush to remove particulate matter and/or surface films. (Tubing associated with pumps and automatic samplers will be flushed with tap water and phosphate-free laboratory detergent.)
2. Rinse thoroughly with tap water.
3. Rinse thoroughly with de-ionized water.

4. Rinse twice with pesticide-grade isopropanol. Equipment used to sample oily materials may be rinsed with hexane if necessary to decontaminate equipment.
5. Rinse with analyte-free water and allow to air dry as long as possible.
6. If sampling equipment is to be stored or transported, wrap completely in aluminum foil, shiny side out, to prevent potential contamination.

Printed or written markings on all well casing (riser pipe and screen) will be removed prior to installation. Pesticide grade isopropanol will not be applied to items constructed of PVC or plastic materials, including monitoring well screens and riser pipe. Disposable PVC bailers, if used, will not be decontaminated as the bailers will be new and delivered to the well site in factory packaging. Electric water-level meters will be cleaned by washing the sensor and first 5 feet of tape with tap water and phosphate-free laboratory detergent and rinsing with deionized water.

Fluids generated by decontamination procedures will be containerized in a 55-gallon drum and disposed of following SOP-4, IDW Management.

#### **4.2 Decontamination Of Large Equipment**

Decontamination of large equipment used during investigations or remedial activities (drill rigs, backhoes, etc.) will be performed in an established contamination reduction zone. The decontamination area for large equipment will consist of a temporary impoundment with an impermeable liner. The impoundment will be sloped such that all liquids will flow to one end or to the center. Decontamination rinsate will be collected in 55-gallon drums and disposed of in accordance with SOP-3, IDW Management. Any decontamination fluid which cannot be pumped from the impoundment will be allowed to evaporate.

Large equipment will be free from excess grease, oils, and soils from previous work prior to arrival at the site. Equipment which leaks fuel, coolant, or lubricants will be removed from the site and repaired prior to use. These equipment will be decontaminated prior to initial use and prior to removal from the site. Large equipment will be cleaned with a power washer, steam jenny, or hand washed with a brush, tap water, and detergent (does not have to be laboratory detergent, but should not be a degreaser) to remove any soil, oil, grease, and hydraulic fluid from the exterior of the unit. The unit will then be rinsed thoroughly with tap water.



For well installations, special decontamination procedures must be observed to prevent contamination or further contamination of the borehole. All down-hole drilling equipment and tools (such as the auger flight and auger bit) will be steam-cleaned using a pressure washer (water at 200°F and 1500 psi) prior to initial use and between locations. All PVC well materials will be delivered decontaminated and individually wrapped in plastic. If screen and casing arrive on site factory-sealed, with no rips or holes, the decontamination requirements can be waived.



**SOP NO. 4**  
**IDW MANAGEMENT**

**STANDARD OPERATING PROCEDURE NO. 4  
IDW MANAGEMENT  
REVISION 5**

**Prepared For:**

**U.S. AIR FORCE  
MACDILL AIR FORCE BASE  
FLORIDA**

**Prepared By:**

**EARTH TECH ENVIRONMENT & INFRASTRUCTURE, INC.  
GREENVILLE, SC**

**Under Contract To:**

**U.S. ARMY CORPS OF ENGINEERS  
OMAHA, NE/MOBILE, AL  
CONTRACT NO. DACW45-94-D-0002**

**MAY 2003**

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## STANDARD OPERATING PROCEDURE NO. 4

### IDW MANAGEMENT

#### 1.0 OBJECTIVE

This document presents information regarding the collection and disposal of investigation derived wastes (IDW) generated from sites at MacDill Air Force Base, Florida (MAFB). Potential sources of IDW will be drill cuttings, excess drilling fluids, sample materials, decontamination fluids, and purge water from well development, sampling, or aquifer testing. More detailed procedures for general waste characterization and management are provided in SOP No. 5.

#### 2.0 REFERENCES

Florida Department of Environmental Protection, 1994. Chapter 62-775, FAC, "Soil Thermal Treatment Facilities", REGfiles, Inc., Tallahassee, FL.

Code of Federal Regulations, 1989. Title 40, Part 761.207. U.S. Government Printing Office, Washington.

#### 3.0 MATERIALS

Fifty-five gallon drums will be utilized for containerization of most IDW. However, if large quantities of IDW will be generated in one area, it may be more cost effective or logistically advantageous to utilize bulk storage containers such as roll-off boxes or portable tanks. Drums to be used for containerization will be either new or reconditioned. All containers will be certified DOT-approved to contain and transport the waste to be placed in them. Liquid wastes, slurries, and solids will be placed in DOT-approved 55-gallon drums. The containers will be constructed of a material which is compatible with the waste or will be lined with a liner which is compatible with the waste. Bulk containers will be lined when appropriate.

#### 4.0 PROCEDURES

Prior to initiating activities in an area, background information available concerning the area and proposed activities will be reviewed to determine what IDW could potentially be generated as a result of the activities. Appropriate containers will be made available at each site and personnel made aware of IDW procedures. Refer to SOP No. 5 for proper waste characterization procedures.



## **4.1 IDW Container Management**

Contractors working under the Basewide ERWP are required to establish a container management system. The system defines procedures to label, track and document each container of IDW generated. Contractor specific container management systems are provided in Appendix F of the Basewide ERWP.

## **4.2 IDW Management**

The storage, treatment and disposal method for a given IDW will depend on its nature. All IDW should fall into the following categories: liquid waste, Level D personal protective equipment (PPE), or other solid wastes. Management procedures for these wastes are provided in the following sections. Refer to Section 4.0 of SOP No. 5 for proper waste characterization procedures.

### **4.2.1 Liquid Wastes**

Liquid wastes will generally include decontamination rinsate and purge water from groundwater sampling, well development, or aquifer testing. As liquid wastes are generated, they will be collected and containerized in 55-gallon drums. Liquids containing solids (drilling fluids, decontamination rinsate, development water) will be allowed to settle. The liquid portion will then be decanted and stored on-site in 55-gallon drums. Any remaining solid wastes (following decanting) will be combined and transferred to an IDW management area (such as the Earth Tech trailer compound for non-hazardous waste) and managed with other solid wastes. If solids content is less than 5%, the solids will be disposed with the liquid wastes. The Base POC will be contacted to locate an approved storage area for hazardous waste. Hazardous waste management procedures are provided in Section 4.4.1 of SOP No. 5.

Contaminated liquid wastes from petroleum release sites will be transferred to MAFB IRP Site 38 for treatment using an on-site, low-profile air stripper, then discharged to the base sanitary system (pending MAFB approval). During some investigations and testing periods, if petroleum contaminated IDW generation is expected to be heavy, a frac tank will be mobilized to Site 38 to serve as a holding tank prior to treatment. As an alternative to treatment at Site 38, liquid IDW may be discharged directly to the sanitary sewer system at some sites, based on prior MAFB approval. Non-petroleum contaminated IDW liquid may be discharged directly to the sanitary sewer system at some sites, based on prior MAFB approval. If direct discharge is not acceptable for non-petroleum contaminated IDW liquid, a MAFB-approved waste disposal facility will be identified.

## 4.2.2 Solid Wastes

Solid wastes may include PPE, drill cuttings, and solid waste remaining after liquid waste decanting. Waste generated from Level D PPE will be handled separately from “other solid wastes”. IDW management for both Level D PPE and other types of solid wastes (including Level A, B and C PPE) are described below.

### 4.2.2.1 Level D PPE

Level D PPE will be disposed of as a solid waste for ultimate disposal in a Subtitle D disposal facility. Non-hazardous PPE will be containerized in plastic bags, sealed, and disposed of in a dumpster or another location of the Base’s choosing. If Level A, B, or C PPE is used, it will be managed with other solid wastes as described in Section 4.2.2.2. If the PPE is determined to be a hazardous waste, it will be managed in accordance with the procedures defined in Section 4.4.1 of SOP No. 5.

### 4.2.2.2 Other Solid Wastes

“Other solid wastes” include drill cuttings, drilling fluid, and/or solid waste remaining after liquid waste decanting, and Level A, B, or C PPE, if used. These wastes will be collected and containerized in 55-gallon drums. Upon generation, drums will be labeled with the matrix, drum number, location, date of containerization, personnel responsible, site location (source), and base contact. Hazardous waste will be labeled as specified in Section 4.4.1 of SOP No. 5. Drums of non-hazardous waste will be stored at an IDW management area (such as the Earth Tech trailer compound) with similar wastes from other MAFB sites until transportation is arranged. The Base POC will be contacted to locate an approved storage area for hazardous waste. No drums will be stored for greater than 90 days after generation. Acceptable waste will be treated and disposed of off-site at a thermal treatment facility licensed by the State of Florida in accordance with Chapter 62-775, FAC (FDEP, 1994b). Waste from non-petroleum contaminated sites will be treated and disposed of in accordance with the procedures defined in SOP No. 5. Non-hazardous solid waste may be treated and disposed of by other means if approved by MAFB. Hazardous waste will be treated and disposed at a permitted hazardous facility.

Waste shipments must be manifested in accordance with all applicable federal, state, and local laws. Each off-site shipment of non-hazardous contaminated soils will be accompanied by a completed non-hazardous waste manifest (EPA Form 8700-22), in accordance with 40 CFR 761.207. Manifests will be signed by a representative of MAFB as generator. Original manifests will be provided to MAFB and

maintained as described in 40 CFR 761.208. Earth Tech will retain copies of all manifests for a minimum of three years. Hazardous waste will be manifested as defined in Section 4.5.1 of SOP No. 5.

**SOP NO. 5**

**WASTE CHARACTERIZATION AND MANAGEMENT**



**STANDARD OPERATING PROCEDURE NO. 5  
WASTE CHARACTERIZATION AND MANAGEMENT  
REVISION 5**

**Prepared For:**

**U.S. AIR FORCE  
MACDILL AIR FORCE BASE  
FLORIDA**

**Prepared By:**

**EARTH TECH ENVIRONMENT & INFRASTRUCTURE, INC.  
GREENVILLE, SC**

**Under Contract To:**

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**MAY 2003  
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1	Acceptable Containers for Selected Wastes
2	Waste Characterization Checklist
3	Characteristic Hazardous Wastes
4	Hazardous Waste Drum Label
5	IDW Drum Tracking Form
6	Disposal Truck Safety Inspection Checklist
7	Non-Hazardous Waste Drum Label
8	Hazardous Waste Manifest Checklist

## LIST OF ATTACHMENTS

<u>Attachment</u>	<u>Title</u>
1	FDEP INTEROFFICE MEMO, MANAGEMENT OF CONTAMINATED MEDIA UNDER RCRA, AUGUST 21, 2002
2	HAZARDOUS WASTE MANIFEST
3	NON-HAZARDOUS WASTE MANIFEST



**STANDARD OPERATING PROCEDURE NO. 5**  
**WASTE MANAGEMENT**

**1.0 OBJECTIVE**

This standard operating procedure (SOP) presents the basic process for identifying, managing, and disposing of wastes generated from sites at MacDill Air Force Base (MAFB), Florida. A summary of the waste management process is provided in Figure 1. For procedures specific to investigation derived waste (IDW), see SOP No. 4.

In the event you encounter a waste or circumstances that this SOP does not address, or if there are any questions regarding implementation of this procedure, please contact the program manager for your company or one of the responsible parties listed below:

Earth Tech Site Manager	Ellen Eveland	813-840-2700
MAFB Resource Conservation and Recovery Act (RCRA) Coordinator	Dan Arrendale	813-828-0461

**2.0 REFERENCES**

The following references were used to prepare this SOP and may be used to obtain additional information.

Waste Determination: Florida Department of Environmental Protection (FDEP), Chapter 62-730, Florida Administrative Code (FAC), "Hazardous Waste"

United States Environmental Protection Agency (EPA), Title 40 of the Code of Federal Regulations (CFR) Part 261, "Identification and Listing of Hazardous Waste"

FDEP, Interoffice Memorandum, Management of Contaminated Media under RCRA, August 21, 2002

MAFB Hazardous Waste Management Plan, most current version.

Test Methods: EPA SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods

Containers/Storage:	Department of Transportation (DOT), 49 CFR 173, "Shippers-General Requirements for Shipments and Packagings"  DOT, 49 CFR 178, "Specifications for Packagings"  EPA Guidance Number TSC-92-02, "Management of Contaminated Media"  EPA, 40 CFR 262 Subpart C, "Pre-Transport Requirements"
Manifesting:	EPA, 40 CFR 262 Subpart B, "The Manifest"
Transporting:	EPA, 40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste"  DOT, 49 CFR 173, "Shippers-General Requirements for Shipments and Packagings"  DOT, 49 CFR 177, "Carriage by Public Highway"  DOT, 49 CFR 178, "Specifications for Packagings"  DOT, 49 CFR 179, "Specifications for Tank Cars"
Treatment/Disposal:	EPA, 40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities"  EPA, 40 CFR 268, "Land Disposal Restrictions"  FDEP 62-775, FAC, "Soil Thermal Treatment Facilities"

### **3.0 WASTE CONTAINMENT MATERIALS**

#### **3.1 Containers**

Container selection is based on the waste type and volume. In general, containers should be new or in good condition, free from leaks and visible damage, and clean and empty (except for liners).

Container specifications are provided in 49 CFR 178 for all DOT-regulated hazardous materials. If the waste characteristics are known, 49 CFR 172.101 should be consulted for appropriate packaging and labeling requirements. Liquid wastes and slurries will be placed in DOT 1A1 or 1A2 steel, bung top, single-construction drums. (Side bung drums are not acceptable). Solid wastes will be placed in DOT 1A1 or 1A2 steel, removable cover drums. The containers will be constructed of a material that is compatible with the waste or will be lined with a liner, which is compatible with the waste. Bulk containers will be lined when appropriate. Table 1 of this SOP provides acceptable packing for wastes commonly encountered at MAFB.

If a waste type is unknown and the waste must be containerized prior to hazard characterization (for example in the case of a spill or leak), general guidelines for providing temporary containerization while waste characterization is being performed are provided in the following sections.

### 3.1.1 Unknown Liquid and Sludge Waste

1. Check the atmosphere around the waste with an explosimeter. **Do not attempt to transfer any materials with a lower explosive level (LEL) reading of > 25%.**
2. For aqueous liquids, check the pH. If the waste is corrosive ( $\text{pH} < 2$  or  $\text{pH} > 12.5$ ), the liquid should be stored in plastic containers. Transfer a small quantity of the liquid into a plastic drum (or tank depending on the volume of liquid). If there is no reaction or heat generated, slowly and gradually transfer larger and larger volumes until waste transfer is complete.
3. For organic liquids or non-corrosive aqueous liquids, transfer into metal drums or tanks.

### 3.1.2 Unknown Solid Wastes

1. Check the waste with an explosimeter. **Do not attempt to transfer any materials with a LEL reading of > 25%.**
2. Depending on the quantity of material, the waste may be stored in drums or roll-off containers. The drums should be new or reconditioned DOT type 1A1 type steel drums. Roll-off containers or trucks should be approved for transportation of hazardous waste and should have a liner and tarp.



### **3.2 Absorbents**

In the event of a spill or leak, the primary objective is to stop the migration of the spilled material. Any absorbent material may be used to absorb a leak or spill of non-reactive materials (e.g., absorbent pads, vermiculite, rags, etc.). The absorbent must be properly containerized to prevent loss of the absorbed liquid. The containerized absorbent and waste material must be managed in accordance with this SOP. The waste determination and associated waste codes applicable to the spilled or leaked material are applicable to the containerized absorbent and waste material.

## **4.0 PROCEDURES**

The basic steps to be followed in containing, characterizing, profiling, storing, transporting, and disposing of wastes are presented in the following subsections.

### **4.1 Preparation**

Before beginning any intrusive activity (excavating soil, moving drums, excavating for equipment foundations, etc.), you must perform the following preparatory activities:

1. Attend MAFB waste management training course (2-hour course offered through the Base Environmental Compliance Office).
2. Fill out and coordinate an AF Form 103 – Work Clearance Request
3. Check the area for unexploded ordnance (UXO). If UXO is encountered, do not touch, remove all personnel, secure area, and immediately contact the 6 AMW Command Post at 813-828-4361/4362.
4. Inspect the area for any signs of buried utilities (clean-outs, valves).
5. Ensure a utility clearance has been performed by the appropriate MAFB personnel. Know if there are any electric, water, gas, or fuel lines near the work area.
6. If the area is known or suspected to contain wastes, determine what the wastes are and the applicable health and safety procedures.
7. Make available appropriate health and safety equipment for use if wastes are encountered.



8. Provide the following monitoring equipment: an explosimeter and an organic vapor analyzer (OVA).

#### 4.2 Unexpected Discovery of Waste

If wastes are unexpectedly encountered during the course of work, the first concerns are as follows:

**SAFETY** Secure the area and remove all personnel until the hazard potential of the waste can be established.

**HAZARD EVALUATION** Determine and document the following, if possible and safe to do so:

- Waste type (liquid, solid, drums, etc.)
- Waste source (leaking tank, buried drums, unknown)
- Waste quantity (number of drums, steady flow of liquid, cubic yards of soil, etc.)
- Any explosimeter or OVA readings taken of the waste or in the vicinity of the waste.

**NOTIFICATION** Subcontract personnel shall notify the Point of Contact (POC) immediately.

The POC shall notify the MAFB Installation Restoration Program (IRP) (828-0764/0776/0789), Compliance POC (828-2718), and the contractor program manager.

The contractor program manager shall notify US Army Corps of Engineers (USACE).

#### 4.3 Characterization of Waste

Wastes shall be characterized prior to containerizing or otherwise managing the material unless the environment or human health is being directly impacted (e.g., leak or spill).

Wastes will be characterized by:

- knowledge of the process generating the waste,

- analytical data from previous sampling events, and
- current waste characterization data, as necessary.

For purposes of this SOP, wastes will be categorized into one of the following groups:

- RCRA Listed Hazardous Waste
- RCRA Characteristic Hazardous Waste
- Petroleum-Contaminated Wastes and Soils
  - May be TSCA hazardous due to PCBs
  - May be RCRA hazardous due to characteristics or listing
- Recovered Petroleum Products
  - May be non-hazardous due to recycling
  - May be petroleum or hazardous waste if no recycle option available
- Construction and Demolition (C&D) Debris
  - May contain asbestos
  - May contain lead paint
  - Contaminated media may be hazardous waste due to EPA's "contained-in" policy
- Non-Hazardous Industrial Waste
- "Clean" waste
- "Special" wastes

Guidelines for determining the proper waste category are presented in the following subsections of 4.3. The waste determination process is summarized in Table 2.

### 4.3.1 Hazardous Waste

#### 4.3.1.1 Listed Hazardous Waste

This category of waste has been defined by EPA with specific waste codes. There are two ways to determine if a waste is listed:

1. If you know the process generating the waste, look in 40 CFR 261, Subpart D. This list contains wastes from non-specific and specific sources as well as waste codes for specific chemicals. For example, if you are told you have spent carbon from treatment of wastewater containing explosives, you would look under "Explosives" and find that you have waste K045.
2. If you have a bulk drum, bag, or other container of discarded chemicals, the second part of the table in 40 CFR 261 Subpart D lists chemicals alphabetically. For example if you find a bag filled with a dry mixture labeled "Toxaphene," you could find the corresponding waste code of P123. Note that this would only apply if you have knowledge that an identifiable chemical product is present, either by seeing a labeled bag or drum or by someone telling you what it contains. If you had soils contaminated with some toxaphene, you might have a hazardous waste by characteristic of toxicity (see Section 4.3.1.2), but you would not have a listed hazardous waste.

#### 4.3.1.2 Characteristic Hazardous Waste

There are four characteristics that will make a waste hazardous by definition: Ignitability, corrosivity, reactivity, or toxicity. Table 3 lists the regulatory limits to determine if a waste is characteristically hazardous.

Data can be used from past investigation work and compared with the values in Table 3. Note that for the characteristic of toxicity, the values given in Table 3 represent the concentration in an extract.

1. If you have analytical data for a liquid, either the total concentrations or toxicity characteristic leaching procedure (TCLP) concentrations may be compared directly with the values in Table 3.
2. If you have TCLP analyses on soils or other solids, the TCLP concentrations may also be compared directly.



3. If you have total concentrations in soils or other solids, you can determine if there is a *possibility* that the waste will exceed the TCLP limits. Total concentrations in soil should be divided by 20 before comparing with the limits in Table 3. If the total concentration divided by 20 is less than the limit in Table 3, the waste is not expected to fail TCLP analysis. If the total concentration divided by 20 exceeds the limit in Table 3, a TCLP analysis should be performed for the parameters that exceed the limits. Many times wastes will pass TCLP even if the total concentration divided by 20 exceeds the limit. Use TCLP results for characterization purposes.

Analytical data is required to determine if a waste is characteristically hazardous, but may be used in conjunction with knowledge of waste characteristics to determine what to test. If a waste's characteristics are completely unknown, it is advisable to have the laboratory test for all of the characteristics of a hazardous waste. Typically, you will have some knowledge of the waste characteristics and can eliminate many of the analyses. For example, if you have a wastewater with pH consistently between 5 and 8, you could eliminate the corrosivity tests (because the pH is within limits) and the ignitability testing (because it is a wastewater and not flammable). Further, if you knew that the water was contaminated only with metals, you could test for TCLP metals only.

#### 4.3.1.3 Exceptions

Some wastes are exempted in whole or in part from the definition of hazardous waste. A few of the more commonly encountered exceptions are as follows:

1. Petroleum wastes that contain less than 1,000 ppm halogenated organics may exceed the toxicity characteristic limits for waste codes D018 through D043 only (i.e., all other constituents must be within limits) and be exempted from hazardous waste designation. However, if the wastes are listed hazardous waste, contain polychlorinated biphenyls (PCBs), or exhibit the characteristics of a hazardous waste for waste codes other than D018 through D043, Florida regulations (FAC 62-775.410(4)) require that disposal be in an approved hazardous waste treatment/disposal facility. See subsections 4.3.2 and 4.3.3 for further instructions if you have a petroleum waste.
2. PCB wastes that are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and also fail the characteristic of toxicity for waste codes D018 through D043 will not be regulated as a RCRA hazardous waste but will be classified and handled as Toxic Substance Control Act (TSCA) wastes under 40 CFR 761.



3. There are special requirements for batteries, certain stocks of pesticides, and mercury-containing devices (i.e., thermometers and fluorescent bulbs). If these wastes are encountered, review the requirements of the Universal Waste Standards in 40 CFR 273.
4. Some recycled materials are exempt from hazardous waste regulations. These may include wastes burned for energy in boilers and industrial furnaces, precious metals recovery, spent sulfuric acid, pulping liquor, spent wood preserving solutions, recovered oil and reclaimed lead-acid batteries.
5. Aqueous solutions with > 24% by volume of alcohol are exempt from the characteristic of ignitability.
6. Other exemptions are listed in 40 CFR 261.4. Refer to this regulation if you think your waste may be exempt.
7. The FDEP has provided guidance for the proper management of contaminated media under RCRA (FDEP, 1995). According to this guidance, media contaminated with a hazardous waste may be managed as non-hazardous media if certain guidance concentrations are met. This determination guidance is provided in Attachment 1.

#### 4.3.2 Petroleum-Contaminated Wastes and Soils

Petroleum contaminated soils are exempt from most RCRA hazardous waste regulations, **unless** any of the following conditions are met:

1. Total halogens are present above 1,000 ppm.
2. Waste concentrations exceed toxicity limits (see Table 3) for arsenic, barium, cadmium, chromium, 2,4-D, endrin, lead, lindane, mercury, methoxychlor, selenium, silver, toxaphene, or 2,4,5-TP.
3. It is one of the following five types of petroleum wastes which are listed hazardous wastes:
  1. dissolved air flotation (K048)
  2. slop oil emulsion solids (K049)
  3. heat exchanger cleaning sludge (K050)

4. API separator sludge (K051)
5. leaded tank bottom sludge (K052)

If the petroleum waste is not one of the five listed wastes (or a mixture of one of these wastes with other materials) and does not contain > 1,000 ppm of total halogens or exceed any of the above listed toxicity limits for metals, pesticides, or herbicides, **then** it is a petroleum-contaminated waste and not a hazardous waste.

Additional testing must be done to ensure that petroleum-contaminated wastes are not TSCA-regulated.

If the wastes or soils were contaminated with **used oil, hydraulic oil, or mineral oil**, they must be analyzed for PCBs by EPA Method 3550/3665/8082. The options for disposal differ for various PCB concentrations. Some Florida thermal treatment facilities are permitted to accept wastes with low concentrations of PCBs. The results of the PCB analyses should be provided to the prospective disposal facilities for their determination on their permit allowances. At concentrations of greater than 50 ppm, the soils will most likely need to be treated as TSCA waste and incinerated in an approved facility. Contact the project manager if PCB concentrations exceed 50 ppm or if the disposal facilities will not accept the waste due to PCB concentrations. Arrangements will need to be made for acceptance at a TSCA permitted facility for incineration of the waste materials.

#### 4.3.3 Recovered Petroleum Products

Recovered petroleum products may be managed as a used oil (e.g., recycled) as long as the used oil is not a hazardous waste or TSCA-regulated (see Sections 4.3.1 and 4.3.2). The used oil must also meet the standards specified by Table 1 of 40 CFR 279.11.

#### 4.3.4 Construction and Demolition Debris

Debris generated from construction or demolition can typically be disposed without a manifest at a C&D landfill. Typical C&D materials include concrete, wood, re-bar, pipes, conduits, brick, roofing, flooring, and other debris generated in general construction and demolition of buildings or equipment. Special requirements apply to asbestos insulation and lead paint that may be generated during C&D activities.

**ASBESTOS:** Asbestos is typically found in demolition debris in the form of pipe or boiler insulation, floor tile, ceiling tile, sprayed insulation, or siding. A qualified person must make the determination if asbestos is present, and



if any samples are required. Contact the project manager if you suspect asbestos is present so that a survey can be performed.

**LEAD PAINT:**

Lead paint was used until 1975. Demolition debris of any buildings or equipment constructed prior to 1975 may contain lead paint. As the lead concentrations were frequently very high in the paint, this can be determined by collecting a sample of the dried paint and sending it to a laboratory for lead analysis. If you suspect demolition debris contains lead paint, collect a sample and notify the project manager that an analysis will be performed for lead.

In addition, debris or other media contaminated with a listed hazardous waste is considered a hazardous waste by virtue of EPA's "contained-in policy".

**4.3.5 Industrial Wastes**

If wastes, water, or soils are screened using the procedures above and in Table 2 and it is determined that they are not hazardous wastes, petroleum wastes, recovered petroleum product, or C&D debris, an additional screening is required to determine if the wastes are "clean" enough to remain on site or must be removed for disposal. This should be determined in conjunction with the project manager and the MAFB POC. If wastes exceed certain risk-based criteria, background soils concentrations, or Florida screening levels, they will generally be removed for off-site disposal. In this event, they should be classified as industrial wastes for storage, manifesting, transportation, and disposal purposes. Solid materials will be handled as non-hazardous industrial wastes and disposed of off site. Liquids may be handled the same way or may be treated on site.

**4.3.6 "Clean" Wastes**

"Clean" wastes are solid wastes that are not hazardous, petroleum, C&D, or industrial. Typical examples would include waste paper products, packing materials from equipment, and other small items that have not been in contact with hazardous wastes or substances.

**4.3.7 "Special" Wastes**

This category was created to draw attention to certain types of wastes that will require special handling. Specific requirements are not provided in this SOP because it is not anticipated that these wastes will be

encountered. It is important to note that special wastes may also be hazardous. If any of these wastes are encountered, notify the project manager:

- Medical waste includes any type of spent medical equipment or supplies, any materials contaminated with human fluids, or anything labeled as “medical waste” or “bio-hazard”.
- Explosive waste includes any materials labeled as “explosive”, “shock sensitive”, or exhibiting explosive characteristics.
- Reactive waste includes any materials labeled as or exhibiting characteristics of “reactive”, “strong oxidizer”, “cyanide”, “sulfide”, “air reactive”, or “reacts strongly with water”.
- Compressed gases include any abandoned compressed gas cylinders discovered during performance of work. It does not include any cylinders used in performing the work, such as hydrogen for instrument calibration or compressed breathing air.
- PCB transformers or other materials thought to contain dielectric fluids.
- Dioxin waste includes any liquids or solids contaminated with dioxins.

#### **4.4 Container Labels and Storage**

##### **4.4.1 Hazardous Wastes**

Hazardous waste will be managed in place until it is loaded directly into containers for storage and/or transportation.

For wastes in drums that have been classified as hazardous:

1. Complete and affix a hazardous waste label as indicated in Table 4. Check the requirements of 49 CFR 172.101 to determine if any additional labels (i.e., flammable, corrosive, etc.) are required. Note: Make sure the EPA hazardous waste code, waste description, and the accumulation start date are filled in. The accumulation start date is the date which the container is completely filled or moved into a 90-day point. The manifest document number shall also be written on the label once the number is determined.
2. A unique manifest document number will be assigned to the container and recorded on the label (Table 4) and the manifest when generated. Information regarding drum filling, storage, and disposition will be recorded on a Drum Tracking Form (Table 5).



3. Hazardous waste containers must be stored within an established satellite accumulation area (SAA). At the SAA, up to 55 gallons of hazardous waste or 1 quart of acute hazardous waste is allowed to accumulate. Once a 55 gallon container is full or more than 55 gallons of waste are generated, the container(s) must be moved to a 90-day hazardous waste storage area within three days. If a MAFB SAA is not located at or near the point of waste generation, the contractor must establish a SAA in coordination with 6 CES/CEVH personnel. Movement of the waste to the MAFB 90-day hazardous waste storage area must be coordinated with 6 CES/CEVH personnel. If the volume of waste generated exceeds the capacity of the Base storage area, the contractor must establish and maintain a 90-day hazardous waste storage area in accordance with 40 CFR 262 and the MAFB Hazardous Waste Management Plan. The establishment of a 90-day waste storage area must be coordinated with and approved in advance by the Base Environmental Compliance Office.
4. Inform the Base POC that storage is required for hazardous waste.
5. At the time of transport, prior to loading onto the truck, inspect the drums to ensure they are appropriately labeled and conditions are acceptable for transport.
6. Complete a Disposal Truck Safety Inspection Checklist (Table 6) for the transport truck. If an unsatisfactory condition is noted, require correction before transportation of the waste.
7. For transport of hazardous waste, 49 CFR 172.101 lists the placard requirements. The transporter should be informed of the waste designation and required to provide applicable placards. Ensure placards are placed on the truck prior to moving from the loading area.

For wastes in bulk containers that have been classified as hazardous:

1. Complete and affix a hazardous waste label as indicated in Table 4. Check the requirements of 49 CFR 172.101 to determine if any additional labels (i.e., flammable, corrosive, etc.) are required. Note: Make sure the EPA hazardous waste code, waste description, and start date are filled in. The accumulation start date is the date which the container is completely filled or moved into a 90-day point. The manifest document number shall also be written on the label once the number is determined.
2. A unique manifest document number will be assigned to the container and recorded on the label (Table 4) and the manifest when generated.

3. For bulk shipments, 49 CFR 172.101 lists the placard requirements for the bulk container. The transporter who supplies the bulk container should be informed of the waste designation and required to provide applicable placards. Ensure applicable placards are placed on the truck prior to moving from the loading area.
4. If bulk containers of hazardous waste are not to be immediately transported off site for treatment/disposal, they must be moved to the MAFB 90-day hazardous waste storage area (in cooperation with 6 CES/CEVH personnel). If the volume of waste generated exceeds the capacity of the Base storage area, the contractor must establish and maintain a 90-day hazardous waste storage area in accordance with 40 CFR 262 and the MAFB Hazardous Waste Management Plan. The establishment of a 90-day waste storage area must be coordinated with and approved in advance by the Base Environmental Compliance Office.
5. Containers should be lined or otherwise sealed to prevent liquids from draining.
6. Containers should be tarped after waste is placed inside to prevent rainwater from collecting in the container.
7. Complete a Disposal Truck Safety Inspection Checklist (Table 6) for the container and transport truck. If an unsatisfactory condition is noted, require correction before transportation of waste.

#### **4.4.2 Petroleum and Industrial Waste**

*For wastes in drums that have been classified as either **Petroleum or Industrial**:*

1. Place in appropriate drum as listed in Table 1.
2. Complete and affix a proper waste label as indicated in Table 4 or 7. Check the requirements of 49 CFR 172.101 to determine if any additional labels (i.e., flammable, corrosive, etc.) are required. Note that the accumulation date is the date which the container is completely filled or moved into a 90-day point.
3. Assign an unique manifest document number to the container and record on the label and the manifest when generated (Table 7). Information regarding drum filling, storage, and disposition will be recorded on a Drum Tracking Form (Table 5).



4. Inform the Base POC that storage is required for a non-hazardous waste.

For wastes in bulk containers that have been classified as **Petroleum or Industrial**:

1. Complete and affix a proper waste label as indicated in Table 4 or 7. Check the requirements of 49 CFR 172.101 to determine if any additional labels (i.e., flammable, corrosive, etc.) are required. Note: Make sure the EPA hazardous waste code, waste description, and start date are filled in. The accumulation start date is the date which the container is completely filled or moved into a 90-day point. The manifest document number shall also be written on the label once the number is determined.
2. A unique manifest document number will be assigned to the container and recorded on the label (Table 7) and the manifest when generated.
3. For bulk shipments, 49 CFR 172.101 lists the placard requirements for the bulk container. The transporter who supplies the bulk container should be informed of the waste designation and required to provide applicable placards.
4. If bulk containers are to be stored on base, contact the Base POC to locate an approved storage area for non-hazardous waste.
5. Containers should be lined or otherwise sealed to prevent liquids from draining.
6. Containers should be tarped after waste is placed inside to prevent rainwater from collecting in the container.
7. Complete a Disposal Truck Safety Inspection Checklist (Table 6) for the container and transport truck. If an unsatisfactory condition is noted, require correction before transportation of waste.

#### **4.4.3 C&D and “Clean” Waste**

No specific container label or storage requirements apply if the waste is non-hazardous.

#### **4.4.4 “Special” Waste**

Storage and labeling requirements will be determined on a case-by-case basis.

#### 4.5 Manifests

The following wastes will require **hazardous waste manifests**:

- Characteristic hazardous wastes
- Listed hazardous wastes

The following wastes will require **non-hazardous waste manifests**:

- Petroleum-contaminated wastes and soils
- Recovered petroleum products
- Non-hazardous industrial wastes

The following wastes generally **do not require manifests (Bills of Lading are required)**:

- C&D wastes
- “Clean” wastes

Both hazardous waste and non-hazardous waste manifests should be completed in advance of shipment so that necessary signatures can be obtained. Typically, for hazardous waste, the uniform hazardous waste manifest specific to the state (destination) where the hazardous waste is being treated or disposed will be used for wastes generated at the Base. The contractor may request the disposal facility or transporter to prepare the manifest. However, the contractor will provide the required information and will check each manifest for completeness and accuracy. All required information boxes and sections of the manifest must be completed, verified, and signed *before* the transporter leaves the Base with the waste shipment. All manifests must be reviewed and signed by designated MAFB personnel only *prior to* leaving the Base.

The only MAFB personnel designated to sign hazardous waste manifests are the following 6 CES/CEV personnel:

Andy Rider	813-828-2718
Dan Arrendale	813-828-0461
Rob Ritch	813-828-3393



All MAFB personnel from Environmental Flight and the IRP are authorized to sign non-hazardous waste manifests.

A note must be placed in the manifest that requires a copy of final manifests and weight tickets be sent to the contractor field manager (name and address of the contact should be included). See Section 4.6.1 regarding the required Base procedure for weighing bulk waste shipments and recording the waste quantity (volume or weight) and units (volume or weight) on the manifest prior to the waste shipment leaving the Base facility.

A unique manifest document number will be assigned to each manifest. The number will include a two-letter abbreviation for the contractor's name (e.g., ET) , a two-digit reference to the year (e.g., 02), and a two-digit document number (e.g., 01, 02, 03).

#### **4.5.1 Hazardous Waste Manifests**

Attachment 2 contains a copy of the uniform hazardous waste manifest and instructions for completing the manifest, as required in 40 CFR 262 Appendix. A designated MAFB employee will review and sign the manifest as the generator *prior to* allowing the waste and the manifest to leave MAFB.

A checklist for hazardous waste manifests is contained in Table 9. Listed below are special requirements that the contractor shall follow to review hazardous waste manifests prior to the waste transporter leaving the Base with the waste shipment:

1. The hazardous waste manifest will be pre-printed with all available information prior to the day that the hazardous waste is loaded into the transporter's truck, roll-off container, or other transport mechanism.
2. The contractor will verify that the correct uniform hazardous waste manifest for the destination treatment, storage, or disposal (TSD) facility is being used.
3. The contractor project manager or the designated contractor representative and the designated MAFB employee that will be signing the manifest will be on site during the loading of hazardous waste to add the remaining required information (including, but not limited to, manifest document number, container number and type, total waste quantity, and units for weight or volume). See Section 4.6.1 regarding the total waste quantity and units for bulk wastes being loaded directly into trucks for off-site transport.

4. The contractor will verify that the hazardous waste manifest has been accurately and completely filled out, and that necessary attachments such as land disposal restriction forms or weight tickets (where necessary) are properly completed and included, using the checklist in Table 8. For bulk wastes being loaded directly into transport vehicles, the contractor will again verify on site at the point and day of generation, immediately before the waste is being shipped, that the hazardous waste manifest has been accurately and completely filled out, again using the checklist in Table 8. The contractor will also check to make sure the manifest document number has been written on the hazardous waste label.
4. The contractor will then provide the completed manifest to the designated MAFB personnel for review and signature.
5. The contractor will then have the manifest signed by the transporter. The contractor will keep the required generator copy of the manifest at the point of waste generation until it is verified that the transporter is on the way to the destination TSD facility with an appropriately weighted vehicle (see Section 4.6.1).
6. The contractor will make copies of the generator copy of the manifest and distribute the copies to the contractor representative, and any other designated oversight personnel. These copies will be kept as records of the waste shipment. The original generator copy of the manifest will be returned immediately to the designated MAFB representative.

#### **4.5.2 Non-Hazardous Waste Manifests**

Attachment 3 contains a copy of a non-hazardous waste manifest and instructions for completing the manifest. A designated MAFB employee will review and sign the manifest as the generator *prior to* allowing the manifest to leave the Base.

The specific requirements listed in Section 4.5.1 for hazardous waste manifests are not required by regulation for non-hazardous waste manifests. However, as a best management practice, the required steps listed in Section 4.5.1 will be followed for non-hazardous waste shipments, where applicable and feasible.



## **4.6 Transportation**

Specific requirements will be followed for transportation of hazardous waste:

### **4.6.1 Weighing Requirements for Waste Shipments Transported Off Site**

1. All waste-filled container shipments must be weighed prior to leaving the Base, and either the weight or the volume must be recorded in the appropriate section of the manifest. The standard procedure is for weigh scales, which have been verified to be in working order, to be present on site prior to loading of bulk waste into containers or trucks.
2. On an individual project basis for soils being excavated and loaded into bulk containers at the point and time of generation, an alternate means of weighing bulk containers at a nearby off-site, commercial scales location could be considered. This alternate means of weighing would only be considered if there is a potential that the on-site scales could malfunction (i.e., due to dirt, dust, or moisture) or that the quantity of soils to be excavated is so small that the mobilization of scales to the Base is not cost-effective for that particular project. This use of alternate, nearby off-site scales must be coordinated with FDEP and the Base during the project planning stage, well in advance of the beginning of excavation, loading, and transport activities.

### **4.6.2 Drivers and Trucks**

Drivers are required to wear steel-toed shoes, hard hats, and long pants if they get out of vehicles while on Base at the point of waste generation.

The trucks must be properly decontaminated prior to transportation of wastes. Each truck must pass visual inspection prior to transportation of wastes, including tires, tarps, and other operating and safety components.

**TABLES**



**TABLE 1**  
**ACCEPTABLE CONTAINERS FOR SELECTED WASTES**

<b>Waste Description</b>	<b>D.O.T. Shipping Name</b>	<b>ID Number</b>	<b>Bulk Container(s)</b>	<b>Small Quantity Container(s)</b>
Soils that are hazardous	Hazardous wastes solid, n.o.s.	NA3077	lined and tarped roll-off containers	Steel Drums 1A1 or 1A2; Metal Drum 1N1 or 1N2, Plastic drum 1H1 or 1H2
Water that is hazardous	Hazardous waste liquid, n.o.s.	NA3082	Portable tanks 51, 52, 56, 57 and 60	Steel Drums 1A1 or 1A2; Metal Drum 1N1 or 1N2, Plastic drum 1H1 or 1H2
Non-Hazardous Industrial Waste solid	not a D.O.T hazard	not a D.O.T hazard	roll-off container or dump truck, tarped	Steel Drums 1A1 or 1A2; Metal Drum 1N1 or 1N2
Non-Hazardous Industrial Waste liquid	not a D.O.T hazard	not a D.O.T hazard	Portable tanks 51, 52, 56, 57 and 60	Steel Drums 1A1 or 1A2; Metal Drum 1N1 or 1N2
Petroleum contaminated soils, not hazardous, not flammable	not a D.O.T hazard	not a D.O.T hazard	roll-off container or dump truck, tarped	Steel Drums 1A1 or 1A2; Metal Drum 1N1 or 1N2
Recovered petroleum products, flammable	Flammable liquids, n.o.s.	UN1993	Cargo tanks MC 304, 307, 330, 331	Steel Drums 1A1 or 1A2; Metal Drum 1N1 or 1N2

## TABLE 2 WASTE CHARACTERIZATION CHECKLIST

### Section 1: Is this waste listed (see Section 4.3.1.1)?

- A. Is the waste a discarded or unused commercial chemical?  Yes  No

If yes, look for chemical name in 40 CFR 261, Subpart D.

If the name is found, write down the listing designation: \_\_\_\_\_

- B. What process generated the waste? \_\_\_\_\_

Is this process listed in 40 CFR 261, Subpart D?  Yes  No

If yes, write down the listing designation: \_\_\_\_\_

If a listing designation was found under either A or B, the waste is a listed hazardous waste and must be containerized, stored, manifested, transported, and disposed or treated in accordance with applicable regulations.

### Section 2: Is this waste characteristically hazardous (see Section 4.3.1.2 and Table 3)?

- A. First, determine if your waste is exempt from the definition of hazardous waste:

Is this a petroleum waste or petroleum-contaminated soils?  Yes  No

Is this a PCB waste?  Yes  No

Do you have batteries, thermometers, recalled pesticides?  Yes  No

Is this a waste that can be recycled (fuels, lead-acid batteries)?  Yes  No

Is this an alcohol/water waste?  Yes  No

If the answer to any of the above is yes, refer to Section 4.3.2 to determine if your waste is exempt. Otherwise, proceed to Step B.

- B. Write down what you *know* about the waste. Is it water, solid, soils, what is the pH, do you have analytical data from past samples, etc.?

- C. Compare what you know about the waste to the list of characteristics in Table 3. There may be some limits on this table that you know will not be exceeded (pH, for example if you have already tested the pH). Make a copy of Table 3 and scratch out any characteristics that do not apply to your waste.

- D. Using your marked up copy of Table 3, circle any limits, which are exceeded by analytical results from previous investigations. Your waste may be a characteristic hazardous waste based on these circled limits. If this is based only on total concentrations, you should perform TCLP analysis to confirm.

**TABLE 2 (Continued)**  
**WASTE CHARACTERIZATION CHECKLIST**

**Section 2 (continued): Is this waste characteristically hazardous (see Section 4.3.1.2 and Table 3)?**

- E. The parameters, which are not circled or marked out, are your unknown parameters. Contact the contractor project manager and request laboratory analyses for these parameters.
- F. Once you have all of the data, determine if your waste exceeds any of the characteristic limits for a hazardous waste. If yes, then handle as a hazardous waste. If no, then continue with this checklist to determine the proper category.

**Section 3: Is this a petroleum waste (Section 4.3.2 and Table 4)?**

- A. First, make certain that you do not have a listed hazardous waste. Review Section 1 above to ensure your waste is not listed.
- B. Based on new or historical data, compare waste concentrations with the limits listed in Table 4:

Does your waste contain > 50 ppm PCBs?  Yes  No

Does your waste contain > 1,000 ppm halogenated halocarbons?  Yes  No

If the answer to either of the above is yes, you may not treat or dispose as a petroleum waste. See Section 4.3.3 for further information.

Compare your analytical results for metals, pesticides, and herbicides with the limits in Table 4:

1. If you are using total results, divide your results by 20 before comparing. If your results divided by 20 are less than the limits, your waste is not hazardous by characteristic. If your results divided by 20 are equal or greater than the limits, perform TCLP analyses for these parameters.
2. If you are using TCLP results, compare directly with the limits on Table 4. If your results are less than the limits, you do not have a characteristic hazardous waste. If your results exceed the limits, your waste is characteristically hazardous.

**Section 4: Is this a recovered petroleum product (Section 4.3.3)?**

- A. Contact local recycle facilities. Follow their instructions for characterization testing.
- B. If waste cannot be recycled, review the procedure in Section 2 above for characteristic hazardous wastes.



**TABLE 2 (Continued)**  
**WASTE CHARACTERIZATION CHECKLIST**

**Section 5: Is this waste construction or demolition debris? (See Section 4.3.4)?**

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- A. Is there a possibility for asbestos in the debris? \_\_\_ Yes \_\_\_ No

If yes, contact the contractor project manager and arrange for a survey/sampling.

- B. Is there a possibility of lead paint in the debris? \_\_\_ Yes \_\_\_ No

If yes, contact the contractor project manager and arrange for sampling.

- C. If neither asbestos nor lead paint is present, classify as C&D waste for transportation and disposal.

**Section 6: Is this an industrial waste (Section 4.3.5)?**

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- A. First, make certain that the waste is not hazardous, petroleum, or C&D by reviewing the check list items in Sections 1-5.

- B. Next, determine if your waste is industrial or "clean". This should be done in consultation with the contractor project manager. If the waste contains certain levels of contaminants, it will be considered "industrial".

**Section 7: Is this a "clean" waste (Section 4.3.6)?**

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- A. If the waste has not been in contact with any hazardous wastes or substances, it is likely a "clean" waste. If there is any doubt as to if the waste is "clean", consult the contractor project manager.

- B. "Clean" wastes may be disposed of in the local landfill without any tracking.

**Section 8: Is this a "special" waste (Section 4.3.7)?**

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- A. If there is any doubt about the classification of a waste, consider it a "special" waste.

- B. Section 4.3.7 lists some examples of "special" wastes: medical, explosive, reactive, compressed gases, dioxins.

- C. Notify the contractor project manager if any "special" wastes are encountered.



**TABLE 3  
 CHARACTERISTIC HAZARDOUS WASTES**

PARAMETER	LIMIT	TEST METHOD
<b>Ignitable (D001)</b> <b>(40 CFR 261.21)</b>	Flash point < 140°F	ASTM D-93-97, D-93-80 or D-3278-78
	A solid that can combust by friction or moisture adsorption at room temperature and pressure and burns persistently	Not applicable
	Classified by DOT as either an oxidizer or an ignitable compressed gas	Not applicable
<b>Corrosive (D002)</b> <b>(40 CFR 261.22)</b>	Aqueous with pH < 2 Aqueous with pH > 12.5	EPA SW-846, Method 9040
	Liquid that corrodes steel (SAE 1020) at a rate greater than 0.250 inches per year at 130°F	EPA SW-846, Standard TM-01-69
<b>Reactive (D003)</b> <b>(40 CFR 261.23)</b>	It is normally unstable and readily undergoes violent change without detonation	Not applicable
	It reacts violently with water or forms a potentially explosive mixture with water	Not applicable
	Generates toxic fumes, vapors or gases when mixed with water	Not applicable
	Contains reactive cyanide or sulfide	SW 846, s.7.3
	Capable of detonation or explosive decomposition or reaction at standard temperature and pressure	Not applicable
	It is a forbidden, Class A or Class B explosive as defined in 49 CFR 183	Not applicable
<b>Toxic (40 CFR 261.24)*</b>		
Arsenic (D004)	5 mg/L	SW 846, 1311/6010B
Barium (D005)	100 mg/L	SW 846, 1311/6010B
Benzene (D018)	0.5 mg/L	SW 846, 1311/8260B
Cadmium (D006)	1.0 mg/L	SW 846, 1311/6010B
Carbon Tetrachloride (D019)	0.5 mg/L	SW 846, 1311/8260B
Chlordane (D020)	0.03 mg/L	SW 846, 3510/8081A
Chlorobenzene (D021)	100.0 mg/L	SW 846, 1311/8260B
Chloroform (D022)	6.0 mg/L	SW 846, 1311/8260B
Chromium (D007)	5.0 mg/L	SW 846, 1311/6010B
o-Cresol (D023)	200.0 mg/L	SW 846, 1311/8270C
m-Cresol (D024)	200.0 mg/L	SW 846, 1311/8270C
p-Cresol (D025)	200.0 mg/L	SW 846, 1311/8270C
Cresol (D026)	200.0 mg/L	SW 846, 1311/8270C
2,4-D (D016)	10.0 mg/L	SW 846, 1311/8150

**TABLE 3 (CONTINUED)  
CHARACTERISTIC HAZARDOUS WASTES**

PARAMETER	LIMIT	TEST METHOD
1,4-Dichlorobenzene (D027)	7.5 mg/L	SW 846, 1311/8270C
1,2-Dichloroethane (D028)	0.5 mg/L	SW 846, 1311/8260A
1,1-Dichloroethylene (D029)	0.7 mg/L	SW 846, 1311/8260B
2,4-Dinitrotoluene (D030)	0.13 mg/L	SW 846, 1311/8270C
Endrin (D012)	0.02 mg/L	SW 846, 3510/8081A
Heptachlor and Heptachlor epoxides (D031)	0.008 mg/L	SW 846, 3510/8081A
Hexachlorobenzene (D032)	0.13 mg/L	SW 846, 1311/8270C
Hexachlorobutadiene (D033)	0.5 mg/L	SW 846, 1311/8270C
Hexachloroethane (D034)	3.0 mg/L	SW 846, 1311/8270C
Lead (D008)	5.0 mg/L	SW 846, 1311/6010B
Lindane (D013)	0.4 mg/L	SW 846, 3510/8081A
Mercury (D009)	0.2 mg/L	SW 846, 1311/7470
Methoxychlor (D014)	10.0 mg/L	SW 846, 3510/8081A
Methyl ethyl ketone (D035)	200.0 mg/L	SW 846, 1311/8260A
Nitrobenzene (D036)	2.0 mg/L	SW 846, 1311/8270C
Pentachlorophenol (D037)	100.0 mg/L	SW 846, 1311/8270C
Pyridine (D038)	5.0 mg/L	SW 846, 1311/8270C
Selenium (D010)	1.0 mg/L	SW 846, 1311/6010B
Silver (D011)	5.0 mg/L	SW 846, 1311/6010B
Tetrachloroethene (D039)	0.7 mg/L	SW 846, 1311/8260B
Toxaphene (D015)	0.5 mg/L	SW 846, 1311/3510
Trichloroethene (D040)	0.5 mg/L	SW 846, 1311/8260B
2,4,5-Trichlorophenol (D041)	400.0 mg/L	SW 846, 1311/8270C
2,4,6-Trichlorophenol (D042)	2.0 mg/L	SW 846, 1311/8270C
2,3,4-TP (Silvex) (D017)	1.0 mg/L	SW 846, 1311/8150
Vinyl chloride (D043)	0.2 mg/L	SW 846, 1311/8260B

\* Characteristic of Toxicity is based on a concentration in extract. For liquid samples, total concentrations may be compared directly to the limits. For solids, a dilution of 20 times the weight is performed to extract the sample. Total concentrations in solid samples should be divided by 20 if used to compare with toxic limits.









**TABLE 6  
 DISPOSAL TRUCK SAFETY INSPECTION CHECKLIST**

DATA	ID NUMBER				
Date of Inspection					
Transport Company Name					
Truck ID No.					
Trailer Type (roll-off, bulk storage tank, etc.)					
Roll-off or tank ID number					
Driver's Name					
CDL License No.					
License Exp. Date					
Medical Certificate					
Seat Belts					
Lights					
Guards					
Fire Extinguisher					
General Condition of equipment					
Oil (no leaks)					
Parking Brake					
Tires (>1/16" tread)					
Tarp Condition					
Back-up Alarm					
First aid kit in cab					
Decontamination					
Inspector's initials					

**TABLE 7**  
**NON-HAZARDOUS WASTE DRUM LABEL**

**NON-HAZARDOUS WASTE**

**OPTIONAL INFORMATION**

SHIPPER \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

CONTENTS \_\_\_\_\_

\_\_\_\_\_

**NON-HAZARDOUS WASTE**

EXERADIA SIGMARK® DIV. CATALOG NO. 63275



**TABLE 8  
 HAZARDOUS WASTE MANIFEST CHECKLIST**

**40 CFR 262 Subpart B – The Manifest**

- 1. Is the facility using the correct manifest form (EPA 8700-22; OMB #2050-0039)? Y\_\_\_\_\_ N\_\_\_\_\_
- 2. Is the waste being shipped by rail or water? (If so, check 282.23I) Y\_\_\_\_\_ N\_\_\_\_\_
- 3. Is the manifest filled out properly? Y\_\_\_\_\_ N\_\_\_\_\_

Manifest Line Item No.:

- 1. -Generator EPA ID # Y\_\_\_\_\_ N\_\_\_\_\_
- 5 digit manifest document # Y\_\_\_\_\_ N\_\_\_\_\_
- 3. -Generator name and mailing address Y\_\_\_\_\_ N\_\_\_\_\_
- 4. -Generator phone # Y\_\_\_\_\_ N\_\_\_\_\_
- 5-8. -Transporter names and ID #s Y\_\_\_\_\_ N\_\_\_\_\_
- D-F. -Transporter phone # (state requirement) Y\_\_\_\_\_ N\_\_\_\_\_
- 9. -TSD name and mailing address Y\_\_\_\_\_ N\_\_\_\_\_
- 10. -TSD EPA ID # Y\_\_\_\_\_ N\_\_\_\_\_
- H. -TSD Phone # (state requirement) Y\_\_\_\_\_ N\_\_\_\_\_
- 11. -DOT description of the waste, including hazard class, ID #, and packaging group Y\_\_\_\_\_ N\_\_\_\_\_
- 12. -Container # and type Y\_\_\_\_\_ N\_\_\_\_\_
- 13-14. -Quantity of waste and units (weight or volume) Y\_\_\_\_\_ N\_\_\_\_\_
- I. -EPA waste code (state requirement) Y\_\_\_\_\_ N\_\_\_\_\_
- K. -Handling codes (state requirement) Y\_\_\_\_\_ N\_\_\_\_\_
- 16. -Name, handwritten signature of generator, and date Y\_\_\_\_\_ N\_\_\_\_\_
- 17-18. -Name, handwritten signature of transporter, and date Y\_\_\_\_\_ N\_\_\_\_\_
- 19. -Are any manifest discrepancies noted? (after copy is returned from the TSD) Y\_\_\_\_\_ N\_\_\_\_\_
- 20. -Name, handwritten signature of TSD and date (after copy returned from TSD) Y\_\_\_\_\_ N\_\_\_\_\_

Note manifest document numbers and dates of manifests with errors below:

Manifest #	Date	Destination	Error(s)	Correction	Made

- 4. Is a properly completed Land Disposal Restrictions Form included with the manifest? Y\_\_\_\_\_ N\_\_\_\_\_
- 5. Has a proper weight ticket been generated, or has the waste been weighed? Y\_\_\_\_\_ N\_\_\_\_\_
- 6. Corrections  
 Have corrections to manifest errors been made prior to waste shipment? Y\_\_\_\_\_ N\_\_\_\_\_
- 7. Is the correct manifest document number written on the hazardous waste label? Y\_\_\_\_\_ N\_\_\_\_\_

Comments:

**Note: This Table was adapted from the FDEP RCRA Generator Checklist Form.**

**ATTACHMENTS**



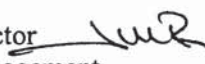
**ATTACHMENT 1**

**FDEP INTEROFFICE MEMO  
MANAGEMENT OF CONTAMINATED MEDIA UNDER RCRA  
AUGUST 21, 2002**

## Memorandum

# Florida Department of Environmental Protection

**TO:** Directors of District Management  
Waste Program Administrators

**FROM:** John M. Ruddell, Director   
Division of Waste Management

**DATE:** August 21, 2002

**SUBJECT:** Management of Contaminated Media under RCRA

The revised guidance for management of contaminated media subject to RCRA requirements is attached. It replaces the guidance dated July 27, 1995. The revised guidance incorporates Phase IV Land Disposal Requirements, risk-based concentration screening criteria and a format/checklist for a Contained-Out Determination and LDR Variance Request.

If you have any questions, please contact Satish Kastury at SC 278-0300.

SK/do

Attachment

cc: Narindar Kumar, EPA, Region 4  
District Waste Program Administrators  
Dotty Diltz, Assistant Director, Division of Waste Management  
Bill Hinkley, Chief, Bureau of Solid and Hazardous Waste  
Doug Jones, Chief, Bureau of Waste Cleanup  
Jim Crane, Bureau of Waste Cleanup  
Dan DiDomenico, Bureau of Waste Cleanup  
Bill Martin, Bureau of Waste Cleanup  
Tim Bahr, Bureau of Waste Cleanup  
Ligia Mora-Applegate, Bureau of Waste Cleanup  
Mike Ashy, Chief, Bureau of Petroleum Storage Systems  
Agusta Posner, OGC  
Angela Dempsey, OGC  
RCRA Permitting and Compliance Technical Committee Members

*"Protect, Conserve, and Manage Florida's Environment and Natural Resources"*

*Printed on recycled paper.*

## ***Attachment I: Management of Environmental Media that Contains Hazardous Waste***

### **INTRODUCTION:**

Contaminated environmental media can become subject to regulation under the Resource Conservation and Recovery Act ("RCRA") if they contain hazardous waste. The Department generally considers contaminated media to contain hazardous waste: (1) when they exhibit a characteristic of a hazardous waste; or (2) when they are contaminated with listed hazardous waste at concentrations of hazardous constituents that are above residential/uncontrolled exposure health-based cleanup target levels ("residential CTLs"). The Department staff overseeing the specific project must approve any other Department requirements for managing media, even if it is not or is no longer subject to RCRA. For example, leachability to groundwater must always be addressed.

The following guidance was developed for sites that generate contaminated media through site investigation, corrective action or other remediation activities, where cleanup is overseen by the Department. This document explains how to manage environmental media (i.e., soils and groundwater) contaminated with hazardous waste once those media are "generated" (that is, removed or displaced from their original location by human activity.) Contaminated sediments or surface water may be managed the same as soils or groundwater. "Environmental Media" does not include any process wastes or sludges. The guidance can be applicable to sites with mixed plumes of petroleum and non-petroleum contamination.

On September 7, 1999 EPA Region 4 issued an updated guidance document incorporating procedures and management practices for contaminated media. The site-specific guidance in this memorandum supplements the Region 4 guidance. This guidance does not change or supersede specific RCRA, CERCLA or any other regulatory requirements. This guidance supercedes the Department's July 27, 1995 Memorandum on the *Management of Contaminated Media under RCRA*.

Separate flow charts for management of media (soils and groundwater) that contain hazardous waste are attached. In site-specific cases, a universal treatment standard, an analytical test method or a CTL may not be available for a constituent. In these cases, requirements for management of environmental media that contain hazardous waste will be determined on a site-specific basis.

### **INTERPRETATION:**

The following criteria determine whether contaminated media (soils or groundwater) from a listed or characteristic hazardous source contain hazardous waste and are therefore subject to RCRA Subtitle C regulation (see attached flowcharts):



**General:**

1. (a) Except as explained more specifically in Sections 2 and 3, media contaminated with a hazardous waste listed under 40 CFR Part 261, Subpart D, shall be managed as hazardous waste and are subject to full RCRA Subtitle C regulation.
- (b) Media that exhibit a hazardous characteristic under 40 CFR Part 261, Subpart C shall be managed as hazardous waste and are subject to full RCRA Subtitle C regulation, until the characteristic is removed.
- (c) Dilution of a hazardous waste with environmental media to avoid land disposal restrictions, and deliberate or routine discharge of hazardous waste to environmental media, are serious violations of RCRA and other environmental laws.
- (d) Media that contain hazardous waste must meet Land Disposal Restriction Universal Treatment Standards (LDR/UTS) set forth in 40 CFR §§268.40 and 268.48 prior to being land disposed. This applies, even if all hazardous characteristics have been removed, until the media meets FDEP health-based concentrations for all constituents of concern. A procedure for obtaining a state site-specific variance for alternative LDR/UTS ("state LDR/UTS variance") is outlined below in Section 4(f).
- (e) Upon written request, the Department may make a site-specific determination that soil contaminated with listed hazardous waste at concentrations of hazardous constituents above residential CTLs no longer contain hazardous waste ("contained-out determination"). The site-specific contained-out determination may be granted by the Department contingent upon management of the soil in accordance with any other Department requirements and institutional controls stated in the order granting the request.
- (f) Where a contained-out determination and/or state LDR/UTS variance would be useful to expedite site remediation, a request in the form of a petition may be submitted to the Department as a part of a facility permit application, clean closure plan, best management plan, or as a separate submittal.

**Groundwater:**

2. (a) The Department's water CTLs are the Department's primary and secondary groundwater protection standards set forth in Chapter 62-520 F.A.C. (which incorporates by reference certain provisions of Chapter 62-550 F.A.C.) and the Department's numerical interpretation of the minimum criteria in Rule 62-520.400, F.A.C. Chapter 62-777, F.A.C. provides guidance for groundwater CTLs.
- (b) Groundwater with hazardous constituent concentrations that do not exceed any applicable health-based water CTL does not contain hazardous waste.



- (c) Groundwater with hazardous constituent concentrations that do not exceed the LDR/UTS for wastewater set forth in 40 CFR 268.48 but do exceed the health-based water CTL is not considered to contain hazardous waste but is also not considered “clean” and must be managed in accordance with other Department requirements.

**Soils:**

- 3. (a) Soil “contains” hazardous waste when it exhibits a hazardous characteristic or is contaminated with listed hazardous waste at concentrations of hazardous constituents that are above residential CTLs. Soil that contains hazardous waste at the time of generation (*i.e.*, when excavated) is “hazardous waste soil”.
- (b) The LDR/UTS for hazardous waste soil which will be land disposed apply to all underlying hazardous constituents reasonably expected to be present in any given volume of hazardous waste soil, even though the soil may be treated so that it no longer contains hazardous waste. Facilities undertaking cleanups in Florida may obtain a state LDR/UTS variance, if applicable, as discussed in Section 4(f) and the attached table.
- (c) Soil that exhibits a hazardous characteristic such as toxicity, ignitability, reactivity or corrosivity, must be treated (using the technology specified in 40 CFR 268.40, if any, or an alternate technology approved by the Department) for:
  - (i) the characteristic constituent, in the case of toxicity characteristic; and,
  - (ii) in the case of ignitability, reactivity or corrosivity, the characteristic property.

Once the characteristic is eliminated (e.g., through treatment), the media no longer contain hazardous waste but may still contain underlying hazardous constituents that must be treated to meet all applicable LDR/UTSs set forth in 40 CFR 268.48 prior to land disposal (unless a site-specific variance is obtained).

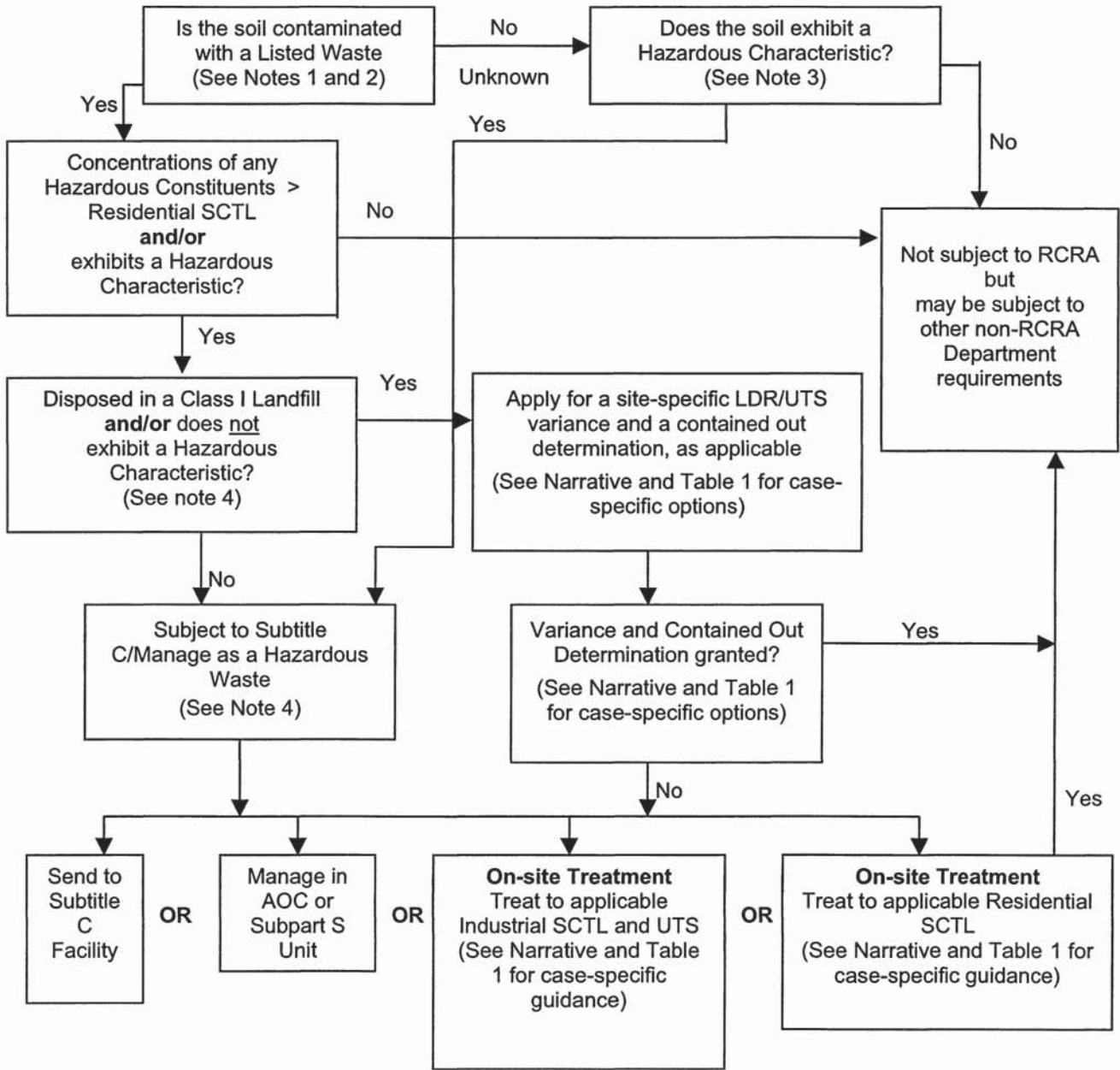
- 4. The requirements for a contained-out determination and/or a state LDR/UTS variance are summarized in Table 1 for cases wherein hazardous waste soils have been generated, and the residential CTL, the industrial CTL and/or the LDR/UTS concentration may be exceeded (before or after treatment).
  - (a) In Case 1, one or more constituent concentrations in hazardous waste soil are greater than residential CTLs but all constituent concentrations are less than (or equal to) the Industrial CTL and LDR/UTS set forth in 40 CFR 268.48. This soil may be disposed of at a Class I landfill. A contained-out determination is required.
  - (b) In Case 2, one or more constituent concentrations in hazardous waste soil are greater than residential CTLs but all constituent concentrations are less than (or equal to) the

Industrial CTL. One or more constituent concentrations exceeds the LDR/UTS set forth in 40 CFR 268.48. This soil may be disposed of at a Class I landfill. A contained-out determination and a LDR/UTS variance are required.

- (c) In Case 3, one or more constituent concentrations in hazardous waste soil are greater than the industrial CTLs but all constituent concentrations are less than (or equal to) the LDR/UTS set forth in 40 CFR 268.48. After treatment to meet the industrial CTL, this soil may be disposed of at a Class I landfill. A contained-out determination is required.
- (d) In Case 4, one or more constituent concentrations in hazardous waste soil are greater than the industrial CTLs and one or more constituent concentrations exceed the LDR/UTS set forth in 40 CFR 268.48. The soils must be treated to meet the industrial CTL prior to disposal in a Class I landfill. A contained out determination is required. If the soils still exceed the LDR/UTS after treatment, a LDR/UTS variance is required.
- (e) In Case 5, all soil constituent concentrations are less than (or equal to) residential CTLs. No contained-out determination or LDR/UTS variance is required for any disposal option. However, soil management may be subject to other Department requirements. Leachability to groundwater must be addressed, for example.
- (f) A suggested format and checklist for requesting a contained-out determination and/or a state LDR/UTS variance is attached. Such relief will be granted by the Department based on the following considerations:
  - (i) physical possibility and technical appropriateness of treating the soil to the specified level or by the specified method;
  - (ii) concentrations of contaminants remaining in the soil are below concentrations necessary to minimize short- and long-term threats to human health and the environment



## Management of Hazardous Waste-Contaminated Media – Soils



UTS – Universal Treatment Standard

AOC – Area of Contamination

<sup>1</sup>See narrative for determining when media are considered to contain hazardous waste.

<sup>2</sup>Dilution of a hazardous waste with media to avoid regulation is a land ban violation (40 CFR 268.3).

<sup>3</sup>The guidance applies only to management of contaminated media being managed under a remediation program. This guidance does not apply to deliberate release of process waste to any media.

<sup>4</sup>Soils that meet LDR requirements that do not exhibit a characteristic but exceed the Industrial Risk-Based Cleanup Minimum Criteria may be treated to meet the Industrial Criteria and sent to a Subtitle D landfill with approval by the Department.

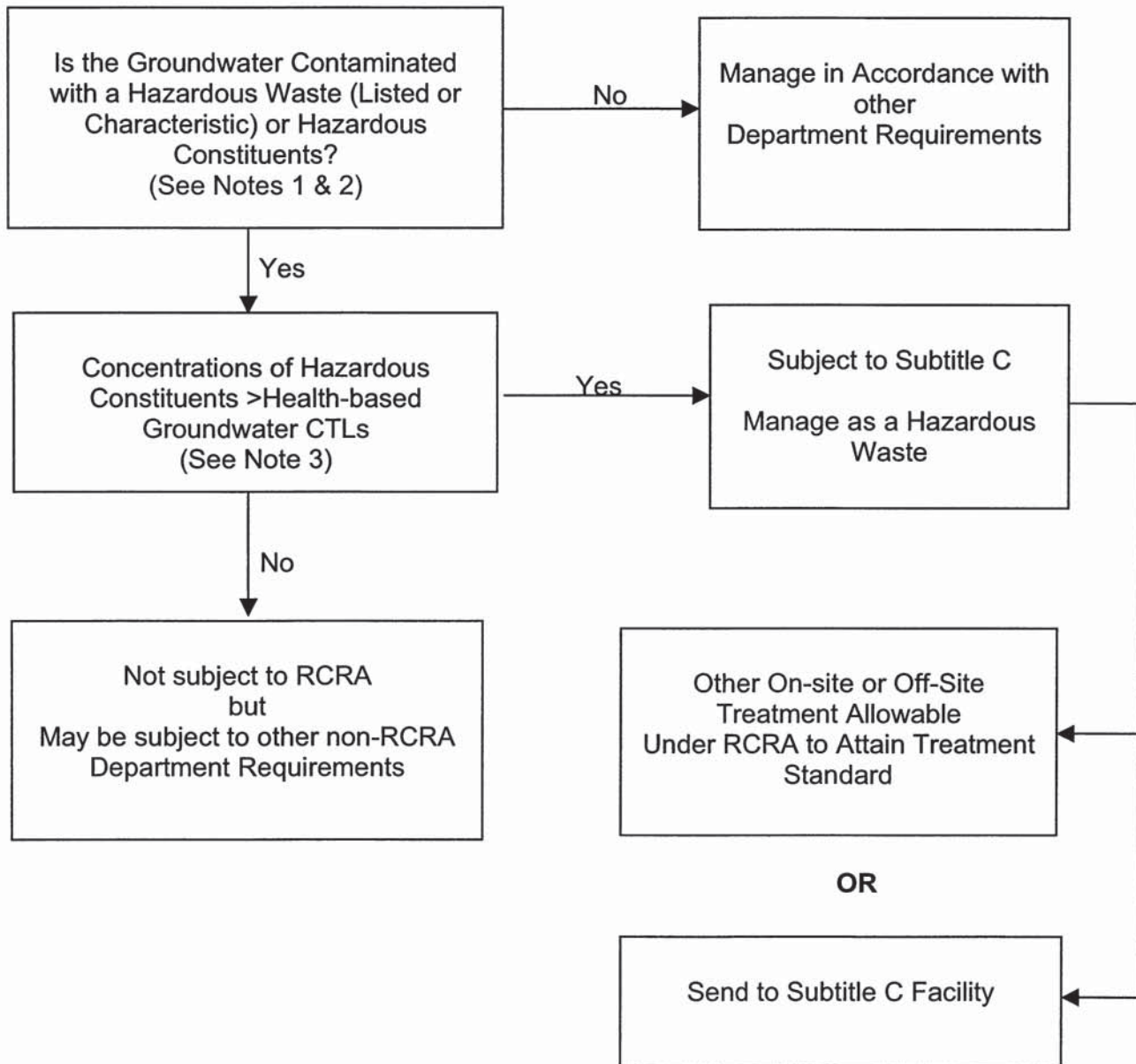
**TABLE 1**  
**SUMMARY OF CONTAMINATED MEDIA CASES – SOILS**

<u>Typical Cases</u>	<u>Memo Section</u>	<u>SC&gt; Residential</u>	<u>SC&gt; Industrial</u>	<u>SC&gt; LDR/UTS</u>	<u>LDR/UTS Variance or Contained Out Determination Requirements</u>
1	4(a)	Y	N	N	Contained Out Determination Required and LDR/UTS Variance Not Required for Disposal in a Class I Landfill
2	4(b)	Y	N	Y	Contained Out Determination and LDR/UTS Variance Required for Disposal in a Class I Landfill
3	4(c)	Y	Y	N	Treat to below Industrial CTLs, Contained Out Determination Required but LDR/UTS Variance not Required for Disposal in a Class I Landfill. Otherwise, manage as a hazardous waste.
4	4(d)	Y	Y	Y	Treat to below Industrial CTLs, Contained Out Determination and LDR/UTS Variance Required for Disposal in a Class I Landfill. Otherwise, manage as a hazardous waste.
5	4(e)	N	N	Y/N	No Variance or Contained Out Determination Required but Subject To Non-RCRA Department Requirements

SC = Soil Concentration  
 As indicated in Sections 1(e) and 3(a), management of soil, which exceeds the residential CTL, requires a contained-out determination and must comply with LDR/UTS requirements.



## Management of Contaminated Media - Groundwater



UTS – Universal Treatment Standard

<sup>1</sup>See narrative for determining when media are considered to contain hazardous waste.

<sup>2</sup>Dilution of a hazardous waste with media to avoid regulation is a land ban violation (40 CFR 268.3)

<sup>3</sup>Contaminated groundwater with concentrations  $\leq$  UTS but above the Cleanup Target Level and which do not exhibit a characteristic must be managed in accordance with any other Department requirements or will be regulated as Hazardous Waste.

FORMAT/CHECKLIST FOR CONTAINED-OUT DETERMINATION  
AND STATE LDR VARIANCE

A petition for contained out determination and/or state site-specific variance for alternative Land Disposal Restriction Universal Treatment Standard (“state LDR variance”) should be submitted to Administrator, Hazardous Waste Regulation Program, Department of Environmental Protection, 2400 Blair Stone Road, MS 4560, Tallahassee, FL 32399 with a copy to Hazardous Waste Program Attorney, 3900 Commonwealth Blvd, Tallahassee, FL 32399-3000 and contain the following:

- (1) A caption which identifies the petitioner and respondent(s) and which includes the word “Petition” in a title or subject line;
- (2) The printed or typed name, address, telephone number, and any facsimile number of the petitioner and the petitioner’s attorney or qualified representative (if any);
- (3) The petitioner’s signature;
- (4) A brief general description of the facility with emphasis on the known use of chemicals and generation of waste and an opinion as to how the soil became contaminated.
- (5) A list of all hazardous constituents likely to be present in the contaminated soil, identified through a complete and technically adequate protocol of sampling and laboratory analysis.
- (6) A copy of, or reference to [by title, date and author] the sampling and analysis protocol used to identify hazardous constituents (i.e. waste analysis plan).
- (7) A copy of, or reference to [by title, date and author], scientifically defensible laboratory results with appropriate quality control/quality assurance data that demonstrate that:
  - (a) the soil does not exhibit a hazardous characteristic; and
  - (b) concentrations of contaminants remaining in the soil are below concentrations necessary to minimize short- and long-term threats to human health and the environment
- (8) If the soil was treated to achieve the applicable concentration for any constituent, a copy of, or reference to [by title, date and author], the complete and technically adequate treatment plan.
- (9) A statement that a variance is sought from land disposal restriction universal treatment standards in 40 CFR Part 268, as promulgated pursuant to §403.721, F.S.; and/or a statement that a determination is sought that the soil no longer contains hazardous waste.
- (10) Specific facts that demonstrate the physical impossibility and/or technical inappropriateness of treating the contaminated soil to the specified level or by the specified method, if applicable.
- (11) A copy of, or reference to [by title, date and author], an appropriate disposal plan for the contaminated soil.

**ATTACHMENT 2**  
**HAZARDOUS WASTE MANIFEST**



Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of	Information in the shaded areas is not required by Federal law.	
3. Generator's Name and Mailing Address			A. State Manifest Document Number			
4. Generator's Phone			B. State Generator's ID			
5. Transporter 1 Company Name		6. US EPA ID Number		C. State Transporter's ID		
7. Transporter 2 Company Name		8. US EPA ID Number		D. Transporter's Phone		
9. Designated Facility Name and Site Address		10. US EPA ID Number		E. State Transporter's ID		
				F. Transporter's Phone		
				G. State Facility's ID		
				H. Facility's Phone		
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)			12. Containers		13. Total Quantity	14. Unit Wt/Vol
			No.	Type		I. Waste No.
a.						
b.						
c.						
d.						
J. Additional Descriptions for Materials Listed Above				K. Handling Codes for Wastes Listed Above		
15. Special Handling Instructions and Additional Information						
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations						
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.						
Printed/Typed Name			Signature			Month Day Year
TRANSPORTER	17. Transporter 1 Acknowledgment of Receipt of Materials					
	Printed/Typed Name			Signature		
FACILITY	18. Transporter 2 Acknowledgment of Receipt of Materials					
	Printed/Typed Name			Signature		
19. Discrepancy Indication Space						
20. Facility Owner or Operator. Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.						
Printed/Typed Name			Signature			Month Day Year

EPA Form 8700-22 (Rev. 9-88) Previous edition is obsolete.

[Part 262, Appendix]



The following statement must be included with each Uniform Hazardous Waste Manifest either on the form, in the instructions to the form, or accompanying the form:

Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment, storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

### GENERATORS

#### Item 1. Generator's U.S. EPA ID Number—Manifest Document Number

Enter the generator's U.S. EPA twelve digit identification number and the unique five digit number assigned to this Manifest (e.g., 00001) by the generator.

#### Item 2. Page 1 of —

Enter the total number of pages used to complete this Manifest, i.e., the first page (EPA Form 8700-22) plus the number of Continuation Sheets (EPA Form 8700-22A), if any.

#### Item 3. Generator's Name and Mailing Address

Enter the name and mailing address of the generator. The address should be the location that will manage the returned Manifest forms.

#### Item 4. Generator's Phone Number

Enter a telephone number where an authorized agent of the generator may be reached in the event of an emergency.

#### Item 5. Transporter 1 Company Name

Enter the company name of the first transporter who will transport the waste.

#### Item 6. U.S. EPA ID Number

Enter the U.S. EPA twelve digit identification number of the first transporter identified in item 5.

#### Item 7. Transporter 2 Company Name

If applicable, enter the company name of the second transporter who will transport the waste. If more than two transporters are used to transport the waste, use a Continuation Sheet(s) (EPA Form

8700-22A) and list the transporters in the order they will be transporting the waste.

#### Item 8. U.S. EPA ID Number

If applicable, enter the U.S. EPA twelve digit identification number of the second transporter identified in item 7.

NOTE: If more than two transporters are used, enter each additional transporter's company name and U.S. EPA twelve digit identification number in items 24-27 on the Continuation Sheet (EPA Form 8700-22A). Each Continuation Sheet has space to record two additional transporters. Every transporter used between the generator and the designated facility must be listed.

#### Item 9. Designated Facility Name and Site Address

Enter the company name and site address of the facility designated to receive the waste listed on this Manifest. The address must be the site address, which may differ from the company mailing address.

#### Item 10. U.S. EPA ID Number

Enter the U.S. EPA twelve digit identification number of the designated facility identified in item 9.

#### Item 11. U.S. DOT Description [Including Proper Shipping Name, Hazard Class, and ID Number (UN/NA)]

Enter the U.S. DOT Proper Shipping Name, Hazard Class, and ID Number (UN/NA) for each waste as identified in 49 CFR 171 through 177.

NOTE: If additional space is needed for waste descriptions, enter these additional descriptions in item 28 on the Continuation Sheet (EPA Form 8700-22A).

#### Item 12. Containers (No. and Type)

Enter the number of containers for each waste and the appropriate abbreviation from Table I (below) for the type of container.

#### Table I—Types of Containers

DM=Metal drums, barrels, kegs  
DW=Wooden drums, barrels, kegs  
DF=Fiberboard or plastic drums, barrels, kegs  
TP=Tanks portable  
TT=Cargo tanks (tank trucks)  
TC=Tank cars  
DT=Dump truck  
CY=Cylinders  
CM=Metal boxes, cartons, cases (including roll-offs)  
CW=Wooden boxes, cartons, cases  
CF=Fiber or plastic boxes, cartons, cases

BA=Burlap, cloth, paper or plastic bags

#### Item 13. Total Quantity

Enter the total quantity of waste described on each line.

#### Item 14. Unit (Wt./Vol.)

Enter the appropriate abbreviation from Table II (below) for the unit of measure.

#### Table II—Units of Measure

G=Gallons (liquids only)  
P=Pounds  
T=Tons (2000 lbs)  
Y=Cubic yards  
L=Liters (liquids only)  
K=Kilograms  
M=Metric tons (1000 kg)  
N=Cubic meters

#### Item 15. Special Handling Instructions and Additional Information

Generators may use this space to indicate special transportation, treatment, storage, or disposal information or Bill of Lading information. States may not require additional, new, or different information in this space. For international shipments, generators must enter in this space the point of departure (City and State) for those shipments destined for treatment, storage, or disposal outside the jurisdiction of the United States.

#### Item 16. Generator's Certification

The generator must read, sign (by hand), and date the certification statement. If a mode other than highway is used, the word "highway" should be lined out and the appropriate mode (rail, water, or air) inserted in the space below. If another mode in addition to the highway mode is used, enter the appropriate additional mode (e.g., and rail) in the space below.

Primary exporters shipping hazardous wastes to a facility located outside of the United States must add to the end of the first sentence of the certification the following words "and conforms to the terms of the EPA Acknowledgment of Consent to the shipment."

In signing the waste minimization certification statement, those generators who have not been exempted by statute or regulation from the duty to make a waste minimization certification under section 3002(b) of RCRA are also certifying that

[Part 262, Appendix]



they have complied with the waste minimization requirements.

Generators may preprint the words, "On behalf of" in the signature block or may hand write this statement in the signature block prior to signing the generator certifications.

NOTE: All of the above information *except* the handwritten signature required in item 16 may be preprinted:

\*\*\*\*\*

#### TRANSPORTERS

##### *Item 17. Transporter 1 Acknowledgment of Receipt of Materials*

Enter the name of the person accepting the waste on behalf of the first transporter. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

##### *Item 18. Transporter 2 Acknowledgment of Receipt of Materials*

Enter, if applicable, the name of the person accepting the waste on behalf of the second transporter. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

NOTE: International Shipments—Transporter Responsibilities.

*Exports*—Transporters must sign and enter the date the waste left the United States in item 15 of Form 8700-22.

*Imports*—Shipments of hazardous waste regulated by RCRA and transported into the United States from another country must upon entry be accompanied by the U.S. EPA Uniform Hazardous Waste Manifest. Transporters who transport hazardous waste into the United States from another country are responsible for completing the Manifest (40 CFR 263.10(c)(1)).

#### Owners and Operators of Treatment, Storage, or Disposal Facilities

##### *Item 19. Discrepancy Indication Space*

The authorized representative of the designated (or alternate) facility's owner or operator must note in this space any significant discrepancy between the waste described on the Manifest and the waste actually received at the facility.

Owners and operators of facilities located in unauthorized States (i.e., the U.S. EPA administers the hazardous waste management program) who cannot resolve significant discrepancies within 15 days of receiving the waste must submit to their Regional Administrator (see list below) a letter with a copy of the Manifest at issue describing the discrepancy and attempts to reconcile it (40 CFR 264.72 and 265.72).

Owners and operators of facilities located in authorized States (i.e., those States that have received authorization from the U.S. EPA to administer the hazardous waste program) should contact their State agency for information on State Discrepancy Report requirements.

##### EPA Regional Administrators

Regional Administrator, U.S. EPA Region I, J.F. Kennedy Fed. Bldg., Boston, MA 02203

Regional Administrator, U.S. EPA Region-II, 26 Federal Plaza, New York, NY 10278

Regional Administrator, U.S. EPA Region III, 6th and Walnut Sts., Philadelphia, PA 19106

Regional Administrator, U.S. EPA Region IV, 345 Courtland St., NE, Atlanta, GA 30365

Regional Administrator, U.S. EPA Region V, 230 S. Dearborn St., Chicago, IL 60604

Regional Administrator, U.S. EPA Region VI, 1201 Elm Street, Dallas, TX 75270

Regional Administrator, U.S. EPA Region VII, 324 East 11th Street, Kansas City, MO 64106

Regional Administrator, U.S. EPA Region VIII, 1860 Lincoln Street, Denver, CO 80295

Regional Administrator, U.S. EPA Region IX, 215 Freemont Street, San Francisco, CA 94105

Regional Administrator, U.S. EPA Region X, 1200 Sixth Avenue, Seattle, WA 98101

##### *Item 20. Facility Owner or Operator: Certification of Receipt of Hazardous Materials Covered by This Manifest Except as Noted in Item 19*

Print or type the name of the person accepting the waste on behalf of the owner or operator of the facility. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

Items A-K are not required by Federal regulations for intra- or interstate transportation. However, States may require generators and owners or operators of treatment, storage, or disposal facilities to complete some or all of items A-K as part of State manifest reporting requirements. Generators and owners and operators of treatment, storage, or disposal facilities are advised to contact State officials for guidance on completing the shaded areas of the Manifest.

[Part 262, Appendix]

Please print or type (Form designed for use on elite (12 pitch) typewriter.)

Form approved QMB No. 2050 0039 Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)		21. Generator's US EPA ID No.	Manifest Document No.	22. Page	Information in the shaded areas is not required by Federal law	
23. Generator's Name			L. State Manifest Document Number			
24. Transporter _____ Company Name			M. State Generator's ID			
25. US EPA ID Number			N. State Transporter's ID			
26. Transporter _____ Company Name			O. Transporter's Phone			
27. US EPA ID Number			P. State Transporter's ID			
28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)			Q. Transporter's Phone			
			29. Containers		30. Total Quantity	
			No		Type	
			31. Unit Wt/Vol		R. Waste No.	
a.						
b.						
c.						
d.						
e.						
f.						
g.						
h.						
i.						
S. Additional Descriptions for Materials Listed Above			T. Handling Codes for Wastes Listed Above			
32. Special Handling Instructions and Additional Information						
33. Transporter _____ Acknowledgment of Receipt of Materials			Signature		Date	
Printed/Typed Name					Month Day Year	
34. Transporter _____ Acknowledgment of Receipt of Materials			Signature		Date	
Printed/Typed Name					Month Day Year	
35. Discrepancy Indication Space						

GENERATOR

TRANSPORTER

FACILITY

EPA Form 8700-22A (Rev. 9-88) Previous edition is obsolete.

[Part 262, Appendix]



**INSTRUCTIONS—CONTINUATION SHEET,  
U.S. EPA FORM 8700-22A**

Read all instructions before completing this form.

This form has been designed for use on a 12-pitch (elite) typewriter; a firm point pen may also be used—press down hard.

This form must be used as a continuation sheet to U.S. EPA Form 8700-22 if:

- More than two transporters are to be used to transport the waste;
- More space is required for the U.S. DOT description and related information in Item 11 of U.S. EPA Form 8700-22.

Federal regulations require generators and transporters of hazardous waste and owners or operators of hazardous waste treatment, storage, or disposal facilities to use the uniform hazardous waste manifest (EPA Form 8700-22) and, if necessary, this continuation sheet (EPA Form 8700-22A) for both inter- and intrastate transportation.

**GENERATORS**

**Item 21. Generator's U.S. EPA ID Number—Manifest Document Number**

Enter the generator's U.S. EPA twelve digit identification number and the unique five digit number assigned to this Manifest (e.g., 00001) as it appears in item 1 on the first page of the Manifest.

**Item 22. Page —**

Enter the page number of this Continuation Sheet.

**Item 23. Generator's Name**

Enter the generator's name as it appears in item 3 on the first page of the Manifest.

**Item 24. Transporter — Company Name**

If additional transporters are used to transport the waste described on this

Manifest, enter the company name of each additional transporter in the order in which they will transport the waste. Enter after the word "Transporter" the order of the transporter. For example, Transporter 3 Company Name. Each Continuation Sheet will record the names of two additional transporters.

**Item 25. U.S. EPA ID Number**

Enter the U.S. EPA twelve digit identification number of the transporter described in item 24.

**Item 26. Transporter — Company Name**

If additional transporters are used to transport the waste described on this Manifest, enter the company name of each additional transporter in the order in which they will transport the waste. Enter after the word "Transporter" the order of the transporter. For example, Transporter 4 Company Name. Each Continuation Sheet will record the names of two additional transporters.

**Item 27. U.S. EPA ID Number**

Enter the U.S. EPA twelve digit identification number of the transporter described in item 26.

**Item 28. U.S. DOT Description Including Proper Shipping Name, Hazardous Class, and ID Number (UN/NA)**

Refer to item 11.

**Item 29. Containers (No. and Type)**

Refer to item 12.

**Item 30. Total Quantity**

Refer to item 13.

**Item 31. Unit (Wt./Vol.)**

Refer to item 14.

**Item 32. Special Handling Instructions**

Generators may use this space to indicate special transportation, treatment, storage, or disposal information or Bill of

Lading information. States are *not* authorized to require additional, new, or different information in this space.

\*\*\*\*\*

**TRANSPORTERS**

**Item 33. Transporter — Acknowledgement of Receipt of Materials**

Enter the same number of the Transporter as identified in item 24. Enter also the name of the person accepting the waste on behalf of the Transporter (Company Name) identified in item 24. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

**Item 34. Transporter — Acknowledgement of Receipt of Materials**

Enter the same number as identified in item 26. Enter also the name of the person accepting the waste on behalf of the Transporter (Company Name) identified in item 26. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

\*\*\*\*\*

**OWNERS AND OPERATORS OF TREATMENT, STORAGE, OR DISPOSAL FACILITIES**

**Item 35. Discrepancy Indication Space**

Refer to item 19.

Items L-R are not required by Federal regulations for intra- or interstate transportation. However, States may require generators and owners or operators of treatment, storage, or disposal facilities to complete some or all of items L-R as part of State manifest reporting requirements. Generators and owners and operators of treatment, storage, or disposal facilities are advised to contact State officials for guidance on completing the shaded areas of the manifest.



**ATTACHMENT 3  
NON-HAZARDOUS WASTE MANIFEST**

# NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No.

2. Page 1 of

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

5. Transporter 1 Company Name

6. US EPA ID Number

7. Transporter 2 Company Name

8. US EPA ID Number

9. Designated Facility Name and Site Address

10. US EPA ID Number

A. Transporter's Phone

B. Transporter's Phone

C. Facility's Phone

11. Waste Shipping Name and Description

12. Containers

No. | Type

13. Total Quantity

14. Unit Wt/Vol

a.

b.

c.

d.

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name

Signature

Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

GENERATOR

TRANSPORTER

F

Y

**SOP NO. 6**

**WELL INSTALLATION, DEVELOPMENT,  
AND ABANDONMENT PROCEDURES**

**STANDARD OPERATING PROCEDURE NO. 6  
WELL INSTALLATION, DEVELOPMENT, AND ABANDONMENT PROCEDURES  
REVISION 5**

**Prepared For:**

**U.S. AIR FORCE  
MACDILL AIR FORCE BASE  
FLORIDA**

**Prepared By:**

**EARTH TECH ENVIRONMENT & INFRASTRUCTURE  
GREENVILLE, SC**

**Under Contract To:**

**U.S. ARMY CORPS OF ENGINEERS  
OMAHA, NE/MOBILE, AL  
CONTRACT NO. DACW45-94-D-0002**

**MAY 2003  
(REVISED FEBRUARY 2006)**



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2	Schematic Diagram for Wells Screened Below the Water Table
3	Schematic Diagram for Double-Cased Wells Screened Below the Water Table

**STANDARD OPERATING PROCEDURE NO. 6**  
**WELL INSTALLATION, DEVELOPMENT, AND ABANDONMENT PROCEDURES**

**1.0 OBJECTIVES**

The objective of Standard Operating Procedure (SOP) No. 6 is to provide instructions for the design, installation, and construction of piezometers and groundwater monitoring wells at MacDill Air Force Base (MAFB), Florida. This document also provides instructions for well development, proper borehole and well abandonment, and management and maintenance of all site wells. Site-specific procedures will depend on project objectives, geologic conditions, and appropriate state and federal regulations and standards.

**2.0 WELL INSTALLATION PROCEDURES**

Monitoring wells are installed primarily to provide information on the hydrogeology of a site, to determine the presence or absence of free-phase or dissolved contaminants, and to determine the extent of contaminant migration, if any are present. It is the policy of MAFB to design, install, and construct monitoring wells in a manner that ensures all wells installed meet the criteria of being 1) adequately sealed to prevent surface contamination or cross contamination between aquifers; 2) capable of yielding high quality groundwater samples representative of true water quality within the target unit; 3) adequately protected; and 4) in compliance with all applicable state and federal regulations. The procedures set forth in this section apply to all MAFB and contract personnel who are responsible, both directly and indirectly, for design of monitoring well systems, oversight of drilling and construction operations, and evaluation of the suitability and reliability of monitoring wells as well as data and measurements obtained from monitoring wells.

**2.1 Well Permits and Dig Permits**

Well permits will be obtained from the Southwest Florida Water Management District (SWFWMD) prior to initiating construction, repair, or abandonment of any monitoring well. The drilling subcontractor, who must be certified in the State of Florida, will be required to obtain and pay for all permits, applications, and other documents required by state and local authorities. The certified well driller or his representative must be present at the site during all drilling operations. All drilling personnel must meet all applicable OSHA requirements. The supervising field representative must be fully knowledgeable and experienced with state and federal regulations for groundwater monitoring programs (e.g., 40 CFR Part 264 Subpart F



and R.61-79.264 Subpart F RCRA requirements, R.61-68 Water Classifications and Standards, and SWFWMD FAC 40A-3).

Dig permits will be obtained by the prime contractor's representative from the appropriate base utility shops (See Attachment 1). Dig permits must be obtained after boring locations have been coordinated, in writing, with the base POC or equivalent.

## **2.2 Borehole Drilling**

All drilling activities shall conform with state and local regulations. With the exception of hand auger borings, all borings will be drilled by a driller or drill firm licensed in the State of Florida.

The drill rig shall be decontaminated prior to drilling as described in SOP No. 3, Section 4.0. The drill rig shall not leak any fluids that may enter the borehole or contaminate drilling equipment. Any detected leaks will be repaired immediately. The use of rags or absorbent materials to absorb leaking fluids is unacceptable.

Lubricants containing chemicals that are toxic or that increase, decrease, or mask the analytes of concern of the investigation will not be permitted. The drilling subcontractor shall provide a chemical analyses of all lubricants proposed for downhole use to the USACE-TM prior to drilling mobilization.

All borings will initially be hand augered to a depth of four feet to ensure that no underground utilities are present. If a boring is drilled in an area suspected or known to be contaminated and a competent clay layer of at least two feet is encountered, surface casing will be installed and grouted in place to minimize the potential for cross contamination between aquifers.

### **2.2.1 Drilling Methods and Borehole Construction**

Boreholes may be drilled using hand augers, truck-mounted augers, mud rotary techniques, or rotasonic techniques. Soil sampling requirements for visual logging of formation materials or the collection of geotechnical samples will be specified in site-specific work plans.

#### **2.2.1.1 Hand Auger Method**

A decontaminated carbon steel bucket may be used to install piezometers; however, a decontaminated stainless steel bucket should be used if soil samples for analytical analyses are collected. It is recommended

that a three-inch diameter hand auger be used. Since sands tend to cave in below the water table, the depth that boreholes may be advanced with a hand auger is limited. The hand auger will be decontaminated according to the procedures described in SOP No. 3, Section 4.0. Soil samples for lithologic characterization or chemical analyses may be obtained directly from the hand auger bucket. If more than one soil sample for chemical analyses is to be collected from a single borehole, the hand auger bucket and any portion of the hand auger that may come into contact with the sample will be decontaminated prior to sample collection. Installations bored with hand augers generally will not be used as permanent monitoring wells. In the event that hand installation is the only method that can be used (e.g., drill rig cannot access the area), the design, equipment, materials, and installation procedures will be detailed in the site-specific work plan for that particular project.

#### 2.2.1.2 Auger Drilling

Soil borings may be drilled using truck-mounted augers. Truck-mounted auger methods can be used to advance boreholes to deeper depths than those attainable with a hand auger. The diameter of the augers used will be dependent on the purpose of drilling the borehole. If a well is to be installed, 6¼-inch ID hollow stem augers should be used to prevent bridging during well construction. Smaller diameter augers may be used for the purposes of collecting soil samples. If problems with heaving sands are encountered in completing borings and well installations with 6¼ -inch ID augers, soil borings may be completed using smaller ID hollow stem augers (3- or 4-inch) and then enlarged with 6¼-inch ID augers. If necessary, a PVC or Teflon center plug may be used in the augers to prevent heaving sands from entering the augers during well installation. Potable water may be used to equalize the pressure during well installation; however, this should be avoided if possible.

#### 2.2.1.3 Mud Rotary Drilling

If anticipated target depths or problems with heaving sands do not allow for the collection of satisfactory soil samples or the completion of a satisfactory borehole for well completion, the soil borings may be completed using mud rotary methods. Drilling fluids shall consist of water or mud. Water from a pre-approved source shall be used in drilling fluids. Only 100 percent sodium bentonite approved by the USACE-TM will be used in drilling mud. The USACE-TM will be provided with a chemical analyses of any drilling mud additive or substitute proposed for use prior to the start of drilling. The diameter of a borehole used for well construction must be at least four inches greater than the outside diameter of the well casing or screen.



#### 2.2.1.4 Rotasonic Drilling

Rotasonic drilling utilizes ultrasonic vibrations to advance a core pipe to the target depth. Drill cuttings are captured in the core pipe and minimal wastes or drill cuttings are produced outside the borehole. Drilling rates using rotasonic drilling are much faster than drilling rates using mud rotary or auger techniques.

A sonic drill rig advances a four-inch to twelve-inch diameter core barrel for sampling first. Upon reaching the desired depth or the end of the stroke, an outer casing is advanced to the same depth. Then the core barrel and rods are removed. The core is displaced from the core barrel by using a low vibration and is contained in a clear plastic sleeve. The sleeved core is then placed in a trough for examination, logging and collection of geotechnical samples (e.g., grain size analyses) as appropriate.

Once the core is removed from the barrel, the core barrel and rods are lowered to the bottom of the hole. Another rod is added and the system is ready to advance again. The outer casing prevents cross contamination and formation mixing and allows for controlled placement of well installation materials.

### 2.3 Well Design Specifications

Monitoring well design requirements are shown in Figures 1 through 3. Detailed specifications are described below. Site-specific requirements, which must be specified in the site-specific work plan, are included in Attachment 2, Monitoring Well Installation Plan.

#### 2.3.1 Well Screen

Well screen materials for monitoring wells will be selected depending upon the known or suspected chemical contaminants at the site, and so that the completed monitoring well provides data which meet the project data quality objectives. Generally, the screen will be sized to retain over 90% of the filter pack and constructed from either polyvinyl chloride (PVC) or stainless steel materials dependent on the particular contaminants that are being investigated at the site. Well screen materials will be of the same size and strength material as the well riser, and will be a non-contaminating, continuous-slot design. No glues, adhesives, lead shot, or lead wool will be used to connect the riser sections or screen. No field slotted screen will be permitted.

### 2.3.2 Filter Pack

Filter pack material will be clean, washed, well-rounded silica sand sized to perform as a filter between the formation material and the well screen. Proper documentation will be furnished concerning the composition, grain-size distribution, cleaning procedure, and chemical analysis. The filter pack gradation shall have a uniformity coefficient ( $C_u$ ) of not more than 2.5, and shall be sized so that the slotted screen will retain 90% of the material. A grain size distribution curve for the filter pack materials used at each site will be included with the submittal of well construction diagrams.

If a pertinent grain-size distribution curve is available for a particular site or monitoring well, then the following procedure will be used to design a filter pack.

1. Multiply the  $D_{30}$  size (from the grain-size distribution graph) by a factor of four to nine (Pack-Aquifer ratio). A factor of four is used if the formation is fine-grained and uniform ( $C_u$  is less than 3), six if it is coarse-grained and non-uniform, and up to nine if it is highly non-uniform and contains silt. Head losses through filter packs increase as the Pack-Aquifer (P-A) ratios decrease. In order to design a fairly stable filter pack with a minimum head loss, the  $D_{30}$  size should be multiplied by a factor of four.
2. Plot the point from step 1 on the 30% abscissa of a grain-size distribution graph and draw a smooth curve with a uniformity coefficient of approximately 2.5.
3. A curve for the permissible limits of the filter pack is drawn plus or minus 8 percent of the desired curve with the  $C_u$  of less than 2.5. The appropriate-sized filter pack can then be chosen from the grain-size distribution curves of various filter packs.
4. Select the slot openings for the well screen that will remain 90 percent or more of the filter packs.

This design will be based on the gradation of the finest aquifer materials anticipated to be affected by the screened part of the monitoring wells (U.S. EPA, 1996).

If no pertinent grain-size distributions curves are available, then 0.010-inch slotted screen will be used with appropriate sized filter pack material in accordance with the following table adapted from ASTM D 5092-90 (ASTM, 1990).



Size of Screen Opening, mm (in.)	Slot No.	Sand Pack Mesh Size Name(s)	1% Passing Size (D-1), mm	Effective Size (D-10), mm	30% Passing Size (D-30), mm
0.125 (0.005)	5	100	0.09 to 0.12	0.14 to 0.17	0.17 to 0.21
0.25 (0.010)	10	16 to 40	0.25 to 0.35	0.4 to 0.5	0.5 to 0.6
0.50 (0.020)	20	10 to 20	0.7 to 0.9	1.0 to 1.2	1.2 to 1.5
0.75 (0.030)	30	10 to 20	0.7 to 0.9	1.0 to 1.2	1.2 to 1.5
1.0 (0.040)	40	8 to 12	1.2 to 1.4	1.6 to 1.8	1.7 to 2.0
1.5 (0.060)	60	6 to 9	1.5 to 1.8	1.7 to 2.0	2.5 to 3.0
2.0 (0.080)	80	4 to 8	2.0 to 2.4	2.4 to 3.0	2.6 to 3.1

In addition to the primary filter pack installed along the screened interval of the monitoring well, a secondary filter pack consisting of finer material will be installed to prevent grout from commingling with the primary filter pack. This is discussed further in Section 2.4.

### 2.3.3 Well Riser

Well riser (casing) will consist of PVC or stainless steel. PVC pipe will be new, threaded, flush joint, and as a minimum, conform to the requirements of ASTM F 480-81/SDR 13.5 (Schedule 40). PVC pipe will bear markings identifying the material as that specified, and will carry the seal of the National Sanitation Foundation. The use of unmarked PVC pipe is acceptable provided documentation is available that the pipe conforms to the requirements of ASTM F 480-81/SDR 13.5. Stainless steel pipe will consist of new, flush-jointed and threaded, type 304, corrosion resistant steel. Printed markings, where present on the well screen or casing, will be removed prior to decontamination. Unless noted in the site-specific work plans, monitoring wells will be two-inch inside diameter (ID).

### 2.3.4 Annular Seal

An annular seal consists of two parts: (1) the bentonite seal placed directly on top of the sand filter pack and (2) the grout seal extending from the top of the bentonite seal to the ground surface. The bentonite seal will consist of hydrated bentonite in the form of uncoated pellets or a bentonite slurry. The grout seal will consist of either (1) a mixture of Portland Cement and water or (2) a 30% high solids bentonite grout. The cement grout will consist of Portland Cement (ASTM C 150-95a) mixed in the proportion of approximately six to seven gallons of approved water per bag of cement (94 pounds). In addition, three to five percent by weight of sodium bentonite powder will be added (2.9 to 4.9 pounds of sodium bentonite will be mixed with each 94-pound bag of Portland cement). The minimum acceptable grout weight will

be 14 pounds per gallon (lbs./gal). The cement grout weight will be determined using a mud balance. Water may be added to the mix in small amounts, at the discretion of the field representative, to facilitate downhole placement.

The 30% high solids bentonite grout will be mixed with water to a density of 10 lbs./gallon, or per the manufacture's recommendation.

## **2.4 Well Construction**

At all times during the progress of the work, precautions will be taken to prevent tampering with the well or the entrance of foreign material into it. Run-off will be prevented from entering the well during construction.

Depending on site conditions, consideration should be given to overdrill the borehole so that soils that have not been removed or that have fallen into the borehole during augering or drill stem retrieval will fall to the bottom of the borehole below the depth of the filter pack and the screen. Normally one to two feet are sufficient for overdrilling. Once the desired depth of the borehole has been attained, the borehole will be prepared for installation of the well casing and screen. If drilling fluid was used, it must be flushed from the borehole with clean potable water to the extent possible without causing borehole collapse. The well casing/screen assembly will then be inserted into the borehole. For wells which are being installed beneath a confining or semi-confining unit, or are intended to monitor deep members or portions of an aquifer, the well casing/screen assembly will be installed within pre-set surface casing, to prevent cross-connections between different aquifer zones. The installation of this surface casing is discussed in Section 2.5. If a well cannot be properly completed to prevent such an interchange of water between water-bearing zones or to prevent a loss of artesian pressure, the well will be abandoned and plugged in accordance with procedures defined in Section 4.0.

The casing/screen assembly will be installed as follows:

- Prior to installation of the casing and screen, the lengths and diameters of all components (including the bottom plug or cap) will be measured and recorded on the Casing/Well Screen Tally Form. The casing riser and screen assembly will be installed round, plumb, and true to line. The Casing/Well Screen Tally Form is provided in Appendix E, Field Forms, of the Basewide Environmental Restoration Work Plan.
- A bottom plug will be attached to the bottom of the screened section.



- The well screen will be connected to the riser sections of the casing assembly. For wells intended to monitor the upper surficial aquifer near the water table, the well screen will be installed so as to straddle the free water surface, extending both above and below the water table to accommodate seasonal or other variations in its elevation. In all cases, the top of the screen will be located at least one foot below the base of the down-hole seal. Screen slot size will be 0.010 inches, or the appropriate size based on grain size distribution analyses and filter back design, as discussed in Section 2.3.2.
- For wells installed to depths exceeding 50 feet, centralizers will be placed at locations just below the screen, just above the location of the secondary filter pack, and at 50-foot intervals along the riser casing. Centralizers will be used for wells less than 50 feet in depth if visual observation indicates their use is needed. Centralizers will not be used if their installation prevents the placement of the annular materials, and may be entirely eliminated if the well is installed through hollow stem augers.
- Unless specified otherwise, all monitoring wells will be completed with a flush finish. The placement of annular materials will be done in such a way that the inside of the well casing is protected. The protective vault will be water-proof and strong enough to support anticipated loads. If an above-grade finish is conducted, well risers will extend at least 2.5 feet above the ground surface.
- With the exception of shallow wells and wells installed using rotasonic drilling methods, the primary filter pack will be placed in the annulus between the well material and borehole using a tremie pipe, starting with the tremie at the bottom of the borehole and working the tremie upward as the filter pack is emplaced. When using hollow stem augers, the augers will be raised incrementally during the installation of the filter pack. Attempts will be made to keep the bottom of the augers below the top of the filter pack during installation. The level of the top of the filter pack in the annulus will be verified by tag-line measurement during all phases of emplacement. The filter pack will extend at least 2 feet above the top of the screen, except where this is not enough vertical distance to set the full thickness of the filter pack. The volume of the installed filter pack will be compared with the annular volume to verify proper placement of the filter pack. This material accounting will be recorded in the field book. Where the well screen of a shallow monitoring well intersects the water table, the well shall be developed completely prior to secondary filter pack and grout installation. During the development process additional filter pack material shall be added to account for any primary filter pack settlement. The volume of additional filter pack material will be recorded and used in the calculations described above. The use of a tremie pipe to install a filter pack in

shallow wells is optional if the base of the well screen is 15 feet or less below the water table. Additionally, the use of a tremie pipe to install the filter pack is optional when wells are drilled by the rotasonic method and constructed within the drill pipe (i.e., similar to hollow stem augers), provided periodic vibration of the drill pipe is conducted during filter pack installation to prevent bridging.

- A secondary filter pack, at least 1 foot thick (except where this is not enough vertical distance to set the full thickness of the secondary filter pack) and consisting of material finer than the primary filter pack, but of similar composition (i.e., 30/65 sieve range fine sand or approximate equivalent), will be placed in the annulus between the primary filter pack and the overlying grout seal. This secondary filter is intended to prevent movement of the grout into the underlying primary filter pack. The secondary filter pack shall be installed following the completion of the primary filter pack installation and development activities, described above.
- A bentonite seal at least two feet thick will be placed immediately above the filter pack (note: this requirement may be waived if there is insufficient distance between the water table and land surface to install a bentonite seal). Only non-coated pelletized bentonite will be used. Pouring of the bentonite is acceptable for boreholes where the annular space is large enough to limit the potential for bridging and to allow measurements to ensure that the bentonite has been placed at proper intervals. Tremie pipes are not recommended (USACE, 1998). It is recommended that the bentonite be placed in six-inch lifts and each lift hydrated a minimum of 30 minutes between lifts before proceeding. After the placement of the final lift, the bentonite seal will be allowed to hydrate another two hours before grouting the remaining annulus. The level of the top of the bentonite seal will be verified by tag-line measurement prior to grouting. When using HSAs, the bottom of the augers will be left in the borehole as close as possible above the bentonite seal.
- To grout the remaining annular space, a tremie pipe will then be maintained one to three feet above the bentonite seal or secondary filter pack, whichever is appropriate, and will be used to slowly emplace the cement/bentonite grout mixture. When using HSAs, the augers will be pulled incrementally during the grouting procedures to limit borehole collapse. Grout will be pumped into the annulus through the tremie pipe until undiluted grout flows from the borehole at the ground surface. The grout seal will be installed after well development only in cases where the well screen intersects the water table.



## **2.5 Double-Cased Wells**

Surface casing will be installed in the borehole when drilling a monitoring well that will be installed at depths below relatively impermeable (confining) layers or below depths of known contamination. The purpose of the surface casing is to prevent cross-contamination between two aquifer zones and to prevent dragging contamination down to a greater depth during the drilling procedure.

A pilot borehole should be drilled and the surface casing installed to slightly below the known depth of contamination or a minimum of two feet into the confining layer. The diameter of the surface casing will be sufficient to contain the inner casing and a two-inch annular space. The size of the borehole should be sufficient to maintain a two-inch annular space between the borehole walls and the surface casing. The material of the surface casing may vary, but it will be chemically inert and able to withstand potential chemical degradation and any forces exerted on the casing during its installation and the monitoring well construction.

The outer casing should be grouted from the bottom to within two feet of the ground surface. The grout should be pumped into the annular space between the outer casing and the borehole wall. This will be accomplished by either placing the tremie tube in the annular space and pumping the grout from the bottom of the borehole to the surface, or placing a grout shoe or plug inside the casing at the bottom of the borehole and pumping the grout through the bottom grout plug and up the annular space on the outside of the casing. In the event the well depth or subsurface obstructions prevent the installation of the tremie pipe or grout shoe, the well may be grouted by welding a valve onto the surface casing and injecting grout into the casing to force grout into the annular space. If the outer casing is set into very tight clay, both of the above methods may have to be used, because the clay usually forms a tight seal in the bottom and around the outside of the casing preventing grout from flowing freely during grout injection. A minimum of 24 hours will be allowed for the grout seal to cure before attempting to drill through it. The grout mixture used to seal the outer annular space will be a neat cement mixture of one 94-lb. bag of Type I Portland Cement per approximately seven gallons of water and three to five percent bentonite powder by weight.

When drilling through the seal, care will be taken to avoid cracking, shattering, and/or washing out the seal. If caving conditions exist such that the outer casing cannot be sufficiently sealed by grouting, the outer casing should be driven into place and a grout seal placed in the bottom of the casing. Removal of outer casings, which are sometimes called temporary surface casings, after the well screens and casings have been installed and grouted is not acceptable. Trying to remove outer surface casings after the inner casing have been grouted could jeopardize the structural integrity of the well. The boring will be

advanced through the surface casing to the target depth for monitoring well installation. The monitoring well will be installed in accordance with the methods presented in Section 2.4. The borehole beneath the surface casing will be of sufficient diameter to maintain a two-inch annular space between the monitoring well and the borehole wall.

Surface casing may also be installed in the borehole to mitigate unstable formation conditions when drilling a monitoring well using mud rotary methods. The depth of the surface casing will be dependent on site conditions.

## **2.6 Well Head Completion**

Upon completion of the well, a suitable well cap will be installed on the top of the well riser. Unless specified otherwise, all monitoring wells will be completed with a flush finish. Flush finish wells will be constructed using a commercially prepared water-tight steel vault designed for use in monitoring well installations. A drain hole at least 0.25-inch in diameter will be installed at the base of the vault to allow condensate to infiltrate into the surrounding soils. The vault should be sized to allow a padlock to be placed on the well cap and provide adequate clearance for inserting a key into the padlock. The lid of the vault should be secured with bolts and be placed either flush with or slightly above the concrete pad to prevent the infiltration of surface water. The site-specific work plan will present additional details regarding the vault type and concrete patching requirements if monitoring well(s) are to be installed in portions of the flight apron or taxiways.

If an above-grade finish is conducted, well riser will extend at least 2.5 feet above the ground surface. The well riser will be surrounded by a larger diameter protective steel, aluminum or PVC casing rising approximately 2.5 feet above ground level and set a minimum of two feet below the ground surface (provided the bottom of the protective casing will not extend below the top of the well screen). The protective casing will be anchored in cement grout backfill. A drain hole at least 0.25-inch in diameter will be drilled at the base of the protective casing. The protective casing will be provided with a locking cap and a brass padlock or the well casing will be secured with a plastic expansion cap locked with a hexagonal key. All locks used at an individual IRP site will be keyed alike. Duplicate keys will be made available to USACE, MAFB, and/or other appropriate contracting agencies.

A minimum three feet by three feet by four inches thick concrete pad, sloped away from the well, will be constructed around the monitoring well with the top outer edge at the final ground elevation. At locations where vehicular traffic is likely, the concrete pad will be reinforced with reinforcement wire or rebar. If the well is completed as an above-grade installation in areas where vehicular traffic is likely, 2-inch



diameter (or greater) concrete-filled bumper posts will be installed as needed to protect the well. The bumper posts should extend a minimum of two feet below ground surface into a concrete footer and rise three feet above ground surface. After the well is installed, the area will be cleaned and all discarded material will be properly disposed.

## **2.7 Well Surveys**

All permanent monitoring wells will be surveyed by a Registered Land Surveyor registered in the State of Florida. Well locations will be surveyed to within 1 foot accuracy using Florida State Plane, West Zone, North American Datum, 1983 (NAD 83). Ground surface elevations and top of concrete pad elevations will be surveyed to within 0.1-foot accuracy; and top of casing elevations will be surveyed to within 0.01-foot accuracy. Elevations will be referenced to the National Geodetic Vertical Datum of 1929 (NGVD-29). Unless a detailed site drawing/map is available from a previous effort (or from the Base), a site map showing all wells, other improvements, above-ground features, and (wherever possible) underground utilities will be developed. All site maps and drawings, if required for a specific project, will be compatible with AutoCAD Release 13 or later.

## **2.8 Documentation and Recording**

A field logbook will be maintained during drilling activities. Information maintained in the field logbook will include location, time on site, personnel present, equipment used, downtime, materials used, samples collected, measurements taken, and any other pertinent information required to reconstruct field activities at a later date. In addition to providing standard field documentation procedures, as specified in the Basewide Environmental Restoration Work Plan (Section 3.8.5), a Daily Quality Control Report (DQCR), Drilling Logs, and Monitoring Well Installation Detail Forms will be completed. Field forms are provided in Appendix E of the Basewide Environmental Restoration Work Plan.

The DQCR will complete by field personnel at the end of each day.

A Drilling Log will be prepared to provide an accurate representation of each boring and will include the following:

- Project and site names, well number, date of drilling, hole location and surface elevation.
- Total hole depth and total well depth,



- Name of the driller and geologist installing the well. Each drilling log shall be signed by the preparer.
- Details of drilling and sampling equipment.
- Lithologic description and any associated field screening results by sample depth.

A Monitoring Well Installation Detail Form will be completed for each monitoring well to provide an accurate “as built” diagram of the well. This form includes a comprehensive list of pertinent drilling, hydrogeologic, and monitoring well construction information. The form includes the following information:

- Project and site names, well number and the total depth of the completed well.
- Depth of any grouting and the amount of cement and bentonite used, method of grout installation, and the total borehole depth and elevation
- Depth, elevation, and type of surface and/or well casings.
- Installation date or dates, and name of the driller and the field representative installing the well.
- Static water level upon completion of the well and after well development.
- All pertinent construction details of monitoring wells, such as depth to and description of all annular fill materials; gradation of filter packs; length, location (depth and elevation), diameter, slot size, material, and manufacturer of well casing and screen; position of centralizers; and location of any blank pipe or intermediate casing installed in the well.
- Description of surface completion, including protective steel casing, protective posts, and the concrete pad.
- Surveyed coordinates and elevation of the top of the well pad, top of ground surface and top of well riser.
- A brief stratigraphic log, showing depths to and descriptions of major lithologic changes encountered in the well borehole.

All original well record forms, field report forms and geologist logs will be maintained in the project file.

### 3.0 WELL DEVELOPMENT PROCEDURES

Well development represents the attempts to restore the volume of aquifer material immediately surrounding the screened portion of the well to its indigenous condition by correcting damage done to the formation during the drilling process. Well development can be accomplished in many different ways. The effectiveness of the different methods are based on three primary factors:

- 1) The type of geologic material,
- 2) the design and completion of the well, and
- 3) the type of drilling technology used in the borehole advancement and well installation.

The discussion below presents the objectives of monitoring well development at MAFB. It also describes the procedures that may be used to effectively develop a well. The actual procedures used will be dependent on site-specific, and possibly even well-specific, conditions. Personnel responsible for well development are encouraged to read U.S. EPA (1996), Aller (1989), and ASTM D 5521-94 (1994) for more detailed discussions of well development philosophy, procedures, and criteria.

#### 3.1 Objective

The primary objective of installing a monitoring well at a site is to collect a groundwater sample that is representative of the quality of groundwater surrounding the well. Well development is an important component of monitoring well completion. Monitoring wells should be sufficiently developed to ensure that they meet their intended objectives. The purposes of well development are the following:

- assure that groundwater enters the well screen freely and at ambient velocities, thus yielding a representative groundwater sample and an accurate fluid level measurement,
- remove all water and drilling additives that may have been introduced into the borehole and formation during drilling and installation activities, and
- remove fine-grained sediments entrained in the filter pack and within the well itself so that groundwater samples have minimal turbidity and excessive silting of the well does not occur.

The criteria that should be utilized to evaluate whether these objectives have been met are presented in Section 3.3.



### 3.2 Procedures

The development of shallow monitoring wells whose screens intersect the water table will commence immediately following the installation of the primary filter pack. During the development process the primary filter pack is likely to settle. Additional filter pack material shall be added during the development process to ensure that the entire primary filter pack is properly developed (and settled) prior to construction of the annular seal and well pad. If needed, further development may be conducted no sooner than 48 hours after installation of the annular seal.

Intermediate depth and double-cased wells and wells that may be susceptible to immediate borehole wall collapse require grouting during installation. The development of these wells should ensue within one week after completion of the well, but no sooner than 48 hours after the grouting is completed. For wells drilled using mud rotary techniques, development should ensue within four days after completion of the well, but no sooner than 48 hours after the grouting is completed.

Well development can be performed using one or more of the following methods: bailing, surging, overpumping, or jetting. As noted above, the method used will be based on site-specific conditions. It is anticipated that for monitoring wells at MAFB, the predominant development methods will be surging and over pumping. It is important to realize that effective development of a well requires the movement of fluids both into and out of the screen part of the well and the surrounding filter pack. No dispersing agents, acids, or explosives will be utilized in well development activities. The water level and height of sediment in the well should be measured and recorded in the field log book prior to development, as discussed in Section 3.4. All development equipment inserted into the well will be decontaminated in accordance with SOP No. 3.

In most cases, the initial well development method will be overpumping using a centrifugal pump to remove sand-sized sediment or PVC shavings that have accumulated in the well. This method shall be continued until the water is free from suspended sand-sized sediment. In overpumping, the pump is operated at a capacity that exceeds the flow velocity that will be induced during the purging process of well sampling (0.5 liters per minute or one gallon in approximately 7.5 minutes).

A surge block is required to create a strong surging action in the well. The surge block will be composed of inert material that will not affect the water quality in the well. The diameter of the surge block will be no less than 0.25 to 0.5 inches smaller than the inside diameter of the well. Caution should be employed to ascertain that the block can move freely up and down the inside of the well without obstructions. The vertical action of the surge block will be accomplished either manually or mechanically with drill rods or



wireline. Care should be taken in the length of the strokes, the velocity of the up and down movement, and the duration of each surge block cycle. If the surging action is too vigorous for the well construction and formation characteristics, then the activity can be detrimental to the well integrity. Detailed discussions are presented in Aller (1989) and ASTM D 5521-94 (1994); responsible personnel should review these discussions before beginning well development with the surge block method.

After utilizing the surge block for approximately 20 strokes, the sediment that entered the well as a result of the surging should be removed by overpumping using a centrifugal pump, as described above. As an option, the surge block may be attached to purge tubing thereby allowing alternating surging and pumping without the need to remove the surge block. When a significant change in visual turbidity is achieved the surging and overpumping process is repeated. This cycle of surging and overpumping shall be continued until for at least two hours.

Following this process, the well development shall be continued using a peristaltic or submersible electric pump (e.g., Grundfos Redi-Flo2™). The rate of overpumping shall be reduced to that of well sampling (0.5 liters per minute or one gallon in approximately 7.5 minutes). During this stage of development pH, specific conductivity, dissolved oxygen, temperature, and turbidity will be measured generally once every well volume removed. The well development will continue until the water quality stabilization criteria specified in Section 3.3 have been met.

Water exiting the well will be contained and properly disposed of, as warranted, based on site conditions. The management of investigation derived waste (IDW) is discussed in SOP No. 4.

If the monitoring well was installed using a mud rotary method, then it is recommended that water jetting be considered as a component of well development to break down the mud cake that may line the borehole walls. The particles of the mud cake can then be brought into and removed from the well by overpumping. The construction of the well should be considered when evaluating this process. For instance, the effectiveness of jetting is commonly reduced by the fine slot sizes (0.010-inch) of many monitoring wells. In addition, any sediment entrained in the jetting fluids may cause damage to a screen composed of PVC material. As noted above, no dispersing agents will be utilized in the jetting of a well. Equipment specifications and detailed procedures for jetting will be included in the site-specific work plan if jetting is to be used.

It is recommended that development with air (e.g., airlift pumping) not be employed, because the introduction of air to the formation could change the chemical environment of the aquifer (e.g., redox potential) and reduce the hydraulic conductivity of the formation.

During well development, the entire well cap and interior of the well casing above the water table should be washed using only water from that well.

If the addition of water is required to facilitate surging and bailing, only formation water from that well will be used. For water jetting, the water quality must be verified prior to the introduction of any water from a source other than the well itself.

Development will not be conducted, or will be discontinued, if free product is present or detected in a monitoring well.

### **3.3 Well Development Criteria**

Development criteria will include the stabilization of water quality parameters. These criteria will be refined, based on initial results at each site, with the objective of achieving minimum turbidity in all wells.

During the pumping stage of development (as discussed in Section 3.2), pH, specific conductivity, dissolved oxygen, temperature, and turbidity will be measured generally once every well volume removed. However, for wells that have a short water column, it may be more practical to measure the field parameters at greater intervals. The well development will continue until the following conditions have been met:

- Field parameters (pH, specific conductivity, dissolved oxygen, and temperature) have stabilized for four consecutive measurement events (less than a change of 0.2 pH units and less than a ten percent change for the other parameters between four consecutive readings).
- No suspended silt-sized or sand-sized sediments are present in the discharged water.
- Yield of the well is representative of the transmissivity of the aquifer. For wells that were installed with the mud rotary method, mud cake on the borehole walls may reduce the yield of the well. If this occurs, development should continue until the mud cake is removed and the yield increases.
- Turbidity has been significantly decreased. Attempts will be made to attain turbidity values of five nephelometric turbidity units (NTUs) or less for four consecutive measurement events. However, it should be recognized that the groundwater at some locations is naturally turbid because of organic or inorganic colloids. The meeting of this criteria will be evaluated by the



on-site geologist or MAFB representative on a well-specific basis. The on-site geologist will be experienced in monitoring well installation and development. (Note: All well installation activities will be supervised by a geologist licensed in the State of Florida.)

If field parameters stabilize, but the water remains turbid, the well, filter pack, and/or borehole walls may still contain construction materials, such as mud cake that has not been removed from the borehole walls. Excessive or thick drilling muds may not be efficiently flushed out of a borehole by purging only. In this case surging or jetting methods may be need to be applied.

### **3.4 Documentation and Recording**

Measurement of field parameters will be documented on a Monitoring Well Development Log as provided in Appendix E, Field Forms, of the Basewide Environmental Restoration Work Plan.

The form includes the following information:

- date and weather,
- summary of well construction,
- pre-development water level,
- measured height of sediment (if any) at bottom of well prior and after the development activities and the detected changes in this height during development,
- time of each measurement,
- cumulative total volume of water removed prior to each measurement,
- volume of water removed between measurements,
- pumping rate,
- method of development and duration employed,
- time and duration of cessation of development,
- results of field parameter measurements, and
- volume of suspended particles in water.

Additional observations, such as apparent yield of the well or detected odors should also be noted on the development log.

In the event the purge water exhibits unusual discoloration or turbidity that cannot be removed during development, eight ounce clear glass jars will be used to collect samples of the last water withdrawn from the well at the cessation of development. These samples will be labeled and photographed with a 35mm color photo. The photograph will be taken following agitation of the jar contents by shaking, and prior to



the settlement of fines in the jar. In addition, the photograph will be a suitably back-lit close up which shows water clarity. These photographs will be filed with their associated well development logs.

#### **4.0 WELL ABANDONMENT PROCEDURES**

Unplugged or improperly abandoned wells pose a potential threat to groundwater quality, because they may serve as a conduit for surface pollutants to migrate into the subsurface or allow mixing of groundwater through interconnecting isolated aquifers. The objective of this document is to provide the general procedures for the proper abandonment of boreholes and wells. The methods must comply with applicable Federal, State, and local rules and regulations, and protect the groundwater resource from undue degradation.

When performing abandonment procedures, it is important to understand the objectives of the abandonment:

- eliminate physical hazards,
- prevent groundwater contamination,
- conserve aquifer yield and hydrostatic head, and
- prevent intermixing of groundwaters within separated aquifer systems.

The following well abandonment procedures are based upon U.S. EPA Region 4 guidance (USEPA, 1996) and SWFWMD FAC 40A-3.

#### **4.1 Abandonment Permits**

A permit to abandon a well will be obtained by the drilling subcontractor. The SWFWMD issues these permits which are valid for 90 days. The permits must be on-site during the well abandonment activities. The drilling subcontractor will be responsible for completely filling out and submitting a SWFWMD well abandonment completion report in an accurate and timely manner. This report will be submitted to the SWFWMD within 30 days after the expiration of the well abandonment permit.

#### **4.2 Boreholes**

The purpose of this section is to provide procedures for the abandonment of hand auger borings, soil borings, or test holes. The procedural standards are intended to include boreholes advanced manually or with a drill rig.

All boreholes will be backfilled with grout or tamped cuttings in accordance with site specific requirements. The decision will be based in part on hydrogeologic considerations, as well as operational constraints. Shallow boreholes, advanced up to approximately ten feet below land surface with a hand auger or drill rig can be backfilled with tamped cuttings, as long as no obvious sources of surficial contaminants which could enter the borehole are nearby. Any borehole advanced to a depth below the water table will be tremie-grouted from the borehole collapse depth to the ground surface.

The grout emplacement and mixture procedures will comply with specifications provided in Section 2.3.4 with regard to monitoring well annular seals. If no monitoring well is to be installed, the boreholes will be backfilled as soon as practical after sampling is completed or data are collected.

### **4.3 Monitoring Wells**

The purpose of this section is to provide procedures for the abandonment and plugging of monitoring wells. The procedures incorporate regulatory direction from the SWFWMD.

A licensed water well contractor will be utilized for all well abandonment activities. This contractor will be responsible for managing the well abandonment permitting process required by the SWFWMD. The water well contractor will plug any well drilled under his license which is not completed or is not suitable for its intended use when work is completed. A well which is unsuitable for its intended use will be plugged within 14 days of notification from the SWFWMD.

Monitoring wells represent a more complex conduit for potential groundwater contamination and intermixing, because they consist of a rigid well pipe structure within an annulus that may be filled with different material along its vertical dimension. The preferred method of well abandonment at MAFB will be to fill the well and porous annular space with grout from bottom to top, in accordance with SWFWMD FAC 40A-3.531(4). With this in mind, it should be recognized that specific well abandonment methodologies will depend on several factors, including the following:

- casing material, diameter, and condition,
- quality of the original seal within the annulus,
- total depth of the well,
- well plumbness,
- hydrogeologic conditions, and
- level of contamination and the zone(s) where the contamination occurs.



These factors should be considered when determining a specific abandonment procedure for a particular well. The SWFWMD should be notified prior to abandonment activities for approval of the abandonment procedures.

When a decision is made to abandon a monitoring well, the borehole will be sealed in such a manner that the well cannot act as a conduit for migration of contaminants from the ground surface to the water table or between aquifers. To properly abandon a well, the well will be grouted with the casing left in the borehole. The well will be pressure grouted by placing the tremie tube at the bottom of the well casing, which will be the well screen or the bottom sump area below the well screen. The pressurized grout will be forced out through the well screen into the filter material and up the inside of the well casing sealing holes and breaks that are present. The tremie tube will be retracted slowly as the grout fills the casing to within two feet of the surface. The well casing will be cut off even with the ground surface and filled with concrete from a depth of two feet to the surface. If the casing has been broken off below the surface, the grout will be tremied to within two feet of the surface and then finished to the ground surface with concrete.

#### **4.4 Documentation and Recording**

The prime contractor's representative oversight will be responsible for fully documenting the well abandonment procedure. The following items will be documented in the field log book:

- name of property owner,
- address of owner or property,
- well location,
- type of well installation method and date,
- type of well (monitoring or extraction)
- construction of well, including total depth, diameter, depth of casing, type of well material, diameter of borehole, and material within annulus,
- depth to bedrock (if applicable),
- depth to groundwater,
- formation material and characteristics,
- materials and quantities used to fill well and annulus,
- description of well abandonment procedures including drilling and placement of grout,
- description of drilling equipment,
- description and placement of well abandonment material,



- casing removed or filled in-place, and
- drilling subcontractor.

The prime contractor's representative will prepare any logs or diagrams that may be helpful in documenting the abandonment process. A copy of the abandonment documentation, including the permit, will be sent to the sent to the Base and USACE.

## **5.0 WELL MANAGEMENT AND MAINTENANCE SYSTEM**

The well management and maintenance system (WMMS) provides an information system to identify, evaluate, and control the maintenance and abandonment of monitoring wells at MAFB. The WMMS provides information to be entered into a database that will interface with the ERPIMS database of information on existing wells at the Base. The WMMS provides information collected from monitoring wells during standard field procedures. Air Force personnel, USACE and contractors can then access the ERPIMS database to generate reports on the physical condition of the wells and to schedule maintenance or abandonment procedures.

Information regarding the condition of monitoring wells at the Base will be entered into the WMMS by one of three routes. During monitoring well installation, information is captured on the Monitoring Well Installation Detail Form. During monitoring well sampling, information is captured on the Field Data Information Log For Groundwater Sampling. If an existing site monitoring well is no longer part of a sampling program (the well is no longer sampled on a routine basis), information is captured on the Well Inspection Form. The Monitoring Well Installation Detail Form, the Field Data Information Log For Groundwater Sampling form, and the Well Inspection Form are provided in Appendix E of the Basewide Environmental Restoration Work Plan.

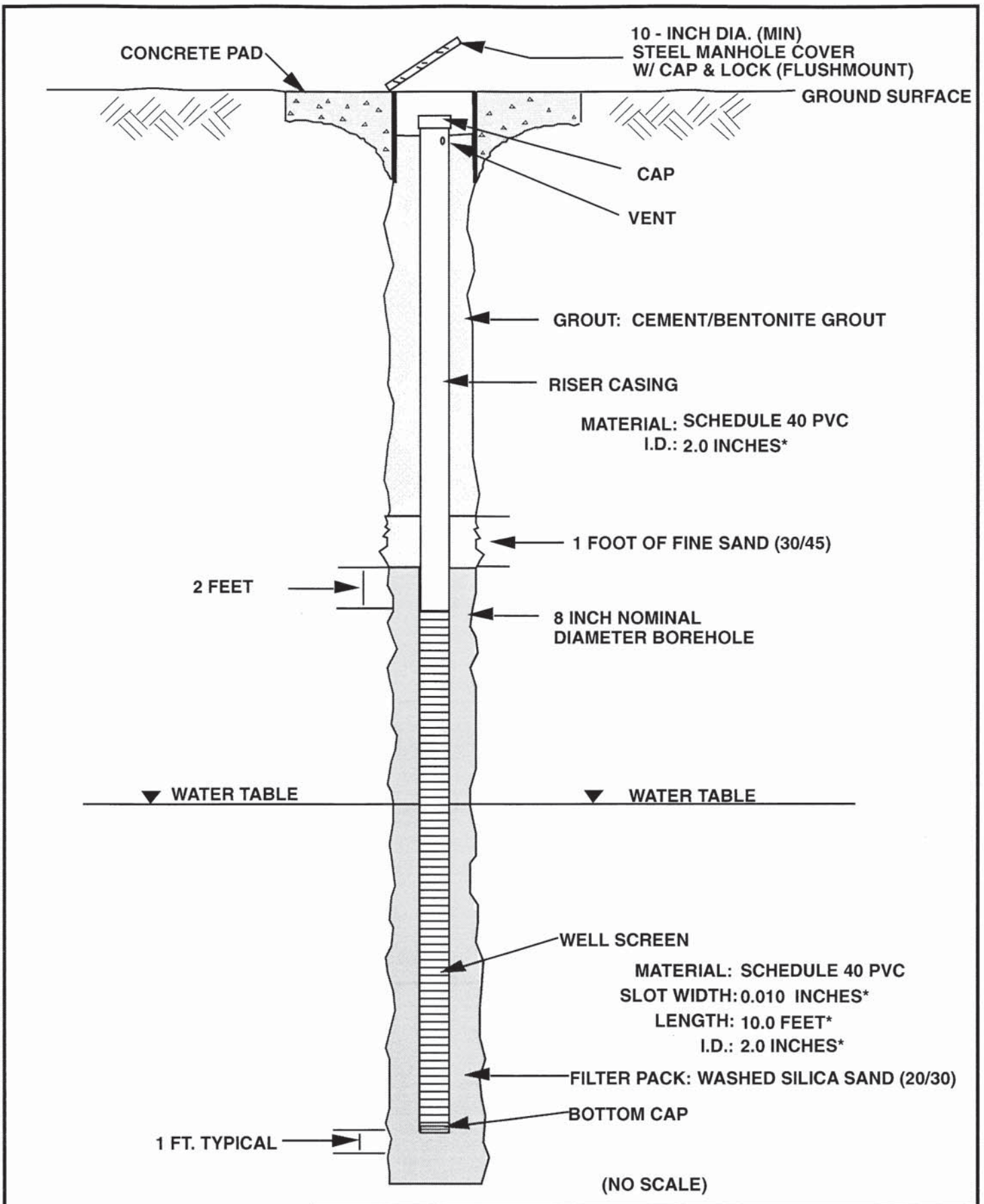
This information will be entered into a form located on the WMMS web page to begin a historical record of the well. The information recorded for new monitoring wells will be interfaced with the ERPIMS database that consists of historical information collected from existing monitoring wells during groundwater sampling events (SOP No. 1, Section 2.2.1.1). Base and contracting personnel can compile and retrieve automated reports of base-wide well inventories and current well condition from the WMMS web page and schedule well maintenance activities in a timely manner.

## 6.0 REFERENCES

- Air Force Center for Environmental Excellence, Handbook for the Installation Restoration Program, Remedial Investigations and Feasibility Studies, September, 1993.
- Aller, L. et al., 1989, Handbook of Suggested Practices for the Design and Installation of Ground-water Monitoring Wells, EPA 600/4-89/034.
- American Society for Testing and Materials (ASTM), Standard Guide for Development of Ground-Water Monitoring Wells in Aquifers, D 5521-94, September 1994.
- American Society for Testing and Materials (ASTM), Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers, D 5092-90, October 1990.
- American Society for Testing and Materials (ASTM), Standard Specification for Portland Cement, C 150-95a, March 1996.
- ASTM Standards C 150-95a D 5092-90, D 5521-94, and F 480-81/SDR. Air Force Center for Environmental Excellence, Handbook for the Installation Restoration Program, Remedial Investigations and Feasibility Studies, September, 1993.
- Southwest Florida Water Management District (SWFWMD), Florida Administrative Code, Chapter 40A-3.
- U.S. Army Corps of Engineers, Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Rodioactive Waste Sites, EM 1110-1-4000; November 1998, <http://www.usace.army.mil/inet/usace-docs/eng-manuals/em1110-1-4000/entire.pdf>.
- U.S. Environmental Protection Agency (EPA), Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Region 4, Environmental Services Division, May 1996.
- U.S. Environmental Protection Agency (EPA), Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Region 4, Environmental Services Division, May 1996.

**FIGURES**



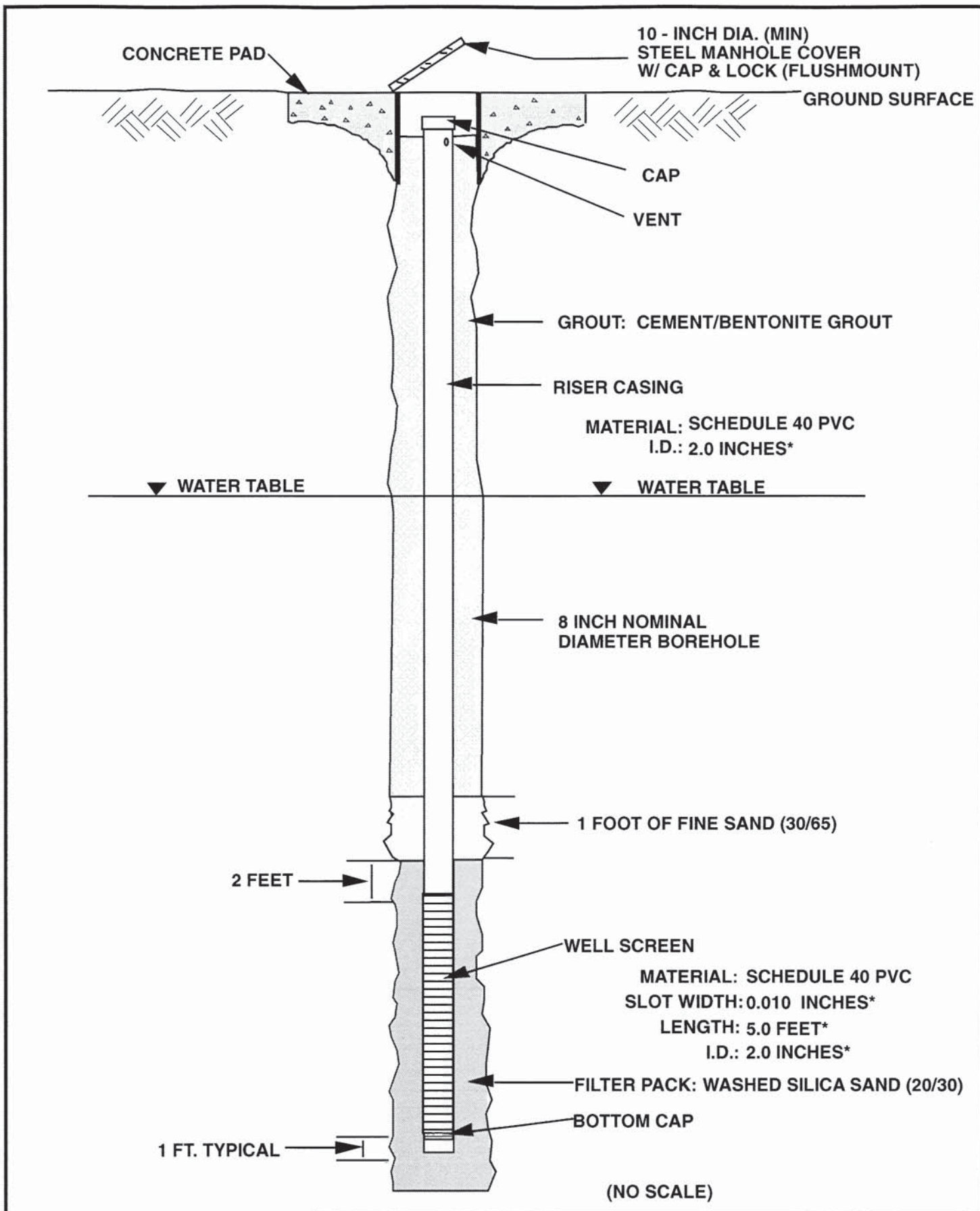


\* Unless Otherwise Specified

EARTH  TECH  
A tyco INTERNATIONAL LTD. COMPANY

FIGURE 1  
SCHEMATIC DIAGRAM FOR WELLS  
SCREENED ACROSS THE  
WATER TABLE

MACDILL AFB, FLORIDA

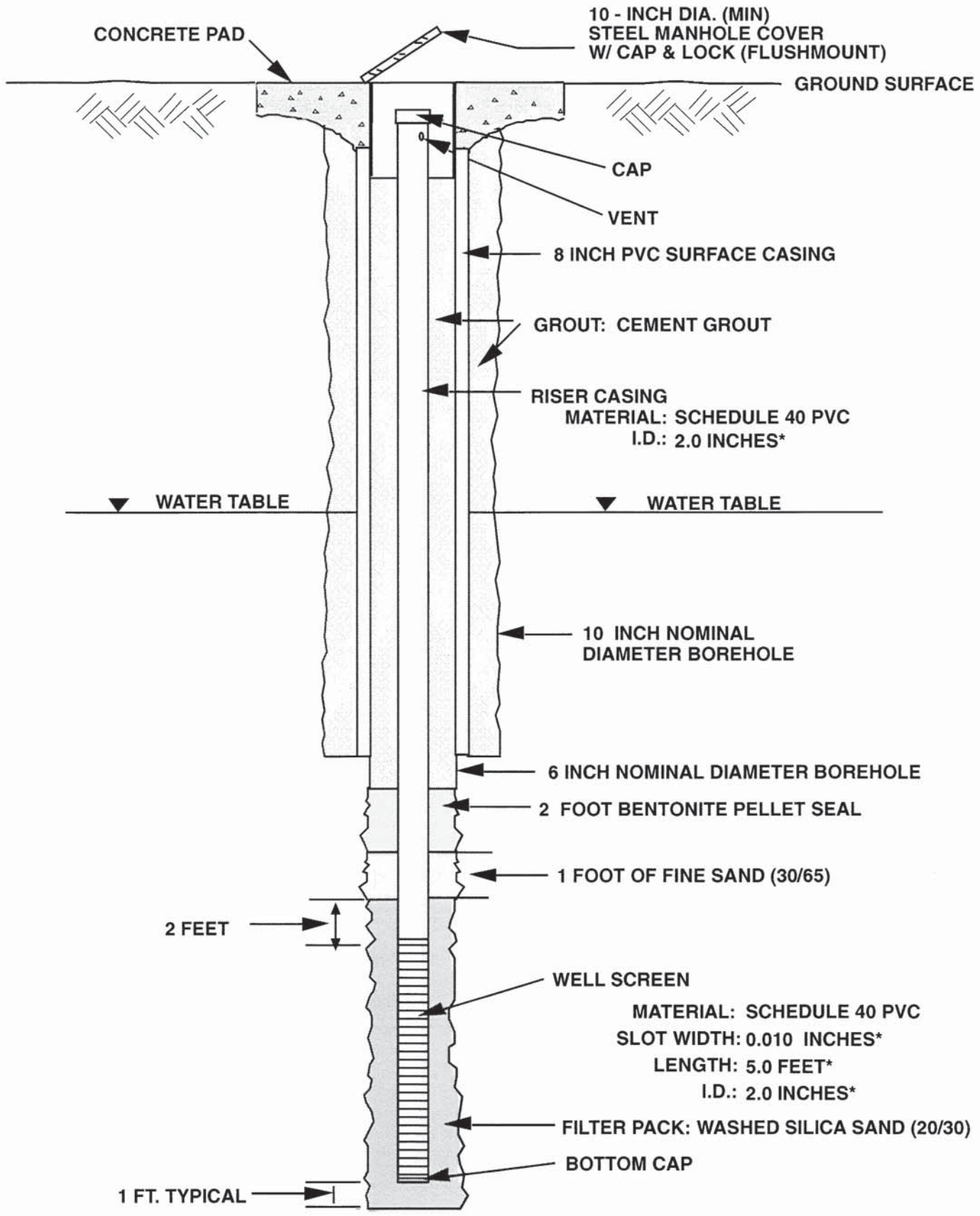


\* Unless Otherwise Specified

EARTH  TECH  
A tyco INTERNATIONAL LTD. COMPANY

FIGURE 2  
SCHEMATIC DIAGRAM FOR WELLS  
SCREENED BELOW THE  
WATER TABLE

MACDILL AFB, FLORIDA



(NO SCALE)

\* Unless Otherwise Specified

EARTH  TECH  
A tyco INTERNATIONAL LTD. COMPANY

FIGURE 3  
SCHEMATIC DIAGRAM FOR  
DOUBLE-CASED WELLS SCREENED  
BELOW THE WATER TABLE  
MACDILL AFB, FLORIDA



**ATTACHMENT 1**  
**BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST**  
**(INCLUDES BLANK FORM AND ANNOTATED FORM)**

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST						DATE PREPARED
1. Clearance is requested to proceed with work at _____ on Work Order _____, Contract No. _____, involving excavation or utility disturbance per attached sketch. This area <input type="checkbox"/> has <input type="checkbox"/> has not been staked or clearly marked.						
2. Type of facility involved.						
<input type="checkbox"/> A. Pavements	<input type="checkbox"/> D. Fire detection & protection			<input type="checkbox"/> G. Traffic flow		
<input type="checkbox"/> B. Drainage systems	<input type="checkbox"/> E. Utility	<input type="checkbox"/> Overhead	<input type="checkbox"/> Underground	<input type="checkbox"/> H. Security		
<input type="checkbox"/> C. Railroad tracks	<input type="checkbox"/> F. Comm	<input type="checkbox"/> Overhead	<input type="checkbox"/> Underground	<input type="checkbox"/> I. Other		
3. Date clearance required			4. Date of clearance			
5. Signature of requesting official			6. Telephone No.		7. Organization	
Organization	Remarks	Reviewer's name and initials				
A. Electrical distribution						
B. Gas distribution						
C. Water distribution						
D. POL distribution						
E. Sewer distribution						
F. Environmental						
G. Pavements/ grounds						
H. Fire protection						
I. Zone						
J. Bioenvironmental hospital						
K. Cathodic protection						
9. Security police						
10. Safety						
11. Communications						
12. Base operations						
13. Cable TV						
14. Commercial utility company <input type="checkbox"/> Telephone (GTE by No-cuts) <input type="checkbox"/> Gas <input type="checkbox"/> Electric	Call Sunshine: 1-800-432-4770 Ticket Nos. _____ Member operators: _____	Contractor to coordinate with Commercial utility company. _____				
15. Other (specify)      User _____						
16. Requested clearance <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved						
17. Typed name and signature of approving officer ( <i>Chief of Operations Flight or Chief of Engineering Flight</i> )						17. Date signed
Chief of Engineering						

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

DATE PREPARED

1. Clearance is requested to proceed with work at \_\_\_\_\_ on Work Order \_\_\_\_\_, Contract No. \_\_\_\_\_, involving excavation or utility disturbance per attached sketch. This area  has  has not been staked or clearly marked.

2. Type of facility involved.

<input type="checkbox"/> A. Pavements	<input type="checkbox"/> D. Fire detection & protection	<input type="checkbox"/> G. Traffic flow
<input type="checkbox"/> B. Drainage systems	<input type="checkbox"/> E. Utility Overhead	<input type="checkbox"/> H. Security
<input type="checkbox"/> C. Railroad tracks	<input type="checkbox"/> F. Comm Overhead	<input type="checkbox"/> I. Other

3. Date clearance required

4. Date of clearance

5. Signature of requesting official

6. Telephone No.

7. Organization

Organization	Remarks	Reviewer's name and initials
A. Electrical distribution		Msgt Oldacre 8-2696
B. Gas distribution		828-3530
C. Water distribution		828-3530
D. POL distribution		Mr. Botelho 8-5435
E. Sewer distribution		828-3530
F. Environmental		Ms. Fisher 8-2567
G. Pavements/ grounds		Mr. Cesky 8-2584
H. Fire protection		Mr. Young 8-4236
I. Zone		Msgt Coonce 8-2834
J. Bioenvironmental hospital		828-3534
K. Cathodic protection		828-2696
9. Security police		828-2373
10. Safety		828-3383
11. Communications		828-2033
12. Base operations		828-2321
13. Cable TV		840-0558
14. Commercial utility company <input type="checkbox"/> Telephone (GTE by No-cuts) <input type="checkbox"/> Gas <input type="checkbox"/> Electric	Call Sunshine: 1-800-432-4770 Ticket Nos. 876727, 876782, 876820, 876828 Member operators: <u>CVI, GTE-NoCuts</u>	Contractor to coordinate with Commercial utility company. _____ _____

15. Other (specify) \_\_\_\_\_ User \_\_\_\_\_

16. Requested clearance  Approved  Disapproved

17. Typed name and signature of approving officer (Chief of Operations Flight or Chief of Engineering Flight) 17. Date signed

Chief of Engineering



**ATTACHMENT 2  
MONITORING WELL INSTALLATION PLAN**



**Memorandum****Florida Department of  
Environmental Protection**

**TO:** Petroleum Cleanup Preapproval Program Staff and Contractors

**FROM:** Michael Ashe, Chief *MAA 9/28/2010*  
Bureau of Petroleum Storage Systems

**DATE:** October 1, 2010

**SUBJECT:** Preapproval Program Backfill Quality Assurance Procedure for Sites Undergoing Excavation

The following procedure is required to provide reasonable assurance that soil used as clean backfill at state-funded petroleum contamination cleanup projects within the Bureau of Petroleum Storage Systems (BPSS) does not contain Chemicals of Concern at concentrations exceeding Soil Cleanup Target Levels (SCTLs). This procedure supercedes the previous backfill sampling memo dated April 7, 2008.

Backfill must be provided from a source of native soil from an area that was previously undisturbed (other than the operation of the borrow pit facility) and should be in an area which has not previously been used for commercial or industrial activities. A history of previous agricultural use is acceptable, but may warrant testing for additional Chemicals of Concern. This requirement may be waived if a "known" (previously sampled) clean source is available. Records and verification of the backfill source must be submitted to the BPSS.

Grab samples must be collected from the fill source (borrow pit) prior to loading for delivery to the remediation site. The frequency (number) of samples can be increased based on the volume of soil as well as the ultimate disposition of the fill material (example: large volume excavation and backfill in residential areas may warrant more frequent sampling). The number and frequency of samples should be specified in the Remedial Action Plan (RAP). For situations where the RAP does not specify the backfill sampling details (such as RAPs submitted prior to issuance of this memo or for excavations less than 200 cubic yards that do not require a RAP), the backfill sampling details will be negotiated between the BPSS site manager and the consultant and documented in writing (or email). Samples will be collected sufficiently far in advance of delivery such that the analytical results can be reviewed and determined to be acceptable before material from the fill source is delivered to the remediation site. For preapproval sites, this can be accomplished by tasking the backfill facility soil sampling as the first event of the Work Order/Task Assignment that initiates the excavation. The site manager will negotiate the number of samples to be taken to ensure that the backfill meets SCTLs and build these costs into the first event.

Soil samples will be analyzed for the following:

- Volatile Organics (by EPA Method 8260)
- Semi-volatile Organics [Base/Neutrals (e.g., PAHs, Pesticides, PCBs) and Acid Extractables (e.g., Phenols)] (by EPA Methods 8270/8081/8082)
- RCRA Metals (by EPA Method 6010 and EPA Method 7471 OR EPA Method 6020, and EPA Method 7471 if not certified for mercury under EPA Method 6020)
- Petroleum Residual Organics (by FL-PRO)

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## **SELECTED SECTIONS OF THE UTILITY PRIVATIZATION AGREEMENT**

See the following pages for information. Only a partial document is included. If the entire document is required to complete the design is can be requested by the Contractor through the Government.

### **UPGRADES / CONNECTIONS AND RENEWALS AND REPLACEMENTS**

- C.11 SDCs / Upgrades / Connections and Renewals and Replacements
  - C.11.1 Due Diligence Adjustment
  - C.11.2 SDCs / Upgrades / Connections and Renewals and Replacements
    - C.11.2.1 Initial System Deficiency Corrections / Connections Charges
    - C.11.2.2 Future System Deficiency Correction / Connections charges
    - C.11.2.2 Future System Deficiency Corrections / Connections Charges
    - C.11.2.3 Renewal and Replacements
    - C.11.2.4 Annual System Deficiency Corrections / Upgrades / Connections and Renewals and Replacement Plan
      - C.11.2.4.1 Initial System Deficiency Corrections / Upgrades / Connections and Renewals and Replacement Plan.
      - C.11.2.4.2 Annual system Deficiency Corrections/Upgrades/Connections and Renewal Replacement Plan.
    - C.11.2.5 SDCs / Upgrades
    - C.11.2.6 Renewals and Replacements
    - C.11.2.7 Requirements and Standards
    - C.11.2.8 Anticipated Connection and Disconnections
  - C.11.3 Connections and Disconnections
    - C.11.3.1 Temporary Connections
    - C.11.3.2 Permanent Connections
    - C.11.3.3 Third Party Construction
- C.12 Operations and Maintenance / Quality Management
- C.13 Transition Plan
- C.14 Historical, Architectural, Landscaping Requirements
- C.15 Specialty Training

### **UTILITY PRIVATIZATION -- POTABLE WATER INFORMATION**

- B.1 General Description of the Utility System
  - B.1.1 Utility System Description
  - B.1.2 Lateral Extent of Utility System Right-of-Access
  - B.1.3 Utility System Points of Demarcation
  - B.1.4 Unique Points of Demarcation

### **UTILITY PRIVATIZATION -- WASTEWATER INFORMATION**

- B.1 General Description of the Utility System
  - B.1.1 Utility System Description
  - B.1.2 Lateral Extent of Utility System Right-of-Access
  - B.1.3 Utility System Points of Demarcation
  - B.1.4 Unique Points of Demarcation

***UTILITY PRIVATIZATION***

***UPGRADES / CONNECTIONS AND  
RENEWALS AND REPLACEMENTS***

## **C.11 SDCs/Upgrades/Connections and Renewals and Replacements**

### **C.11.1 Due Diligence Adjustment**

The Contractor shall be responsible for all required SDC/Upgrades and renewals and replacements to maintain and operate the utility system(s) in a safe, reliable condition, and to meet the requirements of this contract.

The Contractor shall base its proposal on the inventory listed in the utility-specific attachment (Section JA1 and JA2). If during the Joint Inventory that takes place during the Transition Period between contract award and contract start, the Contractor identifies additional inventory not listed in Section JA1 or JA2, the Contractor may submit a request for an equitable adjustment to the Contracting Officer. If the Contractor determines that the inventory listed in Section JA1 and JA2 is overstated, the Contractor shall report the extent of the overstatement to the Contracting Officer, who will determine an equitable adjustment as appropriate.

### **C.11.2 SDCs/Upgrades/Connections and Renewals and Replacements**

#### **C.11.2.1 Initial System Deficiency Corrections/Connection Charges**

Initial System Deficiency Corrections/connection charges are those necessary to reach the standards typically maintained by the Contractor on its utility systems, so that subsequent renewals and replacements will permit the long-term safe and reliable operation of the utility system. All ISDCs/Connections shall be listed in the first submittal of the Initial System Deficiency Corrections and Renewals and Replacements Plan, as part of the offer. Any ISDCs/Connections proposed to remedy Government identified deficiencies listed in the utility specific attachments shall be complete within 5 years of the contract award date. The Government reserves the right to buy down a previously amortized ISDC/connection at no penalty to the Government.

#### **C.11.2.2 Future System Deficiency Corrections/Connection Charges**

Future System Deficiency Corrections (SDC)/connection charges are investments in the utility system resulting from changes in service requirements, laws, or regulations. Future SDCs/connection charges may also include the implementation of new technologies.

Future System Deficiency Corrections for which the Government agrees to pay in accordance with Section C., *SDCs/Upgrades/Connections and Renewals and Replacements*, will be added to Section B-1, *Schedule*, in accordance with Section G., *Utilities Service Charge Adjustment*.

#### **C.11.2.3 Renewals and Replacements**

Renewals and replacements are investments in the utility system to renew or replace system components that fail or reach the end of their useful life.

#### **C.11.2.4 Annual System Deficiency Corrections/Upgrades/Connections and Renewals and Replacements Plan**

The Contractor shall prepare and submit an Annual System Deficiency Corrections (SDC)/Upgrades/Connections and Renewals and Replacements Plan that identifies SDC/Upgrades/Connections and major renewals and replacements the Contractor intends to accomplish. The



Annual SDC/Upgrades/Connections and Renewals and Replacement Plan shall contain a proposed SDC/Upgrade/Connection list for each of the next 5 years. The plan shall be structured as follows:

#### **C.11.2.4.1 Initial System Deficiency Corrections/Upgrades/Connections and Renewals and Replacements Plan**

This Plan is attached as Exhibit JE3 for the Water System and JE7 for the Wastewater System and includes:

- A detailed description and a detailed firm fixed price for each Initial System Deficiency Correction and each Initial Upgrade.
- A detailed description and a line item firm fixed price for each Initial Connection and each Initial Renewal and Replacement.

#### **C.11.2.4.2 Annual System Deficiency Corrections/Upgrades/Connections and Renewals and Replacements Plan**

This Plan shall be prepared and submitted annually and shall contain a list of the proposed work efforts for System Deficiency Corrections (SDCs), Upgrades, New Connections, and Renewals and Replacements that the Contractor intends to accomplish for each of the next 5 years. The plan shall be structured as follows:

- Year 1 shall include detailed information for each work effort including site plans, cost estimates, schedules, and an analysis of the impact of construction on Installation operations and the environment. It shall also address safety requirements.
- Years 2-5 shall include line item descriptions, order-of-magnitude estimates, and general-area site plans for each work effort.

Unless the Contracting Officer provides written notification of an alternate date, the first Annual SDC/Upgrades/Connections and Renewals and Replacements Plan shall be submitted no later than **May 31** of the first full fiscal year following contract award. Thereafter, the plan shall be submitted no later than **May 31** of each year. The Plan shall be submitted to the Government representative designated in Section G.

#### **C.11.2.5 SDCs/Upgrades**

The Contractor may propose SDC/Upgrades in the Annual SDC/Upgrade/Connection and Renewal and Replacement Plan (Future SDC/Upgrades/Connections). The Government reserves the right to determine at its discretion whether it will pay for any portion of proposed SDC/Upgrades/Connections. Future SDC/Upgrades/Connections are required to comply with requirements and standards imposed by law that have changed during the contract term will be paid subject to the availability of funds. Approved SDC/Upgrades and improvements identified in the SDC/Upgrades/Connections and Renewals and Replacements Plan will be paid, in accordance with Section B, *Service Charges for Schedule B-1*. The Government reserves the right to pay for any SDC/Upgrade/Connection as a lump-sum payment rather than by amortizing the SDC/Upgrade/Connection costs.

#### **C.11.2.6 Renewals and Replacements**

Renewals and replacements identified in the SDC/Upgrades/Connection and Renewal and Replacement Plan will be paid in accordance with Schedules 1 and 2 and Section B, *Service Charges for Schedule B-1*.

### **C.11.2.7 Requirements and Standards**

The SDC/Upgrades/Connections and Renewals and Replacements Plan shall include an assessment of any new or revised standards and clearly address planned system improvements or operational changes needed to comply with such standards.

### **C.11.2.8 Anticipated Connections and Disconnections**

The SDC/Upgrades/Connections and Renewals and Replacements Plan shall include a list of anticipated new service connections, including a preliminary design and estimated installation costs. The Government will provide a list of new service requirements and anticipated disconnections.

### **C.11.3 Connections and Disconnections**

The Contractor shall be responsible for adding any additional service points and/or deleting any service points that are no longer required. The Contractor shall coordinate this work with the Contracting Officer's Representative.

If a connection or disconnection constitutes reasonable cause for a change in service charge, the rate will be re-negotiated in accordance with FAR 52.243-1, *Changes -Fixed-Price-Alt 1*.

#### **C.11.3.1 Temporary Connections**

The Contractor shall extend temporary service to the Government or Contractors performing work on the Installation when requested by the Government.

The Government will identify the party responsible for reimbursing the Contractor for temporary connections or utility usage. The Contractor shall provide the following information regarding any temporary service connections:

1. Name of the temporary customer
2. Cost
3. Date of Installation
4. Expected duration of the connection
5. Description of the connection, including route and type of material
6. POC, Title and Phone Number

#### **C.11.3.2 Permanent Connections**

(a) *Charge*. In consideration of the Contractor furnishing and installing at its expense any new connecting facilities requested by the Government, the Government may pay the Contractor a mutually agreed upon connection charge. Any payment will be in a form agreed to by the parties and as permitted by applicable law. When the Government requests new connecting facilities, including work necessary to increase the capacity of existing facilities, the Contractor shall submit a detailed proposal identifying the work necessary to provide the required utility services, any proposed connection charge, and the proposed change in the monthly utility service fee that will go into effect upon completion and placement into service of the new connecting facilities.

Payment for connection charges may be made as a line item under this contract or directly by the requesting

party, however, regardless of payment method, the terms and conditions of this contract shall control. As a condition precedent to final payment, the Contractor shall execute a release of any claims against the Government arising under or by the virtue of such installation. Proposed changes to the monthly utility service fee(s) must be approved in advance by the Contracting Officer, regardless of the payment vehicle utilized for the connection charge.

(b) *Ownership, operation, maintenance and repair of new facilities to be provided.* The facilities to be supplied by the Contractor under this clause, notwithstanding the payment by the Government of a connection charge, shall be and remain the property of the Contractor and shall, at all times during the life of this contract or any renewals thereof, be operated, maintained, and repaired by the Contractor at its expense. All taxes and other charges in connection therewith, together with all liability arising out of the construction, operations, maintenance, or repair of such facilities, shall be the obligation of the Contractor.

(c) *Credits for Refundable Connection Charges.*

(1) Where the Government is part of the Contractor's general rate base and the Contractor subsequently includes the cost of the connecting facilities in its general rate base, the Contractor agrees to allow the Government, on each monthly bill for service furnished under this contract to the service location, a credit in the form of a percentage of the amount of each such bill as rendered until the accumulation of credits shall equal the amount of such connection charge. The amount of the credit percentage shall be negotiated, but shall not be less than that provided for under the terms of any tariff filed by the Contractor or otherwise provided by the Contractor to any commercial customer, provided that the Contractor may at any time allow a credit up to 100 percent of the amount of each such bill.

(2) In the event the Contractor serves any customer other than the Government (regardless of whether the Government is being served simultaneously, intermittently, or not at all) by means of these facilities, the Contractor shall promptly notify the Government in writing. Unless otherwise agreed by the parties in writing at that time, the Contractor shall promptly credit the Government, up to 100 percent of each monthly bill, until there is refunded the amount that reflects the Government's connection costs for that portion of the facilities used in serving others.

(d) *Terminations.* Payment for and disposition of wholly or partially completed facilities upon termination of the contract shall be in accordance with the Government Repurchase Option clause of the Contract.

### **C.11.3.3 Third Party Construction**

(a) Where the Government contracts with a third party to construct new infrastructure that is intended to connect to the Contractor's system, the following terms and conditions shall apply:

(1) The Contractor will provide the Government and the third party contractor with specifications (the "Specifications") applicable under the terms of this Contract for its system components and for interconnections.

(2) The Government will require the third party contractor to renovate or construct any infrastructure that will connect to the Contractor's existing systems in accordance with the Specifications.

(3) The Government will coordinate with the Contractor to ensure the existing system can accommodate any additional load requirements necessitated by the renovation/construction. Should the contractor determine that the existing systems require upgrades to support the



additional load requirements, a price for the upgrade will be negotiated in accordance with FAR 52.243-1, *Changes – Fixed- Price, Alt I*.

(b) At the Government's option, the Contractor will take ownership of system components renovated or constructed by the third party contractor to the Specifications. Any adjustment to service requirements and the contract price as a result of these actions will be in accordance with FAR 52.243-1, *Changes – Fixed- Price, Alt I*.

(c) The Contractor shall have the right to reasonably inspect the third party contractor's construction of system components for which the Contractor will take ownership. FGUA's fixed-price hourly rate is:

\$150/hour for its Contract Operator (USW)  
\$120/hour for its Systems Manager (GSG)

(d) If third party constructed system components are not built to the Specifications, the Contractor shall identify such components and the basis for the discrepancy to the Government with specificity. The Government may direct the Contractor to perform any work required to bring the system into compliance with the Specifications, in which case the Contractor will be compensated in accordance with FAR 52.243-1, *Changes – Fixed- Price, Alt I*.

(e) In the event the parties are unable to agree on an equitable price adjustment for any of the above paragraphs, the matter shall be resolved under the provisions of this contract.

(FAR 52.241-9)

## C.12 Operations and Maintenance/Quality Management

The Operations and Maintenance/Quality Management Plan shall ensure the provision of reliable, cost-effective, and compliant service over the term of the contract. The Contractor shall maintain and update the Plan as necessary and adhere to its requirements throughout the contract term. It shall not be materially altered without the Government's consent.

## C.13 Transition Plan

The Contractor has submitted an Operational Transition Plan for execution during the transition period, a copy of which is attached as Exhibit JE4 for the Water System and Exhibit JE8 for the Wastewater System. The Plan shall not be materially altered without the Government's consent. The transition period will begin on contract award and end no later than the contract start date. This transition period is intended to provide the Contractor time to perform additional due diligence functions, complete the joint inventory, and stand up operations in support of the contract. The contractor will be paid for transition costs in accordance with the pricing proposal. Transition costs are defined as all costs expended during the transition period that are necessary and reasonable to assume ownership and responsibility for the system. The Bill of Sale (BOS) must be approved/signed by the appropriate USAF official(s) prior to contract start, and the Government requires 45 days for the BOS coordination and approval process. This BOS process cannot begin until the agreed upon joint inventory is complete. Failure to submit the joint inventory on time may result in extension of the transition period and a delayed contract start date. Any resultant additional transition costs incurred as a result of failure to meet these timeliness requirements will only be compensated by the government where the failure is not attributable in any way to the acts or omissions of the contractor.

## **C.14 Historical, Architectural, & Landscaping Requirements**

Cultural resources on Federal property are protected and managed by the Archaeological Resources Protection Act of 1979 and other applicable laws. The Contractor shall exercise care so as not to disturb or damage artifacts or fossils (should any be uncovered) during the excavation operations. Should the Contractor discover evidence of possible scientific, prehistoric, historic or archaeological finds within the work limit lines or adjacent to the work area, the Contractor shall immediately cease work at that location and notify the Contracting Officer. The Contractor shall provide the Contracting Officer with complete information as to the specific location and nature of the findings. Where appropriate by reason of discovery, the Contracting Officer may order delays in time of performance or changes in the work or both. If such delays or changes are ordered, an equitable adjustment will be made in accordance with the applicable clauses of the contract.

## **C.15 Specialty Training**

If required by Section JA43 the contractor shall provide training to government military personnel as requested to ensure that such personnel are fully capable of operating and properly certified to operate the system in the event that the Government must resume operations, temporarily or permanently, for any reason.

- END OF SECTION -

***UTILITY PRIVATIZATION***  
***POTABLE WATER INFORMATION***



## Exhibit B—Description of Premises

### B.1. General Description of the Utility System:

#### B.1.1 Utility System Description:

The utility system may be composed of, without limitation, wells (do not exist), well pumps (do not exist), supporting emergency generator sets, water treatment equipment, valves, fire hydrants, water distribution mains, meters, booster station pumps, storage tanks, reservoirs, all related electrical controls, and computer hardware and software used to operate and control the production and delivery of water to end users on the Installation.

#### B.1.2 Lateral Extent of Utility System Right-Of-Access:

For pipe sizes of 24 inches in diameter or less, 26-foot-wide, extending 13 feet on each side of the utility system, as installed.

For pipe sizes greater than 24 inches in diameter, 50-foot-wide, extending 25 feet on each side of the utility system, as installed.

#### B.1.3 Utility System Points of Demarcation:

The point of demarcation is defined as the point on the utility system where ownership changes from the utility system owner to the facility owner. The table below identifies the type and general location of the point of demarcation with respect to the facility for each scenario.

Point of Demarcation (POD)	Applicable Scenario	Sketch
POD is on the downstream side of the water meter, backflow device, or valve (closest apparatus to the exterior of the structure).	Water meter, backflow device, or valve is located on the service line entering the structure within 25 feet of the exterior of the structure.	
POD is where the service line enters the structure.	No water meter, backflow device, or valve exists on the service line within 25 feet of the structure. Note: If a water meter, backflow device, or valve is installed within 25 feet of the structure at any time, the downstream side of the service valve will become the new point of demarcation.	

Point of Demarcation (POD)	Applicable Scenario	Sketch
<p>If the fire suppression system has a storage tank, then the POD is located on the inlet side of the isolation valve or backflow prevention device closest to the storage tank. If no storage tank is present, the POD is located on the inlet side of the PIV or isolation valve closest to the fire suppression pumps.</p>	<p>Fire suppression system is provided flow and/or pressure by the potable water distribution system.</p>	<p>None</p>
<p>POD for irrigation system is the inlet side of the backflow prevention device or isolation valve closest to the irrigation system.</p>	<p>Irrigation system is fed directly from potable water distribution system.</p>	<p>None</p>
<p>POD is the inlet side of the water fountain or hose bib assembly's connection to the service lateral.</p> <p>Note: If a service valve is installed within 25 feet of the hose bib or water fountain, the outlet side of the service valve becomes the new POD.</p>	<p>Water fountains and hose bibs connected to the water distribution system (typically found at ballfields and outdoor recreation areas). <u>No valve is located on the lateral</u> providing water service to the drinking fountain or hose bib within 25 feet of these connections.</p>	<p>None</p>
<p>POD is the outlet side of the service valve.</p>	<p>Water fountains and hose bibs connected to the water distribution system (typically found at ball fields and outdoor recreation areas). <u>Service valve is located on the lateral</u> providing water service to the drinking fountain or hose bib within 25 feet of these water use devices.</p>	<p>None</p>
<p>POD is at the overhead service line's connection to the service entrance mast.</p> <p>Note: If an electric meter is present, or is installed, the owner of the electric distribution system on the installation is the owner and maintainer of the electric meter and can. The POD is on the load side of the meter.</p>	<p>Electric power is provided to a water facility via an <u>overhead</u> service drop. This configuration could be found at facilities dedicated to the water utility such as a water well, pump station, or water tower.</p>	<p>None</p>

<b>Point of Demarcation (POD)</b>	<b>Applicable Scenario</b>	<b>Sketch</b>
<p>POD is at the transformer secondary terminal spade.</p> <p>Note: If an electric meter is present, or is installed, the owner of the electric distribution system on the installation is the owner and maintainer of the electric meter. The POD is on the load side of the meter.</p>	<p>Electric power is provided to a water facility via an <u>underground</u> service connection. This configuration could be found at facilities dedicated to the water utility such as a water well, pump station, or water tower.</p>	<p>None</p>



**B.1.4 Unique Points of Demarcation:**

The following table lists anomalous points of demarcation that do not fit any of the above scenarios.

<b>Building Number or POD Identifier</b>	<b>Point of Demarcation (POD) Description</b>
Base Entry Point	Downstream side of meter prior to backflow device at Dale Mabry Gate.
Base Entry Point	Downstream side of meter prior to backflow device at Himes Ave.
Base Entry Point	Downstream side of meter prior to backflow device at MacDill Gate.
DLA Fuel Storage Area	Downstream side of valves V1012 and V0401.
<b>Housing Chevron Park</b>	
100 ft southeast of Bldg 496	Downstream of V062019 and 4 in valve (valves are connected to a tee).
150 ft northwest of Bldg 366	Downstream of V062024.
<b>Housing Staff Circle</b>	
300 ft northwest of Bldg 382, west of Bayshore Blvd	Downstream side of V0692A.
200 ft northwest of V0692A	Downstream side of V0689.
Line supplying former pool 300 ft southwest of V0689	Point of connection of line into 6 in CI line running southwest from V0689
<b>Housing Wherry</b>	
Intersection of Tampa Point Blvd and Hangar Loop Dr	Downstream side of V082053.
550 ft northeast of V082053, 50 ft southwest of Hangar Loop Dr	Downstream side of V062240.
100 ft southeast from the intersection of Hangar Loop Dr and Bayshore Blvd	2 in plug valve located on the west side of 8 in PVC line.
150 ft southeast of 2 in plug valve	1¼ in plug valve located on the west side of 8 in PVC line.
100 ft southeast of 1 ¼ in plug valve	¾ in plug valve located on the west side of 8 in PVC line
150 ft southeast of ¾ in plug valve	Downstream side of V062204.
Bldg 767 250 ft southwest of V062204	Point of connection of 1 ½ in service line from Bldg 767 into 6 in CI line

<b>Building Number or POD Identifier</b>	<b>Point of Demarcation (POD) Description</b>
Intersection of Phantom Dr and Bayshore Blvd	Downstream side of valve located west of 8 in PVC line.
Intersection of Tampa Point Blvd and Bayshore Blvd	Downstream side of valve located west of 8 in PVC line.
Tinker school East of building	Downstream side of valve connecting new PVC line to existing backflow device located on concrete slab
<b>Housing McClelland</b>	
400 ft north of the intersection of Fortress Dr and McClelland Ave	Downstream side of new valve connected to existing 10 in PVC water main.
<b>Housing Heritage Cove</b>	
North of Bldg 957 (address 1909)	Downstream side of V062103
150 ft east of V062103	Downstream side of V06141
75 ft east of V06141	Downstream side of V062124
150 ft northwest of Bldg 713 (water tower)	Downstream side of V06142
<b>Housing Liberty Cove</b>	
1400 ft west of Bayshore Blvd along McClelland Ave, 75 ft south	Downstream side of 4 in valve
1400 ft west of Bayshore Blvd along McClelland Ave, 100 ft south	Downstream side of 4 in valve
600 ft west of Bayshore Blvd along McClelland Ave, 200 ft south	Downstream side of 6 in tee
250 ft west of Bayshore Blvd along McClelland Ave, 150 ft south	Downstream side of V062211

***UTILITY PRIVATIZATION  
WASTEWATER INFORMATION***



## Exhibit B—Description of Premises

### B.1. General Description of the Utility System:

#### B.1.1 Utility System Description:

The utility system may be composed of, without limitation, collection piping, manholes, final discharge meters, lift stations, treatment plants, supporting emergency generator sets (if any), and electrical controls associated with the lift stations and emergency generator sets on the Installation.

#### B.1.2 Lateral Extent of Utility System Right-Of-Access:

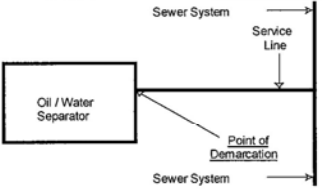
For pipe sizes of 24 inches in diameter and less, 26-foot-wide, extending 13 feet on each side of the utility system, as installed.

For pipe sizes of greater than 24 inches in diameter, 50-foot-wide, extending 25 feet on each side of the utility system, as installed.

#### B.1.3 Utility System Points of Demarcation:

The point of demarcation is defined as the point on the utility system where ownership changes from the utility system owner to the facility owner. The table below identifies the type and general location of the point of demarcation with respect to the facility for each scenario.

Point of Demarcation (POD)	Applicable Scenario	Sketch
POD is the upstream side of the cleanout device	No flow meter exists and a sewer system cleanout does exist.	<p>The sketch shows a rectangular structure on the left. A horizontal line representing the sewer system extends to the right. A vertical line representing the service line enters the structure from the top. A pipe cleanout is shown as a small circle with a cross on the sewer system line. An arrow points to the upstream side of this cleanout, labeled 'Point of Demarcation'. Labels include 'Structure', 'Sewer System', 'Service Line', and 'Pipe Cleanout'.</p>
POD is where the service line enters the structure.  Note: A new cleanout device should be installed within 10 feet of the building during any stoppage or maintenance action. The upstream side of this device will then become the new POD.	No flow meter or cleanout exists on the service line entering the structure.	<p>The sketch shows a rectangular structure on the left. A horizontal line representing the sewer system extends to the right. A vertical line representing the service line enters the structure from the top. An arrow points to the point where the service line enters the structure, labeled 'Point of Demarcation'. Labels include 'Structure', 'Sewer System', and 'Service Line'.</p>

Point of Demarcation (POD)	Applicable Scenario	Sketch
<p>POD is the outfall of the oil/water separator.</p>	<p>Any oil/water separator on the service line.</p>	
<p>POD is the outlet side of the Grease Trap or Pretreatment System.</p>	<p>Grease Trap or Pretreatment System connected to the wastewater collection system.</p>	<p>None</p>
<p>POD is at the overhead service line's connection to the service entrance mast.</p> <p>Note: If an electric meter is present, or is installed, the owner of the electric distribution system on the installation is the owner and maintainer of the electric meter and the can. The POD for the electric meter is at the load side of the meter</p>	<p>Electric power is provided to a wastewater facility via an <u>overhead</u> service drop. This configuration could be found at facilities dedicated to the wastewater utility such as a lift station or wastewater treatment plant.</p>	<p>None</p>
<p>POD is at the transformer secondary terminal spade.</p> <p>Note: If an electric meter is present, or is installed, the new POD is on the load side of the meter.</p>	<p>Electric power is provided to a wastewater facility via an <u>underground</u> service connection. This configuration could be found at facilities dedicated to the wastewater utility such as a lift station or wastewater treatment plant.</p>	<p>None</p>

#### B.1.4 Unique Points of Demarcation:

The following table lists anomalous points of demarcation that do not fit any of the above scenarios.

Building Number or POD Identifier	Point of Demarcation (POD) Description
<b>Housing Chevron Park</b>	
East of Bayshore Blvd, 250 ft northwest of intersection of Bayshore Blvd and Florida Keys Ave	Upstream side of 3 in gate valve on 3 in force main
<b>Housing Staff Circle</b>	
100 ft southwest of Bldg 405	Point of connection of 6 in line into manhole C100
100 ft southwest of Bldg 401	Point of connection of 6 in line into manhole C101
<b>Housing Wherry</b>	
Intersection of Tampa Point Blvd and Hangar Loop Dr	Point of connection of 6 in line flowing north into manhole C1
Intersection of Tampa Point Blvd and Hangar Loop Dr	Point of connection of line flowing northwest into manhole C1
50 ft northeast of intersection of Tampa Point Blvd and Hangar Loop Dr	Point of connection of 10 in line flowing southwest into manhole C76
Bldg 767 300 ft southwest of intersection of Bayshore Blvd and Phantom Dr	Point of connection of line from Bldg 767 into manhole C88
Tinker School 700 ft east of the intersection of Tampa Point Blvd and Hangar Loop Dr	Point of connection of force main into manhole C87
Intersection of Tampa Point Blvd and Bayshore Blvd	Upstream side of valve from new housing 4 in force main
<b>Housing McClelland</b>	
600 ft northwest of intersection of McClelland Ave and Bayshore Blvd	Point of connection of force main from new lift station into manhole B4
<b>Housing Heritage Cove</b>	
250 ft north of the intersection of McClelland Ave and Bayshore Blvd	Upstream side of valve from existing 4 in force main
<b>Housing Liberty Cove</b>	
50 ft south of McClelland Ave and Bayshore Blvd	Upstream side of valve from existing 4 in force main
Below are NEW Unique Points of Demarcation removing the Golf Course Irrigation system from Wastewater Utility Privatization Contract.	
North Golf Course	Discharge side of wastewater effluent valve located approximately 180 feet northwest from the Bldg 726 (Golf Course Clubhouse) and approximately 650 feet west of Bayshore Blvd.

<b>Building Number or POD Identifier</b>	<b>Point of Demarcation (POD) Description</b>
South Golf Course	<p>Discharge side of wastewater effluent valve located approximately 200 feet east of Lake 18 (South Golf Course Containment Pond).</p> <p>Inflow side of wastewater effluent valve located approximately 40 feet east of Bldg 63I (wet well/pumping station).</p>
North Golf Course Pump Station Area	<p>Wastewater effluent pipe flange exiting east side of Bldg 63I approximately six (6) inches from Bldg 63I. POD is feed side of flange (where the feed side and discharge side of flange meet). Flange gasket and flange bolts are owned by SO.</p> <p>Top of the concrete slab over the northeast portion of Bldg 63I (therefore the building enclosure, North Golf Course pumps, piping, electrical equipment are not part of the privatization).</p> <p>Load side of Electric Circuit Breaker to North Golf Course pumps located in 63I. Circuit breaker is located in generator building. (Overhead service line electrical connection to generator building is included in privatization.)</p>



## **CLEAN BACKFILL MEMORANDUM**

**Page Two**

**October 1, 2010**

Other analytes may be added on a case-specific basis.

Soil will only be accepted for use as clean backfill if the results of laboratory analyses show that there are no exceedances of SCTLs for any of the analytes measured. If soil from the low-bid backfill facility does not qualify for use as clean backfill, the second lowest bid backfill facility will be considered.

These procedures also apply to the soil used to mix flowable fill for LDA source removals if the flowable fill will be mixed by the remediation contractor that is performing the LDA source removal (or another subcontractor) but do not apply if the flowable fill is obtained from a commercial concrete products supply company.

Treated soil from a soil treatment facility permitted to operate under Chapter 62-713, Florida Administrative Code (F.A.C.), is also considered suitable for backfill if it has been treated to the standards of "cleaned soil" as described in Subsection 62-713.520(2), F.A.C. In this case no additional soil analysis will be required.

If you have any questions, please contact Diane Pickett of the BPSS at (850)222-6446 ext. 265 or [diane.pickett@dep.state.fl.us](mailto:diane.pickett@dep.state.fl.us).

**WATER & SEWER UTILITY CONSTRUCTION FEES**



**TO:** Richard Burnette, P.E., 6 CES/CEQ

**FROM:** Michael Wilson, FGUA/GSG Capital Projects Manager

**DATE:** May 5, 2011

**SUBJECT:** NVZR XX-XXXX, Water & Sewer Construction Fees

The FGUA has reviewed the XX% design drawings prepared for the above-referenced project and provides this memo regarding for estimated construction inspection fees.

**Inspection Requirements - All Inspections require 72 Hour Notification**

Three stages of coordination between the construction contractor and FGUA are required: Pre-construction Meeting, Construction Inspections, and Final Inspection for Utility Clearance. It is the Contractors responsibility to request all meetings and inspections.

Prior to starting any site work, the Contractor shall contact FGUA at 727-359-1158 to schedule a Pre-Construction meeting (this meeting can be the same Pre-Construction meeting conducted for the Government, provided the FGUA is given at least one (1) week advance notice of the meeting). During this meeting, specific inspection requirements for the project will be determined and, procedures for contacting and scheduling inspections. Final inspections are required upon completion of all utility work. Plans and shop drawing reviews remain the responsibility of the Government Agency contracting the work. Refer also to the Design Guide for information regarding applications required for service termination, service connection, temporary construction water meter, etc. All fees are paid in advance to the Florida Governmental Utility Authority (FGUA) prior to any Utility Work commencement.

LEA ANN THOMAS, CHAIR  
Polk County

DOUG MEURER  
Lee County

ROBERT KNIGHT  
Citrus County

SHANE PARKER  
Hendry County

MICHELE BAKER  
Pasco County

MICHAEL CRUMPTON, P.E.  
DeSoto County

**Construction & Inspection Fees**

Fees are based upon review of the plans currently in preliminary design. Fees are subject to modification upon receipt of 100% plans. As a courtesy to the Government, the FGUA will review early versions of the WORK, however we cannot guarantee that the Inspection Fees quoted will be complete without the benefit of 100% plans.

The following items are covered under the cost shown below:

- One (1) Water main disconnect or connection
- One (1) Sewer main disconnect or connection (contractor must repair any cored manhole)
- All inspections of the utility work, including witnessing for certification purposes
- \*One Temporary Construction Water Meter with BFPD, installed and removed by FGUA

If CONTRACTOR requests more than one connection or disconnection, ADDITIONAL CHARGES WILL APPLY.

We appreciate the opportunity to be of service to MacDill AFB and its construction contractors and look forward to assisting in your successful completion of your project.

Construction & Inspection Fees for Project NVZR XX-XXX: **\$0.00**  
\*Temporary Construction Water Meter: **\$0.00 (includes \$500 refundable deposit)**

**FGUA OPERATIONS OFFICE**

Government Services Group, Inc.  
280 Wekiva Springs Rd., Ste 2000  
Longwood FL 32779  
877/552-3482 Toll Free  
407/629-6900 Tel  
407/629-6963 Fax



# FGUA Form 11, Temporary Water Meter Application

**FGUA Utility Operations Center:**  
 9109 Bayshore Boulevard, Building 84  
 Phone 813-828-3984 - Fax 813-828-3212

**Mailing Address:**  
 P.O. Box 6704  
 Tampa, FL 33608

Full Name of Applicant: \_\_\_\_\_

Contractor/Business Name: \_\_\_\_\_ Local Business Address: \_\_\_\_\_

Business Phone #: \_\_\_\_\_

Business Fax #: \_\_\_\_\_ Email: \_\_\_\_\_

Name of Project Representative that will be Coordinating Work: \_\_\_\_\_

Mobile Phone #: \_\_\_\_\_ Email: \_\_\_\_\_

MacDill AFB Project Name: \_\_\_\_\_

MacDill AFB Project Number: \_\_\_\_\_ Date of Commencement: \_\_\_\_\_

MacDill Project Manager Name: \_\_\_\_\_ Office Number #: \_\_\_\_\_

Email: \_\_\_\_\_

Intended Purpose of the Meter: \_\_\_\_\_

Estimated Time of Use: \_\_\_\_\_ Date Meter is Required: \_\_\_\_\_ For Office USE ONLY

Location of Hydrant \_\_\_\_\_ HYDRANT NUMBER: \_\_\_\_\_

**This agreement serves the need for Temporary Water Service for construction activities from a designated source. Applicants must submit the completed application, a copy of the Water & Sewer Construction Fees letter provided by the FGUA, and pay all fees at the FGUA Utility Operations Center listed at the top of this form. All Payments shall be made to the Florida Governmental Utility Authority (FGUA) by CHECK (cash not accepted).**

**Approved applications are subject to the following conditions:**

- Only FGUA authorized personnel are permitted to install, move or remove portable meters from Fire Hydrants. It is against the Law for anyone other than authorized personnel to tamper with or obtain unmetered water from a MacDill AFB Fire Hydrant.
- No Private Meters may be installed on Base Hydrants, trucks or equipment. Violations will be reported to 6CES and Security Forces.
- FGUA is not responsible for accident or injury caused by unauthorized placement of a portable meter and/or appurtenance.
- The Applicant is liable for any damages to FGUA property and equipment during the contract.
- Safety and Security of the meters assigned to the customer are the responsibility of the Customer.
- All requests for installation, relocation and removal of potable water meters must be made in writing at least 3 days in advance and hand delivered or mailed to the FGUA Utility Operations Center listed at the top of this form. The FGUA Utility Operations Center is open during normal business hours are 8:00 to 4:00 Monday through Friday. (preceding text matches Form 427). Applications received will be scheduled within 3 business days of the date received. When Removal is required the customer must file a written request, in person, and pay outstanding fees (if any). A Confirmation Number will be issued to the Customer at this time, please retain this confirmation number. Upon account reconciliation a Refund of Deposit will be mailed to the address provided above.

I \_\_\_\_\_ (Applicant/ Customer) have reviewed and accept the provisions within this agreement.

\_\_\_\_\_  
**Signature** **Date**

*This Section is Reserved for Office Use Only*

USW Job Number: \_\_\_\_\_

Meter Number Assigned: \_\_\_\_\_

Date Installed: \_\_\_\_\_

Meter Reading Out: \_\_\_\_\_

Removal Request RCVD: \_\_\_\_\_

Date Removed: \_\_\_\_\_

Meter Reading In: \_\_\_\_\_

Confirmation Number: \_\_\_\_\_

Date of Most Recent of Backflow Certification: \_\_\_\_\_

Technician: \_\_\_\_\_

Technician: \_\_\_\_\_

Deposit Returned: \_\_\_\_\_

## MacDill Air Force Base - FGUA Form 427



- Termination of Utility Service
- Utility Outage Request**
- Inspection of Work
- Other \_\_\_\_\_

**FGUA Utility Operations Center:**  
 9109 Bayshore Boulevard, Building 84  
 Phone 813-828-3984 - Fax **813-304-2694**  
**Mailing Address:**  
 P.O. Box 6704  
 Tampa, FL 33608

Full Name of Applicant: \_\_\_\_\_ Applicant Phone #: \_\_\_\_\_

Contractor / Business Name: \_\_\_\_\_ Local Business Address: \_\_\_\_\_

Business Phone #: \_\_\_\_\_

Business Fax #: \_\_\_\_\_ Email: \_\_\_\_\_

**Name of Representative that will be on-site coordinating work:** \_\_\_\_\_

Mobile Phone #: \_\_\_\_\_ Email: \_\_\_\_\_

Justification for Work (add details): \_\_\_\_\_ MacDill AFB Project #: \_\_\_\_\_

\_\_\_\_\_ **MacDill AFB Project Name:** \_\_\_\_\_

**Requested Date of Service:** \_\_\_\_\_ Facilities/ Buildings Impacted: \_\_\_\_\_

**Complete this Block for Water/Sewer Outages that Impact Customers**

Gov't Project Manager Name: \_\_\_\_\_ **Government Approved Date and Duration:** \_\_\_\_\_

Phone and Email: \_\_\_\_\_

\_\_\_\_\_  
*Signature of Authorization (Gov't PM) Date*

**This Request for Work must be submitted by all parties anticipating the need to perform work on or adjacent to existing Water or Sewer utilities, where assistance from the FGUA is required. This application ensures that proper construction techniques, utility terminations and physical line disconnections from FGUA-owned Water and Sanitary Sewer systems are followed. Without exception, FGUA personnel must be present at all times during work of this type. For each work request, applicants must submit a completed form 427 along with the proper fees made by check (cash not accepted) and payable to the FGUA.**

**The following Terms and Conditions apply to all work performed on or around water and sewer utilities**

- Only FGUA personnel are authorized to operate system valves and sanitary sewer lift station equipment.
- *Temporary Utility Outage - Upon proper notification and at a mutually agreed day and time, FGUA operations personnel will arrive onsite to perform a temporary shutdown of the service. Once the outage is complete, FGUA personnel will return to the site to restore the service. The maximum amount of time allowed for a service outage is determined by MacDill AFB authorities. Unless indicated during application, FGUA personnel are not required to be present during the time after Suspension and before Restoration of Service*
- *Applicant is responsible for chlorination and bacteriological testing of all new water mains and service connections in accordance with AWWA C651. It is anticipated that all bacteriological tests, pressure tests, and record drawings will accompany the Certificate of Construction Completion Forms for signature by the FGUA. If, during the initial testing of the water supply and as part of the restoration of service, it is found that proper disinfection and testing has not been performed, the contractor will be required to perform proper disinfection and flushing of the system until passing tests are received. Contractor is liable for the cost of additional testing and services.*
- *Utility Terminations - All Utility Terminations are performed by the FGUA. Prior to the FGUA personnel arrival, the Contractor is required to excavate and expose all water or sanitary sewer piping at the point of termination. Upon completion, contractor will complete the line abandonment or properly restrain any remaining piping, as required by either Government Inspectors and in accordance with the Hillsborough County Design Standards. All excavations must meet current OSHA regulations for pit excavation.*
- *Applicants are liable for any damages caused by the Applicant during work on or around FGUA-owned utilities located and accepted under the terms of Air Force Form 103 and FGUA Form 301.*
- **All requests must be received at least 2-weeks prior to the earliest day needed at the FGUA Utility Operations Center listed at the top of this form.** The FGUA Utility Operations Center normal business hours are 8:00 to 4:00 Monday through Friday. An FGUA Representative will contact you upon application approval.

I \_\_\_\_\_ (Applicant/ Customer) have reviewed and understand the provisions within this agreement.

\_\_\_\_\_  
*Signature of Applicant Date*

**This Section is Reserved for FGUA Office Use Only**

USW Job Number: _____	Payment Received: _____
Work Scheduled for _____ Day/Time	Restoration of Service: _____ Date/Time
FGUA Technician Assigned: _____	BACTI TESTING: _____ Pass / Fail
FGUA Personnel On-Site: _____	
Utility Damage Observed: _____	Boil Water Notice Issued: _____ Date/ Time
Est. Additional Costs: _____	Boil Notice Rescinded: _____ Date/ Time





# Temporary Water Meter Application

9109 Bayshore Boulevard, Building 84

Tampa Florida 33621

Phone (813) 828 -3984 Fax (813) 828 -3212

Date: \_\_\_\_\_

Full Name of Applicant: \_\_\_\_\_

Applicant Phone #: \_\_\_\_\_

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

Company Phone #: \_\_\_\_\_

Company Fax #: \_\_\_\_\_

Email Address : \_\_\_\_\_

MacDill Point of Contact: \_\_\_\_\_

Division/Rank: \_\_\_\_\_

POC Phone #: \_\_\_\_\_

POC Email Address: \_\_\_\_\_

Project Name: \_\_\_\_\_

Project Number: \_\_\_\_\_

Date of Commencement: \_\_\_\_\_

MacDill Field Inspector: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Company Project Representative: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Intended Purpose of the Meter: \_\_\_\_\_

Estimated Time of Use: \_\_\_\_\_

Date Meter is Required: \_\_\_\_\_

For Office USE ONLY

Location of Hydrant \_\_\_\_\_

HYDRANT NUMBER: \_\_\_\_\_

**The purpose of this agreement is to serve the temporary need for Water Service, such as construction, from a designated source. Applicants must submit completed application, water & sewer construction fees letter provided by the FGUA and pay all fees outlined in FGUA letter at Building 84. All Payments shall be made by CHECK (cash not accepted) and made payable to Florida Governmental Utility Authority (FGUA)**

**Approved applications are subject to the following conditions:**

- Only FGUA authorized personnel are permitted to install, move or remove portable meters from Fire Hydrants. It is against the Law for anyone other than authorized personnel to tamper with or obtain unmetered water from a MacDill AFB Fire Hydrant.
- No Private Meters may be installed on Base Hydrants, trucks or equipment. Violations will be reported to 6CES and Security Forces.
- FGUA is not responsible for accident or injury caused by unauthorized placement of a portable meter and/or appurtenance.
- The Applicant is liable for any damages to FGUA property and equipment during the contract.
- Safety and Security of the Meters assigned to the customer are the responsibility of the Customer.
- All requests for installation, relocation and removal of potable water meters must be made in writing at least 3 days in advance and delivered to Building 84 during normal business hours of 8:00am - 4:00pm, Monday through Friday. Applications received will be scheduled within 3 business days of the date received. When Removal is required the customer must file a written request, in person, and pay outstanding fees (if any). A Confirmation Number will be issued to the Customer at this time, please retain this confirmation number. Upon account reconciliation a Refund of Deposit will be mailed to the address provided above.

I \_\_\_\_\_ (Applicant/ Customer) have reviewed and accept the provisions within this agreement.

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Date**

*This Section is Reserved for Office Use Only*

Meter Number Assigned: \_\_\_\_\_

Date of Most Recent of Backflow Certification: \_\_\_\_\_

Date Installed: \_\_\_\_\_

Technician: \_\_\_\_\_

Removal Request RCVD: **Y / N**

Date: \_\_\_\_\_

Confirmation Number: \_\_\_\_\_



# Contractor Utility Locate Acceptance

9109 Bayshore Boulevard, Building 84  
 Tampa Florida 33621  
 Phone (813) 828 -3984 Fax (813) 828 -3212

Date: \_\_\_\_\_

Full Name of Applicant: \_\_\_\_\_

Job Site Phone #: \_\_\_\_\_

Contractor Name: \_\_\_\_\_

Contractor License #: \_\_\_\_\_

Job Trailer Located On-Site ( Y / N ) \_\_\_\_\_

Job Site Location (Bldg./Intersection): \_\_\_\_\_

Contractor Supervisor: \_\_\_\_\_

\_\_\_\_\_

Supervisor Phone #: \_\_\_\_\_

\_\_\_\_\_

MacDill Construction Manager: \_\_\_\_\_

Affiliation (6 CES, USACE): \_\_\_\_\_

Construction Manager Phone #: \_\_\_\_\_

Email: \_\_\_\_\_

Project Name: \_\_\_\_\_

Project Number: \_\_\_\_\_

AF Form 103 (dated): \_\_\_\_\_

Description of Work: \_\_\_\_\_

Planned Work Start Date: \_\_\_\_\_

\_\_\_\_\_

Locate Ticket #: \_\_\_\_\_

\_\_\_\_\_

Date and Time of Utility Locate: \_\_\_\_\_

\_\_\_\_\_

**General Terms and Conditions of Acceptance:**

- Utility locates are valid for a period of 90 days from the date of acceptance, after which the Requestor is required to contact the FGUA for a new Utility Locate. A current copy of the Air Force Form 103 and project drawings shall be available at the Job Site.
- Location and Acceptance pertains to **Water & Sewer Utilities Only** and does not consider any other utilities.
- The Contractor is responsible for obtaining all other utility locates from other base utility owners/operators.
- Contractor is responsible for maintaining and protecting all utility locate marks during the 90 day period.
- Contractors must report Any/All damage to Water or Sewer Utilities **immediately** to the FGUA.
- Contractor will be responsible for all costs associated with the repair to utilities damaged as a result of Contractors Work.

	Marked (X)	Service Technician	Conflicts / Comments	(Initials) Acceptance
Pressurized Water Main				
Water Service Lines				
Reclaimed Water Main				
Gravity Sewer				
Sewage Forcemain				

I \_\_\_\_\_, have reviewed and accept the provisions stated within this agreement and understand them in their entirety wherein by signing this agreement I affirm that, to my knowledge, all Water and Sewer utilities have been properly identified.

\_\_\_\_\_  
 Signature Date

**This Section is Reserved for FGUA Office Use Only**

Office Tracking Log Completed: \_\_\_\_\_ Date: \_\_\_\_\_

Relocate #1: \_\_\_\_\_ Date: \_\_\_\_\_

Relocate #2: \_\_\_\_\_ Date: \_\_\_\_\_

Relocate #3: \_\_\_\_\_ Date: \_\_\_\_\_

Utility Damage: \_\_\_\_\_ Date: \_\_\_\_\_

Cost Recovery: \_\_\_\_\_ Date: \_\_\_\_\_



# Utility Service Termination Application

9110 Bayshore Boulevard, Building 84  
 MacDill AFB, Florida 33621  
 Phone (813) 828-3984 Fax (813) 828 -0000

Name of Applicant: \_\_\_\_\_ Date: \_\_\_\_\_  
 Company Name: \_\_\_\_\_ Company Address: \_\_\_\_\_  
 \_\_\_\_\_  
 Company Phone #: \_\_\_\_\_  
 Company Fax #: \_\_\_\_\_ Company Email: \_\_\_\_\_  
 MacDill Point of Contact: \_\_\_\_\_ POC Organization: \_\_\_\_\_  
 POC Phone #: \_\_\_\_\_ POC Email: \_\_\_\_\_

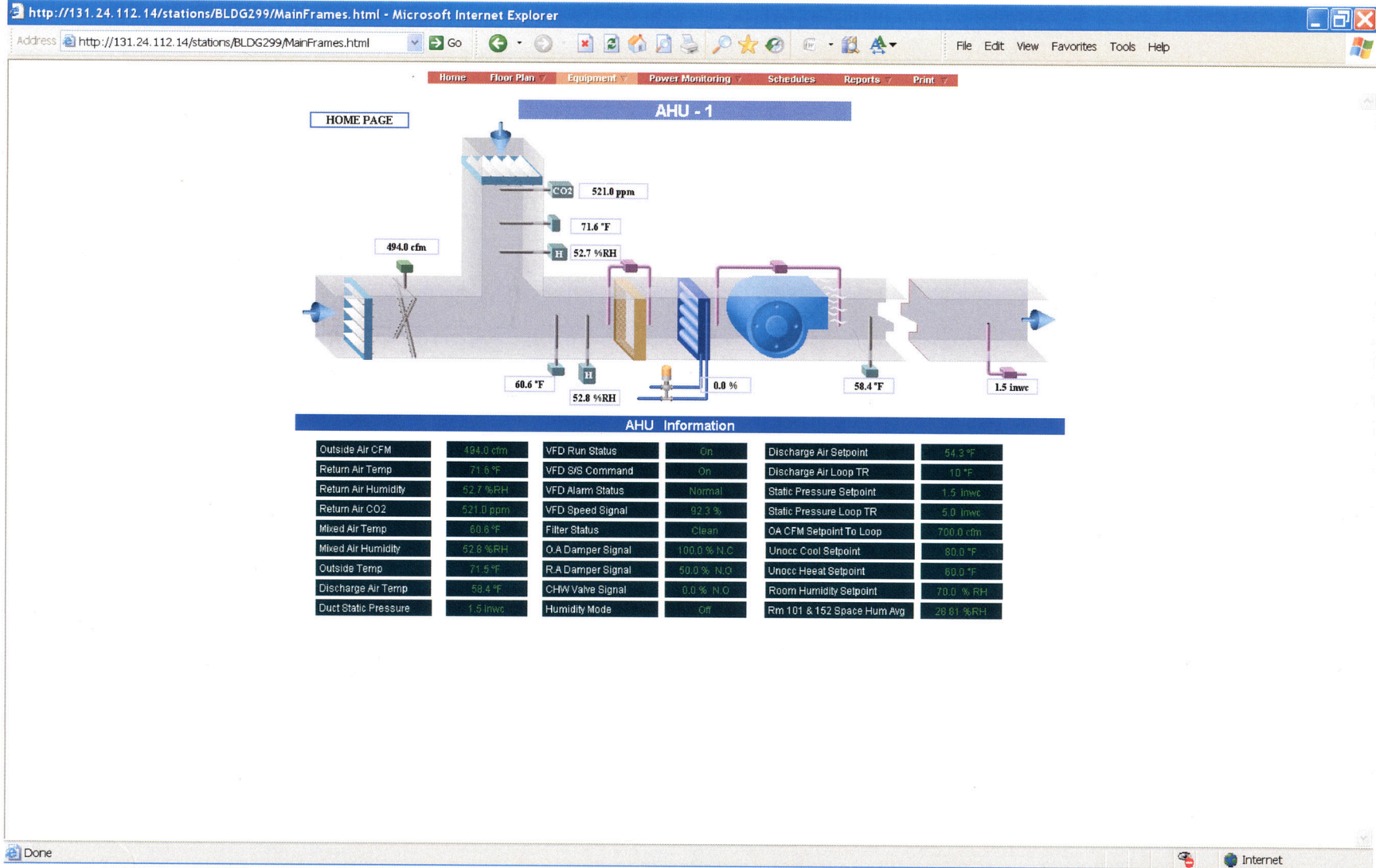
Project Name: \_\_\_\_\_  
 Project Number: \_\_\_\_\_  
 MacDill Construction Manager: \_\_\_\_\_ Phone Number: \_\_\_\_\_  
 Company Project Representative: \_\_\_\_\_ Phone Number: \_\_\_\_\_  
 Check One: Sanitary Sewer \_\_\_\_\_ Water Distribution \_\_\_\_\_  
 Termination Conducted By: Contractor \_\_\_\_\_ FGUA \_\_\_\_\_  
 Brief description of utility termination requested. Be sure to include facility number/site location and pipe size:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Estimated Project Start Date: \_\_\_\_\_ Estimated Date Disconnection Required \_\_\_\_\_

**Terms and Conditions:**  
 The purpose of this application is to ensure proper utility terminations and physical line disconnection from FGUA-owned water and sanitary sewer utilities. Applicants must submit a completed application along with the proper fees. **Applications that are approved are subject to the following conditions:**  
 Contractor is required to excavate and expose all water or sanitary sewer piping at the point of termination; FGUA will perform and complete the proper cut and capping procedure. Contractor may request, by identifying so on this application, to perform the cut and cap procedure in accordance with specifications provided by FGUA. If this is approved, Contractor must contact FGUA to schedule an inspection of the work before work commencement.  
 All fittings and tools used to cut and cap water piping must be properly disinfected in accordance with AWWA C651, Current Edition.  
 All work accomplished by contractor must be inspected by FGUA prior to backfilling. Contractor is required to make all corrections identified by the FGUA construction inspector.  
 Only FGUA personnel are authorized to operate water system valves and sanitary sewer lift station equipment.  
 The Applicant is liable for any damages to FGUA-owned utility lines, including all costs and repairs to marked utility lines damaged by contractor during their work.  
 All requests must be made in writing and delivered to the FGUA in Building 84 during normal business hours of 8:00 to 4:00 Monday through Friday. Approved applications will be scheduled within 5 business days of the date received.

I \_\_\_\_\_ (Requesting Person/Company) have reviewed the Utility Service Termination Application and agree to all of the Terms and Conditions.  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**This Section is Reserved for Office Use Only**

Office Tracking Log Completed: \_\_\_\_\_ Date: \_\_\_\_\_  
 Work ID #: \_\_\_\_\_  
 Construction Inspector: \_\_\_\_\_ Signature: \_\_\_\_\_  
 Date Completed: \_\_\_\_\_ Time On-Site: \_\_\_\_\_  
 Utility Damage: \_\_\_\_\_ Date: \_\_\_\_\_  
 Cost Recovery: \_\_\_\_\_ Date: \_\_\_\_\_



Typical Air Handler



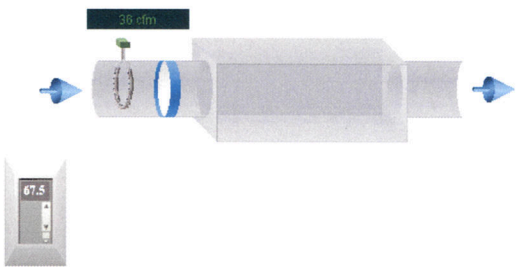
http://131.24.112.14/stations/BLDG299/MainFrames.html - Microsoft Internet Explorer

Address http://131.24.112.14/stations/BLDG299/MainFrames.html

Home Floor Plan Equipment Power Monitoring Schedules Reports Print

Home

### VAV-1



36 cfm

67.5

#### VAV Information & Overrides

Space Temp	67.5 °F	Primary Air Flow	36 cfm	Max CFM Setpoint
Space Setpoint	75.0 °F	Primary Air Flow Setpt	0 cfm	Min CFM Setpoint
Setpoint Mode	BMS Setpoint	Cool Out	14 %	
BMS Setpoint	75.0 °F	Override Status	Normal	
NIGHT SETBACK COOL	65.0 °F			
NIGHT SETBACK HEAT	64.0 °F			

Done Internet

VAV Cooling only

http://131.24.6.89/stations/BLDG203\_P1/MainFrames.html - Microsoft Internet Explorer

Address http://131.24.6.89/stations/BLDG203\_P1/MainFrames.html

Home Floor Plan Alarm Panel Equipment Schedules Reports Print

Floor Page **VAV 1-1**

102 cfm 57.4 °F

72.9

**VAV Information**

Space Air Temp	72.9 °F	Discharge Air Temp	57.4 °F	Max Air Flow Stpt	
Space Temp Setpoint	78.0 °F	Primary Air Flow	102 cfm	Min Air Flow Stpt	
Setpoint Mode	Local Setpoint	Air Flow Setpoint	100 cfm	Min Heat Flow Stpt	
BMS Setpoint	60.0 °F	Cooling %	25 %	Heat Offset	2 °F
Night Setback Cool	60.0 °F	Heat Stage 1	OFF	Heat Lockout	68 °F
Night Setback Heat	60.0 °F	Heat Stage 2	OFF	Override Status	Normal
		Heat Stage 3	OFF		

Done Internet

VAV with Electric Heat

http://131.24.112.14/stations/BLDG299/MainFrames.html - Microsoft Internet Explorer

Address http://131.24.112.14/stations/BLDG299/MainFrames.html

Home Floor Plan Equipment Power Monitoring Schedules Reports Print

Home

### FTU-1

#### VAV Information & Overrides

Space Temp	69.8 °F	Primary Air Flow	201 cfm	Discharge Air Temp	67.6 °F
Space Cooling Setpoint	76.0 °F	Primary Air Flow Setpt	199 cfm	Fan CMD Status	On
Space Heating Setpoint	73.0 °F	Cool Out	51 %	Max CFM Setpoint	
Setpoint Mode	Local Setpoint	Cool / Heat Db	3	Min CFM Setpoint	
BMS Setpoint	89.0 °F	HWV % Open	100.0 %	Min Heat CFM Setpoint	
NIGHT SETBACK COOL	86.0 °F	Override Status	Normal		
NIGHT SETBACK HEAT	64.0 °F				

Done Internet

VAV with Hot Water Reheat and Fan

http://131.24.6.89/stations/BLDG203\_P1/MainFrames.html - Microsoft Internet Explorer

Address http://131.24.6.89/stations/BLDG203\_P1/MainFrames.html

Home Floor Plan Alarm Panel Equipment Schedules Reports Print

### Chilled Water Plant

Home Page

CHILLER ACC-1  
Chiller Yard (Outside)  
CHILLER ACC-2

OPEN VLV-1  
OPEN VLV-2

CHWR 52.1 °F  
CHWS 46.5 °F

ACC-1 Alarm Normal  
ACC-2 Alarm Normal

#### Chilled Water Plant Information

CHWS Temp	46.5 °F	CHWP-1 S/S Command	ON	Valve 1 Command	OPEN
CHWR Temp	52.1 °F	CHWP-1 Status	ON	Valve 2 Command	OPEN
Chiller-1 S/S Command	ON	CHWP-1 Alarm	NORMAL	Current Lead Chiller	CHILLER 1 LEAD
Chiller-2 S/S Command	ON	CHWP-2 S/S Command	ON	Lead Chiller Override	
Plant Enable	ON	CHWP-2 Status	ON	Lag Chiller On CHWR Stpt	53.0 °F
Outside Air Temp	62.2 °F	CHWP-2 Alarm	NORMAL	Lag Chiller Off CHWR Stpt	46.0 °F

#### ACC - 1 & ACC - 2 Information

ACC-1 Actual Capacity	0.00 %	ACC-2 Actual Capacity	26.00 %
ACC-1 CHWS Temp	52.90 °F	ACC-2 CHWS Temp	44.89 °F
ACC-1 CHWR Temp	52.90 °F	ACC-2 CHWR Temp	53.29 °F
ACC-1 CHWS Setpoint	41.99 °F	ACC-2 CHWS Setpoint	41.97 °F
ACC-1 Compressor 1A Status	OFF	ACC-2 Compressor 1A Status	ON
ACC-1 Compressor 1B Status	OFF	ACC-2 Compressor 1B Status	OFF
ACC-1 Compressor 2A Status	OFF	ACC-2 Compressor 2A Status	OFF
ACC-1 Compressor 2B Status	OFF	ACC-2 Compressor 2B Status	OFF

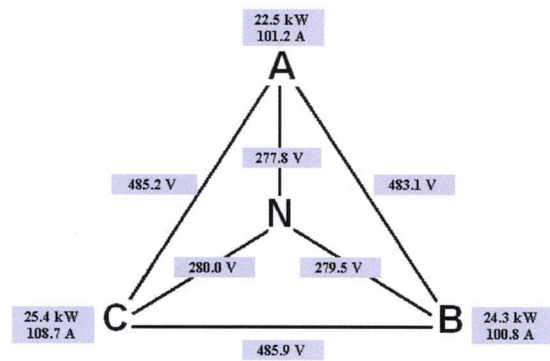
Done Internet

Chiller Plant Layout



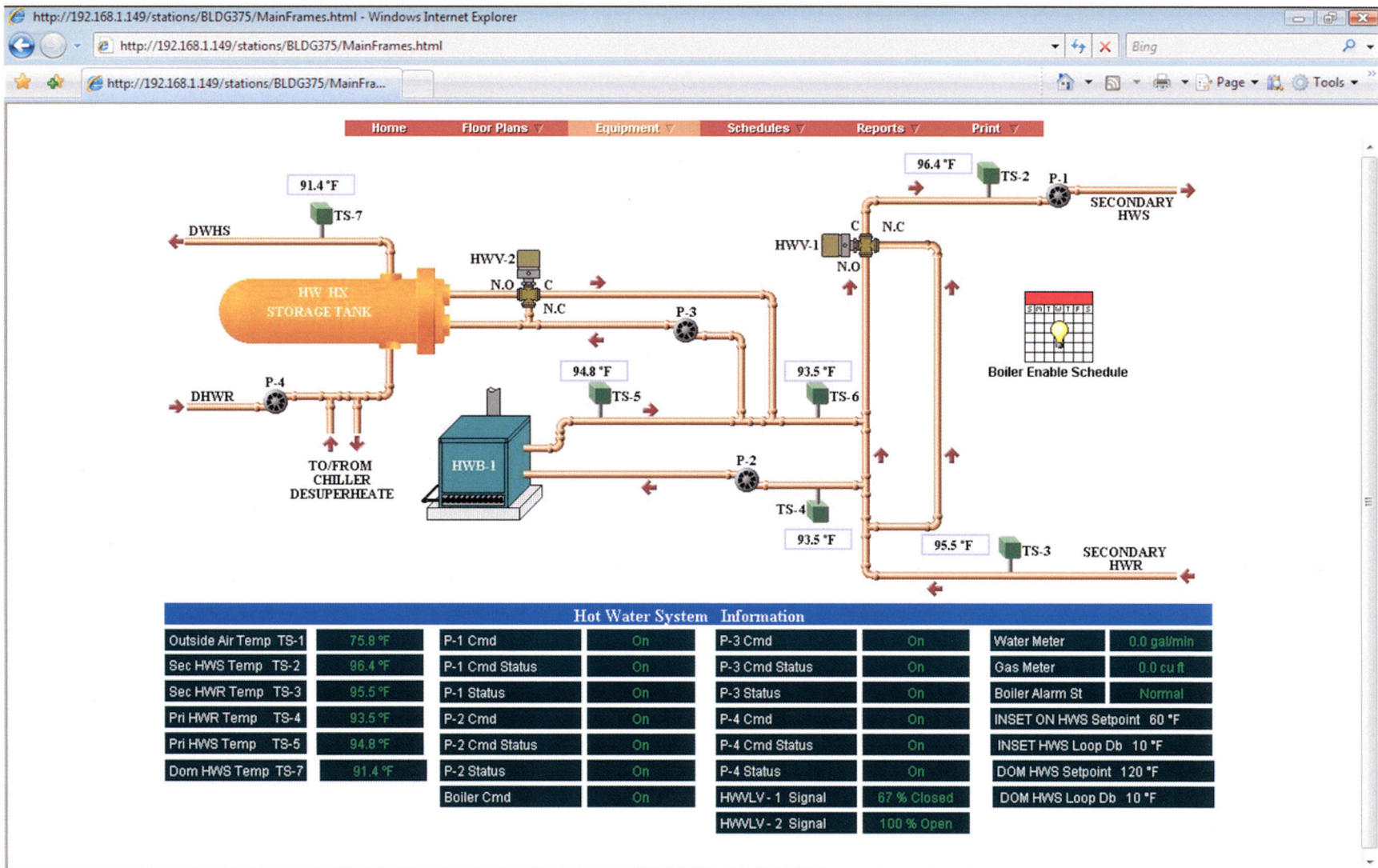
HOME PAGE

### Meter 1 Main Feeder



1.8 kW/hr	Consumption
72.2 kW	Real Power
86.5 kW	Apparent Power
47.6 kW	Reactive Power
0.8 power_factor	Power Factor
70.8 kW	Average Real Power
0.0 kW	Minimum Real Power
104.6 kW	Maximum Real Power
103.3 A	AMPS Average
0.8 power_factor	PHASE A
0.9 power_factor	PHASE B
0.8 power_factor	PHASE C
22.5 kW Real Power	PHASE A
24.3 kW Real Power	PHASE B
25.4 kW Real Power	PHASE C
476.7 V	Voltage Line to Line
279.1 V	Voltage Line to Neutral

Electric Meter Layout



Boiler Plant Layout



**6th Communications Squadron Supplement**  
**to**  
**Engineering Technical Letter (ETL) 02-12: Communications and Information System**  
**Criteria for Air Force Facilities, dated 27 June 2002**

**Communication Systems**

**24 July 2008**

**OPR: 6 CS/SCXX**

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## **SECTION 1. PURPOSE:**

**1.01.** This supplement clarifies communications requirements for MacDill AFB facilities not covered in ETL 02-12. This supplement shall be used in conjunction with ETL 02-12. The 6th Communications Squadron Communications System Officer (CSO) or designee is the only one who can authorize deviation from this supplement.

## **SECTION 2. SCOPE.**

**2.01.** This specification shall be used to plan, design, review and evaluate telecommunications cabling and distribution systems for service connections, pre-wiring of new and renovated facilities to support communications – computer systems (C-CS). This specification addresses C-CS as they relate to interior wiring, exterior duct bank and communications cable to the appropriate service connection point(s).

## **SECTION 3. REFERENCED PUBLICATIONS.**

- ANSI/ICEA S-80-576 Standard (Std) for Telecomm Wire and Cable for Wiring of Premises
- TIA/EIA-569-A Commercial Building Std for Telecommunications Pathways and Spaces
- TIA/ EIA 590 Std for Physical Location & Protection of Below-Ground F.O. Plant
- ANSI/TIA/EIA TSB-75 Additional Horizontal Cabling Practices for Open Offices
- Unified Facilities Criteria 4-021-01 Design and O & M: Mass Notification Systems

## **SECTION 4. BULLETINS.**

- REA 1753F-601 (PE-90) Fiber Cable, Outside
- REA 1753F-205 (PE-39) Copper Cable, Outside
- REA 1753F-208 (PE-89) Copper Cable, Outside
- RUS 1751F-640 Design of Buried Plant – Physical Considerations
- RUS 1751F-642 Construction Route Planning of Buried Plant
- RUS 1751F-644 Underground Plant Construction

## **SECTION 5. GENERAL REQUIREMENTS-INTENT**

**5.1.** Whenever new construction or renovation takes place, the design, installation, and all related costs necessary to complete interior wiring and extend the conduit, ductwork and manhole system to the new or renovated location shall be included in the project cost.

**5.1.1.** Renovation shall include removal of old/unused telecommunications cabling from interior of facilities. 6th Communication Squadron (CS) will identify old/unused cabling.

**5.1.2.** Prior to demolition of any facility, 6th CS personnel shall remove the outside plant communications cables (copper and fiber) serving the facility, if applicable. These cables shall be removed back to the splice point and capped. The 6th Civil Engineering Squadron (project manager) shall notify the 6th Communications Squadron (Plans Office) at least 45 days prior to facilitate scheduling of work.

**5.1.3.** Prior to demolition or renovation of any facility, all network devices, LMR equipment and antennas serving the facility, which shall be impacted by the construction, shall be removed/relocated.

The 6th Civil Engineering Squadron (project manager) shall notify the 6th Communications Squadron (Plans Office) at least 30 days prior to facilitate scheduling of work. Submit the removal/relocation request using automated Form 3215. The 6th Communications Squadron shall remove the antennas.

**5.1.4.** Communications design criteria is grouped into three areas: inside wire & cable; communications equipment room & distribution frame; and exterior work. The design requirements may vary depending on the size and type of facility being built or renovated.

**5.1.5.** The facility design shall provide for concealment of wiring/cablings systems, adequate space for installation, maintenance of C-CS equipment and wiring, and proper separation for specialized systems, if required.

**5.1.6.** The building communications infrastructure shall provide 50% spare capacity for future expansion of the user's voice, network, security and video requirements.

**5.1.7.** The most practical cable/wire distribution system shall be selected, consistent with facility size/function and current/projected C-CS requirements.

**5.1.8.** To minimize the long-term cost of the infrastructure, local standards are established as follows and shall only be changed when approved in writing by the base CSO or their designee. These standards are intended to reduce cost associated with post construction C-CS requirements, to promote common skills among maintenance personnel and to minimize the necessity for excessive on-hand spare parts and equipment.

## **SECTION 6. CABLE MANAGEMENT PLAN.**

**6.1.** Cable management is the planning, designing and accounting of cables routed throughout the building. Placement of any cable system in the building shall follow a well organized and well designed cable management plan. By keeping a record of cable pair counts and assignments and the routing of riser, tie, and distribution cables, future rearrangements or alterations to the wiring system shall be easier. The overall cable management shall be implemented in accordance with TIA/EIA-606 (Administration Standard for the Telecommunications Infrastructure of Commercial Buildings).

**6.2.** The 6th Communications Squadron project manager shall review and approve the proposed cable management plan prior to construction

## **SECTION 7. DESIGNER-INSTALLER QUALIFICATIONS.**

**7.1.** All furnished and installed equipment and all work accomplished under this section shall be performed by a certified telecommunications contractor, with the exception of furnishing and installing conduit, electrical boxes and pull wires. The contractor shall have the following qualifications in telecommunication systems installations:

**7.2.** The contractor shall have a minimum of 3 years experience in the application, installation, splicing and testing of the specified telecommunications systems and equipment.

**7.3.** All craftsmen installing fiber optic and level Cat-6 cables and their associated hardware shall have certification that they are qualified to install and test the provided equipment and materials. General electrical trade staff (electricians) shall not be used for the installation of the premises distribution system cables and associated hardware. Electricians shall be used for installation of the raceway systems.



**7.4.** All installers assigned to the installation of this system or any of its components shall have a minimum of 3 years experience in the installation of telecommunications system components.

## **SECTION 8. INSIDE WIRE AND CABLING**

### **8.1 INSIDE FIBER OPTIC CABLE**

**8.1.1.** Fiber cable type shall depend on the user/base requirements. 6th Communications Squadron (Plans Office) shall make final decision (ex: 8.3/125 microns for single mode and 62.5/125 microns for multi-mode).

**8.1.2.** All fiber cables shall be run in inner duct, with an individual inner duct for every fiber cable. Secure the inner duct along the route with cable ties or U-shaped mounting brackets. Protective bushing(s) shall be used where the fiber enters and exits the interduct. All plastic cable ties shall be trimmed with a flush-cut tool to ensure that no sharp edges result.

**8.1.3.** Fiber cable installed inside conduit/ducts shall have no less than ¼ inch air gap existing around the outside perimeter of the cable.

**8.1.4.** Fiber optic cable shall be installed from the facility demarcation back to the nearest service connection point(s) (Information Transfer Node - ITN). The cable shall be connected/terminated to existing infrastructure. This may require the installation of a new/addition to the manhole/ductbank system. The contractor shall complete the connection/termination.

**8.1.5.** The fiber optic patch panel shall provide a location for maintenance and cross-connecting of fiber optic cables. Patch panel shall have connectors that interface the inside plant cable with the outside plant cable. Panels shall have engraved laminated plastic nameplates above each connector. The nameplates shall indicate panel designation.

### **8.2. INSIDE COPPER CABLE**

**8.2.1.** Copper cable shall be CAT-6 cable. The CAT-6 cable used for voice shall be gray and the CAT-6 cable used for data shall be blue

**8.2.2.** Maintain manufacturer's recommended minimum bend radius of the cables at all times. Do not stretch, stress, tightly coil, bend or crimp the workstation cables when leaving them out of the way of other trades during the staging of the work. All severely stressed cables shall be replaced by the contractor at the contractor's expense.

**8.2.3.** This system shall support voice, local area network (LAN) and cable TV (CATV) connectivity for the facility. Work includes all wiring, cables, jacks, conduits and mounting devices necessary for a complete and usable system. The cabling shall extend from the distribution panel at the service entrance (comm equipment room) to all parts of the building.

**8.2.4.** Whenever exposed in environmental air spaces, only plenum-rated cable shall be used. Plenum rated innerduct can not be a substitute for the plenum-rated cable requirement.

**8.2.5.** Provide a dedicated cable for each outlet.

**8.2.6.** No communications system shall be removed without notifying the 6th Communications Squadron (Plans Office). This notification shall minimize possible communications failure for base users.

**8.2.7.** The cable termination configuration shall be 568A for network (LAN) and 568B for telephones.

**8.2.8.** Each cable shall be numbered corresponding to the outlet.

**8.2.9.** Each voice and data cable shall terminate on 110 punch-downs on back of patch panels (or on 110-type patch panels) at the distribution frame. All 110 type patch panels shall be mounted in a standard communications rack (19 inches wide).

**8.2.10.** All cables shall be the proper type for installation in the particular environment they are to be used. (i.e., have the proper fire rating in accordance with the current NEC/NFPA 70, usually plenum rated cable).

**8.2.11.** Cables shall not be supported by suspended ceilings or any of its components.

**8.2.12.** An additional one foot of cable shall be left on or near the network patch panel for future cable re-termination. An additional 6 inches to 8 inches of each cable shall be left at or near each outlet box/jack for future cable re-termination. No micro bends shall be permitted less than 2 inch bend radius for the entire cable run. Cable runs shall be continuous full length. No splices are allowed between contacts on patch panel and workstation jacks.

**8.2.13.** All telephone cables shall be bundled separately from LAN cables.

**8.2.14.** All indoor cable and wiring shall be supported every 36 inches (910 mm) or less utilizing industry recognized and approved hardware such as cable straps, hangers, steel messenger cables, D-rings, racks, etc. Cable and wiring support shall be self supporting and not rely on or be supported by other pipes, cables, or conduits. The cable shall be neatly bundled and tied with tie wraps into groups of 50 or less.

**8.2.15.** Cables entering and leaving a conduit or duct shall be supported in a manner in which the cable is not stressed at the edge or rim of the conduit. Indoor conduits shall be firmly anchored and supported, and installed IAW the NEC. Protective bushing(s) shall be used where the cable(s) enters and exits the interduct.

**8.2.16.** Ends of conduits shall be deburred to prevent cable damage during installation.

### **8.3. HOUSE BACKBONE CABLE. (Used to connect communications equipment rooms (CERs) to satellite telephone closets (TCs))**

**8.3.1.** The house backbone cable shall consist of riser and horizontal cables. The riser cables provide connection between the telephone patch panels in the TCs and the telephone patch panels or main distribution frame in the CER. The horizontal cables connect individual subscriber telephones and LAN outlets to their respective 110-type patch panels in the TCs.

**8.3.2.** The riser and horizontal cables shall have an appropriate fire rating for the environment where they are to be installed.

**8.3.3.** The house backbone cable shall be designed to interconnect patch panels in each TCs to its service entrance in the CER with dedicated pair counts (i.e., no multiple counts). This configuration shall ensure all pairs appear at the building service entrance.

**8.3.4.** Where patch panels in various TCs require interconnectivity, those connections shall be made at the main distribution patch panel located in the CER. The patch panels, in various TCs, shall not be connected directly from TC (frame) to TC (frame).

**8.3.5.** All patch panels in different TCs shall be connected to the main distribution patch panel in the CER. The patch panels in one TC shall not be directly connected to patch panels in another TC.

**8.3.6.** Riser cables (copper) shall be provided in multiples of 25 pairs and shall be UL type 24 AWG CMR rated. The riser cable (copper) shall be sized with an additional 50% spare pairs over and above the number of pairs needed to terminate all station outlets.

**8.3.7.** Riser cables (fiber) shall be provided in multiples of 12 strands, single mode. The minimum quantity is 12 strands between rooms/closets.

**8.3.8.** All pairs/strands shall be terminated at each end of every cable. All cables shall be labeled at each end with its respective pair/strand counts.

**8.3.9.** Telecommunications cables running parallel to electrical cables shall be separated by a minimum of 12 inches. If minimum separation is not possible, telecommunications cables shall be separated from the electrical cables with ferrous metal barrier (i.e., metal conduit).

**8.3.10.** Telecommunications cables and electrical cables/conduits shall cross at 90 degree angles.

#### **8.4. TELECOMMUNICATIONS OUTLETS.**

**8.4.1.** Telecommunications outlets shall be quadplex (double gang box, with quadplex faceplate) unless otherwise specified by the customer and approved by the communications squadron.

**8.4.2.** Outlets shall be provided in the following configuration:

**8.4.2.1.** All four outlets shall be wired using the Cat-6 RJ-45 connectors, ran back to the assigned communications patch panel in the communications room. One of the jacks shall be wired for LAN and the other shall be wired for phone. The remaining faceplate slots shall be covered with a faceplate cap.

**8.4.2.2.** For administrative office areas, there shall be one outlet every eight linear feet of useable perimeter wall space or one outlet for every 48 square feet of office space, whichever provides a higher outlet density. For areas other than offices, the outlet density shall be determined by the 6th Communications Squadron (Plans Office) and the user/occupant of the facility.

**8.4.2.3.** Each jack shall be an 8-position, 8-wire modular jack. Both flush and surface mount outlets shall be provided as appropriate. Flush mounted types shall be suitable for mounting in standard electrical outlet boxes (preferred method).

**8.4.2.4.** Surface mounted types shall be suitable for mounting on walls and baseboards. Where modular furniture is to be used, outlets suitable for mounting in modular raceways shall be provided.

**8.4.2.5.** Each outlet shall be labeled to show its relationship with the cables terminated on it, and each jack shall be labeled to indicate its use, i.e., voice and network. If an outdoor outlet is necessary it shall be corrosion resistant, weatherproof and designed to mate with a standard 4-wire modular plug.

**8.4.2.6.** Telecommunications outlets shall be mounted at 18 inches above the floor, to the centerline of the cover plate, unless noted otherwise (except wall mounted phones, para 8.5.1).

**8.4.2.7.** If the facility is to be furnished with modular office furniture, the outlet locations shall be matched to the furniture design. The multi-user Telecommunications Outlet Assembly can be used for a zone distribution system to support the area with modular furniture.  
(ref: ANSI/TIA/EIA TSB 75).

**8.4.2.8.** Some rooms, such as conference rooms, may require floor mounted communications outlets. These outlets shall be installed flush with the floor. The location shall be determined by the building occupants (users) and coordinated with 6th Communications Squadron personnel. The quantity and type of outlets shall be determined by 6th Communications Squadron personnel based on user requirements.

## **8.5. MISCELLANEOUS TYPE PHONES and PUBLIC ADDRESS SYSTEMS (when applicable).**

**8.5.1. Wall-mounted Telephone Instrument.** The wall-mounted instrument shall mount to a standard modular wall plate jack (type 630), without the need for a telephone line cord. Instruments not designed to mount on a wall plate jack shall be connected to wall jack with a line cord. The handset shall be securely held on the handset rest to prevent an accidental off-hook condition. The phone shall be mounted 60 inches above the finished floor.

**8.5.2. Outdoor Telephone.** This instrument shall be a sealed outdoor weatherproof telephone designed to terminate a single switched or nonswitched line. This phone shall be equipped with a handset, six foot double jacketed retractile coiled handset cord (or armored handset cord), and base unit. The faceplate, handset, and other exterior hardware shall be corrosion resistant. These telephones shall be capable of being housed inside the outdoor enclosure.

**8.5.3. Outdoor Telephone Enclosure.** The weatherproof enclosure shall be designed for outdoor applications capable of wall or pole mounting. The enclosure shall provide a water-tight, dust-tight, and corrosion resistant housing for a telephone. A sealed hinged door shall be provided, equipped with a return spring to ensure automatic door closure. The enclosure shall be externally labeled and provided with a mechanical door lock.

**8.5.4. Hazardous Area/Explosion Proof Telephone.** This instrument shall be an explosion-proof phone enclosed in a sealed metal housing containing all electrical components except for the handset and cord. The housing shall provide protection against an internal spark or flame from reaching the surrounding atmosphere. This telephone shall be designed for both indoor and outdoor hazardous areas, and shall operate in hazardous locations Class I (Groups A, B, C, D), Class II (Groups E, G), and Class III for both Divisions I and II as defined in the ANSI C2 National Electric Safety Code (NEC), article 500. This phone shall be capable of being housed inside the outdoor enclosure.

**8.5.5. Radio and Public Address (Mass Notification) Systems.** Radio and public address systems shall be provided in inhabited buildings, primary gathering buildings (ex: dining and activity areas of service clubs, hospitals, training facilities, etc), billeting facilities and elsewhere as required to provide real-time



mass voice notification communications to all building occupants a regular basis. The design guidance for the mass notification system is contained in the Unified Facilities Criteria (UFC) 4-021-01, most current version.

**8.5.5.1.** Radio systems shall provide for both AM and FM signal reception. Antenna installations shall conform to base standards.

#### **8.5.6. LMR Antenna, Video Camera conduits and CATV.**

**8.5.6.1.** Install two conduits (one for electric from the electrical room and one for video from the communications room) to each projected video camera location. These conduits shall prevent holes from being drilled in walls after construction completion. As a minimum, the conduit shall be 3/4 inches in diameter, with 1/4 inch nylon pull cords. Install caps on the ends of conduits that are on the exterior of the building.

**8.5.6.2.** Install one conduit from the communications room (near copper cable demarc point) to each projected antenna location. This conduit shall prevent holes from being drilled in walls after construction completion. As a minimum, the conduit shall be 3/4 inches in diameter, with 1/4 inch nylon pull cords. Install a cap on the end of conduit that is on the exterior of the building.

**8.6.3. Cable TV.** The facility owner/occupant shall identify requirements and CATV outlet locations. The CATV specifications and service connection point shall be obtained from the base contracting office, in coordination with 6th Communications Squadron and the local cable company representatives.

#### **8.6. SECURE INTERNET PROTOCOL NETWORK (SIPRNET) (provided when required by comm. squadron).**

**8.6.1.** Data outlets shall use double-gang, 117mm (4-11/16 inches) square by 54mm (2-1/8 inches) deep electrical boxes. Both flush and surface mount outlet shall be provided as appropriate. Flush mounted types shall be flush mounted to wall surface 42.5cm (18 inches) above the finished floor and not placed within 1m (36 inches) of a Non-secure Internet Protocol Network (NIPRNET) LAN outlet.

**8.6.1.1.** Outlet face plates shall be single gang with two (dual) 8-pin modular RJ-45 jacks which shall be the appropriate connectors for service to be provided.

**8.6.1.2.** Outlet face plates shall be red in color to signify classified drop locations.

**8.6.2.** Copper connectors shall be EIA/TIA enhanced category 6, 8-pin/8-position insulation displacement terminations.

**8.6.2.1.** Cat-6 cable shall be shielded twisted pair cable with a red jacket to signify classified cable runs. Red Cat-6 cable shall hold a minimum of 1m (36in) separation from any other LAN/Phone Cabling. The only time cable can cross the path of Regular CAT-6 is at a 90 degree angle.

**8.6.3.** If fiber optic cable is requested instead of Cat-6 cable, the fiber optic connectors (outlets) in the user's work area shall be MTRJ type. MTRJ type shall be used when required to maintain system configuration uniformity, security or other user specified reasons.

**8.6.4.** SIPRNET Data Outlets shall be located to meet customer's needs. If the facility shall be classified as open storage or sensitive compartmentalized information facility (SCIF), drops shall be every 10 feet or 100 square feet of office space.

**8.6.5.** Security requirements for processing classified information may vary and facility design shall be handled on a case-by-case basis. The facility owner/occupant shall identify all requirements and coordinate with the appropriate agencies.

## **SECTION 9. COMMUNICATIONS EQUIPMENT ROOM AND DISTRIBUTION FRAME**

\*Note – All facilities shall contain at least one communication equipment room or telecommunications closet.

### **9.1. Communications Equipment Room.**

**9.1.1.** Communications Equipment Room (CER). The CER is normally the entrance point in the facility for all incoming communications ducts and cables. It is the primary location for C-CS equipment such as local area network (LAN) switches, routers, servers and patch panels.

**9.1.2.** The CER's doors shall open out and be keyed (MacDill's 14-2 key) to allow 6th Communications Squadron personnel 24/7 access. CER's shall not be used as storage.

**9.1.3.** Special purpose facilities that have unusually heavy telecommunications requirements as well as those facilities that have very limited telecommunications requirements shall be designed to meet the users requirements in a cost-effective manner.

**9.1.4.** Whenever feasible, CERs shall be centrally located in the facility, along an exterior wall.

**9.1.5.** Installation contractor shall be responsible for installation of copper riser cable and fiber optic cable connections and terminations between communications rooms. See Section on House Backbone Cable, para 8.3 for additional information.

**9.1.6.** Two (or more) 19-inch equipment racks (telephone and network equipment) shall be installed and securely fastened to the floor, with a 3 foot clearance on all sides for maintenance of C-CS equipment.

**9.1.7.** The comm. room shall have a minimum of one quadplex, 20 amp, dedicated electrical circuit, with isolated ground on each wall. An additional duplex convenience outlet shall be located away from the telecommunications outlets to provide power to operate service and maintenance equipment.

**9.1.8.** The comm. room shall have adequate lighting. It shall be free of any electromagnetic fields and shall not be susceptible to water damage from water pipes or HVAC systems.

**9.1.9.** As a minimum the room shall be kept between 68 to 78 degrees F, with a positive air pressure (to provide a dust free environment).

**9.1.10.** Fire Protection, if required, shall be provided as per applicable code.

**9.1.11.** If sprinklers are required within the equipment area, the heads shall be provided with wire cages to prevent accidental operation. Water pipes shall not be routed over the equipment locations. Drainage troughs shall be placed under the sprinkler pipes to prevent leakage onto the equipment within the room

in accordance with (IAW) TIA/EIA-569A.

**9.1.12.** A minimum of three 4-inch (102mm) floor sleeves shall be installed between stacked telecomm closets. A floor sleeve is a four-inch nominal inside diameter conduit section installed through the floor to allow passage of cables between floors. Protective bushings shall be used at both ends of the conduit (metallic and nonmetallic) to avoid damaging cable jackets during installation. The sleeve shall extend three inches (75mm) up from the floor to prevent water flow from floor to floor. The comm closets shall be vertically aligned to the maximum extent possible. Provide fire stop in accordance with the fire codes where conduits penetrate fire rated ceilings walls or floors.

## **9.2. TELECOMMUNICATIONS CLOSET.**

**9.2.1.** Telecommunications closets (TC) are the facilities for housing telecommunications equipment, cable terminations, and cross-connect wiring. The closet is the transition point between the riser/backbone cable and horizontal/subscriber cables (homeruns to outlets). Closet sizes shall vary depending on the floor space that they serve.

**9.2.2.** The TC's doors shall open out and be keyed to allow 6th Communications Squadron personnel 24/7 access. TC's shall not be used for storage.

**9.2.3.** The closets shall be centrally located within the floor space that they serve so that no copper cable run is longer than 293 feet (90 meters) from the closet to the workstation outlet, including vertical distances to wall telecommunications outlets.

**9.2.4.** The telecommunications closet shall not serve an area in excess of 10,000 square feet. If either maximum requirement (cable run length or square footage) is exceeded, additional telecommunications closets shall be added.

**9.2.5.** Where multiple TCs are required, attention shall be given to their strategic placement to support interconnection via three 4-inch conduits between each room as well as the primary telecommunications room in which the cable head/fiber connections are to be located. Four 1-inch innerducts shall be provided inside the one of the 4-inch conduits or conduit raceways, with pull cord, as a dedicated, direct path between each TC and the primary telecommunications rooms.

**9.2.6.** All LAN runs shall be continuous (homerun) from wall outlet to network patch panel equipment located in TCs or communications equipment rooms.

## **SECTION 10. EXTERIOR WORK**

### **10.1. Communications Cables To and Between Buildings.**

**10.1.1** For Base Fiber Optic Backbone Connections to Information Transfer Nodes (ITNs):

- Gigabit Ethernet Connections - 36 Strand Single Mode (SM) Fiber 8.3/125 micron

**10.1.2** For Base Fiber Optic Satellite Connections (to building):

- Switched Ethernet Connections - 12 Strand SM Fiber 8.3/125 micron

**10.1.3** Minimum of 25 pair copper cable to each new facility for new installations

## **10.2. OUTSIDE COPPER CABLE**

**10.2.1.** All copper conductors for cables less than 2,100 pair shall be not less than 24 AWG. All copper cable conductors for cables more than 2,100 shall be 24 AWG. However, if cable shall not fit inside a 4” duct, than copper conductors may be 26 AWG. All splices shall be spliced with singular splice connectors and shall be sealed in a stainless steel type closure.

**10.2.2.** All outdoor metallic Twisted Pair (TP) Cable shall be filled core type.

**10.2.3.** Copper cable shall be installed from the facility demarcation back to the nearest service connection point(s). The cable shall be connected/terminated to existing infrastructure. The contractor shall complete the connection/termination.

## **10.3. OUTSIDE FIBER OPTIC CABLE.**

**10.3.1.** The filled fiber optic cable portion of the outside plant shall comply with industry standards. The fiber optic cable used indoors shall comply with industry standards.

**10.3.2.** Fiber cable type shall depend on the user/base requirements. 6th Communications Squadron (Plans Office) shall make final decision (ex: 8.3/125 microns for single mode and 62.5/125 microns for multi-mode).

**10.3.3.** Fiber cable installed:

**10.3.3.1.** In manholes, handholes or cable vaults shall be neatly formed, racked, supported and secured in place.

**10.3.3.2.** Through manholes, handholes or cable vaults shall be labeled / tagged (ref: EIA/TIA-606, Administration Standards for Telecommunications Infrastructure of Commercial Buildings).



#### **10.4. OUTSIDE PLANT CABLE ENTRANCE.**

**10.4.1.** Provide a minimum of four 4-inch (102 mm) entrance ducts (copper, fiber, CATV and spare) into the telecommunications room. One of the ducts shall contain four 1" inner ducts; this duct shall be used for fiber optic cable. The copper, fiber and spare ducts shall extend into a communications manhole with available service connection point/s. The CATV duct shall not enter the communications manhole. The CATV duct shall extend 5-feet, straight out, from the building foundation and be capped.

**10.4.2.** The ducts shall stub up 3 inches (75 mm) above the floor in the telecommunications room. Provide 1/4 inch nylon pull rope in all ducts and innerducts.

**10.4.3.** Facilities with large telecommunications requirements may require the installation of more ducts. These ducts shall be run underground from the building to the nearest communication connection point where adequate service is available. One of the ducts shall contain four 1" inner ducts; this duct shall be used for fiber optic cable.

**10.4.4.** Conduits shall be PVC schedule 40 pipe, as a minimum.

**10.4.5.** Ends of PVC conduits shall be deburred to prevent cable damage during installation.

**10.4.6.** The telephone cable pair size required from the nearest communications connection point to the comm room shall be dictated by the 6th Communications Squadron.

**10.4.7.** The fiber optic cable and copper cable shall be terminated within 50 feet of the cable stub-up, if the cable is not riser rated (*Recommended copper cable protector: Circa, C3B1E, Surge Protection Module, 3-element gas, 5-pin, 3-electrode or equivalent protector*). If the cable can not be terminated within 50 feet of the stub-up, the cable shall be placed in a metal conduit that is grounded.

**10.4.8.** The contractor shall provide gel filled base cable, IAW the Rural Electrical Association (REA) standard PE-39 or PE-89 from main communications panel to the nearest communications connection point with sufficient vacant pairs to provide each facility with required cable pairs.

**10.4.9.** All pedestals and outdoor housings shall be permanently labeled using not less than 1/4 inch stamped or painted lettering and shall include the terminal number, cable number and pair count. Where there are cable load points, identify the load point number for the cable.

**10.4.10.** Underground plant construction shall be completed IAW RUS Bulletin 1751F-644.

#### **10.5. CONDUITS AND DUCT BANK.**

**10.5.1.** Where PVC conduits are installed, a metallic tracer wire shall be installed within the conduit or 6 inches above the duct bank to assist in future location efforts, with bonding to occur inside each manhole and at CER grounding frame.

**10.5.2.** Conduit Protection (*info in this para was obtained from RUS Bulletin 1751F-643*)

**10.5.3.** Top protection (concrete cap or concrete slurry encasement) shall be provided where conduits are to be installed under roads, parking lots, paved areas and areas which may be paved at a later date.

**10.5.4.** Concrete bases shall be used whenever the ground is spongy or yielding, such as swamps or marshlands, or where bases are desirable as leveling mediums under conditions where sand base trenches are subjected to washing out.

**10.5.5.** Communications cable duct banks that cross under railroads, runways, and aircraft parking ramps, shall be concrete encased or directional bore and use High-Density Polyethylene (HDPE) pipe at sufficient depth to prevent damage to the ducts or cables. Use the method that is more economical.

**10.5.6.** When determined necessary to simplify installations, conduit shall be curved to provide gentle sweeps, with a minimum radius of 25 feet, for a total bending radius not to exceed 180 degrees between manholes.

**10.5.7.** All conduits shall be sloped toward each opposing manhole at a slope of 3 inches per 100 feet of run to promote drainage of any accumulated liquids.

**10.5.8.** The ducts shall be buried a minimum of 36 inches and have a minimum bending radius of 36 inches (910 mm).

**10.5.9.** There shall not be more than the equivalent of two (2) 90-degree bends (180-degrees total) between pull points, including offsets and kicks.

#### **10.6. Conduit Rodding and Cleaning.**

**10.6.1.** Before installation of underground cables, conduits shall be rodded to determine if conduits are free of foreign obstructions which may prevent placement of cables in conduits. Rodding consists of pulling a test mandrel through the conduits to remove the obstruction. The diameter of the test mandrel shall be 0.25 inches (6mm) smaller in diameter than the inside diameter of conduit.

**10.6.2.** Conduits suspected or found to contain particles of earth, sand, gravel, etc. shall be cleaned by pulling a stiff bristled brush through the conduits.

**10.6.3.** Conduits suspected or found to be obstructed with foreign materials which can not be removed by rodding and/or cleaning shall be immediately reported to the base communications squadron project manager. The comm squadron project manager shall coordinate with appropriate agencies to determine a corrective action.

#### **10.7. Innerduct Installation.**

**10.7.1.** Innerducts installed:

**10.7.1.1.** Shall be used for each fiber optic cable installed.

**10.7.1.2.** Shall not have an inside diameter less than one inch.

**10.7.1.3.** Shall be sized for each fiber optic cable such that no less than ¼” air gap exists between the inside perimeter of the innerducts and the outside perimeter of the cable. In addition, shall be sized such that an air gap exists between the innerduct(s) and the conduit/ducts.

**10.7.1.4.** In a conduit shall be provided up to the capacity of the conduit.

**10.7.1.5.** Shall be capped, plugged or sealed, if unused.

**10.7.1.6.** Through each manhole or cable vault shall be labeled/tagged with cable ID number for the fiber optic cable installed within the innerduct or the word "VACANT". Contact the 6th Communications Squadron project manager for proper cable, manhole, numbers, etc.

**10.7.1.7.** Shall be provided with a waterproof corrosion-resistant pull rope for future cable installations.

**10.7.2.** Exterior duct and communications cable systems to support all valid requirements shall be installed from the facility's CER to the closest service connection point(s). This includes entrance ducts (including spares), conduits, duct and manhole systems to the closest base service connection point(s), and necessary provisions for crossing roads and other paved areas.

## **10.8. Manholes (MH).**

**10.8.1.** Manholes shall be installed for all connections to the existing cable plant as required to maintain a maximum manhole spacing of 475 feet. Additional manholes may be required to provide adequate control of connection and distribution of the cable plant. The manhole covers shall be flush with the ground. The ground shall slope down from the top of the manhole.

**10.8.2.** All manholes shall be designed and constructed to provide a clear floor space of 8 feet x 10 feet measured inside the manhole. An alternate size of 6 feet x 8 feet may be approved only when no primary backbone cable passes through the manhole (lateral or dead end service only). All manholes shall provide a clear height of not less than 7 feet. Mandatory appurtenances include grounding bus bar and grounding rod and related conductors and wiring, a ladder or steps, cable rack supports, a 12-inch diameter sump with a polymer cover, pull in irons, frame and a manhole cover cast with the word "COMMUNICATIONS" exposed to the surface. Conduits shall enter the manholes 4 to 5 feet from floor on the end and be perpendicular to the wall. The conduit entry point shall be sealed.

**10.8.3.** Handholes, when specified, shall be nominally 4 feet x 4 feet x 4 feet inner dimensions and are provided with a grounding rod, cable rack supports sump drain and pulling irons. The design and construction shall be similar to a manhole. The base communications squadron shall specify when handholes shall be used.

**10.8.4.** Manholes/handholes shall be constructed from a precast, water resistant concrete equipped with a removable cover. The manhole size and type shall be specified. Manhole wall recesses, cable rack supports, sumps, pulling-in irons, frame and cover, and ground rod shall be provided in all manholes.

**10.8.5.** A 3/4 inch x 10 foot copper clad steel ground rod shall be installed in the floor of each manhole provided. Four inches of the rod, plus or minus 1/2 inch, shall extend above the finished floor level. The rod shall not enter the manhole more than 3 inches nor less than two inches out from the vertical surface of the adjacent wall. The installed ground shall have an impedance of 25 ohms or less. Precast manholes provided may require the ground rod to enter through the duct window.

**10.8.6.** Manhole and handhole covers may require locking devices. The covers requiring locking devices shall be identified by the communications squadron during the project design reviews.

## **10.9. DIRECT BURIED CABLE (cable placed in ditch, not in conduit)**

**10.9.1.** Cable warning tape shall be a minimum of three inches wide, orange in color, and used for buried applications to mark cable paths. Warning tape shall be installed 12 inches below existing grade. Cable tags shall be provided for all cables at splice points, termination points and manholes/hand holes. All tags shall be permanently labeled and corrosion resistant IAW EIA-606.

**10.9.2.** Power and communications cables shall be separated by 12 inches (30.48cm) of well tamped, fine earth protection. The cable at the top of the crossing, whether power or communications cable, shall receive the same additional protection.

**10.9.3.** Communications cables shall be separated/protected from gas and water mains by 3 inches of concrete or 12 inches of fine earth. If the communications cables cross over the main, extend additional cable protection 3 feet from each side of the crossing.

## **SECTION 11. INSTALLATION AND TESTING**

**11.1.** The contractor shall install the telecommunications and distribution system in accordance with manufacturer's specifications and current industry standards and procedures. All components and elements shall be properly identified and marked.

**11.2.** Before a contractor splices into the existing copper or fiber cable plant, a pre-test shall be accomplished to establish pre-existing cable conditions. The results of the pre-test shall be forwarded to 6th Communications Squadron project manager before splicing operations can start. An Optical Time Domain Reflectometer (OTDR) or other test equipment capable of showing splice loss shall be used to test for db loss in fiber optic cable.

**11.3.** After fiber optic cable is installed, all fiber optic cable shall be tested for db loss to ensure compliance with applicable industry standards. An OTDR or other test equipment capable of showing splice loss shall be used to test for db loss.

**11.4.** All copper cable splicing shall be completed using singular splicing connectors.

**11.5.** All copper cables shall be tested for the following: continuity, shorts, opens, grounds and crosses. In addition all level Cat-6 cables shall be tested to ensure compliance with TIA/EIA 568A standards. Test results shall be provided to base communications squadron project manager.

**11.6.** Provide a cover letter (on letter size, white paper) signed by LAN installer/tester certifying complete compliance with level Cat-6 or gigabit ethernet standards as specified by the latest EIA/TIA specifications. The cable certification letter shall contain a list of each test conducted and the test results. Also, provide an electronic copy of the certification letter and test results. The electronic copy shall be able to be read and processed by readily available Microsoft Word (version 2003 or newer) word processors or Microsoft Excel (Version 2003 or newer). The cable certification letter shall be turned over to the 6th Communications Squadron Plans Office when the facility is transferred from the construction agent to the Air Force.



**11.7.** Any cable(s) damaged during pulling shall be the responsibility of the pulling party/parties. Any cables failing tests shall be re-terminated, re-routed, re-tested, etc., until no other alternatives exist. At this time it shall be assumed that a bad cable run has resulted and the pulling party/parties shall have to bear the responsibility of re-pulling new cable to replace it.

**11.8.** Terminate all fiber optic cable and copper cables at both ends. Cables shall be labeled IAW TIA/EIA 606. Provide drawings, patch panel documentation, full testing and required reports, and warranty all parts and labor for a minimum of one year (using existing cable tests as reference point).

**11.9.** All contractor cable installations shall be inspected and tested; all defects discovered shall be repaired at no cost to the government

## **SECTION 12. DRAWINGS: DESIGN, CONSTRUCTION, AND AS-BUILTS**

### **12.1. DESIGN DRAWINGS (shall include the Following Levels).**

**12.1.1.** Site plan – shows physical and logical connections for a campus or site plan view. It shows actual buildings, major system nodes, exterior cables and exterior pathways. Includes site plan, riser drawings and pathways.

**12.1.2.** Floor layouts – shows layout of a complete building for each floor, revealing horizontal pathways, backbone systems, location of serving zones, access points and other systems.

**12.1.3.** Serving zones – shows outlets locations, telecommunications equipment rooms, access points, cable identifiers and riser diagrams.

**12.1.4.** Equipment rooms – shows layout for such things as racks, ladder racks and patch panels. Show elevations for racks, backboards, cables, conduits, etc.

**12.1.5.** Details – shows faceplate labeling, faceplate type, installation procedures, detail racking, fire-stopping, raceways and other project details.

**12.1.6.** Schedules – covers all miscellaneous requirements of the communications system.

### **12.2. UNDERGROUND CABLE CONSTRUCTION DRAWINGS (cable pulled through underground conduit)**

**12.2.1.** The following information shall be included on construction drawings:

**12.2.1.** Size, gauge, pair count, cable number and cutting (cable) length of cable being placed.

**12.2.2.** Duct configuration of each run where cable is being placed.

**12.2.3.** Size, gauge, count, cable length and cable stub-up locations into buildings, if applicable.

**12.2.4.** Splice items (type of connectors and splice case)

**12.2.5.** Type, size, pair count and number of each terminal to be placed.

**12.2.6.** All existing cables and terminals along the same route serving the same area (all cables and terminals in the construction area).

**12.2.7.** Any special precautions to observe.

**12.2.8.** Manhole cable racking diagram.

**12.2.9.** Direction to the dial central office, if dial central office is not shown on the drawings

### **12.3. DIRECT BURIED CABLE CONSTRUCTION DRAWINGS.**

**12.3.1.** The following information shall be included on construction drawings:

**12.3.1.** Splice items.

**12.3.2.** Type, size, gauge, pair count, cable number and cutting (cable) length of cable.

**12.3.3.** Location of the cable in relation to curb or property lines, or other fixed points.

**12.3.4.** Type, size, pair count and number of each terminal to be placed.

**12.3.5.** Wiring limits and preferred count of each terminal being placed.

**12.3.6.** Depth cable is to be placed.

**12.3.7.** Type of construction, length of crossing under pavement, sidewalk, roadway, etc.

**12.3.8.** Direction to the dial central office, if dial central office is not shown on the drawings.

### **12.4. UNDERGROUND CONDUIT DRAWINGS.**

**12.4.1.** The following information shall be included on construction drawings:

**12.4.1.1.** Number, type and size of ducts in each run; the type of protection; minimum depth of cover and duct configuration.

**12.4.1.2.** Size and type of each manhole; the thickness of the roof, wall and floor; the size and type of frame and cover; the minimum height of collar, the size of the drain or sump and the location of pulling-in irons.

**12.4.1.3.** Location of the conduit run with respect to the curb line, property line, right-of-way, or other fixed points.

**12.4.1.4.** Location of each manhole with respect to at least two fixed points.

**12.4.1.5.** Wall-to-wall and center-to-center measurements on main conduit runs; and the measurements on lateral ducts from the manhole wall to the end of the lateral duct at buildings, poles, etc.

**12.4.1.6.** Radius of all bends in the main conduit.

**12.4.1.7.** Any repair or rebuilding required of existing conduit or manholes.

**12.4.1.8.** Locations of all surface and underground obstacles.

**12.4.1.9.** Type, amount and condition of pavement or sidewalk to be cut and repaired.

**12.4.1.10.** Type of subsoil, if known.

**12.4.1.11.** Location of pull rope/cord.

**12.4.2.** The outside plant housings, buried splices, cable or wire lengths, etc., required for cable or wire repairs shall be so designated on the construction drawings to facilitate trouble-shooting later.

## **12.5. "AS-BUILT" DRAWINGS.**

**12.5.1.** Following the project or turnover, the contractor shall furnish 2 copies of system drawings showing schematics of the entire communications and distribution systems and the physical runs of all communications wiring and equipment installed. These drawings shall be turned over to the 6CS (Plans Office) when the facility is transferred from the construction agent to the Air Force and will be provided in electronic format via CD/DVD ROM

**12.5.2.** The first copy shall be delivered in AutoCAD 2000 (or higher) or Microstation Ver. J (or higher) format, delivered in .DWG or .DGN file formats and will contain no more than 1 sheet.

**12.5.2.1** Use the A/E/C CADD standard for the naming convention.

**12.5.2.2** As a minimum, the contractor shall show cross-connect and termination points for each cable pair, locations and identification number for each modular outlet, and the location and value of each line amplifier and multi-port device throughout the cable system.

**12.5.2.3** A communication riser diagram and cable routing shall also be shown. These drawings shall be updated to final "as built" conditions by the construction contractor and turned over to the 6th CS Plans Office.

**12.5.3** The second copy shall be delivered in ESRI-ArcGIS 9.2 Personal GeoDatabase format, will include all locational (point, line, and polygon feature(s)) along with the original source files.

**12.5.3.1** The Geospatial files shall have an external spatial reference (.prj) file attached specifying the parameters of the coordinate system used (as provided by the 6th CS).

**12.5.3.2** All topologically correct geospatial data shall overlay on the installations latest orthorectified imagery that will be provided.

**12.5.3.3** The contractor shall identify the classification, type, size, location, ID number, and any other necessary attributes (specified by the 6th CS) for all surveyed, mapped, designed, or proposed features.

**12.5.3.4** All symbol and font libraries, text size, format, and placement shall be prepared in accordance with and conform to the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) Release 2 (or most current available).

**12.5.3.5** The contractor shall provide metadata files for all locational data produced and shall conform to the Federal Geographic Data Committee's "Content Standard for Digital Geospatial Metadata, Version 2.0" (or latest version) The output from the metadata generator software shall be provided in ASCII text. The digital metadata files shall be provided to the 6th CS Plans Office along with each final product deliverable, unless otherwise approved in writing by the 6th CS CSO.

### **SECTION 13. OPERATION AND MAINTENANCE MANUALS FOR THE INSTALLED PREMISE DISTRIBUTION SYSTEM**

**13.1.** Contractor shall furnish commercial-off-the-shelf manuals (operation, installations, configuration and maintenance) for all products installed as part of the premise distribution system.

### **SECTION 14. DD FORM 1391, MILITARY CONSTRUCTION PROJECT DATA**

**14.1.** The DD Form 1391s for MILCON projects shall include site location, building sizes, scope of work, as well as the communication infrastructure costs (covered with MILCON funds). Communications equipment and other costs that are not covered with MILCON funds shall be annotated in the "Comm Cost Funded by SC" column:

**14.1.1.** End instruments (telephones, secure telephone units [STU], secure terminal equipment [STE], computers, printers, video projectors, scanners, fax machines, copiers) and installation.

**14.1.2.** Terminations of building wiring infrastructure at equipment or onto existing base networks (connection at communications/network equipment jack).

**14.1.3.** Special-purpose equipment (e.g., secure switches, radio transmitters, and audio-visual equipment) and installation.

**14.1.4.** Switching equipment (telephone switches, additional telephone central office line cards, and LAN switches) and installation.

**14.1.5.** Optical carrier equipment and installation.

**14.1.6.** CATV amplifiers and splitters which shall be government-owned.

**14.1.7.** Network servers, routers and installation.

**14.1.8.** Encryption equipment for classified systems and installation.

**14.1.9.** Power conditioning equipment such as uninterruptible power supplies (UPS) and installation.

**14.1.10.** Associated system engineering for items identified in this list.





DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
WASHINGTON, DC

2 JUN 2011

MEMORANDUM FOR SEE DISTRIBUTION

FROM: HQ USAF/A7C  
1260 Air Force Pentagon  
Washington, DC 20330-1260

SUBJECT: Air Force Sustainable Design and Development (SDD) Implementing Guidance

This memorandum reinforces the Air Force commitment to incorporate sustainable concepts in the planning, programming, design, construction, and operation of facilities and infrastructure. Beginning with FY12 and *regardless of funding source*, all permanent construction activity on Air Force installations in the United States (including Alaska and Hawaii) and its territories on permanent Active Air Force installations, resulting in Air Force Real Property Assets, shall comply with the requirements of this memorandum. This policy shall apply to overseas construction activities to the extent practical, considering mission objectives, and Host Nation agreements. The requirements of the following directives are incorporated into this memorandum:

- Executive Order (EO) 13327, Federal Real Property Asset Management, 6 Feb 04
- Public Law 109-58, Energy Policy Act (EPAct) 2005, 8 Aug 05
- Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding and Guiding Principles, 24 Jan 06
- EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management, 26 Jan 07
- Public Law 110-140, Energy Independence and Security Act (EISA) of 2007, 19 Dec 07
- EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, 8 Oct 09
- ~~Deputy Under Secretary of Defense (Installations and Environment) Memorandum, 19 Jan 10, Subject: DoD Implementation of Storm Water Requirements under Section 438 of the Energy Independence and Security Act (EISA)~~
- Deputy Under Secretary of Defense (Installations and Environment) Memorandum, 25 Oct 10, Subject: Department of Defense Sustainable Buildings Policy
- 10 CFR Part 433, Energy Efficiency Standard for the Design and Construction of New Federal Commercial and Multi-Family High Rise Residential Buildings
- 10 CFR Part 436, Subpart A – Methodology and Procedures for Life Cycle Cost Analyses
- FY12 Defense Planning and Programming Guidance

The following sustainability requirements apply to the Air Force Construction program:

- a. All new vertical construction, and major renovations<sup>1</sup> (Restoration & Modernization), **meeting the USGBC LEED 2009 Minimum Program Requirements (MPRs)** (see attachments 1 and 2)– All facilities in this category shall fully incorporate Federal

<sup>1</sup> For the purposes of this memorandum, a major renovation project is defined as changes to a building that provide significant opportunity for substantial improvement in the sustainable design elements of the building, including energy efficiency, as determined by the signatory of the DD Form 1391. For major renovation projects seeking formal LEED certification, criteria established in the MPRs and the LEED Reference Guide must also be met.

requirements for High Performance and Sustainable Buildings (HPSB) (see attachment 3); shall be registered in USGBC LEED-Online; *shall be formally certified and achieve at a minimum LEED Silver certification* (or meet a comparable level of achievement with an overseas third-party green building rating system); and shall achieve not less than 20 points (40 percent of the Silver point threshold) dedicated toward energy efficiency and water conservation.

b. All new vertical construction, and major renovations (R&M), **not meeting the USGBC LEED 2009 MPRs**, shall fully incorporate the Federal requirements for HPSBs and shall pursue LEED credits (or credits in an equivalent overseas third-party green building rating system), relevant to the scope of the project, to the maximum extent practicable (see attachment 3). For horizontal, utility, and industrial projects, attachments 4, 5, and 6 have been provided as guidance to indicate appropriate thresholds of compliance with this memorandum. The project types are defined in ETL 08-13, *Incorporating Sustainable Design and Development (SDD) and Facility Energy Attributes in the Air Force Construction Program* as:

- Vertical – Includes typical building construction for which LEED-NC was developed as a metric
- Horizontal – Includes site development, heavy earthwork, construct and repair roads, runways, taxiways, aircraft aprons, containment, sidewalks, parking lots, revetments, curbs, and gutters
- Utility - Includes electric, gas, water, steam, and wastewater, including substations, lift stations, oil/water separators, storage tanks, petroleum, oil, lubricants (POL) lines, and transformers
- Industrial – Includes all enclosed facilities for which mechanical cooling/heating is provided for less than 50 percent of the building square footage

The following paragraphs apply to all projects subject to the requirements of paragraphs a and b above, and other construction activities noted herein.

Apply life cycle cost criteria as specified in 10 CFR 436 Subpart A - Methodology and Procedures for Life Cycle Cost Analyses; EO 13327, Federal Real Property Asset Management; AFI 32-1021, Planning and Programming Military Construction (MILCON) Projects; and AFI 32-1032, Planning and Programming Appropriated Funded Maintenance Repair and Construction Projects, as appropriate.

As a continuation of the Air Force commitment to low impact development, implement the DUSD (I&E), DoD Implementation of Storm Water Requirements under Section 438 of Energy Independence and Security Act (EISA) policy for FY11 O&M and MILCON projects (see attachment 7 for implementing guidance). In exceptional circumstances where project considerations may affect the practicability of implementing the DoD guidance in FY11 O&M projects and FY11 or FY12 MILCON projects, low impact development design strategies will continue to be consistent with existing applicable Air Force design guidance.

The requirements of this memorandum are not optional. Sustainable elements necessary to comply with this memorandum cannot be eliminated to save scope or cut cost. The DD Form 1391 shall include the scope and the cost estimate to achieve the requirements of this memorandum. A separate line item entitled "SDD, EPAAct05, EO 13423, EISA 438, and EO 13514" shall list the scope and estimated cost. In lieu of a cost estimate, an allowance, not exceeding 2 percent of the total construction cost, may be identified on the DD Form in the "SDD, EPAAct05, EO 13423, EISA 438, and EO 13514" line item.

For MILCON projects, a Federal government employee of the design/construction agent (as the Owner's Agent) and the BCE, or his/her designee (as the Owner) shall sign the LEED Project Registration Agreement and the LEED Certification Agreement as appropriate.

The Air Force MILCON Sustainability Requirements Reporting Scoresheet (attachment 3) shall be used for reporting Air Force compliance with the Federal HPSB requirements and LEED status, of all MILCON project types listed in paragraphs a and b of this memorandum. AFCEE MILCON Project Managers shall send the Air Force MILCON Sustainability Requirements Reporting Scoresheet to [AFCEE.TDB.MILCONrptg@us.af.mil](mailto:AFCEE.TDB.MILCONrptg@us.af.mil), at: 1) the initial design charrette; 2) the RFP/35 percent design; 3) design complete; and 4) construction complete phases of all MILCON projects addressed by this memorandum. Any decisions based on cost constraints leading to deletion of sustainable concepts, or certification of the project, shall be included in the documentation. At the completion of the project provide HPSB status information to the installation Civil Engineering office for the purpose of updating the ACES-RP, RPA Sustainability Code field.

Specific roles and responsibilities in support of this memorandum are:

ORGANIZATION	ROLES AND RESPONSIBILITIES
HQ USAF/A7C	Development and dissemination of sustainable development policy. POC: Gene Gallogly, AF/A7CA, <a href="mailto:thomas.gallogly@us.af.mil">thomas.gallogly@us.af.mil</a> Development and dissemination of MILCON program policy. POC: Robert Gill, AF/A7CP, <a href="mailto:robert.gill@us.af.mil">robert.gill@us.af.mil</a>
AFCEE	Provide guidance documents and technical support, to include planning, design criteria, the delivery process, and general guidance on sustainability and LEED certification. POC: Paula Shaw, AFCEE/TDBS, <a href="mailto:paula.shaw@us.af.mil">paula.shaw@us.af.mil</a>
AFCESA	Provide guidance documents and technical support to include engineering criteria, construction standards, life cycle and sustainable costs, and operations and maintenance issues. POC: Clifford Fetter, AFCESA/CEOA, <a href="mailto:clifford.fetter@us.af.mil">clifford.fetter@us.af.mil</a>
	Provide guidance documents and technical support to include energy and water conservation, and renewable energy technologies. POC: Ken Walters, AFCESA/CEN, <a href="mailto:kenneth.walters.1@us.af.mil">kenneth.walters.1@us.af.mil</a>

As new LEED rating systems are introduced by USGBC, AFCEE and AFCESA will evaluate the potential for incorporation into the Air Force Construction Program and will forward recommendations to HQ USAF/A7C for guidance update consideration.



TIMOTHY A. BYERS, Maj Gen, USAF  
The Civil Engineer  
DCS/Logistics, Installations & Mission Support

7 Attachments:

1. LEED 2009 Minimum Program Requirements (MPR)
2. LEED 2009 MPR Supplemental Guidance
3. Air Force MILCON Sustainability Requirements Reporting Scoresheet, LEED 2009
4. Guidance on Applying LEED Principles to Air Force Horizontal Construction Projects
5. Guidance on Applying LEED Principles to Air Force Utility Construction Projects
6. Guidance on Applying LEED Principles to Air Force Industrial Construction Projects
7. Implementing Guidance to Meet EISA 2007 Section 438 Requirements

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AFCESA/CC/CEN/CEO  
AFRPA/DR/RPM  
HQ AFSVA/CC  
ALMAJCOM/A7  
11 WG/CE  
USAFA/CE  
AFIT/CE  
HQ AAFES-CF  
HQ DECA-CIF  
HQ USACE/CEMP-ZA  
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# LEED 2009 Minimum Program Requirements

## Apply to

LEED 2009 for New Construction and Major Renovations, LEED 2009 for Core & Shell development, LEED 2009 for Schools, LEED 2009 for Commercial Interiors, and LEED 2009 for Existing Buildings: Operations & Maintenance

**Do not apply to LEED for Homes, LEED for Neighborhood Development, or any LEED rating system adopted prior to 2009**

## Version November 2009

*This version adds to the April 2009 version clarifying language, but not new requirements, that was approved by the LEED Steering Committee and the USGBC Executive Committee in November 2009*

## INTRODUCTION

This document identifies the MPRs, or minimum characteristics that a project must possess in order to be eligible for LEED Certification. These requirements define the types of buildings that the LEED Green Building Rating Systems were designed to evaluate, and taken together serve three goals: to give clear guidance to customers, to protect the integrity of the LEED program, and to reduce complications that occur during the LEED certification process. The requirements in this document will apply to all those, and only those projects seeking to demonstrate conformance with the rating systems listed above.

Definitions, exceptions, and more extensive guidance relating to these MPRs are available in a separate document titled: [LEED 2009 MPR Supplemental Guidance](#). Terms that are *italicized and underlined* here are defined in the Supplemental Guidance document (they are marked as such only the first time that they appear).

At this time U.S. Green Building Council, Inc. has authorized the Green Building Certification Institute (GBCI) to confer LEED Certification. GBCI has agreed to consider requests for exceptions to MPRs that are not already defined in the LEED 2009 MPR Supplemental Guidance document on a case-by-case basis for special circumstances.

In addition to complying with the MPRs, a project must also demonstrate compliance with all rating system requirements in order to achieve LEED Certification.



## 1. MUST COMPLY WITH ENVIRONMENTAL LAWS

### **New Construction, Core & Shell, Schools, Commercial Interiors**

The LEED project building or space, all other real property within the LEED project boundary, and all project work must comply with applicable federal, state, and local building-related environmental laws and regulations in place where the project is located. This condition must be satisfied from the date of LEED project registration or the commencement of schematic design, whichever comes first, up and until the date that the building receives a certificate of occupancy or similar official indication that it is fit and ready for use.

### **Existing Buildings: O&M**

The LEED project building, all other real property within the LEED project boundary, any project work, and all normal building operations occurring within the LEED project building and the LEED project boundary must comply with applicable federal, state, and local building-related environmental laws and regulations in place where the project is located. This condition must be satisfied from the commencement of the LEED project's initial LEED-EB: O&M performance period through the expiration date of the LEED Certification.

### **All Rating Systems**

A lapse in a project's compliance with a building-related environmental law or regulation that results from an unforeseen and unavoidable circumstance shall not necessarily result in non-compliance with this MPR. Such lapses shall be excused so long as they are remediated as soon as feasibly possible.

## 2. MUST BE A COMPLETE, PERMANENT BUILDING OR SPACE

### **All Rating Systems**

All LEED projects must be designed for, constructed on, and operated on a permanent location on already existing land. LEED projects shall not consist of mobile structures, equipment, or vehicles. No building or space that is designed to move at any point in its lifetime may pursue LEED Certification.

### **New Construction, Core & Shell, Schools**

LEED projects must include the new, ground-up design and construction, or major renovation, of at least one commercial, institutional, or high-rise residential building in its entirety.

### **Commercial Interiors**

The LEED project scope must include a complete interior space distinct from other spaces within the same building with regards to at least one of the following characteristics: ownership, management, lease, or party wall separation.

### **Existing Buildings: O&M**

LEED projects must include at least one existing commercial, institutional, or high-rise residential building in its entirety.



### 3. MUST USE A REASONABLE SITE BOUNDARY

#### **New Construction, Core and Shell, Schools, Existing Buildings: O&M**

1. The LEED project boundary must include all contiguous land that is associated with and supports normal building operations for the LEED project building, including all land that was or will be disturbed for the purpose of undertaking the LEED project.
2. The LEED project boundary may not include land that is owned by a party other than that which owns the LEED project unless that land is associated with and supports normal building operations for the LEED project building.
3. LEED projects located on a campus must have project boundaries such that if all the buildings on campus become LEED certified, then 100% of the gross land area on the campus would be included within a LEED boundary. If this requirement is in conflict with MPR #7, Must Comply with Minimum Building Area to Site Area Ratio, then MPR #7 will take precedence.
4. Any given parcel of real property may only be attributed to a single LEED project building.
5. Gerrymandering of a LEED project boundary is prohibited: the boundary may not unreasonably exclude sections of land to create boundaries in unreasonable shapes for the sole purpose of complying with prerequisites or credits.

#### **Commercial Interiors**

If any land was or will be disturbed for the purpose of undertaking the LEED project, then that land must be included within the LEED project boundary.

### 4. MUST COMPLY WITH MINIMUM FLOOR AREA REQUIREMENTS

#### **New Construction, Core and Shell, Schools, Existing Buildings: O&M**

The LEED project must include a minimum of 1,000 square feet (93 square meters) of gross floor area.

#### **Commercial Interiors**

The LEED project must include a minimum of 250 square feet (22 square meters) of gross floor area.



## 5. MUST COMPLY WITH MINIMUM OCCUPANCY RATES

### **New Construction, Core & Shell, Schools, and Commercial Interiors**

#### *Full Time Equivalent Occupancy*

The LEED project must serve 1 or more *Full Time Equivalent* (FTE) occupant(s), calculated as an annual average in order to use LEED in its entirety. If the project serves less than 1 annualized FTE, optional credits from the Indoor Environmental Quality category may not be earned (the prerequisites must still be earned).

### **Existing Buildings: O&M**

#### *Full Time Equivalent Occupancy*

The LEED project must serve 1 or more Full Time Equivalent (FTE) occupant(s), calculated as an annual average in order to use LEED in its entirety. If the project serves less than 1 annualized FTE, optional credits from the Indoor Environmental Quality category may not be earned (the prerequisites must still be earned).

#### *Minimum Occupancy Rate*

The LEED project must be in a state of *typical physical occupancy*, and all building systems must be operating at a capacity necessary to serve the current occupants, for a period that includes all performance periods as well as at least the 12 continuous months immediately preceding the first submission for a review.

## 6. MUST COMMIT TO SHARING WHOLE-BUILDING ENERGY AND WATER USAGE DATA

### **All Rating Systems**

All certified projects must commit to sharing with USGBC and/or GBCI all available actual whole-project energy and water usage data for a period of at least 5 years. This period starts on the date that the LEED project begins typical physical occupancy if certifying under New Construction, Core & Shell, Schools, or Commercial Interiors, or the date that the building is awarded certification if certifying under Existing Buildings: Operations & Maintenance. Sharing this data includes supplying information on a regular basis in a free, accessible, and secure online tool or, if necessary, taking any action to authorize the collection of information directly from service or utility providers. This commitment must carry forward if the building or space changes ownership or lessee.

## 7. MUST COMPLY WITH A MINIMUM BUILDING AREA TO SITE AREA RATIO

### **All Rating Systems**

The gross floor area of the LEED project building must be no less than 2% of the gross land area within the LEED project boundary.



## LED TECHNOLOGY TECHNICAL SPECIFICATION INFORMATION

### PART 1 GENERAL

**Note:** The electrical designer must edit the bracketed information within this attachment for the requirements of the project.

#### 1-1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by their basic designation only.

#### AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C62.41.1-2002	IEEE Guide on the Surge Environment in Low-Voltage (1000 V and less) AC Power Circuits
ANSI C62.41.2-2002	IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits
ANSI C78.377-2008	Specifications for the Chromaticity of Solid State Lighting Products for Electric Lamps
ANSI C136.31-2010	Roadway and Area Lighting Equipment – Luminaire Vibration
ANSI C136.3-2005 (R2009)	Roadway and Area Lighting Equipment – Luminaire Attachments

#### AMERICAN SOCIETY FOR TESTING AND MATERIALS INTERNATIONAL (ASTM)

ASTM B117-09	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM G154	Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

#### DEPARTMENT OF DEFENSE (DoD)

##### Air Force

ETL 11-1	<i>Civil Engineer Industrial Control System Information Assurance Compliance</i>
ETL 12-15	<i>Light-Emitting Diode (LED) Fixture Design and Installation Criteria for Interior and Exterior Lighting Applications</i>

##### Joint Service

UFGS 26 56 00	<i>Exterior Lighting</i>
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FEDERAL COMMUNICATIONS COMMISSION (FCC)

(FCC) Title 47,  
Subpart B, Section 15

Class B Non-consumer Emission Limits for Electronic  
Noise

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

HB-10-11	IES Lighting Handbook
LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products
LM-80-08	Measuring Lumen Maintenance of LED Light Sources
RP-8	Roadway Lighting ANSI Approved
TM 15-07	Luminaire Classification System for Outdoor Luminaires
TM-21-11	Projecting Long Term Lumen Maintenance of LED Light Sources

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE STDSPCD1155	IEEE Standards Dictionary: Glossary of Terms & Definitions
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INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

IEC 60529-2004	Degrees of Protection Provided by Enclosures (IP Code)
IEC 60068-2-30	Environmental Testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
IEC 60068-2-14	Environmental Testing. Tests. Test N. Change of temperature

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA C136.10	American National Standard for Roadway and Area Lighting Equipment—Locking-Type Photocontrol Devices and Mating Receptacles—Physical and Electrical Interchangeability and Testing
NEMA IC S6	Industrial Control and Systems: Enclosures
WD 7-2000	NEMA Guide Publication: Occupancy Motion Sensors

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	National Electrical Code (NEC)
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UNDERWRITERS LABORATORIES (UL)

UL 773	Standard for Plug-In, Locking Type Photocontrols for Use with Area Lighting
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UL 773A	Standard for Nonindustrial Photoelectric Switches for Lighting Control
UL 1310	Standard for Class 2 Power Units

## 1-2 DEFINITIONS

Unless otherwise specified or indicated, electrical and electronics terms used in these specifications and on the drawings shall be as defined in IEEE STDSPCD1155.

- a. Useful Life – the operating hours before reaching 70% of the initial rated lumen output point with no catastrophic failures under normal conditions.
- b. Correlated Color Temperature (CCT) – a visible light characteristic of comparing a light source to a theoretical, heated black body radiator (measured in kelvin).
- c. Effective Projected Area (EPA) – the wind loading of the fixture.
- d. International Protection (IP) Rating – delineates the level at which foreign objects and water can intrude inside a device.
- e. Restriction of Hazardous Substances (RoHS) – products that are RoHS-compliant do not contain any of the following materials: lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (Cr6+), polybrominated byphenyls (PBB), and polybrominated byphenyl ether (PBBE).

## 1-3 SUBMITTALS. Government approval is required for items (a) through (d).

- a. Shop drawings.
- b. Certified lighting design incorporating requirements outlined in ETL 12-15, paragraphs 8 and 10, where applicable. Consider possible snow and ice buildup. The luminaire fixture weight and effective projected area shall not exceed the pole's requirements for all dynamic loading; e.g. wind, snow, ice.
- c. IESNA LM-79 report on manufacturer's standard production model luminaire to include:
  - Testing agency, report number, date, manufacturer's name, catalog number, LED driver, drive current, ambient temperature.
  - Luminaire efficacy (lumens/watt), minimum light output, zonal lumen density.
  - Color qualities (CCT, CRI, chromaticity).
  - ANSI C78.377 Duv.
  - Electrical measurements (input voltage, input current, input power [watts]).
  - Spectral distribution over visible wavelengths (mW/nm).
  - Absolute intensity candlepower (cd) summary table.
  - Isocandela plot.

- Luminance summary table.
- Illuminance – point to point.
- Illuminance – cone of light plot.
- Illuminance – isofootcandle plot.
- Illuminance – roadway isofootcandle plot (if streetlight).
- Picture of sample.
- Photometric file, including BUG rating.

d. IESNA LM-80 report on LED package, array, or module, to include:

- Testing agency, report number, date, type of equipment, and LED light source being tested.
- All data required by IESNA LM-80.

**Note:** Test laboratories for the IESNA LM-79 and IESNA LM-80 reports shall be one of the following:

- National Voluntary Laboratory Accreditation Program (NVLAP) - accredited for solid-state lighting testing as part of the Energy-Efficient Lighting Products laboratory accreditation program.
- One of the qualified labs listed on the Department of Energy (DOE) SSL web site ([http://www1.eere.energy.gov/buildings/ssl/test\\_labs.html](http://www1.eere.energy.gov/buildings/ssl/test_labs.html)).
- A manufacturer's in-house lab that meets the following criteria:
  - (1) Manufacturer has been regularly engaged in the design and production of HID roadway and area luminaires and the manufacturer's lab has been successfully certifying these fixtures for a minimum of 15 years,
  - (2) Annual equipment calibration, including photometer calibration, in accordance with the NIST.

e. Computer-generated photometric analysis of the designed-to values for the “end of useful life” of the lighting installation, using an LLD value of 0.7. Submittal shall include the following:

- Horizontal illuminance measurements at finished grade. Spacing between computer calculation points shall be 10 feet.
- Vertical illuminance measurements at 5-foot intervals above finished grade.
- Minimum footcandle level.
- Maximum footcandle level.
- Average maintained footcandle level.
- Maximum and minimum ratio (horizontal).

f. Product Certificates:

- Submitted by the installing contractor, certification from the manufacturer indicating the expected useful life of the provided luminaires. The useful life



shall be directly correlated to the IESNA LM-80 test data, interpreted per IESNA TM-21. Minimum LED life shall be 50,000 hours.

- Manufacturer certification that fixture meets recyclability requirements.
- Manufacturer certification that the luminaires satisfy “Part 1-4 GENERAL REQUIREMENTS” and “Part 2 PRODUCTS” portions of this specification.

#### **1-4 GENERAL REQUIREMENTS**

Include dimensions, EPA, accessories, and installation and construction details.

#### **1-5 SAFETY CERTIFICATION**

Provide safety certification and file number as required for the luminaire family that shall be listed, labeled, or identified per the NEC. Applicable testing bodies are determined by the Occupational Safety and Health Administration (OSHA) as nationally recognized testing laboratories (NRTL) and include CSA (Canadian Standards Association), ETL (Edison Testing Laboratory), and UL.

#### **1-6 MATERIAL AND EQUIPMENT MANUFACTURING DATE**

Products manufactured more than one (1) year prior to date of delivery to site shall not be used, unless specified otherwise.

#### **1-7 WARRANTY**

LED luminaires and replacement lamps available today claim long life (e.g., 50,000 hours or more), which exceeds the life ratings of nearly all other light sources (except for some electrodeless sources). These claims are based on the estimated lumen depreciation of the LED used in the product and often do not account for other components or failure modes. Projected life of LED luminaires is a key component to payback scenarios in project evaluations; therefore, it is critical that products perform as promised and anticipated. Since life claims provided by suppliers are typically 50,000 hours or more and the initial cost of exterior LED luminaires may be significant, warranties shall include product performance as claimed in terms of useful life.

Life claims by LED luminaire manufacturers shall take into account the whole system, not just the LEDs. A key lesson learned from early market introduction of compact fluorescent lamps was that long-life claims need to be credible and backed up with adequate manufacturer warranties.

Equipment items shall be supported by service organizations that are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

**Note:** On-site replacement includes transportation, removal, and installation of new products.

- a. The LED manufacturer shall provide a written five-year on-site replacement “finish” warranty for luminaires. Finish warranty shall include warranty against failure or substantial deterioration such as blistering, cracking, peeling, chalking, or fading.
- b. The LED manufacturer shall provide a written five-year on-site replacement warranty for defective or non-starting power supply units and LED source assemblies, which include, but are not limited to, LED packages, LED arrays, LED modules, LED dies, encapsulates, and phosphors.
- c. The LED manufacturer shall provide a written five-year on-site replacement warranty for any LED source assembly, package, array, or module, which does not include the power supply, against 10% or more of the individual LEDs in that assembly, package, array, or module failing to illuminate.
- d. The LED manufacturer warranty period shall begin on the date of final acceptance, as executed by a DD Form 1354. The contractor will provide the contracting officer with the signed warranty certificates prior to final payment.

## PART 2 PRODUCTS

### 2-1 LUMINAIRES

Provide luminaires complete with LED light source and power supply unit. Details, shapes, and dimensions are indicative of the general type desired but are not intended to restrict selection to luminaires of a particular manufacturer. Luminaires of similar design, light distribution and brightness characteristics, and of equal finish and quality will be acceptable.

#### 2-1.1 GENERAL PRODUCT REQUIREMENTS

- a. Luminaires shall be UL-listed for wet locations and wiring cavities shall be field-accessible for service or repair needs.
- b. Luminaires must be rated for operation in ambient temperatures from -30 °C to [+40 °C] [+50 °C].
- c. Luminaires shall be full cutoff or fully-shielded as defined by IESNA RP-8. Alternatively, the full cutoff can be validated by meeting the following IESNA TM-15 BUG ratings (backlight, uplight, and glare):
  - Maximum uplight (U) rating of U1.
  - Maximum glare (G) rating equal to G2.

- d. Optical systems for roadway and area luminaires, including the driver, shall be sealed and rated for IP 66 as defined in IEC 60529.
- e. Luminaires shall be fully assembled and electrically tested prior to shipment from factory.
- f. For all mast-arm-mounted luminaires, a wildlife shield shall be included on the fixture to prevent wildlife access.
- g. The color of the luminaires shall be bronze, unless specified otherwise.
- h. Coatings shall be capable of surviving ASTM B117 salt fog environment for 1000 hours minimum without blistering or peeling.
- i. Coatings shall demonstrate gloss retention greater than or equal to 90% for 1000 hours' exposure QUV test per ASTM G154 UVB313, 4-hour UV-B 60 °C/4-hour condensation 50 °C.
- j. Luminaires shall be fully functional after testing for thermal shock according to IEC 60068-2-14 and be fully functional after testing.
- k. Luminaires shall be tested according to IEC 60068-2-30, damp heat, steady state, for high humidity and high temperatures and be fully functional after testing.
- l. Luminaire arm bolts shall be 304 stainless steel or zinc-plated steel.
- m. If a lens not integral to the luminaire is used, the optical enclosure (lens/window) shall be constructed from clear and UV-resistant acrylic or UV-treated tempered glass.
- n. If the lens is integral to the luminaire, the lens shall be UV treated tempered glass.
- o. At least 80% of the luminaire material by weight shall be recyclable at the manufacturer's stated end of life.
- p. Luminaires shall produce a minimum efficacy according to the following table.

Application	Luminaire Efficacy (lumens per watt)
Outdoor pole/arm-mounted area and roadway luminaires	65
Outdoor pole/arm-mounted decorative luminaires	65
Outdoor wall-mounted area luminaires	60
Bollards	35
Parking garage luminaires	70

- q. Luminaires shall incorporate modular electrical connections and be constructed to allow replacement of all or part of the optics, heat sinks, power supply units, and electrical components using only a simple tool, such as a screwdriver.
- r. Luminaires shall bear a nameplate inscribed with the manufacturer's name, address, model number, date of manufacture, and serial number, securely affixed in a conspicuous place. The nameplate of the distributing agent will not be acceptable.
- s. Roadway and area mast-arm-mounted luminaires shall have an integral tilt adjustment of  $\pm 5^\circ$ , in accordance with ANSI C136.3.
- t. Luminaires must pass 3G vibration testing in accordance with ANSI C136.31.
- u. Luminaires shall have surge protection to meet "C Low" waveforms as defined in ANSI/IEEE C62.41.2, Scenario 1 Location Category C.
- v. Luminaires shall incorporate provisions to attach a twist-lock style photocell.

## 2-1.2 WIRING

Twist-style wire nuts and tap-style striplless connectors are not acceptable for factory electrical connections.

## 2-1.3 POWER SUPPLY UNITS

**Note 1:** Remove bracketed options that are not applicable to your project.

**Note 2:** Normal ambient temperature of 40 °C (104 °F) will be adequate for typical night-time operating environments. Selection of 50 °C (122 °F) will increase the system cost and should be used when required for a specific project location. Coordinate with [40] [50] bracketed options in other parts of specification as well. Use a dimmable driver for all applications that may utilize controls (e.g., curfew, motion sensing) as part of the project.

- a. Minimum efficiency of 85%.
- b. The maximum drive current to each individual LED shall not exceed 600 mA.
- c. Rated to operate between -30 °C to [+40 °C] [+50 °C].
- d. Designed to operate on voltage system [120V to 277V] [480V] nominal. Fluctuations in line voltage up to 15% shall have no visible effect on the luminous output.
- e. Operating frequency: 50/60 Hz.



- f. Power factor (PF):  $\geq 0.90$ .
- g. Total current harmonic distortion (THD) for current:  $\leq 20\%$ .
- h. Comply with FCC 47 CFR Section 15, Class B, non-consumer RFI/EMI standards.
- i. Reduction of hazardous substances- (RoHS-) compliant.
- j. Luminaires under a covered structure shall be UL-listed Class P with a sound rating of "A."
- k. Driver shall be dimmable and compatible with standard dimming control circuits.
- l. Driver shall be protected against damage due to either an open-circuit or short-circuit fault condition on the driver output. The driver shall resume normal operation when the fault is removed.
- m. Over-temperature protection shall be provided to cut off output power if temperature limit is exceeded. The driver shall resume normal operation when within normal operating temperature.

#### 2-1.4 LED LIGHT SOURCE

**Note 1:** Select CCT values and CRI bracketed options based on application. If a design strategy is to blend with traditional lighting systems in the local area, pick a CCT in the 4,000-5,000 K range. This temperature is a warmer light source than 6500 K and provides a balance between color temperature, color rendering, and efficacy of the light source. LED chips are manufactured to achieve maximum efficacy related to a specific color temperature and this varies with chip manufacturer and binning.

**Note 2:** High pressure sodium is 2700 K, warm metal halide is 3200 K, clear metal halide is 4000 K, and moonlight is 4100 K.

**Note 3:** 6500 K is a cooler temperature and should only be used when color rendering or environmental concerns such as sky glow are not a factor. Objects appear bluish and items in the red color spectrum may appear distorted.

- a. Correlated color temperature (CCT) shall be in accordance with ANSI C78.377.
  - [Nominal CCT: 3000 K: 3045  $\pm$  175 K]
  - [Nominal CCT 3500 K: 3465  $\pm$  245 K]
  - [Nominal CCT: 4000 K: 3985  $\pm$  275 K]
  - [Nominal CCT 4500 K: 4503  $\pm$  243 K]
  - [Nominal CCT 5000 K: 5028  $\pm$  283 K]
  - [Nominal CCT 5700 K: 5665  $\pm$  355 K]

- [Nominal CCT: 6500 K: 6530 ± 510 K]
- b. Color Rendering Index (CRI) shall be > 65 for all CCTs.
- c. Thermal management shall be passive by design and shall consist of heat sinks with no fans, pumps, or liquids.

## **2-2 ELECTRICAL SYSTEM**

**2-2.1 SURGE PROTECTION:** Comply with ETL 12-15, paragraph 10.5.

### **2-2.2 DAYLIGHTING CONTROLS**

- a. All street, exterior parking lot, drive, and front aisle areas shall be controlled such that exterior luminaires shall not operate during hours of daylight.
- b. Controls may include a combination photocell plus time switch or an energy management system.
- c. Controls shall allow automatic on and off settings based on daylighting, plus timed off settings after expected activity ends.
- d. The energy management system shall employ predetermined control strategies to include automatic dimming for adaptive standards, and remote control shall be in accordance with ETL 11-1, *Civil Engineer Industrial Control System Information Assurance Compliance*.
- e. Consult Unified Facilities Guide Specification (UFGS) 26 56 00, *Exterior Lighting*, for photocell, time switch, and occupancy control requirements.

## DISTRIBUTION LIST

### DEPARTMENT OF DEFENSE

Defense Commissary Agency Design and Construction Division 2250 Foulis St., Suite 2 Lackland AFB, TX 78236	(1)	AAFES ATTN: RE-C PO Box 660202 Dallas, TX 75266-0202	(1)
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### SPECIAL INTEREST ORGANIZATIONS

Information Handling Services 15 Inverness Way East Englewood CO 80150	(1)	Construction Criteria Database National Institute of Bldg. Sciences 1201 L Street NW, Suite 400 Washington, DC 20005	(1)
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<b>6 CES MAFB CONTRACTOR HAZMAT LIST</b>					
<b>PROJECT #</b>	<b>CONTRACTOR NAME:</b>				<b>POC PHONE #</b>
<b>BRIEF PROJECT DESCRIPTION AND LOCATION</b>					<b>6CES/CEC POC</b>
<b>PRODUCT NAME</b>	<b>MANUFACTURER</b>	<b>MANUFACTURER PART/PRODUCT NUMBER</b>	<b>CONTAINER SIZE</b>	<b>CONTAINER TYPE</b>	<b>ESTIMATED MAXIMUM QUANTITY</b>
<b>BIO-ENVIRONMENTAL REVIEW</b>		<b>SAFETY REVIEW</b>		<b>ENVIRONMENTAL REVIEW</b>	



6 CES MAFB CONTRACTOR HAZMAT PROFILE WORKSHEET

CONTRACTOR NAME: \_\_\_\_\_ PROJECT #: NVZR \_\_\_\_\_  
ADDRESS: \_\_\_\_\_ CONTRACT PERIOD  
\_\_\_\_\_  
FROM: \_\_\_\_\_  
\_\_\_\_\_  
TO: \_\_\_\_\_  
CITY: \_\_\_\_\_  
STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_  
BLDG# / SITE / LOCATION: \_\_\_\_\_  
ORGANIZATION SUPPORTED: \_\_\_\_\_  
POC NAME: \_\_\_\_\_ PHONE: \_\_\_\_\_  
CONTRACTING OFFICER: \_\_\_\_\_ PHONE: \_\_\_\_\_  
QAE / INSPECTOR: \_\_\_\_\_ PHONE: \_\_\_\_\_  
CONTRACT TITLE: \_\_\_\_\_

BRIEF DESCRIPTION OF WORK:


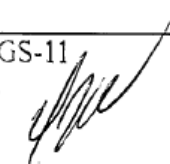
CERTIFICATION STATEMENT: I CERTIFY THAT ALL HAZARDOUS MATERIALS TO BE USED IN CONJUNCTION WITH THIS CONTRACT APPEAR ON THE CONTRACTOR MSDS SUBMITTAL EXEMPT ITEMS LIST.

NAME (PRINT): \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

## 6 CES MAFB CONTRACTOR MSDS SUBMITTAL EXEMPT

## CONTRACTOR MSDS SUBMITTAL EXEMPT LIST

The items cited on the list below do not require MSDS submission if used and managed within the limitation indicated. This exemption applies only to the Hazmat MSDS submittal clause in the contract. It does not exempt these items from any applicable environmental, safety, occupational health or federal acquisition regulation requirements cited elsewhere in the contract.			
ITEM NAME	*Household Quantity	ITEM NAME	*Household Quantity
Administrative supplies (white out, ink pads, etc.)		Gasoline, unleaded, diesel, etc.	X
Air Freshener		General Purpose cleaners (Lysol, Pine-sol, etc)	X
Alkaline Batteries (AA,AAA,C,D,Etc.)		Glass Cleaners, Windex, etc.	X
Anti-Seize (Teflon) Tape		***Glue Sticks, Elmer's Glue	X
Armor All Protectant	X	Grout/Mortar	
Automobile Wax		Hardware (nuts, bolts, screws, nails, washers, etc.)	
Bleach (Clorox, etc.)	X	Insect Repellent, Back Woods Off, etc.	
Carpet / upholstery cleaner		Insect Sprays, Black Flag, Raid, Wasp Spray etc.	
Ceiling Tiles		Leak Detector (Soapy Water)	
Charcoal Starter Fluid	X	Marker Board Cleaner (pump spray)	
Concrete and concrete mix		Metal Polish (Brasso, etc.)	
Common Household detergents, cleaning products	X	Metal wire, framing, girders, I-beams, window frames, etc.	
Dessicant		Printer Cartridges, Ink Cartridges, Printer ribbons	
Dish/Hand Soaps (Ivory, Go-Jo, Etc.)		Shredder Oil	
Drywall/Wallboard		Stamp Pad Ink	
Eye Wash Solutions for personal protection		Sun Block	
**Fire Extinguishers		Superglue	
Floor Wax / Remover / Sweeping Compound	X	Treated Lumber or lumber products	
Furniture Polish (Pledge, Min Wax, Etc.)	X	Toner Cartridges	
		Water, distilled, de-ionized	
<p>* The term "Household quantities" is defined as quantities one could reasonably assume to be found / used by the normal consumer. It does not include industrial or bulk quantities such as 30 or 55 gallon drums.</p> <p>** Halon fire extinguishers are not exempt.</p> <p>*** Industrial adhesives are not exempt</p>			
6 AMDS Bio-Environmental	6 CES Environmental (Gov't)	6 AMW Safety	
<b>Joann E. Herstek</b> <b>6 AMDS/SGPB</b> <b>MacDill AFB, FL 33621</b> <b>813-827-9589</b> <b>Joann.Herstek@macdill.af.mil</b>	 <b>6 CES / CEV</b>	<b>Donald J. Washington GS-11</b> <b>Safety Specialist</b> <b>6 AMW/SEG</b> <b>828-3385</b> 	

**6 CES MAFB Uninterruptible Power Supply (UPS) SUBMITTAL**

Building #	Room #	UPS Make / Model	Battery Make/Model	Quantity of Batteries

## APPENDIX 15

### REQUIREMENTS FOR FUGITIVE DUST

1. Emissions of Unconfined Particulate Matter. No person to cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any activity, including, but not limited to, vehicular movement; transportation of materials; construction; alteration, demolition or wrecking or industrial related activities such as loading, unloading, storing or handling; without taking reasonable precautions to prevent such emissions. Reasonable Precautions include, but are not limited to, the following:
  - a. Paving and Maintenance of roads, parking areas, and yards;
  - b. Application of water or chemicals to control emissions from such activities as demolition of buildings, grading roads, construction, and land clearing;
  - c. Application of asphalt, water, oil, chemicals, or other dust suppressants to unpaved roads, yards, open stock piles, and similar sources;
  - d. Removal of particulate matter from roads and other paved areas under the control of the permittee to prevent reentrainment, and from buildings or work areas to prevent particulate from becoming airborne;
  - e. Landscaping or planting of vegetation;
  - f. Use of hoods, fans, filters, and similar equipment to contain and/or vent particulate matter; and
  - g. Confining abrasive blasting, where possible.
2. Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.
3. Dirt and Fugitive Dust Control Plan Submittal  
Submit truck and material haul routes along with a plan for controlling dirt, debris, and dust on MacDill AFB. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

#### 4. REFERENCES

UFGS-01 57 19.00 20 Temporary Environmental Controls

Rule 62-296.320(4)(c) Florida Administrative Code



APPENDIX 15  
REQUIREMENTS FOR NATURAL GAS-FIRED HEATING UNITS OR OTHER  
EXTERNAL COMBUSTION UNITS

External combustion sources include steam/electric generating plants, industrial boilers, and commercial and domestic combustion units. Coal, fuel oil, and natural gas are the major fossil fuels used by these sources. Liquefied petroleum fuels are also used in relatively small quantities. Power generation, process heating, and space heating are some of the largest fuel combustion sources of sulfur oxides, nitrogen oxides, and particulate emissions.

The contractor shall notify 6 CES/CEV 30 days prior to installation of any new permanent or temporary natural gas-fired or other external combustion systems. The notification shall include, at a minimum, the building number, manufacturer, model number, and heat input rating in BTU/hour. All natural gas fired or other external combustion systems shall be added to the MAFB Title V Air Operating Permit by 6 CES/CEV prior to installation by the contractor.

REFERENCES

Rule 62-210.300 Florida Administrative Code  
AP-42, Volume I, Chapter 1: External Combustion Sources

## APPENDIX 15

## REQUIREMENTS FOR INTERNAL COMBUSTION ENGINES (ICE)

1. The contractor shall supply an Internal Combustion Engine in compliance with the U.S. Environmental Protection Agency requirements, including but not limited to the following:

**Note:** Unless otherwise noted, the latest version of a publication applies.

- a. Engineering Technical Letter (ETL) 11-21 (Change 2): *Emergency and Standby Generator Design, Maintenance, and Testing Criteria*
  - b. 40 CFR Part 60, Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*
  - c. 40 CFR Part 60, Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*
  - d. 40 CFR Part 63, Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*
  - e. 40 CFR Part 89, *Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines*
  - f. 40 CFR Part 90, *Control of Emissions from Nonroad Spark-Ignition Engines at or Below 19 Kilowatts*
  - g. 40 CFR Part 91, *Control of Emissions from Marine Spark-Ignition Engines*
  - h. 40 CFR Part 94, *Control of Emissions from Marine Compression-Ignition Engines*
  - i. 40 CFR Part 1039, *Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines*
  - j. 40 CFR Part 1048, *Control of Emissions from New, Large Nonroad Spark-Ignition Engines*
  - k. 40 CFR Part 1054, *Control of Emissions from New, Small Nonroad Spark-Ignition Engines and Equipment*
    1. 40 CFR Part 1068, *General Compliance Provisions for Highway, Stationary, and Nonroad Programs*
2. Engine Labeling: The engines shall be labeled according to the provisions including, but not limited, 40 CFR parts 89, 90, 94, 1039 1042, 1048, 1054, or 1068, as required and applicable.
  3. Inspection: The engine is required to be inspected/accepted by 6 CES/CEV
  4. Submittals

**Note:** Shall be provided at least 30 days prior to delivery of the Internal Combustion Engine

- a. kW and Hp Rating
- b. Engine Model Number
- c. Engine Serial Number
- d. Engine Technical Data Sheet and, if applicable, Emergency Generator or Fire Pump Technical Data Sheet
- e. Statement of Exhaust Emissions or Emission Data Sheet
- f. USEPA Certificate of Conformity for the engine supplied
- g. Documentation of presence of a non-resettable hour meter

APPENDIX 15  
REQUIREMENTS FOR REFRIGERANTS

1. DEFINITIONS:

“Appliance” means any device which contains and uses a refrigerant and which is used for household or commercial purposes, including any air conditioner, refrigerator, chiller, or freezer.

"Refrigerant" means any substance consisting in part or whole of a class I or class II ozone depleting substance that is used for heat transfer purposes and provides a cooling effect.

"Substitute" means any chemical or product, whether existing or new, that is used by any person as an EPA approved replacement for a class I or II ozone-depleting substance in a given refrigeration or air-conditioning end-use.

"Class I substance" refers to the controlled substances contained in the list found on EPA's website at the following address: <http://www.epa.gov/ozone/science/ods/classone.html>

"Class II substance" refers to the controlled substances contained in the list found on EPA's website at the following address: <http://www.epa.gov/ozone~science/ods/classstwo.html>

"Full charge" means the amount of refrigerant required for normal operating characteristics and conditions of the appliance as determined using one of the following four methods:

- Use the equipment manufacturer's determination of the correct full charge for the equipment,
- Determine the full charge by making appropriate calculations based on component sizes, density of refrigerant, volume of piping, and other relevant considerations;
- Use actual measurements of the amount of refrigerant added or evacuated from the appliance; and/or
- Use an established range based on the best available data regarding the normal operating characteristics and conditions for the appliance, where the midpoint of the range will serve as the full charge and where records are maintained in accordance with §82.166( q).

2. SUBMITTALS

- a. Provide the name, address, and phone number of any contractor/subcontractor contracted by MacDill AFB/USACE/Others to service, maintain, repair and/or dispose of any appliance containing a refrigerant.
- b. Provide the name of each technician, including supervisors and managers, performing any service, maintenance, repair and/or disposal of any appliance containing a refrigerant.
- c. Provide a copy of each technician's certification indicating training in refrigerant recycling by an EPA approved training program, including the date of certification for each technician and the level of certification.
- d. Answer “Yes”, if the appliance(s) the contractor installed, serviced, maintained, repaired and/or disposed located within the jurisdiction of the MacDill AFB that contained and used a class I, class II, or substitute refrigerant in amounts greater than 50 pounds.
- e. If the answer to Question (d.) is “Yes” provide the following:
  - i. Facility Name
  - ii. Building #
  - iii. Appliance Model #



# Construction Standards Manual

**MAY 20, 2009**  
**ANNUAL UPDATE**

**Only the version of this document which is posted on the TECO Peoples Gas intranet website shall be considered the current, Authorized Version. See the next page for important information regarding mid-year revisions and updates.**

*Forward corrections or suggestions to Jeff Wykoff, Manager, Technical Services [jwykoff@tecoenergy.com](mailto:jwykoff@tecoenergy.com), TECO Plaza 7*

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Document by: <b>J. Wykoff</b>	Next Review Date: <b>May 2010</b>				Replaces Version Date: <b>January 15, 2009</b>



## ANNUAL UPDATE

1. Annual update changes can be identified by a vertical line in the right margin. Removed text appears as *italicized strikethrough* font and added text in underlined font.
2. Annual update changes are not highlighted (only mid-year revisions are).
3. For Annual Updates, the dates in all footers will change to reflect the update.
4. The table below summarizes the changes.

05/20/09	1.	Title Page (date changed, disclaimer added)
	2.	Index and Footers - (changed page numbers, added disclaimer, changed dates)
	3.	Update and Revisions Tables (added new page)
	4.	Index Pages (corrected, updated page numbers)
	5.	Section 4.4, "Method of Construction, Welding Steel", Item 3.a, "Welds" (additional reference language)
	6.	Section 4.5, "Testing of Welders (added Item 13, "Nondestructive Testing for Systems Operating with MAOP Less Than Twenty Percent (20%) SMYS")"
	7.	Section 5.3, "Method of Construction, Installation of Plastic Pipe" (corrected item numbering)
	8.	Section 6.5, "Visual Inspection and Electrical Testing of Coating" (revised entire section)
	9.	Section 6.6, "Steel Fittings, Valves, and Appurtenance Coatings" (revised title and entire section)

## MID-YEAR REVISIONS

1. Operations Leadership and Management teams shall be notified of revisions issued by Corporate Engineering Services via electronic mail.
2. The revised version of the entire manual will be posted in the TECO Peoples Gas intranet page on the date of the email notification.
3. Mid-year revisions are identified with highlighted text. Removed text appears in ~~highlighted strikethrough~~ font and added text in highlighted underlined font.
4. The subsequent annual update will incorporate the previous annual update and mid-year revisions by reverting to normal text font.
5. For mid-year revision issuances only, the date in the footer will be updated in **just the affected section(s)**.
6. It is the responsibility of Operations Leadership and Management to ensure all printed versions of this document are current and reflect the current, Authorized Version posted on the TECO Peoples Gas intranet website.

04/26/09	1.	Section 4.5, "Testing of Welders", Item 13, "Nondestructive Testing for Systems Operating with MAOP Less Than Twenty Percent (20%) SMYS" (added conditions and clarifications).
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## **PREFACE**


### **Preface 1.1 – Implementation Policy**

1. It is the policy of TECO Peoples Gas (Peoples Gas) to construct, operate and maintain natural gas systems in a manner which is safe and consistent with good industry practice.
2. Furthermore, Peoples Gas shall comply with all federal, state and local gas codes; generally, these codes set minimum standards but do not specify the manner in which the minimums are to be achieved.
  - a. Therefore, Peoples Gas has issued this Construction Standards Manual and any supplemental documents, the **Operating and Maintenance Procedures Manual**, the **Appendix B - Standard Material List**, **Appendix C - Standard for Pressure Piping -Joining By Welding**, and the **Emergency Procedures Manual**, all of which are used in achieving its goals as well as the requirements of the codes.
3. The records, reports, and forms required by the regulations covered by these policies may be in either paper or electronic form, and archived as appropriate.
4. The Division Manager shall be responsible for the implementation of the policy unless otherwise identified.
  - a. The following words and phrases which are used throughout the manual are used synonymously: local operating center, Supervisor, Supervisor in charge of the operation, Division Manager, and Division Manager’s designated representative.
5. Where the word “include” occurs, it means including but not limited to. Where the word “may” is used it means “is permitted to” or “is authorized to”. Where the words “may not” are used it means “is not permitted to” or “is not authorized to”. Where the word “shall” is used it is used in the mandatory and imperative sense. Where a singular word tense is used, it includes the plural. Where a plural word tense is used, it includes the singular. Where a masculine gender word is used, it includes the feminine, and vice versa.

### **Preface 1.2 – Scope**

1. This Construction Standards Manual covers the design and construction practices associated with the Peoples Gas natural gas distribution system, with the intent that all components of the Peoples Gas distribution system are consistently installed and maintained in a manner that:
  - a. meets state of Florida and federal requirements;
  - b. provides for public safety;
  - c. ensures efficient design;
  - d. protects the environment; and,
  - e. exemplifies the use of best industry practices in order to provide reliability.
2. The scope of this manual is limited to the Peoples Gas pipeline system starting from the outlet of the sale meter from the natural gas suppliers to the outlet of the customer’s meter.

(continued)


Issued by: <b>Corp. Engin.</b>	Approved by: <b>M. Haney</b>		<b>Preface</b> <b>Page 1 of 2</b>	The version of this document which is posted on the TECO Peoples Gas intranet is the only current, authorized version.	Version Date: <b>May 20, 2009</b>
Document by: <b>J. Wykoff</b>	Next Review Date: <b>May 2010</b>				Replaces Version Date: <b>January 15, 2009</b>

3. This manual addresses requirements of federal regulations as embodied in CFR 49, Part 192, Pipeline Safety Regulations and the Florida Public Service Commission embodied in the state of Florida Administrative Code (FAC), Chapters 25-7 and 25-12 (said rules are incorporated into these standards by reference).
4. Field inspections shall be conducted sufficient to assure compliance with these Construction Standards.
5. The Implementation Policy described in the Peoples Gas **Operating and Maintenance Procedures Manual** is incorporated into this Manual.

Reference: CFR49 Parts 192.13 and 192.305; FAC 25-12.004, .007, .008, .009, .020, .030 and .080.

**Preface 1.3 – Restricted Access**

This document is restricted to use by Peoples Gas employees, authorized contractors and their employees, and regulatory personnel. If found, please mail this handbook to TECO Peoples Gas, P.O. Box 2562, Tampa, Florida 33601-2562, Attention: Engineering Services Department/Plaza 7. Telephone (800) 282-4441 or contact the local TECO Peoples Gas office.

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## **SECTION 1 - DESIGN CRITERIA**

### **Section 1.1 – Materials Requirements and Records**

1. All pipeline materials used in the Peoples Gas distribution systems, including all pipeline and service line appurtenances:
  - a. must be capable of maintaining their structural integrity under anticipated temperature and environmental conditions;
  - b. must be chemically compatible with the gas being transported;
  - c. must comply with the requirements of Section 23, "Material Specifications" of this manual;
  - d. must be listed as an approved item in the Peoples Gas document, **Appendix B - Standard Material List** (or as approved by Peoples Gas' corporate Engineering Services), which is incorporated as a part of the Peoples Gas Construction Standards; and,
  - e. must be purchased through the Peoples Gas Purchasing Department (including all emergency orders).
  
2. A record of all materials used shall be made for each construction and maintenance project on Peoples Gas systems using the appropriate Peoples Gas form(s) applicable to the work being performed.

### **Section 1.2 - Design Formulas**

1. Steel pipelines must be designed in accordance with the following:

$$P = \frac{2St}{D} \times F \times E \times T$$

where:

P = design pressure in pounds per square inch gage (PSIG);

S = yield strength in pounds per square inch (as stated in the listed specifications of the pipe);

D = nominal outside diameter of the pipe in inches (as shown on the mill test reports);


t = nominal wall thickness of the pipe in inches (as shown on the mill test reports);

F = design factor;

E = longitudinal joint factor (1.00 for API specification 5L and 0.60 for ASTM A53 Furnace Butt Weld); and,

T = temperature de-rating factor (1.00 when the gas temperature is less than two hundred fifty degrees Fahrenheit (250°F)).

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2. See the Peoples Gas document **Appendix B - Standard Material List** for the approved steel pipe.
3. X-trube tubing shall not be installed within the Peoples Gas distribution system.
4. Each steel service line to be operated at less than one hundred pounds per square inch gage (100 PSIG) must be constructed of pipe designed for a minimum of one hundred pounds per square inch gage (100 PSIG).
5. Plastic (PE) pipelines shall be designed using the following:

$$P = \frac{2St}{(D-t)} \times .32$$

where:

- P = design pressure in pounds per square inch gage (PSIG);
- S = Long Term Hydrostatic strength in pounds per square inch (PE2406 Type II Grade 3 material is one thousand two hundred fifty pound per square inch gage (1250 PSIG);
- t = specified wall thickness in inches; and,
- D = specified outside diameter in inches.

### **Section 1.3 - Pressure Systems**

1. See also Section 12.0, "Defects, Testing, Cleaning and Purging" for pressure test requirements.
2. Utilization Pressure Systems
  - a. All utilization pressure gas distribution systems shall be designed so that the normal operating pressure shall be seven inches water column (7" WC) for natural gas.
    - i. NOTE: the maximum allowable operating pressure shall be fourteen inches water column (14" WC) for natural gas.
  - b. Care should be exercised to assure that the gas distribution system is not operated at a pressure of less than five inches water column (5" WC) even under peak conditions.
  - c. Plastic pipe gas mains and service lines may be installed in utilization pressure systems.
3. Medium Pressure Systems
  - a. All medium pressure gas distribution systems shall be designed to operate at a maximum pressure of ten pounds per square inch gage (10 PSIG) and a minimum pressure of one pound per square inch gage (1 PSIG).
  - b. Plastic pipe gas mains and service lines may be installed in medium pressure gas distribution systems.

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4. Intermediate Pressure Systems
  - a. All intermediate pressure gas distribution systems shall be designed to operate at a maximum pressure of sixty pounds per square inch gage (60 PSIG) and a minimum pressure of ten pounds per square inch gage (10 PSIG).
  - b. Plastic pipe gas mains and service lines may be installed in intermediate pressure gas distribution systems.
  
5. High Pressure Systems
  - a. All high pressure gas distribution systems shall be designed to operate at the maximum allowable delivery pressure of the gas distribution system and at a minimum pressure of sixty pounds per square inch gage (60 PSIG).
  - b. The maximum actual delivery pressure, however, must not exceed a pressure which will produce a hoop stress in the pipe in excess of twenty percent of the specified minimum yield strength (20% of SMYS).
  - c. Plastic pipe gas mains and service lines shall not be installed in high pressure gas distribution systems without prior approval of the Peoples Gas' corporate Engineering Services department.
  
6. Transmission Pressure Systems
  - a. Any pipeline that operates at a pressure that produces a hoop stress in excess of twenty percent specified minimum yield strength (20% of SMYS) shall be considered a transmission system.
  - b. Transmission pipelines may have special construction requirements and all such pipelines shall be designed by and installed under the direction of Peoples Gas' corporate Engineering Services.
  - c. New transmission pipe, valves, fittings, or other line components installed after May 23, 2007 must have features incorporated into the design and construction to reduce the risk of internal corrosion.
  - d. Unless it is impracticable to do so, each new transmission line or replacement of line pipe, valve, fitting, or other line component shall:
    - i. be configured to reduce the risk that liquids will collect in the line;
    - ii. have effective liquid removal features; and,
    - iii. allow the use of devices for monitoring internal corrosion at locations with significant potential for internal corrosion.
  - e. When an operator changes the configuration of a transmission line, design criteria shall consider the impact on the existing downstream system for the risk of increased internal corrosion.
    - i. Records and/or written procedures must be maintained that demonstrate compliance with this criteria.
  - f. Any physical or operational change(s) or modification(s) to transmission lines must be designed, approved and implemented by Peoples Gas' corporate Engineering Services.
  - g. Only steel pipe shall be used in transmission systems.

## **SECTION 2 - EXCAVATION AND DITCHING**

### **Section 2.1 - Description**

1. Section 2, "Excavation and Ditching" includes:
  - a. all excavation, whether by trenching machine, by plowing-in, by power shovel, by hand, or by other methods which may be necessary after clearing and grading has been completed (as specified in Section 21, "Clearing and Grading" of these Standards); and,
  - b. the preparation of a trench or bell hole in which construction or maintenance work is to be undertaken.
  
2. The word "ditching" as used herein shall mean:
  - a. the maintenance of the ditch or bell hole;
  - b. temporary damming, pumping, bailing, draining and dewatering where required; and,
  - c. the furnishings and placing of any temporary shoring used to maintain the ditch.
  
3. Installation of plastic pipe by "plow" or "plowing-in" is acceptable provided adequate care is taken to assure that the pipe and tracer wire is not damaged due to cuts or abrasions or subjected to stretching during installation.
  
4. It is Peoples Gas' policy to protect all wetlands and other environmentally sensitive areas whether or not they are indicated on construction drawings.
  - a. To prevent spilling or dumping spoil into wetlands, drainage systems or natural bodies of water, silt screens and other protection devices shall be used.
  - b. Spoil must be placed upland or removed from the site.
  - c. Spoil shall not be placed (even temporarily) in wetland or drainage areas.
  - d. The jurisdictional authority will make the determination in questionable areas as to whether an area is a wetland or environmentally sensitive area.

### **Section 2.2 - Route of Ditching**

1. The route laid out along right-of-way not under paved streets or highways will be established insofar as possible to avoid damage to trees or their roots, but where major roots of trees are encountered, the ditch shall be altered to avoid damage to roots by ditching around or under said roots.
  
2. All stumps and roots shall be cut out of the ditch line and removed to at least six inches (6") below ditch grade and clean fill shall be used to back-fill and tamp.
  - a. No chips or parts of stumps shall be left in the ditch.
  
2. The spoil bank from ditching operations should not be mixed with loose debris or foreign matter that then might be used in backfilling the ditch line.

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3. Prior to any excavation, notification to the Sunshine State One Call Center of Florida shall be made as required by the "Underground Facility Damage Safety Act", Chapter 556, Florida Statutes.
4. Existing utilities and appurtenances crossing or in immediate proximity to the ditch shall be located and necessary action taken to safeguard them during excavation (See Section 2.5, "Utility Crossing or Parallel Occupancy", below, for minimum clearances and other requirements).

### **Section 2.3 - Ditch Excavation**

1. Ditches shall be excavated for each size range of pipe within maximum widths throughout the ditch depths (see table shown below), and to minimum widths and depths to provide minimum cover:

<b><u>Pipe Size</u></b>	<b><u>Minimum Width of Ditch</u></b>	<b><u>Maximum Width of Ditch*</u></b>
4" and smaller	Twice pipe diameter	12"
6" to 12"	Twice pipe diameter	24"

\*The Division Manager can waive these limitations where ground conditions warrant.

2. Unless otherwise specified by the governing authority, the minimum cover over distribution piping shall be twenty four inches (24"); service lines shall be eighteen inches (18") on public right-of-way and twelve inches (12") when on private property.
  - a. Where these cover provisions cannot be met or where external loads may be excessive, the pipeline shall be cased, bridged, or specially designed to withstand anticipated load.
3. Unless otherwise specified by the governing authority, each buried transmission line must be installed with the minimum cover as follows:

<b><u>Location</u></b>	<b><u>Normal Soil</u></b>	<b><u>Consolidated Rock</u></b>
Class 1*	30"	18"
Class 2, 3, and 4*	36"	24"
Drainage Ditches or Public Roads	36"	24"

\* Note: class locations are defined below in this **Construction Standards Manual, Section 19, "Class Locations"**.

4. The depth of cover shall be measured from the average level of the paved thoroughfare or graded right-of-way of the two sides of the ditch to the top of pipe or pipe covering after pipe has been installed in the ditch.
5. The ditch shall be true to line and grade as established and shall be carefully graded by hand wherever necessary to meet the requirements of this section and to provide an even bed for the full length of pipe.

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6. Employees in an excavation shall be protected from cave-in in accordance with the TECO Peoples Gas Excavation Program and OSHA (29 CFR, Part 1926), Subpart P – Excavations.
7. Where pedestrian or vehicular traffic is to be maintained over or adjacent to excavations, proper safeguards shall be provided to protect the traffic and the excavation in accordance with Peoples Gas System, governmental or other applicable Americans with Disability Act requirements (such safeguards shall include but not be limited to walkways, bridges, guard rails, warning lights, etc.).
8. Undercutting of the sides of excavations shall not be permitted unless special shoring or bracing is installed.
9. Tunneling or cave-type excavations in the sidewall of the excavation will not be permitted.
10. A safety hat shall be worn by all personnel required to pass through or work in areas where there is danger of being struck by objects or materials.
11. If petroleum contaminated soils or water are encountered, excavation is to stop immediately and notification given to the Division Manager and Peoples Gas' corporate Engineering Services.
12. NOTE: Should any of the above standards in this section be interpreted to be in conflict with OSHA Standards, the OSHA requirement will be the controlling regulation.


**Section 2.4 - Waterway, Highway and Railroad Crossing**

1. Along approaches to any waterway, highway or railroad crossing, the depth of ditch shall be increased to the extent considered necessary to allow gradual change in the bottom of the ditch to permit the pipe to bend gradually and naturally in following the ditch bottom.

**Section 2.5 - Utility Crossing or Parallel Occupancy**

1. Where a distribution main or service line crosses over or under interfering pipes of other utilities, appurtenances or other underground structures, a minimum separation of six inches (6") should be maintained.
  - a. The bottom of the ditch should be lowered or raised, or the ditch relocated laterally to maintain the desired clearance.
  - b. Should raising of the ditch reduce the specified normal cover to the extent that less than the required six inch (6") clearance is provided, the clearance should be obtained by lowering the gas line if the raised pipe would have less than the minimum cover allowed in the Construction Standards.
  - c. If this clearance cannot be attained, the line must be protected from damage that might result from the proximity of the other structure.
2. Where a transmission line crosses over or under interfering pipes of other utilities, appurtenances or other underground structures, a minimum separation of not less than twelve inches (12") should be maintained.

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- a. The bottom of the ditch should be lowered or raised, or the ditch relocated laterally to maintain the desired clearance.
  - b. Should raising of the ditch reduce the specified normal cover, to the extent that less than the required twelve inch (12") clearance is provided, the clearance should be obtained by lowering the gas line if the raised pipe would have less than the minimum cover allowed in these Construction Standards.
  - c. If this clearance cannot be attained, the line must be protected from damage that might result from the proximity of the other structure.
3. Where raised pipe will rest on backfilled material, backfill shall be thoroughly tamped to provide solid bearing for the pipe.
  4. The depth of ditch shall increase or decrease gradually to allow the pipe to bend gradually and naturally in following the ditch bottom without requiring bends in the pipe.
  5. Where a transmission line, distribution main, or service line parallels other lines, not less than twelve inches (12") separation will be maintained from such other lines.
    - a. The required separation from parallel lines shall be obtained by moving the ditch line laterally rather than through reduction of the normal minimum cover over the gas line.
    - b. In those instances where maintenance of the minimum clearance between pipes is impracticable, such separation may be reduced provided an adequate insulating material, fiberboard or other non-electrical conductive cushioning material is placed between the pipes.
    - c. The foregoing clearances shall be the minimum clearances allowable, but if the owners of interfering lines or regulatory authorities require greater clearances, such reasonable requirements shall be complied with.
  6. Each plastic pipe main or service line must be installed with sufficient clearance, or must be insulated from any sources of heat, so as to prevent that heat from impairing the serviceability of the pipe.

## **Section 2.6 - De-Watering Ditches**

1. Where pumping of ditches in urban areas is required, whether due to presence of storm water or ground water, special care shall be given to avoid any damage or disfigurement to either private or public property including streets.
2. Constant vigilance shall be maintained to prevent the entrance of water into the gas pipe.

## **SECTION 3 - BENDING**


### **Section 3.1 - Description**

1. Section 3, "Bending", includes all work necessary to shape the pipe to conform to the trench.

### **Section 3.2 - Method of Construction, Bending Steel**

1. The intent of this section of the Construction Standards is to provide for the use of factory fabricated tube turns (elbows) for direction changes.
  - a. However, under certain circumstances, it may be necessary to effect a change in direction of the pipe by cold field bends which shall be permitted only with the approval of the Division Manager.
2. Where the terrain is such that the pipe will not conform to the profile of the ditch, bends shall be placed in the pipe at points which will coincide with points of change in the grade of the ditch.
3. All bends shall be made so that there will be a minimum of five feet (5') between any circumferential weld, coupling, collar, etc. in the pipe and the nearest part of the bend.
4. All sag bends and side bends shall fit the trench neatly, and over bends shall be eight inches (8") to twelve inches (12") above the trench bottom.
5. All side bends shall rest against the wall of the trench farthest from the inside of the curvature of the bend.
6. Transmission lines which operate at a pressure producing a hoop stress of twenty percent (20%) or more of the specified minimum yield strength (SMYS) must be installed so that the pipe fits the ditch so as to minimize stresses and protect the pipe coating.
7. All bends shall be free from buckling, cracks or other evidence of mechanical damage.
8. All bends, other than wrinkle bends, shall not have a difference between the maximum and minimum diameters in excess of two and one half percent (2.5%) of the normal diameter.
9. In addition, for cold bends on sizes twelve inches (12") and larger, the longitudinal axis of the pipe shall not be deflected more than fifteen degrees (15°) in any length along the pipe axis equal to the diameter of the pipe.
10. The difference between the minimum and maximum diameters does not apply to cold field bends on API 5L pipe four inches (4") and smaller in diameter, operating at ten percent (10%) or less of the specified minimum yield strength (SMYS) providing the radii is equal to, or greater than, five (5) times the diameter of the pipe and there is not a circumferential weld in the bend.
11. Wrinkle bends are not permitted on pipe that produces a hoop stress of thirty percent (30%) or more of specified minimum yield strength (SMYS).

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- 12. When wrinkle bends are made in welded pipe, the longitudinal weld shall be located as near as practicable to the neutral axis of the bend.
- 13. The bend must not have any sharp kinks and the crotch of the wrinkles must be a distance of at least one pipe diameter apart.
- 14. All wrinkle bends shall be reported to and approved by Peoples Gas' corporate Engineering Services.
- 14. No circumferential welds are permitted in the bend.

**Section 3.3 - Method of Construction, Bending Plastic**

- 1. When plastic pipe is installed, factory fabricated fittings (elbows) shall be used for sharp direction changes, take-offs, etc. All plastic pipe and fittings shall be installed according to manufacturer's installation specifications.

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## **SECTION 4 - JOINING PIPE AND FITTINGS**

### **Section 4.1 – Description**

1. Section 4, "Joining Pipe and Fittings" includes all work necessary for welding or fusing pipe joints.


### **Section 4.2 - Joining Methods and Requirements**

1. This section shall include work necessary for welding or fusing pipe joints.
2. This sub-part does not apply to joining during the manufacture of pipe or pipeline components, all joints shall meet the minimum requirement for joining materials in pipelines, other than by welding.
3. All joints shall meet the minimum requirement for joining materials in pipelines, other than by welding.
4. All joining will be made in such a manner that the strength of the joint exceeds the minimum stress and strain factors of the pipe as specified by the manufacturer.
5. All joints made should sustain the longitudinal pullout or thrust forces caused by contraction or expansion of the piping system or by anticipated external or internal loading.
6. Each joint must be made in accordance with the written procedures of this manual that have been proven by test or experience to produce strong gas tight joints.
7. Joints shall be made by persons qualified through experience or training and having successfully completed the Peoples Gas testing procedures.
8. Each joint will be visually inspected upon completion to insure compliance with procedures.

### **Section 4.3 - Description, Welding Steel**

1. All electric and gas welding shall comply with written procedures (See **Appendix C - Standard for Pressure Piping -Joining By Welding**).
2. All welders must be qualified showing they have successfully completed the Peoples Gas welder qualification test procedures within the period specified in **Appendix C - Standard for Pressure Piping -Joining By Welding**.
3. Acetylene welding of pipe joints is required on pipe sizes one and three quarters inches (1-3/4") nominal diameter and smaller.
4. Acetylene or electric arc welding of pipe joints may be used for pipe sized larger than one and three quarters inches (1-3/4") nominal diameter up through two and three eighths (2-3/8") inches nominal diameter.
5. Electric arc welding of pipe joints is required on pipe sizes larger than two and three eighths (2-3/8") inches nominal diameter (see **Appendix C - Standard for Pressure Piping - Joining By Welding**).

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6. Weld-on fittings will normally be electric welded, but may be acetylene welded, if test welds made by the welders and tested in accordance with the Peoples Gas procedures are acceptable (see **Appendix C - Standard for Pressure Piping -Joining By Welding**).

## **Section 4.4 - Method of Construction, Welding Steel**

1. General Procedure
  - a. Welding equipment shall be of a size and type suitable for the work and shall be maintained in a condition that ensures acceptable welds, continuity of operation and safety of personnel.
  - b. Arc welding equipment shall be operated within the proper amperage and voltage ranges.
  - c. When practical, all welding shall be done on skids and by rolling the sections being turned from time to time so that the welds shall always be made at or near the top of the pipe.
  - d. The spacing of the pipe before welding, the kind of materials used in the process of welding, and the kind and character of the weld applied, the time of completing the weld and any other work incidental to securing a high standard of work shall be in accordance with Peoples Gas current welding procedures and the best welding practice.
  - e. Welders shall exercise precaution at all times and in all areas to prevent fires from any cause.
  
2. Filler Metals
  - a. All filler metals (welding rods) shall conform to one of the following specifications (reference: API 1104-94):
 

<ul style="list-style-type: none"> <li>• AWS A5.1</li> <li>• AWS A5.2</li> <li>• AWS A5.5</li> <li>• AWS A5.17</li> </ul>	<ul style="list-style-type: none"> <li>• AWS A5.18</li> <li>• AWS A5.20</li> <li>• AWS A5.28</li> <li>• AWS A5.29</li> </ul>
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3. Welds
  - a. Welds on a steel pipeline to be operated at a pressure that produces a hoop stress of twenty percent (20%) or more of SMYS must be nondestructively tested **per Section 4.5, "Testing of Welders", items 12 and 13.**
  - b. Only one repair will be allowed per failed weld; additional failure will require removal of a cylinder section of pipe.
  - c. The open single beveled type butt weld shall be used for all joints in the run of pipe.
  - d. Flanges, except for slip on type, will be of the butt type with beveled ends for single beveled type butt welds.
  - e. The pipe will be furnished with bevels for the purpose of welding.
  - f. Pipe ends prepared in the field for joining shall be beveled to the same angle as mill beveled pipe by using oxyacetylene flame cutting or other approved means.

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- g. On buried mains, each pipe weld or branch connection will be separated by a minimum distance of three (3) pipe diameters or twelve inches (12"), whichever is greater, from other welds or connections unless otherwise approved by the Division Manager.

## **Section 4.5 - Testing of Welders**

1. Only qualified welders will be permitted to weld on pressure containing components.
2. Before being permitted to work, welders must pass the required test in **Appendix C - Standard for Pressure Piping -Joining By Welding.**
3. Pipelines that operate at a pressure that produces a hoop stress of twenty percent (20%) or more require special welder testing requirements as outlined in **Appendix C - Standard for Pressure Piping -Joining By Welding.**
4. Each welder must be re-qualified by testing, and a record of each test shall be made on PGS Form No. 424, Welder Qualification Test (see **Appendix C - Standard for Pressure Piping - Joining By Welding.**)
  - i. A record of each welder's complete test shall be retained on file by the local Division.
5. At any time, any reasonable means of determining the character of each welder's work, including non destructive testing in the field, may be employed.
6. All welders should be observed by a Peoples Gas inspector to assure that they are following the Peoples Gas welding procedures and that the welds produced visually meet standards.
7. Any deviation from Peoples Gas welding procedures will be corrected immediately, and any weld that does not pass the visual inspection or pressure test will be cut out and tested in accordance with the current Peoples Gas welding standards for gas piping.
8. In addition, from time to time during the course of their work, the Division Manager or designee may have removed and destructively tested a production weld, to determine whether the weld is satisfactory.
  - a. If the test of this weld, visual examination, or pressure testing does not meet Peoples Gas standards, each of the welds previously made by this welder will be tested until two consecutive welds pass the test.
  - b. The welder will not make any additional welds on gas carrying facilities until the welder has been retrained in accordance with Peoples Gas procedures and, at the end of re training, the welder shall submit a test weld for requalification which has been tested and approved.
9. The following additional limitations apply to welders:
  - a. A welder shall not weld with a particular welding process unless, within the preceding six (6) calendar months, he has engaged in welding with that process.
  - b. A welder shall not weld on pipe to be operated at a pressure that produces a hoop stress of twenty percent (20%) or more of SMYS unless within the preceding seven (7) months the welder has had one weld tested and found acceptable under **Appendix C - Standard for Pressure Piping -Joining By Welding.**

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- c. A welder shall not weld unless within the preceding fifteen (15) months, but at the least once each calendar year, the welder has requalified.
  - d. A welder shall not weld unless a production weld is cut out within the preceding seven (7) months and at least twice each calendar year, tested, and found acceptable in accordance with **Appendix C - Standard for Pressure Piping -Joining By Welding.**
    - i. Exception: for welders who work on only service lines 2" or smaller, two sample welds shall be tested and found acceptable.
10. Preparation of a Joint for Welding
- a. The surfaces to be welded shall be smooth, uniform, and free from laminations, tears, and slag.
  - b. Scale, grease, paint and other deleterious materials that might adversely affect the welding shall be removed.
  - c. Alignment
    - i. The alignment of abutting ends shall minimize the off-set between surfaces.
    - ii. For pipe ends of the same thickness, the offset shall not exceed one sixteenth inch (1/16").
    - iii. If a larger off-set is caused by dimensional variances, it shall be equally distributed around the circumference of the pipe.
  - d. Lineup Clamps
    - i. Lineup clamps shall be used as necessary.
    - ii. When the lineup clamp is can be safely removed before the root bead is completed, the completion of the bead shall be in equal segments spaced equally around the circumference of the pipe.
    - iii. However, when conditions make it difficult to prevent movement of the pipe or the weld will be unduly stressed once the lineup clamp is removed then the root bead will be completed before the clamp is removed.
  - e. Field Bevel
    - i. Pipe ends should be field beveled by machine tool or machine oxygen cutting.
    - ii. If necessary, manual oxygen cutting may also be used.
    - iii. The beveled ends shall be reasonably smooth and uniform.
  - f. Weather Conditions
    - i. Welding shall not be done when the quality of the completed weld would be impaired by the prevailing weather conditions, including but not limited to airborne moisture, blowing sands or high winds.
    - ii. Windshields shall be used when necessary.
  - g. Clearance
    - i. When the pipe is to be welded above ground, the working clearance around the pipe should not be less than sixteen inches (16").

(continued)

- ii. When the pipe is welded in the trench, the bell hole shall be large enough to provide the welder with ready access to the joint.
  - h. Cleaning Between Beads
    - i. Scale and slag shall be removed from each bead and groove between beads.
    - ii. Power tools are preferable but hand tools may be used.
  - i. Position Welds
    - i. All position welds shall be made with the parts to be jointed securely fastened against movement.
  - j. Cleaning Final Welds
    - i. The completed weld shall be thoroughly cleaned and brushed.
  - k. Filler and Finish Beads
    - i. At no point shall the crown surface be below the outside surface of the pipe nor should it be raised above the parent metal by more than one sixteenths inch (1/16").
    - ii. Two beads shall not be started at the same location.
    - iii. The face of the completed bead should be approximately one eighth inch (1/8") wider than the width of the original groove.
11. Visual Inspection of Welds
- a. Visual inspection of welds must be conducted to ensure that:
    - i. The welding is performed in accordance with welding procedures.
    - ii. The weld is acceptable under Section 6 of API Standard 1104.
12. Nondestructive Testing for Systems Operating with MAOP Exceeding Twenty Percent (20%) SMYS
- a. Nondestructive testing of welds shall be performed by any process, other than trepanning, that will indicate defects that may affect the integrity of the weld.
  - b. The acceptability of discontinuities located by radiographic, magnetic particle, liquid penetrant and ultrasonic test method is determined according to Section 6 of API Standard 1104.
  - c. Nondestructive testing of weld shall be performed by persons trained and qualified in the established procedures and with the equipment employed in testing.
  - d. Procedures must be established for the proper interpretation of each nondestructive test of a weld to ensure acceptability of the weld.
  - e. When nondestructive testing is required, the following percentages of each day's field butt welds, selected at random, must be tested over their entire circumference:
    - i. In Class I locations at least ten percent (10%);
    - ii. In Class 2 locations at least fifteen percent (15%);
    - iii. In Class 3 & 4 locations, one hundred percent (100%), unless impracticable, in which case at least ninety percent (90%).

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- f. At pipeline tie-ins, including tie-ins of replacement sections, one hundred percent (100%) of a sample of each welders work for each day must be nondestructively tested.
- g. Records of nondestructive testing showing location of the test, the number of girth welds made, the number tested, the number rejected and the disposition of the rejects must be maintained for the life of the system.
- h. If a piece from a percentage sample fails, another percentage sample will be taken.
- i. If another sample fails, all of the work from that welder shall be nondestructively tested and the welder will be asked to take a requalification test before being allowed to weld on pressurized piping.

**13. Nondestructive Testing for Systems Operating with MAOP Less Than Twenty Percent (20%) SMYS**

a. ~~During the construction of any steel pipeline operating at MAOP less than twenty percent (20%) of SYMYS, a minimum of ten percent (10%) of the welds, selected at random, shall be non-destructively tested over their entire circumference, on pipelines:~~

i. ~~which are operating at MAOP less than twenty percent (20%) of SMYS; and,~~

ii. ~~which are four and one half inch (4.5") O.D. or greater; and,~~

iii. ~~which are one thousand (1,000) linear feet or more in length.~~

~~This requirement does not apply to valves, appurtenances and fabricated assemblies.~~


**Section 4.6 - Description, Plastic Joining**

1. The handling and installation of plastic pipe shall comply with manufacturer's written procedures and specifications.
2. Care shall be taken that the pipe does not suffer sharp blows, cuts or gouges, nor is subjected to excessive deformation prior to, or during, installation.
3. Care should also be taken that the pipe is not subjected to solar radiation for long periods of time while in storage.
4. Personnel shall exercise due precaution at all times to prevent damage to plastic pipe or fittings during installation.
5. Damaged items shall be removed and replaced prior to placing the line into service.

**Section 4.7 - Method of Construction, Plastic Joining**

1. The preferred method of joining plastic pipe, tubing and fittings shall be the heat fusion method.
2. Approved mechanical connectors are permitted only with prior approval of the Division Manager.
3. All joints in plastic piping systems shall be made in accordance with qualified procedures, which have been established and proven by test to produce gas tight joints at least as strong as the pipe being joined.

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4. All joints in plastic pipe and fittings shall be made only by personnel qualified by training and testing in accordance with the procedures required for the type of joint involved.
5. There are several plastic joining techniques which would adversely affect the integrity of the pipe and shall not be permitted:
  - a. Plastic pipe shall not be threaded.
  - b. Plastic pipe joints shall not be mitered.
  - c. Plastic pipe shall have no bending through the finished connection.
  - d. Direct application of a flame to plastic pipe is prohibited.
  - e. No change from the manufacture's joining procedures.
  - f. The use of adhesives in joining plastic pipe is forbidden.

### **Section 4.8 - Qualification of Personnel for Plastic Heat Fusion**

1. Only qualified personnel will be permitted to join plastic.
2. The training shall be on one or more of the following depending upon the method(s) of joining that the personnel will use in the field:
  - a. socket fusion;
  - b. saddle fusion;
  - c. butt fusion;
  - d. mechanical connectors
  - e. electro fusion
  - f. cross fusion
3. Each person must be re-qualified annually.
  - a. Further, they must also maintain their qualification by using the joining technique during the twelve (12) month period.
4. A person shall be disqualified under any procedure should they have three (3) joints or three percent (3%) of their joints, whichever is less, fail within any twelve (12) month period.
  - a. The failure is relative to pressure testing, and not pertinent to bad fusions which are corrected prior to testing.
  - b. A record of the personnel undertaking plastic training shall be maintained until the next training is recorded.
  - c. These records shall include the date, type of training and joining techniques each person is qualified to use. In addition, a record of joining failures shall be incorporated as part of that record.
5. The training and qualification under this section shall be made in accordance with the manufacturer's written procedures and specifications.

(continued)



## **Section 4.9 – Pinch-Off (Squeeze-Off)**

1. Steel Pipe
  - a. Only a device manufactured specifically for pinching off steel pipe may be used; pinch-off is permitted only if the following conditions are met and procedures followed:
    - i. The pinching surface of the device shall be smooth with no sharp edges or nicks or burrs.
    - ii. The device will be placed on the pipe so the seam of the pipe is approximately in the center of the pinching bar (either top or bottom).
    - iii. Prevention of accidental ignition shall follow Peoples Gas' **Operations and Maintenance Manual, Section 26, "Prevention of Accidental Ignition"**, as well as any applicable published Peoples Gas job procedures and safety programs.
    - iv. Pinch off should not be made within twelve inches (12") of any fitting, welded, screwed, or mechanical.
    - v. Special attention will be made to ensure that the operating pressure of the pipe to be pinched-off does not exceed the pinch-off tool manufacturer's maximum pressure rating limits for the tool.
  
2. Plastic Pipe
  - a. Only a device manufactured specifically for squeezing off plastic polyethylene pipe may be used; squeeze-off is permitted only if the following conditions are met and procedures followed:
    - i. The pipe manufacturer's written procedures and specifications on squeeze-off of the plastic pipe must be adhered to.
    - ii. The squeeze-off tool must have preset mechanical gap stops.
    - iii. The squeezing surface of the squeeze-off tool shall be smooth, with no sharp edges or nicks or burrs.
    - iv. Prevention of accidental ignition shall follow Peoples Gas' **Operations and Maintenance Manual, Section 26, "Prevention of Accidental Ignition"**, as well as any applicable job procedures and safety programs.
    - v. Squeeze-off shall not be made within twelve inches (12") of any fitting, fused or mechanical.
    - vi. Where plastic pipe is squeezed, it is recommended the squeeze area be identified prior to backfill; even though squeeze-off procedures can be utilized without damaging most polyethylene pipe, the pipe should not be subjected to this operation more than once in the same place (see manufacturer specifications).

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## **Section 4.10 - Visual Inspection and Removal, Steel Welds**

1. Welded joints in steel piping not meeting the following visual criteria shall be removed; the weld must:
  - a. be free of cracks;
  - b. be free of inadequate penetration;
  - c. be free of non-repaired burn through, or other defects; and;
  - d. present a professional, workmanship like appearance.

Any technicians responsible for work not meeting the above criteria must follow the requirements of the Peoples Gas document, **Appendix C - Standard for Pressure Piping - Joining By Welding**, for retraining and testing.

## **Section 4.11 - Visual Inspection and Removal, Plastic Fusion Welds**

1. It shall be the responsibility of the person fabricating a plastic fusion joint to insure that its integrity is consistent with the standards outlined herein and in **Appendix C - Standard for Pressure Piping -Joining By Welding** and is of good workmanship.
2. The work of all persons joining plastic pipe and fittings should be visually inspected in the field at least monthly, or as frequently as practical, to assure that the Peoples Gas procedures in this Standard are being followed and that joints produced visually meet the requirements of applicable rules and manufacturer's specifications.
3. Any deviation from the Peoples Gas joining procedures must be corrected immediately, and any joint that does not pass visual inspection or pressure test shall be removed, reworked, or rendered usable.
  - a. Any technician responsible for producing an unacceptable joint shall have any preceding joints inspected until there are two consecutive acceptable joints.
  - b. At that point, if three joints, or three (3%) of the joints inspected (whichever is the lesser) fail, the technician shall be disqualified from performing further work on gas carrying facilities until they have been re-trained and re-qualified in accordance with the manufacturer's written procedures and specifications.

## **SECTION 5 - PIPE INSTALLATION**

### **Section 5.1 - General Requirements**

1. The requirements of this section applies also to all handling and hauling of pipe from the designated storage areas prior to the actual joining and installing of the pipe.
2. To prevent the entrance of animals, foreign matter and materials or water from entering the pipeline or pipe section, the open ends of all sections of pipe that have been joined shall be closed at night and shall not be reopened until work is resumed:
  - a. Night caps, so constructed that they will prevent the entrance of moisture into the pipe, shall be used and shall be securely fastened to the pipe in such a manner that the wind cannot blow them loose.
  - b. The practice of stuffing cloth or paper in the open ends of the pipe is not approved.
  - c. For plastic pipe, if night caps are fabricated, it is suggested that a plastic cap be constructed that can be attached with a compression coupling and removed for reuse.
3. Pipeline markers shall be installed as required below in this **Construction Standards Manual, Section 18, "Pipeline Markers"**.
4. Care shall be exercised when joining sections of pipe to minimize the possibility that any foreign matter remains within the line after completion.
  - a. Any obstructions found shall be removed.


### **Section 5.2 - Method of Construction, Installation of Steel Pipe**

1. Before each section of steel pipe is joined, the internal surface shall be suitably clean (see below Section 12.10, "Cleaning", for final cleaning requirements).
2. Where possible during construction, the pipe will be raised and supported at a suitable distance from the open end such that the open end will be below the level of the pipe at the point of support.
3. Sections of coated pipe shall not be dragged or pulled into position without adequate protection for the protective coating:
  - a. When coated pipe is loaded on trucks or trailers, suitable padding shall be placed between the supports and pipe to prevent damage to the coating.
4. At waterways or at other locations, where it may be necessary to pull or drag sections of pipe into place, the coated pipe shall be protected in such manner as to prevent damage to the coating or to the pipe and the bottom of the ditch shall conform to the pipe.

### **Section 5.3 - Method of Construction, Installation of Plastic Pipe**

1. Before each section of plastic pipe is joined, the internal surface shall be suitably clean (see below this **Construction Standards Manual, Section 12.10, "Cleaning and Purging"**, for final cleaning requirements).

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2. Plastic pipe shall not be installed above ground, except:
  - a. plastic pipe may be installed on bridges provided it:
    - i. is protected from mechanical damage (such as installing in a metallic casing);
    - ii. protected from ultraviolet radiation; and,
    - iii. is not allowed to exceed the pipe temperature limits as specified in 49 CFR 192.123.
  - b. as provided below in this **Construction Standards Manual, Section 29, "Installation of Gas Service Lines"**.
  
3. Plastic pipe shall not be installed in underground vaults, manholes, or other similar facilities, unless encased in gas tight metallic pipe and fittings for its entire length in the facility.
  
4. Continuous wire, electrically conductive tape or other means of locating the pipe will be installed in conjunction with all direct buried plastic mains and service lines.
  - a. NOTE: The wire or tape can be considered a source of heat since it may become accidentally electrically energized.
    - i. Therefore, the wire should be placed approximately six inches (6") above the plastic pipe where practicable.

**Section 5.4 - Protection Against Strain and External Loading, Plastic Pipe**

1. Plastic pipe shall not be installed so that it supports external loads.
2. Plastic pipe shall be installed so as to minimize shear or tensile stresses and strain.
  - a. Reinforcing sleeves may be used whenever plastic pipe extends from, or crosses, any rigid or semi-rigid facility or fixture, such as, but not limited to, the following:
    - i. steel to plastic by any type of compression or transition fitting;
    - ii. plastic into steel or cast iron casing;
    - iii. plastic main to plastic service line;
    - iv. anodeless risers to plastic; and,
    - v. steel valves in a plastic line.


**Section 5.5 - Grading for Drainage**

1. When required on a low pressure distribution system, mains and service lines will be graded so as to drain to drips.

**Section 5.6 - Supports and Anchors**

1. General
  - a. Each pipeline and its components must have enough anchors or supports to:
    - i. prevent undue strain;
    - ii. resist longitudinal forces caused by a bend or offset in the pipe; and,
    - iii. prevent or limit excessive vibration.

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2. Underground
  - a. Each underground pipeline that is being connected to a relatively unyielding line or other fixed object must have enough flexibility to provide for possible movement, or it must have an anchor that will limit the movement of the pipeline.
  - b. Each underground pipeline that is being connected to new branches must have a firm foundation for both the header and the branch to prevent lateral and vertical movement.
  
3. Exposed
  - a. Exposed pipelines must have enough supports or anchors to protect the exposed pipe joints from the maximum end forces caused by internal pressure and any additional forces caused by temperature expansion or contraction or by the weight of the pipe and its contents.
  - b. Each support or anchor on an exposed pipeline must be made of durable, non combustible material and must be designed and installed as follows:
    - i. expansion and contraction of the pipeline between supports or anchors may not be restricted;
    - ii. provision must be made for the service conditions involved;
    - iii. movement of the pipeline should not cause disengagement of the support equipment; and,
    - iv. be electrically isolated from its support structure.
  - c. Each aboveground facility must be protected from accidental damage by vehicular traffic or other similar causes either by being placed at a safe distance from the traffic or by installing barricades such as protective posts.
  
6. Supports on exposed pipeline operated at a stress level of fifty percent (50%) or more of specified minimum yield strength (SMYS) must comply with the following:
  - a. a structural support will not be welded directly to the pipe;
  - b. the support must be provided by a member that completely encircles the pipe.

## **SECTION 6 - PIPE COATING AND WRAPPING**

### **Section 6.1 - Description**

1. Section 6, "Pipe Coating and Wrapping", includes all work and equipment necessary to apply field coatings to steel pipe and fittings, or to repair damaged coating on factory coated pipe and fittings.

### **Section 6.2 - Pipe Coating Specifications**

1. All steel pipe installed underground shall be factory coated with an approved coating, as specified in the Peoples Gas document, **Appendix B - Standard Material List**.
2. When coated pipe is loaded on trucks or trailers, suitable padding shall be placed between the supports and pipe to prevent damage to the coating.
3. See also Peoples Gas **Operations and Maintenance Manual, Section 27.10, "Pipeline Coating"**.


### **Section 6.3 - Wrapping Field Joints**

1. Factory coated pipe shall have a cut back free of any coating material except primer.
2. The ends of any pipe which is cut in the field shall be prepared in the same manner.
3. After field joints have been welded and inspected, the pipe coating shall be cut back sufficiently to remove any damaged coating.
4. Field joints shall be free of any oxidation, dried and thoroughly cleaned of all dirt, grease, weld spatter, and loose or damaged coating.
5. The pipe shall be covered with an approved primer, and coated with either mastic, an approved epoxy, or wrapped with hot or cold applied tape.
6. Primer shall be compatible with the coating being applied.
7. The coating shall be carefully applied according to the manufacturer's specification to assure complete coverage without airspace or holidays.
8. The field applied coating shall overlap the factory coating on both sides of the joint by at least two inches (2").

### **Section 6.4 - Patching Damaged Coatings**

1. Each joint of steel pipe and all fittings shall be carefully inspected for damage.
2. Any coating found to be damaged will be repaired and left in a condition equal to or better than the original coating.

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## **Section 6.5 - Visual Inspection and Electrical Testing of Coating**

1. Immediately prior to placing or lowering pipe into a ditch, the coating on steel pipe and fittings, including field joints, shall be visually inspected for damage.
2. Any damage found ~~is to be repaired prior to backfill~~ will be repaired and left in condition equal to or better than the original coating.
- ~~3. Thin film epoxy coated pipe shall be inspected with a holiday detector per manufacturers' instructions and specifications.~~
3. The coating on steel pipe and fittings, including field joints, shall be inspected with electronic holiday detection equipment which shall:
  - a. be operated by properly trained and qualified personnel and according to manufacturer instructions;
  - b. be set at the proper voltage for the coating type and thickness being inspected (sufficient to provide a spark that will span a gap equal to or greater than the coating thickness);
  - c. be properly calibrated and batteries fully charged prior to use;
  - d. be utilized with electrode attachments specifically designed for the shape of the surface (regular and/or irregular) being inspected (i.e., straight pipe, valves, fittings, etc.); and,
  - e. provide both visual and audible alerts upon detection of a holiday.
4. It is recommended installations of pipe greater than two and three eighths of an inch (2-3/8") nominal pipe size, and longer than two thousand feet (2000'), be inspected with a low amperage holiday detector.

## **Section 6.6 – Steel Fitting Coatings**

- ~~1. All steel fittings placed underground will be coated with an approved primer, mastic, epoxy or tape (hot or cold applied).~~
- ~~2. Fittings with factory coatings shall be inspected for damage, any coating found to be damaged will be repaired and left in condition equal to or better than the original coating.~~

## **Section 6.6 – Steel Valves, Fittings and Appurtenance Coatings**

1. All steel valves, fittings and appurtenances placed underground will be coated with an approved primer, mastic, epoxy or tape (hot or cold applied) and shall be inspected for damage using an electronic holiday detector (per **Section 6.5, "Visual Inspection and Electrical Testing of Coating"**, above).
2. Any coating found to be damaged will be repaired and left in condition equal to or better than the original coating.

## **SECTION 7 - LOWERING-IN**

### **Section 7.1 - Description**

1. Lowering-in, covered in this section, includes all work required while placing the piping into the trench after welding and coating has been completed.

### **Section 7.2 - Method of Construction, Lowering-In**

1. Steel pipe may be lowered into the trench immediately after patching of coating and inspection operations have been completed, but shall be handled as provided in these Standards.
2. Before lowering the pipe, the route of the line shall be inspected and construction personnel shall remove all foreign material such as skids, sharp rocks, roots, brush, stumps, heavy clods, paving rubble (especially asphaltic material) and other objectionable debris likely to damage the pipe coating or plastic pipe.
3. Where necessary, the trench shall be center-filled with selected materials to provide an adequate, firm support foundation for the pipe several inches above the bottom of the trench.
3. Any acceptable manner of lowering in the pipe may be used, provided that excessive strain is not placed upon the pipe and the coating is not injured.
  - a. In case of injury to protective coatings, the loose material shall be removed and the coating returned to a condition equal to that of the uninjured portion.
4. Coated pipe should be handled with slings made of belting having a minimum width equal to the diameter of the pipe.
  - a. Slings shall be constructed so that they can be removed from under the pipe without dragging metal eyes or clevises against the coating.
5. When coated pipe is loaded on trucks or trailers, suitable padding shall be placed between the supports and pipe to prevent damage to the coating.



## **SECTION 8 - BACKFILLING**

### **Section 8.1 - Description**

1. Backfilling, covered in this section, includes all work necessary to place backfill material into the trench and to restore to original condition all roadways, parkways, alleys, lanes, levees, creek banks, hillsides, and other places where the right of way has been excavated.

### **Section 8.2 - Method of Construction, Backfilling**

1. When a ditch is backfilled, it must be backfilled in a manner that provides firm support under the pipe and prevents damage to the pipe and pipe coating from equipment or from backfill material.
2. Backfill restoration must be completed in accordance with local municipal standards.
  - a. In addition, when local municipal standards do not apply, the backfill area shall be left in a condition satisfactory to the Division Manager.
3. It is Peoples Gas' policy to protect all wetlands and other environmentally sensitive areas whether or not they are indicated on construction drawings.
  - a. To prevent spilling or dumping spoil into wetlands, drainage systems or natural bodies of water, silt screens and other protection devices shall be used.
  - b. Spoil must be placed upland or removed from the site.
  - c. Spoil shall not be placed (even temporarily) in wetland or drainage areas.
  - d. The jurisdictional authority will make the determination in questionable areas as to whether an area is a wetland or environmentally sensitive area.

## **SECTION 9 - DIRECTIONAL DRILLING & BORING UNCASED PIPE**

### **Section 9.1 - Description**

1. This section is intended to aid in the design and operation of directional boring as well as boring and jacking projects.


### **Section 9.2 - General Requirements**

1. General
  - a. Directional boring is a means of installing pipelines that can be more cost effective and lessen the environmental impact of traditional methods.
  - b. A basic directional bore operation utilizes a drilling machine, which pushes a pilot drill rod through the ground.
    - i. The direction that the pilot rod takes is controlled by the position of the boring head as it is being pushed.
    - ii. A locating device provides information for the drilling operator to track the boring head position and direction of travel.
  - c. The pilot hole may then be enlarged with reamers.
    - i. The type and size of the pipeline, the soil type, the bore path and other criteria will dictate the reaming operation.
    - ii. In some cases the pilot hole may be reamed and the pipe pulled in one step.
  - d. Each directional bore is unique and therefore must be designed using all the information available.
  - e. In order to accomplish a quality and timely directional bore, the following items should be considered and addressed as necessary:
    - i. Field data, terrain, depth requirements, obstacles, and soil type;
    - ii. Standard pipe calculations (sizing, strength, testing);
    - iii. Directional boring calculations (minimum bend radius, maximum allowable tensile pull, buoyancy, design curve); and,
    - iv. Drilling design limitations (drilling machine capabilities, soil conditions, available work area).
  
2. Field Data
  - a. Observations of the bore location should be made so as to determine the entry and exit points.
  - b. Consideration should be given to surface obstructions at the rig site and the pipe pull back area.
  - c. The size of the area of the rig site will depend on the rig size; common sizing is as follows:
    - i. Small rig: 25' x 50';
    - ii. Medium rig: 50' x 100'; and,
    - iii. Large rig: 100' x 150'.(continued)

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- d. The boring contractor should be consulted during the bid process to determine the size of the rig site as well as the pipe pull back area.
  - e. The locations of other utilities and buried obstructions are vital to planning the bore path.
  - f. Also, soil or core samples may be required to help choose the best bore path.
  - g. In some boring projects, such as highway and river crossings, the bore path is dependent on minimum depth of cover requirements.
  - h. The normal depth for gas piping installed by directional boring shall be ten feet (10').
    - i. However, bores under residential streets and residential driveways in subdivisions may be shallower.
    - ii. Bore depths less than ten feet (10') other than residential driveways shall require approval from Peoples Gas' corporate Engineering Services.
    - iii. Occasionally, bore depths much greater than ten feet (10') may be required, depending upon the requirements of the owner of the obstacle which is being avoided.
3. Standard Pipe Sizing and Calculations
- a. In order to alleviate damage to pipe from tensile stress during pullback, it may be necessary to calculate an increase in the size of the wall thickness of the pipe that will be used.
    - i. Corporate Engineering Services shall be consulted prior to any directional boring project to calculate the proper pipe sizing and specifications to be used.
  - b. Wall thickness can also be used to negate the buoyancy of a pipeline installed in wet ground.
4. Coating
- a. Steel pipe being used for directional bores less than the feet (10') deep and it that is also installed in areas that will be accessible in the future shall be coated with thin film epoxy, at a minimum.
  - b. Steel pipe being used for directional bores ten feet (10') deep or more shall be coated with Dualkote as a minimum.
    - i. Where bore length, depth, geotechnical information and/or bore location indicate a need for additional coating protection, PowerCrete shall be used.
  - c. All joints on steel pipe used in directional boring shall be coated with R95 two part epoxy (or equivalent) applied according to manufacturer's recommendations.
5. Bore Review
- a. Before permits are submitted to any governing agency, or any project/job is sent out for bid, Peoples Gas' corporate Engineering Services shall review directional bore plans for:
    - i. All bores greater than or equal to one thousand five hundred feet (1,500') in length;

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- ii. All railroad crossings; and,
  - iii. All river or wetland crossings that require sovereign submerged easements.
6. Coating Inspection
- a. If inspection of the pipe end exiting a bore indicates possible coating damage from the drilling process, Peoples Gas' corporate Engineering Services shall be immediately notified and consulted to determine the course of action which shall be taken.
7. As-Built
- a. The drilling contractor shall provide as-built plan and profile drawings on any directional bore which is equal to or greater than ten feet (10') in depth.

**Section 9.3 - Boring and Jacking of Uncased Pipe, Requirements**

1. Street intersections, driveways or other surfaces, which cannot be open cut, may be crossed by boring and jacking the pipe under the paved surface.
2. Points of boring and jacking will usually be along straight runs of ditch, so that only moderate widening of normally required pipe ditching will be necessary to provide adequate tail ditch.
  - a. However, where necessary, special tail ditch shall be opened as a part of the normal work of boring and jacking and installing pipe.
  - b. Where the length of special tail ditches must be restricted, that pipe should be inserted into the trench in more than one section, requiring a weld and coating of joint as each additional section is fed into the trench.
  - c. Welding and coating at joints shall be completed as outlined in these Standards.
3. If inspection of the pipe end exiting a bore indicates possible coating damage from the drilling process, Peoples Gas' corporate Engineering Services shall be immediately notified and consulted to determine the course of action which shall be taken.
4. Care shall be used to prevent the entrance of water into the pipe during the boring and jacking installation.
5. The bore pipe should also be pigged separately if it was auger-bored before making the tie-in to the rest of the new line.

**Section 9.4 - Local and State Guidelines**

1. All drilling/boring installation shall be done in accordance with local and state guidelines.



## **SECTION 10 - CASING INSTALLATION**

### **Section 10.1 - Description**

1. This shall include all work necessary to excavate, bore, weld, install pipe and casing under streets, highways, railroads, and other places where such casing is required, and to backfill and repair such excavations.

### **Section 10.2 - General Requirements**

1. The installation of casings with the use of metallic pipeline is prohibited unless necessary for the installation process of the pipeline or justifiably required by an appropriate governmental authority.

### **Section 10.3 - Method of Construction, Casing Installation**

1. For crossings requiring casing, the installation shall be accomplished by directional drilling, boring, and jacking or by other means approved by the jurisdiction having authority.
  - a. Directional drilling, boring or tracing shall comply with Florida Department of Transportation (FDOT) standards and specifications.
2. Normally, either bare line pipe or mill reject of standard wall thickness will be used.
  - a. Care should be taken to assure that the wall thickness of the casing is adequate to provide the strength necessary to withstand anticipated superimposed loads of the transportation facility.
3. Cased crossings of railroads, highways, streets or other such facilities shall be installed in accordance with the requirements of the authorities having jurisdiction over the facility being crossed.
  - a. Written authority for such crossings will be obtained from the necessary authority prior to commencement of such work.
  - b. The length of casing will be governed by requirements contained in the crossing permits obtained from permitting authorities.
4. On casing installations in excess of one hundred fifty feet (150'), consideration should be given to pigging prior to installation of the carrier pipe.
  - a. Pipe shall be drawn into casings in a manner to avoid contacting the casing wall.
  - b. The leading end of the carrier pipe must be capped during insertion.
5. All steel pipe installed in casings shall be supported within the casing and separated from it by the use of spacers located in order to prevent contact between pipe and casing.
  - a. An internal spacer shall be placed within four inches (4") of casing ends.
  - b. Casing seals of an approved type shall be installed on casing ends.
6. Precautions should be taken so as not to damage the pipe or its protective covering.
  - a. Cathodic protection test stations shall be installed on both the casing and steel carrier pipes.

(continued)

- b. If an electrical test made upon completion of the pipe installation show carrier pipe is electrically connected to the casing, the contact shall be cleared before putting the line into service.
- c. Casing shall be vented to the atmosphere by the installation of a two inches (2") or larger vent line.
- d. The vent must be protected from the weather to prevent water from entering the casing.

**Section 10.4 - Plastic Insertion, Into New or Existing Unvented Casing**

1. Plastic pipe may be inserted in steel, cast iron, wrought iron or plastic casing with the following special considerations:
  - a. When plastic pipe is inserted into the casing, care shall be exercised so as to protect the pipe from damage due to rocks, sharp ends, etc., in the casing.
    - i. In addition, the plastic pipe will be protected against external physical damage during the installation.
    - ii. Protective sleeves, where possible, should be installed at each casing end to protect the carrier pipe against external loading at the ends of the casing.
    - iii. The ends should be sealed to prevent the possibility of water and dirt from entering the casing.
  - b. Each length of pipe and each other component must be visually inspected at the site of installation to ensure that it has not sustained any visually determinable damage that could impact its serviceability.
  - c. The backfill shall be carefully compacted under and around the plastic pipe and sleeves to provide a firm support and reduce shear stress.
  - d. Casing to be bonded across for locating purposes or other locating means installed (tracer wire, electronic markers, etc.).

## **SECTION 11 - VALVES AND VALVE PLACEMENT**

### **Section 11.1 - In Line Valves**

1. Valves installed in mains or service lines (in line valves) shall be either lubricated plug valves, gate valves, ball valves or poly valves.
2. Valves in sizes larger than two inches (2") in diameter shall be fusible, welded or flanged end.
3. Valves in sizes six inch (6") in diameter and larger may be gear operated if required.
4. Any application that does not meet one of the criteria above, or is greater than eight inches (8") in diameter should be referred to Peoples Gas' corporate Engineering Services.
  - a. Valves eight inches (8") in diameter and larger shall be gear drive.
5. The following guidelines will be used in selecting steel ball valves:

<b><u>Pressure</u></b>	<b><u>Standard</u></b>	<b><u>Diameter</u></b>
< 275 Psig	ANSI 150 Valves	¾" – 12" Floater
< 740 Psig	ANSI 300 Valves	¾" – 6" Floater
< 350 Psig	ANSI 300 Valves	8" Floater
> 350 and < 740 Psig	ANSI 300 Valves	8" Trunnion
< 740 Psig	ANSI 300 Valves	> 8" Trunnion
> 740 and < 1480 Psig	ANSI 600 Valves	¾" – 12" Trunnion

### **Section 11.2 - Valves at Metering and Regulator Stations**

1. Each district regulator station controlling the flow or pressure into a distribution system must have a valve installed on the inlet piping at a distance from the regulator station sufficient to permit the operation of the valve during an emergency that might preclude access to the station.
  - a. Wherever practical, this distance should be ten feet (10') to fifty feet (50') and the maximum distance should not exceed five hundred feet (500').
  - b. Gate station and critical valves above ground should be trunnion ball valves with block and bleed.

### **Section 11.3 - Riser Valves**

1. All riser valves on steel or plastic service lines shall be ball valves or lubricated plug valves.
2. All riser valves installed on non-activated service lines shall be turned off, locked with a locking device and plugged before leaving the job site.

**(continued)**

## **Section 11.4 - Curb Valves**

1. Curb valves shall be installed on those service lines where the meter and service stop are so located that the service stop is not in a readily accessible location.
2. Curb valves must be installed on high, intermediate and medium pressure systems if the service line is two inches (2") or larger in diameter and serves a shopping center, school, church, industrial plant or other building where twenty-five (25) or more people may normally be expected to reside or congregate.
3. The curb valve shall be located at the main or adjacent to the property line, where practical.

## **Section 11.5 - Excess Flow Valves (EFV)**

1. EFVs shall be installed on all new residential service lines and service replacements that operate continuously throughout the year at a pressure not less than ten pounds per square inch gage (10 PSIG) that serve a single residence.
2. EFVs should be installed on the service line as close to the service tee as is practical, but care should be taken to avoid paved surfaces.
3. An EFV need not be installed when prior experience with mains in the area indicate contaminants in the gas stream could interfere with the operations of the EFV, or when an emergency or short time notice replacement makes it impracticable to notify the service line customer before replacing a service line.
4. When pressure testing service lines with EFVs, caution should be taken to ensure the EFV is not activated.

## **Section 11.6 - Method of Construction, Valve Settings**

1. Underground valves should be equipped with, or be adapted to, a two inch (2") square operating nut.
2. When placed in a buried box or enclosure, the valve installation shall be designed so as to avoid transmitting external loads onto the main.
3. Installation of valves shall be done in accordance with manufacturer's specifications.
4. All valves when installed shall not be placed in stress due to misalignment or loading from items such as heavy meters or regulators.

## **Section 11.7 - Location of Valves**

1. Distribution Pipeline Valves
  - a. Distribution pipeline valves shall be installed in-line to permit shutting down a section of distribution system.
    - i. In general, valves should be spaced to reduce the time to shut down a section of main in an emergency.

(continued)



- b. System design shall be reviewed when extensions, replacements, or other system changes are made to determine spacing and other requirements based on operating pressure, main size, local physical conditions and other considerations.
- c. Each valve on a main designed for operating or emergency purposes shall comply with the following:
  - i. The valve shall be placed in a readily accessible location to facilitate its operation in an emergency.
  - ii. The operating stem or mechanism shall be readily accessible.
  - iii. If the valve is installed in a buried box or enclosure, then it shall be installed in a manner to avoid transmitting external loads to the main.
  - iv. Key valves must be marked in accordance with the Peoples Gas **Operating and Maintenance Procedures Manual, Section 24.4, "Marking of Emergency Valves"**.

## 2. Transmission Pipeline Valve Spacing

- a. Transmission pipeline systems shall have sectionalizing block valves spaced as follows, unless Peoples Gas' corporate Engineering Services determines that an alternative spacing would apply an equivalent level of safety:
  - i. Any point on a pipeline in a Class 4\* location must be within two and one half (2.5) miles of a valve.
  - ii. Any point on a pipeline in a Class 3\* location must be within four (4) miles of a valve.
  - iii. Any point on a pipeline in a Class 2\* location must be within seven and one half (7.5) miles of a valve.
  - iv. Any point on a pipeline in a Class 1\* location must be within ten (10) miles of a valve.

\* Note: class locations are defined below in this **Construction Standards Manual, Section 19, "Class Locations"**.

## 3. Transmission Pipeline Valve Considerations

- a. Each sectionalizing block valve on a transmission pipeline shall comply with the following:
  - i. The valve and the operating device must be readily accessible to open or close and protected from tampering or damage.
  - ii. The valve must be supported to prevent settling or movement of the pipe.

## 4. Transmission Pipeline Blowdowns

- a. Each section of the transmission pipe line must have a blow-down located between main line valves with enough capacity to allow the line to be blown down as rapidly as practical.
  - i. Each blow-down must be located so that the gas can be safely blown to the atmosphere.
  - ii. If the gas line is located adjacent to an overhead electric line, then the gas must be directed away from the electric conductors.

## **SECTION 12 - DEFECTS, TESTING, CLEANING AND PURGING**


### **Section 12.1 - Description**

1. This section covers the repair or removal of defects, as well as the testing, cleaning, and purging of pipelines.

### **Section 12.2 – Defects, Repair or Removal**

1. Defects in Material
  - a. Any imperfection or damage to pipe or other components that impairs the serviceability, must be removed or repaired.
  - b. Any pipe, fittings or appurtenances replaced must be pre-tested according to this Section 12.
2. Repair to Steel Pipe
  - a. A dent is defined as any depression in a steel pipe that produces a gross disturbance in the curvature of the pipe wall without reducing the pipe-wall thickness.
  - b. The depth of a dent is measured as the gap between the lowest points of the dent and the original contour of the pipe.
  - c. Dents must be removed in pipe which operates at pressures producing hoop stress greater than or equal to twenty percent of specified minimum yield strength (20% SMYS) if either of both of the following are present:
    - i. The dent contains a stress concentrator such as a scratch, gouge, groove or arc burn.
    - ii. There is a dent that affects the longitudinal weld or a circumferential weld.
  - d. Dents must be removed in pipe which operates at pressures producing hoop stress greater than or equal to forty percent of specified minimum yield strength (40% SMYS) if either of both of the following are present:
    - i. The depth of the dent is more than one quarter inch (1/4”) in pipe twelve and three quarter inches (12-3/4”) or less in outer diameter.
    - ii. The depth of the dent is more than two percent (2%) of the nominal pipe diameter in pipe greater than twelve and three quarter inches (12-3/4”) in outer diameter.
  - e. Each arc burn on steel pipe to be operated at a pressure that produces a hoop stress of forty percent of specified minimum yield strength (40% SMYS) or greater must be repaired or removed.
    - i. If a repair is made by grinding, the arc burn must be completely removed, and;
    - ii. the remaining wall thickness must be at least equal to either the minimum wall thickness required by the tolerances to which the pipe was manufactured, or, the nominal wall thickness required for the design pressure of the pipeline.

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- f. Gouges, groves, arc burns or dents must be removed by cutting out the damaged portion as a cylinder and shall not be repaired by the use of insert patching or pounding out.
3. Repair to Steel Pipe Joints
- a. In steel, all defective joints, other than welded joints, shall be taken apart and reassembled correctly.
  - b. Welded joints that do not meet the requirements above in this **Construction Standards Manual, Section 4, "Joining Pipe and Fittings"** may be repaired by grinding the weld out, providing the remaining wall thickness of the pipe or fittings is equal to either:
    - i. the minimum thickness required by the tolerances in the specifications to which the pipe was manufactured; or,
    - ii. the nominal wall thickness required for the design pressure of the pipeline.
  - c. The repair shall be made under the same welding procedure as the original weld and a close inspection must be made to determine acceptability and be retested as required.
4. Repair to Plastic Pipe Joints
- a. In plastic, all defective joints shall be removed and replaced; heat fusion joints that do not meet the requirements above in this **Construction Standards Manual, Section 4, "Joining Pipe and Fittings"** shall be removed.

**Section 12.3 - Testing of Pipelines, Mains and Services, General Requirements**

- 1. As portions of a pipeline and piping are sufficiently completed, they shall be subjected to pressure tests in accordance with the current requirements of the Title 49 Code of Federal Regulations, Part 192, Pipeline Safety Regulations, and these Construction Standards.
- 2. Each segment of pipeline, main or service shall have the maximum allowable operating pressure (MAOP), the test medium, the maximum test pressure, the minimum test pressure, the duration of the test period specified.
- 3. Corporate Engineering Services shall be responsible for the design and implementation of testing plans for pipelines and piping that will operate at greater than twenty percent (20%) of specified minimum yield strength (SMYS).
- 4. All piping shall be pressure tested with proper documentation including small sections of main replaced for repair or maintenance purposes.
  - a. See also Peoples Gas' **Operating and Maintenance Manual, Section 21, "Test Requirements for Reinstating Main and Service Lines"**.
- 5. All necessary safety precautions during the time of testing shall be made in order to protect both construction personnel and the general public from accidents due to rupture of any of the piping or appurtenances.
- 6. Defects identified during testing shall be made and the repaired or replaced section shall be re-tested prior to placement of the section into service.

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- For service lines equipped with an excess flow valve (EFV), caution should be taken to ensure the EFV is not activated.

## Section 12.4 - Test Pressures With Table

- The following table outlines the requirements to be used in the testing of pipelines within Peoples Gas' system.

OTHER THAN PLASTIC PIPE:					PLASTIC PIPE
OPERATING BELOW 20% SMYS				OPERATING AT OR OVER 20% SMYS	
<b>MAOP</b>	Less than 1 PSIG	1 PSIG up to 100 PSIG	100 PSIG and over, or under 20% SMYS	All pressures	All pressures
<b>Allowed Test Medium</b>	Air or inert gas	Air or inert gas	Air or inert gas	(1)	Air or inert gas
<b>Maximum Test Pressure</b>	Less than 50% SMYS (3)	Less than 50% SMYS (3)	Less than 50% SMYS (3)	(1)	Maximum test pressure is three times design pressure (4)
<b>Minimum Test Pressure</b>	10 PSIG	90 PSIG or one and one half times the MAOP	One and one half times the MAOP	(1)	50 PSIG or one and one half times the MAOP, whichever is greater
<b>Test Duration</b>	See chart (2), but not less than ten minutes.	See chart (2), but not less than ten minutes	Per chart (2), but not less than one hour	(1)	See chart (2)

- Tests on pipe operating at greater than twenty percent specified minimum yield strength (20% SMYS) must be designed, approved, and supervised by Peoples Gas' corporate Engineering Services.
- Refer to Section 12.6, "Test Duration".
- However, all pipeline components must be taken into consideration when determining the maximum test pressure.
- Where design pressure equals  $2S / (SDR - 1) \times 0.32$  (where S = Long-term Hydrostatic Strength and SDR = Standard Dimension Ratio).
- Increases or decreases in ambient temperature that affect a pipeline during a test procedure may result in changes in the pressure readings, according to the values in the table below:

CHANGE IN TEMPERATURE	% PRESSURE CHANGE	CHANGE IN TEMPERATURE	% PRESSURE CHANGE
1°	0.22	6°	1.28
2°	0.43	7°	1.49
3°	0.64	8°	1.70
4°	0.85	9°	1.92
5°	1.07	10°	2.13




## **Section 12.5 - Test Medium**

1. Normally air would be used as a test medium, however, in testing mains where test pressures will exceed the pressure available from an air compressor, or where conditions dictate the use of another test medium, water or an inert gas may be used.
  - a. Where water is used, the maximum test duration is eight (8) hours.
  - b. Water filled facilities shall be pressured by use of a high pressure pump.
  - c. Where the main is tested with water, the service lines should be tested separately with the inert gas used as a pressure medium for the test of the main.
  - d. When mains are filled with water, the water shall be injected behind a pig to insure a complete, air-free fill.
  - e. The test medium shall be disposed of in accordance with local and state environmental regulations.
2. When it is impracticable to use water for testing, the test pressure may be applied by pressuring to the maximum possible with the air compressor and by obtaining the additional increase required by injecting nitrogen (N<sub>2</sub>), carbon dioxide (CO<sub>2</sub>) or another inert gas. It is recommended that prior to such testing, Peoples Gas' corporate Engineering Services be consulted.
3. It is recommended that the following precautions be taken when nitrogen is being used:
  - a. Take necessary steps to assure that the nitrogen will not escape or be purged into a confined space (such as a bell hole) in which an employee might need to enter.
  - b. Check the atmosphere in confined space for lack of oxygen or assure that the oxygen level is adequate due to normal air movement (winds) or by aeration by mechanical means such as a blower or air mover.

## **Section 12.6 - Test Duration With Table**

1. Gas mains and service lines shall be pressure tested in accordance with the aforementioned requirements for a period of time conforming to the requirements outlined in the table in this section in item 5 below, titled "Minimum Leak Test Duration for Gas Mains and Service Lines".
2. Pipe operating at pressures less than one hundred pounds per square inch gage (100 PSIG) shall be leak tested per the requirements outlined in item 1 above, but not less than ten (10) minutes.
3. Pipe operating at pressures greater than one hundred pounds per square inch gage (100 PSIG) and less than twenty percent specified minimum yield strength (20% SMYS) shall be leak tested per the requirements outlined in item 1 above, but not less than sixty (60) minutes.
4. Tests on pipe operating at greater than twenty percent specified minimum yield strength (20% SMYS) must be designed, approved, and supervised by Peoples Gas' corporate Engineering Services.

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5. Minimum Leak Test Duration for Gas Mains and Service Lines
- This table applies to plastic and steel pipe operating at less than twenty percent (20%) specified minimum yield strength (SMYS).
  - The basis for the calculations is approximately one half (1/2) hour/fifty cubic feet (50 CF) of interior pipe volume; for tests outside the scope of the table, contact Peoples Gas' corporate Engineering Services.
  - Minimum duration of test is ten (10) minutes to twenty four (24) hours (see table below). If water is used as the test medium the minimum duration is eight (8) hours).

DIAMETER	1.25" or less	2"	4"	6"	8"	10"	12"
<i>Minutes per 1,000 linear feet</i>	7	15	60	132	227	350	500
100'	10 min	10 min	10 min	15 min	25 min	40 min	50 min
200'	10 min	10 min	15 min	30 min	45 min	1 hr 15	1 hr 40
300'	10 min	10 min	20 min	45 min	1 hr 10	1 hr 50	2 hr 30
400'	10 min	10 min	25 min	1 hour	1 hr 40	2 hr 25	3 hr 20
500'	10 min	10 min	30 min	1 hr 05	1 hr 55	3 hr 00	4 hr 10
600'	10 min	10 min	40 min	1 hr 20	2 hr 20	3 hr 35	5 hr 00
700'	10 min	10 min	45 min	1 hr 40	2 hr 40	4 hr 10	5 hr 50
800'	10 min	15 min	50 min	1 hr 50	3 hr 05	4 hr 45	6 hr 40
900'	10 min	15 min	55 min	2 hr 00	3 hr 25	5 hr 20	7 hr 30
1,000'	10 min	15 min	1 hr 00	2 hr 15	3 hr 50	6 hr 00	8 hr 20
1,500'	10 min	25 min	1 hr 30	3 hr 20	5 hr 40	9 hr 00	12 hr 30
2,000'	15 min	30 min	2 hr 00	4 hr 25	7 hr 35	12 hr 00	16 hr 40
2,500'	20 min	35 min	2 hr 30	5 hr 30	9 hr 30	15 hr 00	20 hr 40
3,000'	20 min	45 min	3 hr 00	6 hr 40	11 hr 25	17 hr 50	24 hr 00
3,500'	30 min	50 min	3 hr 30	7 hr 45	13 hr 15	20 hr 45	24 hr 00
4,000'	30 min	1 hr 00	4 hr 00	8 hr 50	15 hr 10	23 hr 45	24 hr 00
4,500'	35 min	1 hr 05	4 hr 30	9 hr 55	17 hr 05	24 hr 00	24 hr 00
5,000'	40 min	1 hr 10	5 hr 00	11 hr 05	18 hr 55	24 hr 00	24 hr 00
5,500'	40 min	1 hr 20	5 hr 30	12 hr 10	20 hr 50	24 hr 00	24 hr 00
6,000'	45 min	1 hr 25	6 hr 00	13 hr 15	24 hr 00	24 hr 00	24 hr 00
6,500'	45 min	1 hr 35	6 hr 30	13 hr 20	24 hr 00	24 hr 00	24 hr 00
7,000'	50 min	1 hr 40	7 hr 00	15 hr 25	24 hr 00	24 hr 00	24 hr 00
7,500'	55 min	1 hr 45	7 hr 30	16 hr 40	24 hr 00	24 hr 00	24 hr 00
8,000'	55 min	1 hr 55	8 hr 00	17 hr 40	24 hr 00	24 hr 00	24 hr 00
8,500'	1 hr 00	2 hr 00	8 hr 30	18 hr 45	24 hr 00	24 hr 00	24 hr 00
9,000'	1 hr 05	2 hr 10	9 hr 00	19 hr 50	24 hr 00	24 hr 00	24 hr 00
9,500'	1 hr 05	2 hr 15	9 hr 30	21 Hr 00	24 hr 00	24 hr 00	24 hr 00
10,000'	1 hr 10	2 hr 20	10 hr 00	22 hr 05	24 hr 00	24 hr 00	24 hr 00
11,000'	1 hr 15	2 hr 35	11 hr 00	22 hr 05	24 hr 00	24 hr 00	24 hr 00
12,000'	1 hr 25	2 hr 50	12 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
13,000'	1 hr 30	3 hr 05	13 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
14,000'	1 hr 40	3 hr 20	14 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
15,000'	1 hr 45	3 hr 30	15 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
16,000'	1 hr 50	3 hr 45	16 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
17,000'	2 hr 00	4 hr 00	17 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
18,000'	2 hr 05	4 hr 15	18 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
19,000'	2 hr 10	4 hr 30	19 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
20,000'	2 hr 20	4 hr 45	20 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
21,000'	2 hr 25	4 hr 55	21 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
22,000'	2 hr 30	5 hr 05	22 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
23,000'	2 hr 40	5 hr 25	23 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00
24,000'	2 hr 45	5 hr 40	24 hr 00	24 hr 00	24 hr 00	24 hr 00	24 hr 00

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## **Section 12.7 - Special Tests**

1. At the discretion of the Division Manager, sections of the pipe installed under major traffic arteries or railroads in casing or in bored or jacked openings, which would be difficult or expensive to repair after completion of the line, will be pressure tested before they are tied in.

## **Section 12.8 - Test Records**

1. A separate written record shall be made of each test and shall be kept for the life of the facility tested.
  - a. See Peoples Gas' **Operating and Maintenance Manual** forms at **Section 13, Page 4, "Pipeline Test Record"** and **Section 14, Page 6, "Hydrostatic Test Report"**.
2. The record shall include:
  - a. The description and location of the facility tested.
  - b. The signature of the employee responsible for the test.
  - c. The test medium used.
  - d. The test pressure.
  - e. The test duration.
  6. The leaks or failure found and the corrections made.
3. A pressure recorder may be used to record shut-in pressure for mains under test.
  - a. Test charts, tables, or any other documents should be labeled and attached to the test report to become a part of the permanent records.

## **Section 12.9 - Uprate Testing**


1. Where a main or segment of a distribution system, including service lines, is being tested for purposes of uprating, the requirements outlined in Peoples Gas' **Operating and Maintenance Manual, Section 9, "Uprating"** shall be followed.

## **Section 12.10 - Cleaning and Purging**

1. Upon completion of a test, or a retest if repairs were required, gas mains and service lines shall be thoroughly cleaned and purged prior to placing them in service.
2. Steel lines, one and one quarter inch (1-1/4") and smaller, and all plastic lines shall be cleaned by blowing them out with air and/or inert gas to insure the removal of all construction dirt, rust, scale and foreign matter in the pipe.
3. Adequate volume and velocity of air must be provided to assure that the lines are clean.
4. Steel mains larger than one and one quarter inch (1-1/4") shall be "pigged" until all objectionable foreign material is removed.

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5. The Division Manager shall determine the need for pigging of plastic mains.
6. Transmission pipelines may have special cleaning requirements which will be specified by Peoples Gas' corporate Engineering Services.
7. The purging procedure shall be followed as outlined in Peoples Gas' **Operating and Maintenance Manual, Section 12, "Purging of Pipelines"**.

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## **SECTION 13 - REMOVING AND RESTORING HARD SURFACE PAVEMENTS**

### **Section 13.1 - Description**

1. This shall include work made in cutting, removing, and restoring hard surface pavement.

### **Section 13.2 - Cutting and Removing Hard Surface Pavements**

1. Where mains and laterals are to be laid beneath hard surface pavements, such hard surface pavements shall be cut only at those locations as specified on the plans and/or specifications.
2. When practical, asphalt and/or concrete surfaces shall be cut ahead of the ditching operation, and in such a manner so as to result in a smooth edge along the cut.
3. Spoils from cut pavements, not suitable for incorporation in trench backfill, shall be disposed of away from the construction site.

### **Section 13.3 - Restoration**

1. All restoration shall be completed in a timely manner, using suitable materials that comply with the local permitting agency and/or the Division Manager's specifications.
  - a. All restoration shall be left in "as good or better" condition upon completion.
2. Where the street has not been paved, but has a hard surface composed of gravel, crushed rock, shell or other similar material, construction personnel shall leave the trench overfilled.
  - a. When directed, construction personnel shall dress the backfill back to the base of the existing hard surface, and then place the new hard surface.

## **SECTION 14 - TIE-IN TO EXISTING FACILITIES**

### **Section 14.1 - Method of Construction, Tie-In to Existing Facilities**


1. Cast Iron
  - a. Where a threaded tap is made in cast iron, the diameter of the tapped hole may not be more than twenty five percent (25%) of the nominal diameter of the pipe unless the pipe is reinforced with an approved saddle type fitting.
  - b. The exception to this is that a one and one quarter inch (1-1/4") tap may be made in a four inch (4") cast iron main without reinforcement.
  - c. Existing taps may be used in cast iron pipe if they are free of cracks and have good threads.
  - d. Taps will be spaced a minimum of eighteen inches (18") apart.
  - e. Each service line connection to the main shall, whenever practical, be located on the top of the main.
  - f. A compression type fitting should be used to connect the service line to the cast iron main.
    - i. They shall be designed and installed to effectively sustain longitudinal pull out due to expected external forces, and insulated as required in Peoples Gas' **Operating and Maintenance Manual, Section 27.6, "Electrical Isolation"**.
    - ii. Gasket materials used in these fittings must be compatible with natural gas.
  - g. Tapping of mains for large diameter lateral mains, or service lines, shall be accomplished by use of an approved tapping fitting or saddle
    - i. The correct tapping and stopper tools must be used with the fittings.
  
2. Steel or Plastic
  - a. Where a tie into steel or plastic is made, the connection shall according to the requirements outlined in the Peoples Gas document, **Appendix C - "Standard for Pressure Piping -Joining By Welding"**.
  - b. Tie-ins to existing coal tar or asphaltic wrap pipe require special procedures outlined in the safety program "**Asbestos Awareness and Management"**, as posted on the Peoples Gas intranet.
  
3. General
  - a. During any tie-in to existing facilities, the requirements and procedures outlined in Peoples Gas' **Operating and Maintenance Manual, Section 26, "Prevention of Accidental Ignition"** shall be followed.

## **SECTION 15 - METERING & REGULATION**

### **Section 15.1 - Metering**

1. Sizing
  - a. All meters that will be operating within low pressure natural gas systems of seven inches water column (7" W.C.) shall be sized for a pressure of one half inch water column (1/2" W.C.) meter differential at the maximum required capacity.
  - b. Meters to be used on other than low pressure systems:
    - i. All meters delivering a pressure of seven inches water column (7" WC) shall be sized for a one inch water column (1" W.C.) meter differential at peak capacity.
    - ii. All meters delivering pressure in pounds shall generally be sized for a two inches water column (2" W.C.) meter differential at peak capacity.
    - iii. All residential meters connected to a single appliance shall be designed with a diversity factor of one (1).
    - iv. All residential meters connected to multiple appliances shall be designed with a diversity factor of zero point seventy five (0.75).
    - v. All commercial meters shall be designed with a load factor of one (1) for the total connected load.
  - c. The charts in **Appendix D - Standard Meter Assemblies** shall be used for meter selection.
  
2. Maximum Operating Pressure
  - a. A meter may not be operated at a pressure that exceeds the manufacturer's maximum allowable operating pressure (MAOP).
  - b. Each newly installed meter manufactured after November 17, 1970 must have been tested to a minimum pressure of ten pounds per square inch gage (10 PSIG).
  - c. Each meter having a one half inch (1/2") differential rating of four hundred cubic feet per hour (400 CFH) or more will have a working pressure of at least ten pounds per square inch gage (10 PSIG).
    - i. All meters that have a rating smaller than four hundred cubic feet per hour (400 CFH) will have a working pressure of at least five pounds per square inch gage (5 PSIG).
  - d. All meters proposed to operate at elevated pressure will have a maximum allowable operating pressure (MAOP) equal to or greater than the proposed maximum operating pressure.
  
3. Metering at Standard Low Pressure
  - a. A standard index shall be used when metering at seven inches water column (7" W.C.) for natural gas.

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4. Metering of Firm Natural Gas at Elevated Pressures:
  - a. System Pressures
    - i. The meter shall be equipped with an instrument that will correct volumes at metered conditions to volumes at fourteen point nine eight pounds per square inches atmospheric (14.98 PSIA) base pressure and fourteen point seven three pounds per square inches atmospheric (14.73 PSIA) pressure.
    - ii. This index shall normally read in one hundred cubic feet (100 CCF) when installed on a meter with a five cubic feet (5 CF) or ten cubic feet (10 CF) drive.
    - iii. The index should read in thousand cubic feet (MCF) when installed on a meter with a one hundred cubic feet (100 CF) drive.
  - b. Set Pressures
    - i. When metering at constant pressures, the upstream regulator must be capable of maintaining the average operating pressure (absolute) within plus one percent (+ 1.0%) of the set point.
    - ii. As a general rule, a compensating index that corrects volumes at the set pressure to volumes at fourteen point nine eight pounds per square inches atmospheric (14.98 PSIA) base pressure and fourteen point seven three pounds per square inches atmospheric (14.73 PSIA) pressure shall be used.
    - iii. The compensating index shall have a red face, or other readily distinguishable type dial, so that it can be easily recognized as other than the normal standard index.
  
5. Metering of Interruptible Natural Gas at Elevated Pressures:
  - a. When measuring at line pressure or for an interruptible customer the meter shall be equipped with a pressure-recording device.
  
6. Encoder-Receiver-Transmitter Devices (ERT) in Automatic Meter Reading (AMR) Systems
  - a. ERT units should be installed in the following situations:
    - i. A new meter is installed on an existing AMR route;
    - ii. The meter reader would have difficulty gaining access (i.e. fencing, physical barrier);
    - iii. Reading the meter would cause the meter reader to be exposed to a safety hazard (i.e. dogs); or,
    - iv. The time to manually access and read the meter is greater than four (4) minutes.
  
7. Programming Residential ERT Units:
  - a. The residential ERT should be programmed to match the index (i.e. 7" WC or 2 PSIG), which includes meter drive and pressure.
    - i. This will result in a corrected read to CIS and the pressure factor in CIS should always be one (1).

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- ii. The appropriate compensating index code should be added to the index field.
- iii. When an ERT unit is placed on a commercial metering pressure above seven inches water column (7" WC), then the mechanical index used will be a standard index and the ERT factor will be set to one (1).
- iv. The appropriate billing factor shall be entered into the billing system.

## **Section 15.2 - Pressure Regulation**

1. All regulators will be sized according to manufacturer's specifications and good engineering practice.
2. Low Pressure Delivery
  - a. The standard regulator setting for service to customers at low pressure, where inlet gas pressure does not exceed sixty pounds square inch gage (60 PSIG), shall be a single regulator with internal relief and with no external control lines.
    - i. The outlet pressure shall be either seven inches water column (7" W.C.) or two pounds square inch gage (2 PSIG) for natural gas unless a different utilization pressure is agreed upon between Peoples Gas and the customer and is provided for in the billing rate.
    - ii. The internal relief of the regulator shall limit the outlet pressure to two pounds square inch gage (2 PSIG) or less if the delivery pressure is less than one pound square inch gage (1 PSIG).
    - iii. If the delivery pressure is two pounds square inch gage (2 PSIG), then the internal relief shall limit the delivery pressure to five pounds square inch gage (5 PSIG) or less.
  - b. The standard regulator setting for service to customers at low pressure, where the inlet gas pressure is in excess of sixty pounds square inch gage (60 PSIG), but not more than one hundred twenty five pounds square inch gage (125 PSIG), shall consist of:
    - i. An upstream regulator selected for inlet pressures of up to one hundred twenty five pounds square inch gage (125 PSIG) and outlet pressures of five pounds square inch gage (5 PSIG) to sixty pounds square inch gage (60 PSIG).
    - ii. A relief valve of adequate capacity to insure that the inlet pressure to the downstream regulator does not exceed sixty pounds square inch gage (60 PSIG) in the event of failure of the upstream regulator (this may be internal to the upstream regulator if capacity is adequate).
    - iii. A downstream regulator of equal characteristics to that required by item a. above.
2. Elevated Pressure Delivery
  - a. When the delivery pressure to the customer is at elevated pressure, verification of system pressure is required prior to any agreement between the Peoples Gas and the customer. Note: this higher delivery pressure must not exceed the safe operating conditions of the facilities downstream.

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- b. A single regulator in conjunction with a relief valve may be used where inlet pressures do not exceed one hundred twenty five pounds square inch gage (125 PSIG).
  - i. The regulator and relief valve shall be equal to those provided for initial stage deliveries described in item 2.b.(i) and item 2.b.(ii) above.
  - ii. The relief valve installed must have adequate capacity to insure that the inlet pressure to the meter or to the customer's facilities shall not exceed the maximum permissible operating pressure thereof or a lower pressure, if conditions indicate that such lower pressure should be maintained.
- c. Regulators selected for delivery to customers on "set pressure" billing rates shall meet the requirements described above and shall be capable of maintaining average operating pressures (absolute) within plus one percent (+ 1.0%).
- d. In those cases where the standard design will not fulfill the needs of the customer, special designs including the required regulation and relief valves, shall be utilized. In such cases, the design and selection of equipment and material shall comply with the intent of CFR 49, Part 192 and these Standards.

### **Section 15.3 - Sizing Regulators**


1. In sizing regulators to realize full capacity, the downstream piping may be enlarged one to two pipe diameters greater than the regulator size.
2. Capacity should be calculated at the lowest inlet pressure expected and the maximum load anticipated.
3. The spring should be selected so as not to exceed ten percent (10%) of the maximum and minimum range of the spring.
4. When installing a regulator upstream of a meter, it should be spring loaded, pilot operated, or pressure loaded.
5. Load conditions should determine whether a spring loaded or pilot loaded regulator should be used.
  - a. If a constant pressure set point is required, then a pilot operated regulator shall be used.
  - b. When metering pressure is five pounds square inch gage (5 PSIG) and above, a pilot loaded regulator with an external relief shall be used.
6. Consideration should be given in the pressure rating of the material used in construction of the regulator.
  - a. In some regulators, the diaphragm case is of a lower pressure rating than the body.

### **Section 15.4 - Customer Meters and Regulators, Locations**

1. See also Peoples Gas' **Operating and Maintenance Manual, Section 39.2, "Location of Meters and Associated Appurtenances - General Requirements"** for policy on locating meters outside of buildings.

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2. Utility owned service regulators shall be located outside in a ventilated area.

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3. Utility meters located inside of a building shall:
  - a. be located in a ventilated space;
  - b. be located not more than five feet (5') off of the floor; and,
  - c. be accessible to personnel twenty four (24) hours a day.
  
4. Utility owned gas piping serving meters located inside of a building shall:
  - a. operate at a pressure that does not exceed two pounds square inch gage (2 PSIG);
  - b. be accessible for leak survey;
  - c. as of July 1, 2008, be welded steel pipe; and,
  - d. be painted and identified as property of Peoples Gas.

**Section 15.5 - Customer Meters and Regulators, Protection From Damage**

1. Protection from Vacuum or Back Pressure
  - a. If the customer's equipment might create either a vacuum or a back pressure, a low pressure valve or a check valve shall be installed to protect the distribution system.
  
2. Service Regulator Vents and Relief Vents
  - a. The outside terminal of each service regulator vent and relief vent must:
    - i. be rain and insect resistant;
    - ii. be located at a place where gas from the vent can escape freely into the atmosphere and away from any opening into a building (if located near a source of ignition, the terminal must be vented a minimum of three feet (3') away from such source);
    - iii. be protected from damage caused by submergence in areas where flooding may occur; and,
    - iv. be of adequate size to permit immediate discharge of the venting gas and to prevent over pressurizing customer houseline, the minimum size being that of the vent opening in the regulator (note: it may be necessary to make the vent piping larger than the vent opening so that the vent capacity is not reduced; always follow manufacturer's instructions).
  
3. Pits and Vaults
  - a. Each pit or vault that houses a customer meter or regulator at a place where vehicular traffic is anticipated must be able to support that traffic.
  
4. General
  - a. Meter and regulators will be protected from damage by outside forces by use of barricades properly placed.
  - b. Vent piping shall be metallic.

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## **Section 15.6 - Elevated Pressure Taps on Customer Meters**

1. Pressure taps shall be provided at all meter installations.

## **Section 15.7 - Customer Meter and Regulator Installations**

1. Also see Peoples Gas' approved **Appendix D - Standard Meter Assemblies**.
2. The customer's meter/regulator set must be designed and installed so as to minimize stress on the meter and connected piping.
3. On residential installations where the meter/regulator set is connected to steel house piping, the connected piping normally provides adequate support:
  - a. however, a meter bracket may be used for additional support on these residential sets that are connected to copper tubing or other flexible house piping.
4. All thread nipples used in the Peoples Gas distribution system should be ASTM A53, Type "E" or "F" so as to ensure adequate mechanical strength in the wall thickness beneath the threads.
5. Multi-meter sets shall not have more than ten (10) meters supplied through a common regulator at a pressure that is the same as the metering pressure.

## **Section 15.8 - Large Capacity Meter Design and Installations**

1. A large capacity meter includes diaphragm type meters that have a three thousand cubic foot per hour (3,000 CFH) capacity at two inches water column (2" W.C.) pressure, plus all rotary and turbine type meters; see approved Peoples Gas' **Appendix D - Standard Meter Assemblies**.
  - a. New installations will have adequate bypass and test connections to simplify and speed up the field testing and adjustment procedure.
  - b. Rotary meters will have a strainer/filter installed upstream of the meter.
  - c. Turbine meters will have a filter installed upstream of the meter.
  - d. Pressure taps will be provided upstream and downstream of all large meters for differential tests.
2. Division Manager or designee should prepare documentation for large meter installations.
3. The information should include maximum volume and pressure, minimum pressure, and proposed sizing of all equipment including meters, regulators (orifice size) and relief valves.
4. The Division Manager or designee shall review and approve the design prior to construction.

## **Section 15.9 - Painting/Coating of Meter and Regulator Installations**

1. All meter and regulator installation loops will be protected from atmospheric corrosion by painting exposed piping and coating underground piping as follows:

(continued)



- a. Preparation
    - i. Areas of corrosion are to be cleaned with a wire brush and/or file to remove all particles of corrosion and be wiped clean.
    - ii. Masking tape shall be applied to insulator and the tape painted over. The tape will be removed when the painting is complete.
  - b. Exposed Piping
    - i. Primer shall be applied and allowed to dry in accordance with the manufacturers instructions.
    - ii. The finished coat shall be applied to the entire meter loop from a point approximately four inches (4") above the ground; this may include the meter if necessary.
2. See also Peoples Gas' **Operating and Maintenance Manual, Section 27.12, "Atmospheric Corrosion Control"**.

**Section 15.10 - Electrical Isolation on Meter Installations (Steel Services)**

- 1. Small Meter
  - a. For individual customer services, use an insulating meter stop.
  - b. For multi-customer service sets (serving apartments, etc.), use an insulating meter stop on the riser before the meter manifold.
- 2. Large Meter
  - a. Piping size through one and one quarter inch (1¼") use an insulating meter stop.
  - b. Piping size larger than one and one quarter inch (1¼") use an insulating union or flange insulation.

## **SECTION 16 - SYSTEM/DISTRICT REGULATION AND LIMITING VALVES**


### **Section 16.1 - System and District Regulation**

1. A district regulator station is one that regulates the supply of gas to a distribution main or network of mains serving more than one customer.
2. Regulators, relief valves, valves and other fittings shall be sized according to manufacturer's specifications and good engineering practice.
  - a. Each district regulator station shall include pressure relief or pressure limiting devices adequate to protect the distribution system served from over pressuring in the event of failure of the station to function properly.
3. Pressure taps shall be installed on both the upstream and downstream sides of all regulator stations.
4. For maximum allowable operating pressures (MAOP) on distribution systems, see Peoples Gas' **Operating and Maintenance Manual, Section 7, "Maximum Allowable Operating Pressure"**.
5. All designs must be approved by the Division Manager or Peoples Gas' corporate Engineering Services.

### **Section 16.2 - Over Pressure Protection Systems and Relief Valves**

1. Relief Valves
  - a. Each pressure relief or pressure limiting device:
    - i. must be constructed of materials such that the operation of the device will not be impaired by corrosion;
    - ii. must have valves and valve seats that are designed not to stick in a position that will make the device inoperative;
    - iii. must be designed and installed so that it can be readily operated to determine if the valve is free, be tested to determine the pressure at which it will operate and be tested for leakage when in the closed position;
    - iv. must have support made of a non-combustible material;
    - v. must have discharge stacks, vents, or outlet ports designed to prevent accumulation of water, ice or snow and located so that gas can be discharged into the atmosphere without undue hazard;
    - vi. must be designed and installed so that the size of the openings, pipe and fittings located between the system to be protected and the pressure relieving device, and the size of the vent line, are adequate to prevent hammering of the valve and to prevent impairment of relief capacity;
    - vii. must, where installed at a district regulator station to protect a pipeline system from over pressuring, be designed and installed to prevent any single incident such as an explosion in a vault or damage by a vehicle from affecting the operation of both the overpressure protective device and the district regulator; and,

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- viii. must, except for a valve that will isolate the system under protection from its source of pressure, be designed to prevent unauthorized operation of any valve that will make the pressure relief valve or pressure limiting device inoperative.
2. Required Capacity of Pressure Relieving and Limiting Station
- a. Each pressure relief station or pressure limiting station or group of stations installed to protect a pipeline must have enough capacity, and must be set to operate to prevent over pressuring of the protected system.
    - i. On systems with a maximum allowable operating pressure (MAOP) of greater than sixty pounds per square inch gage (60 PSIG), the relief valve will be set at the maximum allowable operating pressure (MAOP) plus ten percent (10%).
    - ii. On systems with a maximum allowable operating pressure (MAOP) between twelve pounds per square inch gage (12 PSIG) and sixty pounds per square inch gage (60 PSIG), the relief valve will be set at the system maximum allowable operating pressure (MAOP) plus six pounds per square inch gage (6 PSIG).
    - iii. On systems with a maximum allowable operating pressure (MAOP) between one pound per square inch gage (1 PSIG) and less than twelve pounds per square inch gage (12 PSIG), the relief valve will be set at no more than fifty percent (50%) above the system maximum allowable operating pressure (MAOP).
    - iv. On low pressure systems, the relief valve will be set to give full capacity relief at a maximum pressure build up to sixteen inches water column (16" W.C.) on natural gas.
  - b. When more than one pressure regulator feeds into a distribution system, relief valves or other protective devices must be installed at each station to ensure that the complete failure of the largest capacity regulator in that station will not impose pressures on any part of the distribution system in excess of those listed in item 2.a. above.

### **Section 16.3 - Design of Instrument/Control Piping and Components**

1. A shutoff valve must be installed at each takeoff line as near as practical to the point of takeoff. Blow down valves must be installed where necessary.
2. Pipe or components in which liquids may accumulate must have drains or drips.
3. Pipe or components subject to clogging from solids or deposits must have suitable connections for cleaning.
4. The arrangement of pipe, components, and supports must provide safety under anticipated operating stresses.
5. Each joint between sections of pipe, and between pipe and valves or fittings, must be made in a manner suitable for the anticipated pressure and temperature conditions.
  - a. Slip type expansion joints may not be used.


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- b. Expansion must be allowed for by providing flexibility within the system itself.
- 6. Each control line must be protected from anticipated causes of damage, and must be designed and installed to prevent damage to any one control line from making both the regulator and the overpressure protective device inoperative.
- 7. Supply and control lines should be sloped downward from instruments to avoid the flow of liquids in these lines.

**Section 16.4 - Paint and Coating of Regulator and Relief Valve Stations**

- 1. All regulator and relief valve stations will be protected from atmospheric corrosion by painting exposed piping and coating underground piping as detailed above in this **Construction Standards Manual, Section 15.9, "Painting/Coating of Meter and Regulator Installations"**.

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## **SECTION 17 - VAULTS**

### **Section 17.1 - Structural Design Requirements**

1. Each underground vault or pit for valves, pressure relieving, pressure limiting or pressure regulating stations, must be able to withstand the loads which may be imposed upon it, and protect installed equipment.
2. There must be sufficient working space so that all of the equipment required in the vault or pit can be properly installed, operated and maintained.
3. Each pipe entering, or within, a regulator vault or pit must be steel, except instrument and control piping which may be copper, steel or other acceptable material.
  - a. Plastic is not an acceptable material.
  - b. Where pipe extends through the vault or pit structure, the openings must be sealed to prevent the passage of gases or liquids through the opening.

### **Section 17.2 - Accessibility**

Each vault must be installed in an accessible location and be, in so far as practical, away from the following:

1. Street intersections or points where traffic is heavy or dense.
2. Points of minimum elevation, catch basins, or places where the access cover will be in the course of surface waters; and,
3. Water, electric, steam, or other facilities.

### **Section 17.3 - Sealing, Venting and Ventilation**

Each underground vault or closed top pit containing either a pressure regulating or reducing station, or a pressure limiting or relieving station, must be sealed, vented or ventilated, as follows:

1. When the internal volume exceeds two hundred cubic feet (200 CF):
  - a. The vault or pit must be ventilated with two ducts, each having at least the ventilating effect of a pipe four inches (4") in diameter.
  - b. The ventilation must be enough to minimize the formation of a combustible atmosphere in the vault or pit.
  - c. The ducts must be high enough above grade to disperse any gas/air mixtures that might be discharged.
2. When the internal volume is more than seventy five (75) cubic feet but less than two hundred cubic feet (200 CF):
  - a. If the vault is located under an area carrying vehicular traffic, it must have a tight fitting cover without open holes through which an exposed gas/air mixture might be ignited, and there must be a means for testing the internal atmosphere before removing the cover.

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- b. If the vault is located in the area which does not carry vehicular traffic, it may be:
  - i. installed as detailed above in item (1) (a); or,
  - ii. installed as detailed above in item (2) (a); or,
  - iii. it may have openings in the cover or grating and if they have an effective ventilating area in a ratio of less than twenty cubic feet (20 CF) of volume to one (1) square foot of ventilation (in which case, no additional venting is required).

**Section 17.4 - Drainage and Water Proofing**

1. Each vault must be designed so as to minimize the entrance of water.
2. A vault containing gas piping may not be connected by means of a drain connection to any other underground structure.
3. All electrical equipment in vaults must conform to the applicable requirements of Class 1, Group D, of the National Electrical Code, ANSI Standard C1.

## **SECTION 18 - PIPELINE MARKERS**

### **Section 18.1 - Above Ground Markers**

1. A line marker must be placed as close as practical directly over the top of each buried distribution main and transmission line:
  - a. at each crossing of a public road and railroad;
  - b. wherever necessary to identify the location of the pipeline to reduce the possibility of damage or interference; and,
  - c. where the pipeline enters under and exits from under a waterway or body of water.
2. A line marker is not required for the following buried pipeline locations:
  - a. distribution mains in Class 3\* or Class 4\* locations where an active damage prevention program is in effect (Sunshine State One Call).

\* Note: class locations are defined below in this **Construction Standards Manual, Section 19, "Class Locations"**.
3. Pipelines above ground must be marked in areas which are accessible to the public.
4. The following must be written legibly on all markers on a background of sharply contrasting colors:
  - a. the word "Warning" or "Caution" followed by the words "Gas (or the name of the gas transported) Pipeline" all of which, except for markers in heavily developed urban areas, must be in letters at least one inch (1") high with quarter inch (1/4") wide stroke; and,
  - b. the name of the pipeline operator and telephone number (including area code) where the operator can be reached at all times.
5. The Division Manager or designee will have the final determination as to where pipeline markers will be placed.
6. In general, consecutive visible above ground markers should be placed with the sight of one another.

### **Section 18.2 - Buried Warning Tape**


1. Buried warning tape shall be buried in the trench above all polyethylene (PE) gas main and service lines.
2. The warning tape will be installed approximately twelve inches (12") above the gas main.

### **Section 18.3 - Electronic Markers (EM) Standard**

1. 3M™ Electronic Marking Buoys (EM) shall be used as a company standard to mark Peoples Gas pipelines as outlined in this section.
  - a. Use of any other electronic buoy must be approved by Peoples Gas' corporate Engineering Services.

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2. Required EM applications include:

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- a. whenever undetectable facilities are discovered and exposed;
  - b. at the end of newly installed gas mains;
  - c. service stubs greater than two feet (2') in length;
  - d. interface points for corrosion protection systems;
  - e. newly installed insulators in cathodic protection systems;
  - f. newly installed gas facilities in parallel with, and in close proximity to, existing high pressure facilities; and,
  - g. cast iron mains when they are exposed.
3. Recommended EM applications include:
- a. retro-fitted emergency valves;
  - b. newly installed emergency valves;
  - c. underground valves of all types;
  - d. excess flow valves;
  - e. squeeze points;
  - f. service taps;
  - g. changes in direction made with fittings, i.e.:
    - i. depth changes; and,
    - ii. laterals, tees, crosses, branches;
  - h. bends/changes of direction;
  - i. encasement ends;
  - j. water crossings;
  - k. major road crossings;
  - l. rail crossings;
  - m. retrofit paralleling gas facilities in close proximity; and,
  - n. new directional drilled facilities at depths of ten feet (10') or more.
4. Installation Procedures
- a. In wet or other areas where marker movement is possible a tie-down procedure shall be used:
    - i. Secure the marker by inserting a cable tie through the tie down tabs and connect to the key point.
    - ii. If the key point is metallic, the ball marker should be separated from it with a minimum of six inches (6") of dirt.

(continued)



- b. Do not install the EM deeper than manufacture's maximum recommended depth.
  - i. Normally five feet (5') deep.
- c. Hand-fill at least six inches (6") of dirt over the marker and hand stabilize to protect the marker.
  - i. Mechanical tamping should not be used without at least eighteen inches (18") of backfill in place.
- d. EM buoys must be incorporated into the Peoples Gas geographic information system (GIS)
  - i. Field dimensioning is required.
- e. To increase the detection area, it is recommended to place the marker at thirty inches (30").
  - i. If additional fill to finish grade or a cut to finish grade is anticipated, place the marker at the appropriate depth to accommodate for such changes.

## 5. Spacing

- a. The minimum distance between markers should be six feet (6').
- b. The recommended distance between markers should not exceed one hundred feet (100').
- c. At changes in direction spacing should be selected to clearly communicate the horizontal pipeline route.
  - i. At bends the recommended spacing is two feet (2').

## **SECTION 19 - CLASS LOCATIONS**

### **Section 19.1 - Description**

A "class location unit" is an area that extends two hundred twenty (220) yards on either side of the centerline of any continuous one (1) mile length of pipeline except as provided in item (3) (b) of this section below.

### **Section 19.2 – Building and Dwelling Count by Class**

For the purpose of this section, each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy:

1. A Class 1 location is any class location unit that has ten (10) or fewer buildings intended for human occupancy.
2. A Class 2 location is any class location unit that has more than ten (10) but less than forty six (46) buildings intended for human occupancy.
3. A Class 3 location is:
  - a. Any class location unit that has forty six (46) or more buildings intended for human occupancy; or,
  - b. An area where the pipeline lies within one hundred (100) yards of any of the following:
    - i. a building that is occupied by twenty (20) or more persons during normal use; or,
    - ii. a small, well-defined outside area that is occupied by twenty (20) or more persons during normal use, such as a playground, recreation area, outdoor theater, or other place of public assembly.
4. A Class 4 location is any class location unit where buildings with four (4) or more stories above ground are prevalent.

### **Section 19.3 - Boundaries**

The boundaries of the class locations may be adjusted as follows:

- a. A Class 4 location ends two hundred twenty (220) yards from the nearest building with four (4) or more stories above ground.
- b. When a cluster of buildings intended for human occupancy requires a Class 2 or 3 location, the class location ends two hundred twenty (220) yards from the nearest building in the cluster.

## **SECTION 20 - CORROSION CONTROL**

### **Section 20.1 - Description**

This section prescribes minimum requirements and procedures for the protection of metallic pipelines and components from external and atmospheric corrosion for new piping systems.

1. External and internal corrosion shall be controlled consistent with condition of the piping system and the environment in which the system is located.
2. NACE RP-01-69/NACE RP-06-75, NACE RP-02-75 may be referenced for guidance.
3. The Division Manager shall be responsible to ensure that any cathodic protection system is properly designed and installed.

### **Section 20.2 - External Corrosion Control for Buried or Submerged Pipelines**

1. All new metallic pipelines and service lines installed shall be externally coated and cathodically protected.


### **Section 20.3 – Coating System**

1. The performance of the coating system is dependent on surface preparation, coating material application methods and testing methods.
2. Factory applied coating is preferred for all pipeline components to ensure adequate surface preparation and coating application under controlled conditions.
3. Pipe coating shall be inspected visually and may be inspected by an electric holiday detector just prior to lowering pipe into ditch.
4. Any holiday or other damage to the coating detrimental to effective corrosion control shall be repaired.
5. The backfilling operation shall be inspected for quality, compaction and placement of material to prevent damage to pipe coating.

### **Section 20.4 – Protective Coatings and Surface Preparation**

1. External protective coating, applied for the purpose of external corrosion control must:
  - a. have surface preparation compatible with the coating to be applied, and:
    - i. the pipe surface shall be free of deleterious materials such as rust, scale, moisture, dirt, oils, lacquers, and varnish; and,
    - ii. the surface shall be inspected for irregularities which could protrude through the coating (any such irregularities shall be removed);
  - b. have sufficient adhesion to the metal surface to effectively resist under-film migration of moisture;
  - c. be sufficiently ductile to resist cracking;

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- d. have sufficient strength to resist damage due to handling and soil stress; and,
  - e. have properties compatible with any supplemental cathodic protection.
2. Each external protective coating which is an electrically insulating type must also have low moisture absorption and high electrical resistance.
  3. Each external protective coating must be inspected just prior to lowering the pipe into the ditch and backfilling and any damage to coating must be repaired.
  4. Each external protective coating must be protected from damage resulting from adverse ditch conditions or damage from supporting blocks.
  5. If coated pipe is installed by boring, driving, or other similar method, precautions must be taken to minimize damage to the coating during installation.
  6. Repairs should be made with approved material and procedure when any defects in the coating are made or found.  
(Ref: CFR 49 Part 192.461)


**Section 20.5 – Cathodic Protection Systems**

1. The objective of using cathodic protection is to control the corrosion of metallic surfaces in contact with electrolyte.
2. A cathodic protection system provided by a galvanic anode or impressed current anode system shall be installed that will mitigate corrosion and contain a method of determining the degree of cathodic protection achieved on the buried or submerged piping system.
3. A cathodic protection system shall preferably be installed at the same time as the construction but no later than one (1) year after completion of construction.
4. Cathodic protection shall be controlled so as not to damage the protective coating, pipe, or components.
5. Owners of known underground structures which may be affected by installation of a cathodic protection system shall be notified of said installation and where necessary, joint bonding surveys shall be conducted by parties involved.
6. The cathodic protection system shall be compatible with coating used on the pipeline.  
(Ref: ASME B 31.4 – 99)

**Section 20.6 – Electrical Isolation**

1. Each buried or submerged pipeline must be electrically isolated from other underground metallic structures, unless the pipeline and the other structures are electrically interconnected and cathodically protected as a single unit.

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2. One or more insulating devices must be installed where electrical isolation of a portion of a pipeline is necessary to facilitate the application of corrosion control.
3. Except for unprotected copper inserted in ferrous pipe, each pipeline must be electrically isolated from metallic casings that are a part of the underground system.
  - a. However, if isolation is not achieved because it is impracticable, other measures must be taken to minimize corrosion of the pipeline inside the casing.
4. Inspection and electrical tests must be made to assure that electrical isolation is adequate.
5. An insulating device may not be installed in an area where a combustible atmosphere is anticipated unless precautions are taken to prevent arcing.
6. Where a pipeline is located in close proximity to electrical transmission tower footings, ground cables or counterpoise, or in other areas where fault currents or unusual risk of lightning may be anticipated, it must be provided with protection against damage due to fault currents or lightning and protective measures must also be taken at insulating devices.

## **Section 20.7 – Test Point Stations**

1. A sufficient number of test point stations, or other contact points for electrical measurement to determine the level of cathodic protection, shall be provided for each protected system.
2. Steel gas service lines, and test leads are acceptable test point stations.
3. Probe bars should not be used.
  - a. However, steel service lines should be used only with caution as a means for contacting the gas main under test, as good electrical continuity must be present between the gas main and the gas service line to ensure that the test is valid.
4. Test point stations should be installed, where practical, at the following locations:
  - a. all casing installations under highways, roadways and railroads;
  - b. all points of isolation, on primary gas feeder lines (i.e. at insulating flanges);
  - c. selected points on the system sufficient in number so that adequate electrical tests may be made to evaluate the system level of cathodic protection.
    - i. these test point stations would normally be at the points where the lowest potential measurements are expected on the system (i.e., at the most remote points in the gas system).
  - d. on isolated sections of coated steel pipeline installed for repair purposes on a bare steel or cast iron pipeline system; and,
  - e. at canals, rivers, creeks, etc.
5. A record of test point station locations shall be maintained on PGS Form No. 645 or Form 313, "Cathodic Protection Data" (see Peoples Gas' **Operating and Maintenance Manual, Section 27, "Corrosion Control"**).

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6. It shall be the responsibility of the Division Manager to determine the location of test point stations.

**Section 20.8 – Test Leads**

Each test lead installation shall conform to the following:

1. Each test lead wire must be connected to the gas pipeline so as to remain mechanically secure and electrically conductive.
2. Each test lead wire must be attached to the pipeline so as to minimize stress concentration on the pipe.
  - a. Attachment of the test lead to the pipeline should be by the thermite welding process, that is, by brazing the lead to a steel tab and then welding the tab to the pipeline, or by other methods approved by the General Manager, Engineering Services.
  - b. Welding a test lead to the main shall not be permitted.
3. Each bared test lead wire and bared metallic area at point of connection to the pipeline must be coated with an electrical insulating material compatible with the pipe coating and the insulation on wire.
4. The coding of test lead wires shall be as follows:
  - a. anode wire (from the anode lead to the pipeline: RED;
  - b. casing wire: YELLOW;
  - c. test lead wire: GREEN OR BLACK.
5. The coding of insulating fittings shall be as follows:
  - a. north and west: WHITE;
  - b. south and east: BLUE OR BLACK.
6. Colored plastic sleeves may be used on existing wires.
7. Number 10 or 12 TW wire shall be the minimum gage used for test lead wires; and,
8. Care shall be taken when backfilling to avoid damage to test leads.
9. Test leads should not be shorted to metallic valve boxes or to conduit comprising the test point.

**Section 20.9 – Interference Currents**


1. Each pipeline system which is subjected to stray currents shall have in effect a continuing program to minimize the detrimental effects of such currents.

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2. Each impressed current type cathodic protection system or galvanic anode system must be designed and installed so as to minimize any adverse effects on existing adjacent underground metallic structures.

**Section 20.10 – Atmospheric Protection**

1. Pipe and components that are exposed to the atmosphere shall be protected from external corrosion by use of corrosion resistant steel or application of protective coating or paint unless the operating company can demonstrate by test, investigation, or experience in area of application that a corrosive atmosphere does not exist.
2. Protective coating or paint shall be applied to a clean surface and shall be suitable material to provide adequate protection from the environment.

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## **SECTION 21 - CLEARING AND GRADING**

### **Section 21.1 - Description**

1. This work shall include the clearing of all trees, brush, hedges, or other obstacles, with the exceptions noted below, lying within the confines of the route of the line.
2. The term "grading" includes all excavation and the forming of embankments, diverting of ditches or small streams, building of temporary bridges and roads, or work performed to facilitate movement of equipment onto and along the route.

### **Section 21.2 - Method of Construction, Clearing and Grading**

1. Where cultivated shrubbery, trees, or valuable growing timber is encountered on the route of the line, it may be required that such shrubbery, trees, or growing timber be left standing.
2. Where large trees are cut on the right of way, they shall be cut close to the ground so that the remaining stumps will not extend more than three inches (3") above the ground level.
3. Branches and leaves removed from such trees shall be placed in piles, along with brush or undergrowth that has been cut, and shall be disposed of away from the construction site.
4. Brush and other debris should not be shoved into piles with earth from grading, nor placed in the ditch line.
5. Excess excavated material shall be placed in piles.
6. Such material shall not be scattered along the right of way, and shall not be placed in low areas along the route of the facilities, without the consent of the Division Manager.
7. Material removed from creek banks shall not be placed in the creek bed at points that will interfere with excavation of the ditch across the creek bed.
8. After pipe has been installed and such other operations that may be necessary have been completed, material excavated from hillsides, creek banks, and other places shall be replaced in its original position and protected from slides and erosion by riprap, wash breakers, terraces, or such other means as may be designated by the Division Manager or designee.
9. Clearing and grading shall be affected in a manner that shall cause minimum inconvenience to the interests and property of landowners, tenants and the general public.
10. It is important the methods used during clearing and grading activity be in accordance with all local, municipal, state, and environmental agency standards having jurisdiction.


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## **SECTION 22 - CONSTRUCTION NOTIFICATION**

### **Section 22.1 – Notice of Major Construction**

1. Notice shall be given by the Division Manager or designee to the Florida Public Service Commission with a copy forwarded to Peoples Gas' corporate Engineering Services, on PGS Form No. 603, "Notice of Major Construction", in duplicate, at least twenty-five (25) days prior to commencement of construction, when both of the following conditions have been met on pipeline construction projects:
  - a. The proposed construction shall be installed within the Peoples Gas natural gas distribution systems; and,
  - b. This requirement shall apply to new construction, replacement, relocation or insertion on lines at least two inches (2") in diameter and at least two thousand linear feet (2000 LF) in total length including service lines.

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## **SECTION 23 - MATERIAL SPECIFICATIONS**

### **Section 23.1 – Records**

1. Records shall be kept sufficient to prove that all materials and components used, or intended to be used, in the Peoples Gas distribution systems meet the applicable specifications listed in the rules and/or the standards adopted by this Construction Standards Manual and the Peoples Gas Operating and Maintenance Procedures Manual.

### **Section 23.2 – Standard Material List**

1. Standard materials used in the Peoples Gas distribution systems are included in Peoples Gas **Appendix B - Standard Material List** and must be ordered in accordance with Peoples Gas approved practices. (See Peoples Gas' Purchasing department policies and procedures).
2. Peoples Gas' corporate Engineering Services department shall review the product specification of a fitting/component, test new materials to ensure that they meet the applicable standards and add such items after evaluation to the Peoples Gas **Appendix B - Standard Material List**.
  - a. This review and testing may be at the request of the Division Manager or designee, or as a matter of routine evaluation by Peoples Gas' corporate Engineering Services' personnel.


### **Section 23.3 – Non-Conformance to Florida Public Service Commission Rules**

1. If a fitting or other pipeline component does not conform to the standards or specifications, as adopted by the Florida Public Service Commission Rules, Peoples Gas' corporate Engineering Services may petition the Florida Public Service Commission for approval for the use of the fitting/component.
  - a. Such petition shall, if possible, identify the material with a comparable material, and it should be shown that the material, unless otherwise noted, would comply with the specifications of the compared material.
  - b. Complete information as to the chemical composition and physical properties shall be supplied to the Florida Public Service Commission and the Florida Public Service Commission's approval must be obtained prior to the actual use of the fitting or component.


### **Section 23.4 – Pipe and Fitting Markings**

1. All pipe installed in the Peoples Gas distribution systems shall be properly stenciled with the manufacturer's pipe specifications in a location where the stencil can readily be seen.
2. All fittings and components installed within the Peoples Gas distribution systems shall:
  - a. be individually stenciled; or,
  - b. have the manufacturer's trademark identifying the manufacturer that supplied the material; or,

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- c. shall be received in cartons with the manufacturer's specifications clearly marked:
    - i. Note: all fittings not marked individually or not having the manufacturer's trademark shall be kept in the original manufacturer's cartons until used for installation.
3. If any material received does not meet all the requirements above and as specified in the Peoples Gas Standard Material List, a report shall be completed by the Division Manager or designee stating the exceptions and shall be promptly submitted to Peoples Gas' Purchasing department.

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## **SECTION 24 - BARRICADING WORK AREAS, GUIDELINES**


### **Section 24.1 - Objectives**

1. Work area protection should be planned with the following objectives in mind:
  - a. To provide maximum protection for employees in the work area;
  - b. To provide maximum safety for passing motorists and pedestrians; and,
  - c. To maintain a free flow of traffic consistent with the work area that is protected.

### **Section 24.2 – Traffic Control**


1. Planning for Traffic Control:
  - a. Defining detailed standards that would be adequate to cover all applications is not practical; no one set of signs or other traffic control devices can typically satisfy all conditions for a given project.
  - b. The traffic control selected for each situation should be based on the type of highway, traffic conditions, the duration of the work operation, physical constraints, and the nearness of the workspace to traffic.
2. City, County, and Private Roadways:
  - a. The authority of a public body or official having jurisdiction for guiding traffic may adopt traffic control plans or devices.
  - b. Methods used during construction, maintenance and utility activity shall be in accordance with all existing local and municipal traffic control standards.
  - c. When non-existent, the standards used shall comply and be in accordance with U.S. Department of Transportation-Part VI of the Manual on Uniform Traffic Control Devices (MUTCD).
3. Florida Department of Transportation Rights-of-Way:
  - a. The contractor shall be responsible for ensuring that each employee who is supervising the selection and placement of Maintenance of Traffic Control Devices be properly trained by attending and successfully completing Florida Department of Transportation (FDOT) approved Maintenance of Traffic (MOT) training course, or the permittee's approved MOT course.
  - b. Any person supervising MOT activities shall at all times have in their possession proof that they are certified in MOT setup.
  - c. Methods used during construction, maintenance and utility activity shall be in accordance with FDOT Standards Indexes 601 thru 660.
  - d. In some cases actual field conditions and/or utility work scenarios may not be identical to those represented in the standards; therefore, combining one or more, or the use of a portion of these standards, is allowed as long as the safety provisions of the MUTCD are maintained and not taken out of context.
  - e. For specifics, refer to the current copy of the FDOT Utility Accommodation Manual.

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4. Rail Flagging:
  - a. All permitted utility work performed on an operation rail corridor shall comply with the flagging requirements of the operating railroad.
  - b. Reference: Florida Department of Transportation - Utility Accommodation Manual U.S. Department of Transportation - Part VI of the Manual on Uniform Traffic Control Devices.

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## **SECTION 25 - HAULING AND STRINGING**

### **Section 25.1 - Description**

1. This shall include all unloading, hauling, storage, handling and stringing of pipe, paint, valves, fittings and other material required for construction.
2. This work shall include the handling and hauling of all materials from the time of receiving until the final installation of the materials on the job, and the hauling of surplus materials back to the Peoples Gas storage areas.
3. Also see related information above in this **Construction Standards Manual, Section 6, "Pipe Coating and Wrapping"**, and **Section 7, "Lowering-In"**.

### **Section 25.2 - Method of Construction, Hauling and Stringing**

1. Construction personnel shall haul and string all pipe and other materials along the route of the line in a satisfactory manner that will avoid damage.
2. Coated pipe shall not be rolled or thrown from the bed of a truck to the ground.
3. The stringing of the pipe shall be performed in such a manner as to cause the least interference with normal use of the streets, highways and land crossed by the route of the line and, in congested areas.
4. It may be required that pipe and other materials be strung along the pipeline only as needed for incorporation into the system that same day.
5. Pipe on slopes should be checked, wedged or staked to prevent rolling.

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## **SECTION 26 - STREAM CROSSINGS**

### **Section 26.1 - Description**

1. This section refers to trenching, excavation, directional boring and all other work necessary for the installation of pipelines across creeks, streams, drainage ditches and adjacent low lands or flood plains.

### **Section 26.2 - Method of Construction, Stream Crossings**

1. The trench for such lines shall be excavated to such width and depth as required by the permitting agency.
2. The section of pipe to be installed across the normal channel of all such streams will be weight-coated with concrete or similar material as needed to ensure negative buoyancy to protect the pipe.
3. Construction personnel shall conduct the work required in such a manner so that excavations and installation of pipe will not hinder the flow of water.

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## **SECTION 27 - RIVER CLAMPS AND ANCHORS**

### Section 27.1 - Description

1. This shall include all work necessary to unload, haul, string, and install river clamps at locations and in the manner designated by the Peoples Gas.

### **Section 27.2 - Method of Construction, River Clamps and Anchors**

1. Pre cast concrete or cast iron river clamps shall be installed at locations designated on the plans.
2. One or more thicknesses of rock shield shall be placed between the pipe and each river clamp, as necessary.
3. The clamp shall be fitted securely to the pipe and all bolts shall be firmly tightened.
4. Where clamps are installed on long sections of pipe, care shall be taken to prevent buckling of the pipe from the weight of the clamps.

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## **SECTION 28 - CLEAN UP**

### **Section 28.1 - Description**

1. All work necessary to restore the right of way to its original condition, in accordance with local, municipal and state requirements.

### **Section 28.2 - Method of Construction - Clean-Up**

1. Personnel shall clean up immediately behind construction along streets, alleys, highways and right of way provided, and shall remove all remaining debris.
2. The route of the lines and other working areas shall be restored as nearly as possible to their original condition.
3. Surplus material that remains on the right of way or in contractor warehouses, after construction is completed, shall be returned to the Peoples Gas warehouse, or to such other convenient point that may be designated by the Division Manager or designee.

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## **SECTION 29 - INSTALLATION OF GAS SERVICE LINES**

### **Section 29.1 - Description**

This shall include all work necessary to install a gas service line from the main connection through the outlet of the meter stop (also, see Section 11.4, "Curb Valves").

### **Section 29.2 - Method of Construction, Installation of Gas Service Lines**

1. Gas service lines shall be installed at a right angle, wherever possible, from the gas main to the riser location.
2. All valves and/or stops which require lubricant shall, prior to installation, be lubricated with the required amount and grade of lubricant.
3. Gas service lines shall be purged and all valves left in the closed position.
4. The outlet of the meter stop shall be protected from entrance of water and dirt by a suitable plug or cap when the meter set is not installed at time of completion of the gas service line installation.
5. Each new service line that has not been placed in gas service shall comply with one of the following:
  - a. if the meter set assembly has not been installed, the service line riser valve shall be closed, locked, and tagged with an "Out of Service" tag and the valve plugged or capped to prevent the flow of gas; or,
  - b. if a residential meter set assembly has been installed, the service line riser valve shall be closed, locked and tagged with an "Out of Service" tag.
  - c. if a commercial meter set assembly with a valve on the outlet side is installed, the riser valve shall be left on, and the outlet valve left closed and capped.

### **Section 29.3 - Method of Construction, Gas Service Lines Into Buildings**


1. Installation of gas service lines into or through the outer foundation wall of a building below ground, shall be made only if no other practicable or feasible method exists.
2. In the case of a metal service line, each installation must be protected against corrosion and be sealed at the foundation wall to prevent leakage into the building.
3. In the case of a plastic service line each installation must be protected from shearing action and backfill settlement and be sealed at the foundation wall to prevent leakage into the building.

### **Section 29.4 - Method of Construction, Gas Service Lines Under Buildings**

1. Installation of gas service lines under a building shall be made only if no other practicable or feasible method exists.

(continued)

2. Where an underground service line is installed under a building, the service line must be encased in gas tight conduit.

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3. Together with its conduit, if the gas service line supplies the building it underlies, extend into a normally usable and accessible part of the building.
  - a. The space between the conduit and gas service line shall be sealed to prevent gas leakage into the building.

**Section 29.5 - Plastic Service Lines**

1. Where plastic service line tie-ins are made on steel, wrought iron or cast iron mains, a steel service tee with a compression outlet incorporating an internal stiffener (or a weld outlet with a transition fitting) shall be used.

**Section 29.6 - Risers**

1. All steel risers must be cathodically protected.
2. Gas service line risers used in conjunction with plastic service lines shall be of the anodeless type; this type of riser eliminates the need to apply cathodic protection and the associated monitoring and record keeping.

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- iv. Appliance Serial #
  - v. Type of Appliance (commercial refrigeration appliance, industrial process refrigeration appliance, comfort cooling appliance, or other type of refrigeration appliance in accordance with the definitions found in 40 CFR § 82.152.)
  - vi. Type of Refrigerant
  - vii. Full Charge
  - viii. Date Full Charge Determined
- f. If the answer to Question (d.) is “Yes” provide copies of any and all work logs, service tickets, invoices and any other documents maintained by the contractor relating to the following:
- i. The date any and all service was performed;
  - ii. The date each leak was discovered;
  - iii. A complete detailed description of all repair work done (if repairs were not conducted, state the reasons);
  - iv. The date each repair was conducted;
  - v. The amount of refrigerant added at the completion of each repair;
  - vi. The name of the technician who performed the work; and
  - vii. Any documentation associated with leak rate calculations, and the calculated leak rate.
  - viii. Identify each of the above by Facility Name, Building #, and Serial #
- g. Describe all methods utilized by the contractor on MacDill AFB to remove refrigerants or substitutes from appliances.
- h. Provide the name and complete business address of the refrigerant reclamation facility used by the MacDill AFB to process recovered or used refrigerant.

### 3. REFERENCE

40 CFR Part 82 – Protection of Stratospheric Ozone, Subpart F – Recycling and Emissions Reduction





**Operating  
And  
Maintenance  
Procedure  
Manual**

## **IMPLEMENTATION POLICY**

It is the policy of TECO Peoples Gas to construct, operate and maintain natural gas systems in a manner which is safe and consistent with good industry practice.

Furthermore, TECO Peoples Gas shall comply with all federal, state and local gas codes. Generally these codes set minimum standards but do not specify the manner in which the minimums are to be achieved. Therefore, TECO Peoples Gas has issued the Operating and Maintenance Procedures Manual, Construction Standards, Standard Material List and Emergency Procedures Manual, to be used in achieving its goals as well as the requirements of the codes.

The records, reports, and forms required by the regulations covered by these policies may be in either paper or electronic form, and archived accordingly.

The Division Manager shall be responsible for the implementation of the policy unless otherwise identified. The following words and phrases which are used throughout the manual are used synonymously: local operating center, Supervisor, Supervisor in charge of the operation, Division Manager, and Division Manager's designated representative.

Where the word "include" occurs, it means including but not limited to. Where the word "may" is used it means "is permitted to" or "is authorized to". Where the words "may not" are used it means "is not permitted to" or "is not authorized to". Where the word "shall" is used it is used in the mandatory and imperative sense. Where a singular word tense is used, it includes the plural. Where a plural word tense is used, it includes the singular. Where a masculine gender word is used, it includes the feminine, and vice versa.



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9	39,40&41	None	System Upgrading Procedure and Record	Life of Facility
10	45	266	Gate Station Odorization Report	Three Years
10	46	644	Odorization Record	Three Years
13	53	None	Pipeline Test Record	Life of Facility
14	57 & 58	24	Gas Leak & Repair Form	Life of Facility
14	59	None	Hydrostatic Test Report	Life of Facility
15	63	639	Area Leak Survey	Two Most Recent
17	68	614	Above Ground Piping Inspection & Maintenance Report	Two Most Recent (at least 5 years of inspection history)
18	73	653	Manhole & Catch Basin Survey	Two Most Recent
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22	83	402	Authorization for Retirement	Permanently
23	92	654	Pressure Regulating Installation Data	Life of Facility

<b>Section</b>	<b>Page</b>	<b>PgS Form Number</b>	<b>Description</b>	<b>Retain Records For</b>
23	93	659	District Regulator Station Inspection & Maintenance Report	Two Most Recent
24	98	657	Valve Maintenance & Operating Order	Life of Facility
24	99	638	Valve Maintenance Record Card	Life of Facility
25	101	None	Annual Vault Inspection	Two Most Recent
27	114	668	Cathodic Protection Interference Test Report	Life of Facility
27	115	645	Cathodic Protection Data	Life of Facility
27	116	313	Cathodic Protection Data	Life of Facility
27	117	294	Pipeline Electrical Survey Data	Five Years
27	118	515	Rectifier System Report	Five Years
27	119	None	Pipe Inspection Report	Five Years
29	124	506	Plastic Pipe Joining Record	Life of Facility
30	128 & 129	424	Welder Qualification Test Inspectors Record	Permanently
31	134	None	Inspection Record Combustible Gas Indicator	Two Most Recent
38	147	None	Out of Service Tag	n.a.



<b>Section</b>	<b>Page</b>	<b>PgS Form Number</b>	<b>Description</b>	<b>Retain Records For</b>
39	164	640	Large Volume Meter Installation Maintenance Report	One Most Recent

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> SAFETY - RELATED CONDITIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605, 191.23 and 191.25	<b>Date Revised:</b> July 31, 2011
<i>Section 1 – Safety Related Conditions</i>	<b>Approved:</b> 

### **Section 1.1 - General**

TECO Peoples Gas is committed to the construction, maintenance and operation of its facilities in a manner that is safe to the public and employees. All employees, including management, supervisors and non-supervisory employees, shall use good judgment in performing all work in a safe manner. It is the obligation of the individual employee who is aware of an unsafe or potentially unsafe condition to immediately bring the matter to the attention of the employee's supervisor.


The Supervisor will report the safety-related condition to the Division Manager. The Division Manager will prepare the report itemizing the information required by Title 49 Code of Federal Regulations, Part 191.25 (b).

### **Section 1.2 - Reporting Safety-Related Conditions**

State and federal regulations require that "safety-related conditions" be reported in writing. The report must be received in the State and Federal office:

- Within five (5) working days after determining that a safety-related condition exists,
  - But no later than ten (10) working days after the discovery of the safety-related condition.
1. Except as stated in item (b) below, a report is required for the following situations defined by the regulations as safety-related conditions:
    - a. In the case of pipelines that operate at a hoop stress of twenty percent (20%) or more of SMYS:
      - i. General corrosion that has reduced the wall thickness to less than that required for the maximum allowable operation pressure.
      - ii. Localized corrosion pitting to a degree where leakage might result.
      - iii. Any material defect or physical damage that impairs its serviceability

*(continued on next page)*


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> SAFETY - RELATED CONDITIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605, 191.23 and 191.25	<b>Date Revised:</b> July 31, 2011
<b>Section 1 – Safety Related Conditions (continued)</b>	<b>Approved:</b> 

- b. For all distribution, transmission, and gathering systems where:
- i. Unintended movement or abnormal forces caused by environmental causes, such as earthquake, landslide, or flood that impairs the serviceability of a pipeline.
  - ii. Any over-pressure condition that exceeded the maximum allowable operating pressure plus the buildup allowed for over pressure protection devices.
  - iii. A leak in a gas pipeline that constitutes an emergency, but that is not otherwise reportable.
  - iv. Any safety-related condition that could lead to an imminent hazard and that requires a twenty-percent (20%) or more reduction in operating pressure or the shutdown of a pipeline.

2. A report is NOT required if the condition:


- a. Is temporarily or permanently repaired or replaced within five (5) working days after determination, except that reports are required for generalized corrosion as described in Section 1.2, item 1.a.i. above or localized corrosion on pipelines not effectively coated and cathodically protected and meeting Section 1.2, item 1.a.ii, above.
- b. Exists on a pipeline that is more than two hundred twenty (220) yards from any building intended for human occupancy or outdoor place of assembly, except railroad, paved road, street or highway.
- c. Exists on a master meter system or a customer-owned service line.
- d. Results in a reportable incident before the deadline.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> SAFETY - RELATED CONDITIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605, 191.23 and 191.25	<b>Date Revised:</b> July 31, 2011
<i>Section 1 – Safety Related Conditions (continued)</i>	<b>Approved:</b> 

3. Telephone Report: Because of the time limit, each condition stated above shall be reported by telephone directly to the Division Manager within five (5) working days from the time of discovery. The following information is required:
  - a. Name and principal address of Operator.
  - b. Date of report.
  - c. The name, job title and business telephone number of person submitting report.
  - d. The name, job title, and business telephone number of the person who determined that the condition exists.
  - e. The date the condition was discovered and the date that condition was first determined to be a safety-related condition as defined in item 1. (above, this Section 1.2).
  - f. The location of the condition, with reference to the nearest street address, survey station number, milepost, landmark, or name of pipeline, as appropriate.
  - g. A description of the condition, including circumstances leading to its discovery and any significant effects of the condition on safety.
  - h. The corrective action taken (including reduction of pressure or shutdown) before the report is submitted and the planned follow-up for future corrective action, include the anticipated schedule for starting and concluding such action.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INCIDENT REPORTING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 191.3, 191.5, 191.9 and 191.15, Florida Administrative Code 25-7.018 and 25-12.084	<b>Date Revised:</b> July 31, 2011
<b>Section 2 – Incident Reporting</b>	<b>Approved:</b> 


### **Section 2.1 - General**

This Procedure describes the criteria for reporting certain natural gas leaks and facility failures involving the TECO Peoples Gas distribution and transmission systems as required by the above listed federal and state regulations. The Division Managers shall be responsible for making certain that the Florida Public Service Commission (FPSC) and US Department of Transportation (USDOT) are properly notified of reportable accidents, leaks, or incidents.


### **Section 2.2 - Reports and Reporting of Accidents, Leaks, or Incidents:**

1. At the earliest practical moment following discovery, TECO Peoples Gas shall notify the FPSC by telephone of any event that involves a release of gas from its pipeline(s) which:
  - a. Caused a death or any personal injury requiring inpatient hospitalization;
  - b. Required taking any segment of transmission pipeline out of service;
  - c. Resulted in gas igniting
  - d. Caused estimated damage to the property of TECO Peoples Gas, or others, or both (including gas loss), totaling \$10,000 or more;
  - e. Could reasonably be judged as significant even though it does not meet the other requirements.
2. TECO Peoples Gas need not give notice of an event that met only the criteria of subparagraphs (b) or (c) of the above paragraph, if it occurred solely as a result of, or in connection with, planned or routine maintenance or construction.
3. TECO Peoples Gas shall immediately report to the FPSC any distribution system-related accident or failure which interrupts service to either ten percent (10%) or more of its division meters or five hundred (500) or more meters.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INCIDENT REPORTING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 191.3, 191.5, 191.9 and 191.15, Florida Administrative Code 25-7.018 and 25-12.084	<b>Date Revised:</b> July 31, 2011
<b>Section 2 – Incident Reporting (continued)</b>	<b>Approved:</b> 

4. The telephone notice shall be made to the FPSC emergency line, Pipeline Safety Section at (850) 413-6650, and shall include the following:
  - a. Company name (TECO Peoples Gas), name of person making report and their telephone numbers.
  - b. Location of leak or incident.
  - c. Time of accident/incident.
  - d. Fatalities and/or personal injuries.
  - e. Other significant facts relevant to the accident or incident
5. In addition to notifying the FPSC by telephone, TECO Peoples Gas is responsible for notifying the USDOT of an incident that results in a death or personal injury necessitating in patient hospitalization; or estimated property damage, including cost of gas lost of TECO Peoples Gas or others or both, of fifty thousand dollars (\$50,000) or more. Each notice required shall be made by telephone to 800-424-8802 and shall include the same information reported to the FPSC.
6. TECO Peoples Gas shall report, in writing, a summary of each accident or incident as described above. The report shall be submitted to the FPSC as soon as practical, but not more than thirty (30) days after detection, using the most current version of the form as supplied by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration: “Incident Report For Gas Distribution System - PHMSA F 7100.1” for gas distribution incidents and “Incident Report for Gas Transmission and Gathering Pipeline Systems – PHMSA F 7100.2” for gas transmission incidents. The submitter is required to use the most current version of the official form. If the incident meets the criteria of Section 2.2.5 above, the appropriate report (PHMSA F 7100.1 or PHMSA F 7100.2) will be submitted PHMSA online at PHMSA’s OPS Online Data Entry and Operator Registration System site (<http://opsweb.phmsa.dot.gov/cfdocs/opsapps/pipes/main.cfm>).

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CLASS LOCATIONS – TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.609 and 192.611	<b>Date Revised:</b> July 31, 2011
<i>Section 3 – Class Locations/Transmission</i>	<b>Approved:</b> 

### **Section 3.1 - Population Density Indexes and Initial Determination**

Prior to pipeline construction, population density indexes are to be determined by aerial photography or field survey in order to identify all locations for engineering design and testing consideration.


The Corporate Engineering Department shall be responsible for the initiation of class location surveys necessary to prepare the pipeline density indexes.

### **Section 3.2 - Change in Class Location & Required Study**

Whenever an increase in population density, as determined from field surveys or other forms of continuing surveillance, indicates a change in class location for a segment of an existing steel pipeline operating at hoop stress that is more than forty percent (40%) of SMYS, or indicates that the hoop stress corresponding to the established maximum allowable operating pressure for a segment of existing pipeline is not commensurate with the present class location, the Division Manager shall immediately make a study to determine:

1. The present class location for the segment involved.
2. The design, construction, and testing procedures followed in the original construction and a comparison of these procedures with those required for the present class location.
3. The physical condition of the segment to the extent that can be ascertained from available records.
4. The operating and maintenance history of the segment.
5. The maximum actual operating pressure and the corresponding operating hoop stress, taking pressure gradient into account, for the segment involved.
6. The actual area affected by the population density increase, and physical barriers or other factors, which may limit further expansion of the densely populated area.

The Division Manager shall upon completion of the above-referenced project, initiate action as specified below at Section 3.3, “Class Change & MAOP Confirmation or Revision”.


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CLASS LOCATIONS – TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.609 and 192.611	<b>Date Revised:</b> July 31, 2011
<i>Section 3 – Class Locations/Transmission (continued)</i>	<b>Approved:</b> 

### **Section 3.3 - Class Change & MAOP Confirmation or Revision**

The Corporate Engineering Department shall, upon receipt of the study referenced above at Section 3.2, “Change in Class Location & Required Study”, Section 3, Page 21, develop a plan for MAOP confirmation or revision of the segment of pipeline involved. Confirmation or revision necessary by changes in class location must be completed within twenty four (24) months of the change in class location.

1. If the segment involved has been previously tested in place for a period of not less than eight (8) hours, and the segment is in satisfactory physical condition, the MAOP must be confirmed or reduced so that the corresponding hoop stress will not exceed:
  - a. Seventy-two percent (72%) of SMYS nor eighty percent (80%) of the test pressure in Class 2 locations.
  - b. Sixty percent (60%) of SMYS nor sixty six and seven tenths percent (66.7%) of the test pressure in Class 3 locations.
  - c. Fifty percent (50%) of SMYS nor fifty five and five tenths percent (55.5%) of the test pressure in Class 4 locations.
2. If the segment involved has not been previously tested in place as described in item 1 above, the MAOP must be reduced so that the corresponding hoop stress is not more than that allowed under Title 49, Code of Federal Regulations, Paragraph 192.619 for new segments of pipeline in the existing class location.
3. If the segment involved has not been qualified for operation under items 1 or 2 above, it must be tested in accordance with Title 49 Code of Federal Regulations, Subpart J-Test Requirements. The MAOP must then be established so as to be equal to or less than the following:
  - a. The MAOP after re-qualification test is 0.8 times the test pressure in Class 2 locations, 0.667 times the test pressure in Class 3 locations, or 0.555 times the test pressure in Class 4 locations.
  - b. The MAOP may not exceed the MAOP established before the confirmation or revision.
  - c. The corresponding hoop stress may not exceed that which is specified in item 2 above.




<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CLASS LOCATIONS – TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.609 and 192.611	<b>Date Revised:</b> July 31, 2011
<i>Section 3 – Class Locations/Transmission (continued)</i>	<b>Approved:</b> 

**Section 3.4 - Reports and Records**

The form, “Report of Adjacent New Construction/Observation” (see sample below at Section 3, Page 21), shall be completed by the Division Manager to report building construction within six hundred sixty feet (660’) of a pipeline.

The report shall be forwarded to Corporate Engineering to determine if a change in class location has occurred.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CLASS LOCATIONS – TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.609 and 192.611	<b>Date Revised:</b> July 31, 2011
<i>Section 3 – Class Locations/Transmission (continued)</i>	<b>Approved:</b> 



**REPORT OF ADJACENT NEW CONSTRUCTION / OBSERVATION  
MONITORING FOR CONSTRUCTION IN THE AREA OF THE  
\_\_\_\_\_ TRANSMISSION MAIN  
SERVING \_\_\_\_\_**

**NAME:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**FINDINGS:**

**A.** I HAVE MONITORED ALL \_\_\_\_\_ MILES OF THE TRANSMISSION MAIN SERVING \_\_\_\_\_ AND I HAVE FOUND **NO CONSTRUCTION** IN THE AREA AROUND THE \_\_\_\_\_ TRANSMISSION MAIN.


**B.** I HAVE MONITORED ALL \_\_\_\_\_ MILES OF THE TRANSMISSION MAIN SERVING \_\_\_\_\_ AND I **HAVE FOUND CONSTRUCTION** IN THE AREA AROUND THE \_\_\_\_\_ TRANSMISSION MAIN. THE CONSTRUCTION WAS BETWEEN THE FOLLOWING MILE POST MARKERS:

\_\_\_\_\_ AND \_\_\_\_\_  
\_\_\_\_\_ AND \_\_\_\_\_  
\_\_\_\_\_ AND \_\_\_\_\_

**REMARKS:** \_\_\_\_\_

(use back of page if necessary)

\_\_\_\_\_ **SIGNATURE**

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CONTINUING SURVEILLANCE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605, 192.609, and 192.613	<b>Date Revised:</b> July 31, 2011
<i>Section 4 – Continuing Surveillance</i>	<b>Approved:</b> 

#### **Section 4.1 - General**

The surveillance of TECO Peoples Gas' gas system is a combined effort of different groups. Surveillance is carried out in order to discover leaks and failures, minimize corrosion damage, determine maintenance and repair requirements, monitor the operating condition of the system, and take appropriate action.

Leaks and failures of gas system components are readily discovered during normal operations. The Operations personnel also discover leaks or failures during routine leak surveys and other investigations. The corrosion personnel monitor cathodic protection levels. The personnel of this service also provide leakage and failure surveillance during their routine operations. Personnel on both routine and incidental assignments shall be alert for conditions that would interfere with the safe operation of the gas system. These conditions shall be reported to their immediate supervisor.


#### **Section 4.2 - System Review**

As a means of maintaining the integrity of the systems, continuing surveillance through the analysis of completed inspection and maintenance records, daily operating reports, and other operating records shall be on-going and conducted so as to identify any system facilities experiencing abnormal or unusual operating and maintenance conditions.

The Division Manager must periodically review each pipeline and/or system under his/her jurisdiction. Consideration should be given to all of the following:

1. Class location at the time of the review and any changes in location class.
2. Alterations or additions to the system, which may change, pressure or flow maximums.
3. Patrols.
4. Leak or failure frequency.
5. Changes in corrosion control requirements or corrosion failures.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CONTINUING SURVEILLANCE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605, 192.609, and 192.613	<b>Date Revised:</b> July 31, 2011
<b>Section 4 – Continuing Surveillance (continued)</b>	<b>Approved:</b> 

6. Loss of flow efficiency or excessive pressure drops either system-wide or localized.
7. Ability of the pipeline or system to handle future loads within the prescribed operating pressure range.
8. Unaccounted-for-gas.

If the review indicates that the facility is, or will be, in unsatisfactory condition, one of the following actions shall be undertaken:

1. A procedure shall be initiated to recondition the segment and, if necessary, establish a new MAOP.
2. The MAOP shall be reduced to a safe pressure after considering the conditions present.
3. A procedure shall be initiated to phase out or replace the unsatisfactory segment.

#### **Section 4.3 - Frequency of Reviews**

The reviews will be on-going, but at a minimum a complete review of each pipeline or system shall be made annually by the Division Manager.

#### **Section 4.4 - Class Location Survey**


Changes in class location generally occur as a result of community development and expansion. Such changes will be observed as they occur. Whenever such increases in population density in an area are noted, a survey of the affected area should be made by field observation. The entire area shall be surveyed as part of the periodic review.

#### **Section 4.5 - Class Determination**

The class location of each area surveyed shall be determined.

*(continued on next page)*



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CONTINUING SURVEILLANCE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605, 192.609, and 192.613	<b>Date Revised:</b> July 31, 2011
<i>Section 4 – Continuing Surveillance (continued)</i>	<b>Approved:</b> 

#### **Section 4.6 - Changes in Class Location**

Whenever there is a change in the class location of any facility, the Division Manager must determine the effect of the change on the facility. The design, construction, and testing procedures followed in the original construction must be compared with the requirements for the new location class.

If this review determines that the maximum operating pressure of the facility is greater than that permitted by the new class location, the system must be down-rated, confirmed, or up-rated.

#### **Section 4.7 - Unaccounted-For-Gas**

The trend of unaccounted-for-gas is an important tool in verification of the effectiveness of a maintenance program. Therefore, the Division Manager shall continuously monitor this trend.

Investigative action shall be taken whenever the loss exceeds two percent (2%) for distribution systems.

#### **Section 4.8 - System Alterations**

Once a system has been rated, all design and construction shall be done to the standard thus established. If any review, inspection, or survey determines that materials or methods which do not comply have been used, the system shall be down-rated, up-rated by appropriate procedure, or that portion replaced.


#### **Section 4.9 - Future Load Capability**

It is the responsibility of the Region Operations Manager to evaluate load increases and the ability of the system to handle such growth within established pressure ranges. If it is determined that it will not be possible for the system to serve an anticipated new load, one of the following steps shall be taken:

1. The system shall be reinforced (additional capacity supplied).
2. The system shall be up-rated.


Unexpected pressure drops from normal load increases are not considered emergency situations although temporary pressure increases may be required.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CONTINUING SURVEILLANCE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605, 192.609, and 192.613	<b>Date Revised:</b> July 31, 2011
<i>Section 4 – Continuing Surveillance (continued)</i>	<b>Approved:</b> 

**Section 4.10 - Remedial Action**

All unusual leaks, failures, changes in cathodic protection voltage and current levels, and operating or maintenance conditions will be brought to the attention of the Division Manager. All segments of pipeline found to be in an unsatisfactory condition shall be repaired or replaced as soon as practical. In the event that the condition presents a hazard, the repair or replacement will be accomplished immediately. The Region Operations Manager shall prepare plans and programs for upgrading and reconditioning and for phasing out facilities that cannot be reconditioned.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> DAMAGE PREVENTION PROGRAM	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.614	<b>Date Revised:</b> July 31, 2011
<i>Section 5 – Damage Prevention Program</i>	<b>Approved:</b> 


**Section 5.1 - General**

TECO Peoples Gas participates in Sunshine State One-Call of Florida (SSOCOF). TECO Peoples Gas will locate underground gas facilities for contractors and individuals who are excavating near TECO Peoples Gas facilities, and TECO Peoples Gas will determine the location of other underground facilities prior to starting excavating activities.

**Section 5.2 - Damage Prevention Requirements**

The damage prevention requirements specified by Title 49 Code of Federal Regulations, Paragraph 192.614 (b) as specified below.

<b>Responsible Party</b>	<b>Damage Prevention Requirement</b>
SSOCOF	<ul style="list-style-type: none"> <li>• Receiving and recording requests for locating.</li> </ul>
Division Manager	<ul style="list-style-type: none"> <li>• Providing actual field locating and marking of facilities.</li> <li>• Describing the type of marking to be provided and how to identify markings.</li> <li>• Providing inspection of facilities during excavation activities where there is reason to believe that the facilities could be damaged by excavation.</li> <li>• Dispatching an employee on additional inspections as frequently as necessary during and after the activities to verify the integrity of the pipeline.</li> <li>• Providing leakage surveys immediately after blasting has occurred.</li> </ul>
Damage Prevention	<ul style="list-style-type: none"> <li>• Maintaining the identity on a current basis of persons who normally engage in excavation activities in the TECO Peoples Gas service area.</li> <li>• Providing for notification by mail annually of the persons identified above of the existence of a damage prevention program, purpose of program, how to learn the location of underground pipelines before construction, and other services provided by the TECO Peoples Gas damage preventive program.</li> </ul>
Operations Personnel	<ul style="list-style-type: none"> <li>• TECO Peoples Gas operations personnel will notify the Division Manager when he/she has reason to believe facilities could be damaged by excavation activities.</li> </ul>

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> DAMAGE PREVENTION PROGRAM	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.614	<b>Date Revised:</b> July 31, 2011
<i>Section 5 – Damage Prevention Program (continued)</i>	<b>Approved:</b> 

### **Section 5.3 - One Call**

The Region or Local Operations Center must acknowledge each location request from the general public. The acknowledgement must either confirm the presence of pipeline facilities, or indicate that the excavation area does not have pipeline facilities. When facilities are confirmed, they shall be marked in the field within forty-eight (48) hours from the time the inquiry is received. Also, the acknowledgement shall advise the inquirer of the type of temporary marking device(s) that will be used and the date and time the marking will be provided. This acknowledgement may be by telephone or in writing, as appropriate. In the case of location requests by telephone, the Region or Local Operations Center is not required to respond upon receipt of the request. However, the acknowledgement should follow the request within forty-eight (48) hours.


Explicit information describing the characteristics of the gas pipeline should not be given in an acknowledgement to an inquirer. TECO Peoples Gas personnel should not give information such as the type of pipeline; for example, cast or wrought iron, steel or plastic; nor the pipeline's working pressure; nor the exact location of the pipeline without field verification. However, this information may be useful when provided by TECO Peoples Gas personnel assisting excavators in the field during construction watch.

### **Section 5.4 - One-Call Systems**

All Peoples' Region or Local Operations Centers are members of the SSOCOF. The serial number assigned by SSOCOF's Call Center will satisfy the law if that number is given to the person requesting a location. Calls received at the Region or Local Operations Centers shall be referred to the SSOCOF.

The Region Operations Manager shall ensure gas facilities shown in the company mapping system are up to date. Corporate Engineering will regularly create a shape file of the gas facilities to update the SSOCOF database.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> DAMAGE PREVENTION PROGRAM	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.614 and 192.755	<b>Date Revised:</b> July 31, 2011
<i>Section 5 – Damage Prevention Program (continued)</i>	<b>Approved:</b> 

### **Section 5.5 - Field Locating**

All locating in the field shall be recorded on the SSOCOF Locate Ticket.

### **Section 5.6 - Pipeline Markers**

#### 1. Temporary Marking

Temporary marking devices shall be flags, stakes, paint or other suitable ways of identifying pipeline facilities in the field. Whenever possible, these temporary marking devices shall be yellow; to conform to the international color code system for utility locating that has been adopted by TECO Peoples Gas.


Temporary marking devices should be placed horizontally within twelve inches (12") on either side of the facility. Vertical marking, when requested by the excavator, should be within eighteen inches (18") of the top or bottom of the pipeline.

#### 2. Permanent Marking

Permanent pipeline markers shall be installed as outlined in TECO Peoples Gas' Construction Standards at Section 18.0, "Pipeline Markers". The Region or Local Operations Center shall initiate, on a continual basis, a review of the need for additional markers due to changes in structures on the pipeline such as new roads, railroad or canal crossings. In addition, surveys shall be made to ensure the presence of the installed markers. For example, the pipeline markers may be noted on leak survey maps and/or records and any missing markers may be reported to the Region or Local Operations Center.

### **Section 5.7 - Protecting Cast Iron Pipelines - Excavations and Undermining**

Additional care shall be used when excavating around cast iron with mechanical equipment. The main should be exposed (undermined) as little as possible and only as needed to perform the work. When a section of a buried cast iron pipeline is exposed, that segment, where necessary, must be protected against vibration, damage from heavy construction equipment, from trains, from trucks, from buses, or from blasting as well as impact forces by vehicles or earth movement. Protection from damage, which could occur during apparent future excavations near the pipeline or other foreseeable outside forces, which might subject that segment of the pipeline to bending stress, is required.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> DAMAGE PREVENTION PROGRAM	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.614	<b>Date Revised:</b> July 31, 2011
<i>Section 5 – Damage Prevention Program (continued)</i>	<b>Approved:</b> 

**Section 5.8 - Coordination Before the Project**

TECO Peoples Gas shall maintain contact with the various governmental agencies and other companies with underground facilities and shall encourage them to coordinate construction projects with TECO Peoples Gas.

Whenever notice of a project located near TECO Peoples Gas’ facilities is received, the owner and contractor shall both be contacted. In all cases, information regarding the extent and location of the TECO Peoples Gas facilities shall be given.

In cases involving directional boring in the vicinity of TECO Peoples Gas’ facilities, on-site monitoring by TECO Peoples Gas representatives may be required to insure the integrity of the gas facilities.

**Section 5.9 - Annual Advisory Letter**


The Public Information Program advises excavators of the hazards of accidental contact with utility facilities and how to minimize these hazards.

A letter warning of the hazards of accidental contact with utility facilities shall be sent to firms and individuals engaged in excavation activities in the TECO Peoples Gas service territory. The letter shall be mailed annually.

**Section 5.10 - General Public Program**


There shall be an ongoing program advising the general public and customers of the hazards of accidental contact with utility facilities and how to recognize and report a gas emergency. The program will use bill inserts, media advertising, and other suitable public information and education methods.

At least once each year, odor impregnated bill stuffers shall be included with bills so gas users can become familiar with the odor of gas. Additionally, advertisements shall annually be placed in the largest local daily newspapers serving each Operating Center informing the General Public what to do in a gas emergency and how to contact TECO Peoples Gas. The program must be conducted in English and other languages commonly understood by a significant number and concentration of the non-English speaking population.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> DAMAGE PREVENTION PROGRAM	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.614	<b>Date Revised:</b> July 31, 2011
<i>Section 5 – Damage Prevention Program (continued)</i>	<b>Approved:</b> 

**Section 5.11 - Responsibility and Record Keeping**

It shall be the responsibility of the Region or Local Operations Center to make inspections, furnish locations and complete and retain the appropriate records.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INVESTIGATION OF FAILURES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.617	<b>Date Revised:</b> July 31, 2011
<i>Section 6 – Investigation of Failures</i>	<b>Approved:</b> 

### **Section 6.1 - General**

The purpose of a gas-related accident investigation is to determine the cause, not to reach initial conclusions. The scope of an investigation shall depend upon the nature of the accident or failure.

The first person to arrive at an accident site shall, after meeting the requirements of TECO Peoples Gas' Emergency Plan make every effort to preserve the scene (as much as practical under the conditions) until the investigation team arrives. Also, the names of any witnesses should be recorded and furnished to the investigation team upon arrival.

The Division Manager is responsible for the timely investigation of all failures occurring on the gas system. The Division Manager shall, upon notification of an accident or failure, designate an investigation team to visit the site for the purpose of gathering evidence in determining the cause of the incident.


The Division Manager may request the services of TECO Peoples Gas' Insurance, Legal, and Safety departments, as well as outside investigative experts for assistance in ensuring an impartial, complete investigation and proper preservation of evidential material.

Where deemed necessary, in order to determine the cause of any failure, samples of the failed facility or equipment will be secured for laboratory analysis. Information obtained from the analysis will be used to minimize the possibility of a recurrence.

### **Section 6.2 - Conclusion and Report Preparation**

The investigation team shall, after analysis of the facts, reach a conclusion as to the cause (or probable cause) of an accident or failure. The written report shall include as exhibits all information relevant to the determination (test results, photographs, drawings, statements, laboratory analysis, etc.). Any recommendations, which may avert future incidents of a similar nature, shall be so stated in the report. The Division Manager shall review the report and take necessary action.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> MAXIMUM ALLOWABLE OPERATING PRESSURE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.619, 192.621 and 192.623, Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<i>Section 7 – Maximum Allowable Operating Pressure</i>	<b>Approved:</b> 

**Section 7.1 - General**

Maximum Allowable Operating Pressure (MAOP) has been established by TECO Peoples Gas as follows, steel and plastic facilities shall not be operated at a pressure that exceeds the lowest of the following;

1. The design pressure of the weakest element in the system which will be subjected to the line pressure.
2. The pressure obtained by dividing the pressure to which the pipeline was tested by the appropriate factor from the following table:

Steel Installed On or before <u>Nov 11, 1970</u>	Steel Installed After <u>November 11, 1970</u>	Polyethylene <u>Plastic Pipe</u>
1.4	1.5	1.5

3. The maximum safe pressure as determined by the Operating Center after considering history of the segment based upon actual operating pressures, corrosion records, leak records, etc.

The establishment of MAOP shall be the responsibility of the Division Manager.

**Section 7.2 - Establishment of MAOP**


A system must not be operated at pressure greater than that designed as the maximum operating pressure for that system.

**Section 7.3 – Increasing MAOP on Existing Systems**

Prior to increasing the MAOP of an existing system, a written plan is to be formulated and submitted to Corporate Engineering according to the requirements contained in this manual below at Section 9.1, “Uprating”

**Section 7.4 - New Systems**

The designer of the system must determine operating pressures in new systems and these pressures shall be based on current and future flows on the system and on the economics of construction, operation and maintenance. Maximum operating pressure should be specified and the system shall be designed, constructed and tested accordingly.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PRESSURE MONITORING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations 192.741; Florida Administrative Code 25-7.050	<b>Date Revised:</b> July 31, 2011
<i>Section 8 – Pressure Monitoring</i>	<b>Approved:</b> 

### **Section 8.1 - Operating Pressure (Distribution)**

Systems must not be operated at a pressure lower than that required for safe operation of a properly adjusted customer appliance. In high-pressure distribution systems, this pressure must be considered to be the minimum pressure recommended for proper operation of the regulators. In low-pressure systems, this pressure shall be considered to be three inches (3") water column (WC). For the purpose of compliance with this paragraph, pressure must be at the lowest pressure point in the system.

### **Section 8.2 - Pressure Records**


All gas systems that are supplied by two (2) or more regulator stations shall have installed a permanent pressure recorder or telemeter system. The Operating Center/Region shall determine whether any pressure recorders and/or telemeter system will be installed on a natural gas system that is supplied by only one (1) regulator station. All pressure recording records shall be checked for abnormally high or low pressures and for erratic regulation. If records indicate this type of action, regulators and auxiliary equipment must be inspected and necessary measures must be employed to correct the unsatisfactory conditions.

All pressure recording devices and telemeter systems shall be calibrated annually by the Operating Center/Region and accuracy shall be maintained within the manufacturers' specifications.

### **Section 8.3 - Over-Pressure Report**

Each time the actual operating pressure in any system exceeds the maximum allowable or certified operating pressure, the qualified person shall report this in writing to the Division Manager within five (5) working days. This report shall include:

1. System identification and station identification if a regulator malfunction occurs;
2. Date of occurrence;
3. Maximum actual operating pressure and the percent by which it exceeds the maximum allowable or certified operating pressure;
4. Description of the operation or over-pressure protection devices; and,
5. The reason for the over-pressure and the action taken to prevent a recurrence.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> UPRATING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.551, 192.553, 192.555, and 192.557; Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<b>Section 9 – Up-Rating</b>	<b>Approved:</b> 


### **Section 9.1 - General**

Prior to increasing the MAOP of an existing system, a written plan is to be formulated and submitted to TECO Peoples Gas' corporate Engineering Services at least thirty (30) days prior to the proposed start date of the actual uprating.

The following procedures shall be followed and fully documented on a permanent record by the operations personnel:


1. Review the design of the system to be uprated, including the type of materials used, the maintenance records and history, and the previous gas leak survey records.
2. Verify the specifications of pressure regulation equipment, relief valves, distribution and gas service line valves and instrumentation to ensure the adequacy of the equipment to operate at the higher MAOP.
3. Prior to the initial pressure elevation, arrange to have conducted a leak survey. All leaks found must be repaired and documented, except a leak determined not to be potentially hazardous need not be repaired if it is monitored during the pressure increase and it does not become potentially hazardous.
4. Where required, adequately reinforce, or anchor, any offsets, bends and dead ends in coupled pipe to avoid movement of the pipe in the event that the offset, bend, or dead end is exposed during an excavation.
5. When determined to be necessary, install system isolation valve(s).
6. Repair or replace those parts of the system proposed to be uprated, which are unsatisfactory or inadequate for the higher MAOP.
7. Where required, install suitable pressure limiting devices and instrumentation. Establish the location of temporary recording gauges, or test gauges, to be used during the uprating.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> UPRATING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.551, 192.553, 192.555, and 192.557; Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<b>Section 9 – Up-Rating (continued)</b>	<b>Approved:</b> 

8. Prior to the actual pressure increase, physically disconnect all deteriorated, inactive lines from the system to be uprated and abandon in accordance with abandonment procedures outlined below at Section 22, “Abandonment or Inactivation of Facilities”.
9. Consider excavation of mains and service lines to determine the physical condition of the pipe. The inspection should include such items as the type coating, the method of joining, any evidence of external corrosion, sampling of the methods of service line tie-ins and the location of the service lines.
10. Isolate the system to be uprated from any other systems not proposed to be elevated at this time.
11. If the pressure is increased in steps, the pressure should be held constant after each incremental pressure increase and the system that is affected in the uprating shall be surveyed for evidence of any leaks. The maximum pressure increments should be equal to ten (10) psig or twenty-five percent (25%) of the total pressure increase, whichever produces the fewer number of increments. However, when uprating a utilization pressure system to a pressure that is higher than the pressure that is delivered to the customer (i.e. service regulators are required), there must be at least two (2) approximately equal, incremental increases.
12. If the system to be uprated is to be tested at a one-time only pressure test, the system shall be tested in the same manner as new construction. (See Section 12.0, “Defects - Testing - Cleaning - Purging”, of the Construction Standards)
13. Prior to the uprating, each building served must be inspected for an accessible shut-off valve located outside of the building structure. A shut-off valve shall be installed on any building which the inspection shows does not have such a valve, or the meter set(s) must be relocated to the outside of the building.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> UPRATING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.551, 192.553, 192.555, and 192.557; Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<b>Section 9 – Up-Rating (continued)</b>	<b>Approved:</b> 


14. If the pressure in the mains or service lines, or both, is to be higher than the pressure delivered to the customer, a service regulator shall be installed on each service line and each service regulator shall be tested to determine that it is functioning correctly. When service regulators have just been installed on any service lines, the pressure must first be increased just sufficiently so that the service regulator can be tested for proper functioning.
15. All personnel participating in the pressure elevation must be instructed in the procedures to be followed prior to, and during the uprating.

**Section 9.2 - Uprating to Less Than 30% SMYS**

The following steps are required when increasing high pressure to a greater high pressure but less than that required producing a hoop stress of thirty percent (30%) of SMYS in steel pipe and in all plastic or cast iron systems:

1. Complete the preliminary steps required above.
2. If the new maximum allowable operating pressure will exceed sixty (60) PSIG, survey all regular customers' meter installations. Rebuild any installations as required.
3. Provide for a supply source to introduce higher-pressure gas into the system; over-pressure protection must be included.
4. Isolate the system to be uprated from all of the parts of the system that will remain at the lower pressure.
5. Increase pressure to the new uprate test pressure in increments of ten (10) PSIG or twenty-five percent (25%) of the difference between the new uprate test pressure and old maximum allowable operating pressure, whichever is greater, there must be at least two (2) increments and allow the pressure to stabilize between each increase.
6. Conduct a leak survey between each increase, and repair all leaks which are potentially hazardous.
7. After the uprate test is completed, lower the pressure down to the new normal operating pressure.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> UPRATING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.551, 192.553, 192.555, and 192.557; Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<i>Section 9 – Up-Rating (continued)</i>	<b>Approved:</b> 

**Section 9.3 - Up-rating to Greater Than 30% SMYS**

Pressure increases which will result in a hoop stress of thirty percent (30%) of SMYS or more at the new maximum allowable pressure may be made while the facility is in service only if:

1. The facility was constructed before September 12, 1970. The new maximum allowable operating pressure is limited to a value equal to the highest actual pressure to which the facility has been subjected (either during test or in operation) divided by the appropriate factor.
2. The facility is in a Class 1 location and impracticable to remove from service for testing and it is in satisfactory condition for the pressure increase. The new maximum allowable operating pressure does not exceed eighty percent (80%) of that allowed for in a new facility at the same location.

All other facilities must be uprated while out of service. If uprating in service is permitted, it shall be done in accordance with the requirements of less than thirty percent (30%) SMYS above except that the pressure increase increments shall be ten percent (10%) of the actual operating pressure before uprating or twenty-five percent (25%) of the total pressure increase, whichever is greater.


**Section 9.4 - Up-rating, While Out of Service**

Any facility may be uprated while out of service. All facilities operating in stress ranges of thirty percent (30%) or more of SMYS for which upgrading in service is not permitted must be taken out of service before uprating is complete. All facilities to be uprated while out of service must be physically disconnected from all other parts of the gas system throughout the program.

Before any pressure increase is made the preliminary steps must be completed. A pressure test shall then be done in accordance with the procedures required for a new line in the same location.

Once the previously established MAOP has been reached, the increase in pressure must be made in increments that are equal to:

1. Ten percent (10%) of the pressure before the uprating; or,
2. Twenty-five percent (25%) of the total pressure increases whichever produces the fewer number of increments.


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> UPRATING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.551, 192.553, 192.555, and 192.557; Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<i>Section 9 – Up-Rating (continued)</i>	<b>Approved:</b> 

### **Section 9.5 - New Maximum Operating Pressure**

Any new MAOP established under this section may not exceed the MAOP that would be allowed under Section 12 of the Construction Standards Manual, for a new segment of pipeline constructed of the same materials in the same location.

### **Section 9.6 - Records**

1. The Division Manager shall be responsible for developing and forwarding the written uprating plan to Corporate Engineering.
2. The proposed written plan for pressure elevation is to be submitted to the Florida Public Service Commission by Corporate Engineering prior to elevating the pressure. If no reply is received within fifteen (15) days from the Florida Public Service Commission, it can be assumed that the uprating plan is acceptable as submitted.
3. The Division Manager shall be responsible for the supervision and implementation of the written uprating plan.
4. The Division Manager shall be responsible for maintaining the permanent records of all requirements of this section. These records shall be retained for the life of the segment of the system to be uprated.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> UPRATING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.551, 192.553, 192.555, and 192.557; Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<b>Section 9 – Up-Rating (continued)</b>	<b>Approved:</b> 


### SYSTEM UPRATING PROCEDURE AND RECORD

District: \_\_\_\_\_ Town: \_\_\_\_\_  
 Section: \_\_\_\_\_  
 Work Order: \_\_\_\_\_ Print: \_\_\_\_\_  
 Present MAOP: \_\_\_\_\_ Proposed MAOP: \_\_\_\_\_  
 Preliminary Leak Survey Date: \_\_\_\_\_ Type: \_\_\_\_\_ By: \_\_\_\_\_  
 Over-pressure Protection Review: Adjacent Systems: \_\_\_\_\_ Upgraded System: \_\_\_\_\_  
 Cathodic Protection Survey Date: \_\_\_\_\_ By: \_\_\_\_\_  
 Connected Component Review.  
 Main types: \_\_\_\_\_ Joining Methods: \_\_\_\_\_  
 Valves: \_\_\_\_\_ Fittings: \_\_\_\_\_  
 Services have outside shut-off valves: \_\_\_\_\_  
 Services have adequate over-pressure protection: \_\_\_\_\_  
 Service regulators have been installed and have correct orifice: \_\_\_\_\_  
 Meter cases and correcting devices have the rating for the new MAOP: \_\_\_\_\_

A record of conditions found and corrections made shall be attached to this form and Retained for the life of the facility.

The system will be upgraded in \_\_\_\_\_ steps of \_\_\_\_\_ PSIG each.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> UPRATING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.551, 192.553, 192.555, and 192.557; Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<b>Section 9 – Up-Rating (continued)</b>	<b>Approved:</b> 

**Step 1**

Pressure increased from \_\_\_\_\_ PSIG to \_\_\_\_\_ PSIG Date: \_\_\_\_\_

Leak Survey Date: \_\_\_\_\_

Leaks Found:

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

**Step 2**

Pressure increased from \_\_\_\_\_ PSIG to \_\_\_\_\_ PSIG Date: \_\_\_\_\_

Leak Survey Date: \_\_\_\_\_

Leaks Found:

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

**Step 3**

Pressure increased from \_\_\_\_\_ PSIG to \_\_\_\_\_ PSIG Date: \_\_\_\_\_

Leak Survey Date: \_\_\_\_\_

Leaks Found:


Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

Location: \_\_\_\_\_ Grade: \_\_\_\_\_ Date Repaired: \_\_\_\_\_

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> UPRATING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.551, 192.553, 192.555, and 192.557; Florida Administrative Code 25-12.083	<b>Date Revised:</b> July 31, 2011
<b>Section 9 – Up-Rating (continued)</b>	<b>Approved:</b> 

**Step 4**

Pressure increased from \_\_\_\_\_ PSIG to \_\_\_\_\_ PSIG Date: \_\_\_\_\_

Leak Survey Date: \_\_\_\_\_

Leaks Found:

Location: _____	Grade: _____	Date Repaired: _____
Location: _____	Grade: _____	Date Repaired: _____
Location: _____	Grade: _____	Date Repaired: _____
Location: _____	Grade: _____	Date Repaired: _____

Follow up leak survey date: \_\_\_\_\_ By: \_\_\_\_\_

Leaks Found:


Location: _____	Grade: _____	Date Repaired: _____
Location: _____	Grade: _____	Date Repaired: _____
Location: _____	Grade: _____	Date Repaired: _____
Location: _____	Grade: _____	Date Repaired: _____

The upgrading procedure for the named main segment was completed as provided in the O & M Manual.

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Project Engineer/Inspector



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> ODORIZATION OF GAS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.625; Florida Administrative Code 25-12.055	<b>Date Revised:</b> November 1, 2011
<i>Section 10 – Odorization of Gas</i>	<b>Approved:</b> 

### **Section 10.1 -General**

All gas supplied to customers of TECO Peoples Gas must be provided with a distinctive odor. Gas in transmission lines in a Class 3 or 4 location shall be odorized unless exempt from the regulations. The odor may be produced from natural constituents present in the gas stream or by the injection of a chemical odorant at an appropriate point in the system. Odorization of all gas must be under the control of the operating location regardless of whether the gas is supplied from wellhead, intrastate or interstate pipeline sources.

All personnel working with odorization equipment will have knowledge of the general operating principals involved. Personnel responsible for the operation, maintenance, and testing of odorization equipment will have access to manufacturer's service manuals and other reference material. These items shall be readily available for reference. The Division Manager is responsible for maintaining all equipment in satisfactory condition and establishing test and calibration schedules to properly maintain all odorization equipment to ensure that all gas is sufficiently odorized.


### **Section 10.2 - Types of Odorant**

The odorization procedures and odorant used shall comply with the requirements of the Florida Public Service Commission. Commercial odorants used by TECO Peoples Gas will consist chiefly of tertiary butyl mercaptan. Acceptable odorants are RP Captan or equivalent. An acceptable odorant for addition to propane is ethyl mercaptan or equivalent.

### **Section 10.3 - Rate Of Odorization**

A combustible gas in a distribution line must contain a natural odorant or be odorized so that at a concentration in air of one-fifth of the lower explosive limit, the gas is readily detectable by a person with a normal sense of smell.

The amount of commercial odorant necessary to meet the above requirement is dependent on many factors including the type of odorant, the amount of sulfur present in the purchased gas, and the age and type of the system. Odorant injected at a rate between one quarter (0.25) and one and one quarter (1.25) pounds of odorant per million cubic feet of gas will generally be adequate.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> ODORIZATION OF GAS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.625; Florida Administrative Code 25-12.055	<b>Date Revised:</b> November 1, 2011
<i>Section 10 – Odorization of Gas (continued)</i>	<b>Approved:</b> 

#### **Section 10.4 - Odorizer Equipment**

Odorizers must be designed to control the amount of odorant supplied to the system without wide variations. Each odorizer shall be equipped with a device to permit determination of the amount of odorant injected. Wick type odorizers used for individual customers and small distribution systems are exempt from this requirement.

Odorizers and associated piping must be carefully designed and installed to avoid leakage. Threaded joints should be made with Teflon tape. Ordinary pipe dope should never be used. Odorizer installations shall be designed with adequate storage to minimize refills, and to allow accurate checks of odorant usage.

#### **Section 10.5 - Preparation of Odorization Records & Surveys**

A record shall be maintained of the odorant injection rate for each odorizer on TECO Peoples Gas' system, and for each individual check of odorant intensity made by TECO Peoples Gas operating personnel. These records shall be prepared by the Division Manager and retained for a minimum of three (3) years.


#### **Section 10.6 - Odorant Injection Records**

The form PgS 266, "Gate Station Odorization Report" (see sample at Section 10, Page 45) shall be prepared each month by the Division Manager from odorizer readings and gas purchase readings. Actual gas quantities purchased will be used, when available, for entry on the report form and calculation of the odorization rate for odorizers at stations without telemetering, and recalculation of odorization rate for telemeter stations where a significant telemetering error occurred.

#### **Section 10.7 - Odorant Intensity Survey Records**

The odorant intensity in each distribution system shall be frequently checked to assure that sufficient odorant is present in the gas stream. Acceptable methods of determining the adequacy of odorization include (a) use of a titrator or equivalent device and (b) use of an odor tester by an experienced utility technician. These will give measurements of the amount of odorant present. The sniff tests should only be used throughout the daily routine to establish odorant is present but not to quantify the level. Over odorization will become quickly apparent as a result of the excessive number of leak calls on which no leak can be found. Under odorization must be quickly detected and corrected by Division Manager. TECO Peoples Gas' employees shall report any observed unusual odorant level, either weak or strong, to their supervisor.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> ODORIZATION OF GAS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.625; Florida Administrative Code 25-12.055	<b>Date Revised:</b> November 1, 2011
<i>Section 10 – Odorization of Gas (continued)</i>	<b>Approved:</b> 

The Division Manager shall establish a schedule for conducting odorant intensity checks at regular intervals at various locations on each separately odorized system. These tests must be conducted at least twelve (12) times per calendar year, at intervals not to exceeding forty-five (45) days.

Odorant intensity checks should be taken at the ends of each system to determine the area of weakest odorant intensity. These odorant intensity checks should be recorded on form PgS 644, “Odorization Record” (see sample at Section 10, Page 46). Check point locations should be reviewed annually to account for gas distribution system growth.


Twenty four (24) hour checks of the odorant injection rate shall be made at the discretion of the Division Manager and reported on the form PgS 266, “Gate Station Odorization Report” (see sample at Section 10, Page 45).

#### **Section 10.8 - Incident Testing**

Odor levels shall be immediately checked when an incident occurs involving natural gas. The odor level shall be checked in the vicinity of the incident utilizing an odor meter or similar testing device.

#### **Section 10.9 - Odorization Problems**

Inadequate odorization can be detected by personnel in the field which includes odor meter tests or verbal notices by construction and maintenance personnel commenting on the quantity of odorant in the gas. Customers and Leak Survey Technicians also provide input on inadequate or excessive odorization. In the event of odorization problems, an immediate response shall be made to determine and correct the cause.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> ODORIZATION OF GAS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.625; Florida Administrative Code 25-12.055	<b>Date Revised:</b> November 1, 2011
<i>Section 10 – Odorization of Gas (continued)</i>	<b>Approved:</b> 

**Gate Station Odorization Report**

**TECO Peoples Gas: Form PgS 266**

Station Name: \_\_\_\_\_  
 Type Equipment: \_\_\_\_\_  
 Division \_\_\_\_\_ Date \_\_\_\_\_

**PEERLESS M.P.**

A. Ending Meter Reading \_\_\_\_\_ MCF  
 B. Beginning Meter Reading \_\_\_\_\_ MCF  
 C. (A - B) in MCF \_\_\_\_\_ MCF  
 D. Beginning Tank Reading \_\_\_\_\_ GAL  
 E. Ending Tank Reading \_\_\_\_\_ GAL  
 F. (D - E) Odorant Used \_\_\_\_\_ GAL  
 G. (F x 6.8) Odorant Used \_\_\_\_\_ LBS  
 H.  $G / C \times 1000 =$  LBS per MCF \_\_\_\_\_ LBS

**MANUAL PUMP BYPASS DRIP**

A. FGT Gas Volume Statement \_\_\_\_\_ MCF  
 B. Beginning Tank Reading \_\_\_\_\_ GAL  
 C. Ending Tank Reading \_\_\_\_\_ GAL  
 D. Odorant Used \_\_\_\_\_ GAL  
 E.  $D \times 6.8$  \_\_\_\_\_ LBS  
 F.  $D / A \times 1000 =$  LBS per MCF \_\_\_\_\_ LBS

**N-JEX (YZ SYSTEM)**

A. Ending Meter Read \_\_\_\_\_ MCF  
 B. Beginning Meter Read \_\_\_\_\_ MCF  
 C. (A - B) in MCF \_\_\_\_\_ MCF  
 D. Odorant used (taken from touch pad) \_\_\_\_\_ LBS  
 E.  $(D / C) * 1000 =$  LBS PER MMCF \_\_\_\_\_ LBS


Or, use pounds of odorant used from front touch pad divided by the volume in MCF from FGT billing statement X 1000 equals lbs. Per MMCF,

**DANIELS & PUMP COMB.**

A. Ending Daniels Reading \_\_\_\_\_ MCF  
 B. Beginning Daniels Reading \_\_\_\_\_ MCF  
 C. Volume Gas Used \_\_\_\_\_ MCF  
 D. Beginning Scale Weight \_\_\_\_\_ LBS  
 E. Ending Scale Weight \_\_\_\_\_ LBS  
 F. Odorant Used \_\_\_\_\_ LBS  
 G.  $F / C \times 1000 =$  LBS per MMCF \_\_\_\_\_ LBS  
 Storage Capacity \_\_\_\_\_ GAL  
 Storage Reading \_\_\_\_\_ %  
 Calculated by: \_\_\_\_\_ Date: \_\_\_\_\_





<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> TAPPING PIPELINES UNDER PRESSURE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.627	<b>Date Revised:</b> September 10, 2007
<i>Section 11 – Tapping Pipelines Under Pressure</i>	<b>Approved:</b> 

**Section 11.1 -Personnel Qualifications**

TECO Peoples Gas construction crews shall be qualified by on-the-job training and experience before attempting to make a hot tap or stopping operation. Personnel performing hot taps and stopping operations shall be familiar with the pressure limitations of the hot tapping equipment to be used and thoroughly trained in the mechanical procedures and safety precautions associated with the use of such equipment. Only qualified, personnel shall be used for hot tapping.

**Section 11.2 Identification of Pipe and Suitability for Tapping**

The designer is responsible for the design of the tap and placing a notation on the sketch if the pressure is other than normal distribution pressure; however, the person performing the work is responsible for verifying that this information is on the sketch and resolving any questions concerning the accuracy of the information.

The person performing the work shall thoroughly review applicable maps and records to determine the location of other lines, which may be in the vicinity of the pipeline to be tapped. The outside diameter, coating, pipe material, joint connection and manufacturers markings on the exposed pipe shall be reviewed to ensure that the exposed pipe is the one to be tapped. When identification of the pipe is uncertain, TECO Peoples Gas shall consider extending the excavation. During the tapping operation, qualified personnel shall verify pressure and line contents on initial line perforation.


Tapping or drilling machines shall not be used in tunnels, manholes, or other places, which cannot be vented. When machines or fittings are removed from live mains, the openings shall be plugged as soon as possible.

**Section 11.3 - Additional Requirements for Transmission Systems**

Under normal circumstances, the hot tap will not be made on an operating pipeline at pressures over fifty percent (50%) of the maximum allowable operating pressure. Sufficient time will be allowed for the gas flow rate to reach equilibrium condition at the reduced pressure before making the hot tap.

The tap shall be located on a straight section of pipe, removed a sufficient distance from any bend so as to minimize secondary stresses due to shifting of the main line. The tap shall not be made through any weld - circumferential or longitudinal seam weld, or its heat-affected zone.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> TAPPING PIPELINES UNDER PRESSURE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.627	<b>Date Revised:</b> September 10, 2007
<i>Section 11 – Tapping Pipelines Under Pressure (continued)</i>	<b>Approved:</b> 

The pipe to be tapped shall be free of laminations and free of any significant external or internal corrosion. The wall thickness of the pipe to be tapped is to be compared to that at original construction. The pipe to be tapped shall not be operating at a temperature above two hundred (200°F) Degrees Fahrenheit.

On a standard hot tap where the tap is less than or equal to one half (1/2) the diameter of the carrier pipe, the welded nipple will be leak tested. Prior to the test, a saddle shall be installed for the purpose of providing additional strength for the fillet weld on the nipple. The leak test shall be a hydrostatic or gas test at a pressure not to exceed the design pressure of the carrier pipe.

On a hot tap where the tap is greater than one half (1/2) the diameter of the carrier pipe, a full encirclement, fully welded fitting, shall be used. The tap fitting shall be leak tested prior to cutting the coupon from the carrier pipe.

Because of the exposure to personnel, precautions should be taken to remove personnel a safe distance from the test site. The operator conducting the test should take measures to avoid personal exposure to hazards associated with a possible test failure.


The test duration should be one (1) hour.

All welding performed in the installation of the tap shall be non-destructively tested in accordance with Title 49, Code of Federal Regulations, Parts 192.241 and 192.243.

A record shall be made of each hot tap installed on a transmission pipeline, and records shall be retained for the life of the pipeline.

#### **Section 11.4 - Stopping**

Stopping operations shall be planned to minimize customer service interruptions. The stopper fittings, stopping machines and stoppers must be rated for the main pressure. Planning for stopping operations shall identify the gas supply for all connected main segments. When using a bypass or when there are two or more feeds into the area, a pressure gauge shall be installed on the live side of each stopper fitting.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PURGING OF PIPELINES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.629	<b>Date Revised:</b> July 31, 2011
<i>Section 12 – Purging of Pipelines</i>	<b>Approved:</b> 

**Section 12.1 - Purging with Natural Gas or Propane Gas**

When piping is being purged of air by the use of natural gas or propane gas, the natural gas or propane gas must be released into one end of the line in a moderately rapid and continuous flow. This operation will continue until the piping being purged is free of air. If the natural or propane gas cannot be supplied in sufficient quantity to prevent the formation of an explosive mixture, a slug of inert gas must be released into the line before the natural or propane gas. When the natural gas or propane gas is being vented into the open air, each potential source of ignition must be removed from the area as outlined below at Section 26, "Prevention of Accidental Ignition". After purging is complete, a test shall be made with a combustible gas indicator to ensure a combustible mixture does not remain.

**Section 12.2 - Purging with Air or an Inert Gas**


If piping is being purged of gas by the use of air or an inert gas, the air must be released into one end of the line in a moderately rapid and continuous flow. This operation will continue until the piping being purged is free of gas. If the air cannot be supplied in sufficient quantity to prevent the formation of an explosive mixture, a slug of inert gas must be released into the line before the air. When natural or propane gas is being vented into the open air, each potential source of ignition must be removed from the area as outlined below at Section 26, "Prevention of Accidental Ignition". After purging is completed, a test shall be made with a combustible gas indicator to ensure a combustible mixture does not remain.

**Section 12.3 - Special Conditions**

Facilities which do not fall under the specific provision of this Section 12 shall be purged per the standards outlined in "Purging Principals and Practice" published by the American Gas Association.

**Section 12.4 - Responsibility**

It shall be the responsibility of the Supervisor in charge of the operation to ensure that the proper purging practices are being followed and to detail specific purging practices not covered by this Section 12.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REPAIR PROCEDURES - DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.701 and 192.703	<b>Date Revised:</b> July 31, 2011
<i>Section 13 – Repair Procedures - Distribution</i>	<b>Approved:</b> 

### **Section 13.1 - General**

Maintenance of the gas system is the responsibility of the Division Manager. If at any time, a distribution facility is discovered to be damaged or deteriorated to the point that its service ability is impaired, or if a leak is found that creates a hazard, immediate measures shall be taken to implement the emergency plan. If it is not feasible to make a permanent repair at the time of discovery, temporary repairs can be made; however, permanent repairs shall be made as soon as possible. When the repair is made by replacing the damaged segment of pipeline by welding in another segment of pipe of equal or greater strength pre-tested pipe can be used.

### **Section 13.2 - Repair of Steel Pipe**

Lines operating at less than twenty percent (20%) of SMYS must be repaired by one of the following methods:


1. Cutting out a cylinder and replacing the damaged piece of pipe.
2. Applying a full encirclement split sleeve.
3. Applying a properly designed bolt-on leak clamp or sleeve.
4. Applying a fillet-welded steel plate patch with rounded corners of similar material of equal or greater strength, which is not more than one-half (1/2) the diameter of the pipe.

### **Section 13.3 - Weld Repair**

Steel lines operating at less than twenty percent (20%) of SMYS that have welds which are leaking or have otherwise failed may be repaired by installing a full encirclement welded split sleeve of appropriate design, or by removing a section of pipe containing the weld and replacing it with a section of new pipe of equal or greater strength.

### **Section 13.4 - Repair of Plastic**

The repair of plastic pipe or couplings shall be made by replacing the damaged or leaking pipe or coupling with a new section of pipe of equal or greater strength rating. The recommendations of the plastic manufacturer should be taken into consideration when determining the type of repair that is to be made.

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<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.701 and 192.703	<b>Date Revised:</b> July 31, 2011
<i>Section 13 – Repair Procedures – Distribution (continued)</i>	<b>Approved:</b> 

### **Section 13.5 - Mechanical Joints**

The use of compression type fitting for repairs to plastic pipe is permitted if the fitting is designed to withstand longitudinal pullout. The fitting must be installed in accordance with the manufacturer's procedures. Each compression type joint on plastic pipe must be made with a rigid stiffener that fits the inside diameter of the pipe closely in order that the plastic pipe cannot be crushed. Any gasket material in the fitting must be compatible with the plastic. Nonferrous fittings shall be used when joining plastic pipe to plastic pipe for repairs. All joints must be designed and installed to sustain the forces caused by expansion or contraction of the piping or anticipated external or internal forces. Each joint must be made in accordance with written procedures that have been proven by test or experience to produce strong gas-tight joints (may be manufacturer's recommendations). Each joint must be inspected to insure compliance with the procedure.

### **Section 13.6 - Inspection and Testing**

All pipe and materials shall be transported to and handled with care at the site to prevent damage. All material must be visually inspected before installation, and damage found shall be repaired. If repair is impossible or impracticable, the material shall not be used. All pipes must be examined visually both inside and out before it is installed in the pipeline. Any loose rust, scale, or foreign material shall be removed from the inside by swabbing before the piece is installed. A second surface inspection must be made immediately prior to lowering-in.


Special inspection requirements for pipe of various materials are indicated below.

1. Coated steel pipe must be visually inspected and should be checked with a holiday detector. Any areas of coating damage must be inspected in detail to make sure that the pipe underneath has not also been damaged. Any coating damage shall be repaired.
2. Plastic pipe must be inspected visually prior to lowering.

Defects found in the pipe must be repaired as indicated in this procedure before the pipe is placed in service.

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<i>Section 13 – Repair Procedures – Distribution (continued)</i>	<b>Approved:</b> 


Any heat fusion joint that appears defective (visual inspection) or fails a nondestructive test must be removed from the line.

If the repair has been made by replacing a pipe section, it must be tested as though it were a new line in the same location. The test shall be made on the section before installation. All tie-in welds, clamps, sleeves and saddles must be visually inspected and soap tested at line pressure.

**Section 13.7 - Reports and Records**

1. The form PgS 24, “Gas Leak & Repair Form” (see sample below at Section 14, Pages 57 and 58), must be completed by the utility technician to document the disposition of leaks, how the leak was repaired and the probable root cause of the leak.
2. The form, “Pipeline Test Record” (see sample below at Section 13, Page 53), must be reviewed by the Division Manager to document the testing of pipe.

The originals of the above referenced reports and forms are to be maintained for the life of the facility.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
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<i>Section 13 – Repair Procedures – Distribution (continued)</i>	<b>Approved:</b> 



**PIPELINE TEST RECORD**

Description \_\_\_\_\_

Location \_\_\_\_\_

Test Medium Used (Gas or Other) \_\_\_\_\_

Test Pressure (Gauge) \_\_\_\_\_ Test Duration \_\_\_\_\_

Charts Used  Yes  No (Attach If Used)

New Pipe Tested Size \_\_\_\_\_ Length \_\_\_\_\_


Old Pipe Tested Size \_\_\_\_\_ Length \_\_\_\_\_

Failures Noted \_\_\_\_\_

Corrective Measures Taken \_\_\_\_\_

Remarks \_\_\_\_\_

Signed \_\_\_\_\_ Date \_\_\_\_\_

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REPAIR PROCEDURES - DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Parts 192.701 and 192.703	<b>Date Revised:</b> July 31, 2011
<i>Section 14 – Repair Procedures – Transmission</i>	<b>Approved:</b> 

### **Section 14.1 - General**

All segments of TECO Peoples Gas operating pipeline shall be maintained in accordance with prescribed safety requirements. All leaks or damage caused by external forces, or detected by prescribed inspection procedures shall be repaired promptly.

Permanent repair on leaks and damage shall be made as soon as possible after discovery. If the pipeline can be removed from service, the repair will be made by replacing the damaged segment of pipeline, and welding in another segment of pipe of equal or greater strength. In the event that a permanent repair cannot be made within a reasonable time, the actual operating pressure will be reduced and temporary methods capable of operating at the reduced pressure will be used. If the leak, damage, or imperfection in a pipeline is in an area where danger to life or property exists, TECO Peoples Gas personnel shall take immediate temporary measures to protect people first and property second. Consult the Emergency Procedures Manual for steps to be followed in an emergency condition.

### **Section 14.2 - Repair of Steel Lines Operating at Twenty Percent of SMYS or More**


Each imperfection or damage found in operating pipelines must be repaired by cutting out the damaged pipe and replacing it with a pipe of equal or greater design strength if it is feasible to do so. A full encirclement welded split sleeve of appropriate design may be applied over the defect if it is not feasible to replace the section. If the line is not taken out of service during the repair procedure, operating pressure must be reduced to less than twenty percent (20%) of the SMYS of the pipe.

### **Section 14.3 - Testing of Repairs**

All repairs made by welding will be tested and inspected in accordance with Title 49, Code of Federal Regulations, Parts 192.241 and 192.243. The Division Manager will be responsible for visual inspection of the welding, and for acceptance of nondestructive tests.

TECO Peoples Gas utilizes radiographic inspection, also referred to as X-rays, as its standard nondestructive test of welding. Only firms with qualified radiographers, using accepted procedures, will be employed to provide radiographic inspection.

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<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.701, 192.703, and 192.711 through 192.719	<b>Date Revised:</b> July 31, 2011
<b>Section 14 – Repair Procedures – Transmission (continued)</b>	<b>Approved:</b> 

The Radiographic Contractor is responsible for preparation of the nondestructive test report, including the disposition of defective welds, and forwarding to the Division Manager as a permanent record.

If a segment of the pipeline is repaired by cutting out the defective portion of the pipe as a cylinder, the replacement pipe must be tested to the pressure required for a new line installed in the same location. TECO Peoples Gas shall utilize a hydrostatic test to meet this requirement.

The hydrostatic test may be made on the pipe prior to installing it in the pipeline. All girth butt welds not strength tested are tested after installation by radiographic inspection. If pre-tested pipe is not used, then the segment of pipeline, which has been repaired, will be hydrostatically tested after the pipe has been installed.

The hydrostatic test reports and radiographic inspection reports will be retained as a permanent record. The radiographic films will be identified and retained for a period of five (5) years.


**Section 14.4 - Permanent Field Repair of Welds**

All welds shall meet the requirements of API Standard 1104 and Title 49, Code of Federal Regulations, Part 192. All welds on pipe or fittings which are found unacceptable under API Standard 1104 or Title 49, Code of Federal Regulations, Parts 192.241 (c) shall be repaired in accordance with requirements of API Standard 1104 or Title 49, Code of Federal Regulations, Part 192.245. The TECO Peoples Gas welding inspector shall be responsible for determining the need for repairs. All nondestructive test methods are limited in the information that can be derived from the indications they produce. The qualified person may therefore reject any weld that appears to meet these acceptance standards if, in the qualified person’s opinion, the depth of a discontinuity may be detrimental to the weld.

In addition to meeting the above requirements, welds may not be repaired if they exceed the following conditions:

1. No single defect to exceed twelve and one-half percent (12.5%) of the pipe circumference
2. The maximum accumulated defects do not exceed twenty-five percent (25%) of the pipe circumference.

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3. If a defect is longer than eight percent (8%) of the circumference, a minimum of eight percent (8%) of sound metal shall be between the maximum defect and any adjacent defect.


If defects exceed the above conditions, the weld must be replaced by cutting out as a cylinder the section of pipe containing the defective weld, and replacing that section of pipe. All cracked welds will be replaced. If feasible, the line shall be taken out of service while the weld is being repaired. All welds repaired or replaced shall be nondestructively tested and inspected in accordance with Title 49, Code of Federal Regulations, Part 192.719. If the testing shows any defect in a repair weld, the weld will be cut out as a cylinder and replaced. If a defective weld cannot be repaired in accordance with the above procedures, the weld may be repaired by installing a full encirclement welded split sleeve of appropriate design.


#### **Section 14.5 - Reports and Records**

1. The form PgS 24, “Gas Leak and Repair Form” (see sample below at Section 14, Pages 57 and 58) must be completed by the Division Manager to document the disposition of leaks, how the leak was repaired and the probable cause of the leak.
2. The form, “Hydrostatic Test Report” (see sample below at Section 14, Page 59) must be completed by the Division Manager to document the testing of the pipe.


The originals of the above referenced reports and forms are to be maintained for the life of the facility.




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Date/Time Reported	Date/Time Arrived	 <b>PEOPLES GAS</b> <b>GAS LEAK AND REPAIR FORM</b>	Leak No. _____		
Date/Time Dispatched	Date/Time Made Safe		Division _____		
<b>Geographic Location</b> Location _____ (Address or Intersection) City _____ County _____		<b>Reported By</b> Name _____ Telephone Number _____ Customer (or Occupant) <input type="checkbox"/> Excavator <input type="checkbox"/> Fire <input type="checkbox"/> Public <input type="checkbox"/> Employee <input type="checkbox"/>			
<b>Leak Grade</b>	<b>Detection Method</b>	<b>%Gas/PPM</b>	<b>Collecting</b>	<b>Pressure</b>	<b>Surface</b>
Grade 1 <input type="checkbox"/>	Mobile Flame Pack <input type="checkbox"/>		In Building <input type="checkbox"/>	UP 7" <input type="checkbox"/>	Lawn <input type="checkbox"/>
Grade 2 <input type="checkbox"/>	Flame Pack <input type="checkbox"/>		Near Building <input type="checkbox"/>	IP < 60 psig <input type="checkbox"/>	Soil <input type="checkbox"/>
Grade 3 <input type="checkbox"/>	Visual/Vegetation <input type="checkbox"/>		In Man Hole/Vault <input type="checkbox"/>	IP < 125 psig <input type="checkbox"/>	Asphalt <input type="checkbox"/>
No Leak <input type="checkbox"/>	Cmbstbl Meter <input type="checkbox"/>		In Soil <input type="checkbox"/>	IP > 125 psig <input type="checkbox"/>	Concrete <input type="checkbox"/>
	Odor <input type="checkbox"/>		Under Paving <input type="checkbox"/>	TP > 200 <input type="checkbox"/>	Brick <input type="checkbox"/>
	Pressure Test <input type="checkbox"/>		Vent to Atmosphere <input type="checkbox"/>		Other <input type="checkbox"/>
	Other <input type="checkbox"/>		Other <input type="checkbox"/>		Other <input type="checkbox"/>
					Aboveground <input type="checkbox"/>
					Below Ground <input type="checkbox"/>
					Meter No. _____
					Meter Inside <input type="checkbox"/>
					Meter Outside <input type="checkbox"/>
x - Denotes estimated leak location      o - Denotes test locations Remarks (Description of Incident) _____ _____ _____					
Surveyed by: _____		Date: _____	Photos Yes <input type="checkbox"/> No <input type="checkbox"/>		
<b>Part of System</b>	<b>Location of Leak</b>	<b>Cause of Leak</b>	<b>Pipe Material/Size</b>	<b>Condition</b>	
Main <input type="checkbox"/>	Pipe <input type="checkbox"/>	Corrosion <input type="checkbox"/>	Plastic <input type="checkbox"/>	Badly Deteriorated <input type="checkbox"/>	
Serv Line <input type="checkbox"/>	Valve <input type="checkbox"/>	Natural Force <input type="checkbox"/>	Steel <input type="checkbox"/>	Heavy Pitting <input type="checkbox"/>	
Meter Set <input type="checkbox"/>	Fitting <input type="checkbox"/>	Excavation Damage* <input type="checkbox"/>	Cast Iron <input type="checkbox"/>	Uniform Rust, No Pitting <input type="checkbox"/>	
Reg Sta <input type="checkbox"/>	Drip <input type="checkbox"/>	*Additional information required - see back		Light Pitting <input type="checkbox"/>	
Other <input type="checkbox"/>	Regulator <input type="checkbox"/>	Other Outside Force Damage <input type="checkbox"/>	Wrought Iron <input type="checkbox"/>	Good Condition <input type="checkbox"/>	
	Tap Connection <input type="checkbox"/>	Material and Welds <input type="checkbox"/>	Other <input type="checkbox"/>		
	Meter <input type="checkbox"/>	Equipment <input type="checkbox"/>	<b>Type of Coating</b>	<b>Condition</b>	
<b>Depth</b>	Control Line <input type="checkbox"/>	Operations <input type="checkbox"/>	X-tru <input type="checkbox"/>	Bad <input type="checkbox"/>	
	Inst. Piping <input type="checkbox"/>	Other <input type="checkbox"/>	Epoxy <input type="checkbox"/>	Fair <input type="checkbox"/>	
	C.I. - Bell & Spigot <input type="checkbox"/>	Leak caused by Company personnel <input type="checkbox"/>	C&W Enamel <input type="checkbox"/>	Good <input type="checkbox"/>	
<b>Federal Land?</b>	C.I. - Mech. Joint <input type="checkbox"/>	Leak caused by Company Contractor <input type="checkbox"/>	Galvanized <input type="checkbox"/>	Excellent <input type="checkbox"/>	
Yes <input type="checkbox"/> No <input type="checkbox"/>	Other <input type="checkbox"/>		Bare <input type="checkbox"/>		
<b>Excess Flow Valves</b>			<b>Excavator Notification</b>		
If service line was damaged, did it have an excess flow valve? Yes <input type="checkbox"/> No <input type="checkbox"/>			Did the excavator notify company of the damage? Yes <input type="checkbox"/> No <input type="checkbox"/>		
If Yes, did the excess flow valve close? Yes <input type="checkbox"/> No <input type="checkbox"/>					
<b>Permanent Repair</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>	<b>Anodes Installed:</b>	<b>Resurvey Inspection(s)</b>		
If No,		Yes <input type="checkbox"/> No <input type="checkbox"/>	Date	% Gas	By
<b>Date of Permanent Repair</b>	_____	<b>Card Completed:</b>			
		Yes <input type="checkbox"/> No <input type="checkbox"/>			

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REPAIR INFORMATION (For more space attach sheet)										
DESCRIPTION OF REPAIR					Billable <input type="checkbox"/> Yes <input type="checkbox"/> No					
Repaired by: _____										
The repair costs listed below are: Partial <input type="checkbox"/> Final <input type="checkbox"/>										
Materials Used:		Quantity	Unit Price	LABOR HOURS						
				Description	# Empl	Reg Hrs	1.5 Hrs	2.0 Hrs		
				Utility Techs						
				Utility Techs						
				Utility Techs						
				Utility Techs						
				Utility Techs						
Coil Pipe No. _____		Pressure Test Date: _____		Supervision						
		Pressure Test _____ psig.		Engineering						
EQUIPMENT USED (For more space attach sheet)				Administrative						
Qty	Description	Hours	Qty	Description	Hours	Outside Vendor Invoices				
	Crew Truck & Tools			Tap Machine		Invoice Date/Number		Invoice Amount		
	Backhoe & Trailer			Crane/Boom Truck						
	Dump			Well Points						
	Welding Tool & Equip.			Ditch Pump						
	Compressor & Tools			Shoring						
				Emergency Equip.						
GAS LOSS										
Size of the opening: _____					Line pressure before rupture: _____					
Length of time gas escaped: _____					Gas Loss (Office Use): _____					
Person/Party Causing Damage										
Name: _____					Phone Number: _____					
Address: _____										
Insurance Carrier _____					Policy Number: _____					
Occupational License _____					License Number: _____					
Notification					Marking					
Did the Excavator notify the one-call center? <input type="checkbox"/> Yes <input type="checkbox"/> No					Were gas facility markings visible <input type="checkbox"/> Yes <input type="checkbox"/> No					
What is the One-call Ticket Number? _____					at excavation site? (flags, paint, stakes or permanent markers)					
Did the damage cause a service interruption? <input type="checkbox"/> Yes <input type="checkbox"/> No					Were gas facilities marked <input type="checkbox"/> Yes <input type="checkbox"/> No					
Approximately how many customers were affected? _____					correctly? (Within tolerance zone, 24" either side of the mark)					
Duration of outage (Hours): _____					Locator: _____					
What was the root cause of the damage?			Type of Excavator:		Type of Work Performed:			Type of Equipment:		
<input type="checkbox"/>	Facility marking or location not sufficient		<input type="checkbox"/>	Contractor	<input type="checkbox"/>	Telecommunications	<input type="checkbox"/>	Landscape	<input type="checkbox"/>	Hand Tools
<input type="checkbox"/>	Facility was not located or marked		<input type="checkbox"/>	Developer	<input type="checkbox"/>	Sewer	<input type="checkbox"/>	Irrigation	<input type="checkbox"/>	Explosives
<input type="checkbox"/>	Facility could not be located		<input type="checkbox"/>	Utility	<input type="checkbox"/>	Natural Gas	<input type="checkbox"/>	Railroad Maintenance	<input type="checkbox"/>	Backhoe
<input type="checkbox"/>	Abandoned facility		<input type="checkbox"/>	Municipality	<input type="checkbox"/>	Water	<input type="checkbox"/>	Street Light	<input type="checkbox"/>	Ditching Machine
<input type="checkbox"/>	Incorrect facility records/maps		<input type="checkbox"/>	County	<input type="checkbox"/>	Electric	<input type="checkbox"/>	Drainage	<input type="checkbox"/>	Directional Drilling
<input type="checkbox"/>	Wrong information provided		<input type="checkbox"/>	State	<input type="checkbox"/>	Storm Drain	<input type="checkbox"/>	Agriculture	<input type="checkbox"/>	Vertical Drilling
<input type="checkbox"/>	Deteriorated facility		<input type="checkbox"/>	Railroad	<input type="checkbox"/>	Cable TV	<input type="checkbox"/>	Traffic Signal/Sign	<input type="checkbox"/>	Road Mixer/Stabilizer
<input type="checkbox"/>	No notification made to the one-call center		<input type="checkbox"/>	Occupant	<input type="checkbox"/>	Road Work	<input type="checkbox"/>	Building Demolition	<input type="checkbox"/>	Grader
<input type="checkbox"/>	Notification to the call center was not sufficient		<input type="checkbox"/>	Farmer	<input type="checkbox"/>	Petroleum Pipeline	<input type="checkbox"/>	Building Construction	<input type="checkbox"/>	Paving Roller
<input type="checkbox"/>	Excavation practices not sufficient		<input type="checkbox"/>	Unknown	<input type="checkbox"/>	Curb/Sidewalk	<input type="checkbox"/>	Site Development	<input type="checkbox"/>	Crane
<input type="checkbox"/>	Failure to maintain clearance		<input type="checkbox"/>	Other	<input type="checkbox"/>	Pool	<input type="checkbox"/>	Driveway	<input type="checkbox"/>	Pipe Bursting
<input type="checkbox"/>	Failure to maintain marks				<input type="checkbox"/>	Fencing	<input type="checkbox"/>	Grading	<input type="checkbox"/>	Dredging/Pile Driving
<input type="checkbox"/>	Failure to support exposed pipelines				<input type="checkbox"/>	Plumbing	<input type="checkbox"/>	Waterway Improvement	<input type="checkbox"/>	Auger
<input type="checkbox"/>	Failure to use hand tools where req'd				<input type="checkbox"/>	Eng/Survey	<input type="checkbox"/>	Liquid Pipeline	<input type="checkbox"/>	Vacuum Excavation
<input type="checkbox"/>	Failure to test-hole (pot-holing)				<input type="checkbox"/>		<input type="checkbox"/>	Pole Set/Remove	<input type="checkbox"/>	Probing Device
<input type="checkbox"/>	Improper backfilling practices									
<input type="checkbox"/>	Previous damage									
<input type="checkbox"/>	One-call notification error									
Map Posted by: _____					Date: _____					
Leak Report Closed by: _____					Date: _____					

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REPAIR PROCEDURES - TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.701, 192.703, and 192.711 through 192.719	<b>Date Revised:</b> July 31, 2011
<i>Section 14 – Repair Procedures – Transmission (continued)</i>	<b>Approved:</b> 



**HYDROSTATIC TEST REPORT**

<b>Test Section No.</b>	<b>Job Number</b>
<b>Project Name</b>	
<b>Test No.</b>	<b>Test Company</b>
<b>Start Date</b> _____ <b>Time</b> _____	<b>Finish Date</b> _____ <b>Time</b> _____
<b>From Station</b>	<b>To Station</b>
<b>Reference Drawings</b>	
<b>Location Of Deadweights</b>	<b>Location Of Recorders</b>
<b>Deadweight Model S/N</b>	<b>Pressure Recorder</b>
<input type="checkbox"/> <b>Temp. Recording Attached</b>	<input type="checkbox"/> <b>Pressure Recording Attached</b>
<b>Remarks</b>	

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PATROLLING AND LEAK SURVEY - TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.705 and 192.706	<b>Date Revised:</b> July 31, 2011
<i>Section 15 – Patrolling and Leak Survey - Transmission</i>	<b>Approved:</b> 

**Section 15.1 - General**

The purpose of pipeline patrol is to observe surface conditions on and adjacent to TECO Peoples Gas’ rights-of-way which might affect safe operation of the system. Methods of patrolling include walking, driving, flying or other appropriate means of traversing the right-of-way.


The type of examination and frequency with which it is made will depend on the location and type of system. Any safety-related conditions such as earth movement, material defects, etc., may be reportable.

The Division Manager shall prepare a plan indicating the scheduling of all patrols for the coming year.

**Section 15.2 - Transmission Facilities**

All transmission lines must be patrolled and a leak survey must be made in accordance with the following schedule:

Class 1 Locations	Patrol at least once each calendar year, at intervals not exceeding fifteen (15) months. Patrol highway and railroad crossings at least twice each calendar year, at intervals not exceeding seven and one-half (7.5) months. Conduct a leak survey at least once each calendar year, at intervals not exceeding fifteen (15) months, with a continuous sampling type leak indicator.
Class 2 Locations	
Class 3 Locations	Patrol at least twice each calendar year, at intervals not exceeding seven and one-half months. Patrol highway and railroad crossings at least four (4) times each calendar year, at intervals not exceeding four and one-half (4.5) months. Conduct a leak survey at least once each calendar year, at intervals not exceeding fifteen (15) months, with a continuous sampling type leak indicator.
Class 4 Locations	Patrol at least four (4) times each calendar year at intervals not exceeding four and one-half (4.5) months. A leak survey must be conducted with a continuous sampling type leak indicator at least once each calendar year, at intervals not exceeding fifteen (15) months.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PATROLLING AND LEAK SURVEY - TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.705 and 192.706	<b>Date Revised:</b> July 31, 2011
<i>Section 15 – Patrolling and Leak Survey – Transmission (continued)</i>	<b>Approved:</b> 

If the system transports gas without odor or odorant, the leak survey schedule becomes the same as the patrol schedule for Class 3 and Class 4 locations.

While surveying, if a read occurs on the leak detection instrument, it shall be immediately rechecked and validated. If the leak is valid, it shall be pinpointed by means of bar test holes. Reads shall be taken with the CGI to determine the extent and classification of the leak. The area of migration shall also be determined. The form PgS 24, “Gas Leak and Repair Form” (see sample above at Section 14, Pages 57 and 58) shall be prepared at any time a leak is found. Upon receipt of this form, the Division Manager shall initiate repair of the leak. Priority for repair depends upon the leak classification. Any Grade 1 leak shall be given immediate attention. Other leaks shall be handled in a routine manner. Refer to Section 19 for Leak Classification and Action Criteria.


### **Section 15.3 - Surface Patrol**

The Division Manager shall ensure that their personnel observe the rights-of way and adjacent area for evidence of:

1. Gas leaks;
2. Exposed pipe;
3. Line breaks;
4. Erosion;
5. Equipment working on or near the pipeline;
6. New construction which may be located within two hundred twenty (220) yards on either side of the pipeline;
7. Any other unusual condition or hazard along, near, or approaching the right-of-way; and,
8. Condition of pipeline markers.

Field operating personnel shall immediately notify the Division Manager of any activity which may adversely affect the safe operation of the pipeline system.





<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PATROLLING AND LEAK SURVEY - TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.705 and 192.706	<b>Date Revised:</b> July 31, 2011
<i>Section 15 – Patrolling and Leak Survey – Transmission (continued)</i>	<b>Approved:</b> 

**Section 15.4 Reports and Records**

1. The form, “Report of Adjacent New Construction/Observation” (see sample above at Section 3, Page 21), shall be completed by the Division Manager to document the patrolling of pipelines.
2. The form PgS 639, “Area Leak Survey” (see sample below at Section 15, Page 63), shall be completed by the Division Manager to document the leak surveying of pipelines.
3. A print of area surveyed shall be dated, signed and highlighted by the Division Manager to document the area surveyed.

The originals of the above referenced reports and forms are to be maintained for the life of the facility.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PATROLLING AND LEAK SURVEY - TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.705 and 192.706	<b>Date Revised:</b> July 31, 2011
<b>Section 15 – Patrolling and Leak Survey – Transmission (continued)</b>	<b>Approved:</b> 



RS 639 REV. 7/97 DAY/WEEK ENDING \_\_\_\_\_

**PROGRESS REPORT:** PAGE \_\_\_\_\_ OF \_\_\_\_\_

DIVISION \_\_\_\_\_ TOWN(S) SURVEYED \_\_\_\_\_

MAP SHEET NOS. SURVEYED \_\_\_\_\_

**TYPE OF SURVEY:**  
 FLAME IONIZATION UNIT (PORTABLE) \_\_\_\_\_ COMBUSTIBLE GAS INDICATOR/BARHOLE \_\_\_\_\_  
 MOBILE SURVEY (FI UNIT) \_\_\_\_\_ VEGETATION \_\_\_\_\_  
 OTHER (Specify) \_\_\_\_\_

**SURVEYED:**

<input type="checkbox"/> MAINS	<input type="checkbox"/> NATURAL GAS
<input type="checkbox"/> ALL CATCH BASINS, TELEPHONE AND ELECTRICAL BOXES AND MANHOLES	<input type="checkbox"/> L. P. GAS
<input type="checkbox"/> METER SETS	<input type="checkbox"/> COMMERCIAL
<input type="checkbox"/> BASEMENTS/BUILDINGS AND ASSOCIATED SERVICE LINES	<input type="checkbox"/> RESIDENTIAL
<input type="checkbox"/> SERVICE LINES	
<input type="checkbox"/> REGULATOR/GATE STATIONS	

AREA SURVEYED: \_\_\_\_\_

LEAK NOS. ASSIGNED:  
 Referred to Distribution: \_\_\_\_\_  
 Referred to Service Dept: \_\_\_\_\_


<b>SURVEY SUMMARY:</b>	<u>MILES SURVEYED</u>	<u>LEAK INDICATIONS FOUND:</u>		
		<u>GRADE I</u>	<u>GRADE II</u>	<u>GRADE III</u>
MAINS				
COMM.	_____	_____	_____	_____
RES.	_____	_____	_____	_____
TOTAL	_____	_____	_____	_____
	<u>NO. SURVEYED</u>	<u>GRADE I</u>	<u>GRADE II</u>	<u>GRADE III</u>
SERVICE LINES:				
COMM.	_____	_____	_____	_____
RES.	_____	_____	_____	_____
TOTAL	_____	_____	_____	_____

REMARKS: \_\_\_\_\_

DATE: \_\_\_\_\_ SURVEYED BY: \_\_\_\_\_


POSTED TO LEAK MAPS BY: \_\_\_\_\_ POSTING DATE: \_\_\_\_\_

ORIGINAL - SYSTEM ENGINEERING DEPT. (weekly summary only)  
 COPY - DIVISION FILES (daily and/or weekly summary)

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> RECORD KEEPING - TRANSMISSION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.709	<b>Date Revised:</b> September 10, 2007
<i>Section 16 – Record Keeping - Transmission</i>	<b>Approved:</b> 

**Section 16.1 - General**

Repair and corrosion records shall be kept until the segment is retired. TECO Peoples Gas shall keep the date, location, and description of each repair made to pipe (including pipe-to pipe connections) for as long as the segment of transmission line involved remains in service. Leak surveys, line patrol and inspection reports are to be kept for five (5) years.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PATROLLING - DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.721	<b>Date Revised:</b> July 31, 2011
<i>Section 17 – Patrolling - Distribution</i>	<b>Approved:</b> 

### **Section 17.1 - General**

Patrolling of the TECO Peoples Gas distribution system is done on a systematic basis in an effort to locate mains in places or on structures where anticipated physical movement or external loading could cause failure or leakage. Where the main or support structure is constructed and maintained to resist anticipated movement and external loads, the Division Manager may determine that patrols of the facility are not necessary. Patrolling may be accomplished in conjunction with leakage surveys, scheduled inspections and other routine activities. The frequency of patrolling mains must be determined by the severity of the conditions, which could cause failure or leakage, and the consequent hazards to public safety. The Division Manager shall prepare a plan indicating the scheduling of all patrols for the coming year.

In addition to the scheduled patrolling procedure the qualified employees have been instructed to report hazardous or potentially hazardous conditions when found as a result of their normal work activities.

### **Section 17.2 - Patrol Frequency**


Distribution system patrolling will be performed in business districts, at intervals not exceeding four and one half (4.5) months, but at least four (4) times each calendar year; outside business districts at intervals not exceeding seven and one half (7.5) months, but at least twice each calendar year.

### **Section 17.3 - Patrol Requirements**

The Division Manager shall prepare a list of critical areas that exist on distribution pipeline facilities. This list will be reviewed and updated before each patrol. Each facility should be checked for the following:

1. Mains on Bridges
  - a. Secure hangers or supports.
  - b. Missing bolts in expansion joints, compression couplings, or flanges.
  - c. Physical condition of piping (check for pulled compression couplings).


*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PATROLLING - DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.721	<b>Date Revised:</b> July 31, 2011
<b>Section 17 – Patrolling – Distribution (continued)</b>	<b>Approved:</b> 

- d. Deteriorated coating at ends of pipe.
  - e. Condition of paint (excessive rust).
  - f. Debris lodged against pipe from high water.
  - g. Presence of pipeline markers on main.
2. Regulator Stations and Similar Installations
- a. Adequate locks on gates and valves (by-pass valves must be locked closed and relief valves must be locked open).
  - b. Physical condition of piping (checks for pulled compression couplings and pipe in strain).
  - c. Condition of paint (excessive rust).
  - d. Presence of pipeline marker.
  - e. Condition of orifice fittings, valves and other items in pits.
  - f. Evidence of corrosion or deterioration of coating.
3. Vault Vents, Relief Valves, Casing Vents, Blow-off Stacks
- a. Locks where needed.
  - b. Physical condition of piping (straight and plumb).
  - c. Condition of paint (excessive rust).
  - d. Presence of pipeline marker.

*(continued on next page)*



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PATROLLING - DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.721	<b>Date Revised:</b> July 31, 2011
<i>Section 17 – Patrolling – Distribution (continued)</i>	<b>Approved:</b> 

4. Pipeline Location Markers
  - a. Condition of support - post, pole, etc. (straight and plumb).
  - b. Condition of paint (excessive rust).
  - c. Actual marker sign in place.
5. Pipeline Other Locations
  - a. Exposed pipe.
  - b. Gas leaks.
  - c. Line breaks.
  - d. Erosion.
  - e. Equipment working on or near pipeline.
  - f. Other evidence of unsafe conditions.


The results of the critical area patrol shall be reviewed by the Division Manager for changes or deficiencies and remedial action taken where warranted.

#### **Section 17.4 - Reports and Records**

1. The form PgS 614, “Above Ground Piping Inspection and Maintenance Report” (see sample at Section 17, Page 68) shall be completed by the Division Manager to document the results of the patrol, including such items as leak indications, encroachments, erosion, other conditions which may affect the safety of the line and recommendations for action.

The originals of the above referenced reports and forms are to be maintained for the life of the facility.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LEAK SURVEY – DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.723	<b>Date Revised:</b> November 1, 2011
<i>Section 18 – Leak Survey - Distribution</i>	<b>Approved:</b> 


**Section 18.1- General**

TECO Peoples Gas has the capability of conducting mobile or walking leakage surveys using gas detector system capable of detecting a concentration of 50 ppm gas in air. Most surveys of mains and service lines are conducted by walking crews, however if service lines and mains are accessible to vehicles, the mobile equipment may be used.

**Section 18.2 - Distribution Survey Frequency**

<b>Distribution Main or Service Type</b>	<b>Principal Business Districts</b>	<b>Non-Business District</b>
Bare, Galvanized and Steel Tubing	Once each calendar year not to exceed fifteen (15) months	One hundred percent (100%) each three (3) years.
<b>Other Than</b> Bare, Galvanized and Steel Tubing	Once each calendar year not to exceed fifteen (15) months	One hundred percent (100%) each five (5) years.

Consideration shall also be given to increased frequency based on particular circumstances and conditions.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LEAK SURVEY – DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.723	<b>Date Revised:</b> November 1, 2011
<i>Section 18 – Leak Survey – Distribution (continued)</i>	<b>Approved:</b> 

### **Section 18.3 - Survey Procedure**

Leak surveys shall be conducted on a periodic basis in accordance with the above Section 18.2, “Distribution Survey Frequency”.

The frequency of leak surveys may be more frequent than the minimum requirements as set forth. The following are some factors that may be considered for the increase in survey frequency.


1. Pipe material (i.e. cast iron, galvanized, etc.).
2. Pipe joints (i.e. screwed, compression coupling, etc.).
3. Soils, paving, etc.
4. Population density.
5. Leakage history.

All positive indications of combustible gas or vapor present in the general vicinity of a gas main, service line, or other gas facilities shall be assumed to be of natural gas origin until proven otherwise. If combustible materials other than natural gas are indicated, then the appropriate governmental authority should be notified of such findings so that corrective action may be taken by them.

Area leak surveys are to be recorded on the various forms that are noted in this Section. The leak survey records shall be retained for the period specified in the forms section located in the front of this manual.

Each leak indication, up to the outlet of the meter, shall be documented on a separate form PgS 24, “Gas Leak and Repair Form” (see sample above at Section 14, Pages 57 and 58). A leak number shall be assigned and recorded on form PgS 639, “Area Leak Survey” (see sample above at Section 15, Page 63).

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LEAK SURVEY – DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.723, Florida Administrative Code 25-12.041 and 12.042	<b>Date Revised:</b> November 1, 2011
<i>Section 18 – Leak Survey – Distribution (continued)</i>	<b>Approved:</b> 

All leak surveys of gas mains shall be documented on individual sets of Operating Center maps designated as leak survey records or within the Company’s GIS. Mains should be marked as surveyed. Each main and facilities survey shall be coded to indicate which year that the leak survey was completed.

**Section 18.4 - Business Districts**


Business districts are the principal business areas in an urban community. In determining business districts, the following areas should be considered:

1. The general public regularly congregates or where the majority of buildings on either side of the street are utilized for economic, industrial, religious, educational, health or recreational purposes.
2. Gas facilities are under continuous paving that extends from the centerline of the thoroughfare to the building wall or from the main to the building wall.
3. The atmosphere in manholes, catch basins, curb boxes, cracks in pavement or sidewalks, and other surface openings to underground facilities, which might provide an opportunity for finding combustible gas, shall be checked with a gas detection instrument in such a manner that the presence of gas leaking though cracks or the accumulation of gas within manholes would be detected.
4. Any other location or site, which in the judgment of TECO Peoples Gas should be so designated.

**Section 18.5 – Types of Leak Surveys**

(Section removed as of September 2010)



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LEAK SURVEY – DISTRIBUTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.723, Florida Administrative Code 25-12.041 and 12.042	<b>Date Revised:</b> November 1, 2011
<i>Section 18 – Leak Survey – Distribution (continued)</i>	<b>Approved:</b> 


**Section 18.6 - Reports and Records**

1. The form PgS 24, “Gas Leak & Repair Form” (see sample above at Section 14, Pages 57 and 58), must be completed by the qualified field technician to document the location and grade of the leak.
2. The form PgS 639, “Area Leak Survey” (see sample above at Section 15, Page 63), must be completed by the qualified field technician to document the amount of mains and services surveyed and the number of leaks found. In place of form PgS 639, the company’s GIS can also be utilized to record this information.
3. A print of area surveyed shall be dated, signed and highlighted by qualified field technician to document the area surveyed or the Company’s GIS will be used to record the information.

The original of the above referenced reports and forms are to be maintained for the life of the facility.





<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LEAK CLASSIFICATION AND ACTION CRITERIA	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.706 and 192.723; Florida Administrative Code 25-12.040	<b>Date Revised:</b> September 10, 2007
<i>Section 19 – Leak Classification and Action Criteria</i>	<b>Approved:</b> 

### **Section 19.1 - Leak Classification and Action Criteria**

The procedure established by TECO Peoples Gas for handling gas leak complaint reports received from customers, the general public, TECO Peoples Gas employees, or anyone else is outlined in the Emergency Procedures Manual. The following establishes a procedure by which leakage indications of flammable gas can be graded and controlled. Particular care must be taken to determine whether or not any leakage discovered is entering a building or sewer system. When evaluating any suspected gas leak, the initial step is to determine the perimeter of the potential leak area. When the perimeter extends to a building wall, the investigation should continue into the building. Leaks shall be isolated to the general location of mains and services; meter set assemblies, district regulators, customer's piping or appliances. Appropriate personnel shall then classify the leak and take action in accordance with the following schedule.

#### **Grade 1 Leak - Definition**


A Grade 1 leak is one that represents an existing or probable hazard to persons or property, and requires immediate repair or continuous action until the conditions are no longer hazardous.

#### **Grade 1 Leak - Action Criteria**

The Grade 1 leak requires prompt action to protect life and property, and continuous action until the conditions are no longer hazardous. The prompt action in some instances may require one or more of the following:

1. Implementation of the Emergency Procedures, per Emergency Procedures Manual.
2. Evacuation of premises.
3. Blocking off an area.
4. Rerouting traffic.
5. Elimination of ignition sources.
6. Stopping the flow of gas by closing valves, etc.
7. Notification of police and fire departments.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LEAK CLASSIFICATION AND ACTION CRITERIA	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.706 and 192.723; Florida Administrative Code 25-12.040	<b>Date Revised:</b> September 10, 2007
<i>Section 19 – Leak Classification and Action Criteria (continued)</i>	<b>Approved:</b> 

### **Grade 2 Leak - Definition**

A Grade 2 leak is one that is recognized as being non-hazardous at the time of detection but justifies scheduled repair based on probable future hazard.

### **Grade 2 - Action Criteria**

Leaks should be repaired or cleared within ninety (90) days from the date the leak was reported, unless due to resurvey the leak was determined to be a Grade 3 leak as defined below. In determining the repair priority, criteria such as the following should be considered:

1. Amount and migration of gas.
2. Proximity of gas to buildings and subsurface structures.
3. Extent of pavement.
4. Soil type, and soil conditions (such as frost cap, moisture and natural venting).

Grade 2 leaks may vary greatly in degree of potential hazard. Some Grade 2 leaks, when evaluated by the above criteria, may justify scheduled repair within the next five (5) working days. Others will justify repair within thirty (30) days or during the working day on which the leak is discovered. These situations should be brought to the attention of the individual responsible for scheduling leak repair.


On the other hand, many Grade 2 leaks, because of their location and magnitude, can be scheduled for repair on a normal routine basis with periodic re-inspection as necessary.

### **Grade 3 Leak - Definition**

A Grade 3 leak is one that is non-hazardous at the time of detection and can be reasonably expected to remain non-hazardous.

*(continued on next page)*




<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LEAK CLASSIFICATION AND ACTION CRITERIA	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.706 and 192.723; Florida Administrative Code 25-12.040	<b>Date Revised:</b> September 10, 2007
<i>Section 19 – Leak Classification and Action Criteria (continued)</i>	<b>Approved:</b> 

**Grade 3 Leak - Action Criteria**

Above ground grade 3 leaks shall be repaired within ninety (90) days from the date the leak was originally located unless the leak is upgraded or does not produce a positive leak indication when a soap and water solution, or its equivalent, is applied on suspected locations at operating pressure. Grade 3 leaks that are underground shall be reevaluated at least once every six (6) months until cleared. The frequency of reevaluation shall be determined by the location and magnitude of the leak.

**Section 19.2 - Follow - Up Inspection**

The adequacy of all the repairs of leaks shall be checked by appropriate methods immediately after the repairs are completed. Where there is residual gas in the ground, a follow-up inspection using a gas detector instrument must be made as soon as practical but in no case later than one (1) month for Grade 1 leaks and six (6) months for Grade 2 leaks. The date and status of recheck shall be recorded on the leak repair records.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LINE MARKERS FOR MAINS AND TRANSMISSION LINES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.707; Florida Administrative Code 25-12.050	<b>Date Revised:</b> July 31, 2011
<i>Section 20 – Line Markers for Mains and Transmission Lines</i>	<b>Approved:</b> 

### **Section 20.1 - General**

Gas transmission and distribution mains in Class 1 and 2 areas and all exposed mains shall be marked. Transmission mains should be marked to the extent possible in Class 3 and 4 areas unless placement of a marker is impractical. Markers should be placed in other areas where the public needs to be aware of the presence of gas mains. Signs identifying and warning of the hazard of smoking and open flames shall be posted on all large regulating stations. All hazardous location areas on the above mains shall be marked and maintained during patrol of the lines.


Pipeline markers are utilized to identify the location of TECO Peoples Gas pipelines in order to reduce the possibility of damage or interference. The installation of permanent markers on private property may take place wherever the party exerting control over the surface use of the land will permit such installations. The placement of temporary markers is advisable in areas of known heavy construction activity (particularly along highways and major excavations) during the period construction is in progress.

The Division Manager is responsible for the proper marking of gas facilities. The condition of signs and markers shall be inspected at the time of the routine inspection of the facility and deteriorated signs and markers repaired or replaced.

### **Section 20.2 - Placement of Markers**

Markers should be placed at intervals that would allow an individual to trace the route of the main and to readily warn the public of the presence of the main. Marking hazardous locations on transmission and distribution mains are encouraged. Main markers should be located:

1. At all water crossings.
2. At transmission valves or other appropriate locations near the valve.
3. At each public road and railroad crossing. The markers should face toward railroad.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> LINE MARKERS FOR MAINS AND TRANSMISSION LINES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.707; Florida Administrative Code 25-12.050	<b>Date Revised:</b> July 31, 2011
<i>Section 20 – Line Markers for Mains and Transmission Lines (cont.)</i>	<b>Approved:</b> 

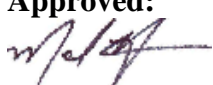
### **Section 20.3 - Minimum Specifications**

Federal regulations require that the marker must contain:

1. The word "WARNING", or "CAUTION" or "DANGER".
2. The words "GAS PIPELINE", all in letters at least one inch (1") high with a quarter inch (1/4') stroke.
3. The name "TECO Peoples Gas".
4. The telephone number (including area code) where TECO Peoples Gas can be reached at all times.

### **Section 20.4 - Warning Signs**

Whenever the permanent possibility of accidental ignition of gas exists, permanent signs warning of the possibility of ignition shall be posted in a conspicuous place. Suitable warning signs shall also be posted as needed to warn the general public whenever a temporary danger of ignition exists because of an operation being performed.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> TEST REQUIREMENTS FOR REINSTATING MAIN AND SERVICE LINES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.505, 192.507, 192.509, 192.511, 192.513 and 192.725	<b>Date Revised:</b> September 10, 2007
<i>Section 21 – Test Requirements for Reinstating Main and Service Lines</i>	<b>Approved:</b> 


### **Section 21.1 - Reconnection of Temporarily Disconnected Services**

Before a service line, which has been disconnected from the serving main, can be reconnected, it must be tested in the same manner as a new service line. If the service was damaged, replace the damaged section and test from the point of damage to the meter stop. In addition, there shall be sufficient bar testing from the main to the damaged section using a combustible gas indicator. If there is any indication of physical movement caused by the damage, the line must be tested from the main to the meter stop.

### **Section 21.2 - Reconnection of Temporarily Disconnected Mains or Pipelines**

Mains or pipelines, which have been disconnected from their source of supply, must be tested in accordance with the following requirements before they can be reused:


1. Facilities Not Disturbed: Piping facilities, which are disconnected temporarily, need not be tested if they are not disturbed.
2. Facilities Moved Within a Trench: Piping facilities which are moved within a trench, but not lifted out of the trench, shall be pressure tested in the same manner as a new line in the same location.
3. Facilities Lifted From a Trench: Piping facilities which are lifted out of a trench and either returned to the same trench or moved to a new trench shall be visually inspected to make sure that all welds are sound -and that no damage has been done to the pipe. They must then be tested in the same manner as new lines in their final location.
4. Facilities Cut Into Sections: Piping facilities, which are cut into sections, must be reinstalled as though they were new facilities. All new welds must be tested as required for new facilities.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> TEST REQUIREMENTS FOR REINSTATING MAIN AND SERVICE LINES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.505, 192.507, 192.509, 192.511, 192.513 and 192.725	<b>Date Revised:</b> September 10, 2007
<i>Section 21 – Test Requirements for Reinstating Main and Service Lines (continued)</i>	<b>Approved:</b> 

**Section 21.3 - Reinstating Service in Abandoned Lines**

Abandoned service lines, before being reactivated, shall be tested in the same manner as new service lines. Service lines temporarily disconnected because of main renewals, or other planned work, shall be tested from the point of disconnection to the service line riser valve at the meter location or as a unit with the main renewal. This test shall be undertaken in the same manner as a new gas service line. However, if a bypass is installed to keep a service line active, the portion maintained in continuous active use need not be tested.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> ABANDONMENT OR INACTIVATION OF FACILITIES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.727	<b>Date Revised:</b> September 10, 2007
<i>Section 22 – Abandonment or Inactivation of Facilities</i>	<b>Approved:</b> 

### **Section 22.1 - Abandonment of Pipelines**


The following procedures shall be followed for abandonment or inactivation of facilities:

1. Check Prior to Abandonment: Office records should be checked and necessary field checks should be made to insure the pipelines or mains scheduled for abandonment are disconnected from all sources and supplies of gas (such as other pipelines, mains, crossover piping, meter stations, customer piping, control lines, and other appurtenances).


Abandonment procedures used in the Division shall include the following:

1. Facilities abandoned in place shall be physically disconnected from the active system piping and the open ends of the abandoned facility shall be permanently sealed.
2. All abandoned facilities, when purged must be purged in accordance with Section 12, Purging, of this manual, to prevent the development of a potentially hazardous condition.
3. An abandoned pipeline facility need not be purged when the volume is so small that there is no potential hazard. All other abandoned pipeline facilities shall be purged.
4. Service lines connected to abandoned mains shall be permanently sealed below grade at the customer end of the service lines.
5. Vaults abandoned in place shall be filled with a suitable compacted material.
6. Service lines abandoned from active mains should be disconnected as close to the main as practical. Both ends of the abandoned portion of the service line nearest the main should be sealed.

The record of the facility's abandonment shall appear on form PgS 402, "Authorization For Retirement (AFR)" (see sample below at Section 22, Page 83). These records shall be retained in the Operating Center.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> ABANDONMENT OR INACTIVATION OF FACILITIES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.727	<b>Date Revised:</b> September 10, 2007
<b>Section 22 – Abandonment or Inactivation of Facilities (continued)</b>	<b>Approved:</b> 

Form 402 10/82 (SUBMIT IN DUPLICATE)		AUTHORIZATION FOR RETIREMENT		TECO PEOPLES GAS	
DIV. NAME		DIV. NO.	DEPT. NAME	J.O. NO.	
LOCATION OF RETIREMENT:		REQUEST NO.	REQUEST DATE	DATE A.F.R. ASSIGNED	
CITY/TOWN/VILLAGE		COUNTY	STATE	IS AN INSURANCE REIMBURSEMENT INVOLVED? <input type="checkbox"/> YES <input type="checkbox"/> NO	
TITLE		INSTALLED UNDER AFE NUMBER/W.O. NUMBER AND YEAR			
Description of Property to be Retired: Company number: _____		Serial Number: _____			
Reason - Remarks: Give Complete Explanation - Attach Necessary Sketches					
Description of Item, Size, Quantity, Unit, Etcetera		Disposition	Estimate Salvage	PLANT ACCOUNTING USE ONLY Original Cost	
Property Disposition (1) Abandon in Place (2) Return to Stock		(3) Scrap (4) Sell	(5) Trade		
Originator	Date	Vice Pres. Operations		Date	
Superintendent	Date	Executive Vice President		Date	
Division Manager	Date	Vice President - Finance		Date	
Plant Accounting (CPR)	Date	President		Date	
Plant Account _____		AFR No. ENTERED _____			
Journal Entry Date _____					
		AFR No. _____			

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REGULATOR STATION INSPECTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.739, 192.741 and 192.743	<b>Date Revised:</b> July 31, 2011
<b>Section 23 – Regulator Station Inspection</b>	<b>Approved:</b> 

### **Section 23.1 - General**

All town border stations and pressure reducing stations must comply with the following inspection requirements. Individual component inspections shall be made concurrently with other inspections when practical. At least once each calendar year and at intervals not exceeding fifteen (15) months, each pressure limiting station, relief device (except rupture discs), and pressure regulating station must be inspected to determine that it is in good mechanical condition.


All personnel working with station equipment should have knowledge of the general operating principals involved. Personnel responsible for the operation, maintenance, and testing of station equipment will be responsible for accumulating manufacturer's service manuals and other reference material. These items should be readily available for reference. The Division Manager is responsible for maintaining all equipment in satisfactory condition, establishing test and calibration schedules to properly maintain all station equipment and to ensure that these inspections are completed. A capacity calculation shall be made to determine that the station has adequate capacity for the service in which it is employed.

### **Section 23.2 - Operational Inspection**

This inspection is a visual and operational check for the proper functioning of equipment. The operational inspection is designed to verify that the regulating station is operating as designed and to identify any needed repairs. The operational inspection does not require the disassembly of regulators or relief valves. Employees performing operation inspections should have:

1. The regulator station data sheet, form PgS 654, "Pressure Regulating Installation Data" (see sample below at Section 23, Page 92) or equivalent information within the GIS database.
2. The regulator station inspection form PgS 659, "District Regulator Station Inspection and Maintenance Report" (see sample below at Section 23, Page 93) or equivalent information within the GIS database.
3. The current station drawing.

*(continued on next page)*


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REGULATOR STATION INSPECTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.739, 192.741 and 192.743	<b>Date Revised:</b> July 31, 2011
<b>Section 23 – Regulator Station Inspection (continued)</b>	<b>Approved:</b> 

4. A combustible gas indicator.
5. Accurate pressure gauges capable of measuring both the inlet and outlet pressure of the station.
6. The manufacturer's instruction manual for each regulator and relief valve type in the station.

#### Operational Inspection Steps

1. Leak Check - Using a CGI set on the LEL scale, check for the presence of gas at the following locations:
  - a. Atmosphere of vault or structure.
  - b. The piping and equipment in the station.
  - c. Regulator and relief valve diaphragm vents.
  - d. Relief valve vent stacks.
2. Visual Inspections - Visual inspections shall be made to determine that a satisfactory condition exists which will allow proper operation of the equipment. The following should be included in the inspection (where necessary).
  - a. Station piping supports, pits, and vaults for general condition and indications of ground settlement. NOTE: Prior to entering a vault which has restricted openings (such as manholes) or which is more than four feet (4') deep, and while working therein, tests should be made of the atmosphere in the vault (see below at Section 25, Vault Maintenance).
  - b. Station doors and gates, as well as pit and vault covers to insure that they are functioning properly and that access is adequate and free from obstructions.


*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REGULATOR STATION INSPECTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.739, 192.741 and 192.743	<b>Date Revised:</b> July 31, 2011
<b>Section 23 – Regulator Station Inspection (continued)</b>	<b>Approved:</b> 

- c. Ventilating equipment installed in station buildings or vaults for proper operation, and for evidence of accumulation of water or other obstructions.
  - d. Control, sensing, and supply lines for conditions, which could result in a failure.
  - e. All locking devices for proper operation.
  - f. Overall Station condition shall be checked for appearance, paint condition, weeds, and debris.
  - g. Presence and condition of warning signs.
  - h. Check piping for corrosion and proper installation.
  - i. Ascertain that proper protection from hazards exists.
3. Pressure Gauges - Verify the accuracy of the inlet and outlet dial and recording pressure gauges with a test gauge or dead weight tester. If the indicated error is greater than two percent (2%) of full scale, the gauge should be re-calibrated or replaced. If the shutoff valve ahead of the gauge is defective, the valve shall be repaired or replaced. Gauge accuracy should be checked before operating any bypass or changing the station operation to inspect or maintain the pressure regulating equipment. All gauge valves must be in the full open position.


*(continued on next page)*



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
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<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.739, 192.741 and 192.743	<b>Date Revised:</b> July 31, 2011
<b>Section 23 – Regulator Station Inspection (continued)</b>	<b>Approved:</b> 

4. Regulator Check - Close the valve downstream of the regulator and observe the pressure buildup between the regulator and valve. An excessive or rapid buildup indicates a defective regulator valve. Whenever excessive or rapid buildup occurs, a primary inspection shall be performed on the defective regulator. Note: If the control line tap is downstream of the valve, it will be necessary to isolate the control line and using nitrogen, induce a higher pressure in the control line to cause the regulator to move to the closed position. Open the valve (or reconnect the control line) and check that the regulator returns to its normal operating pressure. The regulator set point should be the same as shown on the data sheet. Perform the same test for the monitor regulator. For small single run regulator stations, a pressure check made at the station or at a customer service regulator tap will satisfy this requirement.
5. Supply and Control Line Filters - Inspect any filters in control and pilot supply lines. Clean the filter or, if necessary, replace the filter.
6. Overpressure Protection - Close the shutoff valve ahead of the relief valve, and using nitrogen, propane or natural gas, check the set point of the relief valve. If the set point is different from the set point shown on the data sheet, adjust the set point. After checking and adjusting the relief valves, open the shutoff valve and check the relief for positive shutoff. Whenever a positive shutoff does not occur, a primary inspection shall be performed on the defective relief valve. Use a CGI to check for the presence of gas in the relief valve stack. If the station is not in a locked fence enclosure or in a vault, the relief valve shutoff valve shall be locked in the open position.
7. Valves - An inspection and/or test of valves shall be made to insure that the valves will operate and are correctly positioned (caution should be used to avoid any undesirable effect on pressures during operational checks.) The required locking devices shall be installed and the locks operable. Each valve shall be partially turned to assure that it can be operated when needed. Each valve shall be checked for proper position, open or closed. The following valves should be included in the inspection and/or test:
  - a. Station inlet, outlet and bypass valves.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REGULATOR STATION INSPECTION	<b>Date Issued:</b> October 1, 2003
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<i>Section 23 – Regulator Station Inspection (continued)</i>	<b>Approved:</b> 


- b. Relief device isolating valves.
- c. Control, sensing and supply line valves.

**Section 23.3 - Primary Inspection**

The primary inspection is the complete tear down of pressure regulating equipment, allowing the inspection of the operating components of the regulator. The regulator orifices, valves, and linkages are inspected for wear and proper operation, and any defective parts are replaced. A primary inspection shall be performed whenever defective equipment is found or deemed necessary by the Division Manager. NOTE: the primary inspection covers the disassembly of each defective regulator, relief valve, and pilot regulator.

Primary Regulator Inspection Steps

1. Clean regulator bowl and examine for signs of erosion caused by dirt in the flowing gas stream.
2. Examine valves and seats for wear, nicks, or depressions and replace as required.
3. Examine valve stems and guides for wear and binding and replace as required.
4. Check pilot and regulator springs to determine that they are the correct spring for the application and are the springs listed on the form PgS 654, "Pressure Regulating Installation Data" (see sample below at Section 23, Page 92) or the equivalent information is listed in the Company GIS.
5. Elastomer elements shall be removed and replaced as needed.
6. Check for proper diaphragm operation. As a general rule the diaphragm cases should not be disassembled in the field. A periodic inspection of the diaphragm is not needed. If deterioration of the diaphragm is suspected or the diaphragm appears to be leaking, the regulator should be removed from service and repaired in a shop or if more appropriate, a field repair conducted.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REGULATOR STATION INSPECTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.739, 192.741 and 192.743	<b>Date Revised:</b> July 31, 2011
<i>Section 23 – Regulator Station Inspection (continued)</i>	<b>Approved:</b> 

### **Section 23.4 - Determination of Required Relief Capacity**

The maximum possible flow through the source supplying the system being protected shall be determined.

1. When the source is controlled by TECO Peoples Gas, recognized engineering formulas shall be used to make the calculations based on data published by or otherwise obtained from the manufacturer of the equipment used as a pressure source or pressure control component.
  - a. A lesser capacity than calculated above is acceptable if calculations of flow in the piping on the inlet or outlet of the equipment show a lesser throughput to be the maximum.
  - b. Data used in these calculations should be selected so that the capacity calculated will represent the maximum throughput in actual operations including emergencies. Minimum demand may be considered.
2. When TECO Peoples Gas does not have control of the source, information should be obtained to adequately determine the maximum flow and pressure capacity of that source. This information may then be used as the basis for relief capacity requirements.
3. When more than one pressure regulating or compressor station feeds a pipeline, relief capacity based on complete failure of the largest capacity regulator or compressor should be adequate.


### **Section 23.5 - Miscellaneous Station Equipment Inspection**

During the inspection the following maintenance should also be performed:

1. All filters, strainers, separators, and similar items where dirt or liquid may collect shall be checked and action taken, if necessary, to place the item in full operating condition.
2. Miscellaneous station equipment shall be checked for hazardous conditions and proper operation.

### **Section 23.6 - System Changes**

Whenever there are changes in the system which could increase the supply of gas from the source, the capacity of the control device, or the ability of the relief device to handle the required flow, a re-determination shall be made.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REGULATOR STATION INSPECTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.739, 192.741 and 192.743	<b>Date Revised:</b> July 31, 2011
<i>Section 23 – Regulator Station Inspection (continued)</i>	<b>Approved:</b> 

### **Section 23.7 - Final Inspection**

The final inspection procedure shall include the following:

1. A check for proper position of all valves. Special attention should be given to regulator station bypass valves, relief device isolating valves, and valves in control, sensing and supply lines.
2. Restoration of all locking and security devices to the proper position.

### **Section 23.8 - Reports and Records**


There are two record forms for pressure regulating stations:

1. The form Pgs 654, “Pressure Regulating Installation Data” (see sample below at Section 23, Page 92) or its equivalent in the Company’s GIS, must be completed by the qualified person to document the capacity of a district regulator station. This form is a listing of all equipment and specifications in the station and shall be complete and correct. The MAOP, equipment capacities, and set points are critical. The form shall be revised whenever equipment or equipment set points are changed and shall be verified and, if necessary, corrected at the annual inspection. If over-pressure protection is provided by a relief valve, the calculation of the relief valve capacity shall be attached to the form.

The drawing or sketch on the form must be completed by the qualified person to provide a graphic outline of the station. The drawing shall be changed any time the station is revised, and shall be verified and, if necessary, corrected at the annual inspection.

2. The form PgS 659, “District Regulator Station Inspection and Maintenance Report” (see sample below at Section 23, Page 93) or its equivalent in the Company’s GIS, must be completed by the qualified person to document the inspection and maintenance of regulator stations and gate stations. The form provides a record of the annual operating or primary inspection. It verifies that the station was inspected and details any work completed during the inspection.

The originals of the above referenced reports and forms are to be maintained for the life of the facility.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> REGULATOR STATION INSPECTION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.739, 192.741 and 192.743	<b>Date Revised:</b> July 31, 2011
<i>Section 23 – Regulator Station Inspection (continued)</i>	<b>Approved:</b> 

**Section 23.9 – Telemetry or Recording Gauges**

Any part of the gas distribution system that is supplied by more than one district regulator station must be equipped with telemetry or recording pressure gauges to indicate the gas pressure in the system.


The Division Manager shall determine the need for telemetry or recording pressure gauges on systems that are supplied by one district regulator station based on the number of customers supplied, operating pressures in the system, system capacity and other applicable operating conditions.

Whenever there are indications of high or low pressure the station equipment must be inspected and necessary measures taken to correct any unsatisfactory operating conditions.







<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> EMERGENCY VALVE PROCEDURE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.745 and 192.747	<b>Date Revised:</b> July 31, 2011
<i>Section 24 – Emergency Valve Procedure</i>	<b>Approved:</b> 

**Section 24.1 - General**

All transmission and distribution emergency valves must comply with the following inspection requirements. Individual component inspections shall be made concurrently with other inspections when practicable. At least once each calendar year and at intervals not exceeding fifteen (15) months, each transmission and distribution emergency valve must be serviced, inspected, and partially operated to determine that it is in good mechanical condition.

**Section 24.2 - Designation of Emergency Valves**

Selected valves are designated as emergency valves. The emergency valves are necessary for the safe optimum operation of the system.


Transmission main emergency valves include:

1. Block valves that are spaced so that every point on main segment is within the required spacing for the class location.
2. Block valves that are located at the beginning of each lateral.
3. Block valves that control the flow of gas to regulator stations serving towns, large subdivisions, and large customers.
4. Block valves that control the flow of gas to mains in emergency locations such as stream or aerial crossings.
5. Block valves that are located at the inlet and outlet of compressor stations. Provisions must be made for the rapid blow-down of each segment of transmission main that can be isolated by closing block valves.

Distribution main emergency valves are:

1. Valves that control the flow of gas to distribution regulator stations. These valves should be located a safe distance from the station, but not more than five hundred feet (500') from the station inlet.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> EMERGENCY VALVE PROCEDURE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.745 and 192.747	<b>Date Revised:</b> July 31, 2011
<b>Section 24 – Emergency Valve Procedure (continued)</b>	<b>Approved:</b> 

2. Sectionalizing valves - Valves shall be spaced within each distribution system to reduce the time to shut down a segment of the system in an emergency. In determining the spacing of these valves, the following factors shall be evaluated:
  - a. Volume and pressure of gas between valves.
  - b. Size of area and population density between valves required to isolate the area as well as the accessibility of the required valves.
  - c. The minimum number of personnel required to shut down and restore the area.
  - d. Other means and availability of required equipment to control the flow of gas in the event of an emergency.
  - e. The number and type of customers, such as hospitals, schools, commercial and industrial loads, etc., that will be affected.
3. Valves that control gas flow to mains in vulnerable locations such as water crossings.
4. Valves that are installed at other locations as deemed necessary by the Division Manager.


### **Section 24.3 - Valve Inspections**

Each designated sectionalized or emergency valve will be inspected as often as necessary to insure access and operating capability, but not to exceed intervals of fifteen (15) months, but at least once each calendar year.

The inspection will include:

1. A check for adequate lubrication.
2. Proper alignment to permit use of a key or wrench.
3. Operate the valve.

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<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> EMERGENCY VALVE PROCEDURE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.745 and 192.747	<b>Date Revised:</b> July 31, 2011
<i>Section 24 – Emergency Valve Procedure (continued)</i>	<b>Approved:</b> 

4. Clear any debris or obstruction that might interfere with or delay the operation of the valve.
5. Check location references that are recorded on the map to insure the valve can be readily located from records.
6. Verification of valve number tag.

NOTE: A record will be kept of the periodic inspections and will contain sufficient information to show compliance with these procedures.

#### **Section 24.4 – Marking of Emergency Valves**

All emergency valves shall be physically identified using a durable tag or other approved equivalent method of marking and shall be numbered using an identification system appropriate to the Local Operating Center/Region requirements.


Above ground emergency valves and emergency valves located in vaults shall have a permanent (or visible until next inspection) identification (i.e. durable tags, painted numbers) affixed to them. The marking shall appear on the valve body or hand wheel.

Buried valves operated by a valve key wrench shall have the marking in a visible location or on the inside of the valve curb box or stand pipe where the cover will not destroy the markings.

The preferred method of marking shall be a tag of durable brass, aluminum, or non-corrosive material where corrosion may exist, or other approved material in the material list affixed with glue, wire, or screws and shall be stamped with a minimum of one quarter inch (1/4") characters identifying the valve. The marking should be placed on the north inside edge of the valve box approximately one sixteenth inch (1/16") from the top edge of the valve box. The tag should be secured to a cast iron valve box with a three-eighths inch (3/8") No. 7 cadmium plated sheet metal screws or approved glue. The area of the valve box where the marking is to be affixed should be cleaned and filed to insure complete closure.

Emergency valve box covers shall be painted an identifying color. Yellow shall be used if not reserved by another utility.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> EMERGENCY VALVE PROCEDURE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.745 and 192.747	<b>Date Revised:</b> July 31, 2011
<i>Section 24 – Emergency Valve Procedure (continued)</i>	<b>Approved:</b> 


**Section 24.5 - Reports and Records**

1. The form PgS 657, “Valve Maintenance and Operating Order” (see sample below at Section 24, Page 98) or its equivalent in the Company’s GIS, must be completed by the Division Manager to document the location and maintenance of emergency valves.
2. The form PgS 638, “Valve Maintenance Record Card” (see sample below at Section 24, Page 99) or its equivalent in the Company’s GIS, must be completed by qualified field technician to document maintenance of emergency valves.

The originals of the above referenced reports and forms are to be maintained for the life of the facility.





<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> VAULT MAINTENANCE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.749	<b>Date Revised:</b> September 10, 2007
<i>Section 25 – Vault Maintenance (continued)</i>	<b>Approved:</b> 

**Section 25.1 - General**

Each vault housing pressure regulating and pressure limiting equipment, and having a volumetric internal content of two hundred (200) cubic feet or more, must be inspected at intervals not exceeding fifteen (15) months, but at least once each calendar year, to determine that it is in good physical condition and adequately ventilated. Individual component inspections shall be made concurrently with other inspections when practical.


**Section 25.2 - Vault Inspection**

All vaults as described above must be inspected and necessary maintenance must be performed. Such inspections must include:

1. That the vault is structurally sound and no bearing on pipeline facilities.
2. That the cover presents no hazard to the public or equipment in the vault.
3. The facilities in vault are subjected to external corrosion.
4. The ventilation in vault is adequate.
5. If gas leaks are found in vaults, the source will be determined and leaks repaired.
6. If ventilating equipment is used, check for proper operation.

**Section 25.3 - Reports and Records**

The form, “Annual Vault Inspection” (see sample below at Section 25, Page 101) or its equivalent in the Company’s GIS, shall be completed by the qualified person to document the inspection of the vaults over two hundred (200) cubic feet in volume.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> VAULT MAINTENANCE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.749	<b>Date Revised:</b> September 10, 2007
<i>Section 25 – Vault Maintenance (continued)</i>	<b>Approved:</b> 



**ANNUAL VAULT INSPECTION**

**Date of Inspection:** \_\_\_\_\_

**Inspected By:** \_\_\_\_\_

**Location of Vault:** \_\_\_\_\_

**Items to be Inspected:**

**1. Is it structurally sound and not bearing upon pipeline facilities?**

\_\_\_\_\_ Yes          \_\_\_\_\_ No

**2. Does cover present a hazard to the public or equipment in the vault?**

\_\_\_\_\_ Yes          \_\_\_\_\_ No

**3. Are pipeline facilities in the vault adequately protected from external corrosion?**

\_\_\_\_\_ Yes          \_\_\_\_\_ No

**4. Is venting and/or ventilating equipment, if required, in proper operating condition?**


\_\_\_\_\_ Yes          \_\_\_\_\_ No

**Recommendations:**

\_\_\_\_\_

\_\_\_\_\_




<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PREVENTION OF ACCIDENTAL IGNITION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.751	<b>Date Revised:</b> September 10, 2007
<b>Section 26 – Prevention of Accidental Ignition</b>	<b>Approved:</b> 

**Section 26.1 - General**

The danger of accidental ignition must be minimized in any structure or area where the presence of gas constitutes a hazard of fire or explosion. Employees shall be aware of the hazard of accidental ignition and take positive steps to reduce the hazard. Fire extinguishers shall be readily available when operations involve escaping gas. TECO Peoples Gas has taken Steps to minimize the danger of accidental ignition of gas in any structure or area where the presence of gas constitutes a hazard of fire or explosion, including the following:

1. Smoking and open flames: Smoking and open flames are prohibited.
  - a. In structures or areas containing gas facilities where possible leakage or presence of gas constitutes a hazard of fire or explosion.
  - b. In the open, when accidental ignition of gas-air mixture might cause personal injury or property damage.
2. Accidental electric arcing: To prevent accidental ignition of electric arcing, the following should be considered:
  - a. Flashlights, portable flood lights, extension cords, and any other electrically powered tools or equipment should be of a type approved for use in hazardous atmospheres.
  - b. Internal combustion engines that power trucks, cars, compressors, pumps, generators, and equipment should not be operated in suspected or known hazardous atmospheres.
  - c. Bonding to provide electrical continuity should be considered around all cuts separating metallic pipes, which may have natural gas present. This bond should be installed prior to cutting and maintained until all reconnections are completed or a gas-free environment exists. Bond cables should be installed in such a manner to assure that they do not become dislodged during construction and that they provide minimal electrical resistance between pipe sections.

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- d. The potential ignition of gas that can be caused by static electric charges induced on the outside surface of plastic piping should be eliminated during cutting operations. Acceptable methods of accomplishing this include covering the pipe surfaces with wet rags or thoroughly spraying the exposed pipe with a compatible electrically conductive liquid or water.
  - e. Static electric charges induced on the inside surfaces of plastic piping by gas flow cannot be eliminated by the methods outlined in item 2.d. above. Appropriate steps, such as flow control from a location a safe distance from the location of the escaping gas, should be taken to minimize the escape of gas and to protect personnel from the potential hazards. A plastic vent or blow-down should not be used due to the possibility of internal static electric charge causing ignition of the escaping gas.
3. Other sources of ignition: Care should be taken in selecting the proper hand tools for use in hazardous atmospheres and in handling tools to reduce the potential for a spark.

**Section 26.2 - Welding, Cutting and Other Hot Work**

- 1. General: Prior to welding, cutting, or other hot-work in or around a structure or area containing gas facilities, a thorough check should be made with a gas detector for the presence of a combustible gas mixture. Welding should begin only when safe conditions are indicated.
- 2. Pipelines Filled with Gas: When a pipeline or main is to be kept full of gas during welding or cutting operations, the following are recommended:
  - a. A slight flow of gas should be kept moving toward the cutting or welding operation.
  - b. The gas pressure at the site of the work should be controlled by suitable means.
  - c. All slots or open ends should be closed with tape, tightly fitted canvas, or other suitable material immediately after a cut is made.
  - d. Two openings should not be uncovered at the same time.

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### 3. Pipelines Containing Air:

- a. Before the work is started, and at intervals as the work progresses, the atmosphere in the vicinity of the zone to be heated should be tested with a combustible gas indicator or by other suitable means.
- b. Unless a suitable means (such as an air blower) is used to prevent a combustible mixture in the work area, welding, cutting, or other operations that could be a source of ignition should not be performed on a pipeline, main, or auxiliary apparatus that contains air and is connected to a source of gas.
- c. When the means noted in 3.b. above are not used, one or more of the following precautions (depending upon circumstances at the job) are suggested:
  - i. The pipe or other equipment upon which the welding or cutting is to be done should be purged with an inert gas.
  - ii. The pipe or other equipment upon which the welding or cutting is to be done should be continuously purged with air in such a manner that a combustible mixture does not form in the facility at the work area.

#### **Section 26.3 - Isolating Pipelines**

1. General: Planned work on gas facilities should incorporate procedures to shut off or minimize the escape of gas. No portion of a pipeline, large service, or main should be cut out under pressure, unless the flow of gas is shut off or minimized by the use of line valves, line plugging equipment, bags, stoppers, or pipe squeezers. Where one hundred percent (100%) shutoff is not feasible, the following precautions are recommended:
  - a. Plan the job to minimize the escape of gas and sequence steps to limit the time and amount of gas to which personnel are exposed.
  - b. The size and position of the cut should allow the gas to vent properly even with an employee in the excavation.

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- c. Protection of personnel working in a gaseous atmosphere under an overhang or in a tunnel or manhole.

2. Isolating Pipeline Segments:


- a. Preliminary Action: TECO Peoples Gas should conduct a pre-work meeting(s) to review the work with the personnel involved.

This includes the method of isolation, the purpose of each phase, drawings, procedures, schematics as applicable, and responsibilities of each individual including the designation of an individual in charge of the operation.

- b. Isolation Precautions: Isolation equipment left unattended should have a positive means of preventing unauthorized operation. A positive means should be provided at the work site to alert and protect personnel from unintentional pressuring. Consideration should be given to the use or installation of items such as relief valves, rupture discs, pressure gauges, pressure recorders, vents, pressure alerting devices, and other pressure detecting devices. Isolation equipment should be inspected and maintained prior to use. Temporary closures capable of withstanding full line pressure should have a means to determine pressure build-up (such as gauges and venting).
- c. Monitoring Isolated Segments: Monitoring procedures should be established based on the pressure, volumes, closures, and other pertinent factors. Personnel assigned to operate isolation equipment should have a means to determine pressure build-ups (such as gauges and vents). Personnel monitoring at remote locations should have communication with the work site and the person in charge of the operation.

**Section 26.4 - Notifications Prior to Purge or Blow-down**

- 1. Public Officials: The appropriate public officials should be notified prior to a purge or blow-down in those situations where the normal flow of traffic through the area might be disturbed or where it is anticipated that there will be calls from the public regarding the purge or blow-down.

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<i>Section 27 – Corrosion Control</i>	<b>Approved:</b> 

### **Section 27.1 - General**

The Division Manager shall continuously sample and evaluate the effectiveness of the corrosion control program. The program must be carried out by or be administered by a person qualified by experience and training in pipeline corrosion control methods.

When a condition of active corrosion is found, positive action must be taken to mitigate and control the effects of the corrosion. Schedules must be established for application of corrosion control. Monitoring effectiveness must be adequate to mitigate and control the effects of the corrosion prior to its becoming a public hazard or endangering public safety.

### **Section 27.2 - External Corrosion Control**

#### **Section 27.2.1 - Protection of Existing Facilities**

All buried or submerged steel pipelines installed before August 1, 1971, must be cathodically protected where active corrosion is found. "Active corrosion" is defined as continuing corrosion, which, unless controlled, could result in a condition that is detrimental to public safety. "Active corrosion" shall be determined by leak history and other records and by examination of exposed pipe surfaces during excavations.

If gas leakage results from active corrosion of a pipeline, the pipeline shall be replaced with non-metallic pipe; or repaired and cathodic protection applied to meet the requirements of Title 49 Code of Federal Regulations, Part 192 Subpart I.

#### **Section 27.2.2 - Protection of New Construction**


Each buried pipeline installed after July 31, 1971 must be protected against external corrosion per Title 49 Code of Federal Regulations, Part 192 Subpart I.

### **Section 27.3 - Criteria for Cathodic Protection and Pipe-to-Soil Potential Measurements**

Unless directed otherwise, copper-copper sulfate reference electrodes are to be used in pipe-to-soil potential measurements. These reference electrodes shall be properly maintained.

Unless directed otherwise, pipe-to-soil potential measurements to determine the level of cathodic protection are to be made with respect to close earth, that is, a reference electrode located as near as possible to the earth directly over the structure in question. The placement of a reference electrode in the immediate vicinity of a galvanic anode shall not be acceptable for any electrical measurements used to determine the adequacy of cathodic protection.



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## **Section 27.4 - Monitoring of Cathodic Protection**

### **Section 27.4.1 - Protected Lines**

Each pipeline that is under cathodic protection must be tested at least once each calendar year, but with intervals not exceeding fifteen (15) months. The test shall include determination whether the level of cathodic protection meets the requirements Title 49 Code of Federal Regulations, Part 192 Subpart I.


Separately protected gas service lines and short sections of mains (i.e. mains not over one hundred (100) feet in length), shall be surveyed on a sampling basis. At least ten (10%) percent of these separately protected lines and short sections of gas mains, distributed over the entire system, should be surveyed each calendar year, with a different ten (10%) percent checked each calendar year, so that all of the separately protected service lines and short sections of mains are surveyed in each ten (10) year period.

The form PgS 313, “Cathodic Protection Data” (see sample below at Section 27, Page 116), or alternatively, form PgS 645, “Cathodic Protection Data” (see sample below at Section 27, Page 115) must be completed by a qualified person for each test lead point existing in the system (either form may be utilized at the discretion of the Division Manager).

### **Section 27.4.2 - Rectifiers**

Each impressed current power source (i.e. rectifier systems) shall be inspected six (6) times annually at intervals not exceeding two and one-half (2 1/2) months to ensure that the rectifier is operating properly.

The form PgS 515, “Rectifier System Report” (see sample below at Section 27, Page 118), must be completed by a qualified person to document the condition of rectifier units.

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### **Section 27.4.3 - Interference Bonds**

Each major interference bond, the failure of which would jeopardize the cathodic protection applied to the pipeline, must be electrically checked for proper performance six (6) times annually, at intervals not exceeding two and one half (2 1/2) months.

Each minor interference bond must be checked at least once each calendar year, with intervals not exceeding fifteen (15) months.


The form PgS 668, “Cathodic Protection Interference Test Report” (see sample below at Section 27, Page 114), must be completed by a qualified person to document readings at interference bonds with other companies.

### **Section 27.5 - Unprotected Lines - Three (3) Year Re-evaluation**

All steel gas pipelines that are not cathodically protected shall be reevaluated every three (3) years at intervals not exceeding thirty-nine (39) months. Reevaluations on unprotected pipe shall consist of pipe to soil potential measurements taken at spacing intervals of one hundred (100) feet (or less) along the pipeline. At each station, the pipe to soil potential shall be measured directly over the pipeline, the close reading. In areas where peaks in the potential measurements, that is, potential measurements one hundred millivolts (.100v) more negative than normal, further investigation is required.

Additional pipe-to-soil measurements shall be taken forward and to the rear of the peak at spacing intervals of twenty feet (20’). The number of additional stations shall be dependent on the amount of pipe with high negative potentials. Also, at each of the spacing intervals of twenty feet (20’), a side drain potential, remote, shall be made at a point approximately ten (10) feet perpendicular to the pipeline.

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The close profile shall be compared to the remote profile. Close potential measurements more negative than remote potential measurements indicate anodic areas, that is, “hot spots”, requiring further inspection to determine the need for applying cathodic protection. Close potential measurements less negative than remote measurements indicate cathodic areas requiring no further action. If gas leakage results from active corrosion of a pipeline, remedial action shall include application of cathodic protection. Cathodic protection installed for remedial action shall be tested at least once every calendar year, but with intervals not exceeding fifteen (15) months, unless the pipeline is replaced with non-metallic pipe.

The form PgS 294, “Pipeline Electrical Survey Data (see sample below at Section 27, Page 117), must be completed by a qualified person to document electrical survey results.

#### **Section 27.6 - Electrical Isolation**


Each buried or submerged gas pipeline must be electrically isolated from other underground metallic structures unless the entire network is to be cathodically protected as one unit.

Each gas pipeline should be protected against lightning or fault currents in areas of known unusual risk. Some of these areas include electrical transmission tower footings, lightning rod grounding systems, ground cables or counter poise. Zinc grounding cells shall be used, when required, as a protective measure. An insulating device may not be installed in an area where a combustible atmosphere is anticipated unless lead wires are attached to either side of the insulating device and extended to a safe location outside the area in question, or other precautions are taken to prevent arcing.

The location of underground insulating devices installed on gas mains shall be posted to TECO Peoples Gas’ maps and records.

#### **Section 27.7 - Test Point Stations**

A sufficient number of test point stations, or other contact points for electrical measurement to determine the level of cathodic protection, shall be provided for each protected system. Probe bars should not be used. Steel gas service lines, and test leads are acceptable test point stations, however, steel service lines should be used only with caution as a means for contacting the gas main under test to insure good electrical continuity.

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**Section 27.8 - Interference Currents**

Each cathodic protection system must be designed and installed so as to minimize any adverse effects on existing adjacent underground metallic facilities. Where it is known, or suspected, that stray currents are affecting TECO Peoples Gas’ gas lines or foreign structures, tests must be made to determine the extent of the interference. Remedial measures must be taken to eliminate the detrimental effects of these interference currents. Interference testing shall be coordinated with the operators of affected structures.

**Section 27.9 - Examination of Exposed Pipe**

All exposed portions of buried gas pipelines shall be examined for evidence of external corrosion. The section of gas pipeline exposed should be examined to determine the condition of the coating and for evidence of active corrosion if a bare portion of the pipeline is exposed. Note: Generally, pitting, blistering, or graphitization of the pipeline surface shall be considered evidence of active corrosion. If active corrosion exists, steps must be taken for implementation of one of the remedial measures outlined below.

The form, “Pipe Inspection Report” (see sample below at Section 27, Page 119), must be completed by a qualified person to document the condition of pipe, which is exposed during excavation.


**Section 27.10 - Pipeline Coating**

Steel pipeline purchased by TECO Peoples Gas and proposed for use underground shall be factory coated with an approved coating specified in TECO Peoples Gas’ Standard Materials List. Field joint wraps shall be made by persons qualified by experience and training and shall be made in accordance with the manufacturer's specifications.

All metallic joints must be externally coated with a material suitable for corrosion control prior to burial. Coating of irregular fittings such as valves, as well as propane tanks to be buried, shall be made with TECO Peoples Gas approved mastic. Steel gas pipeline joints shall be coated with approved materials. Field-applied coatings shall overlap the factory coating on both sides of the joint by at least two inches.

Coating shall be inspected prior to lowering into the ditch. Any damage must be repaired.

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The amount of cathodic protection must be controlled so as not to damage the protective coating or the pipe.

Note: Voltage sufficient to cause damage to the coating or the pipe can be reached with an impressed current-type cathodic protection system (i.e. a rectifier-type cathodic protection system).

#### **Section 27.11 - Internal Corrosion Control**

Pipe removed from operating service for any reason shall be examined for evidence of internal corrosion. If evidence of internal corrosion is found, any adjacent pipe should be inspected to determine the extent of the internal corrosion.

#### **Section 27.12 - Atmospheric Corrosion Control**

##### **Section 27.12.1 - General**


Above-ground facilities through which gas moves, including pipe, valves, and other appurtenances attached to the pipe, and all gas metering stations, gas pressure regulator stations, and other fabricated assemblies shall be inspected for evidence of active corrosion at intervals not exceeding three (3) years and remedial action shall be taken, where necessary. Note: Minor oxidation, which occurs upon most metal surfaces exposed to the atmosphere, is not considered to be the type of atmospheric corrosion requiring remedial action.

##### **Section 27.12.2 - Coating Requirements**

All portions of gas pipeline that are exposed to the atmosphere must be coated with a material suitable to protect the pipeline from atmospheric corrosion:

1. On New Construction: On exposed portions of the pipeline, for example, at rivers, canals, intercostals waterways and at ditch crossings, the normal coating as specified for underground pipelines is sufficient to protect against atmospheric corrosion. Gas metering facilities, gas pressure regulators, propane gas tanks and other associated aboveground piping must be coated with an approved paint that is suitable to prevent atmospheric corrosion.
2. On Existing Facilities: All exposed portions of existing metallic gas pipelines and all aboveground piping facilities shall be coated and painted with approved coating materials.



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**Section 27.13 - Replacement Piping**

Whenever a section of buried or submerged pipeline is replaced because of corrosion and the replacement is with metallic pipe, the new pipe must be cathodically protected. A determination should be made on the feasibility of localized cathodic protection or cathodically protecting the repaired segment and adjacent segments as a single unit.

**Section 27.14 - Repairs Not Requiring Replacement**

Whenever a corrosion leak is repaired on a segment of a gas pipeline, that segment of pipeline shall be considered a "hot spot". The location shall be evaluated to determine if necessary to attach an anode to the pipeline at this location to mitigate corrosion.

**Section 27.15 - Converted Facilities (Propane Gas to Natural Gas)**

For converted systems the required level of cathodic protection must be applied within one (1) year following the conversion.

**Section 27.16 - Records Keeping**


**Section 27.16.1 - Construction and Replacement Records**

Records of construction and replacement of gas pipelines shall be maintained sufficient to show the nature of the work undertaken; the actual location of the work undertaken, the date of installation and the date cathodic protection was applied.

Records shall be kept sufficient to prove that the materials and components used, or intended for use in the gas pipeline, meet the applicable specifications.

**Section 27.16.2 - Maps**

Maps or records showing the location of cathodically protected pipelines, cathodic protection facilities, galvanic anodes and neighboring structures bonded to the cathodic protection system shall be maintained for the life of the facility (LOF).

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### **Section 27.16.3 - Retention of Records**

Following forms are to be utilized for Corrosion Control data:

1. The form PgS 668, “Cathodic Protection Interference Test Report” (see sample below at Section 27, Page 114), documenting readings at interference bonds with other companies, must be retained for the life of the facilities.
2. The form PgS 313, “Cathodic Protection Data” (see sample below at Section 27, Page 116), or alternatively, form PgS 645, “Cathodic Protection Data” (see sample below at Section 27, Page 115) documenting each test lead point existing in the system, must be retained for the life of the facilities.
3. The form PgS 294, “Pipeline Electrical Survey Data (see sample below at Section 27, Page 117), documenting electrical survey results, must be retained for five (5) years.
4. The form PgS 515, “Rectifier System Report” (see sample below at Section 27, Page 118), documenting the condition of rectifier units, must be retained for five (5) years.
5. The form, “Pipe Inspection Report” (see sample below at Section 27, Page 119), documenting the condition of pipe which is exposed during excavation, shall be retained for five (5) years.

The above records of each test, survey or inspection shall be maintained in sufficient detail to demonstrate the adequacy of the corrosion control measures. Records required by Sections 27.4.1, 27.4.3 and 27.11 shall be retained for the life of the facility.



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<b>CATHODIC PROTECTION DATA</b>	Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	C.P. No.
	Month Last Tested															"C" Job No.
	Map Pages															
STRUCTURE PROTECTED										CTS	TEST POINT LOCATIONS					
Location _____										A						
Length _____ Size _____										B						
Yr. Inst. _____ Coating _____										C						
Avg. Soil Res. _____ OHM CM										D						
Remarks _____										E						
Anode No.(s) _____										F						
INS COUPLING OR ANODE LOCATION			PSV	MA	BY	PSV	MA	BY	PSV	MA	BY	PSV	MA	BY		
FGS 645 Rev 1/95																
<b>CATHODIC PROTECTION AREA</b>																
DATE OF TEST	PIPE TO SOIL POTENTIALS						Test By	REMARKS								
	A	B	C	D	E	F										









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### PIPE INSPECTION REPORT

Location: \_\_\_\_\_

Date Installed: \_\_\_\_\_

Condition of Pipe:     Good         Slightly Pitted         Badly Pitted         Hole

Corrosion:     Localized     General    Max. Pit Depth    \_\_\_\_\_

Coating:     Coal Tar     Epoxy     Bare    Other    \_\_\_\_\_


Soil Type:     Clay         Sandy         Rocky        Other    \_\_\_\_\_

Moisture:     Normal         Wet or Swampy

Reason For  
Uncovering: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> BY-PASS OPERATION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192	<b>Date Revised:</b> September 10, 2007
<i>Section 28 – By-Pass Operation</i>	<b>Approved:</b> 

### **Section 28.1 - General**

The by-passing of a regulator station must be planned, and the plan followed.

### **Section 28.2 - By-Pass Operation**

By-passing pressure regulators is a complex procedure that requires comprehensive planning and careful execution. Overpressure of the supplied system or service interruptions are possible results of an improperly operated by-pass. A plan should be developed and all the involved employees prior to starting the bypass procedure should review the plan.


The planning should:

1. Identify the maximum and minimum pressures allowed on the downstream or supplied system.
2. Review the station drawings for correctness.
3. Identify the valves to be operated and determine the sequence of valve operation.
4. Identify the gauge taps to be used. Be sure that the gauge taps are on the supplied system and not the piping segment that will be isolated.
5. Identify the overpressure protection available on the supplied system during the by-pass procedure.

The job procedure should:

1. Review the by-pass plan.
2. Designate the by-pass operator.


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<i>Section 28 – By-Pass Operation (continued)</i>	<b>Approved:</b> 

3. Install the pressure gauges that the by-pass operator will use to monitor the system pressure. These gauges must be in good condition and calibrated. These gauges should be visible to the by-pass operator throughout the by-pass procedure. One of the gauges on the supplied system should have sufficient range to measure pressures up to the normal regulator station inlet pressure.
4. Locate and operate the valves that will be used in the by-pass procedure.
5. Place the by-pass in operation. Allow the system to stabilize prior to working on the regulator. The bypass operator shall remain at the by-pass valve throughout the procedure and continuously monitor the system pressure. The system pressure must be maintained between the established maximum and minimum limits.
6. If at any time during the by-pass operation the by-pass operator cannot maintain the pressure within the prescribed limits, the operator shall:
  - a. Place the regulator back in operation and return the system to normal operation. If it is not possible to return the system to normal operation, turn off the supply of gas to the system and notify the appropriate supervisors of the emergency.
  - b. It will then be necessary to follow the steps outlined in the emergency plan for restoring gas service.

After completing the work, return the station to normal operation. Place the regulator back in service, and close the by-pass valve. Carefully observe the station operation to assure that all equipment is properly operating and the equipment set points are correct. If a temporary by-pass was used, remove the piping. Lock the by-pass valve on the customer set, where applicable.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PLASTIC JOINING QUALIFICATIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.281, 192.283, 192.285 and 192.287; Florida Administrative Code 25-12.021	<b>Date Revised:</b> July 31, 2011
<i>Section 29 – Plastic Joining Qualifications</i>	<b>Approved:</b> 

### **Section 29.1 - General**

Personnel joining plastic pipe shall be trained in the approved joining procedures and shall complete the prescribed tests. Records of the training and qualification tests shall be maintained.

### **Section 29.2 - Joining of Plastic Pipe by Heat Fusion**


A copy of each written procedure being used for joining plastic pipe must be available to the person making joints and to the person inspecting joints at the site where joining is accomplished. Plastic pipe that is joined by heat fusion must not be disturbed until it has properly set. The joining must be protected from weather conditions that would impair the quality of the joint.

Personnel qualified for the work by experience or training must make all heat fusion joints. Before any plastic joiner is permitted to make any production joints in plastic pipe, such joiner is required to demonstrate qualification by successfully completing the appropriate test as prescribed by the manufacturer of the pipe.

All personal qualifications and requalification tests, whether successful or not, shall be recorded on test report forms. The Division Manager shall retain one copy of this report. Copies of any previously given test may also be obtained from the Division Manager. Any person who successfully passes the qualification test shall be given the qualification papers appropriate to the method under which they qualified.

After initial qualification, an individual may make production joints using any procedure, for which the individual is qualified for a period of one (1) year, unless the individual is found to be unable to make satisfactory production joints.

Each person who joins plastic pipe shall be qualified by training and experience in each procedure the individual uses to join plastic pipe. Each person shall demonstrate the ability to join plastic by making and having tested a specimen joint of each procedure the individual uses to join plastic pipe. A person must make at least one joint in a procedure each twelve (12) months to remain qualified in that procedure. A person who has had more than three percent (3%) of the joints made found unacceptable by test must be retrained and retested before making additional plastic pipe joints. The procedures used to join plastic pipe are mechanical coupling, heat socket fusion, heat butt fusion, heat saddle fusion, and electrofusion.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PLASTIC JOINING QUALIFICATIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.281, 192.283, 192.285 and 192.287; Florida Administrative Code 25-12.021	<b>Date Revised:</b> July 31, 2011
<i>Section 29 – Plastic Joining Qualifications (continued)</i>	<b>Approved:</b> 

**Section 29.3 - Testing**

Plastic pipe joints submitted for test shall be made in the presence of a qualified person who is qualified by experience or training in inspecting plastic pipe joints, and the test results shall be documented on form PgS 506, “Plastic Pipe Joining Record” (see sample below at Section 29, Page 124). The completed joints and longitudinal straps shall be compared with a satisfactory joint or pictures of a satisfactory joint. Joints having defects or inconsistencies shall be rejected and additional joints submitted for test.


**Section 29.4 - Contractor Qualification**

Contractor's employees who join plastic pipe must pass the same qualification tests as TECO Peoples Gas employees on an annual basis.

**Section 29.5 - Qualification Records**

The Division Manager will maintain the permanent records of TECO Peoples Gas employees who are qualified to join plastic pipe.

1. The form PgS 506, “Plastic Pipe Joining Record” (see sample below at Section 29, Page 124), shall be completed by the Division Manager or qualified person for each employee who passed the required qualification tests.


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PLASTIC JOINING QUALIFICATIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.281, 192.283, 192.285 and 192.287; Florida Administrative Code 25-12.021	<b>Date Revised:</b> July 31, 2011
<b>Section 29 – Plastic Joining Qualifications (continued)</b>	<b>Approved:</b> 

PgS 506

**TECO**  
PEOPLES GAS

**PLASTIC PIPE JOINING RECORD**

Part A : Fusion				
Type	Pipe	Name: _____	Division _____	
Training	Type			
SOCKET	Aldyl A _____	1) Joining procedures followed correctly	Yes _____ No _____	
	TR4-18 _____	2) Visual Exam on Joint indicates.....	Good _____ Bad _____	
	X-Fuse _____	3) Bend Test Joints shows.....	Good _____ Bad _____	
	Remarks:			
Date: _____		Instructor Inits. _____		
BUTT	Aldyl A _____	1) Joining procedures followed correctly	Yes _____ No _____	
	TR4-18 _____	2) Visual Exam on Joint indicates.....	Good _____ Bad _____	
	X-Fuse _____	3) Bend Test Joints shows.....	Good _____ Bad _____	
	Remarks:			
Date: _____		Instructor Inits. _____		
SADDLE	Aldyl A _____	1) Joining procedures followed correctly	Yes _____ No _____	
	TR4-18 _____	2) Visual Exam on Joint indicates.....	Good _____ Bad _____	
	X-Fuse _____	3) Bend Test Joints shows.....	Good _____ Bad _____	
	Remarks:			
Date: _____		Instructor Inits. _____		
Part B: Mechanical Connectors				
The above trainee has successfully demonstrated that he can assemble plastic pipe using the following approved fittings.				
Date of Training	MANUFACTURERS DESCRIPTION	Passed		Instructor
		Yes	No	
	Dresser Style 738 (711)			
	Normac 1.25" Coupling			
	Dresser Style 90 Posilock			
	Normac Lock Stiffner			
	Perfection Permasert			
	Dresser Style 700 Posihold 3" - 6"			
	Dresser Style 700 Posihold 1.25" & 2"			
	Continental Style 5			
	Continental 5/8" * 2" #1201-17-1004			
	Continental 5/8" * 2" #5361-17-1004			
	Continental 1/2" CTS #2957-52-1004			
	Other:			
Part C: Record of Joining Failures				
Date	Type of Joint	Reason for Failure:		

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> STEEL WELDING QUALIFICATIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192 Subpart E; Florida Administrative Code 25-12.027	<b>Date Revised:</b> July 31, 2011
<i>Section 30 – Steel Welding Qualifications</i>	<b>Approved:</b> 

### **Section 30.1 - General**

Qualified-welding procedures shall be used for welding on natural gas facilities. Personnel welding on steel pipe shall be trained in the qualified procedures and shall complete the prescribed tests. Records of the training and qualification tests shall be maintained.

The two welding processes used in normal gas work are oxygen-acetylene, and shielded metal arc. The processes are further divided into welding procedures based on outside diameter, wall thickness, specification and grade of pipe, type or filler material, variables in the welding equipment, position of the pipe and position of the weld.


### **Section 30.2 - Joining of Steel Pipe by Welding**

Welding is the preferred method of joining steel pipe and/or fittings. All welding must be performed in accordance with established, written procedures approved by the Division Manager. No change shall be made in the welding procedures or welding specifications without approval from the Division Manager. Welders who are qualified in accordance with written procedures must perform all welding. Each welding procedure (rod type, machine setting and other factors influencing the weld) used in the installation of gas facilities must be qualified to produce welds meeting the requirements of these procedures. The quality of the test weld used to qualify the procedure must be determined by destructive testing. Each welding procedure must be recorded in detail including the results of the qualifying weld tests. The record must be retained and followed whenever the procedure is used.

Once qualified, a procedure must not be changed without qualification of the new procedure. A change may be made from one pre-qualified procedure to another at any time. All welders must be qualified before they can be permitted to weld on any of the TECO Peoples Gas facilities. Each welder must be qualified in accordance with Appendix C of TECO Peoples Gas' Construction Standards.

All welder qualification tests and re-qualification tests, whether successful or not, shall be recorded on the weld test report form. The Division Manager shall retain one copy of this report. Any welder who successfully passes the qualification test shall be given the qualification papers appropriate to the method under which he qualified. No welder whose qualification is based on nondestructive testing may weld compressor station pipe and components.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> STEEL WELDING QUALIFICATIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192 Subpart E; Florida Administrative Code 25-12.027	<b>Date Revised:</b> July 31, 2011
<i>Section 30 – Steel Welding Qualifications (continued)</i>	<b>Approved:</b> 

A qualified welder may weld on TECO Peoples Gas facilities using any welding procedure for which he has qualified, unless he is found to be unable to make satisfactory production welds. After the initial qualification in a welding process, the individual must engage in that welding process and have one (1) production weld tested and found acceptable within the preceding six (6) months and two (2) production welds each year. All tests must be in accordance with the qualifying test or the welder must re-qualify.

Special attention should be given to unequal internal diameters. If the internal offset is less than three thirty-seconds (3/32”) inch, special treatment is not necessary. If it is more than three thirty-seconds (3/32”) inch then a transition piece of intermediate wall thickness should be welded between the unequal diameters or pipe end preparation performed in accordance with Appendix C of TECO Peoples Gas’ Construction Standards.


The welding operation must be protected from weather conditions that would impair the quality of the completed weld. Before beginning any welding, the welding surfaces must be clean and free of any material that may be detrimental to the weld. When position welds are to be made, a sufficient area around the weld shall be cleared to permit the welder complete access. The ends to be joined must be aligned to provide the most favorable condition for the deposit of the root bead. The alignment must be preserved while the root bead is being deposited.

The Division Manager or designate shall review and sign all employees’ form PgS 424, “Welder Qualification Test Inspectors Record” (see sample below at Section 30, Page 128 and 129), of acceptable test welds. The qualified person shall verify that a welder has engaged in that welding process and has had one production weld tested and found acceptable within the preceding six (6) months and two (2) production welds each year by completing the above referenced form. If a welder has not engaged in a given welding process and had production welds tested and found acceptable within the previous calendar six months, or if there is reason to question his welding ability, he shall re-qualify by making the acceptable series of test welds for the process(es).

**Section 30.3 - Contractor’s Welders**


Contractor’s welders shall pass the same qualified tests as TECO Peoples Gas employees. If additional welding procedures are developed for an individual project, the contractor's welders shall qualify using these procedures. The Division Manager is responsible for keeping the necessary records documenting the qualification and maintenance of qualification records for contractor’s welders.




<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> STEEL WELDING QUALIFICATIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192 Subpart E; Florida Administrative Code 25-12.027	<b>Date Revised:</b> July 31, 2011
<i>Section 30 – Steel Welding Qualifications (continued)</i>	<b>Approved:</b> 

**Section 30.4 - Reports and Records**

The form PgS 424, “Welder Qualification Test Inspectors Record” (see sample below at Section 30, Page 128 and 129) must be completed by the Division Manager (or designee) to document the qualification and maintenance of qualification of each welder.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> STEEL WELDING QUALIFICATIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192 Subpart E; Florida Administrative Code 25-12.027	<b>Date Revised:</b> July 31, 2011
<b>Section 30 – Steel Welding Qualifications (continued)</b>	<b>Approved:</b> 

		Gas Operations Welding Standards	
		<b>Forms</b>	
Effective 05/01/10 Supersedes 07/30/01			Section 8 Page 1 of 2

**8.1 FORM 424**

**WELDER QUALIFICATION TEST RECORD**  
(page 1 of 2)

Welder's Name: \_\_\_\_\_ Operations Center: \_\_\_\_\_ Test Date: \_\_\_\_\_

Welding Process:     Electric Arc     Oxy-Acetylene

Wall Thickness:     Less than .1875"     .188" to .750"     Over .750"

Test Type:     Initial Test     Production Weld     Recertification

Test Procedure:     WT-1     WT-2     WT-3  
                            WT-4     WT-5     WT-6

WeldType:  
 Butt     Fillet Service Fitting/Nipple     Fillet

Base Material Specification: \_\_\_\_\_


Filler Material Specification: \_\_\_\_\_


I have witnessed the above welder preparing and joining this test weld in accordance with Gas Operation's specifications.


Signed: \_\_\_\_\_

The above welder has (check one)  passed,  failed the above qualification procedure and is permitted to weld on Gas Operations facilities as per Company specifications and standards.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_  
                           Division Manager

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> STEEL WELDING QUALIFICATIONS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192 Subpart E; Florida Administrative Code 25-12.027	<b>Date Revised:</b> July 31, 2011
<i>Section 30 – Steel Welding Qualifications (continued)</i>	<b>Approved:</b> 

		Gas Operations Welding Standards	
Effective <b>05/01/10</b>	<b>Forms</b>		Section 8
Supersedes <b>07/30/01</b>			Page 2 of 2
<b>8.1</b>		<b>FORM 424</b>	
<b>WELDER QUALIFICATION TEST RECORD</b> (page 2 of 2)			
<b>Guided Bend</b>	Type Specimen	Specimen Number	Location, nature and size of any crack or defect.
	Root Bend		
	Face Bend		
<b>Tensile Strength</b>	Specimen Number		
	Width		
	Thickness		
	Maximum Load - Lbs.		
	Original Area - Sq In		
	Actual Tensile Strength - PSIA		
	Specified Minimum Tensile Strength		
	Fracture Location		
<b>Knick-Break</b>	Specimen Number	TEST RESULTS	
<b>Knock-Off</b>			
<p>I have tested the referenced weld sample within the applicable provisions of TECO Gas Operations specifications and API 1104, and certify the above test results.</p> <p>Signed: _____ Date: _____</p> <p>Representing: _____</p>			

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INSPECTION OF COMBUSTIBLE GAS INDICATORS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> None	<b>Date Revised:</b> November 1, 2011
<i>Section 31 – Inspection of Combustible Gas Indicators</i>	<b>Approved:</b> 

### **Section 31.1 - General**

All combustible gas indicators (CGI) shall be inspected at the specified intervals, and at any other time there is reason to believe that a CGI is not operating properly, the CGI shall not be used until it has been inspected, calibrated, and repaired if necessary.

### **Section 31.2 - Daily Inspection**

Prior to the first use of the CGI each day, the following inspections shall be made:


#### **For a manual pump instrument:**

1. Visually inspect the CGI with emphasis on the aspirator bulb, sample line, and probe. Look for cracks or leaks that would dilute the sample.
2. Adjust voltage to proper level. If the voltage cannot be adjusted to proper level, replace the batteries.
3. Zero the LEL and percent gas ranges.
4. Verify instrument detects natural gas in the LEL and percent range before use.

#### **For an electronic type instrument:**

1. Push the POWER button to initiate operation. Watch display screen for any information unit displays such as CAL DUE, if unit is not within calibration dates recalibrate before use.
2. If the display fails to illuminate or “BAT LOW” is shown on the display, replace the batteries.
3. Prior to use, test the integrity of the sensor cap and tubing. Use your finger to block the inlet of the sensor cap for 4-5 seconds. The display will read “FLOW BLOCKED” if all seals are intact. If this does not occur change the sensor cap and “O” rings. During pump flow block, a beep will occur every 2 seconds until the pump restarts and adequate flow is present.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INSPECTION OF COMBUSTIBLE GAS INDICATORS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> None	<b>Date Revised:</b> November 1, 2011
<i>Section 31 – Inspection of Combustible Gas Indicators (continued)</i>	<b>Approved:</b> 

4. The display will indicate LEL readings (when so equipped) by displaying an “L” next to the percent symbol. All LEL readings have a resolution of 0.1% LEL.
5. Verify instrument detects natural gas in the LEL and percent range before use.
6. When used for leak survey, verify instrument detects natural gas at the 50 ppm range

### **Section 31.3 - Monthly Inspections**

The outlined inspection of each CGI shall be made and recorded each month. The employee to whom the CGI is assigned shall make the inspection.

#### **For a manual pump instrument:**


1. Visually inspect the CGI with emphasis on the aspirator bulb, sample line, and probe. Look for cracks and leaks that would dilute the sample. Check batteries for signs of leakage and swelling. Check the accessories required for proper operation. Inspect filters and replace if dirty.
2. Adjust voltage to proper level. If the voltage cannot be adjusted to proper level, replace batteries.
3. Zero the LEL and percent gas ranges.
4. Calibrate the CGI on both the LEL scale and the percent gas scale.
5. Record the inspection on the form, “Inspection Record Combustible Gas Indicator” (see sample below at Section 31, Page 134), and verify with signature.

#### **For an electronic type instrument:**

1. Push the POWER button to initiate operation. Watch display screen for any information unit displays such as CAL DUE, if unit is not within calibration dates recalibrate before use.

*(continued on next page)*



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INSPECTION OF COMBUSTIBLE GAS INDICATORS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> None	<b>Date Revised:</b> November 1, 2011
<i>Section 31 – Inspection of Combustible Gas Indicators (continued)</i>	<b>Approved:</b> 

2. If the display fails to illuminate or “BAT LOW” is shown on the display, replace the batteries.
3. Prior to use, test the integrity of the sensor cap and tubing. Use your finger to block the inlet of the sensor cap for 4-5 seconds. The display will read “FLOW BLOCKED” if all seals are intact. If this does not occur change the sensor cap and “O” rings. During pump flow block, a beep will occur every 2 seconds until the pump restarts and adequate flow is present.
4. The display will indicate LEL readings (when so equipped) by displaying an “L” next to the percent symbol. All LEL readings have a resolution of 0.1% LEL.
5. Verify instrument detects natural gas in the LEL and percent range before use.
6. When used for leak survey, verify instrument detects natural gas at the 50 ppm range.


The inspection record shall be for a calendar year and retained for one additional year.

#### **Section 31.4 - Leak Test**

This leak test will indicate a leak in the hoses and internal piping in the combustible gas indicator (CGI). Cover the inlet with finger or thumb and flatten bulb with two (2) or three (3) squeezes. Keeping the inlet covered, cover the bulb outlet check valve with thumb and release bulb. The bulb should not fully inflate for thirty (30) seconds.

#### **Section 31.5 - Calibration Tests**

CGI's shall be calibrated on the LEL and 100% scale with a calibration kit. The percent methane-in-air mixture is shown on the label of the individual gas sample tanks. Set the instrument on the LEL scale and draw a sample into the instrument from the LEL sample tank. The reading should be between the high and low limits as recommended by the manufacturer. Set the instrument on the percent gas scale and draw a sample into the instrument from the 100% sample tank. The instrument should register 100%.


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INSPECTION OF COMBUSTIBLE GAS INDICATORS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> None	<b>Date Revised:</b> November 1, 2011
<i>Section 31 – Inspection of Combustible Gas Indicators (continued)</i>	<b>Approved:</b> 

**Section 31.6 - Repairs**

Local personnel shall replace batteries, accessories, and filters on a need basis, and may replace filaments and ballast lamps. Instruments requiring more extensive repairs shall be forwarded to the manufacturer or a qualified service contractor.

**Section 31.7 - Reports and Records**

The form, “Inspection Record Combustible Gas Indicator” (see sample below at Section 31, Page 134) must be completed by the Division Manager to document the inspection and repair of combustible gas indicators.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INSPECTION OF COMBUSTIBLE GAS INDICATORS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> None	<b>Date Revised:</b> November 1, 2011
<i>Section 31 – Inspection of Combustible Gas Indicators (continued)</i>	<b>Approved:</b> 




**INSPECTION RECORD  
COMBUSTIBLE GAS INDICATOR**

Location: \_\_\_\_\_ Assigned To: \_\_\_\_\_

Make: \_\_\_\_\_ Model: \_\_\_\_\_ Serial No.: \_\_\_\_\_

Month 200_	Date	Visual Inspection				Battery	Zero		Calibration		Inspected By
		Instru- ment	Hose	Battery	Leak Test	Voltage	LEL	% Gas	LEL	% Gas	
Jan.											
Feb.											
March											
April											
May											
June											
July											
Aug.											
Sept.											
Oct.											
Nov.											
Dec.											
2000											
Jan.											
Feb.											
March											
April											
May											
June											
July											
Aug.											
Sept.											
Oct.											
Nov.											
Dec.											
Remarks (use back if necessary)											

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> EMERGENCY RESPONSE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605; Florida Administrative Code 25-7.018, 25-12.041, 25-12.084	<b>Date Revised:</b> September 10, 2007
<i>Section 32 – Emergency Response</i>	<b>Approved:</b> 

**Section 32.1 - General Requirements for System-Wide Emergency Plans**

Emergency plans shall be kept in the form of an Emergency Procedure Manual. These plans shall include emergency plans for each of the following general items:


1. Fires and explosions.
2. System failures.
3. Load curtailments/interruption of gas supply.
4. Natural disasters (i.e. hurricanes, tornadoes and flooding).
5. Civil disturbances.
6. National emergencies.
7. Reporting to the US Department of Transportation (USDOT), PHMSA - the Pipeline and Hazardous Materials Safety Administration, Washington, DC.
8. Reporting to the Florida Public Service Commission.

**Section 32.2 - General Requirements of Each Division's Emergency Plans**

Each Operating Center/Region Emergency Procedure Manual should include the following information:

1. An emergency organization chart and chain of command to report and to supervise emergency situations.
2. A list of company personnel (including addresses and telephone numbers) who will be contacted as the emergency might dictate.
3. After-hours emergency response.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> EMERGENCY RESPONSE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.605; Florida Administrative Code 25-7.018, 25-.041, 25-12.084	<b>Date Revised:</b> September 10, 2007
<i>Section 32 – Emergency Response (continued)</i>	<b>Approved:</b> 


4. A list of public officials (including title, address and telephone number) who may be contacted during the various types of emergency situations.
5. A list of sources of supplies (i.e., hardware stores, lumber yards) that might be used in case of an emergency situation.
6. A list of emergency supplies and equipment to be kept in the Division.
7. A list of contractors.
8. A list of other utility companies in the area.
9. A list of local radio and television stations and newspapers, with the list including main news telephone numbers and after-hours emergency new telephone numbers.
10. A list of restaurants and catering services.
11. A list of lodging accommodations and emergency shelters.
12. A list of hospitals, rest homes and other key locations that would be given preferential service.
13. A list of interruptible rate customers and other large volume customers.
14. System map(s) showing isolation sections and emergency valve locations required to implement the isolation of each selected section.

This information shall be reviewed annually by the location and revised as necessary.

TECO Peoples Gas personnel shall be acquainted with that portion of the emergency plan that applies to their duties and responsibilities and shall be informed of changes and additions to the emergency plan as they occur.

A liaison in each Region shall be maintained with appropriate local public officials with respect to the emergency plan.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> MAPS & RECORDS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Florida Administrative Code 25-12.060 and 25-12.061	<b>Date Revised:</b> September 10, 2007
<i>Section 33 – Maps &amp; Records</i>	<b>Approved:</b> 

### **Section 33.1 System Maps**

System maps of each Local Operating Center's distribution area shall be maintained on file in each facility. Such maps and/or related records shall readily identify the location and size of the system's facilities and include other information pertinent to the safe design, operation, and maintenance of the system.

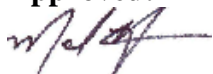
### **Section 33.2 Records**

All tabulations, standards, drawings, and other records or documentation of incidents, procedures or studies related to or arising from compliance with this manual shall be retained by the Local Operating Center/Region and shall be available for review by the Regulatory personnel.

### **Section 33.3 Retention of Records and Responsibility**

1. Records pertaining to the system design and/or records necessary for the future evaluation of the system's safety shall be retained for the life of the facility (L.O.F.) involved.
2. Records not included in item 1 above, which are periodically superseded, by updated or revised records shall be retained for the two (2) most recent inspections or surveys.
3. Records not included in items 1 or 2 above shall be retained for as long as they are in current use or until superseded by updated or revised documents.

It shall be the responsibility of the Division Manager or his designated representative to ensure compliance with the provisions of this manual.


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CRITERIA FOR CORROSION REPAIRS ON DISTRIBUTION PIPELINES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.487 and 192.489	<b>Date Revised:</b> September 10, 2007
<i>Section 34 – Criteria for Corrosion Repairs on Distribution Pipelines</i>	<b>Approved:</b> 

### **Section 34.1 – Criteria for Repairs on Cast Iron Pipelines**

1. **General Graphitization:** Each segment of cast iron or ductile iron pipe on which general graphitization is found to a degree where a fracture or any leakage might result must be replaced.
2. **Localized Graphitization:** Each segment of cast iron or ductile iron pipe on which localized graphitization is found to a degree where any leakage might result, must be replaced or repaired, or sealed by internal sealing methods adequate to prevent or arrest any leakage.

### **Section 34.2 – Criteria for Repairs on Lines Other Than Cast Iron. or Ductile**

1. **General Corrosion:** Except for cast iron or ductile iron pipe, each segment of generally corroded gas distribution line pipe with a remaining wall thickness less than that required for the maximum allowable operating pressure of the pipeline, or a remaining wall thickness less than thirty (30%) percent of the nominal wall thickness, must be replaced. However, if the area of general corrosion is small, the corroded pipe may be repaired. Corrosion pitting so closely grouped as to affect the overall strength of the pipe is considered general corrosion for the purposes of this paragraph.
2. **Localized Corrosion Pitting:** Except for cast iron or ductile iron pipe, each segment of gas distribution line pipe with localized corrosion pitting to a degree where leakage might result must be replaced or repaired.


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> PROTECTING CAST IRON PIPELINES - EXCAVATION & UNDERMINING	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.755	<b>Date Revised:</b> September 10, 2007
<i>Section 35 – Protecting Cast Iron Pipelines – Excavation &amp; Undermining</i>	<b>Approved:</b> 

**Section 35.1 – Protecting Cast Iron Pipelines**

Additional care shall be used when excavating around cast iron with mechanical equipment. The main should be exposed (undermined) as little as possible and only as needed to perform the work. When a section of a buried cast iron pipeline is disturbed, that segment, where necessary, must be protected against vibration, damage from heavy construction equipment, from trains, from trucks, from buses, or from blasting as well as impact forces by vehicles or earth movement.

**Section 35.2 – Excavation and Undermining**

Protection from damage which could occur during apparent future excavations near the pipeline or other foreseeable outside forces which might subject that segment of the pipeline to bending stress is required.


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CAULKED BELL AND SPIGOT JOINTS	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192.753	<b>Date Revised:</b> September 10, 2007
<i>Section 36 – Caulked Bell and Spigot Joints</i>	<b>Approved:</b> 

**Section 36.1 – Caulked Bell and Spigot Joints at Pressures Greater Than 25 PSIG**

Each standard cast iron caulked bell and spigot joint that is subject to a pressure greater than twenty-five (25) psig, must be sealed with a mechanical leak clamp or a material or device which does not reduce the flexibility of the joint; permanently bonds either chemically or mechanically, or both with the bell and spigot metal surfaces; and, seals and bonds in a manner that meets the strength, environmental, and chemical compatibility requirements of Section 1.1.1, Materials - General, of TECO Peoples Gas' Construction Standards.

**Section 36.2 – Caulked Bell and Spigot Joints at Pressures of 25 PSIG or Less**

Any unclamped standard cast iron bell and spigot joints subject to pressures of twenty-five (25) psig or less that are exposed for any reason, regardless of operating pressures, are to be sealed by a means other than by caulking.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> TURN ON, TERMINATION/INTERRUPTION & DISCONTINUANCE OF SERVICE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations Part 192.727 & 192.16; Florida Administrative Code Chapters 25-7.089, 25-12.043, 25-12.044 and 25-12.045	<b>Date Revised:</b> July 31, 2011
<b>Section 37 – Turn On, Termination/Interruption &amp; Discontinuance of Service</b>	<b>Approved:</b> 

**Section 37.1 – Initiation / Turn-On of Service**

Service shall be initiated only by authorized personnel knowledgeable in the turn-on procedures of the TECO Peoples Gas.

Gas service may be declined to a customer or any customer equipment until the customer complies with all applicable gas codes that have been adopted by the local authority having jurisdiction.

Service shall not be established to any customer until it has been determined that a constant pressure can be contained by the piping (see Job Procedures No. 01-001, Turn-On).

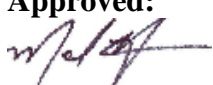
**Section 37.2 – Termination / Interruption of Service**

The procedures outlined below should be followed each time a service is turned off, or when TECO Peoples Gas becomes aware that the gas to a customer has been interrupted, whether intentionally or unintentionally:

1. Where applicable, verify the meter number on the meter with the meter number on the service order.
2. If the meter is left on the service line riser at the time of termination/interruption, the service line riser valve is to be turned off. A blind or slug is to be installed in the meter swivel, or in a union, or other fittings, on the outlet side of the service line riser valve. The service line riser valve is to be locked in the closed position and an "Out of Service" tag (see sample below at Section 38, Page 147) is to be installed.
3. If the meter is left on the service line riser at the time of an interruption, the service line riser valve is to be turned off and locked in the closed position.
4. If the meter is removed from the service line at the time of termination/interruption, the service line riser valve is to be locked and tagged with an "Out of Service" tag (see sample below at Section 38, Page 147) and the service line and the customer's house line shall be plugged or capped. The regulator(s) should be removed, if any are installed.

*(continued on next page)*



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> TURN ON, TERMINATION/INTERRUPTION & DISCONTINUANCE OF SERVICE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations Part 192.727 & 192.16; Florida Administrative Code Chapters 25-7.089, 25-12.043, 25-12.044 and 25-12.045	<b>Date Revised:</b> July 31, 2011
<b>Section 37 – Turn On, Termination/Interruption &amp; Discontinuance of Service (continued)</b>	<b>Approved:</b> 

5. If there is no meter on the service line, such as a service line downstream of a master meter installation, the valve is to be locked in the closed position, an "Out of Service" tag (see sample below at Section 38, Page 147) is to be installed and a blind inserted in a union, or other fittings on the outlet side of service line valve. The regulator(s) should be removed, if any are installed.


The exception to the procedure above could be when company representatives normally performing meter reading terminate service for non-payment, or for another similar reason. In this situation, the service line riser valve would be locked and tagged with an "Out of Service" tag (see sample below at Section 38, Page 147), but the blind may not be installed. The company representative will then report their actions taken to the Utility Coordinator so that a Utility Tech can be sent to install a blind at the earliest practical opportunity.

### **Section 37.3.1 – Discontinuance of Service Due to Inactivity**

The following actions shall be taken for inactive service lines that have been used, but have become inactive without reuse:

1. If there is no prospect for reuse, the service line shall be retired and physically abandoned within three (3) months.
2. Except as noted below\*, after a service line has been inactive for a period of twenty-four (24) months and there is a prospect for reuse of the line, one of the following actions shall be taken within six (6) months:
  - a. Disconnect the service line from all sources of gas and abandon or remove.
  - b. A valve on the service line shall be locked in the closed position and the service line plugged to prevent the flow of gas.
  - c. Remove the meter and plug the end of the service line to prevent the flow of gas.
3. Except as noted below\*, after sixty (60) months of inactivity, service lines shall be retired and physically abandoned within six (6) months.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
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<b>Reference:</b> Title 49 Code of Federal Regulations Part 192.727 & 192.16; Florida Administrative Code Chapters 25-7.089, 25-12.043, 25-12.044 and 25-12.045	<b>Date Revised:</b> July 31, 2011
<i>Section 37 – Turn On, Termination/Interruption &amp; Discontinuance of Service (continued)</i>	<b>Approved:</b> 

\* See Section 37.3.2, “Temporary Waiver Of Service Line Retirement Requirements Until December 2009” for alternate requirements. The requirement to comply with item 1., above, remains unchanged.

One of the following actions must be taken to abandon a service line:

1. Disconnect the service line from all sources of gas at the nearest point to the main where cutting of pavement is permitted.
2. Where cutting of pavement is not permitted, the service line shall be disconnected at the nearest point, not under a paved surface.

**NOTE:** The stub of the service line shall be disconnected closer to the main or at the main, if at some later date it becomes accessible during normal operations.

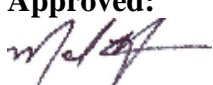
Records of the size, material and location of remaining service stubs shall be kept. These records must be readily available to personnel assigned to pipeline locating activities. It shall be the responsibility of the Division Manager to initiate the review of the necessary records to ensure compliance with the procedure outlined in this Section 37.3.1, “Discontinuance of Service Due to Inactivity”.

### **Section 37.3.2- Temporary Waiver of Service Line Retirement Requirements**

Effective on June 8, 2007, the Florida Public Service Commission granted members of the Florida Natural Gas Association a temporary waiver of the requirements of Florida Administrative Code (FAC), Chapter 25.12.045, items (1)(b) and (1)(c) for a two (2) year period. The waiver is subject to the terms, conditions, and requirements outlined below.

1. The two (2) year waiver of action is available for gas services under the following scenarios:
  - a. Any service line that reached **two (2) years** of inactivity **after** December 31, 2006 is exempt from the requirements of Section 37.3.1, “Discontinuance of Service Due To Inactivity”, **item 2.**, above.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
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<b>Reference:</b> Title 49 Code of Federal Regulations Part 192.727 & 192.16; Florida Administrative Code Chapters 25-7.089, 25-12.043, 25-12.044 and 25-12.045	<b>Date Revised:</b> July 31, 2011
<b>Section 37 – Turn On, Termination/Interruption &amp; Discontinuance of Service (continued)</b>	<b>Approved:</b> 


- i. Services reaching **two (2) years** of inactivity **prior to** December 31, 2006 are not eligible for the temporary waiver, and must be acted upon in compliance with the requirements of Section 37.3.1, “Discontinuance of Service Due To Inactivity”, **item 2.**, above.
- b. Any service line that reached **five (5) years** of inactivity **after** December 31, 2006 is exempt from the requirements of Section 37.3.1, “Discontinuance of Service Due To Inactivity”, **item 3.**, above.
  - i. Services reaching **five (5) years** of inactivity **prior to** December 31, 2006 are not eligible for the temporary waiver, and must be acted upon in compliance with the requirements of Section 37.3.1, “Discontinuance of Service Due To Inactivity”, **item 3.**, above.
2. In the event that the waiver is withdrawn after the two (2) year period, TECO Peoples Gas will have until December 31, 2011 to become compliant with the requirements of Sections 37.3.1, “Discontinuance of Service Due To Inactivity”, items 2. and 3., above.
3. The temporary waiver of action does not affect any actions required by Section 37.2, “Termination / Interruption of Service”, or any other sections of this manual.
5. TECO Peoples Gas shall continue to monitor abandoned service lines and maintain records as identified in Section 37.3.1“.

#### **Section 37.4 – Discontinuance of Gas Service Due to Hazardous Conditions**

When TECO Peoples Gas personnel become aware of any hazardous condition relative to a customer's piping, or appliances, one (1) of the following actions shall be taken:

1. Discontinue service to the hazardous piping or appliance(s).
2. Discontinue service to the customer and take action as outlined above at Section 37.2, “Termination/Interruption of Service”, of this manual.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> TURN ON, TERMINATION/INTERRUPTION & DISCONTINUANCE OF SERVICE	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations Part 192.727 & 192.16; Florida Administrative Code Chapters 25-7.089, 25-12.043, 25-12.044 and 25-12.045	<b>Date Revised:</b> July 31, 2011
<b>Section 37 – Turn On, Termination/Interruption &amp; Discontinuance of Service (continued)</b>	<b>Approved:</b> 

Service shall not be reinstated until the defect or deficiency is corrected and the provisions are met in compliance with the requirements at Section 37.1, “Initiation / Turn-On of Service”, above.


### **Section 37.5 – Notification of New Customers**

This section applies to new customers that have buried piping on their property which is not owned, monitored, nor maintained by TECO Peoples Gas. TECO Peoples Gas is required to notify such customers, within ninety (90) days of initiating service, of the following:

1. TECO Peoples Gas does not own, monitor, nor maintain the customer’s buried piping.
2. If the customer's buried piping is not maintained, it may be subject to the potential hazards of corrosion and leakage.
3. Buried gas piping should be: (i) Periodically inspected for leaks; (ii) Periodically inspected for corrosion if the piping is metallic; and (iii) Repaired if any unsafe condition is discovered.
4. When excavating near buried gas piping, the piping should be located in advance, and the excavation done by hand.
5. Service providers, including plumbing, heating and air conditioning contractors can assist the customer in locating, inspecting, and repairing the customer's buried piping.

TECO Peoples Gas initially notified each customer via mail prior to the required notification date of August 14, 1996. TECO Peoples Gas currently provides the customer the above required information in writing in two forms:

1. The “At Your Service” booklet which contains the above buried piping information and is provided to customers at the time of initiation of new gas service (see Job Procedures No. 01-001, Turn-On).
2. A printed section, “Buried Piping Notification” appears on the back of all TECO Peoples Gas’ monthly natural gas bills.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INVESTIGATION OF UNAUTHORIZED UTILIZATION OF COMPANY FACILITIES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Florida Administrative Code Chapter 25-12.046	<b>Date Revised:</b> July 31, 2011
<i>Section 38 – Investigation of Unauthorized Utilization of Company Facilities</i>	<b>Approved:</b> 


**Section 38.1 – Unauthorized Meter Turn-On**


All unauthorized meter turn-ons or restoration of gas service shall be investigated to determine beyond a reasonable doubt, that a hazardous condition does not exist. The following steps shall be taken:

1. Ascertain that appropriate tests and investigations have been made and that no leaks exist in the piping system downstream of the meter set;
2. Determine that all connected gas appliances are operating satisfactorily, or are turned off;
3. If entry cannot be gained to the premises or a hazardous condition is found, the service line riser valve controlling service to the premises shall be locked in the closed position and tagged with an “Out of Service” tag (see sample below at Section 38, Page 147); and;
4. When an unauthorized establishment of gas service has occurred on a meter manifold or common header, an immediate investigation shall be made to determine if adjacent facilities have been tampered with or other unauthorized gas service has been established. All inactive services shall be checked for compliance with the requirements above at Section 37.1, Initiation / Turn-on of Service, or Section 37.2, “Termination / Interruption of Service”.
5. Any unauthorized operation of any other equipment on TECO Peoples Gas’ facilities shall be immediately investigated to determine the effect upon the system. All prudent measures to assure the safety of customers and the public shall be taken.


It shall be the responsibility of the Division Manager to initiate and maintain records of the investigations and actions taken in compliance with this section.




<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> INVESTIGATION OF UNAUTHORIZED UTILIZATION OF COMPANY FACILITIES	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Florida Administrative Code Chapter 25-12.046	<b>Date Revised:</b> July 31, 2011
<b>Section 38 – Investigation of Unauthorized Utilization of Company Facilities (continued)</b>	<b>Approved:</b> 




OUT OF SERVICE  
DO NOT DISTURB OR CHANGE  
THE CONDITION OF THIS VALVE.  
UNDER PENALTY OF LAW  
TO RESTORE SERVICE CALL  
PEOPLES GAS SYSTEM



FUERA DE SERVICIO  
NO TOCAR NI CAMBIAR LA  
POSICION DE ESTA VALVULA  
BAJO PENALIDAD DE LA LEY  
PARA RESTABLECER EL SERVICIO  
COMUNIQUESE CON PEOPLES GAS

SECTION	 <b>PEOPLES GAS</b>	DATE
SCALE		SHEET of
DWG. BY		J.O. A.P.E.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> MEASUREMENT, CUSTOMER METERING, REGULATING EQUIPMENT	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<i>Section 39 – Measurement, Customer Metering, Regulating Equipment</i>	<b>Approved:</b> 


### **Section 39.0 - Measurement, Customer Metering and Regulating Equipment**

#### **Section 39.1 - Use of Meters and Regulators - General Requirements**

1. All gas sold and used by TECO Peoples Gas shall be metered except in the case of an emergency or when otherwise authorized by the Vice-President of Operations.
2. TECO Peoples Gas shall install, own, operate and maintain all equipment necessary for the regulation and measurement of gas to its customers, except if additional meters and/or regulators are furnished and installed for the convenience of the customer.
3. Pre-payment meters shall not be used to bill customers.
4. When there is more than one (1) meter at a common location, the meter installation shall be tagged or permanently marked to indicate the facility being metered.

#### **Section 39.2 - Location of Meters and Associated Appurtenances - General Requirements**

1. Each customer shall furnish a convenient, accessible and safe place in which a meter(s) and associated appurtenances can be installed, operated and maintained. This location, insofar as practical, shall be outside the building and free of excessive temperature variations or other causes that might affect meter operation or accuracy.
2. If changes in conditions on the customer's premises adversely affect the accessibility or safety of a meter location, the customer shall be responsible for the cost of relocating the meter, its appurtenances and related piping to a location meeting TECO Peoples Gas' requirements.
3. Meters shall be electrically isolated from the house piping and protected from atmospheric corrosion and other damage.


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> MEASUREMENT, CUSTOMER METERING, REGULATING EQUIPMENT	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<i>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</i>	<b>Approved:</b> 

**Section 39.3 - Periodic Meter Tests**

**Section 39.3.1 - Meter Test Frequency**


1. Residential meters are tested according to a statistical sampling plan approved by the Florida Public Service Commission. For residential diaphragm-type positive displacement meters having a capacity of less than or equal to two hundred fifty (250) cfh @ one half inch (½”) WC, the following process shall be implemented:
  - a. Annually, a sample of three hundred fifteen (315) of the above class residential meters shall be tested.
  - b. Meters chosen for the sample shall have been in service for at least five (5) years, and:
    - i. Thirty percent (30%) shall be those with the longest time in service (oldest installation dates).
    - ii. Thirty percent (30%) shall be those showing the highest amount of gas measured (readings).
    - iii. Forty percent (40%) shall be random selections from the balance of meters in service for at least five (5) years.
  - c. The maximum meter test failure rate for the sampled group shall be twenty-one (21) meters.
    - i. If the sample meter test failure rate is twenty-two (22) or greater, corporate Engineering Services shall isolate the error population based on an analysis of the sample meter test failures.
    - ii. A new sample of the isolated error group consisting of at least fifty (50) meters will be taken within six (6) months following identification. Corporate Engineering Services will be responsible for analyzing the isolated error population and developing routines and/or programs to assist in analysis.

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<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> MEASUREMENT, CUSTOMER METERING, REGULATING EQUIPMENT	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

2. All commercial diaphragm-type positive displacement meters having a capacity of *less than or equal to* two hundred fifty (250) cfh @ one half inch (½”) WC shall be periodically removed, inspected and tested at least once every one hundred twenty (120) months.
3. Commercial diaphragm-type positive displacement having a capacity *greater than* two hundred fifty (250) cfh *but less than or equal to* two thousand five hundred (2,500) cfh @ one half inch (½”) WC shall be field or shop tested in accordance with the “American Gas Association Gas Measurement Manual: Meter Proving, Part Number Twelve, 1984 Edition”, at least once every one hundred twenty (120) months.
4. Meters having a capacity *greater than* two thousand five hundred (2,500) cfh @ one half inch (½”) WC shall be field or shop tested in accordance with the American Gas Association’s “Gas Measurement Manual: Meter Proving, Part Number Twelve, 1984 Edition”, at least once every sixty (60) months.
5. Instruments and Auxiliary Devices:

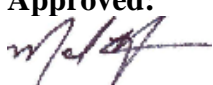
Any instruments and auxiliary devices when used in conjunction with any meter to correct the metered volume for pressure or temperature shall be adjusted to an accuracy level to assure that the combined accuracy of the instrument and auxiliary device, or both, and the associated meter do not exceed one percent (1 %) error fast or two percent (2%) error slow. To ensure and verify the performance of each instrument and auxiliary device, each instrument and device shall be checked at the same test interval as prescribed for the associated meter.

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<b>Subject:</b> MEASUREMENT, CUSTOMER METERING, REGULATING EQUIPMENT	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

**Section 39.3.2 - Field Testing**

1. All side-connect meters of greater than two thousand five hundred (2,500) CFH shall be equipped with test connections and a bypass, or bypass connections, in order to facilitate field testing. Test connections on meters two thousand five hundred one (2,501) CFH up to ten thousand (10,000) CFH shall have taps of at least one and seven-eighths inches (1 7/8") in diameter. Test connections on meters of capacity larger than ten thousand (10,000) CFH shall have taps of at least three inches (3") or larger in diameter. Auto adjusting turbine meters four inches (4") or larger do not require test connections.
2. Field testing of customers' meters shall be made by measurement personnel with a Field Transfer Prover. Air is to be used for the test medium. After the meter has been by-passed, a pressure test shall be made at normal operating pressure to ensure that the piping connections and valves do not leak or pass gas.
3. Any Field Transfer Prover used shall be operated in accordance with the manufacturer's recommendations.
4. Diaphragm meters with a test dial of five (5) cubic feet or less shall be tested at a flow rate of one hundred percent (100%) of the rated capacity and also at twenty percent (20%) of the rated capacity. All other meters shall be tested in accordance with manufacturers' recommendations and the American Gas Association's "Measurement Manual: Meter Proving Part No. 12, 1978 edition".
5. The meter test data shall be entered into the Computerized Meter History System.



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<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

### **Section 39.3.3 – Inspection**


1. When a meter installation is visited for purposes of testing, all the related equipment, such as pressure regulators, pressure relief valves, filters, valves, etc. shall be visually inspected. If maintenance to valves, filters and accessory equipment is necessary, it shall either be undertaken by operations personnel at that time, or a report shall be submitted to schedule maintenance promptly. A soap test of exposed pipe and fittings affected by the work shall be made to ensure no leakage.
2. A leak report, form PgS 24, “Gas Leak and Repair Form” (see sample above at Section 14, Pages 57 and 58), shall be prepared on any leak and shall be submitted to the appropriate department. If a hazardous leak is found that cannot be repaired by the personnel on site, additional help shall be requested and the leak shall be repaired or regraded before leaving the location.

Information should be entered on form PgS 640, “Large Volume Meter Installation Maintenance Report” (see sample below at Section 39, Page 164), whenever maintenance is undertaken.

### **Section 39.4 Meter Test by Request**

1. At a customers' written request, the TECO Peoples Gas shall, without charge, test the accuracy of the meter in use at the customer's premises if the meter has not been tested by the Company or by the Florida Public Service Commission during the twelve (12) months prior to the request.
2. If a customer requests a meter test more frequently than provided for in item 1 above, TECO Peoples Gas may require a deposit to defray the cost of the test. The deposit shall not exceed the amount stipulated in Florida Administrative Code Chapter 25-7.65 (2). If the algebraic sum of the open and check error of the meter is found to be more than two percent (2 %) fast, the deposit shall be refunded. If below this accuracy limit, the deposit may be retained as a service charge.

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<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
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<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 


3. A customer, or authorized representative, may request and witness the meter test. On request, a written report may be given of the results of the meter test by TECO Peoples Gas.
4. At the request of a customer, arrangements shall be made for a meter test to be conducted by an independent meter testing facility of the customer's choosing. The customer shall be responsible for negotiating and paying the independent meter testing facility any fee charged for the test. The independent meter testing facility shall, at a minimum, conform to the requirements of the "American Gas Association Gas Measurement Manual: Meter Proving, Part Number Twelve, 1984 edition". The customer shall pay for all charges to TECO Peoples Gas associated with a meter test by an independent meter testing facility. TECO Peoples Gas shall provide a detailed breakdown of such costs and may require payment of such costs prior to the actual meter test. If the meter is found to be running faster than the established limits by (2) above, the costs shall be refunded. If the meter operates within the allowable limits in (2) above, TECO Peoples Gas may retain the payment received as a service charge. Where appropriate, the meter may be field tested by the independent meter testing facility.
5. TECO Peoples Gas may, at its discretion, conduct its own test of the meter in conformance with the testing standards established by these rules. In the event that separate tests of the same meter conflict, the Florida Public Service Commission shall resolve the matter at the request of TECO Peoples Gas or the customer.

### **Section 39.5 Meter Testing Procedures**

#### **Section 39.5.1 Meter Testing Equipment Requirements**

1. TECO Peoples Gas shall own or have access to all testing equipment, including bell-type meter prover(s) of not less than five (5) cubic feet capacity and/or other meter testing device(s) approved by the Vice President, Operations. The equipment shall be maintained in correct adjustment so that it is capable of determining the accuracy of service meters to within one-half of one percent (0.5 %). The meter testing equipment shall be available for inspection by the Florida Public Service Commission.

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<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

2. The accuracy of all meter testing equipment shall be established in accordance with the procedures set forth in the “American Gas Association Measurement Manual: Meter Proving, Part Number Twelve, 1984 edition”.
3. All alterations, accidents or repairs to meter testing equipment which might affect the accuracy or operation of the equipment shall be promptly reported to corporate Engineering Services. Corporate Engineering Services shall be responsible for reporting the details of the accident or the repairs made, in writing, to the Florida Public Service Commission. This report shall be submitted through and be approved by the Vice President, Operations.
4. Each meter testing device shall have the necessary accessories needed for accurate meter testing and shall be stored so that it shall not be exposed to drafts or excessive temperature variations.

### **Section 39.5.2 Meter Test Methods**

#### 1. General:


All meter tests shall be performed by trained personnel using approved methods and equipment.

#### 2. Diaphragm meters with a test dial of five (5) cubic feet or less:

The accuracy of customer service meters of this type shall be determined by passing air from a standard bell-type meter prover or a calibrated test meter at a rate of flow designated herein when the liquid in the prover tank, the test equipment, the atmosphere of the room and the meter to be tested are for all practical purposes the same temperature. The amount of air passed shall be sufficient to cause the meter test dial to make one (1) revolution. The meter shall be tested at two (2) rates of flow:

- a. An open run test which shall be at a rate of flow at one hundred percent (100 %) of rated capacity.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> MEASUREMENT, CUSTOMER METERING, REGULATING EQUIPMENT	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

- b. A check rate test which shall be at a rate of flow approximately twenty percent (20 %) of rated capacity.

The averages of the tests at the two (2) rates of flow shall agree within one percent (1 %), and the average error of the meter shall be considered to be the algebraic sum of twenty-five percent (25 %) of the average error indicated by the open run test and seventy-five percent (75 %) of the average error indicated by the check rate test:

For example:

Open Rate of + 1.75 and Check Rate of +0.75:

$$(25 \% \times 1.75 = .4375) + (75 \% \times 0.75 = .5625) = 1.0 \%$$


3. Other meters:

Provision shall be made by each Operating Center for testing other diaphragm-type meters with a test dial of over five (5) cubic feet or other type meters such as turbine, rotary displacement, and orifice meters in accordance with manufacturer's recommendations and the "American Gas Association Gas Measurement Manual: Meter Proving, Part Number Twelve, 1984 edition".

**Section 39.5.3 - Meter Accuracy at Installation**

1. A new meter shall not be more than plus or minus one percent (1 %) when installed at a customer's premise. Manufacturer's test data may be used if there is no indication of damage resulting from the shipping. If damage is apparent and in order for the manufacturers test data to be used, a sample of not less than ten percent (10%) of the meters in the damaged shipment shall be tested and found to be within accuracy limits. If any meter of this sample is found not to be within accuracy limits, the entire shipment must be tested and where necessary, the meters adjusted within accuracy limits.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
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<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

2. Every meter removed from service when opened for repairs shall be adjusted to be not more than plus or minus one percent (1%) before being reset; and, if not opened for repairs, any meter may be reset without adjustment if found to be not to be more than plus or minus one percent (1 %) in error provided that the meter is otherwise in good condition.
3. The difference of percent accuracy between the check rate and open rate of a repaired meter of two hundred fifty (250) cfh or less capacity shall not exceed one percent (1 %) (see previous section). A plus or minus one half of one percent (0.5%) difference is the desired accuracy for a repaired meter. The meter error shall be determined by the algebraic formula given above at Section 39.5.2. (1) “Meter Test Methods”.
4. No meter shall be installed unless it has been tested and found to be within the accuracy limits prescribed above at Section 39.5.3.(1) “Meter Accuracy at Installation” and with a test period no longer than twelve (12) months prior to the date of installation. Manufacturer test data may be used to ensure they are within the accuracy limits.

#### **Section 39.5.4 - Sealing Meters**

1. All meters tested for installation shall be sealed at the time of the test by the person performing the test. The seal shall be of a type that will ensure detection of tampering. When a compression type lead seal or a snap tin-type seal is used, a sealing tool bearing TECO Peoples Gas’ logo and location identification shall be used.


#### **Section 39.5.5 - Large Volume Meter Inspection and Meter Number Change Program**

The following procedures should be checked when conducting a Large Volume Meter Inspection or when undertaking a Meter Number Change Program:

1. If the metering pressure is greater than seven inches water column (7" W.C.) and a correcting device, (i.e. a Compensating Index, BPI, or electronic instrument), is not installed, the pressure factor shall appear in the billing records.

*(continued on next page)*




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<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

2. If the metering pressure is greater than seven inches water column (7" W.C.), the regulator shall be tagged indicating the required operating pressure. This includes installations with Compensating Indexes as well as Standard Indexes.
3. If the Index does not read in CCF, the billing records shall indicate the proper multiplier, (i.e. "10" for MCF, etc). See below at Section 39.7, "Units of Measure".
4. If the meter has a Compensating Index, the metering pressure should agree with that shown on the Index. If the index atmospheric and base pressure is different than billing atmospheric and base pressure, the delivery pressure shall be adjusted.

In addition, a TECO Peoples Gas service order should be completed when the meter number is changed indicating the following:

1. New meter number.
2. Old meter number.
3. New index reading.
4. Old index reading (same as new).
5. Pressure Factor, even though unchanged, if the metering pressure is greater than seven inches water column (7" W.C.) and no correcting device (i.e. Compensating Index, BPI, etc.) is installed.
6. Meter Index Multiplier, even though unchanged, if the index reads in other than CCF.
7. Type index in use (i.e. Standard, Compensating, BPI, electronic correction device, etc.).

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<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<i>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</i>	<b>Approved:</b> 


## **Section 39.6 - Records of Meters and Meter Tests**

### **Section 39.6.1 - Requirements**

1. TECO Peoples Gas shall maintain a permanent meter record for each meter which TECO Peoples Gas owns or uses for any purpose. This meter record shall include the following:
  - a. Date of purchase.
  - b. Identification number.
  - c. Size or capacity of the meter.
  - d. Date and place of installation and removal for the last three (3) locations where the meter was installed.

These records shall be retained until the meter is destroyed or permanently removed from service.
2. The original meter test data shall be recorded and retained at least until superseded by a later test. These records shall indicate the following:
  - a. Sufficient information to identify the meter.
  - b. Reason for the test.
  - c. Date of the test and the reading of the meter.
  - d. Computed accuracy both "as found" and "as left".

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<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 


- e. Repairs made, if any.
  - f. Name or the initials of the person performing the test.
3. TECO Peoples Gas shall, at the request of the Florida Public Service Commission, report a summary of the "as found" tests.
  4. TECO Peoples Gas shall file a report with the Florida Public Service Commission on or before February 10th of each calendar year. This report shall contain complete information regarding:
    - a. Number of meters in service by installation date.
    - b. Number of meters tested.
    - c. Number of meters past due for tests.
    - d. All refunds and other related information requests.

The corporate Engineering Services group shall be responsible for preparation of this report. This report shall be submitted through, and be approved by, the Vice President, Operations.

**Section 39.6.2 - Computerized Meter History System**

TECO Peoples Gas shall utilize a computerized meter history system to process and accumulate plant accounting data, premise location test repair information and other pertinent information on all meters owned by TECO Peoples Gas. TECO Energy's Information Services (IS) group is responsible for the system within the main frame computer, while providing routine monthly and special request reports. TECO Peoples Gas' Operating Centers, corporate Engineering Services, and Plant Accounting are responsible for input data.

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The system is designed to accommodate the following needs:


1. Furnish information required by the Florida Public Service Commission.
2. Provide TECO Peoples Gas with the necessary information to assure accurate measurement and efficient and economical operational.
3. Provide data for TECO Peoples Gas' periodic meter change-out program.
4. Provide data for the adjustment of bills for meter error.
5. Provide plant accounting data.

#### **Section 39.6.3 - Coding For Dead Meters**

The following coding should be utilized to indicate in the Meter Accounting and Control System (MACS) why a dead meter is not registering:

1. Internal Inspection - (coded as 999). This group requires internal inspection to find the cause of the meter not running. This may be any of the following:
  - a. Internal leak, holes in the diaphragm, broken valve cover, etc.
  - b. Broken or disengaged parts.
  - c. Corrosion or frozen moving parts.
  - d. Out of timing.
2. Obvious Leaks - (coded as 888). This group will not be set up on the prover, as the visual inspection deems a test impossible due to obvious outside leaks such as:
  - a. Part of the casing is missing.

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<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

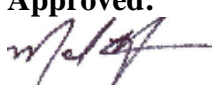
- b. Case is corroded through (holes are showing).
  - c. Case damaged through impact.
  - d. All screws left loose after inspection in the Division.
3. Damaged Index - (coded as 777). Included within this group is damage to the index and/or index drive. The meter may or may not run, but there is no reading to compare to the prover scale.
  4. Flooded - (coded as 666). This group has too much water in the meter to be poured out and any proof obtained will be erratic.

**Section 39.7 - Units of Measure**

**Section 39.7.1 - Volume**

CF	= 1 ft	1 x 1 x 1	= 1
CCF	= 100 ft	100 x 1 x 1	= 100
MCF	= 1000 ft	100 x 1 x 10	= 1000
MMCF	= 1,000,000 ft	100 x 1 x 10,000	= 1,000,000
Therm	= 100,000 BTU		



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<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

**Section 39.7.2 - Pressure**

Inches of W.C.	(IWC)	Used for lower pressures;
Inches of Hg	(IHg)	Used for medium pressures;
Ounces per inch	(OSI)	Used for lower pressures;
Pound per Inch	(PSI)	Used for highest pressures;

1 - Inch of W.C.	=	0.074	IHg	=	0.58	OSI	=	0.036	PSI
1 - Inch of Hg	=	13.6	IWC	=	7.8	OSI	=	0.49	PSI
1 - Ounce per Sq. In.	=	1.73	IWC	=	0.128	IHg	=	0.063	PSI
1 - Pound per Sq. In.	=	27.7	IWC	=	2.04	IHg	=	16.0	OSI

Contract delivery pressure to customer is:


$$7 \text{ IWC} = 0.5 \text{ IHg} = 4 \text{ OSI} = 0.25 \text{ PSI}$$

Gas delivered at any other pressure has to be corrected to 7 IWC by use of the following formula and example for billing:

$$\text{Correction Multiplier} = \frac{\text{Actual Pressure} + \text{Atmospheric Pressure}}{\text{Contract Pressure} + \text{Atmospheric Pressure}}$$

$$\begin{aligned} \text{Example:} & \quad \frac{5.0 \text{ Psig} + 14.73 \text{ Psig}}{1.317} = \frac{19.73}{1.317} = \\ & \quad 0.25 \text{ Psig} + 14.73 \text{ Psig} = 14.98 \end{aligned}$$

The Contract Pressure plus the Atmospheric Pressure is equal to our Contract Base Pressure of 14.98.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b>	<b>Date Issued:</b>
<b>MEASUREMENT, CUSTOMER METERING, REGULATING EQUIPMENT</b>	<b>October 1, 2003</b>
<b>Reference:</b> Florida Administrative Code Chapter 25-7.021, 25-7.049, 25-7.059 through 25-7.066, 25-7.070, 25-7.079-.080, and 25-7.084	<b>Date Revised:</b> September 10, 2007
<i>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</i>	<b>Approved:</b> 


**Section 39.7.3 - Temperature**


The unit used is Degrees of the Fahrenheit Scale (degrees F). The most common temperature used in gas measurement is 60 degrees F. This is called the Temperature Base.

**Section 39.7.4 - Units Of Therm Measurement**

1 Therm	= 100 CF	= 1 CCF	=
100,000 BTU			
10 Therms	= 10 CCF	= 1 MCF	=
1,000,000 BTU			
100 Therms	= 10 MCF	= 10,000,000 BTU	
1,000 Therms	= 100 MCF	= 100,000,000 BTU	
10,000 Therms	= 1 MMCF		
100,000 Therms	= 10 MMCF		
1,000,000 Therms	= 100 MMCF		
10,000,000 Therms	= 1000 MMCF		
100,000,000 Therms	= 10,000 MMCF		
1,000,000,000 Therms	= 100,000 MMCF		

Note: These conversions assume one thousand (1000) BTU/CF gas heat content. Actual conversions will vary with gas heat content.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
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<b>Section 39 – Measurement, Customer Metering, Regulating Equipment (continued)</b>	<b>Approved:</b> 

  
**PEOPLES GAS**

LARGE VOLUME METER INSTALLATION MAINTENANCE REPORT

Address: \_\_\_\_\_ City: \_\_\_\_\_

Name: \_\_\_\_\_

**METER:** Mfg. \_\_\_\_\_ Size \_\_\_\_\_ Style \_\_\_\_\_ Company No. \_\_\_\_\_  
Location: \_\_\_\_\_ Tested: Yes \_\_\_ No \_\_\_ Pressure: In \_\_\_ Out \_\_\_  
Condition: Oil Level \_\_\_\_\_ Paint \_\_\_\_\_ Bolts, Nuts \_\_\_\_\_  
Index \_\_\_\_\_ Instrument \_\_\_\_\_  
Remarks & Repairs Made: \_\_\_\_\_


**REGULATORS:** Mfg. \_\_\_\_\_ Size \_\_\_\_\_ Style \_\_\_\_\_ Orifice Size \_\_\_\_\_  
Mfg. \_\_\_\_\_ Size \_\_\_\_\_ Style \_\_\_\_\_ Orifice Size \_\_\_\_\_  
Internal Relief: Yes \_\_\_ No \_\_\_ Pressure In \_\_\_ Out \_\_\_  
Condition: Paint \_\_\_\_\_ Bolts, Nuts \_\_\_\_\_ Vent \_\_\_\_\_  
Location: Outside \_\_\_\_\_ Inside \_\_\_\_\_  
Is Vent piped to safe location: Yes \_\_\_ No \_\_\_ Vent Pipe Size \_\_\_\_\_ Length \_\_\_\_\_  
Remarks & Repairs Made: \_\_\_\_\_

**RELIEF VALVE:** Mfg. \_\_\_\_\_ Size \_\_\_\_\_ Style \_\_\_\_\_ Press. Range \_\_\_\_\_  
Tested for Relief Pressure: Yes \_\_\_ No \_\_\_ Starts to relieve @ \_\_\_\_\_  
Location: \_\_\_\_\_ Inlet Pipe Size \_\_\_\_\_ Outlet Pipe Size \_\_\_\_\_  
Is outlet piped to safe location: Yes \_\_\_ No \_\_\_ Length of outlet pipe \_\_\_\_\_ ft.  
Remarks & Repairs Made: \_\_\_\_\_

**STRAINER/FILTER:** Mfg. \_\_\_\_\_ Size \_\_\_\_\_ Style \_\_\_\_\_  
Press. In \_\_\_\_\_ Element cleaned: Yes \_\_\_ No \_\_\_  
Remarks & Repairs Made: \_\_\_\_\_

**PIPE & FITTINGS FROM RISER COCK TO CUSTOMER HOUSE PIPING:**  
Leak Test Made: Yes \_\_\_ No \_\_\_ Number of leaks found \_\_\_\_\_  
Condition: Paint \_\_\_\_\_ Foundation \_\_\_\_\_ Supports \_\_\_\_\_  
Remarks & Repairs Made: \_\_\_\_\_

INSPECTION/REPAIRS MADE BY: \_\_\_\_\_ Date: \_\_\_\_\_

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> MULTI-SERVICE AND FACILITY IDENTIFICATION	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Florida Administrative Code Chapter 25-7.059 and 25-12.050	<b>Date Revised:</b> September 10, 2007
<i>Section 40 – Multi-Service and Facility Identification</i>	<b>Approved:</b> 

### **Section 40.1 – Multi-Service Installations**

#### **Section 40.1.1 – Marking of Multi-Service Installations**

Where there is more than one (1) meter at a common location, each meter set is to be tagged or permanently marked to indicate the part of the building or the area being supplied.

See also above at Section 39.1, "Use of Meters & Regulators - General Requirements".

#### **Section 40.1.2 – Identification Code**

When apartment numbers or letters are in use, they shall be utilized to identify the service line valve that serves the specific apartment unit. However, when numbers or letters are not available, the Operating Center should refer to the code shown below for marking procedures. This code shall be used to identify the building, or the area being supplied from a particular meter:


Location:

N = North      S = South      E = East      W = West

R = Rear      F = Front      B = Basement

#### **Section 40.2 – Marking of Facilities**


Each customer meter, regulator station, or any other above ground gas facility shall be permanently marked to identify TECO Peoples Gas' name and phone number. Marking shall be accomplished by using permanent signs, markers, decals or other appropriate means.

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> CONTROL ROOM MANAGEMENT	<b>Date Issued:</b> August 1, 2011
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192	<b>Date Revised:</b> n/a
<i>Section 41 – Control Room Management</i>	<b>Approved:</b> 

**Section 41.0 – General Requirements for a Control Room Management Plan**

Procedures for control room management are kept in the form of a Control Room Management. This manual will implement the applicable control room management procedures required by 49 CFR 192.631.




<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject: Gas Transmission Integrity Management</b>	<b>Date Issued:</b> December 17, 2004
<b>Reference:</b> <b>Title 49 Code of Federal Regulations 192 Subpart O</b>	<b>Date Revised:</b> n/a
<i>Section 42 – Gas Transmission Pipeline Integrity Management</i>	<b>Approved:</b> 

**Section 42.0 – General Requirements for a Gas Transmission Pipeline Integrity Management Plan**


Requirements for an integrity management program on any gas transmission pipeline are kept in the form of a Pipeline Integrity Management Plan. This plan/manual shall include requirements for each of the following elements:

1. Identification of all high consequence areas, in accordance with § 192.905.
2. A baseline assessment plan meeting the requirements of § 192.919 and § 192.921.
3. Identification of threats to each covered pipeline segment, which must include data integration and a risk assessment. An operator must use the threat identification and risk assessment to prioritize covered segments for assessment (§ 192.917) and to evaluate the merits of additional preventive and mitigative measures (§ 192.935) for each covered segment.
4. A direct assessment plan, if applicable, meeting the requirements of § 192.923, and depending on the threat assessed, of § § 192.925, 192.927, or 192.929.
5. Provisions meeting the requirements of § 192.933 for remediating conditions found during an integrity assessment.
6. A process for continual evaluation and assessment meeting the requirements of § 192.937.
7. If applicable, a plan for confirmatory direct assessment meeting the requirements of § 192.931.
8. Provisions meeting the requirements of § 192.935 for adding preventive and mitigative measures to protect the high consequence area.
9. A performance plan as outlined in ASME/ANSI B31.8S, section 9 that includes performance measures meeting the requirements of § 192.945

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<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject: Gas Transmission Integrity Management</b>	<b>Date Issued:</b> July 31, 2011
<b>Reference:</b> <b>Title 49 Code of Federal Regulations 192 Subpart O</b>	<b>Date Revised:</b> n/a
<i>Section 42 – Gas Transmission Pipeline Integrity Management</i>	<b>Approved:</b> 

10. Record keeping provisions meeting the requirements of § 192.947.
11. A management of change process as outlined in ASME/ANSI B31.8S, section 11.
12. A quality assurance process as outlined in ASME/ANSI B31.8S, section 12.
13. A communication plan that includes the elements of ASME/ANSI B31.8S, section 10, and that includes procedures for addressing safety concerns raised by--
  - a. OPS; and
  - b. A State or local pipeline safety authority when a covered segment is located in a State where OPS has an interstate agent agreement.
14. Procedures for providing (when requested), by electronic or other means, a copy of the operator's risk analysis or integrity management program to--
  - a. OPS; and
  - b. A State or local pipeline safety authority when a covered segment is located in a State where OPS has an interstate agent agreement.
15. Procedures for ensuring that each integrity assessment is being conducted in a manner that minimizes environmental and safety risks.
16. A process for identification and assessment of newly-identified high consequence areas. (See § 192.905 and § 192.921.)


<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject: Distribution Integrity Management Program</b>	<b>Date Issued:</b> August 2, 2011
<b>Reference:</b> <b>Title 49 Code of Federal Regulations 192 Subpart O</b>	<b>Date Revised:</b> n/a
<i>Section 43 – Distribution Integrity Management Program</i>	<b>Approved:</b> 

### **Section 43.0 – General Requirements for a Distribution Integrity Management Plan**

Requirements for a distribution integrity management program are kept in the form of a Gas Distribution Integrity Management Program. A written integrity management plan must contain procedures for developing and implementing the following elements:


1. Knowledge. An operator must demonstrate an understanding of its gas distribution system developed from reasonably available information.
  - a. Identify the characteristics of the pipeline's design and operations and the environmental factors that are necessary to assess the applicable threats and risks to its gas distribution pipeline.
  - b. Consider the information gained from past design, operations, and maintenance.
  - c. Identify additional information needed and provide a plan for gaining that information over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities).
  - d. Develop and implement a process by which the IM program will be reviewed periodically and refined and improved as needed.
  - e. Provide for the capture and retention of data on any new pipeline installed. The data must include, at a minimum, the location where the new pipeline is installed and the material of which it is constructed.
  
2. Identify threats. The operator must consider the following categories of threats to each gas distribution pipeline: corrosion, natural forces, excavation damage, other outside force damage, material or welds, equipment failure, incorrect operations, and other concerns that could threaten the integrity of its pipeline. An operator must consider reasonably available information to identify existing and potential threats. Sources of data may include, but are not limited to, incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject: Distribution Integrity Management Program</b>	<b>Date Issued:</b> July 31, 2011
<b>Reference:</b> <b>Title 49 Code of Federal Regulations 192 Subpart O</b>	<b>Date Revised:</b> n/a
<i>Section 43 – Distribution Integrity Management Program</i>	<b>Approved:</b> 


3. Evaluate and rank risk. An operator must evaluate the risks associated with its distribution pipeline. In this evaluation, the operator must determine the relative importance of each threat and estimate and rank the risks posed to its pipeline. This evaluation must consider each applicable current and potential threat, the likelihood of failure associated with each threat, and the potential consequences of such a failure. An operator may subdivide its pipeline into regions with similar characteristics (e.g., contiguous areas within a distribution pipeline consisting of mains, services and other appurtenances; areas with common materials or environmental factors), and for which similar actions likely would be effective in reducing risk.
4. Identify and implement measures to address risks. Determine and implement measures designed to reduce the risks from failure of its gas distribution pipeline. These measures must include an effective leak management program (unless all leaks are repaired when found).
5. Measure performance, monitor results, and evaluate effectiveness.
  - a. Develop and monitor performance measures from an established baseline to evaluate the effectiveness of its IM program. An operator must consider the results of its performance monitoring in periodically re-evaluating the threats and risks. These performance measures must include the following:
    - i. Number of hazardous leaks either eliminated or repaired as required by § 192.703(c) of this subchapter (or total number of leaks if all leaks are repaired when found), categorized by cause;
    - ii. Number of excavation damages;
    - iii. Number of excavation tickets (receipt of information by the underground facility operator from the notification center);
    - iv. Total number of leaks either eliminated or repaired, categorized by cause;
    - v. Number of hazardous leaks either eliminated or repaired as required by § 192.703(c) (or total number of leaks if all leaks are repaired when found), categorized by material; and
    - vi. Any additional measures the operator determines are needed to evaluate the effectiveness of the operator's IM program in controlling each identified threat.

*(continued on next page)*

<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject: Distribution Integrity Management Program</b>	<b>Date Issued:</b> July 31, 2011
<b>Reference:</b> <b>Title 49 Code of Federal Regulations 192 Subpart O</b>	<b>Date Revised:</b> n/a
<i>Section 43 – Distribution Integrity Management Program</i>	<b>Approved:</b> 

6. Periodic Evaluation and Improvement. An operator must re-evaluate threats and risks on its entire pipeline and consider the relevance of threats in one location to other areas. Each operator must determine the appropriate period for conducting complete program evaluations based on the complexity of its system and changes in factors affecting the risk of failure. An operator must conduct a complete program re-evaluation at least every five years. The operator must consider the results of the performance monitoring in these evaluations.
  
7. Report results. Report, on an annual basis, the four measures listed in paragraphs (e)(1)(i) through (e)(1)(iv) of this section, as part of the annual report required by § 191.11. An operator also must report the four measures to the state pipeline safety authority if a state exercises jurisdiction over the operator's pipeline.



<b>OPERATING AND MAINTENANCE PROCEDURE</b>	
<b>Subject:</b> GLOSSARY	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192	<b>Date Revised:</b> September 10, 2007
	<b>Approved:</b> 

**Glossary**

**Term**

**Definition**

Anode

The electrode in a corrosion cell at which oxidation (corrosion) occurs. In the corrosion process, the area where metal ions enter solution.

Abandoned Pipeline

A pipeline that is physically separated from its source of gas and is no longer maintained under Title 49 Code of Federal Regulations, Part 192.

Abandonment

The process of abandoning a pipeline.

CGI

Combustible Gas Indicator, which is used to determine the presence of natural gas

Cathodic

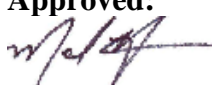
The electrode in a corrosion cell at which reduction occurs. In the corrosion process, the area where electrons do not enter solution

Class Location

An onshore area that extends two hundred twenty (220) yards on either side of the centerline of any continuous 1 mile length of a pipeline. The Class location ends two hundred twenty (220) yards from the last feature that defines the class location.

Class 1 location is an offshore area; or any class location unit that has ten (10) or less buildings intended for human occupancy.


Class 2 location is any class location unit that has more than 10 but less than forty six (46) buildings intended for human occupancy. When all buildings intended for human occupancy within a Class 2 or 3 are in a single cluster, the class location ends two hundred twenty (220) yards from the nearest building in the cluster.

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<b>Subject:</b> GLOSSARY	<b>Date Issued:</b> October 1, 2003
<b>Reference:</b> Title 49 Code of Federal Regulations, Part 192	<b>Date Revised:</b> September 10, 2007
	<b>Approved:</b> 

**Term**

**Definition**


Class Location (continued)	<p>Class 3 location is any class location unit that has forty six (46) or more buildings intended for human occupancy; or an area where the pipeline lies within one hundred (100) yards of either a building or a small, well-defined area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by twenty (20) or more persons on at least 5 days a week for ten (10) weeks in any twelve (12)-month period. (The days and weeks need not be consecutive.) When all buildings intended for human occupancy within a Class 2 or 3 are in a single cluster, the class location ends two hundred twenty (220) yards from the nearest building in the cluster.</p> <p>Class 4 location is any class location where buildings of four (4) or more stories above ground are prevalent. A Class 4 location ends two hundred twenty (220) yards from the nearest building with four or more stories above ground.</p>
Control Line	The pipe, valves and fittings used to interconnect air, gas or hydraulically operated control apparatus.
Corrosion	The deterioration of metal or its properties because of a reaction with its environment.
Curb Valve	A valve installed for the purpose of shutting off the gas supply to a building. It is installed below grad in a service line, at or near the property line. It is operated by use of a key or wrench, through a curb box or standpipe.
Customer Meter	The device, which measures gas, delivered to a customer for consumption of the premises.
Deactivation	The process of making the pipeline inactive.
Distribution Main	Any main installed within a community to convey.

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	<b>Approved:</b> 

**Term**

**Definition**


Heat Fusion	A joint made in thermoplastic piping by heating the parts sufficiently to permit fusion of the materials when the parts are pressed together.
High Pressure Distribution System	A distribution system in which the gas pressure in the main is higher than the pressure provided to the customer.
Inactive Pipeline	A pipeline that is being maintained under Title 49 Code of Federal Regulations, Part 192 but is not presently being used to transport gas.
Leak	Any unintended escape of natural gas.
Leakage Survey	A systematic inspection made for the purpose of finding leaks in a gas piping system.
Length	A piece of pipe as delivered from the steel mill, sometimes also called a "joint".
Line Section	A continuous run of transmission line between adjacent compressor stations, between a compressor station and storage facilities, between a compressor station and a block valve, or between adjacent block valves.
Low Pressure Distribution System	A distribution system in which the gas pressure in the main is substantially the same as the pressure provided to the customer.
Main	Piping from which an extension of service is available.
Maximum Allowable Operating Pressure (MAOP)	The maximum pressure at which any pipeline or facility may be operated.

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**Term**

**Definition**

Meter Set Assembly	The piping installed to connect the inlet side of the meter to the gas service line, and to connect the outlet side of the meter to the customer's fuel line.
Monitor Regulator	A pressure regulator, set in series with another pressure regulator, for the purpose of providing automatic over-pressure protection in the event of a malfunction of the primary regulator.
Offshore	Beyond the line of ordinary low water along that portion of the coast of the United States that is in direct contact with the open seas and beyond the line marking the seaward limit of inland waters.
Operational Inspection	The inspection performed at stated intervals to assure that equipment is properly operating and that the equipment set points are correct.
Over-Pressure	When pressures exceeding the maximum allowed operating pressures of components on a system.
Over-Pressure Protection	The use of a device or equipment installed for the purpose of preventing pressure in a pipe system or other facility from exceeding a predetermined limit.
Over-Pressure Protection Station	A relief valve or pressure relief installed in a separate vault or structure or at a separate vault or at a separate site from the regulator station it is protecting.
Pipeline or Pipeline System	All of the parts of the conduit through which gas is transported including such items as valves, pipe, fittings and other appurtenances attached to the pipe, stations and fabricated assemblies.


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	<b>Approved:</b> 

**Term**


**Definition**

Pipeline Facility	Any new or existing pipeline including rights-of-way and any equipment or building used in the transportation or treatment of natural gas.
Pressure	Pressure in the pipeline expressed in pounds per square inch above atmospheric pressure i.e., gage pressure (abbreviation = PSIG), unless otherwise stated.
Pressure Limiting Station	Any installation used to assure that pressures in any pipeline would not exceed a certain maximum
Pressure Regulating Station	Consists of apparatus installed for the purpose of automatically reducing and regulating the gas pressure in the downstream transmission, main holder, pressure vessel or compressor station piping to which it is connected. Included in the station are any enclosures and ventilating equipment, and any piping and auxiliary equipment (such as valves, control instruments or control lines).
Pressure Relief	The apparatus installed to vent gas from a main in order to prevent the gas pressure from exceeding a predetermined limit. May be installed in an over pressure protection station.
Primary Inspection	The teardown of individual equipment components to inspect internal condition. A primary inspection includes all of the test and checks of an operational inspection.
Private Right-Of-Way	A right-of-way that is not located on a road street or highway used by the public, not on railroad right-of-way.
Qualified Welding Procedure	A tested and proven detailed method by which sound welds having suitable mechanical properties can be produced. API standard 1104 is the guide for qualifying welding procedures.



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	<b>Approved:</b> 

<b><u>Term</u></b>	<b><u>Definition</u></b>
Qualified Welder	An individual who has demonstrated his ability to produce welds meeting the requirements of API Standard 1104.
Response Time	The time interval from when the leak was reported to the time the employee arrives at the premises and starts the investigation.
SMYS	Specified minimum yield strength is: <ul style="list-style-type: none"> <li>a. For steel pipe manufactured in accordance with a listed specification, the yield strength specified at the minimum in that specification; or,</li> <li>b. For steel pipe manufactured in accordance with an unknown or unlisted specification, the yield strength determined in accordance with Title 49 Code of Federal Regulations, Part 192.107(b).</li> </ul>
Service	That portion of the gas piping between the main and the customer meter set, and is not normally available for the extension of service.
Service Line Valve	A valve located in the service line ahead of the service regulator, or ahead of the meter when there is no regulator.
Service Regulator	A device installed on a gas service to control the pressure of the gas delivered to the customer.
Short Section of Pipe	A segment of pipeline one hundred feet (100') or less in length.
Stopcock	Valve on the riser, just before the customer meter.

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**Term**

**Definition**

Supervisor in Charge	The supervisor designated as being responsible for coordinating all field activities.
Test Station	A wire or other point on underground piping where electric contact for corrosion control testing purposes can be made.
Transmission Main	Means a pipeline, other than a gathering line, that: <ul style="list-style-type: none"> <li>1. Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume customer that is not downstream from a distribution center;</li> <li>2. Operates at a hoop stress of twenty percent (20%) or more of SMYS; or,</li> <li>3. Transports gas within a storage field. A large volume customer may receive similar volumes of gas as a distribution center, and includes factories, power plants and institutional users of gas.</li> </ul>
Under-Pressure	When pressures less than those required operating equipment safely is experienced.
Vault	An underground structure which may be entered, and which is designed to contain piping or piping components.