18 March 1991

MEMORANDUM OF AGREEMENT
ON
CRITERIA/STANDARDS FOR ECONOMIC ANALYSES/LIFE CYCLE COSTING FOR MILCON DESIGN

1. Purpose. The purpose of this Memorandum of Agreement (MOA) is to establish criteria and standards for performing economic analyses and life cycle cost studies used in support of design decisions for projects in the Military Construction (MILCON) Program, i.e., to support the selection from various alternatives of components/systems being considered as elements in facilities design. These criteria and standards apply to all design decisions regardless of when they are made in the planning, programming, design, and procurement process. This agreement does not apply to economic analyses and life cycle studies used to make project-justification decisions during the planning and programming process.

2. General. Economic analyses shall be conducted as part of the design process to ensure that the selection/rejection of design alternatives is not based solely on construction costs, but also on least life cycle costs (LCC), that is, lowest total cost of ownership. The depth and degree of formality of these analyses shall be determined on a case-by-case basis to ensure that the cost of performing an analysis is clearly outweighed by the potential benefits derived. Results of generic studies or results of previous analyses of alternatives similar to those currently under consideration may be used in lieu of performing a new study provided the previous study was based on similar design conditions, criteria, and methods. Previous studies should be updated only as required to reflect changes of conditions significant enough to impact the design decision. All economic analyses and other justification for the selection of a design alternative, whether a previous study or a new one, shall be clearly documented in the appropriate section of the project design analysis.

3. Methods. All analyses shall consider the total LCC for design alternatives, where the LCC includes all costs and benefits associated with an alternative over its expected life, including but not limited to construction/procurement, energy, maintenance, operation, repair, replacement, alteration, disposal costs, and retention values. The present value discounting approach shall be used to adjust for the differences in timing of costs and benefits unless otherwise specified by other directives or by public law. The basic discount factor for finding the present value of a future amount is calculated as follows:

$$\text{Discount Factor} = \frac{1}{(1 + d)^n}$$

where: d = appropriate discount rate, and
n = the time period over which the discounting is done.

Discounting should be applied to all costs and benefits over the appropriate analysis period. Specific criteria are as follows:

a. Discount Rates. The discount rates are expressed in "real" terms, i.e., over-and-above the rate of inflation for the economy as a whole.

(1) Non-energy related studies: An annual "real" discount rate of 10% should be used in evaluating all non-energy related economic studies.

(2) Energy related studies: All energy related economic studies (studies in which energy costs are relevant, regardless of their magnitude relative to other costs) shall use the current discount rate published by the National Institute of Standards and Technology (NIST) in their annual supplement to NIST Handbook 135, and disseminated by the appropriate Service Headquarters Office.

b. Analysis Period: The analysis period shall be the date of the study (DOS) through the economic life of the facility as a whole. The economic life shall not be taken beyond 25 years from the scheduled beneficial occupancy date (BOD) for the project unless specifically approved by the appropriate Service Headquarters Office. Such approval cannot be granted for energy related studies as it is precluded by statute.

c. Cash Flow: In general, cash flow used in the analysis will be based on the estimated calendar dates on which the events and costs/benefits are projected/scheduled to occur. Construction/procurement costs may be assumed to be incurred as a single lump sum, preferably at the time corresponding to the midpoint of the construction/procurement process. Other cash flows that occur periodically throughout the year (e.g., cost of fuel, electricity, water, maintenance, etc.) may be assumed to be incurred as a single lump sum, preferably at midyear. In circumstances where the above assumptions add unnecessarily to the complexity of the calculations, all cash flows may be assumed to occur at the end of the year in which they are actually scheduled/projected to occur.

d. Benefits and Costs: All benefits and costs will be expressed in terms of constant dollars that reflect the purchasing power of the dollar on the DOS (i.e., constant DOS dollars). The rate of inflation of the economy as a whole will be excluded from all LCC calculations. (The rate of inflation is irrelevant to the LCC analysis results since all benefits and costs are expressed in terms of constant DOS dollars and discounted using a "real" discount rate which reflects the time value of money over-and-above the general rate of inflation.)

e. Future Benefits and Costs: In projecting future benefits and costs, an allowance for future price-level changes will be made only for particular benefits and costs expected to change at rates higher or lower than the general rate of inflation. In such cases, the rates of change used in the analysis will be the "differential" rates, i.e., the anticipated differences between the actual projected rates of change and the general inflation rate.

(1) Non-energy studies: For non-energy studies, the differential rate of future price-level change shall generally be assumed to be zero, except in those cases where there is reliable information/data to the contrary.

(2) Energy studies: Fuel/energy costs shall have differential escalation rates as published by NIST in Handbook 135 and disseminated as indicated in paragraph 3.a(2) above.

4. Computer Aided Calculations. All computer aided calculations for MILCON design economic studies will be accomplished using the Life Cycle Cost In Design (LCCID), a computer program for economic analysis developed by the U.S. Army Corps of Engineers Construction Engineering Research Laboratory (CERL) or a version thereof which has been certified by CERL as equivalent.

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