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Subject: MCA & SRM Building Energy and Sustainability Policy

Applicability: Directive and Guidance

References:

- a. Engineering and Construction Bulletin (ECB) 2013-5, 13 Feb 2013, Subject: Continuity of the High Performance Energy and Sustainability Policy
- b. Memorandum, ASA (IE&E), 16 Dec 13, Subject: Sustainable Design and Development Update
- c. Memorandum, Office of the Under Secretary of Defense, 10 Nov 2013, Subject: Department of Defense Sustainability Buildings Policy
- d. Unified Facilities Criteria (UFC) 1-200-02, High-Performance and Sustainable Building Requirements, 1 Mar 2013
- e. ECB 2012-13, 23 April 2012, Subject: Energy Implementation Guidance Update, ASHRAE 189.1, Life-Cycle Cost Analysis Requirements
- f. USACE Report 2013-01, Comparison of ASHRAE Energy Standards for the Design of High-Performance Army Buildings, Feb 2013
- g. ECB 2013-25, 6 September 2013, Subject: Implementation of the Energy & Sustainability Record Card and New DD 1354 Sustainability Codes
- h. ANSI/ASHRAE/IES Standard 90.1-2010 Final Determination Quantitative Analysis, October 2011
- i. CFR Title 10 Part 433¹, "Energy Efficiency Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings," 9 July 2013
- j. CFR Title 10 Part 436, Subpart A and National Institute of Standards and Technology (NIST) Handbook 135, "Life-Cycle Costing Manual for the Federal Energy Management Program"²
- k. Memorandum, Department of the Army, OACSIM, 04 Feb 2013, Subject: District and Islanded/Decentralized Heating System Selection Evaluation with Life Cycle Cost Analysis Guidance

¹ Include 10 CFR 433 (Federal Register July 9, 2013) updates to the baseline standard to ASHRAE Standard 90.1-2010, "Energy Standard for Buildings Except Low-Rise Residential Buildings"

² Include change in life-cycle cost methodology for Federal buildings from 25 years to 40 years from The Energy Independence and Security Act (EISA) of 2007

1. **Purpose.** The purpose of this Engineering and Construction Bulletin (ECB) is to update and implement new policies and procedures for Energy, Sustainability and Life-Cycle Cost Analyses into the Military Construction, Army (MCA) and Sustainment, Restoration and Modernization (SRM) programs. This ECB effectively replaces ECB 2013-5 (Ref. a) and ECB 2012-13 (Ref. e) and defines the Energy and Sustainability performance requirements for projects in the various phases of the Planning, Programming, Budgeting, and Execution process. On 16 December 2013, the Office of the Assistant Secretary of the Army (Installations, Energy and Environment) released an update to the Sustainability Design and Development (SDD) Policy (Ref. b) which supersedes the previously issued policy and is based on meeting the minimum requirements of Unified Facilities Criteria (UFC) 1-200-02 (Ref. d) with additional requirements listed in the SDD Policy Update.

As stated in the SDD Policy Update: “The goal of this policy is to provide productive, safe, and healthy facilities and installations that enhance mission effectiveness, reduce the Army’s environmental footprint, and achieve levels of energy independence that enhance continuity of mission-essential operations. Guided by federal mandates, the Army will plan, design, build, and operate facilities to achieve the highest-performing sustainable design that is life-cycle cost-effective within the program amount. The feasibility to include renewable energy shall be investigated and documented for each project, starting with installation master planning and project planning and development activities.” This statement falls in line directly with the Department of Defense Sustainability Buildings Policy (Ref. c).

2. **Scope.** All MCA projects will comply with the Department of the Army Sustainable Design and Development Policy Update (Ref. b) and applicable UFCs to the extent practicable for projects programmed year FY14-15 with full compliance in programmed years FY16 and beyond. All SRM projects will comply to the extent practicable for projects programmed in FY15 and beyond.

3. **Directive & Guidance.** This ECB is intended to provide directive and guidance in following energy and sustainability requirements listed in the Army SDD Policy update. Please note that if the requirements in the SDD Policy Update conflict with UFC 1-200-02, then the requirements in the SDD Policy Update take precedence until the UFC is updated accordingly. This applies to all sections in UFC 1-200-02.

a. Energy for New Buildings – As stated in ECB 2012-13 (Ref. e), we have reviewed and evaluated ASHRAE Standard 189.1-2011 and 90.1-2010 in collaboration with the Pacific Northwest National Laboratory (Ref. f) and have determined that minimum requirements of ASHRAE Standard 189.1-2011 and 90.1-2010 would result in a nominal increase in cost that is life-cycle cost effective. Previous guidance, to meet EPACT 2005, established the minimum energy requirement at 30 percent energy savings compared to the 2007 version of ASHRAE Standard 90.1. Based on our review of current and past versions of ASHRAE Standards 189.1 and 90.1 we have established a new minimum energy requirement of 12 percent better³ than ASHRAE Standard 90.1 2010 as defined in UFC 1-200-02. Furthermore, as the SDD Policy

³ The energy savings between the 2010 and 2007 versions of ASHRAE Standard 90.1 was on average 18.2 percent (ref. f). Therefore, 12 percent savings below a 90.1-2010 baseline building will, in effect, yield a 30 percent level that meets the original requirement in EPACT 2005

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Update states, projects must achieve the maximum energy savings that is life-cycle cost effective within the programmed amount. Therefore, a life-cycle cost analysis (LCCA) is required for each project whether it meets, exceeds or falls below the 12% target as compared to a baseline building that includes actual design features and systems that would have been included if the requirement was only to meet minimum requirements of ASHRAE 90.1-2010.

The LCCA shall be initiated to validate the cost effectiveness of the project during Code 3 scope and cost validation. Project scope and cost shall be justified such that the 1391 project documentation to be submitted to Congress for authorization and funding support a cost effective project. The LCCA will be finalized at 35 percent design and made part of the Design Analysis and available for review upon request. Any subsequent changes in project scope beyond 35 percent design that impact energy savings or project cost require an update to the LCCA.

For purposes of determining compliance with EAct 2005 energy requirements, energy consumption requirements shall be determined according to 10 CFR Part 433 (Ref. i) for both the ASHRAE 90.1-2010 baseline building and proposed building by using the Performance Rating Method found in Appendix G of ASHRAE 90.1-2010, except the formula for calculating the Performance Rating in Paragraph G1.2 shall read as follows:

$$\text{Percent Improvement} = 100 \times \frac{[(\text{Baseline building consumption} - \text{Receptacle and process loads}) - (\text{Proposed building consumption} - \text{Receptacle and process loads})]}{(\text{Baseline building consumption} - \text{Receptacle and process loads})}$$

In addition to determining energy savings for EAct compliance, it is important to note that per the SDD Policy Update, the energy savings must include receptacle and process loads. This is a separate effort from determining EAct compliance. To meet this requirement, the proposed theoretical Annual Energy Use Intensity (EUI [kBtu/ft²]) will be calculated for both the proposed and baseline building including estimated receptacle and process loads. These values should be tracked and entered into the Energy and Sustainability Record Card (see ECB 2013-25).

b. Energy for SRM Projects – Comply with the applicable criteria in UFC 1-200-02. Expect to see more detailed guidance for these types of buildings in the near future.

c. LEED Projects – LEED version 3 uses ASHRAE 90.1-2007 as a baseline and to establish the rules for energy modeling. LEED version 4 uses ASHRAE 90.1-2010 for the same purpose. ASHRAE 90.1-2010 is more stringent than ASHRAE 90.1-2007 and the rules for energy modeling required by Appendix G of the standards are different. In order to avoid developing two different energy analyses to demonstrate compliance with UFC 1-200-02 and LEED prerequisite/credit requirements, project teams pursuing LEED Silver certification in LEED version 3 may choose to substitute the EA prerequisite 2 Minimum Energy Performance and EA credit 1 Optimize Energy Performance from LEED version 4 for the same prerequisite and credit in LEED version 3. The associated LEED templates should indicate that the LEED version 4 criteria are being used. Note that this may impact compliance with EA prerequisite 2 Minimum Energy Performance or result in a reduction in the number of points achieved for EA credit 1 Optimize Energy Performance; therefore, a project delivery team has the option to prepare two sets of models: one for compliance described in Section 3.a. of this ECB and another for LEED v3 purposes.

d. Energy Cost Budget – In accordance with 10 CFR 433 and UFC 1-200-02, minimum compliance with ASHRAE 90.1 is required. ASHRAE 90.1 allows several compliance paths. One compliance path is the Energy Cost Budget Method from Chapter 11 of the standard which requires energy modeling with a different set of rules from the Appendix G, Performance Rating Method, of the standard. Project teams seeking to apply the Energy Cost Budget Method as a means of compliance with the ASHRAE 90.1 standard must generate two separate sets of energy models. In addition to increasing efforts in demonstrating ASHRAE 90.1 compliance, the Energy Cost Budget Method results in increased effort associated with reviewing energy models for contract compliance. For this reason, the Energy Cost Budget Method (for all versions of ASHRAE 90.1) is disallowed as a means of demonstrating ASHRAE 90.1 compliance in contract documents unless the Geographical District approves this method in writing.

e. Sustainability – All project delivery teams should follow the requirements listed in the SDD Policy Update and UFC 1-200-02.

4. Future Energy Requirements. In the latest update to 10 CFR 433 (Ref. i), the Department of Energy updated the baseline reference standard for minimum energy performance (Ref. h). Buildings for which design for construction begins on or after July 9, 2014 must achieve 30 percent energy consumption reduction below that of a ASHRAE 90.1 2010 baseline building if life-cycle cost effective. For now, all projects for which design for construction begins on or after July 9, 2014 must attempt to achieve 30% below the baseline requirements while ensuring life-cycle cost effectiveness requirements in Paragraph 3.a. of this ECB. We are still determining the impacts of this new requirement. Expect more guidance on compliance with this latest DOE update to the CFR in the coming months in addition to an update to UFC 1-200-02.

5. Life-Cycle Cost Requirements. Subpart A of Title 10 Code of Federal Regulations Part 436 (Ref. j) establishes Methodology and Procedures for Life Cycle Cost Analyses for determining energy and water conservation improvements for Federal Buildings which is an administrative law and the authority for it rests in 42 U.S.C. 6361, 42 U.S.C. 8251-8263, 42 U.S.C. 828708287C. A LCCA requires a systematic evaluation of alternatives according to the energy requirements stated in paragraph 3.a. of this ECB. However, good engineering judgment must be exercised in the analysis of alternatives so that significant effort is not being expended comparing two or three nearly equal alternatives. Where substantial costs between alternatives are involved, e.g. renewable energy applications, installing district heating, cooling or central energy plants (see Ref. k), ensure that the alternatives are analyzed towards the most economical solutions to meet the specific requirements.

For economic comparison analysis, the baseline building should include actual design features and systems that would have been included if the requirement was only to meet the minimum levels of ASHRAE Standard 90.1-2010 and account for actual fuel use (i.e. remove the requirement to match fuels between the baseline and proposed building found in Appendix G of 90.1). Additionally, it is acceptable to use a LCCA from a previous project to justify current project system selections provided that the previous analysis has been reviewed to ensure that nothing changed such as costs, available technology, energy performance, etc. Such changes necessitate appropriate adjustments to LCCA from previous projects.

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The Building Life-Cycle Cost (BLCC) program developed by the National Institute of Standards and Technology (NIST) was designed to comply with 10 CFR Part 436 (Ref. j) and includes a MILCON Analysis module. All project delivery teams shall use the BLCC program and follow the methodology in 10 CFR Part 436 to determine the LCCA for each project when requesting additional funds for features in excess of the baseline described in Paragraph 3. A link is provided below with instructions on how to download the BLCC program for free:

http://www1.eere.energy.gov/femp/information/download_blcc.html

Further detailed instructions regarding LCCA requirements will be forthcoming in a separate ECB.

6. Exemptions. Any exemptions to the SDD Policy Update (Ref. b) must follow the directions listed in the SDD Policy Update memo.

7. Further Guidance. Further technical criteria are being developed on sustainable topics addressed by policy. Expect supplemental guidance to be released. ECB's (www.wbdg.org), ER's (<http://www.publications.usace.army.mil/USACEPublications/EngineerRegulations.aspx>) and TechNotes (<https://www.mrsi.usace.army.mil/sustain>) are posted and updated regularly.

8. Point of Contact. The Headquarters USACE point of contact is Daniel Carpio (CECW-CE), at 213-452-3667 or Daniel.Carpio@usace.army.mil.

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