

DEPARTMENT OF THE ARMY POLICY CONSIDERATIONS FOR GREEN SUSTAINABLE REMEDiation

BY

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Pictures from Previous Page

Left Photo – MMR Wind Turbine

Top Right Photo – Lifting blade assembly at MMR

Middle Right Photo – Inspecting MMR turbine

Bottom Right Photo – Lifting blades at MMR

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USAWC CIVILIAN RESEARCH PROJECT

**DEPARTMENT OF THE ARMY POLICY CONSIDERATIONS
FOR GREEN SUSTAINABLE REMEDIATION**

by

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United States Army National Guard

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ABSTRACT

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The author is proposing to investigate green sustainable remediation (GSR) policy and initiatives for Department of Defense (DoD) and the services, United States Environmental Protection Agency (USEPA), and various state regulatory agencies/organizations to collect information/data to support the formulation and development of proposed Army GSR policy recommendations for implementation and execution. The investigation of the various agency GSR policies, instructions, and initiatives will identify data gaps, information requirements, and identify process requirements for future Army GSR policy. Currently, the Army follows the DoD GSR policy, which encourages using GSR when and where applicable within the Cleanup program. The Army does not have a formal/written policy with regards to how GSR will be incorporated into the Army Cleanup Program. It is critical for the Army to develop a written policy and guidance to provide direction on how the Army will choose to apply and or implement GSR in the Army Cleanup Program. The CRP's end product will provide recommendations for Army policy on GSR and also identify data gaps in information that require further research to support the development of the policy.

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ACRONYMS

ADA- Anti Deficiency Act

ADEQ- Arizona Department of Environmental Quality

AEC- Army Environmental Command

AECS- Army Environmental Cleanup Strategy

AESIS- Army Energy Security Implementation Strategy

AEWCP- Army Energy and Water Campaign Plan

AFCEE- Air Force Center for Engineering and Environment

ARNG- Army National Guard

ASA- Assistant Secretary of the Army

ASCIM- Assistant Chief of Staff Installation Management

ASCP- Army Sustainability Campaign Plan

ATSWAMO- Association of Territorial and State Waste Management Official

BRAC- Base Realignment and Closure Act

CC- Compliance Cleanup

CERCLA- Comprehensive Environmental Response and Compensation Liability Act

CONUS- Contiguous United States

CNO- Chief Naval Operations

CTC- Cost to complete

CX- Center of Expertise

DAS- Deputy Assistant Secretary

DASA- Deputy Assistant Secretary Army

DASN- Deputy Assistant Secretary Navy

DERP- Defense Environmental Restoration Program

Acronyms Continued

DLA-E- Defense Logistics Acquisition-Energy
DoD- Department of Defense
DON- Department of Navy
DRP- Demand Response Program
EISA- Energy Independence Security Act
EO- Executive order
EPACT- Energy Policy Act
ER,A- Environmental Restoration, Army
FMR- Financial Management Regulation
FS- Feasibility Study
FUDS- Formerly Used Defense Site
FY- Fiscal Year
HQ- Headquarters
I, E & E- Installations, Energy and Environment
IMCOM- Installation Command
IS,E- Installation Support, Environment
ITRC- Interstate and Technology Regulatory Council
IRP- Installation Restoration Program
GHG- Green House Gas
GSR- green sustainable remediation
LTM- Long Term Monitoring
MA-ARNG- Massachusetts Army National Guard
MADEP- Massachusetts Department of Environmental Protection
Acronyms continued
MMR- Massachusetts Military Reservation

MMRP- Military Munitions Response Program

MOU- Memorandum of Understanding

NAVFAC- Navy Facility Engineering Command

NEPA- National Environmental Policy Act

OCR- Office with Coordinating Responsibility

OCONUS- Outside of the Contiguous United States

O&M- Operation and Maintenance

OPR- Office with Primary Responsibility

OSWER- Office of Solid Waste and Emergency Response

POM- Program Objective Memorandum

RACER-Remedial Action Cost Estimating and Requirements

RAO- Remedial Action Operations

RECs- Renewable Energy Certificates

RPM- Remedial Project Manager

SER- Sustainable Environmental Remediation

SRT- Sustainable Remediation Tool

USEPA- United States Environmental Protection Agency

USACE- United States Army Corps of Engineers

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Executive Summary

The Army needs to develop a written policy for green sustainable remediation (GSR). The policy should capitalize and incentivize remediation system optimization/practices and integrate green principles into remedy selection, future land use, and integrate the use of renewable energy for cleanups (current and future). The following are key policy recommendations:

- Deputy Assistant Secretary of the Army (DASA) for Environment, Safety, and Occupational Health (ESOH) should conduct a pilot study to implement renewable energy projects to meet the cleanup energy requirements before the start of fiscal year (FY) 2012. In conjunction with conducting the renewable energy pilot study, the DASA for Energy and Sustainability (E & S) should develop a renewable energy policy that outlines the Army's desired end state for renewable energy attributes (energy and environmental) and potential financial benefits for the installation (demand response program, sale of renewable energy certificates (RECs) and sales of excess energy) by the end of FY 2013.
- DASA E & S should develop a renewable energy policy that:
 - Maximizes the financial and renewable energy attributes (energy and environmental) both short term and long term
 - Maximize the benefit and leverage the management of the Army Energy program (similar to private industry)

- DASA ESOH should develop a written GSR policy for the Army Cleanup Program:
 - Policy should direct development of guidance for system optimization following a similar process conducted by the Navy and Air Force by the close of FY 2013.
 - Policy for system optimization should have financial incentives that benefit the installation and the Army Cleanup program in a similar fashion to those outlined in the energy efficiencies program in the DoD Financial Management Regulations (FMR) Volume 12, Chapter 12.
 - Policy should include a similar management control process that requires headquarters approval (Air Force and Navy policy) for future pump and treatment systems in the Army Cleanup Program.
 - Policy should include GSR evaluations for all remedy selection and remedial system optimization efforts (current and future) pending the outcome of the Omaha District United States Corps of Engineers (USACE)/Assistant Chief of Staff Installation Management (ASCIM) GSR evaluation pilot program.
 - Army should evaluate whether the USACE/ASCIM GSR evaluation outputs merit inclusion into the Army sustainability reporting as well into the ASCP reporting metrics.

- DoD and DASA ESOH should engage United States Environmental Protection Agency (USEPA) Headquarters to identify a better balance in the Comprehensive Environmental Response Liability and Compensation Act (CERCLA) remedy selection process that allows for a better balance between overall impact to the environment and the overall impact from the remedy selected using the GSR evaluation process. When green remediation principles are integrated into the feasibility study (FS) and remedy selection process, remedies that have a lesser impact to environment are discounted because the remedy is not an active cleanup/remedy. Many regulators (state and federal) are for green and sustainable remediation however, many regulators appear to be unwilling to consider passive remediation as an alternative or balance to the overall environmental impact of the cleanup. USEPA, DoD, and the Army need to have a dialog to discuss the balance between impacts to environment, active versus passive remedy versus future land use, and define a decision point or balance that better matches DoDs and USEPAs green remediation policy. The USEPA green remediation policy in practice is not balanced with respect to how the regulators are implementing the intent of the policy.

The Army executes \$700 millionⁱ annually (Tesner 2010) to conduct environmental restoration and cleanup activities in the contiguous of the United States (CONUS) and outside of the contiguous of the United States (OCONUS) on Army Installationsⁱⁱ. DoD and the Army are in the process of developing and implementing sustainability processes and practices for the day to day execution of Army Operations. “The Army has been engaged in a process to create sustainable installations since March 2000” (Phillips 2004). DoD’s GSR policy on green remediation differs from EPA’s. EPA’s policy only focuses on remedy selection and active remediation, where as DoD has expanded their policy, where applicable, to consider all phases of the cleanup process. Currently, the Army does not have a written GSR policy.

This research paper provides recommendations for Army policy for implementation based on research and analysis of GSR policies, guidance and initiatives for DoD, Army, Navy, Air Force, USEPA, and various state regulatory agencies/organizations. This research will identify data gaps, information requirements, and evaluate process change requirements for future Army GSR policy. The current Army policy/guidance is to follow the DoD GSR policy memorandum dated August 29, 2009, which encourages green remediation where applicable. It is critical for the Army to manage and control their own GSR efforts prior to the development of a formal policy, if determined necessary, beyond the DoD policy.

There are many intangible factors regarding GSR and its implementation. Some of these include:

- How much does GSR cost to implement as compared to the application of traditional investigation and/or remediation methods?
- What are measurable metrics for implementation of GSR?
- Should (could) GSR be a mandatory requirement for all environmental cleanup projects or should there be Army programmatic goals and objectives for implementation?
- How do we capture the costs of implementing GSR within the cost to complete (CTC) for the environmental liability? Or is it necessary to capture?
- How do we capture GSR costs in the Program Objective Memorandum (POM)?
- If a GSR policy is developed and implemented what is the budget impact during the year of execution and in the out-years? Are there internal competing budget interests within the cleanup program such as the Military Munitions Response Program [MMRP]? Are there internal initiatives within the Army Cleanup Program to re-evaluate existing remedies and land-use to completely eliminate the environmental liabilities, reduce the long term monitoring (LTM) and or remedial operation actions (RAO) by conducting additional cleanup to reduce the LTM/RAO tail)?

- Will regulators support remedies that reduce the carbon footprint, for example: natural attenuation and monitoring versus active pump and treat for groundwater) but take a significantly longer time to remediate?

The initial research for this paper focused on the military services and the Secretariats responsible for development of policy. Follow-on discussions were conducted with each services cleanup execution organization. A select number of regulatory organizations were also evaluated with a limited number of interviews conducted. After completing the research and interviews the author developed policy recommendations for consideration for the Army to develop its GSR policy.

1.0 Background

“Army sustainability as defined in the Army 2010 posture statement is ...a program to transition from the Army’s traditional, compliance based approach in environmental stewardship to a mission oriented systems based approach. Army sustainability objectives are to meet current and future mission requirements world-wide, safeguard human health, improve quality of life, and enhance the natural environment. Sustainable practices improve our ability to organize, equip, train and deploy our soldiers as part of the joint force today and into the future.” (Wingfield 2010). The following discussion provides an overview and summary of Sustainability in the Army.

1.1 Army Sustainability, Guidance and Initiatives

Sustainability has evolved within the federal government under the direction of two primary presidential executive orders (EO), EO 13514ⁱⁱⁱ and EO 13423^{iv}. Related to the EO's are the Energy Policy Act (EPACT)^v and the Energy Independence Security Act (EISA)^{vi}. The EO's provide goals and objectives for water and energy efficiencies, reductions and conservation. Each federal agency is responsible for developing a sustainability implementation plan (SIP) that outlines how the organization will achieve the efficiencies and reductions.

To meet the goals and objectives of the EO's, the Army developed the Army Sustainability Campaign Plan (ASCP). The ASCP has several companion documents that were used in its development. The ASCP was signed by General Chiarelli in May 2010 (Chiarelli, Army Sustainability Campaign Plan 2010). A brief description of the ASCP and its supporting documents follows.

1.1.1 Army Sustainability Campaign Plan

The executive summary in the ASCP identifies the plan as the “roadmap to align and integrate ongoing efforts with new and necessary plans and programs to address DoD's objectives in implementing EO 13514” (Chiarelli, Army Sustainability Campaign Plan 2010). The ASCP crosses four lines of operation (materiel, readiness, human capital, and services and infrastructure), which are core business processes in the Army. The

following subsections are summary of the key companion documents used to develop the ASCP from previous Army sustainability initiatives/strategies.

1.1.2 Army Energy Security Implementation Strategy

The Army Energy Security Implementation Strategy (AESIS) was signed on January 13, 2009 by the Army Senior Energy Council and the DASA for Energy and Partnerships. The mission statement from AESIS states “Make energy a consideration for all Army activities to reduce the demand, increase efficiency, seek alternative sources, and create a culture of energy accountability while sustaining or enhancing operational capabilities” (Chiarelli, Army Energy Security Implementation Strategy 2009).

1.1.3 Army Strategy for the Environment

October 1st, 2004 the Army signed the document Army Strategy for the Environment “Sustaining the Mission-Secure the Future” (Brown 2004). This document identifies sustainability as the foundation of the strategy and the strategy states that “We must strive to become systems thinkers if we are to benefit from the interrelationships of the triple bottom line of sustainability: mission, environment, and community” (Brown 2004).

1.1.4 Army Environmental Cleanup Strategy

The Army Environmental Cleanup Strategy (AECS) was implemented in April 2003 and has been updated in 2005, 2007 and most recently March 23rd, 2009. AECS cleanup vision is for the Army to be the national leader in cleaning up contaminated land to protect human health and the environment as an integral part of its mission (Lieutenant General Robert Wilson 2009). This strategy has nine overarching objectives for the cleanup program^{vii}. The AECS discusses green remediation as part of the future direction of the cleanup program, specifically within the context of EO 13423. Green remediation is also discussed as part of the objectives, targets and success indicators for the Army Active Restoration Program, Base Realignment and Closure (BRAC) Restoration Program, Formally Used Defense Sites (FUDS) Restoration Program, and Army Compliance Cleanup Program as part of objective 8 (“support the development of and use of cost effective cleanup approaches and technologies to improve program efficiencies”).

1.1.5 Army Energy and Water Campaign Plan

The Army Energy and Water Campaign Plan (AEWCP) was signed August 1st 2006 by the Assistant Chief of Staff Installation Management (ASCIM), Lieutenant General Robert Wilson. The intent of the AEWCP is to ensure that the Army provides safe, secure, reliable environmentally

complaint, and cost-effective energy and water services to its stakeholders (soldiers, civilians, families, and contractors on Army installations).

1.1.6 Army Energy Security Implementation Strategy

The Army Energy Security Implementation Strategy (AESIS) was signed on January 13th, 2009 by the Army Energy Council and the DASA for Energy and Partnerships (General Peter W 2009). The document outlines the Army's energy security vision, mission and goals with direction on the development of objectives and metrics to gauge progress towards such goals. A discussion regarding various organizations GSR policies follow.

2.0 GSR Policy (DoD, Services, USEPA, and State Regulators/Organizations)

The following subsections provide insight into current GSR policy and initiatives for DoD, the military services, USEPA and state regulatory agencies/organizations. The information identified provides some insight into potential Army GSR policy needs and also identifies potential issues with regulatory agencies.

2.1 DoD GSR Policy

In August 2009, DoD signed a GSR memorandum that provided DoD's position on GSR. DoD's initial GSR policy efforts focused on learning about green

remediation efforts by the Services (DASA ESOH, May 2009). Key components to DoDs GSR policy memorandum are the following (M. V. Wieszek 2009):

- Encourages DoD components to consider green and sustainable remediation practices in the implementation of Defense Environmental Restoration Program (DERP)^{viii}
- Support DoDs efforts to implement EO 13423 and reduce overall energy demand
- Evaluate current and future remedial activities
- DoD components are encouraged to consider green remediation options when and where they make sense to the DoD component responsible for the remediation

A significant difference in DoDs GSR policy and USEPA headquarters Superfund Green Remediation Strategy is that the USEPA strategy focuses on remedy selection and remediation. The DoD GSR policy calls for consideration of green and sustainable principles/remediation for all phases of the cleanup (site characterization through site closeout).

The DoD policy does not mandate each of the services to conduct GSR in their respective cleanup programs, rather, each service provide quarterly updates on

their GSR initiatives and case study's of GSR implementation. DoD Office Installation and Environment is considering providing a policy update to the August 2009 DoD GSR policy memorandum (M. V. Wieszek 2010).

2.2 Army GSR Policy and Guidance

2.2.1 Current Policy and Guidance

The Army does not have a written policy for GSR in the Army Cleanup Program. However, GSR was incorporated into the 2010 AESC (see section 1.1.4). The AESC only touches on one of the EO's, 13423. There are several other areas that AESC could include as measurable targets and objectives for the Army Cleanup Program to include EO 13514, renewable energy under EPACT 2005, EISA 2007, and the AESIS. The AESC should be updated to reflect the energy aspects of renewable energy, energy efficiency, and green house gas (GHG) reduction potential under EO 13514. The renewable energy case study on Massachusetts Military Reservation (MMR), Annex 1, will identify several valuable lessons learned on implementing renewable energy in the Army Cleanup program. These recommendations and lessons learned should be incorporated in the AESC as targets and objectives that are measurable for AESC as well as the ASCP.

Army GSR efforts to date (M. K. Roughgarden 2010) include the following:

- Include green remediation in FY 2010-2011 AESC Plan
- Support DoD efforts
- Review United States Corps of Engineers (USACE) decision framework for incorporation of sustainability into Army Environmental Remediation
- Conduct inventory of green sustainable remediation efforts and case studies in Army^{ix}

The DASA ESOH office is considering developing a written policy for GSR (Tesner 2010). The ASCIM Installation Support, Environment (IS,E), Cleanup Branch is following the GSR efforts in DoD and currently has initiatives to support the development of potential GSR policy for the Army. Section 2.2.4 discusses the initiatives in more detail. The USACE is another key player within the Army framework for policy and guidance for GSR. The following section discusses the USACE policy, initiatives and guidance for GSR in the Army.

2.2.2 USACE Interim Guidance Decision Framework

The USACE has the following role in cleanup and restoration within the Army. The USACE is responsible for the program management and

execution of the FUDS program for DoD. The Army serves as the executive agent^x for DoD in implementing the FUDS program. In addition to the FUDS program the USACE supports Army installations and USEPA as a service provider conducting project management and project execution.

The Omaha District USACE Center for Expertise (CX) developed an Interim Guidance document titled “Decision Framework for Incorporation of Green and Sustainable Practices into Environmental Remediation Projects” (Engineers 2010) dated March 5th, 2010. The interim guidance is applicable to FUDS^{xi} sites and projects managed or implemented by the USACE for Army installations or USEPA (if the customer requests it). The USACE as organization has its own sustainability campaign plan, separate from the ASCP. The USACE interim guidance for GSR on FUDS was developed as a separate initiative outside of the direction from ASCIM or DASA ESOH. From a policy development perspective, this can be problem having two different policy development efforts that are overarching for the Army in both the sustainability aspects as well as how the Army decides to apply and implement GSR for the Army Cleanup Program. Note FUDS is only one program of four cleanup programs within the Army.

ASCIM has contracted with the Omaha USACE CX to prepare a preliminary process for evaluating GSR and incorporating it into Army Environmental Remediation projects. The following sections will provide more detail about the USACE GSR project with ASCIM.

2.2.3 Installation Management Command (IMCOM)

IMCOM is an interesting Army command with respect to how environmental policy and guidance are implemented and executed in the Army and the Installation Management organization. The IMCOM commander serves two roles with respect to the Army. The first role of the IMCOM commander is on the Army Staff as the ASCIM. The second role is as the commander of IMCOM/Installation Management.

IMCOM has a significant role in the ASCP with its various subordinate offices playing a key role in coordination and execution of the ASCP environmental aspect areas, either as the Office with Primary Responsibility (OPR) or the Office with Coordinating Responsibility (OCR). GSR was never included for consideration in the ASCP when it was developed. This can be attributed to the Army not having a written GSR policy and DoD issuing a GSR policy memorandum in August 2009. The ASA I, E, & E and IMCOM/ASCIM will play a significant role in the ASCP and any GSR policy developed for the Army Cleanup Program. The

following is a discussion of the IMCOM/ASCIM GSR policy initiatives and guidance currently being developed in support of a potential written policy for the Army.

2.2.4 ASCIM/ISE

IS,E is the Army Staff proponent for Army Environmental Programs and principal advisor to the ACSIM and ASA I, E & E on environmental programs. IS,E is responsible for developing strategic policies and establishing priorities, resources, strategy, and program guidance related to resourcing Army Environmental Programs.

IS,E has on-going GSR initiatives within its Cleanup Branch that will aid the ASA I, E & E in developing a written policy, if the Secretariat decides that a written GSR policy will benefit the Army Cleanup Program and support sustainability within the framework of the ASCP. The most significant initiative to date in IS,E is the contracted effort with the Omaha USACE CX to evaluate the consideration and incorporation of green and sustainable remediation practices in Army Environmental Remediation. The objective of this initiative/contract is to follow the USACE Decision Framework/Interim Guidance as a pilot program on select Army Remediation sites within the different cleanup programs in the Army. The

end product of this study/pilot program will be a report that contains an examination of the effectiveness of the GSR practices that are considered and incorporated; and provide procedures for GSR practices that are deemed effective as evidenced by the data generated as the practices are implemented on Army remediation sites as part of this pilot program. The report will also provide recommendations for the development of Army-wide GSR guidance and policy. More importantly, the USACE effort will provide a GSR evaluation process that the Secretariat will consider and evaluate when considering a written policy for GSR. The GSR evaluation process has potential in supporting DoD and the Army's discussions with USEPA HQ and regulators on defining a balance/decision point when considering active remediation versus passive remediation and the overall benefits to environment.

A draft document titled "Process for Consideration and Incorporation of Green and Sustainable Remediation Practices in Army Environmental Remediation Projects" was submitted by the USACE for review February 9, 2011. This document serves as a work plan that outlines how the USACE and its contractor will evaluate sites for consideration and incorporation of GSR at each of the selected pilot sites from each representative portion of the Army Cleanup Program which include FUDS, Compliance Cleanup, and DERP (Installation Restoration Program[IRP] and Military Munitions Response Program[MMRP]).

In the draft document it is not clear whether the GSR evaluation process and end products are aligned with any units of measure or processes required by the ASCP and or the EO's as required by all federal agencies. The preliminary GSR evaluation process needs to generate usable data that can be reported into the ASCP and the Army's EO reporting requirements/process. A written GSR policy consideration for the Army Cleanup Program will include what potential metrics could be used and or applied at a level that is measurable or a benefit to the Army (especially with the ASCP). If the data generated from the USACE GSR evaluation gets lost in the white noise level of the metric or is calculated differently or inconsistently with what the Army is reporting overall, the Army may not want to even bother with GSR metrics and reporting. There needs to be a benefit to the Army for conducting GSR evaluations beyond what the DoD policy already dictates, otherwise why spend the money and go through the effort.

Other IS,E GSR initiatives include the development of a web page to provide information on Army GSR initiatives and efforts. The Navy and the Air Force have developed informational web pages and fact sheets in support of project managers and programs on how the services desires to execute GSR. Note, the Navy and the Air Force do not have any type of written GSR policy directing GSR as a requirement. The Navy and the Air Force is only providing information on the benefits GSR and also providing

a process to follow if it is applicable or beneficial to the project. Sections 2.3 and 2.4 provide information on the Navy and Air Force GSR policy and guidance.

2.2.5 Army Environmental Command (AEC)

AEC is a subordinate unit under IMCOM that provides environmental services to Army installations as a business enterprise process. AEC also serves as the Army DERP program manager and reports directly to ASCIM/IS,E. Each of the major commands (Army Materiel Command, Army National Guard, Army Reserve, and Medical Command, and installations) has a choice of service providers that will execute environmental restoration services at the installation. Most active installations have the Army Cleanup Program activities managed by AECs environmental restoration division, which is now located in San Antonio with IMCOM Headquarters.

AEC does not have any official GSR initiatives outside of what is outlined in the AECS. AEC like, the other services states that GSR related activities/processes are captured in the CERCLA remedy selection process and also through remedial system optimization activities on active remediation sites/projects. AEC does not have a written optimization

policy nor does it have written policy requiring HQ approval for groundwater pump treatment systems.

2.3 Navy GSR Policy and Guidance

Key Navy organizations that are involved in the development of cleanup policy include:

- Assistant Secretary of Navy Installations and Environment (ASN I&E)
- Chief of Naval Operations(CNO)
- Naval Facility Engineering Command (NAVFAC) Headquarters

The Navy's current position on a written GSR policy is that the DoD GSR policy is sufficient and provides the Navy the necessary flexibility to conduct restoration activities and incorporate GSR where applicable as outlined by the 2009 DoD GSR policy memorandum. The Navy has no plans of developing a written GSR policy.

The Navy has a restoration policy titled Department of Navy (DON) Optimization Policy that follows and incorporates the principles of GSR. In an interview with the Navy's Assistant Principal for Restoration, Deputy Assistant Secretary of the Navy (DASN), Environment, Mr. Richard Mach, identified that the Optimization Policy considers green principles as part of the process and evaluation. The

Navy optimization policy was signed in 2004. The optimization policy required by NAVFAC is for all remediation response actions and has the following requirements:

- Requirement to use three NAVFAC Optimization Guidance Documents
- Requires Headquarters approval for all new groundwater pump and treatment systems
- 3rd party evaluation of optimization
- Track progress within NORM (reporting process/metrics):
 - Recommendations from optimization study
 - Implemented strategies
 - Results
 - Cost savings

The optimization policy incorporates many of the green remediation principles outlined by USEPA in the Superfund Green Remediation Strategy. The Army could benefit by having a similar policy for the Army Cleanup Program. In addition to the optimization policy the Navy has developed a Sustainable Environmental Remediation (SER) Fact Sheet^{xii} that provides information to Navy Project Managers and Program Managers that outlines the Navy's approach to applying SER. The fact sheet serves as a tool-box that provides the user Sustainability Metrics, Environmental Footprint Assessment Methodology, areas

where SER can be incorporated into the CERCLA process and Footprint reduction methods. None of the information or processes in the fact sheet is mandated by a written policy, with the exception of the Optimization Policy. If a Navy Remedial Project Manager (RPM) does not want to consider or evaluate SER, the RPM is not obligated by policy to do so. The Navy is not considering reporting any of the metrics identified in the SER fact sheet as part of the EO metrics for 13514 or 13423 (Mach 2010).

2.4 Air Force GSR Policy and Guidance

Key organizations that are involved in the development of cleanup policy include:

- Assistant Secretary (AS), Installations, Environment, and Logistics (I, E&L)
- Deputy Assistant Secretary (DAS), Environment, Safety, and Occupational Health (ESOH)
- Air Force Center Engineering and Environment (AFCEE)

The Air Force does not have a written policy for GSR. The Air Force, similar to the Navy, is following the DoD Policy for GSR. The Air Force is in the “practice of considering all environmental effects of implementation and operation, and incorporating options to maximize net environmental benefits of cleanup actions” (Headquarters 2010). The Air Force is calling its GSR activities initiatives. The overall Air Force objective for the GSR initiatives is to incorporate GSR as part of a holistic approach for cleanup (Headquarters 2010).

The Air Force has developed an optimization tool to incorporate GSR in active remedies. AFCEE and its partners have developed the Sustainable Remediation Tool (SRT) to serve two general purposes: 1) planning for future implementation of remediation technologies at a particular site, as well as 2) planning a means to evaluate optimization of remediation technology systems already in place or to compare remediation approaches based on sustainability metrics. The SRT allows users to estimate sustainability metrics for specific technologies. Note Air Force is not considering any of the GSR metrics for inclusion into the Air Forces sustainability campaign plan to meet EO13514 and 13423 reporting requirements.

Air Force, like the Navy has a policy requiring approval of groundwater pump and treatment systems. This management control process definitely will assist with managing active cleanup remedies that have the potential to cause more environmental damage than the net environmental benefit of the cleanup action. The majority of the GSR initiatives are through the AFCEE Technology Transfer section. The AFCEE Technology Transfer section has submitted potential draft language for consideration of a written GSR policy to the Air Force DAS ESOH (Becvar 2011).

The Air Force also similar to the Navy has a web page that provides information to project managers' and program managers' information regarding green and

sustainable remediation^{xiii}. Also the information provided by the Air Force is not policy. Managers are not required to do any of the GSR practices.

2.5 USEPA Principles for Greener Cleanup

On August 27th, 2009, The United States Environmental Protection Agency (EPA), Office of Solid Waste and Emergency Response (OSWER) issued guidance titled “Principles for Greener Cleanups” (EPA OSWER, August 2009). In the EPA “Principles for Greener Cleanups” EPA states “These principles for Greener Cleanups are not intended to allow cleanups that do not satisfy threshold requirements for protectiveness, or do not meet other site specific cleanup objectives, to be considered greener cleanup. The Principles are not intended to trade cleanup program objectives for other environmental objectives.” (EPA OSWER, August 2009). Most recently, USEPA released its Superfund Green Remediation Strategy dated September 2010.

2.6 Superfund Green Remediation Strategy

The USEPA HQ developed a Superfund Green Remediation Strategy in September 2010. The strategy consists of three overarching categories: Policy and guidance development; Resource development and program implementation; and Program evaluation. The strategy outlines nine key actions^{xiv} (40 specific actions). As discussed in previous sections, the USEPA

strategy differs from the DoD policy in that USEPA's strategy only focuses on remedy selection and remediation, where DoD is considering all phases of the cleanup process. USEPA does not intend amend CERCLA to incorporate GSR as part of the administrative code, rather, USEPA intends to implement GSR in a similar fashion as the services, although, USEPA is currently developing written policy. How the USEPA written policy translates with respect to execution and implementation on DoD cleanup sites remains to be seen.

Of concern to DoD and the services is that each USEPA region has developed its own Green Remediation Policy, in addition to the HQ strategy. An additional concern is how USEPA as an organization is interpreting the intent and implementation of green remediation and the principles thereof. Is each region following the USEPA HQ Superfund Green Remediation Strategy? In one region there appears to be a different interpretation than what is outlined in the USEPA HQ strategy.

In USEPA Region I, two different Army cleanup programs attempted to incorporate green remediation principles into the remedy selection using the 9 criteria for feasibility studies (FS) for remedy evaluation/selection as outlined in CERCLA. Each program integrated green remediation principles into the FS process and as result both the state and USEPA told the program managers to remove the green criteria.

The 1st cleanup program is the AFCEE IRP program at MMR, Cape Cod, MA (Annex 1 provides an overview of the AFCEE IRP at MMR). AFCEE executes a jointly funded IRP (Army and Air Force DERP funds). The Program Manager was told to remove the green remediation criteria from the FS for a site called CS-10 (Davis 2010). Another Army Cleanup Program at MMR, the Impact Area Groundwater Study Program (a compliance cleanup program enforced under the Safe Drinking Water Act) also received the same direction from the state and USEPA for a FS that incorporated green remediation principles/criteria. The concern of the regulators is that passive remediation is not acceptable. However, in practice, it goes against the principles of green remediation and also against the Superfund Green Remediation Strategy. As discussed in the executive summary and other sections, a better balance needs to be developed when comparing impacts to the overall environment from the cleanup action, especially when future land use and the protection of human health are both met by the passive remedy. The USACE/ASCIM GSR evaluation pilot study will definitely provide the necessary support information to support discussions with USEPA HQ on the matter.

2.7 State Regulatory Agency(s)/Organizations GSR Policy

Four regulatory states agencies (Arizona, California, Massachusetts, and New York) and two state regulatory organizations (Association of Territorial and State Solid Waste Management Officials [ATSWAMO] and the Interstate Technology

Regulatory Council [ITRC]), GSR policies were researched. The author interviewed the Massachusetts Department of Environmental Protection (MADEP) personnel in Boston, MA.

One of the four state regulatory agencies has a written policy on GSR, New York.

New York Department of Environmental Conservation (DEC) issued a program policy for green remediation on August 10th, 2010^{xv}. The policy document provides the concepts and techniques for green remediation. DEC followed the DoD GSR policy where, GSR is applied to all phases of cleanup and is also applicable to the different cleanup programs within DEC. The DEC policy makes GSR mandatory for current remediation efforts. The DEC policy further states that green remediation concepts will be applied to current and future projects. The policy does not modify or replace remedial goals and is not intended to encourage, and does not justify implementation of “no action” or a lesser remedy.

MADEP does not have a formal GSR policy with respect to its primary regulation for environmental cleanup, the Massachusetts Contingency Plan (MCP). MADEP has an informational web page^{xvi} similar to the services that provides information on what green remediation is and how it can be implemented on cleanup projects and within the regulatory framework of the MCP.

The Department of Toxic Substance Control (DTSC) California Environmental Protection Agency (EPA) issued an Interim Advisory for Green Remediation in December 2009^{xvii}. The advisory was similar to the Air Force and Navy position with GSR. A discussion about the regulatory organizations follows.

ATSWAMO is an external regulatory organization for State and Territorial regulatory agencies. August 2010 ATSWAMO issued a draft final report titled “Incorporating Green and Sustainable Remediation at Federal Facilities”. The intent of the report was to focus on current federal agency policies and strategies being implemented that may impact federal facility cleanup projects. The final draft report acknowledges the difficulties of agreeing on how and when to implement green remediation concepts and the discussion about whether GSR should factor into the remedy selection as outlined in the discussion in section 2.6.

ITRC provides guidance to help state environmental agencies gain technical knowledge and develop consistent regulatory approaches for reviewing and approving specific technologies^{xviii}. The ITRC has a GSR team evaluating GSR issues.

3.0 Areas of Consideration for Army GSR Policy Development

After completing a review of the various GSR policies, guidance, and initiatives within the services, federal and state regulatory agencies, as well as regulatory work group organizations such as ATSWAMO, the following provides some insight into potential policy considerations for GSR within the Army.

3.1 GSR Definitions and Metrics

ASCIM and DASA ESOH should evaluate the current ASCIM GSR initiative being executed by the USACE and validate whether the GSR evaluations conducted and the associated outputs from the evaluation merit any consideration for incorporation into ASCP metrics for the Army. The USACE GSR evaluation effort will consider environmental, economic, and societal parameters.

The environmental, economic, and societal parameters that will be used in conducting the GSR evaluation should be compared with what the Army will be required to report as part of the ASCP for compliance with the EO's. The Army currently provides an annual sustainability report that draws from existing Army environmental and energy databases. Some care should be used in evaluating the database sources that Army is currently using to generate that annual sustainability report and what the Army will be required to report as part of the

compliance with the EO's. An example where the appropriate installation or command may not be reporting the data correctly is in the area of energy consumption, GHG calculations, and renewable energy attributes/credits for Army cleanup sites.

On Army installations, restoration projects are supposed to work with the installations public works. The RPM provides funds to the public works for the electricity consumed for the cleanup activities/actions. This is then tracked as consumed electricity by the public works on the installation. However, this often does not occur and the Project Manager/Program Manager responsible for the environmental cleanup works directly with the public utility company to pay for the electricity. This will result in the data on energy consumption for the electricity for the cleanup activities never being captured because the installation public works personnel are out of the loop and only report up what the installation consumes for electricity, even though the cleanup project is consuming electricity on the installation.

This further complicates how the Army captures electricity consumption data which is used to calculate GHG inventory for the Army and baseline energy efficiency savings. In Annex 1, the renewable energy case study at MMR provides further evidence that data calls/information being reported for GHG inventory are being missed. The Air Force nor the Army is claiming credit for the

renewable energy generated at MMR. MMR is a Massachusetts's Army Guard (MA-ARNG) installation however MA-ARNG is not reporting the renewable energy being generated into the ASCIM energy database. ASCIM uses an energy database for the Army to track energy consumption and renewable energy. The ARNG HQ Energy Manager, CW3 Swihart, identified that the MA-ARNG has not reported any renewable energy for MMR. The example of how the electricity is consumed and not tracked because the public works personnel do not have visibility on the energy consumed/purchased directly from a public utility company is also occurring at MMR.

With respect to GSR metrics, a review of the Army Cleanup Program energy requirements and how each project is paying and reporting energy consumption should be conducted in support of identifying potential renewable energy opportunities. The Army Cleanup Program may not be properly reporting energy consumption, which in turn could potentially skew the GHG inventory. If renewable energy projects are implemented to meet cleanup energy requirements, the Army will not be capturing the appropriate GHG reduction credits/data from the renewable energy efforts in the Army Cleanup Program. The renewable energy case study on MMR in Annex 1 further illustrates this.

3.2 Budgetary Planning and Programming Considerations for Army GSR Policy

The question of how much does it cost to implement GSR has been asked by several organizations. Each of services already has costs for planned and programmed for sites that are identified for execution or have the potential to go to the cleanup phase. DoD requires the services to prepare cost to complete (CTC) estimates for the environmental liability for each site identified. As identified in the previous sections, the Army, Air Force and Navy have been conducting GSR practices in the remedy selection and system optimization process. This practice was never called GSR. For this aspect of GSR the CTC estimates would appear to be reasonable and have no additional cost associated for programming and planning purposes.

There are some areas within the definition of GSR that could have potential unrealized costs associated with conducting GSR in the different phases of the cleanup process. The DoD GSR policy identifies that all phases of the cleanup process are to be considered for GSR as compared to USEPA's Superfund Green Remediation Strategy which focuses on the remedy and remediation.

A question that needs analysis, are there cost savings realized with applying green principles to traditional site characterization methodologies? Does it cost more to apply green principles versus conducting business as usual when

conducting site characterization? With the remedy selection and system optimization there are definitely potential cost savings, especially if the issue with the regulators concern about DoD using GSR to select passive remedies is resolved. The ASCIM/USACE GSR evaluation effort will definitely provide some insight with respect to costs and life cycle analysis of remedies with GSR applied. If the ASCIM/USACE effort identifies additional costs from conducting the GSR evaluation process and the Army decides to develop a written policy requiring GSR for all projects, the Army Cleanup Program would need to identify the requirement/additional cost and ensure that the difference is captured in the next budget programming effort when the policy/requirement is implemented. ASCIM would also have to adjust the Program Objective Memorandum (POM) to capture the GSA policy requirements.

3.2.1 Environmental Liability Cost to Complete (CTC)

If there are un-captured costs as a result of a new Army Cleanup Program GSR policy how does the un-captured cost get captured in the current environmental liability CTC process. The current process requires CTCs to be developed with Remedial Action Cost Engineering Requirements (RACER), a cost estimating program that is mandatory when developing cost estimates for CTCs. RACER is not designed to incorporate GSR into the CTC for environmental liability. DoD and or the services would have to fund and develop GSR modules for RACER, if a GSR policy had a related

cost increase to the traditional cleanup methods outlined in the RACER cost estimating program. More than likely, the service(s) that makes GSR a policy will incur an additional cost increase and be responsible for the development cost to update the estimation software.

3.2.2 Competing Program Budget Interests

Within each cleanup program, the program manager may have internal competing budget interests. Working with constrained budgets, program managers may have to prioritize which sites get funding based upon a variety of issues to include political and human health risk. Within the DERP program there are definitely competing budget interests. The IRP is supposed to be ramping down and the MMRP program is ramping up with respect to execution. The budgets for the DERP program did not increase to accommodate the increase in execution rate for MMRP. The annual DERP budget remains constant each year. The theory is that as the IRP execution rate ramps down because the majority of the IRP environmental liabilities have remedies in place, there should be budget available to increase the execution rate of the MMRP because all of the sites are at the beginning stage (site characterization).

Another potential competing internal budget issue is the ASCIM internal evaluation of all the IRP sites with remedies in place. ASCIM is comparing

the remedy and remediation objectives against the future land use to identify whether the future land use is compatible with the remedy being executed. Some IRP sites have remedies that are not compatible with the future land use. For example there are active cleanup remedies for sites that have no mission or training requirement to address the environmental liability immediately. As compared to some sites that have remedies that do not address the environmental liability fast enough to meet the mission/training requirements. ASCIM is evaluating all of the remedies to identify sites that require the environmental liability to be addressed quicker than what has been put in place for the remediation objective/goal. If the results of the internal evaluation identify sites with the need for additional resources to accelerate the cleanup, this effort will definitely become a competing interest. Also related to this issue are sites with 20 plus years of Long Term Care/Monitoring. A question being asked, should the Army be spending the funding to monitor indefinitely? Should the funding for long term monitoring identified for the 20 plus years be invested into removing more contamination to further reduce the liability instead of monitoring? Add a GSR policy and a pilot program to conduct renewable energy project for cleanup sites, it becomes a competing budget interest.

3.3 MMR Case Study: Renewable Energy on Army Cleanup Project

In area of renewable energy the Army is facing some unique challenges with respect to funding the construction/operations of renewable energy systems and managing the renewable energy attributes and potential financial benefits for the installations in an effort to reduce energy demands. The Army lacks policy on how to manage the renewable energy attributes and potential financial benefits of operating renewable energy systems on installations (Kidd 2010). Annex 1 provides a case study overview on renewable energy on an Army Cleanup Project article titled “Army Cleanup Program and Renewable Energy Opportunities” (LTC Bill Myer 2010).

4.0 DA GSR Policy Recommendations

The Army needs to develop a written policy for green sustainable remediation (GSR) that capitalizes and incentivizes remediation system optimization/practices that integrates green principles into remedy selection, future land use, and integrates the use of renewable energy for cleanups (current and future) with long term cleanup energy requirements. The following are key policy recommendations:

4.1 Renewable Energy Pilot Program Army Cleanup Program

DASA ESOH should direct a pilot study on implementing renewable energy on Army Cleanup sites that have long term cleanup energy requirements to operate and maintain active remediation. The renewable energy pilot study should be

started in FY 2012. In conjunction with conducting the renewable energy pilot program on Army Cleanup sites, DASA E & S needs to develop a renewable energy policy that outlines the Army's desired end state for renewable energy attributes (energy and environmental) and potential renewable energy financial benefits for the installation (demand response program, sale of renewable energy certificates (RECs) and sales of excess energy) by the end of FY 2013. A draft policy memorandum for the Renewable Energy Pilot Program Army Cleanup Program is enclosed in Annex 2.

The pilot study should capitalize on the lesson learned from MMR from the planning, construction, management, operations and maintenance and execution of the renewable energy project. DASA E & S should resolve the issues identified in the MMR renewable energy case study to support the development of the renewable energy policy. Additionally, the Army Cleanup Program should identify current and future IRP cleanup sites with energy requirements and validate and how energy is accounted for at the installation to ensure that the cleanup energy consumption is being properly reported. The Army Cleanup Program should develop and prioritize a list of installations based on the annual or forecasted cleanup energy consumption to support the selection of pilot study sites for evaluation for renewable energy source potential. Based upon this evaluation DASA ESOH and DASA E & S should select 5 sites to implement renewable energy sources on to meet cleanup energy requirements and support the development of the DASA E & S Renewable Energy Policy.

4.2 Renewable Energy Policy

During the execution of the renewable energy pilot study for the Army Cleanup Program, DASA E & S will be able to develop and staff the Renewable Energy Policy using data generated from the pilot study sites selected to implement renewable energy for the cleanup energy requirements. The DASA E & S renewable energy policy should maximize the financial and renewable energy attributes (energy and environmental) and benefits, short term and long term, to maximize and leverage the gains in support of the Army Energy program (similar to private industry).

In support of the proposed policy the Army should conduct a legal review of Financial Management Regulation (FMR) Volume 12, Chapter 12 and identify/validate whether the Air Force interpretation for the sale of excess energy is valid. There are many portions of the FMR that allow for the benefit/financial incentives to be returned to the installation. For example, the DRP allows the installation to receive a financial incentive (funding from a private utility company for participation) not related to energy efficiency savings and this funding is directly credited to the installations O&M account. The FMR also allows installation to use energy efficiency savings realized (un-obligated funds) to be placed into an extended availability energy savings account. The un-obligated funds can remain in the account for up to five years as originally appropriated. 50% of the funds have to be used for morale, welfare, and recreation and the remaining 50% for additional energy efficiency projects at the installation.

Throughout the FMR, the benefits go directly to the installation. The Army needs to get clarification from DoD on various areas of the of the FMR and an explanation of why sales of excess electricity energy would be sent to a general fund receipt account, 2240, per the Air Forces legal interpretation, instead of an appropriation account for the installation. DoD needs to clarify the definition of the statement “the appropriation account currently available to military department concerned for the supply of electrical energy”. This statement is not specific and subject to interpretation. If DoD’s clarification supports concept that the appropriation accounts at the installation are applicable, then issue is resolved.

Also related to the sales of excess energy is the management and or sales of RECs as a renewable energy attribute. The policy should outline the Army’s desired end state on renewable energy attributes (energy and environmental). Additionally, the Army needs to seek clarification or develop its own opinion with respect to sales of RECs. If USEPA or any federal agency can buy RECs, why couldn’t any federal agency sell RECs generated as a result of complying with EO and EPACT requirements? Why wouldn’t the Army take advantage of such benefits in a time of constrained and reducing budgets?

4.3 GSR Policy for System Optimization and Remedy Selection

DASA ESOH should develop a written GSR policy for the Army Cleanup Program to conduct system optimization following a similar process conducted by the Navy and Air Force by the close of FY 2013. The GSR policy for system optimization should have financial incentives that benefit the installation and the Army Cleanup program in a similar fashion to those outlined in the energy efficiencies program in the DoD Financial Management Regulations (FMR) Volume 12, Chapter 12. If through system optimization the installations are able to document a cost savings either the installation or the Army Cleanup Program should be able to take unobligated funds and place them into an account similar to the program developed for energy efficiency savings to incentivize the system optimization. The logic is also similar to the sales of excess energy as discussed in the MMR case study.

The policy should include a similar management control process that requires DASA ESOH approval (Air Force and Navy policy) for future pump and treatment systems in the Army Cleanup Program.

DASA ESOH GSR policy should include GSR evaluations for all remedy selection and remedial system optimization efforts (current and future) pending the outcome of the Omaha District USACE/ASCIM GSR evaluation pilot program. The Army should evaluate whether the USACE/ASCIM GSR evaluation

outputs merit inclusion into the Army sustainability reporting as well into the ASCP reporting metrics.

4.4 DoD/Army Engagement of US EPA HQ

DoD and DASA ESOH should engage USEPA HQ to identify a better balance in the CERCLA remedy selection process that allows for a better balance between the overall impact to the environment and the overall impact from the remedy selected for GSR. When green remediation principles are integrated into the feasibility study (FS) and remedy selection process, remedies with a lesser impact to the environment are discounted because the remedy is not an active cleanup/remedy. Many regulators (state and federal) are for green and sustainable remediation however, many regulators appear to be unwilling to consider passive remediation as an alternative or balance to the overall environmental impact of the cleanup. USEPA, DoD, and the Army need to have a dialog to discuss the balance between impacts to environment, active versus passive remedy versus future land use, and define a decision point or balance that better matches DoDs and USEPAs green remediation policy. The USEPA green remediation policy in practice is not balanced with respect to how the regulators are implementing the intent of the policy.

4.5 MMR Renewable Energy Case Study Recommendations

If the Army is going to develop a policy for renewable energy and wants the installation to benefit from hosting the renewable energy source, the Air Force legal opinion regarding the sales of excess energy at MMR needs to be validated or changed as soon as possible. MMR has the potential to generate excess energy for re-sale very soon and if AFCEE follows the process as outlined in the net metering process, AFCEE will potentially set precedence on this issue.

Finally the Army should modify the MOU for MMR to include discussions about how renewable energy attributes and the sales of excess energy will be managed based upon the funding split of the program. The Army is currently not getting RECs for the renewable energy generated at MMR because there is no policy directing or mandating a process on how to manage renewable energy attributes.

Annex 1

MMR Case Study Renewable Energy on Army Cleanup Project:

“Army Cleanup Program and Renewable Energy Opportunities”

Army Cleanup Program and Renewable Energy Opportunities

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Army Environmental Policy Institute

13 December 2010



Introduction

As the U.S. Army continues to develop and implement sustainability as part of their Army Sustainability Campaign Plan (ASCP) (Chiarelli, Army Sustainability Campaign Plan 2010), several challenges require resolution. Sustainability has become part of the Army business process and it is embracing the concept by implementing a variety of sustainable process changes. In area of renewable energy the Army is facing some unique challenges with respect to funding the construction/operations of renewable energy systems and managing the ¹renewable energy attributes and potential financial benefits for the installations in an effort to reduce energy demands. The Army lacks policy on how to manage the renewable energy attributes and potential financial benefits of operating renewable energy systems on installations (Kidd 2010). The U.S. Department of Energy offers unique partnering opportunities and mechanisms to finance the construction and operation of renewable energy systems. However, with these opportunities, the Army does not get the maximum benefit because many of the private industry partnership opportunities want the renewable energy attributes in exchange for support in financing the construction and operation of the renewable energy system.

The Army has a unique opportunity in the area of green sustainable remediation to capitalize on renewable energy opportunities within the Army cleanup program that will allow the Army to capitalize on the renewable energy attributes. The Army Cleanup Program, specifically, the Defense Environmental Restoration Program (DERP), can serve as a viable venue for the Army to meet a portion of its renewable energy requirements/goals as outlined in the ASCP and meet requirements and metrics outlined in Executive Order (EO) 13514^{xix}, EO 13423^{xx}, and the Energy Policy Act (EPACT)^{xxi} (Agency 2010).

¹ The Center for Resource Solutions, which is the largest REC certifier in the US, defines a REC as “A generic term for a bundle of attributes except the actual electrical energy associated with the generation of electricity at a renewable energy facility.”² The “bundle of attributes” includes environmental attributes such as emissions offsets or avoidances.³ These differing definitions present a conflicting view on whether or not ownership of emission offsets is conveyed in a REC.

What makes the Army cleanup program a viable venue to meet a portion of the Army's renewable energy requirements/portfolio?

- DERP funding can be used to build and operate renewable energy system(s) to provide² cleanup energy requirements;
- DERP funding is readily available for use on renewable energy efforts in support of green remediation at numerous Army installations;
- The Army can^{xxii} double count renewable energy certificates (RECs)³ on federal facilities for potential re-sale as a commodity or credit for EO metrics (EO 13514 and EO13423);
- Army can report/take credit for green house gas reduction (GHG) per EO 13514 (^{xxiii}Scopes I and II);
- The potential for the sale of future excess energy for re-investment back to the installation exists once after active cleanup efforts begin to ramp down through⁴ optimization and contaminant mass removal;
- Installations can participate in Demand Response Programs offered by utilities and directly take advantage of financial incentives offered for re-investment at installation;
- Upon completion of active cleanup efforts, renewable energy real property transferred to the installation for continued use of above benefits long after cleanup is complete.

The Army cleanup program has several active remediation sites at installations that have energy requirements and will be operational for several years until the cleanups are complete. Currently the Army does not have any formal policy or guidance on implementation of renewable energy at cleanup sites. That said Army cleanup managers are beginning pursue renewable energy in support of cleanup energy requirements^{xxiv}. If the Army is going to meet its renewable energy requirements it is critical to produce a policy directing the desired outcome supporting the overall U.S. Army energy security strategy to ensure consistency.

² Cleanup energy requirements are the actual energy required to operate the remediation, which is often electricity.

³ Renewable energy certificates (RECs), also known as Green tags, Renewable Energy Credits, Renewable Electricity Certificates, or Tradable Renewable Certificates (TRCs), are tradable, non-tangible energy commodities in the United States that represent proof that 1 megawatt (MWh) of electricity as generated from an eligible renewable energy resource (Wikipedia 2010).

⁴ Optimization process where all components of a environmental remediation process is evaluated and recommendations are provided to maximize the effectiveness of the process e.g. reducing extraction pumping rates, adding new extraction wells, reduced operation times as contaminant mass is removed over time, etc.

This article will examine the different types of cleanup funds, program advantages and limitations with respect to renewable energy as part of the U.S. Army cleanup program. Further, a case study of a jointly funded Army and Air Force cleanup site in Massachusetts's that has been through the process of implementing a renewable energy project using DERP funds will be examined. This case study will offer several valuable lessons learned and identify process changes that will require clarification or modification to allow the Army to maximize the benefits of renewable energy on its cleanup sites. Following the case study potential solutions, policy recommendations/clarifications, and the way ahead will be discussed.

Background

The Army cleanup program consists of two primary components (DERP and Compliance Cleanup) based on the type of funding. The first component is the DERP, which consists of the Installation Restoration Program (IRP) 10 United States Code (USC) 2701 and the Military Munitions Response Program (MMRP) 10 USC 2710. The average annual budget for the Army in the DERP appropriation has been approximately \$400 Million per year (Kelly 2010). The second component is the Compliance Cleanup program, which uses Army Operation and Maintenance (O&M) funds. The level of funding for the Army's Compliance Cleanup program averages approximately \$35-40 Million per year (Roughgarden 2010). Additionally the Army serves as an executive ⁵agent to the Department of Defense (DoD) executing the formerly used defense sites (FUDS)⁶ program, with the United States Army Corps of Engineers (USACE) being responsible for program management and execution. Also as part of the Army cleanup program is the Base Re-alignment and Closure Act (BRAC) cleanup which supports bases being de-activated or excess property.

The DERP has the most flexibility in executing renewable energy projects in support of the cleanup energy requirements at installations. Under DERP, projects are exempt from National Environmental Policy Act (NEPA) requirements as well as the Military Construction planning requirements/processes. A critical factor to consider for renewable energy projects in DERP is that the renewable energy system should not be over-designed to meet other energy requirements at the installation. The intent of the DERP funding appropriation is to allow DoD agencies to meet cleanup requirements and address environmental liabilities from past or current DoD

⁵ Executive agent represents all of the services in DoD in addressing the program management and execution of cleanup for FUDS

⁶ FUDS program cleans up only **DoD generated pollution** which occurred before transfer of property to private owners, or federal, state or local government owners (Norfolk District US Army Corps of Engineers 2010)

operations. Renewable energy projects for Army cleanup sites should be designed to meet the energy requirements of the cleanup. DoD's Green Sustainable Remediation Policy Memorandum dated 10 August 2009, also supports the use of renewable energy to reduce energy requirements and provide energy efficiencies (Wieszek 2009).

The second program, the Compliance Cleanup (CC) program can be used to fund renewable energy projects in support of the cleanup effort however the program has the following limitations:

- Limited budget
- Operation and maintenance (O&M) funds have a construction funding limitation of \$750K (definition of minor construction in Military Construction [MILCON⁷]). Any construction project greater \$750K has to follow the MILCON planning/programming/execution process.

A case study of a jointly funded IRP cleanup project that has implemented a renewable energy project to meet to the cleanup energy requirements using DERP funds follows.

MMR Renewable Energy Case Study

Massachusetts Military Reservation (MMR) is located on Cape Cod, Massachusetts. Currently, the MMR is the home for a variety of organizations with the primary tenants being the Massachusetts National Guard (Air and Army), the Air Force, and the U.S. Coast Guard. The MMR was established as base in the 1930's (AFCEE 2010). The U.S. Army built and operated MMR from 1940 to 1946 (AFCEE 2010). The U.S. Air Force operated MMR from 1955-1972 (AFCEE 2010) and in 1976 transferred to the State Massachusetts's and licensed to the Massachusetts Guard by the Army. In 1982, the Air National Guard initiated the Installation Restoration Program (IRP) to address various chemical releases to soil and groundwater from past industrial operations. A total of 73 areas of concern (AOCs) were identified by regulators with 21 of the 73 AOCs requiring an investigation. Currently the MMR IRP has nine groundwater pump and treatment systems that extract and treat over 14.5 million gallons of groundwater per day (Forbes 2010). To date the MMR IRP cleanup has cost over \$600 million dollars to execute (Davis 2010).

⁷ MILCON has a five year planning period for execution and is often difficult to get appropriations (competing MILCON project interests)

The MMR IRP is being executed by the Air Force Center for Engineering and Environment (AFCEE) for both Army and Air Force IRP cleanup sites. The Air Force and the Army both contribute DERP⁸ funding to execute the cleanup at the sites according to a memorandum of understanding (MOU) between the Army, Army National Guard, Air National Guard and Air Force (MOU 2005). To date, only one wind turbine has been constructed and is operational. Two additional wind turbines are under contract for construction in fiscal year (FY) 2011. Total construction costs for all three wind turbines are \$14,433,923 with the Army portion being \$9,974,582 (69%) of \$14,433,923 construction costs. A discussion regarding the cost benefit analysis that was conducted to support the decision to use DERP funding to build and operate a renewable energy system to meet cleanup energy requirements follows.

MMR Cost Benefit Analysis

In 2005, AFCEE received approval to use Army and Air Force DERP funds to build and operate a wind turbine for several cleanups sites at MMR. The 1st wind turbine was to provide 25-30% of the energy requirements for the operations of the nine groundwater pump and treatment systems. The average annual electricity cost to operate the nine groundwater pump and treatment systems is approximately \$2 million per year⁹. AFCEE conducted a sustainability assessment on the electricity generation to power the groundwater pump and treatment systems and identified the following conclusions (Forbes 2010):

1. Renewable energy would reduce the cost of electricity to operate the systems
2. Offset air emissions from the commercial power plants used to generate the electricity
3. Provide 25-30% of the programs electricity needs

In discussions with the AFCEE IRP Manager, Jon Davis (Davis 2010), AFCEE had to go through several steps prior to receiving approval to use DERP funding for the construction of a wind turbine in support of a cleanup project. The first step (most critical) was to conduct a cost benefit analysis of multiple scenarios for using wind turbines.

⁸ DERP funding is provided by congress to address DoD environmental liabilities and restoration for all of the services. Each service has DERP funding account. The Army DERP funding/appropriation is called Environmental Restoration, Army (ER,A) or 2020.

⁹ FY 2009, electricity costs were greater than \$2 million.

Since 2005, AFCEE has received funding from the Army and the Air Force to build two additional wind turbines. With the two additional turbines, AFCEE used the following four scenarios to outline the cost benefit analysis (See Table 1):

1. No wind turbines;
2. One wind turbine;
3. Two wind turbines;
4. Three wind turbines;

Table 1

Wind Turbine Scenarios Cost Benefit Analysis

Baseline (no turbines)	Cost	Other Considerations	
Electricity FY 10-36	\$44,523,329		
Scenario 1 (One existing turbine)			
Turbine Cost	\$5,000,000	% of ERA requirement provided by wind between FY 10-36:	54.26%
Electricity and Maintenance Cost*	\$18,928,527	Year Wind addresses 100% of ERA electricity requirement	2031
Net Reduction in ERA CTC FY 10-36	\$20,594,801	Value of electricity generated for other MMR users	\$147,547
Scenario 2 (One existing turbine + One 1.5MW turbine)			
Turbine Cost**	\$11,000,000	% of ERA requirement provided by wind between FY 10-36:	80.59%
Electricity and Maintenance Cost*	\$7,162,570	Year Wind addresses 100% of ERA electricity requirement	2019
Net Reduction in ERA CTC FY 10-36	\$26,360,759	Value of electricity generated for other MMR users	\$14,797,046
Scenario 3 (One existing turbine + Two 1.5MW turbines)			
Turbine Cost***	\$15,000,000	% of ERA requirement provided by wind between FY 10-36:	91.89%
Electricity and Maintenance Cost*	\$3,251,537	Year Wind addresses 100% of ERA electricity requirement	2014
Net Reduction in ERA CTC FY 10-36	\$26,271,792	Value of electricity generated for other MMR users	\$37,306,743

* Cost of non-wind generated electricity and maintenance of wind turbine

** Cost of one additional turbine with primary electric work

*** Cost of second additional wind turbine

(Davis 2010)

The cost benefit analysis for three wind turbines identified that the three turbines would address 100% of cleanup energy requirements by 2014. The analysis also identified that the three wind turbines would also generate \$37 million in excess energy from 2014 to 2036 (the estimated completion date of the cleanup). AFCEE also identified that the initial investment in the first turbine would pay for itself in 5-8 years (Forbes 2010). The cost benefit analysis was a significant factor in providing the justification to use DERP funding to meet the energy requirements for the remaining life cycle of the MMR IRP cleanup efforts. Another critical step was the process of monitoring, recording, and accounting for the electricity generated from the wind turbine.

MMR Net-Metering Process

AFCEE developed a written agreement with the NStar Gas and Electric Corporation (NStar Electric Company 2009) on how to manage the electricity generated from the wind turbine(s). As part of the process in developing the net metering agreement between the Air Force and NStar, the Air Force identified that any energy in excess of the monthly cleanup electricity requirements were to be returned to the treasury (Cliff Klein (ARPC/SAF/FMP[AFAFO])Lee Maltais and (AFCEE/MMR) 2010). AFCEE considered the sale of excess energy generated above beyond the actual remediation systems energy requirements to be augmentation of an appropriation, thus a violation of the ^{xxv}Anti-Deficiency Act (ADA)¹⁰. AFCEE is following the procedure outlined below to manage and account for energy on the cleanup project:

1. AFCEE is using net-metering to monitor the electricity generated from the wind turbine. Nstar sends AFCEE a check for the electricity generated from the wind turbine. Through Net-metering, NStars measures the electricity generated from the wind turbine which is

¹⁰ Specifically, AFCEE's legal opinion points to the DoD Financial Management Regulation (FMR) Volume 12, Chapter 12 and 10 USC 2916 as a reference document to describe where the revenue from sale of the excess energy is an ADA violation, if the funding is not returned to the treasury. AFCEE identified the treasury general fund receipt account, specifically, General Fund Receipt Account 2240, Sale of Power and Other Utilities, to send revenue from excess energy sales provided to the utility.

distributed to the grid for NStar customers. ¹¹The electricity generated from the wind turbine(s) does not directly power the pump and treatment systems at MMR.

2. AFCEE pays a monthly electric bill to multiple utility companies (in Massachusetts) for the nine IRP pump and treatment systems. The electricity for all of the remediation systems is metered and AFCEE receives a utility bill for the electricity consumed. AFCEE receives and pays for the electricity on a monthly basis. The renewable energy is not 100% operational all the time and AFCEE needs to ensure that the systems are operational¹². Renewable energy is not operational 100% percent of the time due to a variety of reasons ranging from weather to a host of maintenance issues.
3. AFCEE uses the following management control process to maintain visibility on the DERP funding used to pay for the electricity vs. electricity generated from the wind turbines:
 - “Checks received from the utility company will be credited to the Environmental Restoration, Air Force (ER,A) accounts that paid the original utility expenses. For AFCEE, original expenses will be made from an ERA funded MORD citing EEIC 48020 and all credits received will be posted against ERA account EEIC 4802W. This allows for the accounting system to capture all payments and credits and improves visibility for all transactions. All credits received after the time the credits equal expenses (EEIC48020=EEIC4802W) would be considered a sale of electricity and the credit would be deposited with the Treasury. In the case that excess credits are not deposited with the Treasury, AFCEE would be in violation of the ADA as this action would be augmenting the ERA appropriation.” (Cliff Klein (ARPC/SAF/FMP[AFAFO])Lee Maltais and (AFCEE/MMR) 2010).

AFCEE’s legal interpretation of how excess energy sales from DERP funded renewable energy projects in support of the cleanup energy requirements is a process that the Army needs to re-evaluate and potentially develop a policy to address. The AFCEE interpretation has the potential to set precedence not only for renewable energy and the management of renewable energy attributes on cleanup projects but also for renewable energy on installations, regardless of whether the project was funded with DERP appropriated funds. AFCEE participates in a demand responses program that allows the IRP and installation to take advantage of a financial incentive

¹¹ AFCEE evaluated consuming the electricity generated on-site, however, there was not a sufficient transmission grid that would support direct consumption of the energy generated and there was a significant cost associated with building an appropriate transmission grid to deliver the electricity to the remediation systems.

¹² This is the second reason why AFCEE chose net-metering for the wind turbine(s) instead of directly consuming the electricity generated from the wind turbine(s).

offered from a private utility company. Under DoD FMR Volume 12, Chapter 12, the IRP and installation are allowed to receive a financial incentive.

MMR Demand Response Program

At MMR, AFCEE has taken advantage of a financial incentive program offered by Power Pay New England by participating in a Demand Response Program (DRP)¹³. The incentives are credited to the installation's O&M account and remain available for the same purposes and the same period as the O&M account appropriation.

AFCEE signed a DRP agreement with Energy Curtailment Specialists (ECS), to stop active remediation during peak power demand periods when requested by ECS. ECS is serving as a demand response broker and through the Defense Logistics Agency-Energy (DLA-E) executed the agreement on behalf of United States government with AFCEE to take advantage of the financial benefit from this program. The cleanup program has the flexibility to stop the nine pump and treatment systems for a limited time and still meet cleanup goals and objectives. In 2009, AFCEE received \$47,000 for participating in the ECS Power Pay, New England Program. AFCEE credited the Air Guard O&M account at MMR with the funding received. Along the lines of the government being able to take advantage of financial incentives offered by private utility companies, is the issue of how the government manages renewable energy attributes, specifically RECs (energy attributes and environmental attributes). Can or should the government be able to sell renewable energy attributes e.g. RECs, and have the funding from the sales available to the installation for re-use?

MMR Renewable Energy Certificates

AFCEE, under EPACT 2005, is authorized to claim RECs for the green energy generated at MMR. Under EPACT AFCEE can claim two RECs for every 1 megawatt of electricity generated and consumed on-site from a renewable energy source on a federal property/facility. AFCEE is currently not claiming any of the RECs for the renewable energy generated at MMR. AFCEE is also not consuming the electricity on-site from the wind turbines. Discussions with the Jon Davis, AFCEE RPM, identified that neither the Air Force nor the Army have a policy that outlines how RECs are to be managed. The management of the RECs would include the management of the renewable energy attributes, both energy and environmental attributes, such as a credit to meet EO reporting metrics (green house gas reduction) or the sale of REC as financial commodity. The sale of RECs would have similar implications as the sale of excess

¹³ DoD FMR Volume 12, Chapter 12, section 120302 allows the government to receive financial incentives from electric utilities under 10 USC 2913 that are not considered energy cost savings (FMR V12, CH 12, 2009).

energy. An interesting fact to consider is that the Army or any federal agency can buy RECs to meet EO metric/reporting requirements. ¹⁴USEPA is currently meeting its EO 13514 requirements by purchasing 100% green power. So the question becomes, if it is okay to buy RECs to offset energy consumption, why wouldn't a federal agency be able to sell RECs?

The renewable energy project for the MMR IRP has some issues that require immediate resolution. First, the MMR IRP is jointly funded which includes the capital investment of building the three wind turbines with DERP funding. The Army is responsible for funding 69% of the three wind turbines and also pays a similar contribution to the annual operation and maintenance of the turbines. The MOU between the Air Force, Army, and Air National Guard, and Army National Guard will require modification to identify how the excess energy and renewable energy attributes will be distributed between the various stakeholders. In addition to modifying the MOU is the issue of the Air Force and the Army is not claiming RECs for this project. The MOU needs to be modified to address how the Army's portion of the RECs will be claimed and how the RECs, renewable energy attributes, and sales of excess energy will be managed. There is no policy outlining how RECs can be sold as a commodity on the market or any policy outlining how the Army desires to manage RECs within the Army Energy Program. The Army needs to validate or modify the Air Forces current legal opinion on the sale of excess energy and its opinion to return the funding to the treasury to avoid an ADA violation. As identified in Table 1, MMR IRP could have excess energy above the actual cleanup energy requirements by 2014. Also consider the fact that the Army and Air Force are currently missing out on the opportunity to claim RECs for the energy since the startup of the wind turbine(s). Just consider all of the potential RECs/benefits from the operational renewable energy system at MMR that will not be claimed and capitalized on due to a lack of policy.

Issues

In reviewing the MMR renewable energy case study, several issues are identified, all of which point to the need of strategic policy and guidance for renewable energy. One of the strategic level issues is that the U.S. Army does not have a policy integrating potential renewable energy opportunities from the Army cleanup program into the overall Army energy portfolio to meet its various renewable energy goals/objectives outlined in the ASCP and supporting companion documents. Additionally, the Army also lacks a policy outlining how to manage the renewable

¹⁴ To continue offsetting 100 percent of EPA facilities' total estimated annual electricity consumption at all the Agency's 175 facilities with [renewable energy certificates \(RECs\)](#) through the end of fiscal year (FY) 2011, EPA signed two green power contracts—one in November 2009 for 215 million kilowatt hours (kWh), and another in September 2010 for 42 million kWh.

energy attributes (energy and environmental) for the Army Energy portfolio to include RECs, excess energy sales (to benefit the installation), and EO 13514 metric reporting GHG reduction (Scope I and II). An Army Energy policy is needed to outline what the desired end state is for the various benefits and renewable attributes/credits and determine the best way of managing the benefits to maximize the benefit to the Army in both the short and long term. The Assistant Secretary for the Army (ASA) for Energy and Sustainability, Installations, Energy, and Environment (I, E & E) should serve as the lead agency for the development of the policy. In the interim a pilot program using the Army cleanup program should be conducted to aid the in the development of a policy for renewable energy.

Recommendations

The ASA for I, E, & E should serve as the lead on conducting a pilot program for the Army cleanup program to implement renewable energy on a select number of active cleanup programs with large energy requirements. The pilot program would ensure that all renewable energy projects are managed and executed in a consistent manner (construction, operations, reporting requirements, financial incentives, excess energy sales [if applicable], and manage the renewable energy attributes/credits) that support the desired end state of the Army Energy Program. The DERP level of funding can support the execution of a limited number of renewable energy projects to support the cleanup energy requirements. The pilot program should allow the Secretariat insight as to the best way to leverage the renewable energy attributes for the Army Energy Security Program. Data generated from the pilot program would provide excellent data in support of policy development and future implementation guidance. The pilot program can serve as the tool to work out the lines of communication, reporting, and appropriate stakeholder responsibility for integrating the Army cleanup program renewable energy projects into the ASCP. The pilot program will also help capture the lessons learned from MMR on the program planning, execution/construction, and operation and maintenance, utility accounting (Net-Metering, Utility Bill Payment, DERP funding/appropriation crediting).

ASA I, E, & E will be able to conduct the necessary interagency coordination within the Army as well as with other federal government agency to agency interaction/coordination during the development of a policy. The proposed policy should outline the energy management strategy for the renewable energy attributes and designate a reporting process for capturing the data/credits under the EO. An end product of the proposed policy should include the development of guidance for implementing renewable energy projects on Army Installations.

In support of the proposed policy the Army should conduct a legal review of Financial Management Regulation (FMR) Volume 12, Chapter 12 and identify/validate whether the Air Force interpretation for the sale of excess energy is valid. There are many portions of the FMR that allow for the benefit/financial incentives to be returned to the installation. For example, the DRP allows the installation to receive a financial incentive (funding from a private utility company for participation) not related to energy efficiency savings and this funding is directly credited to the installations O&M account. The FMR also allows installation to use energy efficiency savings realized (un-obligated funds) to be placed into an extended availability energy savings account. The un-obligated funds can remain in the account for up to five years as originally appropriated. 50% of the funds have to be used for morale, welfare, and recreation and the remaining 50% for additional energy efficiency projects at the installation. Throughout the FMR, the benefits go directly to the installation. The Army needs to get clarification from DoD on various areas of the of the FMR and an explanation of why sales of excess electricity energy would be sent to a general fund receipt account, 2240, per the Air Forces legal interpretation, instead of an appropriation account for the installation. DoD needs to clarify the definition of the statement “the appropriation account currently available to military department concerned for the supply of electrical energy”. This statement is not specific and subject to interpretation. If DoD’s clarification supports concept that the appropriation accounts at the installation are applicable, then issue is resolved.

Also related to the sales of excess energy is the management and or sales of RECs as a renewable energy attribute. The policy should outline the Army’s desired end state on renewable energy attributes (energy and environmental). Additionally, the Army needs to seek clarification or develop its own opinion with respect to sales of RECs. If USEPA or any federal agency can buy RECs, why couldn’t any federal agency sell RECs generated as a result of meeting EO and EPACT requirements to use renewable energy as means of reducing energy demand and or dependency. In using Power Purchase Agreements and partnering with private industry for renewable energy projects the government uses the renewable energy attributes as an incentive for the private industry to support/finance such projects. Why shouldn’t the Army take advantage of such benefits in a time of constrained and reducing budgets?

If the Army is going to develop a policy for renewable energy and the wants the installation to benefit from hosting the renewable energy source, the Air Force legal opinion needs to be validated or changed as soon as possible. MMR has the potential to generate excess for re-sale very soon and if AFCEE follows the process as outlined in the net metering process, AFCEE will potentially set precedence on this issue.

Finally the Army should modify the MOU for MMR to include discussions about how renewable energy attributes and the sales of excess energy will be managed based upon the funding split of the program. The Army is currently not getting RECs for the renewable energy generated at MMR because there is no policy directing or mandating a process for renewable energy attributes and how to manage the attributes.

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Annex 2

Draft DASA ESOH Renewable Energy Pilot Study

Army Cleanup Program Memorandum

DRAFT MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Renewable Energy Pilot Study Army Cleanup Program

References:

- a) National Defense Authorization Act, 2010
- b) Army Sustainability Campaign Plan, May 2010
- c) Energy Policy Act (EPACT), 2005
- d) Energy Independence Security Act (EISA) 2007
- e) DoD Green Sustainable Remediation Memorandum, 29 August 2009

1. **Purpose.** This memorandum establishes Army Cleanup Program policy regarding the evaluation and implementation of renewable energy sources to meet Army Cleanup Program energy requirements.

2. **Background.** The Army lacks policy on how to manage the renewable energy attributes and potential financial benefits of operating renewable energy systems on installations. The Army has a unique opportunity in the area of green sustainable remediation to capitalize on renewable energy opportunities within the Army cleanup program that will allow the Army to capitalize on the renewable energy attributes and financial benefits. The Army Cleanup Program, specifically, the Defense Environmental Restoration Program (DERP), can serve as a viable venue for the Army to meet a portion of its renewable energy requirements/goals as outlined in the Army Sustainability Campaign Plan (ASCP) and meet requirements and metrics outlined in Executive Order (EO) 13514, EO 13423, and the Energy Policy Act (EPACT).

3. **Policy.** DASA ESOH will direct a pilot study on implementing renewable energy on Army Cleanup sites that have long term cleanup energy requirements to operate and maintain active remediation. The renewable energy pilot study will start in FY 2012. In conjunction with conducting the renewable energy pilot study on Army Cleanup sites, DASA E & S will develop a renewable energy policy that outlines the Army's desired end state for renewable energy attributes (energy and environmental) and potential renewable energy financial benefits for the installation (demand response program, sale of renewable energy certificates (RECs) and sales of excess energy) by the end of FY 2013.

The pilot study will capitalize on the lesson learned from MMR renewable energy project on planning, construction, management, operations and maintenance and execution of the renewable energy project. Additionally, the Army Cleanup Program should identify current and future IRP cleanup sites with energy requirements and validate and how energy is accounted for at the installation to ensure that the cleanup energy consumption data is being captured/reported through ASCIM. The Army Cleanup Program will develop and prioritize a list of installations based on the annual or forecasted cleanup energy consumption to support the selection of pilot study sites for evaluation for renewable energy source potential.

Based upon this evaluation DASA ESOH and DASA E &S will select 5 sites to implement renewable energy sources on to meet cleanup energy requirements and support the development of the DASA E & S Renewable Energy Policy.

4. **Applicability.** Effective immediately, this policy applies to all Army Cleanup Programs.

Mr. Hugh Wolfe

Deputy Assistant Secretary of the Army
Environment, Safety, Occupational
Health

Mr. Richard Kidd

Deputy Assistant Secretary of the Army
Energy and Sustainability

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Director, U.S. Army Acquisition Support Center

Endnotes

ⁱ The Army executes four primary cleanup and restoration programs: 1) the Defense Environmental Restoration Program (DERP), which includes the Installation Restoration Program (IRP) and the Military Munitions Response Program (MMRP); 2) the Compliance Cleanup Program; the formerly used defense sites (FUDS) program; and base realignment and closure (BRAC) program. The DERP, FUDS and BRAC programs use congressionally appropriated funding to execute cleanup and restoration activities on DERP eligible projects. The Compliance Cleanup program funds the cleanup and restoration activities that are not eligible for DERP funding.

ⁱⁱ Army installations include Army Reserve, Army National Guard and Active Army Installations as the associated training land CONUS and OCONUS.

ⁱⁱⁱ EO13514 “Federal Leadership in the Environmental, Energy and Economic Performance” signed by President Obama October 5, 2009, supports existing federal energy efficiency requirements and establishes a range of new sustainability goals for the federal government.

^{iv} EO13423 “Strengthening Federal Environmental, Energy and Transportation Management” was signed by President Bush on January 24th, 2007. EO 13423 instructs Federal agencies to conduct their environmental, transportation and energy related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. The order sets goals in the following areas: energy efficiency; sustainable buildings; acquisition; electronics stewardship; renewable energy; fleets; toxic chemical reductions; water conservation; and recycling.

^v EPACT was signed into law in August 8, 2005, requires federal agencies to reduce energy intensity every year in their facilities by 2 percent per year beginning in 2006, up to a cumulative of 20 percent reduction by the end of 2015.

^{vi} Signed 19 December 2007, EISA aims to increase US Energy security, develop renewable fuel production, and improve the vehicle fuel economy. EISA reinforces the energy reduction goals for federal agencies in EO 13423.

^{vii} AECS Nine overarching objectives:

1. Ensure prompt action to address imminent and substantial threats to human health, safety, and the environment
2. Conduct appropriate, cost effective efforts to identify, evaluate, and, where necessary to protect human health and the environment, conduct response actions to address contamination resulting from DoD activities. Maintain relevant cleanup information in a permanent.
3. Comply with statutes, regulations, Executive Orders, and other external requirements governing cleanup
4. Ensure that Army regulations, policies, and guidance are developed within the framework of the Army Environmental Cleanup Strategy
5. Plan, program, budget, and execute cleanup in accordance with DoD and Army directives and guidance using validated, auditable, and site-level data
6. Develop cleanup partnerships with appropriate federal, state, local, tribal, territorial, or host-nation authorities
7. Promote and support public stakeholder participation in the cleanup process, as appropriate, and make site-level cleanup information available to the public
8. Support the development and use of cost-effective cleanup approaches and technologies to improve program efficiency
9. Perform semi-annual program management reviews of cleanup progress against established targets and periodic reviews of sites where contamination remains in place

^{viii} DERP funding is provided by congress to address DoD environmental liabilities and restoration for all of the services. Each service has DERP funding account. The Army DERP funding/appropriation is called Environmental Restoration, Army (ER,A) or 2020.

^{ix} United States Army Corps of Engineers (USACE) Omaha District, Center of Expertise (CX) is under contract with ASCIM/ISE to conduct an inventory of Army Green Sustainable Remediation projects and evaluate recently completed phases of remediation and characterization projects to identify areas where GSR was successfully implemented or could have been implemented.

^x Executive agent represents all of the services in DoD in addressing the program management and execution of cleanup for FUDS

^{xi} FUDS program cleans up only **DoD generated pollution** which occurred before transfer of property to private owners, or federal, state or local government owners (Norfolk District US Army Corps of Engineers 2010)

^{xii} Web Link: to Navy Sustainable Environmental Remediation Fact Sheet:

https://portal.navfac.navy.mil/portal/page/portal/navfac/navfac_ww_pp/navfac_nfesc_pp/environmental/erb/resourceerb/gsr_fact_sheet.pdf

^{xiii} AFCEE hyperlink to Green and Sustainable Remediation Web Page:

<http://www.afcee.af.mil/resources/technologytransfer/programsandinitiatives/sustainableremediation/index.asp>

^{xiv} USEPA Superfund Green Remediation Strategy nine key actions:

1. Clarify the role of green remediation in remedy selection for remedial and non-time critical removal actions
2. Develop a compendium of protocols and tools to help project managers and program managers integrate green remediation practices
3. Identify options that enable the use of green remediation practices
4. Address air pollutant emissions
5. Develop pilot project to evaluate and demonstrate green remediation applications
6. Establish opportunities in contracts and assistance agreements to identify green remediation practices selected in remedies
7. Communicate and share success stories and lessons learned among “implementers” across the program and the public
8. Establish a roadmap for evaluating the environmental footprint of a cleanup at a project level
9. Evaluate the environmental footprints of Superfund cleanups at a programmatic level

^{xv} http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

^{xvi} <http://www.mass.gov/dep/cleanup/priorities/susrem.htm>

^{xvii} http://www.dtsc.ca.gov/OMF/upload/GRT_Draft_Advisory_20091217_ac1.pdf

^{xviii} http://www.itrcweb.org/teampublic_GSR.asp

^{xix} EO13514 “Federal Leadership in the Environmental, Energy and Economic Performance” signed by President Obama October 5, 2009, supports existing federal energy efficiency requirements and establishes a range of new sustainability goals for the federal government.

^{xx} EO13423 “Strengthening Federal Environmental, Energy and Transportation Management” was signed by President Bush on January 24th, 2007. EO 13423 instructs Federal agencies to conduct their environmental, transportation and energy related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. The order sets goals in the following areas: energy efficiency; sustainable buildings; acquisition; electronics stewardship; renewable energy; fleets; toxic chemical reductions; water conservation; and recycling.

^{xxi} EPACT was signed into law in August 8, 2005, requires federal agencies to reduce energy intensity every year in their facilities by 2 percent per year beginning in 2006, up to a cumulative of 20 percent reduction by the end of 2015.

^{xxii} Under EPACT, the energy has to be generated and consumed at the federal in order to take double the REC credit

^{xxiii} The GHG emissions generated directly and indirectly by an entity such as a federal agency can be classified into “scopes,” based on the source of the emissions:

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- [Scope 1](#) emissions are direct GHG emissions from sources that are owned or controlled by the entity. Scope 1 can include emissions from fossil fuels burned on site, emissions from entity-owned or entity-leased vehicles, and other direct sources.
 - [Scope 2](#) emissions are indirect GHG emissions resulting from the generation of electricity, heating and cooling, or steam generated off site but purchased by the entity, and the transmission and distribution (T&D) losses associated with some purchased utilities (e.g., chilled water, steam, and high temperature hot water).
 - [Scope 3](#) emissions include indirect GHG emissions from sources not owned or directly controlled by the entity but related to the entity's activities such as vendor supply chains, delivery services, outsourced activities, employee travel and commuting, T&D losses associated with purchased electricity, and site remediation activities. (Agency 2010)

^{xxiv} Two Army cleanup sites pursuing/using renewable energy include a formerly used defense site (FUDS) site Hastings, Nebraska and Massachusetts Military Reservation (MMR)

^{xxv} The **Anti-Deficiency Act (ADA)** is [legislation](#) enacted by the [United States Congress](#) to prevent the incurring of obligations or the making of expenditures (outlays) in excess of amounts available in [appropriations](#) or funds. It is codified at **31 U.S.C. § 1341**. An important corollary of the constitutional provision is that departments and agencies of the government may not "augment" appropriations either by raising money instead of seeking and getting an appropriation or by retaining funds collected and using them instead of receiving an appropriation. This bar to augmentation of appropriations is regularly violated by the executive branch and often with the consent of Congress. Practices in the nature of revolving funds (funds that are kept liquid by the use of "income" realized by agencies) clearly violate the augmentation limitation. (Wikipedia, Anti-Deficiency Act 2011)

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