

ANL/EA/CP - 98921

RECEIVED
OCT 19 1999
OSTI

ENVIRONMENTAL MANAGEMENT OF ASSEMBLED CHEMICAL WEAPONS
ASSESSMENT PROGRAM

Bobby R. Templin, Gary Frey
Argonne National Laboratory

and

Greg Mohrman
Program Manager Assembled Chemical Weapons Assessment

For Presentation at:

1999 Global Demilitarization Symposium and Exhibition
Joint Commanders Group and National Defense Industrial Association
Tulsa, Oklahoma
May 17-20, 1999

Work supported under a military interdepartmental purchase request from the U.S. Department of Defense, Program Manager Assembled Chemical Weapons Assessment, through U.S. Department of Energy contract W-31-109-ENG-38.

The submitted manuscript has been created by the University of Chicago as Operator of Argonne National Laboratory ("Argonne") under Contract No. W-31-109-ENG-38 with the U.S. Department of Energy. The U.S. Government retains for itself, and others acting on its behalf, a paid-up, nonexclusive, irrevocable worldwide license in said article to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the Government.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

ENVIRONMENTAL MANAGEMENT OF ASSEMBLED CHEMICAL WEAPONS ASSESSMENT PROGRAM

INTRODUCTION

The Assembled Chemical Weapons Assessment (ACWA) Program was established to provide a fast-paced technology management process to investigate promising demilitarization technologies at all stages of development, select those technologies that have the best potential to serve as viable alternatives to the current incineration technology, and determine the effectiveness of the selected technologies. In particular, the aggressive pace of the program has fostered a close examination of ways to advance technologies rapidly through the development and acquisition process.

This paper is not a "how to" guide for future technology development or chemical demilitarization projects. What is presented here is the rationale and strategy that the Program Manager ACWA (PMACWA) has developed to facilitate the ACWA Program through the environmental regulatory process. It is hoped that the lessons learned will be of use to others.

BACKGROUND

Congress established the ACWA Program (Public Law 104-208) in response to public concern regarding the baseline incineration process for demilitarizing assembled chemical weapons. The authorizing legislation instructs the Department of Defense (DOD) to "...identify and demonstrate not less than two alternatives to the baseline incineration process..." Congress suspended funding for construction of incinerators at Blue Grass Army Depot in Kentucky and Pueblo Chemical Depot in Colorado until a date 180 days after DOD provides Congress with a report detailing the effectiveness of each demonstrated alternative technology and its ability to meet applicable safety and environmental requirements. An additional constraint that Congress stipulated was that "none of the funds in this or any other Act may be obligated for the preparation of studies, assessments, or planning of the removal and transportation of stockpile assembled unitary chemical weapons or neutralized chemical agent to any of the eight chemical weapons storage sites within the continental United States."

Congress did not define baseline incineration and assembled munitions in Public Law 104-208. However, DOD previously defined baseline incineration to be the technology and process in place at the Johnston Atoll Chemical Agent Disposal System (JACADS) (PMCD 1988) and the Tooele Chemical Agent Disposal Facility (TOCDF) located at Deseret Chemical Depot in Utah. The DOD defines assembled chemical weapons as munitions containing both chemical agents and explosive materials that are stored in the U.S. unitary chemical weapons stockpile. This definition includes rockets, projectiles, and mines. Unitary agents include chemical blister agents (e.g., the mustard agents H, HD, and HT) and chemical nerve agents [e.g., GB (sarin) and VX] (CBDCOM 1997a).

Work supported under a military interdepartmental purchase request from the U.S. Department of Defense, Program Manager Assembled Chemical Weapons Program, through U.S. Department of Energy contract W-31-109-ENG-38.

Congress also directed the DOD to designate a program manager for ACWA who was independent of the baseline incineration management, i.e., independent of the Program Manager Chemical Demilitarization (PMCD). The PMACWA will only demonstrate alternative technologies (i.e., not baseline incineration). The PMACWA must then report on the feasibility of those technologies to Congress. Unlike the PMCD programs, the ACWA Program was not charged with the systematic construction and operation of facilities or processes to reduce the chemical stockpile. Any destruction of chemical munitions under the ACWA Program will be ancillary.

RELATIONSHIP TO OTHER CHEMICAL DEMILITARIZATION ACTIVITIES

The PMCD remains responsible for the Chemical Stockpile Disposal Program (CSDP). The PMCD operates the baseline incineration process at JACADS, Johnston Atoll, and at TOCDF, Deseret Chemical Depot. Baseline incineration facilities are also under construction at Anniston Chemical Activity in Alabama, Pine Bluff Chemical Activity in Arkansas, and Umatilla Chemical Depot in Oregon. Plans remain on hold for demilitarization systems at Blue Grass Army Depot and Pueblo Chemical Depot pending the release of funds for facilities at those locations.

The PMCD Alternative Technologies and Approaches Program is developing chemical neutralization processes for the low-volume bulk stockpiles located at Edgewood Chemical Activity in Maryland and Newport Chemical Depot in Indiana. Commonly referred to as Alternative Technology I or Alt. Tech. I, this program was established in response to the directive in Public Law 102-484 to examine non-baseline alternatives at those sites having only bulk chemical storage - Edgewood and Newport. Although the program is also concerned with alternatives to incineration, it is not associated with the ACWA Program, which is directed toward alternative technologies for assembled chemical weapons.

THE DEMONSTRATION PROGRAM

To meet the programmatic goal of demonstrating at least two alternatives to the baseline incineration process, the PMACWA developed a three-phased implementation plan: (1) development of criteria for screening potential disposal technologies, (2) technology assessment, and (3) technology demonstration.

Opportunities to integrate the input of stakeholders (i.e., communities, regulators, and other concerned parties) have been built into every phase of the program. The primary mechanism for stakeholder involvement is the Dialogue on Assembled Chemical Weapons Assessment. Participants in the Dialogue process include representatives from affected communities, appropriate state and tribal regulators, U.S. Environmental Protection Agency (EPA) staff, DOD staff, representatives from national citizen groups, and other concerned parties. The goal of the Dialogue process is to draw on a wide range of experience, perspectives, and expertise in support of efforts to identify, demonstrate, and deploy safe, effective, and broadly acceptable methods for disposing of chemical munitions and any resulting materials and waste streams.

Working with the Dialogue participants, the ACWA Program Technical and Environmental Teams developed several sets of criteria for selecting the technologies to be included in the demonstration program. These criteria were designed to eliminate proposals for technologies that were technically infeasible; could not support the ACWA Program's objective or time constraints; were likely to result in obvious, significant environmental impacts; or were unlikely to be acceptable to the general public.

The DOD issued a Request for Proposals (RFP) (CBDCOM 1997b) on July 28, 1997. Each response to the RFP was evaluated against the screening criteria. Through this evaluation process, the PMACWA selected six technologies for inclusion in the demonstration program. These technologies included systems developed by the following lead companies: AEA Technology, Burns and Roe, General Atomics, Lockheed Martin, Parsons and Allied Signal, and Teledyne Commodore. Because of funding limitations, ACWA is currently only demonstrating technologies provided by Burns and Roe, General Atomics, and Parsons and Allied Signal.

THE ENVIRONMENTAL LEGAL AND REGULATORY CONSTRAINTS

In Public Law 104-208, Congress required that all "...applicable federal and state environmental and safety requirements..." be met by the ACWA Program. Thus, the ACWA Program demonstrations must be performed in compliance with all applicable federal, state, and local environmental laws and regulations. Therefore, the PMACWA must obtain all the necessary permits and approvals prior to any demonstrations. In addition, the demonstrations must comply with all applicable Army and DOD regulations.

Early in the program, it was unknown how many firms would respond to the RFP and what technologies they would propose. This lack of information hampered efforts to secure the needed environmental permits and prepare National Environmental Policy Act (NEPA) documents in advance. However, guidelines were developed on the basis of constraints of chemical surety requirements, current environmental regulations, the prohibition on the transportation of chemical munitions and surety items, provisions of the Chemical Weapons Convention (CWC), and the ACWA schedule. From these guidelines, a strategy was developed to meet environmental regulatory requirements within the ACWA schedule.

Permitting

It was anticipated that handling and management of chemical munitions during the demonstration and evaluation phase of the ACWA Program would be subject to provisions of the Resource Conservation and Recovery Act (RCRA). Chemical weapons slated for destruction are waste, sometimes hazardous waste, as defined by RCRA. In addition, the treatment and destruction technologies would likely be a waste treatment process as defined by RCRA. Test residues, by-products, and spent materials used during the demonstration are also expected to be hazardous wastes. Therefore, ACWA demonstrations must comply with state hazardous waste regulations and federal regulations where the states have not received complete EPA authorization for their program.

The assumption that chemical munitions would be considered hazardous waste if removed from storage for use in the technology assessment and demonstration was important in discussions regarding permits. An argument could have been made that the use of these munitions in the ACWA program is for research and development (R&D) rather than treatment and disposal. However, this argument would be difficult to sustain because the R&D effort would result in treatment and disposal. The use of this argument would also have been counter to the assertion that the chemical agents withdrawn from the munitions should be counted toward destruction rather than R&D use under the Chemical Weapons Convention (CWC).

The accelerated schedule for the ACWA Program made it extremely difficult to develop new RCRA treatment, storage, or disposal facility permits, known as Part B permits, before the planned demonstration start dates. Typically a RCRA Part B permit can require a year or more to be developed and approved. RCRA Part B permits already in place, or in the process of approval, might have been used to meet the current ACWA timetable. However, none of the chemical stockpile sites or Army chemical agent test facilities had permits in place or in the approval process that could have been used without major modifications. These modifications would have been comparable to developing and obtaining approval for a new permit. Part B permits are also nontemporary in nature and may not have been acceptable to the regulatory community for this type of program.

Research, development, and demonstration (RDD) permits appeared to be appropriate for the ACWA Program. This form of permit is specifically for "any hazardous waste treatment facility which proposes to utilize an innovative and experimental hazardous waste treatment technology or process for which permit standards for such experimental activity have not been promulgated..."(40 Code of Federal Regulations (CFR) 270.65). Conceptually, RDD permits require less time in review and preparation because they are more limited in nature. It is possible that a RDD permit could be developed and approved in 180 to 270 days. However, this relatively short development approval time cannot be assured, and, therefore, it could not be assumed that permits would have been available in time to support ACWA technology assessments and demonstrations.

Demonstrations could also be conducted under the constraints and requirements established for RCRA treatability studies under 40 CFR, Parts 261.4(e) and (f). However, treatability studies are limited to less than 1 kg (2.2 lb) of acute hazardous waste or 1,000 kg (2,205 lb) of non-acute hazardous waste per test. Waste chemical agents are listed as hazardous wastes in six of the chemical stockpile states: Colorado, Indiana, Kentucky, Maryland, Oregon, and Utah. Those states that were chosen as potential demonstration locations had listed chemical agents as an acute hazardous waste. However, the regulatory agencies in those states indicated that variances from the limits could be granted to allow testing of greater quantities of each agent. In these cases, the 1,000-kg limit for non-acute hazardous waste would be applied to the chemical agents.

The proposed ACWA demonstrations would also be subject to other environmental regulatory requirements. Emissions or releases of the materials used by the various technologies or the test residues could be subject to requirements under the Clean Air Act, Clean Water Act, or Emergency Planning and Community "Right to Know" Act. The various Executive Orders regarding human

health and environmental protection were also reviewed. These requirements were believed to have a lesser impact than RCRA permitting but also had to be considered.

The PMACWA also considered alternatives to traditional environmental compliance. The DOD ENVVEST, in conjunction with the EPA Project XL, offered the possibility of constructing a negotiated regulatory compliance scheme that could be tailored to the ACWA Program. ENVVEST stands for "ENVironmental inVESTment" and Project XL is "Project eXcellence in Leadership." Both programs are intended for tests of innovative strategies to achieve cleaner and cheaper environmental results than conventional regulatory and policy approaches would achieve (EPA 1999). If a proposal is accepted for an ENVVEST/XL project, then the sponsor, regulators, and stakeholders refine the project definition and commit to the terms for project completion. The testing of alternative disposal technologies appeared to be a good candidate for ENVVEST/XL, and the Dialogue provided the sponsor, regulator, and stakeholder interface. However, the time needed to formally establish the project was a key concern.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) applied to the ACWA Program as it would any major federal action. NEPA requires federal agencies to consider environmental factors in decision making. In addition, Army Regulations (AR) 200-2, the Army's NEPA-implementing regulation, requires environmental considerations to be integrated into the decision-making process, thus ensuring that NEPA requirements are evaluated at each major decision point in a program or proposal.

The major decision points of the ACWA program are at the end of each phase. The phases are identified as follows in the RFP:

- Phase I Program Evaluation Criteria Development
- Phase II Technology Assessment
- Phase III Demonstration Testing

Each phase was designed to support the subsequent phase. Although, theoretically, the Army could discontinue activities while in any phase, none of them had independent utility.

Phase I was designed to receive public input on criteria needed to govern the development of alternative technologies. Phase II included soliciting proposals for research into alternative technologies that will meet the criteria. Phase III is the demonstration of the feasibility of selected technologies.

The first issue was whether NEPA analysis must be applied to each phase or to the program as a whole. In this case, the early phases were merely attempts to obtain sufficient information to make the true decision of the program - which technologies were to be demonstrated. There was to be no federal action with the potential of significant environmental impact in the early phases. It is only with the decision to conduct an actual technology demonstration that there would be a federal action to which NEPA applied (i.e., at the decision point at the beginning of Phase 3).

Attempting to apply NEPA independently to each decision point would have created an artificial breaking of the project into smaller elements without looking at the overall (cumulative) relationships and impacts of the whole initiative. At issue was whether the individual phases of the ACWA Program would have independent utility, and hence could be separated. It appears they did not. While the Army could have discontinued the program at any phase of development, these phases were sequenced so that work could not proceed on one phase until a previous phase was essentially complete. Therefore, NEPA applied to the program as a whole and not the individual phases.

The level of NEPA analysis that was appropriate for the program also had to be determined. The Army's NEPA implementing procedures in AR 200-2 identify the appropriate NEPA documentation to be prepared for groups of actions. These lists of actions give guidance on whether to prepare an environmental impact statement (EIS) or an environmental assessment (EA) or to apply a categorical exclusion (CX).

One problem encountered in defining the proper level of NEPA documentation was the lack of a specific listing under an EA, EIS, or CX relating directly to the ACWA Program. A review of the lists indicated that the closest match was in AR 200-2, Section 6-3 (Actions Requiring an EIS), Subpart C, "The disposal of nuclear materials, *munitions, explosives, industrial chemicals and military chemicals, and other hazardous or toxic substances* that have the potential to cause significant environmental impact [emphasis added]."

An EIS is required for a "major federal action significantly affecting the quality of the human environment" (AR 200-2). The EIS includes a discussion of the proposed action, all reasonable alternatives to the proposed action, the affected environment, and the potential environmental impacts of each action. Issues addressed in an EIS include direct, secondary, and cumulative effects; possible land use conflicts; energy requirements; natural resource use; and effects on quality of life. However, the ACWA small-scale technology demonstrations did not appear to be of the size or nature that would require an EIS. The program did not include the actual long-term disposal of hazardous or toxic substances. The ACWA Program was designed for the limited testing or demonstration of treatment systems. The decision to develop full-scale disposal facilities is beyond the scope of the ACWA Program. For these reasons, an EIS was not considered the appropriate level of NEPA documentation.

Categorical exclusions from the NEPA process are for actions that have been determined to normally require, at most, a Record of Environmental Compliance. CX A-11 of AR 200-2, Appendix A, is for a "category of actions which do not individually or cumulatively have a significant effect on the human environment... and for which, therefore, neither an EA nor an EIS is required." This CX would appear to apply if the ACWA assessments and demonstrations could be conducted by established laboratories within enclosed facilities. However, in order to use a CX, an action must also meet certain screening criteria that address whether the action proposed has independent utility and can stand alone. The ACWA Program could not take advantage of CX A-11 because it did not meet the screening criteria for at least two reasons. The first was that under AR 200-2 screening criteria A-31, unproven technologies cannot use a categorical exclusion. Secondly, the program is greater in scope and size than is normal for this category of action.

An EA is required when an action cannot be excluded under a CX, yet an EIS is not necessary because the action is believed to have no significant impacts on the quality of the human environment. An EA would provide the analysis to determine whether an EIS is in fact needed or if a Finding of No Significant Impact (FONSI) can be prepared. Lacking any guidance or direction to the contrary, an EA appeared to be the appropriate level of environmental documentation for the ACWA assessments and demonstrations.

THE ENVIRONMENTAL MANAGEMENT STRATEGY

The legislation that established the AWCA Program did not define what constituted a technology demonstration. Therefore, the PMACWA had latitude in determining the scale of the technology demonstrations, but the schedule, budget, and the number of technologies to be demonstrated did limit the scale of any one technology that would be tested. The time and resources needed to develop permits or to negotiate an alternative arrangement (e.g., ENVVEST/XL) for large-scale facilities did not appear to be in the program's interest.

Although the quantity of material that could be tested was limited in a treatability study, the use of the treatability study provisions required only regulatory notification and not regulatory permit approval. Treatability studies, with variances to use up to 1,000 kg of agent, appeared to fit the scale of testing envisioned by the ACWA technical team. The PMACWA began planning the components of the demonstrations to fit the regulatory definition and limitations of a treatability study. At the same time, discussions were begun with state regulators to secure the needed variances to operate at the larger treatability sample limits.

The definition of a treatability sample had to be taken into consideration in the planning. The limits on sample size applied to waste "as received." This issue was significant because some of the proposed technologies were based on hydrolyzing agents with caustics. This process results in a large mass of material that is mainly water. If the product of this process, hydrolysate, was to be shipped to a demonstration site, the entire mass would be counted against the sample limitations. If the hydrolysate was generated on site, however, the nonhazardous waste portion of its mass would not be counted, because only the hazardous waste component (agent itself) is "received." The problems created by counting the mass of the nonhazardous portion of the hydrolysate as sample mass could be avoided by (1) locating the technologies requiring large masses of hydrolysate at sites where hydrolysate could be generated, (2) ensuring the hydrolysate did not meet the definition of hazardous waste, or (3) adopting a process by which the hazardous waste would not be added until the bulk of the hydrolysate was located on site.

The PMACWA employed all three methods. One demonstration was moved to the point of HD hydrolysate production in order to generate the full quantity of hydrolysate needed for the demonstration onsite. In one instance, the pH of hydrolysates formed from explosives and propellants was adjusted to avoid the hazardous waste characteristic of corrosivity. Similarly, the formulation for a propellant hydrolysate was changed to remove a lead component that would have made the hydrolysate meet the definition of a hazardous waste. The lead component would then be added at the site of the treatability study.

Using RCRA treatability study provisions eliminated the concern that the regulatory review and approval process would be lengthy and thus delay the program. However, the Dialogue Group raised concerns that there would not be the same opportunities for public involvement and regulatory oversight provided by the formal permit process. This issue was mainly a concern with the Utah demonstrations, since multiple locations and a number of demonstrations were involved. The PMACWA overcame this concern by formulating a Stipulation and Consent Agreement with the Utah Department of Environmental Quality (DEQ). This voluntary agreement with the DEQ provided for public meetings to provide information to the public and receive comments on the proposed demonstrations. A regulatory review process and a time constraint of 1 year for testing were made a part of the agreement. The agreement also provided a mechanism to address the variance to use up to 1,000 kg of agent for each demonstration technology.

The decision to conduct demonstrations as RCRA treatability studies reduced the size of the equipment to the point that it could be placed in various test chambers owned and operated by the Army. This procedure placed an additional layer of protection between the environment and the ACWA technology demonstrations. All emissions and releases from the demonstrations can then either be held for further evaluation and, if needed, given additional treatment prior to discharging to the environment, or be routed through additional environmental control equipment. In addition, the PMACWA was able to use the existing air and water permits under which the test facilities already operated.

The NEPA analysis proceeded concurrently with development of the regulatory approvals and the demonstration planning. The use of treatability studies and existing test chambers also aided the NEPA analysis. The treatability studies placed quantity limitations on the demonstrations. The use of existing facilities meant there would be no impacts to the environment from new construction. The analysis focused on compatibility of the technologies with the environmental protections offered by the chambers and the potential impacts of the operations themselves. Mitigating any potential environmental impacts early in the program avoided the possible need to develop an EIS.

The Dialogue Group was used as a means of obtaining early stakeholder and regulatory review. The Dialogue was in fact made part of the internal review process of the draft EA and provided a means to anticipate and address public concerns. At all levels of review, the use of workshop and one-on-one coordination was used to expedite the preparation of the EA. On the basis of the ACWA self-imposed constraints, a FONSI was issued.

Potential problem areas that were uncovered in the treatability study review process and the NEPA analysis were continually fed back into the planning process. Environmental protection and impact mitigation measures were considered throughout the demonstration planning. The ACWA Environmental Team, Technical Team, and Public Outreach Team worked in close coordination to ensure that all elements of the ACWA program were taken into account. Regulatory agencies were given draft test plans for review and comment. This process allowed concerns to be addressed early in the planning process when changes could be more easily made. A series of formal and informal meetings have been held with state and federal regulators to determine their views on the ACWA environmental strategy. Stakeholder views have been obtained through the Dialogue Group and public meetings.

CONCLUSIONS

Environmental planning and management was an integral part of the ACWA Program planning process. To ensure that environmental protection issues could be addressed expeditiously and not delay the demonstrations, the PMACWA scaled the technology demonstrations such that simplified regulatory processes and existing research and development facilities could be used. The use of enclosed facilities for the demonstrations prevents any uncontrolled discharges to the environment and made it possible to conduct environmental assessments relatively quickly. The PMACWA also arranged for public briefings to ease any community concerns over the operations with chemical weapons. These steps precluded regulatory and community resistance to the ACWA activities. The cooperation of the regulators and stakeholders has been a key element in enabling the ACWA Program to move with the speed that it has to date.

Technology demonstrations are currently underway and are scheduled to be completed in late May 1999. The data collected during these demonstrations will be used to prepare and submit a summary report to Congress by August 1999. The challenge continues for the ACWA management to guide the demonstrations to completion and to plan for possible pilot testing. As the scale of the ACWA facilities increase in size, the ease of reduced regulatory processes and environmental analyses will no longer be possible. However, the PMACWA will continue to explore all paths through the environmental process to speed the ACWA program to its goals while at the same time ensuring adequate protection of public health and safety and of the environment.

REFERENCES

CBDCOM (Chemical and Biological Defense Command), 1997a, "Broad Agency Announcement No. BAA-97-ACWA-1."

CBDCOM (Chemical and Biological Defense Command), 1997b, "Solicitation No. DAAM01-97-R-0031," Aug.

EPA (U.S. Environmental Protection Agency), 1999, *XL at a Glance*, Apr. 26, [http://yosemite.epa.gov/xl/xl_home.nsf/all/xl_glance].

PMCD (Program Manager for Chemical Demilitarization), 1988, *Chemical Stockpile Disposal Program, Final Programmatic Impact Statement*, Aberdeen Proving Ground, Md., Jan.