

**PILOT TESTING OF NEUTRALIZATION/SUPERCRITICAL
WATER OXIDATION OF VX AGENT AT NEWPORT CHEMICAL DEPOT,
INDIANA
ENVIRONMENTAL IMPACT STATEMENT
RECORD OF DECISION**

Consistent with the National Environmental Policy Act (NEPA) of 1969 and regulations promulgated pursuant thereto, this Record of Decision (ROD) documents and explains the Department of the Army's decision to construct and operate a facility at Newport Chemical Depot (NECD), Indiana, to pilot test a disposal technology for agent VX currently stored at the site in ton containers. The Army has determined that the Final Environmental Impact Statement (EIS) adequately addresses the potential impacts of the Army's actions relating to pilot testing a disposal technology for agent VX stored at NECD. The Army has also determined that conclusions in the Final EIS establish that the decision to implement on-site pilot testing at NECD provides maximum protection to the environment, the general public and workers at the facility. The Army plans to dispose of up to 615 tons of VX stored at NECD consistent with the terms of this ROD.

In making this decision, the Army has considered the transcripts of scoping meetings, public hearings, and all verbal and written comments received during public comment periods associated with the preparation of the Final EIS. Results of analyses contained in the Final EIS are also incorporated into this ROD.

BACKGROUND

Section 1412, Title 14, Part B of Public Law 99-145 (Department of Defense Authorization Act of 1986) and subsequent legislation require destruction of the United States stockpile of lethal unitary chemical agents and munitions. The majority of the chemical agent is stored in the continental United States at eight Army installations and about 4% of the original stockpile total weight is stored at NECD. The chemical agent inventory at NECD consists entirely of agent VX in ton containers. This inventory is obsolete, and its continued storage and associated deterioration with age presents increasing risk to NECD personnel and neighboring communities.

To implement the Congressional directive in Public Law 99-145, the Department of the Army conducted a programmatic environmental review consistent with NEPA and the governing Council on Environmental Quality regulations (Title 40, Code of Federal Regulations, Parts 1500 through 1508). A Final Programmatic EIS was issued in January 1988. In its Programmatic ROD (53 Federal Register 5816, February 1988), the Department of the Army selected on-site incineration as the method by which the Army would destroy the nation's unitary chemical stockpile. However, the passing of Section 173 of Public Law 102-484 required the Secretary of the Army to submit a report to Congress on potential alternatives to using the incineration process for disposal of chemical agent. Two reports by the National Research Council (NRC) (1993 and 1994) formed the basis for the Army's report to Congress in 1994. Using data from commercial vendors, the NRC (1996) re-examined alternative disposal technologies and concluded that, for the agent VX stockpile at NECD, neutralization followed by supercritical water oxidation (SCWO) had a number of advantages over other

alternative technologies. Based on the NRC reports and two independent Army agency reviews, the Program Manager for Chemical Demilitarization (PMCD) recommended proceeding with a pilot test of a neutralization-based technology followed by SCWO at NECD. Another key factor was the recommendation by the members of the Indiana Citizens' Advisory Commission that the Army consider using an alternative disposal technology to incineration.

THE DECISION

The decision is to demonstrate the feasibility of using the neutralization/SCWO disposal technology to destroy agent VX at NECD. The VX neutralization process to be pilot tested at NECD will be composed of simple chemical and physical operations conducted using standard industrial equipment. The Newport Chemical Agent Disposal Facility (NECDF) will include a Chemical Demilitarization Building housing the entire neutralization process, SCWO reactors, and associated support facilities. The NECDF will be enclosed by a double security fence and will have an entry and egress control system to ensure that access to and from the facility will be restricted and controlled. All practical means to avoid or minimize environmental harm from the selected alternative, which is the environmentally preferred alternative, have been adopted.

The demilitarization process begins by mechanically punching the thick walled steel ton containers and draining the VX. The drained containers will be cut in half and sprayed to bare metal with high-pressure hot water. After cleaning and agent-free confirmation, the containers will be shipped off-site to a steel recycling facility. The VX will be added to a neutralization reactor containing water and sodium hydroxide. The chemical reaction that occurs in the reactor destroys the VX and produces a liquid by-product called hydrolysate. Composition of the hydrolysate will be water, sodium hydroxide, and phosphorus, and sulfur organic containing compounds. The hydrolysate in the neutralization reactor will be pumped to a second reactor, mixed again with a sodium hydroxide solution, and tested to confirm agent-free status before being sent to the SCWO unit. If the hydrolysate is not confirmed agent-free it will be kept in the second reactor for further processing and agent-free confirmation before being sent to the SCWO unit. The SCWO unit will operate at approximately 650°Celsius (1,200°Fahrenheit) and 24.1 megapascals (3,500 pounds per square inch). In the SCWO unit the total organic carbon content of the hydrolysate will be destroyed with greater than 99% destruction and removal efficiency. When the reactor contents cool, the pressurized gases (carbon dioxide and nitrogen) and liquids (phosphates, sulfates and water) separate. The gases will be sent through carbon filters and released. The carbon filter system will be under engineering and monitoring controls to ensure agent will not be released into the environment. In the evaporator/crystallizer unit phosphate and sulfate liquids will be evaporated, leaving salts for disposal in a permitted landfill. The majority of the remaining effluent, which has a toxicity level similar to distilled water, will be recycled in the process, while a small amount will be monitored before it is piped to the NECD wastewater treatment plant.

CONSIDERATION OF ALTERNATIVES

The alternatives considered in the Final EIS are the "proposed action" and "no action" (i.e., continued storage of VX in ton containers). The "no action" alternative is addressed as required by Council on Environmental Quality regulations, even though its implementation is precluded by Public Law 99-145. In addition, the "no action" alternative is considered to be deferral of Section 173 of Public Law 102-484 which establishes the very specific goal of

requiring the Army to re-examine alternative technologies to the use of the incineration process for disposal of chemical agents.

At one time, the option of sending the neutralization hydrolysate to an off-site treatment facility was under consideration by the Army. However, technical and programmatic evaluations concluded that off-site treatment is not suitable at this time. Based on these impact analyses it is concluded that conducting pilot test operations at NECD is the preferred environmental alternative for implementing the agent VX neutralization process followed by SCWO.

ENVIRONMENTAL IMPACTS

The site and environs of NECD will be impacted, although minimally, from construction and pilot testing operations. The principal areas of potential impact are listed below.

- Impacts from construction of the disposal facility are expected to be typical of that for any medium-sized industrial facility. Construction activities will result in increased levels of airborne fugitive dust and emissions from construction vehicles. Emissions from commuter and construction vehicles will contribute minor amounts of some criteria pollutants. The anticipated influx of workers into the NECD area to support construction and operations was found to result in little potential for adverse impacts on the demands for services and on the existing infrastructure. In fact, beneficial impacts to the local economy should result from the proposed construction and operation of the pilot test facility at NECD. Impacts on existing ecological resources within the construction area are expected to be minimal.
- During routine pilot test operations at the NECD appreciable human health and environmental impacts are not expected to occur. Routine pilot testing would generate process liquid effluent at a relatively low rate of three liters per minute (0.8 gallons per minute). The effluent generated will come from the evaporator/crystallizer unit. This effluent will be piped to the existing NECD wastewater treatment plant, where it will be further treated, combined with the pollution control center detention basin overflow, then discharged into the Wabash River. The effluent will not exceed water quality standards or adversely affect aquatic biota at the point of discharge or elsewhere in the Wabash River. Therefore, no adverse impacts to human health and the environment should occur during routine pilot test operations.
- The Army has determined that routine pilot test operations will not likely jeopardize the four threatened or endangered species found in the area. To ensure the effluent will not impact listed species in the project area, the Army used the best available scientific and commercial data to analyze the potential harmful effects of effluents during daily operations of the facility. The Army will continue to monitor for newly listed threatened or endangered species in the vicinity of NECD and consult with the United States Fish and Wildlife Service as appropriate.

MITIGATION

The Army will adopt all practicable means to minimize the likelihood and consequence of environmental impacts from the selected alternative.

The Army will apply strict operational constraints to ensure that effluents will be controlled to meet all requirements through the use of state-of-the-art process control technology. Minimal air quality impacts would be expected from construction and routine operations. Appropriate engineering measures will be instituted to minimize fugitive dust emissions during construction, and to ensure compliance with all Federal, State, and local environmental laws and regulations as well as permit conditions during construction and pilot test operations.

Movement of agent VX from the current storage area to the NECDF will be conducted only during daylight hours, and favorable weather conditions.

Workers at the NECDF will be afforded maximum protection through various facility design features, administrative procedures, agent monitoring, personal protective clothing and equipment, training, and adherence to occupational safety and health procedures. No significant adverse impacts to worker health are anticipated.

Emergency planning and response capabilities are being upgraded at NECDF and in the neighboring communities. The Army has provided, and continues to provide, financial and technical assistance to enhance the emergency preparedness activities of State and local governments. The Army, Federal Emergency Management Agency, State, county, and local organizations are working together to enhance emergency response policies, plans, procedures, public education, and guidelines for exercises and training.

SCHEDULE

Award of the contract for the NECDF is planned for the second quarter, federal fiscal year 1999. Construction is expected to begin when all appropriate environmental permits have been obtained from the State of Indiana.


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