Review of the Revised Plan for Off-Site Treatment of Newport Chemical Agent Disposal Facility's Caustic VX Hydrolysate at the DuPont Secure Environmental Treatment Facility in Deepwater, New Jersey:

Summary of the Report to Congress

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DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention

Summary of the Report to Congress

Background

The U.S. Army proposed and initiated a plan for destroying its stockpile (1,269 tons in 1,690 containers) of nerve agent VX* currently being stored at the Newport Chemical Agent Disposal Facility (NECDF) in Newport, Indiana. NECDF was designed and is operated as a pilot-plant facility to destroy the entire Newport VX stockpile.

The first step of the plan occurs at NECDF, where the VX is processed with water and sodium hydroxide. This process results in a waste product referred to as caustic VX hydrolysate (CVXH). The second step, which has not yet been implemented, is to transport the CVXH off-site to the DuPont Secure Environmental Treatment Chamber Works Facility in Deepwater, New Jersey. At the DuPont facility, it will be further treated and the final waste product discharged into the Delaware River with other plant effluent.

Statutory Involvement of DHHS in the Disposal of Chemical Weapons

Public Laws 99-145 (1986), 91-121 (1970), and 91-441 (1971) require the Department of Health and Human Services to provide public health oversight of the Department of Defense plans for the testing, transportation, and disposal of lethal chemical weapons. This function was delegated to CDC from the Office of the Surgeon General in 1981. CDC's public health oversight role generally ends when the lethal chemical warfare materials are destroyed, usually meaning that they have been reduced to hazardous waste that may contain only negligible levels of chemical warfare agent. At that time, the oversight responsibility falls under existing transportation and environmental disposal regulations. With respect to these specific proposals, however, CDC evaluated the off-site disposal plan pursuant to the congressional request. CDC was not requested to review other destruction techniques or alternate processes. In its normal oversight role, CDC does not create or dictate the design itself, but rather reviews the destruction plan, with a focus on hazard identification and hazard assessments.

The Phase I Review

In March 2004, four U.S. Senators from New Jersey and Delaware, along with four U.S. Representatives (two from each state), requested that CDC formally review the proposal for off-site treatment of CVXH to determine "if there are public health risks involved with the Army's proposal." CDC responded to this request, conducting a review and publishing the findings in a ("Phase I") report[H] in April 2005. The U.S. Environmental Protection Agency (EPA) assisted CDC by reviewing the ecologic impacts associated with the plan.

In the Phase I report, CDC noted that the Army/Dupont proposal sufficiently addressed critical issues in the areas of potential human toxicity, transportation, and treatment of the Newport CVXH, but did note some concerns. Following is a brief summary of the results of CDC's Phase I evaluation:

- Less than half of the Newport VX stockpile had been tested and verified for adequate destruction at NECDF because of insufficient data concerning stabilizers and feed concentrations.
- The potential human health hazards of the untreated CVXH are associated predominantly with its corrosive and caustic properties, and not with nerve agent effects. The toxicity of CVXH does not preclude handling and transportation with proper precautions.
- The transportation plan meets Department of Transportation regulations, and precautions in the plan are adequate to protect the public and personnel.
- The technical review of the DuPont proposal indicated that it is a viable process and should be capable of treating the CVXH.
- EPA's analysis indicated that the DuPont risk assessment does not contain adequate information to determine whether the ecologic risk from the discharge of treated CVXH into the Delaware River is acceptable.

CDC found that the Army/Dupont proposal sufficiently addressed critical issues in the areas of potential human toxicity, transportation, and treatment of CVXH with the noted concerns. EPA, however, concluded that the information about the ecologic risk of treated CVXH discharge into the Delaware River was inadequate. Consequently, CDC could not recommend proceeding with the treatment and disposal at the DuPont facility until EPA's noted deficiencies were addressed.

The Phase II Review

After CDC issued the Phase I report, Congress asked the Army and CDC to work together to address the remaining issues from the Phase I report and to review the proposed DuPont phosphonate removal process. CDC enlisted the support of several organizations to address the diversity of technical issues within the proposed plan. EPA reviewed the ecologic implications of discharging the DuPont wastewater into the Delaware River. A professional engineering consulting firm assisted CDC with its review of the DuPont CVXH treatability studies. The completed CDC "Phase II" report, including EPA's portion, was peer-reviewed under a mechanism furnished by the Agency for Toxic Substances and Disease Registry.

The review focused on three primary areas:

- The information and test results required to address the findings and questions from the initial report to Congress;
- A review of the feasibility of the phosphonate treatment proposal by DuPont; and
- Future issues and concerns involving items such as the plans for process scale-up, actual operations, and managing process change.

Phase II Findings

- The Army/DuPont proposal provided sufficient additional data to address unanswered questions from the first report.
    - NECDF is capable of processing VX, with all combinations of stabilizers and at levels up to 16 percent VX in the reactor (referred to as "16% loading"), to produce a mixture that meets all requirements for shipment to the DuPont facility.
    - The NECDF reactor sample is a critical checkpoint for testing and clearing shipments for off-site treatment and disposal. Representative samples of the mixed VX and other materials in the reactor must be carefully taken and analyzed to ensure that the treatment has met the specifications for transportation and acceptance at DuPont.
    - The Phase II study finding reconfirmed the Phase I conclusion that the transportation plan is protective of public health and safety.

- DuPont's pretreatment and final treatment processes were shown to be effective in removing phosphonates and also in destroying VX and its byproduct, EA 2192, if present, to levels below detection.
- No significant human health risk from VX was evident, based on the processing parameters, at the nearest public drinking water intake to the DuPont treatment facility discharge point.
- EPA was able to assess the potential ecological impact on the Delaware River and no issues were identified.

CDC and EPA Recommendations

- NECDF should continue to improve its quality-control program for its reactor sampling system and provide data to evaluate its performance.
- NECDF needs to develop an effective means to adequately sample the storage containers, due to the potentially long storage time for the CVXH. It is too soon to determine what impact, if any, long-term storage will have on the material's characteristics and its conformance to the clearance criteria.
- EPA recommends that DuPont conduct an ecological baseline study. EPA will provide DuPont with details about this.

Conclusion

CDC has found that the Army/DuPont proposal sufficiently addresses critical issues in the areas of potential human toxicity, transportation, and treatment of CVXH. EPA concluded that all of its previous ecological concerns were sufficiently addressed by DuPont and/or the Army. Consequently, CDC has no critical technical issues with the Army proceeding with its plan to treat NECDF-produced CVXH at an approved facility such as the DuPont facility.

NECDF must consistently produce material to meet the defined criteria and maintain robust sampling and analytical techniques to confirm this for the life of the project. If key CVXH characteristics such as flammability, pH, or an increase in solids content change, CDC recommends that the involved regulators reevaluate the toxicology and transportation to ensure continued protection of public health and safety.

In addition, adequate oversight and safeguard mechanisms, especially in the area of change management, sampling, and communication between DuPont and NECDF, will need further development and refinement to ensure ongoing protection for public health, safety, and the environment throughout the life of the project. CDC will maintain its mandated oversight role and ensure that the quality-control program is consistently met.

*VX = O-ethyl S-[2- (diisopropylamino) ethyl] methyl phosphonothioate.

[H] Review of the U.S. Army Proposal for Off-Site Treatment and Disposal of Caustic VX Hydrolysate from the Newport Chemical Agent Disposal Facility.