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Disposition of PUREX Contaminated Nitric Acid The Role of Stakeholder Involvement

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Westinghouse
Hanford Company Richland, Washington

Management and Operations Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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ABSTRACT

What does the United States space shuttle and the Hanford PUREX facility's contaminated nitric acid have in common. Both are reusable. The PUREX Transition Project has achieved success and minimized project expenses and waste generation by looking at excess chemicals not as waste but as reusable substitutes for commercially available raw materials. This philosophy has helped PUREX personnel to reuse or recycle more than 2.5 million pounds of excess chemicals, a portion of which is the slightly contaminated nitric acid. After extensive public review, the first shipment of contaminated acid was made in May 1995. Removal of the acid was completed on November 6, 1995 when the fiftieth shipment left the Hanford site. This activity, which avoided dispositioning the contaminated acid as a waste, generated significantly more public input and concern than was expected. One of the lessons learned from this process is to not underestimate public perceptions regarding the reuse of contaminated materials.

The quantity of radioactivity in the contaminated acid (each individual shipment) met the criteria for a low specific activity shipment under the Department of Transportation regulations. In the total volume of acid there was less than 0.3 grams (0.01 ounces) of plutonium and 7,400 kilograms (16,300 pounds) of uranium, of which approximately 72 kilograms (158 pounds) was U-235 (i.e. fissile material). Low specific activity shipments are routinely shipped across the country. The handling (including transportation) of hazardous liquid chemicals occurs daily in the continental United States. In 1993 alone, approximately 5.3 X 10^9 liters (1.4 billion gallons) of nitric acid was produced and transported internationally; without substantial incident. However, the transport and disposition of the PUREX contaminated acid generated more interest and comments than was expected for an activity of this type. In comparison, spent fuel shipments from PUREX generated little interest from reviewers.

PUREX DEACTIVATION

In December 1992, DOE directed that the PUREX Plant be shut down and deactivated because it was no longer needed to support the nation's weapons-grade plutonium production. The scope of the deactivation project involves many activities necessary to place the PUREX Plant in an environmentally safe and stable state for long-term surveillance and maintenance. Removing major hazards from the PUREX Plant, such as excess chemicals, spent fuel, and residual plutonium are major goals of the deactivation project. This will reduce the risk of

exposure to both onsite workers and members of the general public. Stakeholder involvement has played a major role in the formation of deactivation plans, implementation of selected strategies and accomplishment of specific goals.

BACKGROUND INFORMATION

Historically, nitric acid was used at the Hanford Site's PUREX Plant to dissolve irradiated fuel elements, and for the separation and purification of uranium, plutonium, and neptunium in solvent extraction operations. The nitric acid was recovered and reused during processing. A specific result of cessation of PUREX Plant operations is that excess chemicals are available, including approximately 692,000 liters (183,000 gallons) of slightly radioactively contaminated nitric acid.

DEACTIVATION PLANNING

The original project baseline for disposition of the excess 10 molar nitric acid was to sugar denitrate the material to approximately 1 molar acid in the PUREX canyon. This process would generate between 300 to 400 metric tons of nitrogen oxides or NO^x as gaseous effluent. Denitration would reduce the liquid volume to be transferred for disposal to tank farms by about 33 percent. This action eliminates the acid but provides no beneficial use for the material, while having potential present and future environmental impacts.

Westinghouse sought ways to beneficially use the material to avoid processing the acid as waste. Brainstorming sessions were held to seek innovative ways to use the material. With no use for the surplus acid identified within the DOE complex, private sector interest was solicited. An expression of interest was received from British Nuclear Fuels private limited company (BNF plc), the sole respondent to the Commerce Business Daily advertisement.

Abandoning the treatment option to sugar denitrate the acid and pursuing the beneficial reuse of the material, along with other changes to the project, resulted in saving $37 million and shortened the duration of the Deactivation project by 10 months. Beneficial reuse of the acid is the most economical and cost effective solution for disposition of the acid.

DOCUMENTATION

The concept of shipping the acid to England for use in a process similar to PUREX was previously addressed under the National Environmental Policy Act (NEPA) as a Categorical Exclusion or (CX). Nuclear proliferation became a potential concern with interest groups. Later DOE determined that the action would meet conditions of the regulations that require additional NEPA review. Therefore an Environmental Assessment was prepared to provide a quantitative analysis of potential risks and environmental impacts associated with the proposed action and alternatives, in the continental U.S. and on international waters, and to allow a determination of whether or not an Environmental Impact Statement is required.

Preparation, review, and approval of the Environmental Assessment took many months. An Ad Hoc stakeholder committee, consisting of representatives from three local interest groups, DOE, and Westinghouse, was formed to facilitate document preparation and review. The Ad Hoc stakeholder committee was used to improve the nitric acid Environmental Assessment

and address many different opinions prior to issuing the document for comment. Subsequently, the draft document was sent to more than 200 individuals, states, Indian Nations, interest groups and affected public for public comment. Public meetings were held on the east coast at the three proposed shipping ports; Portsmouth, Virginia, Baltimore, Maryland and Newark, New Jersey. Figures 1 and 2 show the posters used at the public meetings. During the public comment period more than 50 inquiries for information, clarification, or comment were made. All comments were addressed in the final Environment Assessment.

Comments included a wide range of topics and issues. Some comments were specific to the activity and some comments were unrelated to the project. Comments ranged from concerns about potential spread of contamination to proliferation issues. Comments on proliferation were addressed in the "Environmental Assessment, Disposition and Transportation of Surplus Radioactive Low Specific Activity Acid, Hanford Site, Richland, Washington," DOE/EA-1005, as follows:

> In evaluating the nonproliferation policy aspects of the proposed shipment, DOE considered the facts that BNF plc has a readily available supply of nitric acid, which could be procured from any number of U.S. or other commercial sources, and that interested parties such as Ecology, U.S. Environmental Protection Agency (Region 10), Yakima Indian Nation, and the Confederated Tribes of the Umatilla Indian Reservation do not object to the shipments. In addition, the proposed shipment appeared to be a case-specific solution to a material disposition problem, promoting waste minimization and reducing potential emissions to the environment. The export would not make a material contribution to the proliferation of weapons of mass destruction and would be consistent with Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions*. These facts appeared to support the position that the transfer of nitric acid from the PUREX Plant was a policy-neutral decision, and did not set a precedent from either a technical or policy standpoint.

Many comments were associated with the transport of the acid across the United States. Some states requested advance notice of shipments. The Department of Energy instituted weekly conference calls to keep states and other interested individuals informed on the status of the shipments.

A Finding of No Significant Impact or (FONSI) was approved by the Hanford Site Manager in May 1995. Shortly there after the first nitric acid shipments to England were made. Figure 3 shows PUREX employees loading acid into the shipping container. The last shipment left the Hanford site on November 6, 1996. A total of 707,000 liters (187,000 gallons) of acid were shipped.

LESSONS LEARNED

The PUREX Transition Project team developed a good working relationship with state/federal regulators/stakeholders. Early and frequent contact with interest groups is key to project success. Flexibility is also key to success. Working directly with outside groups such as the Ad Hoc committee helped to produce an initial draft of the environmental assessment that was more palatable to the public. However, it is ironic that due to specific

concerns, public comment on the disposition of the slightly contaminated acid generated significantly more interest than the transfer of spent fuel. The lesson here is one of perceptions. In this case the greater risk was not the biggest concern. When addressing unique situations such as the disposition of PUREX contaminated acid, it is essential that "normal procedures" not be totally relied upon. Due to frequent interaction with the regulators and stakeholders deactivation project goals were accomplished without delay to field work.

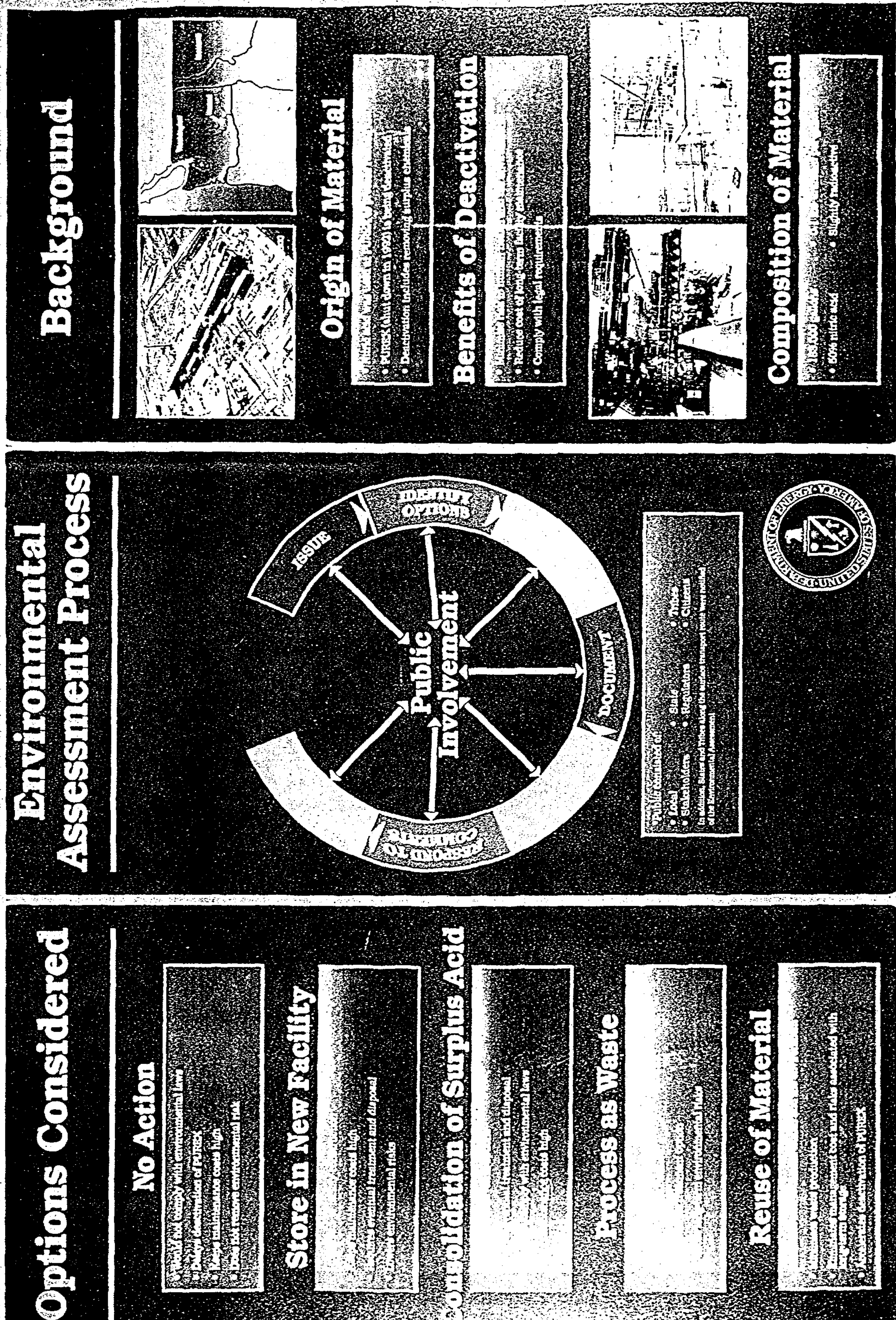

Figure 1. Public Involvement Posters
Disposition of PUREX Contaminated Nitric Acid.

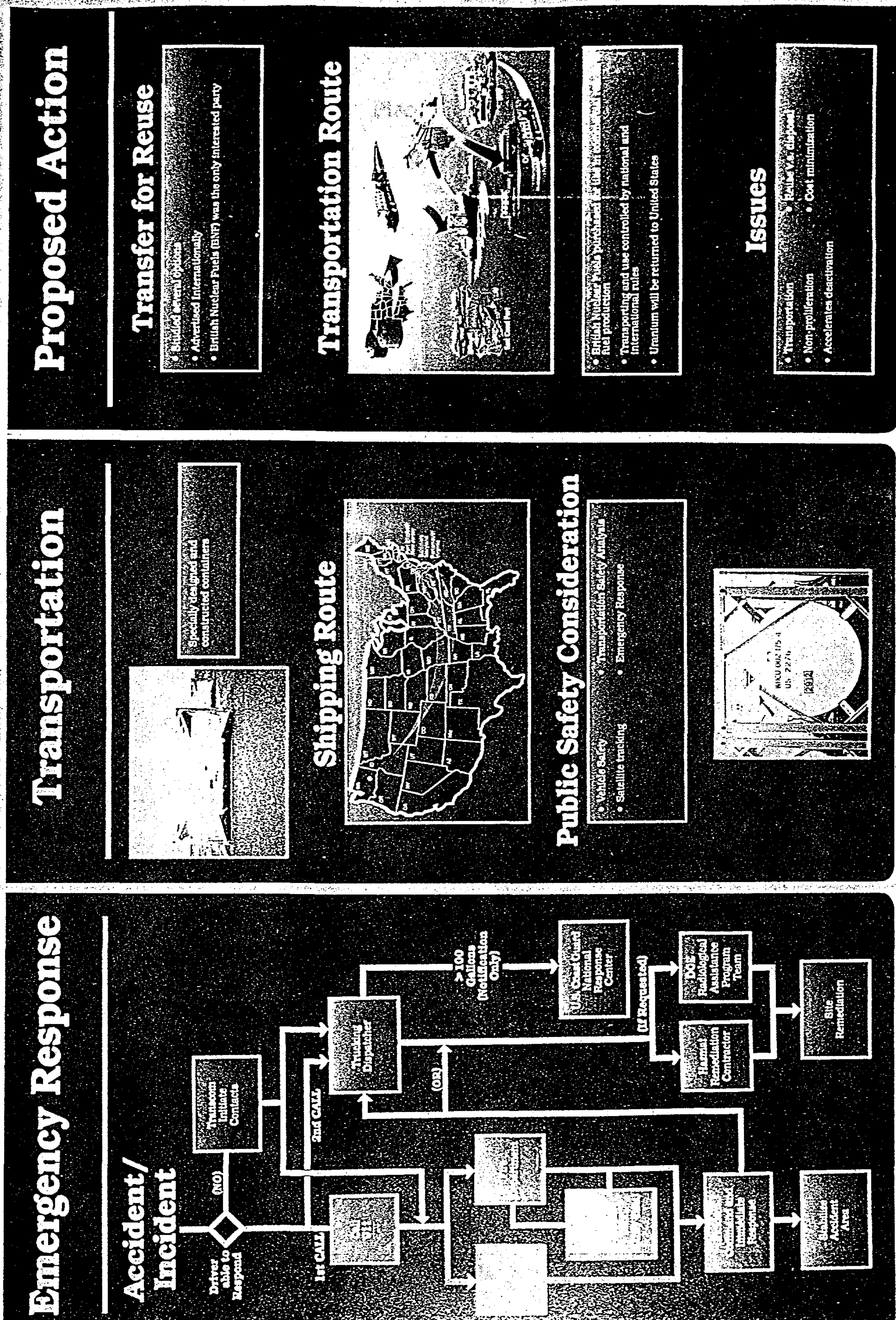

Figure 2. Public Involvement Posters --
Disposition of PUREX Contaminated Nitric Acid.

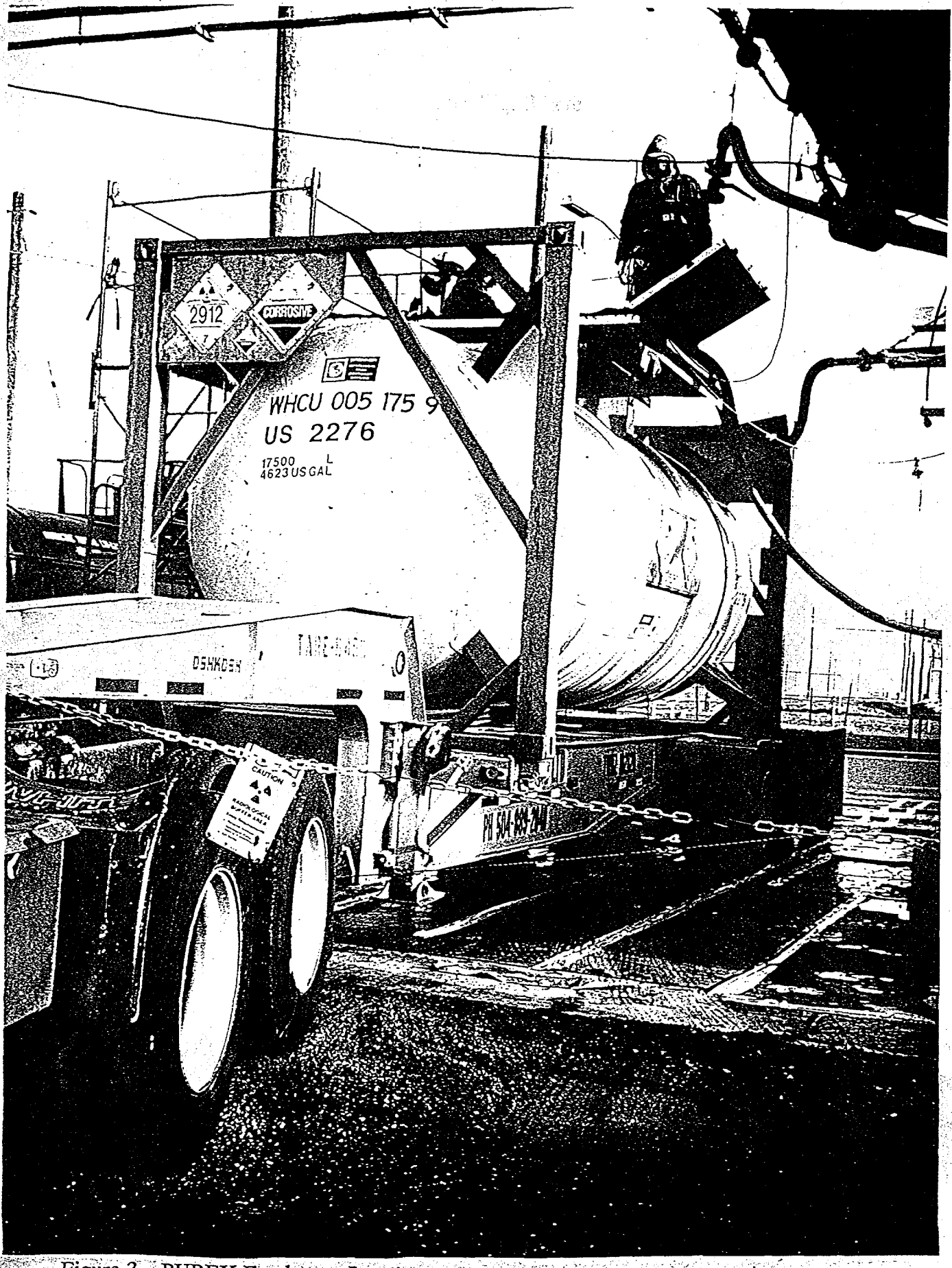

Figure 3. PUREX Employees Loading Contaminated Nitric Acid into a Shipping Container.