

INSTITUTIONAL AGREEMENTS AND INTERACTION FOR RESEARCH AND
DISPOSITION OF NUCLEAR WASTE FROM THREE MILE ISLAND

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ABSTRACT

Various institutional agreements were made for the research and disposition of nuclear wastes from the Three Mile Island accident. The wastes provided opportunities for useful research and development toward commercial disposition. Interaction among the participating institutions occurred in the spirit of cooperation. Of particular importance were the participation by area citizens in the monitoring of krypton-85 and cooperation of government agencies in the task.

INTRODUCTION

The March 1979 accident at Three Mile Island Unit 2 (TMI-2) created a variety of nuclear wastes atypical of those generated at commercial plants. Included were gaseous, liquid, and solid wastes. Normal paths for disposing of commercial wastes were not available to these wastes because of their form, because they had such high concentrations of radionuclides (predominantly cesium and strontium), or because of transuranic contamination. Further, the unique characteristics of these wastes made them candidates for research and development of ways to treat and dispose of accident-generated wastes. Consequently, the U.S. Department of Energy (DOE) formulated two agreements for accepting the waste, one with the Nuclear Regulatory Commission (NRC) and the other with plant owner GPU Nuclear. In addition, DOE and its contractor EG&G Idaho, Inc., established a citizen-managed program to monitor the atmosphere for the release of gaseous waste, principally krypton-85. DOE developed the program in cooperation with the local citizens, the Pennsylvania Department of Environmental Resources (DER), The Pennsylvania State University, and the U.S. Environmental Protection Agency (EPA).

INTERAGENCY AGREEMENT FOR TMI-2 WASTE

The DOE and NRC developed a Memorandum of Understanding ensuring that TMI would not become a long-term waste disposal facility. It provided that with DOE's acceptance of the waste for generally beneficial research, development, and testing, such activities would be performed at appropriate DOE facilities. The memorandum also stated that DOE might take possession of other abnormal wastes for cost reimbursable disposal. The specific wastes for which the Memorandum of Understanding accounts are: EPICOR II System (Class C ion-exchange) wastes, Submerged Demineralizer System (SDS) wastes, reactor fuel, transuranic contaminated wastes, and Makeup and Purification System resins and filters.

DOE and the NRC worked closely to carry out this task, and the NRC kept state and local government officials and the public informed of progress on the Island. DOE provided technical support to GPU Nuclear through the department's contractor EG&G Idaho.

ADDITIONAL AGREEMENTS AND COOPERATIVE INTERACTION

The Idaho National Engineering Laboratory (INEL) and Battelle Columbus Laboratory together examined the EPICOR II wastes and performed waste solidification experiments to gain a better understanding of how to handle and dispose of Class C low-level waste. DOE performed a demonstration in which EPICOR II waste was buried in a high integrity container (HIC) specially developed for DOE by Nuclear Packaging, Inc. (NuPac). The burial container met the NRC's technical position on HICs and was certified by the State of Washington for use at the U.S. Ecology facility. A large majority of the 50 EPICOR II liners subsequently were disposed of in commercial burial grounds in Washington State. Additional NRC-funded EPICOR resin solidification research continues at the INEL with the remaining liners.

The highly radioactive zeolites from the SDS were part of a number of DOE research programs, including vitrification of the highly contaminated wastes. SDS liners were also used in a monitored retrievable burial demonstration program. This experience aided in the development of the joule-heated ceramic melter that will be used in the vitrification of West Valley, Savannah River, and Hanford wastes and provided a large part of experience necessary to qualify the SDS vessel as a stainless steel HIC. DOE has been supporting the efforts of GPU Nuclear and NuPac, to get the SDS vessel qualified in Washington State as a HIC.

Gas generation research results from the EPICOR II and SDS waste programs are being reviewed by DOE and its contractors and the Electric Power Research Institute and are among the subjects of discussion with the Edison Electric Institute and the American Society for Testing and Materials. The NRC has also reviewed these results, focusing its attention on gas control for safe waste shipment.

When DOE agreed with GPU Nuclear to accept the TMI-2 core, the department opened new, significant opportunities for research and development. The INEL and other laboratories have begun their examinations of 11 core samples. The results of this work will support reactor safety, while providing experience in handling, shipment, and storage of

damaged fuel. The program will also demonstrate dry loading and unloading of fuel in a rail shipping cask whose design features double containment of damaged fuel and fuel debris.

Meanwhile, DOE and GPU Nuclear are negotiating another agreement for the temporary storage at the INEL and final repository disposition of abnormal transuranic contaminated wastes on a cost reimbursable basis. These wastes are considered unusual because of the high fission product contamination. This waste would include the purification system resin.

DOE and the NRC continue to work together to safely remove and dispose of the TMI waste. The fuel and wastes that DOE has accepted are being shipped according to DOE, NRC, and U.S. Department of Transportation regulations. In addition, the NRC provides DOE with waste shipment inspections and onsite safety reviews at TMI.

CITIZEN RADIATION MONITORING PROGRAM

The citizen-managed radiation monitoring program provided a means for citizens in the TMI area to

independently measure and thereby verify radiation levels reported by the NRC, EPA, and GPU Nuclear during the purge of krypton-85 from the Reactor Building in July 1980. Twelve communities participated in the DOE-established program. The unique effort fostered citizen confidence in public information in the TMI-2 area. In its role, The Pennsylvania State University tested and evaluated the monitoring instruments and trained more than 50 citizens to manage the program and operate the instruments. The Pennsylvania DER assisted the local citizens in instrument siting and data review and reporting.

CONCLUSION

The DOE program for removal and disposition of TMI wastes has provided useful information for the NRC and the private nuclear power industry in handling similar kinds of wastes in the future. The receipt of waste and fuel has brought opportunities for research by the INEL and government laboratories in Washington State and for involvement by the commercial sector. These programs have demonstrated how various government agencies, private companies, and public citizens can work together.