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# Site Decommissioning Management Plan

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**Division of Low-Level Waste Management and Decommissioning  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001**



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## **ABSTRACT**

**The Nuclear Regulatory Commission (NRC) staff has identified 48 sites contaminated with radioactive material that require special attention to ensure timely decommissioning. While none of these sites represent an immediate threat to public health and safety, they have contamination that exceeds existing NRC criteria for unrestricted use. All of these sites require some degree of remedia-**

**tion, and several involve regulatory issues that must be addressed by the Commission before they can be released for unrestricted use and the applicable licenses terminated. This report contains the NRC staff's strategy for addressing the technical, legal, and policy issues affecting the timely decommissioning of the 48 sites and describes the status of decommissioning activities at the sites.**

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- C NRC ACTION PLAN TO ENSURE TIMELY CLEANUP OF SDMP SITES

## ABBREVIATIONS

AEA	Atomic Energy Act	EVES	ESADA (Empire States Atomic Development Associates) Vallicitoes Experimental Superheat Reactor
AEC	Atomic Energy Commission		
AGN	Aerojet-General Nucleonics		
ALARA	as low as reasonably achievable		
ALCOA	Aluminum Company of America	FCSS	Division of Fuel Cycle Safety and Safeguards (NRC)
AMC	American Magnesium Company	FEI	facility environmental investigation
AMS	Advanced Medical Systems, Inc.	FTE	full-time equivalent
ANL	Argonne National Laboratory	FUSRAP	Formerly Utilized Site Remedial Action Program
ANSI	American National Standards Institute		
APCP	alkaline ponds closure plan	FY	fiscal year
APFA	accelerated pulsed fast-critical assembly		
APG	Aberdeen Proving Ground, U.S. Army	GA	General Atomics
		GAC	General Atomics Company
		GAO	General Accounting Office
		GE	General Electric
B&W	Babcock & Wilcox	GEIS	generic environmental impact statement
BPC	BP Chemicals America, Inc.		
BTD	bomb throwing device	GNFC	Gulf Nuclear Fuels Company
BTP	Branch Technical Position	GSA	Government Services Administration, U.S.
BWR	boiling-water reactor		
BWTR	Babcock & Wilcox Nuclear Development Center Test Reactor	GUNFC	Gulf United Nuclear Fuels Corporation
CAL	confirmatory action letter	HEPA	high-efficiency particulate air
CANEL	Connecticut Advanced Nuclear Engine Laboratory	HEU	high-enriched uranium
		HTGR	high-temperature gas reactor
CAVALIER	Cooperatively Assembled Virginian Low-Intensity Educational Reactor		
CDP	conceptual decommissioning plan	IMNS	Division of Industrial & Medical Nuclear Safety (NRC)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act CFA certification of financial assurance		
		LCAAP	Lake City Army Ammunition Plant
		LEU	low-enriched uranium
		LLWM	Division of Low-Level Waste Management and Decommissioning (NRC)
CFR	<i>Code of Federal Regulations</i>		
CIRGA	critical isotope reactor, General Atomics	MDDER	Maryland Department of the Environment and Resources
CNSI	Chem-Nuclear Systems, Inc.		
CSTA	Combat Systems Test Activity	MDH	Minnesota Department of Health
CVTR	Carolinas-Virginia tube reactor	MDNR	Michigan Department of Natural Resources
DEP	Department of Environmental Protection	MED	Manhattan Engineering District
		MEI	Magnesium Elektron, Inc.
DFP	decommissioning funding plan	MELtd	Magnesium Elektron, Ltd.
DLA	Defense Logistics Agency	MPB	main process building
DOE	Department of Energy, U.S.	MTL	Materials Technology Laboratory
DOI	Department of Interior, U.S.		
dpm	disintegrations per minute	NED	New England Division
DU	depleted uranium	NEORS/SP	Northeast Ohio Regional Sewer District/Southerly Plant
		NMI	Nuclear Metals, Inc.
EA	environmental assessment	NMSS	Office of Nuclear Material Safety and Safeguards (NRC)
EPA	Environmental Protection Agency, U.S.	NPL	National Priority List

## ABBREVIATIONS (Continued)

NPS	National Park Service	SDMP	Site Decommissioning Management Plan
NRC	Nuclear Regulatory Commission, U.S.	SER	safety evaluation report
NRR	Office of Nuclear Reactor Regulation (NRC)	SFC	Sequoyah Fuels Corporation
NS	nuclear slip	SLC	Safety Light Corporation
NUMEC	Nuclear Materials and Equipment Corporation	SMB	source material license
		SMSY	source material storage yard
		SNM	special nuclear material
ODH	Ohio Department of Health	SRM	staff requirements memorandum
OEPA	Ohio Environmental Protection Agency	SRP	standard review plan
		SX	solvent extraction
OGC	Office of General Counsel (NRC)		
ONDD	Non-Power Reactors and Decommissioning Project Directorate (NRC)	TBD	to be determined
		TEDE	total effective dose equivalent
		3M	Minnesota Mining and Manufacturing Company
ORISE	Oak Ridge Institute for Science and Education	TI	Texas Instruments, Inc.
OSP	Office of State Programs (NRC)	TLD	thermoluminescent dosimeter
		TRIGA	training reactor and isotopes production, General Atomics
PADER	Pennsylvania Department of Environmental Resources		
PM	project manager	UF	uranium fluoride
PNL	Pacific Northwest Laboratory	UNC	United Nuclear Corporation
PRP	potentially responsible party	USRC	United States Radium Corporation
PTS	Parks Township site		
P&W	Pratt & Whitney (United Technologies)	VOC	volatile organic compound
		VPA	Valley Pines Associates
PWR	pressurized-water reactor		
		WEC	Westinghouse Electric Corporation
RAI	requests for additional information	WEMCO	Westinghouse Environmental Management Company of Ohio
RAWP	remedial assessment work plan		
RCRA	Resource Conservation and Recovery Act	WG	Wyman-Gordon Company
		WHUT	waste holdup tank
RES	Office of Research (NRC)	WMNA	Waste Management of North America, Inc.
RMC	Radiation Management Corporation		
		WRA	Watertown Redevelopment Authority
SCP	site characterization plan	WTR	Westinghouse test reactor
SCR	site characterization report		
		ZPR	zero power reactor

# 1 INTRODUCTION

Each year the U.S. Nuclear Regulatory Commission (NRC) must evaluate requests, mainly from materials licensees, to discontinue licensed operations. The majority of those requests are routine and straightforward and are acted on in a timely manner such that the sites are remediated, if necessary, and released for unrestricted use. However, termination of licenses at some sites is considerably more complex because soils and structures contain nonroutine levels and volumes of radiological contamination. In SECY-88-308 (Contaminated Material Licensee Facilities, October 31, 1988) and SECY-89-369 (Strategy for Decommissioning of Material Licensee Sites, December 8, 1989), the NRC staff listed over 30 sites that involve unique and difficult decommissioning issues requiring special attention to ensure timely decommissioning. While none of these sites represent an immediate threat to public health and safety, they have contamination that exceeds existing NRC criteria for unrestricted release. All of these sites require some degree of remediation, and several involve regulatory issues that must be addressed by the Commission before the sites can be released for unrestricted use and the applicable licenses terminated.

These problematic sites have buildings, former waste disposal areas, large piles of tailings, ground water, and soil contaminated with low levels of uranium or thorium (source material) or other radionuclides. Consequently, they present varying degrees of radiological hazard, remediation complexity, and cost. Some of the sites are still under the control of active NRC licenses, whereas licenses for other sites already may have been terminated or never may have been issued. At some sites, licensees are financially and technically capable of completing decommissioning in a reasonable timeframe, whereas at other sites, the licensee or responsible party may be unable or unwilling to perform decommissioning. In addition, the sites are currently in various stages of decommissioning. At some sites, licensees have initiated decommissioning, whereas at other sites, decommissioning has not yet been planned or initiated. The NRC staff requirements memorandum (SRM) from the Commission, dated August 22, 1989, indicated that it is imperative that the staff develop a comprehensive strategy for NRC activities to deal with these contaminated sites so that closure on decommissioning issues is attained in a timely manner. In

a subsequent SRM dated January 31, 1990, the Commission directed the staff to "...submit a list of contaminated sites in order of priority including the name and location of the site, name of responsible party, condition of the site, schedule and description of the next step in site cleanup, and other pertinent information. The list should be accompanied by a discussion of criteria used to rank each site."

The original report of the staff's planned strategy was submitted to the Commission on March 29, 1990 (SECY-90-121, Site Decontamination Management Program), and was followed by updated reports in April 1991 (SECY-91-096, Site Decommissioning Management Plan [SDMP]) and May 1992 (SECY-92-200, SDMP). Although this is the third update of the SDMP, this is the first publication of the SDMP in the NUREG format. Previous versions of the SDMP were reported to the Commission and catalogued as SECY papers. The NUREG format was selected to facilitate distribution of the report to interested parties and to ease future reference of the information that will not be included in future biennial supplements, such as the detailed site descriptions contained in Appendix A and the descriptions of policy issues that have been resolved. To simplify referencing this SDMP, and future supplements, this NUREG is simply entitled "Site Decommissioning Management Plan."

The objective of the SDMP is the timely decommissioning of the contaminated sites listed in this report (and other contaminated problem sites identified in the future) and the subsequent removal of the sites from the list. Implementation of the following elements of the SDMP will ensure this objective:

- definition of project management plan
- schedules and resources needed for NRC oversight of SDMP site decommissioning
- identification of the sites to be listed in the SDMP
- tracking SDMP site decommissioning progress
- resolution of policy and congressional issues for SDMP implementation and minimization of problems with future contaminated sites

## 2 PROGRAM MANAGEMENT PLAN AND RESOURCES

### 2.1 Program Management Plan

The NRC Division of Low-Level Waste Management and Decommissioning (LLWM) of the Office of Nuclear Material Safety and Safeguards (NMSS) has the overall pro-

gram management responsibility for the SDMP. LLWM is the contact point for information on the SDMP and the overall status of the decommissioning of the sites listed in this report. This includes (1) identifying and resolving policy issues affecting timely decommissioning,

(2) maintaining and updating the site listing in this report, (3) updating the schedule of tasks for decommissioning of sites that have been completed or rescheduled, (4) providing program direction and guidance to NRC organizations having site-specific project management responsibility, and (5) removing sites from the list as licenses are terminated or necessary remediation activities short of license termination are completed.

Each site listed in Appendix A of this report has a specific project manager (PM) assigned primary responsibility for review and approval of characterization and remediation activities. Site-specific project management is divided among the NMSS Divisions of Fuel Cycle Safety and Safeguards (FCSS) and LLWM and the NRC regional offices. The PM listed for each site in Appendix A is the contact for detailed information on the decommissioning of that site. A site monitor from LLWM is assigned to track progress at each site where PM responsibility resides outside of LLWM and to stay abreast of emerging site-specific issues that may impede decommissioning.

Schedules are established for the decommissioning activities that need to be completed to remove sites from the SDMP. The details of the current schedules are in each site's description in Appendix A. The Appendix A descriptions also identify potential problems that may inhibit the timely decommissioning of the site.

NRC has determined that sites in the SDMP warrant special NRC oversight to ensure safe and timely decommissioning. Sites that have shut down and are in the routine process of decommissioning have not been added to the SDMP list. Also, sites that are operational and have contamination in operational portions of the facility have not been added to the SDMP list. A site is placed on the SDMP list if it meets one or more of the following criteria:

- The responsible organization may not be financially viable (e.g., inability to pay for or unwillingness to perform decommissioning).
- There are large amounts of contaminated soil or unused settling ponds or burial grounds that may be difficult to decommission.
- There is long-term presence of contaminated, unused buildings.
- The license was previously terminated, but residual contamination exceeds unrestricted release limits.
- There is contamination or potential contamination of the ground water from onsite wastes.

A site will be removed from the list if it meets one of the following criteria:

- The license has been terminated after acceptable remediation.

- For operating sites that have an inactive, contaminated portion of the site (e.g., a contaminated, inactive settling pond or building or a large volume of contaminated soil), remediation of the area has been completed and the license has been modified to reflect the remediation.
- For unlicensed sites, acceptable remediation has been completed and the responsible party has been notified.
- When regulatory jurisdiction is completely assumed by an Agreement State (e.g., Kerr-McGee West Chicago becoming the responsibility of the Agreement State Illinois).

The residual contamination criteria applied to the decommissioning of the SDMP sites are contained in the Commission-approved "Action Plan to Ensure Timely Cleanup of SDMP Sites", 57 FR 13389 (Action Plan) (see Section 6 of this report). These criteria are based on existing NRC guidance, criteria, and practices.

## 2.2 Program Management Activity in 1992

Since the original SDMP was issued in March 1990, NRC staff has actively pursued site decommissioning and resolution of generic issues. These efforts have led to the decommissioning schedules established in Appendix A. NRC headquarters and regional staff have continued to expend considerable effort reviewing site characterization plans, decommissioning plans, decommissioning activities, and site radiological surveys.

As more sites moved forward in their decommissioning efforts, the number of instances increased where multiple sites required staff attention simultaneously. Previous versions of the SDMP included a detailed system for prioritizing the SDMP sites based on four ranking factors: (1) timeliness of action needed, (2) status of regulatory efforts, (3) knowledge of responsible party, and (4) congressional interest. The staff considered the priority of remediation of the site (i.e., A, B, or C) in its determination of which sites competing for NRC resources would be addressed first. After numerous case-by-case decisions regarding allocation of resources, the staff realized that the prioritization system did not adequately reflect the rapidly changing decommissioning status of the SDMP sites. Because none of the sites pose an immediate threat to public health and safety, the staff's decisions have been primarily based on which staff activity would promote the greatest progress towards the completion of site decommissioning. Congressional, State, and local interests also were significant factors in several cases. Therefore, the prioritization system has been removed from the SDMP. Future resources will be allocated first to those sites where NRC review, or other regulatory activity, is the critical path in the site decommissioning effort.

In 1993, LLWM initiated efforts to improve the planning, coordination, and budgeting of site activities through the development of a project management system. This system will provide information on SDMP milestones, potential slippage in schedules, and resources required to meet the schedules. The staff is currently testing the software using the projects/tasks assigned to one section of the Decommissioning and Regulatory Issues Branch, LLWM. Following the testing phase and assessment, LLWM intends to evaluate whether to expand the system to include significant milestones for each SDMP site and use the system for planning and budgeting.

Following the issuance of the SDMP Action Plan in April 1992, LLWM and regional staff received numerous inquiries from SDMP site owners and interested State and local parties. Several site owners expressed displeasure or surprise at being placed on the SDMP list, but many had questions about the program and their responsibilities. State and local representatives sought specific information about the sites located in their State or community. In responding to these calls and letters, the staff realized that, in general, the SDMP and NRC's decommissioning regulations and guidance were not well understood by the site owners and other interested parties. To facilitate a better understanding of the SDMP, the staff organized a

workshop to discuss the technical and policy bases for the SDMP with all interested parties. The workshop was hosted by NRC in Rockville, Maryland, on November 19, 1992. The response from the approximately 200 attendees was positive and the staff is considering a followup workshop in November 1993 to address certain technical issues in more detail.

### 2.3 Resources

The resource estimates for the SDMP are separated into three parts: (1) resources for overall project management; (2) resources for specific project management, which also include resources for enforcement action to compel timely and effective cleanup; and (3) resources for the resolution of SDMP policy issues.

The resources allocated for SDMP activities in the fiscal year (FY) 1994 budget are provided for the appropriate NRC organizations, in each of the three parts, in Table 1 (see next page). The level of resources in FY 1993-1995 for the SDMP policy and site-specific decommissioning actions are \$700K and 34.6 full-time equivalents (FTE) in FY93, \$700K and 38.2 FTE in FY94, and \$390K and 39.2 FTE in FY95.

## 3 CONTAMINATED SITE DESCRIPTIONS

### 3.1 Summary of Contamination at SDMP Sites

To gain a general understanding of the nature and extent of contamination at the SDMP sites, this section provides an overview of the operations that contaminated the sites and the type and form of contamination currently present. For detailed descriptions of the contamination present at individual sites refer to Appendix A of this report.

Contamination at SDMP sites resulted from a variety of NRC-licensed operations and unlicensed operations. Figure 1 places each of the 46 sites listed in the SDMP as of January 1993 into one of seven general categories of operations.

At 14 of the 46 SDMP sites ore, or other feed material, was processed to produce rare earth or other metals. The feed material for these operations contained significant quantities of uranium and thorium, which were entrained in the resulting waste stream (e.g., slag or concentrated residue). Facilities that conducted nuclear fuels research, or other research involving radioactive material, were located at six of the SDMP sites. Three of the sites manufactured or used a uranium-based catalyst in the production of acrylonitrile, a basic component in the manufacture of plastics. The contamination at the remaining sites

resulted from an assortment of operations including the manufacturing or use of sources containing byproduct material, production of Mg-Th alloys, processing of enriched uranium for use in the fuel cycle, production and testing of depleted uranium weapons, extrusion of uranium metal, production of optical glass containing thorium, and the disposal of contaminated waste.

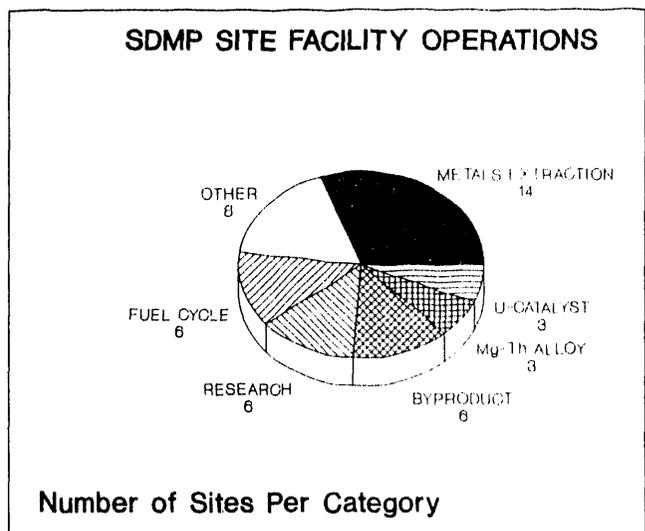


Figure 1

**Table 1 FY 1994 budget allocations for SDMP**

Organization	Resources (FTE)*		
	FY 93	FY 94	FY 95
<b>Overall Program Management</b>			
Division of Low-Level Waste Management and Decommissioning (LLWM)	2.3	2.3	2.3
<b>Site-Specific Project Management</b>			
LLWM	10.6	13.0	14.8
Fuel Cycle Safety and Safeguards (FCSS)	3.0	4.5	4.5
Region I	3.9	4.3	4.3
Region III	2.1	3.1	3.1
Office of the General Counsel (OGC)	1.5	1.5	1.5
<b>Policy Issues</b>			
LLWM	0.6	0.6	0.6
Division of Industrial & Medical Nuclear Safety (IMNS)	3.0	1.5	1.5
Office of Research (RES)	7.0	6.8	6.1
Office of Nuclear Reactor Regulation (NRR)	0.2	0.2	0.2
OGC	0.2	0.2	0.2
Office of State Programs (SP)	0.2	0.2	0.2
<b>Total Resources</b>			
LLWM	13.5	15.9	17.7
IMNS	3.0	1.5	1.5
FCSS	3.0	4.5	4.5
Region I	3.9	4.3	4.3
Region III	2.1	3.5	3.1
RES	7.0	6.8	6.1
NRR	0.2	0.2	0.2
OGC	1.7	1.7	1.7
OSP	0.2	0.2	0.2
<b>Total Full-Time Equivalent (FTE)</b>	<b>34.6</b>	<b>38.2</b>	<b>39.3</b>
<b>Total Technical Assistance:**</b>	<b>\$700K</b>	<b>\$700K</b>	<b>\$390K</b>

\*Direct unloaded FTE.

\*\*NMSS funds only.

Figure 2 shows the type and form of contamination at the 46 sites listed in the SDMP as of January 1993. The material of primary concern to NRC is soil and/or slag contaminated with thorium and uranium. As shown in Figure 2, a large number of SDMP sites contain contaminated soil/slag. Many of the sites contain both thorium and uranium contamination. The thorium and uranium exist in relatively low concentrations. However, the volumes of contaminated material are large.

The soil/slag volumes at the sites range from less than 28 m<sup>3</sup> (1000 ft<sup>3</sup>) to greater than 280,000 m<sup>3</sup> (10,000,000 ft<sup>3</sup>). The total volume of contaminated material of all types, at all SDMP sites, is currently estimated to be approximately 560,000 m<sup>3</sup> (20,000,000 ft<sup>3</sup>). This estimate will change as additional site characterizations are completed.

Three sites contain soil contaminated with byproduct material and one site contains plutonium-contaminated soil.

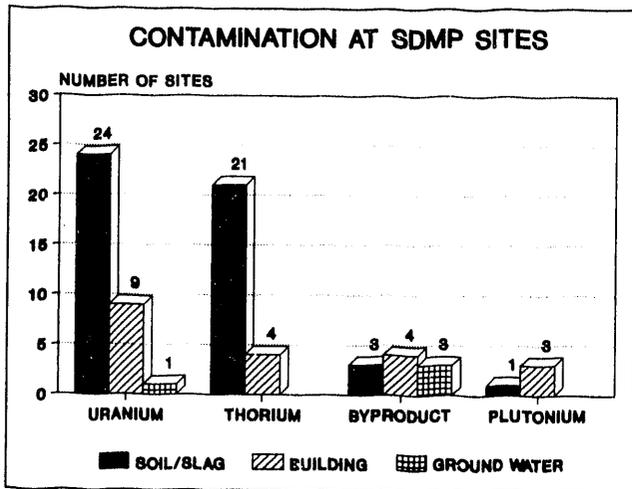


Figure 2

The volume of soil contaminated with plutonium and byproduct material is small at these sites. The contaminated soil does not pose a major regulatory problem and is not the primary reason for the sites being listed in the SDMP. Ground water contamination has been identified at four sites, byproduct material contamination at three sites, and uranium contamination at one. The general absence of uranium, thorium, and plutonium ground water contamination at the SDMP sites is not unexpected since these isotopes are believed to be present in predominantly low solubility forms. The extent of the ground water contamination that has been identified does not indicate a significant risk to public health and safety. However, the presence of contaminated ground water complicates the remediation process because more detailed hydrological analyses are required and remediation is more complex. Also, at several of the sites where radiological ground water contamination has been identified, non-radiological hazardous material also is present.

Again referring to Figure 2, several SDMP sites also have buildings that are contaminated with uranium and thorium. In addition, a small number of sites contain buildings contaminated with byproduct material and plutonium. The regulatory, technical, and long-term health and safety concerns for contaminated buildings are not as great as for the contaminated soil/slag discussed above. The remediation technology for buildings is relatively simple and inexpensive.

### 3.2 Detailed SDMP Site Descriptions

Appendix A contains a detailed description of the characteristics and problems associated with each SDMP site, as well as the contamination present at each site. Each site description contains the following nine elements:

- (1) **Site identification** includes the name of the licensee, location of the facility, license and docket number, the license status, the name of the NRC PM, and the name of the LLWM monitor, if applicable.
- (2) **Site and operations** includes site characteristics such as the nature of the operations, number of process buildings, and site area.
- (3) **Radioactive wastes** includes types of radionuclides present, radionuclide concentrations or exposure rates, and the potential for migration in air or ground water. If there is contaminated soil, information about the area, depth and volume of contamination is included. If disposals have taken place, information is included about disposal methods (e.g., burial or discharge into sewers or other drains) and the type of wastes. If the characteristics of the contamination are not well known, order of magnitude estimates are included.
- (4) **Radiological hazard** includes the basis for the type of hazard (e.g., inhalation, ingestion, intrusion, ground water, occupational), the types of radioactive materials in the contaminated areas, and any actual or potential human exposure. Information on any known non-radioactive waste also is included.
- (5) **Financial assurance and responsible organization** includes available decommissioning cost estimate and financial assurance information. The capability of the responsible organization to perform the cleanup and any problems involved (e.g., licensee bankruptcy, unwillingness to perform cleanup, presence on Superfund list) also are discussed.
- (6) **Status of decommissioning activities** includes whether the licensee has submitted a plan, whether it has been approved, and whether it is a generalized plan or one that specifically addresses necessary remediation and decommissioning efforts. If the licensee is actively remediating the site, information about what work has been completed on buildings, soil, ponds, ground water, etc. is included.
- (7) **Other involved parties** provides information concerning third-party involvement by other State or Federal regulatory or government agencies.
- (8) **NRC/licensee actions and schedule** includes the NRC and licensee actions needed to complete site decommissioning and the schedule for these actions.
- (9) **Problems/issues** includes a synopsis of the issues currently being encountered, or anticipated, at the site that could delay site decommissioning.

## 4 SDMP SITE DECOMMISSIONING STATUS

### 4.1 SDMP Site Status Overview

This section describes the activities, or milestones, used to track decommissioning progress and provides an overview of the decommissioning activities completed to date at SDMP sites. Site-specific progress since the last update of the SDMP (May 1992) and site-specific activities scheduled for completion over the next year, are discussed in Sections 4.3, 4.4, and 4.5.

At 42 of the 48 sites currently listed in the SDMP, the decommissioning of the entire site or an inactive contaminated portion of the site is required. Licensed operations have ceased at these 42 sites or inactive areas. However, for the remaining six SDMP sites, licensed operations are ongoing and the licensees do not anticipate ceasing operations in the near future. In general, the objective at these six sites is not to decommission the entire site in the near future, but to prepare for decommissioning or to evaluate various site-specific problems that would likely lead to a complex decommissioning action, extended over a protracted period of time, if operations were to cease.

Progress at the six sites that require actions other than decommissioning is evaluated on a case-by-case basis. Section 4.5 discusses completed and scheduled activities for these sites. Progress at each of the 42 sites that require decommissioning is measured by tracking eight decommissioning activities, or milestones. These activities are listed below.

- (1) site characterization, including preparing the characterization plan, performing the characterization, and preparing the characterization report
- (2) NRC review and approval of the site characterization plan and site characterization report
- (3) development and submission of decommissioning plan
- (4) NRC review and approval of decommissioning plan
- (5) performance of decommissioning actions described in the plan
- (6) performance of termination survey and submitting termination survey report
- (7) NRC performance and documentation of confirmatory survey
- (8) NRC termination of license

Figure 3 shows the overall progress that has been made towards decommissioning the SDMP sites to date by

showing the total number of sites that have completed a given decommissioning milestone. Figure 3 does not reflect those sites that have been partially characterized and remediated. Partial activities, which represent significant progress in some cases, are discussed in Section 4.3.

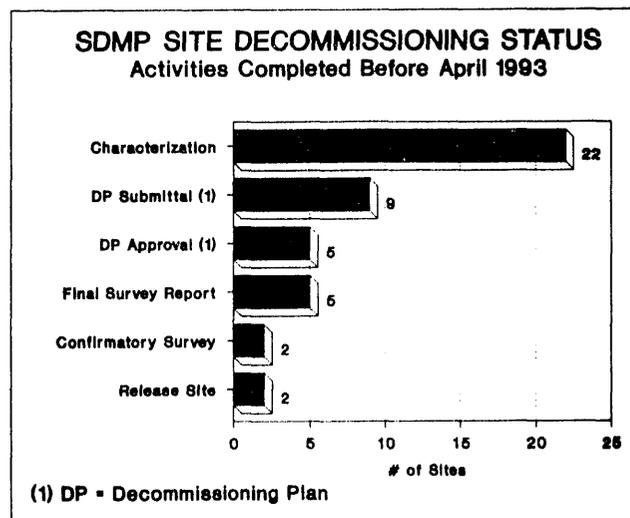


Figure 3

### 4.2 Additions to SDMP List

Three sites were added to the SDMP during 1992: the Anne Arundel County/Curtis Bay site, the United Technologies—Pratt & Whitney site, and the Sequoyah Fuels Corporation site. Detailed descriptions of these sites are in Appendix A. Summary descriptions of these sites follow.

- Anne Arundel County/Curtis Bay (Curtis Bay)

This site was added to the SDMP because that part of the site was removed from the General Services Administration (GSA, now Defense Logistics Agency [DLA]) license in 1977 and residual contamination above acceptable unrestricted use levels was subsequently identified at the site. The Curtis Bay site is located in a southern suburb of Baltimore in an industrialized area of Anne Arundel County, Maryland. The original license was issued to the GSA to store thorium nitrate (average 47 percent by weight) in fiber and steel drums as part of the National Defense Stockpile. A parcel of land from the former stockpile site, including a number of buildings, was sold to Anne Arundel County, in the late 1970's and early 1980's.

A recent NRC contractor survey identified surface contamination that requires remediation in limited

areas of 8 of the 10 abandoned warehouses on the site. Thorium concentrations in soil in excess of the Option 1 limit of the Branch Technical Position on the "Disposal or On-Site Storage of Thorium or Uranium Wastes From Past Operations" (1981 BTP) of 0.37 Bq (10 pCi)/g were identified in 27 surface soil samples and 15 subsurface samples. The volume of contaminated soils and building materials is expected to be low. The DLA has assumed lead responsibility for remediating the site. DLA submitted a conceptual decommissioning plan in February 1993 and plans to submit a decommissioning plan in May 1993. Remediation should be complete before the end of 1993.

- **United Technologies—Pratt & Whitney (P&W)**

This site was added to the SDMP because residual contamination was found at levels in excess of current unrestricted release criteria and the NRC license for the site was terminated in 1971. The site comprises approximately 450 hectares (1100 acres) and is located 8 km (5 miles) southeast of Middletown, Connecticut. P&W has operated the site in Middletown since 1957 for the development and manufacture of aircraft engines. At that time the site was owned by the U.S. Government and operated under contract. Of the approximately 34 major buildings on the site, 22 were identified as locations where radioactive material may have been used or stored during operations at the site. Building 450 has been the only building identified on the site with significant radioactive contamination.

In June 1992 P&W's contractor performed a radiological survey in and around Building 450. Gamma exposure rates measured at waist height inside the hot cells ranged between 5 and 10 nC/kg (20 and 40  $\mu$ R)/hr. Beta-gamma contamination was found to be as high as  $1.4E + 8$  Bq ( $2.3E + 6$  dpm)/100 cm<sup>2</sup>. Removable beta-gamma contamination was measured as high as  $1.4E + 6$  Bq (22,507 dpm)/100 cm<sup>2</sup>; however, the majority of the measurements showed levels below  $6E + 4$  Bq (1,000 dpm)/100 cm<sup>2</sup>. Alpha contamination was not detected in any measurements. Soil contamination was detected under the sump in the floor of hot cells 3 and 4 in concentrations up to 1.0 Bq (27 pCi)/g. The contamination comprises of approximately 98 percent Cs-137 and 2 percent Co-60.

P&W completed remediation of the contaminated areas in December 1992. The termination survey report was submitted to NRC February 1993 and is currently under NRC review. This site should be released for unrestricted use and removed from the SDMP in 1993.

- **Sequoyah Fuels Corporation (SFC)**

This site is listed in the SDMP because licensed operations are scheduled to cease by July 31, 1993, and the site contains large volumes of contaminated soil, other waste, and contaminated ground water. Decommissioning is projected to take several years to complete. The SFC site consists of a 34-hectare (85-acre) portion of an approximately 850-hectare (2100-acre) site located 4.0 km (2.5 miles) south of Gore, Oklahoma. The site is currently owned by Sequoyah International. Kerr-McGee Corporation owned and operated the site from 1970 to 1988 when General Atomic (GA) purchased Sequoyah Holding Corporation, the parent of Sequoyah International.

The primary licensed operations conducted at the site are uranium hexafluoride (UF<sub>6</sub>) and uranium tetrafluoride (UF<sub>4</sub>) conversion. In addition to the conversion facilities, the site contains storage areas for U<sub>3</sub>O<sub>8</sub> from the mills, treatment and storage ponds for radiological and non-radiological effluents, facilities to convert the raffinate to fertilizer, and storage areas for bulk hazardous chemicals used in licensed operations including nitric, hydrofluoric, and sulfuric acid and solvents such as tributyl phosphates.

SFC conducted a facility environmental investigation (FEI) in 1990–1991 to determine the extent of contamination on the site. The FEI identified significant radiological and chemical contamination of the soil and ground water in the vicinity of the main process building (MPB) and the solvent extraction (SX) building. For example, in the shallow ground water under the MPB and SX areas total uranium concentrations ranged from 20,000  $\mu$ g/l to 36,000  $\mu$ g/l. In the deeper sandstone/shale ground water, total uranium concentrations ranged from 1040  $\mu$ g/l to 1420  $\mu$ g/l. The maximum contaminant level for uranium in EPA's proposed National Primary Drinking Water Regulations (56 FR 33049) is 20  $\mu$ g/l.

In response to a demand for information by the staff, SFC provided a preliminary plan for completion of decommissioning that outlines a 10-year schedule for decommissioning at an estimated cost of \$21 million. SFC proposes to fund decommissioning through revenues from contracts and projected sales totaling about \$89 million. The staff is currently reviewing the plan and the proposed financial assurance mechanism.

### **4.3 Major Site Decommissioning Activities Completed in 1992**

Table 2 lists the sites that completed major decommissioning activities between June 1, 1992, and April 1, 1993

**Table 2 Decommissioning activities completed between June 1, 1992 and April 1, 1993.**

<b>Decommissioning Activity Completed</b>	<b>Site</b>
Site Characterization Plan Submittal	Babcock and Wilcox (Parks Township, PA) Fansteel Magnesium Elektron Molycorp, Inc. (Washington, PA)
Site Characterization Report Submittal	Chemetron Corporation (Harvard and Bert Ave.) Elkem Metals, Inc. Old Vic, Inc. Permagrain Northeast Ohio Regional Sewer District/ Southerly Plant (by NRC Contractor)
Decommissioning Plan:	
Submittal of Partial Plan	Watertown Arsenal/Mall Aluminum Company of America Northeast Ohio Regional Sewer District/ Southerly Plant
Submittal of Final Plan	Chevron Corporation Elkem Metals, Inc. Watertown GSA Schott Glass Technologies, Inc.
Approval of Final Plan	B&W Apollo Kerr-McGee (Cimarron)
Submittal and Approval of Final Plan	Old Vic, Inc. Texas Instruments, Inc.
Termination Survey Report Submittal	Budd Company Old Vic, Inc.
NRC Confirmatory Survey Submittal	Budd Company
Release for Unrestricted Use:	
Release Partial Site	Kerr-McGee Cimarron (Plutonium Building)
Release Entire Site	Budd Company
Remove Site From SDMP List	Budd Company

(since the last update of the SDMP). For specific details regarding these activities refer to Appendix A.

Significant partial decommissioning activities are included in Table 2. In this case "partial" means that the plan or report does not address all of required actions for removal of the site from the SDMP. For some sites, completing partial decommissioning activities is the most efficient way to proceed. For example, if a site contains contaminated buildings and settling ponds, and an onsite burial, it may be most efficient to decommission the buildings, settling ponds, and burial area in separate partial

decommissioning actions since the technical, policy, and legal issues differ for each.

Brief descriptions of the more notable site decommissioning activities listed in Table 2 follow.

- Budd Company  
The remediation of this site was completed in May 1992. Budd submitted a final survey report concluding that the site met NRC unrestricted release criteria. NRC confirmatory surveys verified the accuracy of the licensee's survey results. In SECY-93-062

(March 12, 1993), the Commission was informed of the staff's intention to terminate the license for the Budd site, release the site for unrestricted use, and remove the site from the SDMP. On April 21, 1993, after informing the Commission of its intent in SECY-93-062 (March 12, 1993), the staff terminated the license for the Budd site, released the site for unrestricted use, and removed the site from the SDMP list.

- Chevron Corporation

After more than three years of continued discussions between NRC, Chevron Corporation, and the National Park Service (NPS), Chevron and NPS developed a cooperative agreement outlining their respective financial responsibilities for the remediation of the site known as the Nuclear Lake site. Chevron has requested that, as a step to ensure finality of decommissioning of this site, NRC issue a consent order specifying the conditions for decommissioning the site. The staff is preparing a SECY paper forwarding the draft order to the Commission.

An investigation of the "targets" identified in Nuclear Lake during previous magnetic and radar studies was conducted by divers who visually identified the targets. The targets were determined to be rocks, tree stumps, a sunken boat, and a sunken Jeep. No containers of waste were discovered and there was no indication that radioactive material had been disposed of in the lake.

Chevron submitted, and NRC approved, a partial decommissioning plan in December 1992 that addresses the contaminated soil on the site. A second partial plan, submitted in February 1993, addresses the contaminated buildings on the site. By letter dated April 16, 1993, the staff provided Chevron its comments on the second plan. After the comments are addressed, which should be relatively straight forward, remediation of the soil and buildings should be completed within a matter of months. The Chevron site should be released for unrestricted use and removed from the SDMP before April 1994.

- Chemetron, Harvard and Bert Avenue

The Harvard Avenue and Bert Avenue sites were characterized and a report submitted to NRC in June 1992 in response to an NRC consent order issued in May 1992. NRC staff reviewed the report and found it to be acceptable for the purpose of developing a final site decommissioning plan. On May 7, 1993, Chemetron submitted a license amendment request

to incorporate a condition that Chemetron shall submit a decommissioning plan by October 1, 1993.

From May 5 through 7, 1993, NRC Region III inspectors conducted surveys in the vicinity of the Harvard Avenue site to assist in resolving concerns regarding offsite contamination. These concerns arose following the discovery of uranium contamination on the roof of an adjacent building owned by the Aluminum Company of America. The inspectors found three isolated, nonresidential, areas near the former Chemetron operations area that contain elevated contamination levels. Samples were collected from these areas.

- Kerr-McGee, Cimarron

The Commission approved the decommissioning plan for the contaminated soil at the Kerr-McGee Cimarron site with certain recommendations as stated in an SRM dated October 30, 1992. The plan calls for the onsite disposal of the contaminated soil, by burial, under Title 10 of the *Code of Federal Regulations* (10 CFR), Section 20.302. The average concentration of uranium in the buried soil is required to be less than the Option 2 limit of the 1981 BTP. NRC terminated the mixed-oxide license for the Cimarron site in February 1993. A license for the residual uranium contamination at Cimarron remains active. The remediation of the uranium contamination is projected to be completed in 1994.

- Texas Instruments, Inc.

After NRC approval of a decommissioning plan submitted in 1992, Texas Instruments, Inc. (TI) excavated the contaminated material from an onsite burial and shipped the material to a licensed disposal facility. Additional contamination was found during the NRC confirmatory survey and is being remediated. The decommissioning of the TI site should be completed in 1993. The site is expected to be removed from the SDMP in March 1994.

- Babcock and Wilcox (B&W), Apollo

The decommissioning plan for the Apollo site was approved in June 1992. The excavation and disposal of an estimated 11,200 m<sup>3</sup> (400,000 ft<sup>3</sup>) of contaminated soil is nearly completed. The soil is being shipped to Envirocare for disposal. To date, the decommissioning has cost approximately \$58 million. Congress provided a specific appropriation for \$29 million, and B&W funded the remaining \$29 million. The decommissioning of the Apollo site should be completed in 1994.

Several of the decommissioning activities listed in Table 2 were completed ahead of schedule, or were not scheduled at the time of the last SDMP update. These include the submittal of characterization plans for Molycorp, Inc. (Washington, Pennsylvania) and Magnesium Elektron sites; the submittal of a decommissioning plan for the Chevron site and a partial decommissioning plan for the Northeast Ohio Regional Sewer District/ Southerly Plant site; and NRC approval of final decommissioning plans for the Old Vic, Inc., and TI sites.

However, several activities scheduled for completion during 1992 were delayed. Table 3 lists the sites for which decommissioning activities were delayed, the reason for the delay, the originally scheduled date, and the revised date. Only schedular delays greater than 6 months are included in Table 3. Nine sites experienced schedular delays for one or more decommissioning activities. The delays for two sites were caused by a licensee failing to make a scheduled submittal. In these cases NRC staff negotiated revised submittal dates with the responsible parties. The schedular slippage for seven sites was at least partially the result of delays in the completion of NRC reviews.

Overall, the timeliness of licensee submittals has improved. The majority of the submittals to date have been made on a voluntary basis. Only one order (i.e., requiring Chemetron to submit a characterization report) has been issued. The staff continues to closely monitor the timeliness of licensee actions to determine if orders, or inclusion of decommissioning schedules into licenses as conditions, are required to ensure continued steady progress toward decommissioning of the sites.

Two of the sites for which scheduled activities were delayed, the Cabot Corporation Reading and Revere sites, were scheduled to be decommissioned and removed from the SDMP in 1992. The delays at these sites were attributable to a combination of NRC review time, the identification of additional contamination, and, at the Reading site, a lack of resolution as to an acceptable method for disposal of approximately 560 m<sup>3</sup> (20,000 ft<sup>3</sup>) of contaminated slag.

Regarding the delays caused by NRC review time, the staff continues to evaluate NRC resources allocated to SDMP site activities and the priorities for resource use. As discussed in Section 2.2, because of the rapidly changing status of these sites, relative to one another, the current priority for NRC resources is first to review those submittals that are clearly on critical path in the licensee's schedule for decommissioning. For example, the TI and Old Vic, Inc., licensees were fully prepared in 1992 to decommission their sites as soon as possible. NRC approvals of the decommissioning plans for these sites were not scheduled and did not involve the most problematic issues

affecting SDMP sites (although the excavation of the former 10 CFR 20.304 burial at the TI site was a major action). However, the NRC review of these plans was given a higher priority than other scheduled activities to support the licensee's commitment to timely decommissioning.

#### 4.4 Major Site Decommissioning Activities Scheduled for 1993

Table 4 lists the decommissioning activities scheduled for completion between April 1, 1993, and April 1, 1994. Appendix A gives detailed descriptions of the activities listed in Table 4. Six sites (Old Vic, TI, United Nuclear Corporation (UNC) Recovery Systems, Chevron Corporation, P&W, and Amax) are expected to be removed from the SDMP before April 1994. Brief descriptions of the more notable decommissioning activities listed in Table 4, with the exception of those scheduled for the P&W, TI, and Chevron Corporation sites, which are described above, and the Amax site, which is described in Section 5, follow.

- Old Vic, Inc.

The former Victoreen, Inc., facility in Cleveland, Ohio, was used to conduct research, calibrate instruments, and manufacture electrical components. The facility was initially decommissioned in October 1988, and a final survey report was submitted to NRC in August 1989. A subsequent NRC confirmatory survey identified contamination in excess of NRC's unrestricted release criteria at several locations. Old Vic, Inc. (the current licensee) re-characterized the facility and submitted a site characterization report to NRC in October 1992. The licensee completed the remediation of the facility in January 1993 and submitted a final survey report in February 1993. An NRC contractor performed a confirmatory survey in April 1993. The site is expected to be released for unrestricted use and removed from the SDMP in July 1993.

- UNC Recovery Systems

Through 1992, NRC staff worked with the State of Rhode Island to address the State's contention that NRC should exercise jurisdiction over the nitrate contamination in onsite ground water and not terminate the license for the site. The last meeting between NRC, UNC, and the State was held February 11, 1993. UNC is preparing a ground water monitoring program for the nitrate contamination to be submitted to the State of Rhode Island. NRC's contractor will collect another round of ground water samples to reconfirm the acceptability of the Sr-90 and gross beta concentrations in the ground water so that the environmental assessment can be finalized.

**Table 3 Delayed decommissioning activities scheduled for completion between June 1, 1992 and April 1, 1993**

Site	Decommissioning Activity	Reason for Delay	Old Date	Revised Date
Aluminum Company of America	Determination that onsite burial exists	Licensee submittal	6/92	Unknown
	Confirmatory survey	Licensee submittal	6/92	4/93
	Release site for unrestricted use	Licensee submittal	6/92	4/93
BP Chemicals America, Inc.	Partial decommissioning plan	NRC review	6/92	7/93
Cabot Corporation, Boyertown	Evaluate need for interim remediation	NRC review	12/92	12/93
Cabot Corporation, Reading	NRC approval of confirmatory survey report	NRC review	4/92	4/93
	Release site for unrestricted use	NRC review/ additional con- tamination identified	12/92	10/94
Cabot Corporation, Revere	NRC approval of confirmatory survey report	NRC review	6/92	3/93
	Release site for unrestricted use	NRC review additional con- tamination identified	12/92	10/94
Heritage Minerals	Decision regarding dilution of monazite sand	NRC review	5/92	6/93
Nuclear Metals, Inc.	Submittal of site characterization plan and schedule for decommissioning	Licensee submittal	5/92	3/93
Permagrain Products	Submittal of decommissioning plan and schedule	Licensee submittal	10/92	6/94
RMI Titanium	NRC approval of decommissioning plan	NRC review	12/92	6/94
RTI, Inc.	NRC evaluation of need for additional surveys	NRC review	8/92	3/93

The staff believes that the remaining issues will be resolved and has scheduled the license termination for September 1993, following a public meeting on the action.

- Northeast Ohio Regional Sewer District/Southerly Plant (NEORSD/SP)

The staff anticipates considerable progress during 1993 towards decommissioning this site. NEORSD/SP plans to submit two partial decommissioning plans to address the contamination at the site. The

first plan was submitted in January 1993 and covers the contaminated lagoons. By letter dated April 16, 1993, NRC staff approved the lagoon decommissioning plan. The lagoon decommissioning should be completed and the lagoons released for unrestricted use by October 1993. The remainder of the site requires characterization before a decommissioning strategy can be developed. This characterization plan is scheduled for submittal in April 1993 with the characterization report due January 1994. The decommissioning strategy for the remaining contaminated areas on the site is scheduled for March 1994.

**Table 4 Decommissioning activities scheduled for completion between April 1, 1993 and April 1, 1994**

<b>Decommissioning Activity Completed</b>	<b>Site</b>
<b>Site Characterization Plan</b>	
Submittal	Engelhard Corporation Molycorp, Inc. (York, PA) Whittaker Corporation
Approval	Babcock and Wilcox (Parks Township, PA) Magnesium Elektron Molycorp, Inc. (Washington, PA)
Submittal and Approval	Engelhard Corporation Lake City Ammunitions Plant (Remington Arms Company) Northeast Ohio Regional Sewer District/Southerly Plant Westinghouse Electric Corporation (Waltz Mill Site)
<b>Site Characterization Report</b>	
Submittal	Babcock and Wilcox (Parks Township, PA) Fansteel Lake City Ammunition Plant (Remington Arms Company) Magnesium Elektron Northeast Ohio Regional Sewer District/Southerly Plant Nuclear Metals, Inc Westinghouse Electric Corporation (Waltz Mill Site) Whittaker Corporation
<b>Decommissioning Plan</b>	
Submittal/Approval of Partial Plan	Engelhard Corporation
Approval of Partial Plan	Aluminum Company of America BP Chemicals America, Inc. Northeast Ohio Regional Sewer District/Southerly Plant Watertown Arsenal/Mall
Submittal of Final Plan	Babcock and Wilcox (Parks Township, PA) Chemetron Corporation (Harvard and Bert Ave.) Hartley and Hartley Landfill Kerr-McGee Cushing Northeast Ohio Regional Sewer District/Southerly Plant Pesses Company (Metcoa)
Submittal/Approval of Final Plan	Cabot Corporation (Revere) DOW Chemical Company Permagrain Products, Inc.
Approval of Final Plan	Chevron Corporation Elkem Metals, Inc. RMI Titanium Company Watertown GSA

**Table 4 (Continued)**

<b>Decommissioning Activity Completed</b>	<b>Site</b>
<b>Termination Survey Report</b>	
Submittal of Report for Partial Site	Aluminum Company of America BP Chemicals America, Inc. Northeast Ohio Regional Sewer District/Southerly Plant
Submittal of Final Report	Babcock and Wilcox (Apollo) Cabot Corporation (Revere) Texas Instruments Watertown GSA
<b>NRC Confirmatory Survey</b>	
Confirmatory Survey of Partial Site	Aluminum Company of America Northeast Ohio Regional Sewer District/Southerly Plant
Final Confirmatory Survey	Babcock and Wilcox (Apollo) Chevron Corporation Old Vic, Inc. Texas Instruments, Inc. United Technologies—Pratt & Whitney Watertown GSA
<b>Release for Unrestricted Use</b>	
Release Partial Site	Aluminum Company of America Northeast Ohio Regional Sewer District/Southerly Plant
Release Entire Site	Chevron Corporation Old Vic, Inc. Texas Instruments, Inc. UNC Recovery Systems United Technologies—Pratt & Whitney
<b>Remove Site from SDMP List</b>	Amax Chevron Corporation Old Vic, Inc. Texas Instruments, Inc. UNC Recovery Systems United Technologies—Pratt & Whitney

- **Dow Chemical**

Dow Chemical requested an exemption from the "unrestricted use" portion of the decommissioning definition in NRC regulations to allow disposal of thorium contaminated slag in a permitted hazardous waste disposal site that is scheduled to remain under institutional control until 2075. Dow intends to submit a decommissioning plan in 1993 if the exemption request is granted. The staff is preparing a paper on Dow's requested exemption from the unrestricted

use requirement for Commission review and approval. The paper should be completed in June 1993.

- **Aluminum Company of America (ALCOA)**

ALCOA plans to proceed with the decommissioning of the remaining contaminated building concurrently with the investigation of possible thorium contamination in a sanitary landfill located on the site. The building is scheduled for unrestricted release in August 1993. If it is found that thorium contaminated

material was not buried in the landfill, the ALCOA site should be released for unrestricted use in 1993.

Figure 4 projects the overall SDMP site decommissioning progress expected by April 1, 1994, by taking the site totals from Figure 3 (decommissioning activities completed by April 1, 1993) and adding the number of sites projected to complete a given activity between April 1, 1993, and April 1, 1994 (site totals from Table 4). An equal or greater number of sites are projected to have decommissioning plans approved, submit final survey reports, complete the process of NRC confirmatory surveys, and be released for unrestricted use, during 1993/1994 than during the previous three years combined. This is a positive indication that the SDMP strategies and policy issue solutions implemented to date have resulted in an acceleration of the decommissioning of SDMP sites.

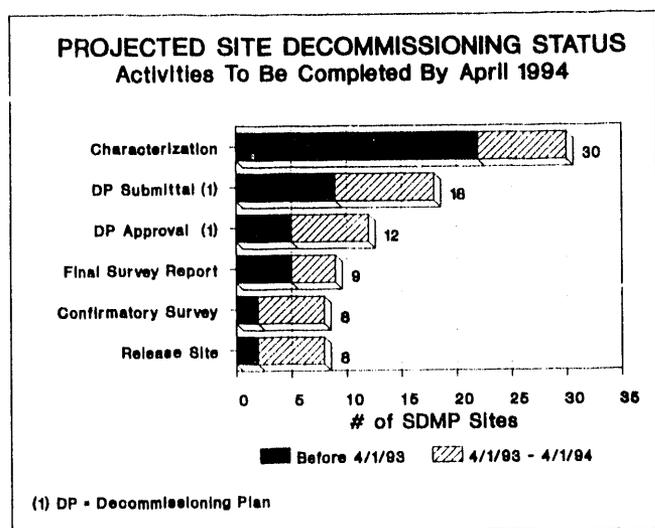


Figure 4

#### 4.5 Status of SDMP Sites Where Decommissioning Is Not Required Action

As discussed above, the SDMP contains six sites for which decommissioning to the unrestricted use standard is not the required action in the near term. These sites are

- Advanced Medical Systems, Inc.
- Amax
- Army, Department of, Aberdeen Proving Ground
- Cabot Corporation, Boyertown, PA
- Magnesium Elektron
- Shieldalloy Metallurgical Corporation, Newfield, NJ

The progress made at each of these six sites since the last SDMP update and the activities scheduled for 1993 are discussed below.

- **Advanced Medical Systems, Inc. (AMS)**

On July 7, 1992, AMS provided decommissioning financial assurance in the amount of \$750,000 as permitted by 10 CFR 30.35(c)(2). Pursuant to that same regulation, AMS is required to submit a decommissioning funding plan before its next license renewal. The current AMS license expires on December 31, 1994.

On April 1, 1993, the Northeast Ohio Regional Sewer District (NEORS D) filed a law suit against AMS for damages to its Southerly Plant from Co-60 contamination transmitted by liquid waste released by AMS to NEORS D sanitary sewers. The staff cannot predict the impact on the financial posture of AMS if the NEORS D law suit is successful and results in significant damages. In addition, NEORS D filed a petition pursuant to 10 CFR 2.206 on March 3, 1993, requesting NRC to modify the AMS license to require the following:

- assume all costs resulting from the offsite release of Co-60 that has been deposited at NEORS D/SP
- remediate the sewer connecting the AMS London Road facility with the public sewer at London Road and continue remediation of the sewers downstream as far as necessary

- **Amax**

NRC informed the U.S. Department of Energy (DOE) in August 1991 that the Amax site met the provisions of the Section 151(c) of the Nuclear Waste Policy Act of 1982 and that the next step was for DOE to take title and custody of the site. Since that time, the schedule for the transfer has suffered repeated delays. After a meeting with DOE and Amax on October 6, 1992, the outstanding issues appeared to have been resolved. NRC noticed the planned transfer of the site to DOE and termination of the NRC license in the *Federal Register* on March 24, 1993 (58 FR 15886). DOE is expected to submit to NRC the appropriate closing or conveyance documents to effect the transfer by June 1993.

- **Army, Department of, Aberdeen Proving Ground**

The U.S Army Aberdeen Proving Ground (APG) is an active Department of Defense test facility. Testing of munitions containing depleted uranium has been conducted at APG since the 1950's. An area of approximately 8 km by 3 km (5 miles by 2 miles) is contaminated with approximately 82,000 kg (180,000

pounds) of fired depleted uranium rounds. Because of concerns regarding the environmental impact of the existing contamination, and additional contamination anticipated to result from future tests, NRC is working with the Army to develop an improved environmental radiation monitoring (ERM) program for the site. The revised ERM program is scheduled for approval by NRC in June 1993. In June 1994, NRC will evaluate the results of a one year environmental monitoring period to determine if the environmental impact of the testing is acceptable and licensed operations should continue.

- Cabot Corporation, Boyertown, PA

NRC review of the licensee's renewal application continued during 1992. Cabot was requested to submit a decommissioning funding plan as a supplement to the renewal request. Cabot is scheduled to submit the funding plan, a description of residues stored on site, and the plans for future disposition of the residues during 1993. NRC will then evaluate the need for interim remediation of the site (before license termination at some unknown future date) and decide whether to require a license condition defining the schedule for the remediation activities.

- Magnesium Elektron

Magnesium Elektron, Inc. (MEI), has produced zirconium chemicals at this site since 1952. The feed ore contains less than 0.05 percent by weight of uranium and thorium (source material) and, therefore, use of the feed material does not require an NRC license. However, in 1989 NRC identified source material in excess of 0.05 weight percent in the sludge generated during the zirconium production. Subsequently, NRC informed MEI that an NRC license was required for the sludge. MEI believes that it does not possess licensable quantities of source material and, in August 1992, requested NRC to delay licensing action pending MEI's characterization of the sludge. A characterization plan was submitted to NRC in September 1992. NRC provided comments on the plan in October 1992. MEI is scheduled to submit a revised characterization plan in April 1993 and a characterization report by August 1993. Once the report is received, NRC will determine if a license is required, and if so, determine if interim remediation is necessary before license termination in the future.

- Shieldalloy Metallurgical Corporation, Newfield, NJ

This is an active facility that manufactures specialty ferro alloys. The renewed license is scheduled to be issued in 1993. The site currently contains over

28,000 m<sup>3</sup> (1,000,000 ft<sup>3</sup>) of contaminated slag and lime. The waste volume continues to increase as operations proceed and is predicted to exceed the possession limits of the license in 1996 or 1997. Shieldalloy asserts that in the absence of onsite disposal, or recovery of useful material, it does not have the means to fund offsite disposal of the waste. The staff expects Shieldalloy to submit a decommissioning funding plan before 1996. The plan will be determined from the conclusions of a technical basis document that is being developed for the decommissioning of Shieldalloy's site in Cambridge, Ohio. The type and volume of waste at the Cambridge site are similar to the waste at the Newfield site. The technical basis document will include analyses of decommissioning alternatives and costs and is scheduled for submission to NRC in May 1993.

## 4.6 Generic Issues Encountered in 1992

### 4.6.1 Sites With Large Volumes of Thorium-Contaminated Soil or Slag

There are 14 SDMP sites that contain large volumes of thorium contaminated soil or slag. The waste volumes at these sites range from 560 to 280,000 m<sup>3</sup> (20,000 to 10,000,000 ft<sup>3</sup>) with thorium concentrations ranging from 3.7 Bq to 148 Bq (100 pCi to 4,000 pCi)/g. The cost of decommissioning these sites could range from approximately \$1 million to \$500 million if offsite disposal is required for all material with thorium concentrations in excess of the 1981 BTP Option 1 limits (the Commission-approved Action Plan states that pending NRC rulemaking on radiological criteria for decommissioning, the residual contamination limits in Options 1 and 2 of the 1981 BTP, and as low as reasonably achievable (ALARA), will be used to evaluate decommissioning plans for SDMP sites contaminated with uranium or thorium). The alternative to offsite disposal of this material is onsite disposal in accordance with 10 CFR 20.302.

To date, NRC has not approved an application for onsite disposal of thorium-contaminated wastes at an SDMP site. However, the Commission recently approved, with recommendations, the staff's plans to approve an application for the onsite disposal of uranium-contaminated soil at the Kerr-McGee Cimarron site. This disposal was described in SECY-91-398, "License Terminations for Cimarron Corporation Facilities, Crescent, Oklahoma." In SECY-91-398, the staff sought the Commission's approval of an onsite disposal, by shallow burial, of about 14,000 m<sup>3</sup> (500,000 ft<sup>3</sup>) of uranium contaminated soil at an SDMP site. Actual uranium concentrations for this soil averaged approximately 2.6 Bq (70 pCi)/g; the 1981 BTP Option 2 limit is 11.1 Bq (300 pCi)/g for insoluble uranium and 3.7 Bq (100 pCi)/g for soluble uranium. The projected

dose to a member of the public from this burial, assuming that the burial cover is removed at some time in the future, is approximately 0.05 mSv (5 mrem)/yr total effective dose equivalent (TEDE) (all projected doses discussed in this section were calculated using dose factors from the 1981 BTP and do not include exposure from radon and radon daughter products). At an average concentration equal to either the soluble or insoluble 1981 BTP Option 2 limits for uranium, the projected dose is approximately 0.2 mSv (20 mrem)/yr TEDE.

Onsite shallow burials of thorium-contaminated soil or slag, with average concentrations of thorium equal to the 1981 BTP Option 2 limit of 1.85 Bq (50 pCi)/g, are predicted to have more significant dose consequences than the burial of uranium contaminated material, such as that described above. The projected dose to a member of the public from a burial with an average thorium concentration of 1.85 Bq (50 pCi)/g (assuming that the cover is removed at some time in the future, a 0.5 structural shielding factor and an 80 percent occupancy factor) is approximately 1.7 mSv (170 mrem)/yr TEDE. This dose exceeds the 1 mSv (100 mrem)/yr TEDE public exposure limit in 10 CFR Part 20. An average thorium concentration of approximately 1.11 Bq (30 pCi)/g would be required to lower the dose to 1 mSv (100 mrem)/yr TEDE. The staff considers the 10 CFR Part 20 1 mSv (100 mrem)/yr TEDE limit the upper bound for ALARA analyses at SDMP sites. In decommissioning plans for SDMP sites approved to date, the projected doses have been on the order of a few mrem/yr TEDE.

Since the projected dose from onsite burial of thorium-contaminated soil/slag with concentrations at the 1981 BTP Option 2 limit exceeds 1 mSv (100 mrem)/yr TEDE, the staff is considering several alternatives for decommissioning the sites with large volumes of thorium contaminated waste, including (1) exemption from the unrestricted release requirement in the regulations; (2) waste placement in a uranium mill tailings impoundment; (3) processing to reduce the thorium to acceptable concentrations; (4) deep disposal, or disposal by mine backfill, which would make the chance of human intrusion very remote; and (5) disposal at permitted hazardous waste disposal sites.

The Shieldalloy Metallurgical Corporation is scheduled to submit a technical basis document for decommissioning its Cambridge, Ohio, site (which contains over 280,000 m<sup>3</sup> [10,000,000 ft<sup>3</sup>] of thorium-contaminated slag) in May 1993. The submittal will include a site-specific pathways analysis and an analysis of decommissioning alternatives and costs. After receipt of the technical basis document, the staff intends to analyze the decommissioning alternatives proposed, as well as other alternatives such as the five listed above, and prepare a Commission paper on general policy options for dealing with sites that contain large volumes of thorium contaminated waste.

#### 4.6.2 ALARA

The SDMP Action Plan states that pending NRC rulemaking on radiological criteria for decommissioning, cleanup criteria will be applied on a site-specific basis with emphasis on residual contamination levels that are ALARA. However, no specific guidance has been developed on how to apply the concept of ALARA in establishing residual contamination criteria. Based on discussions with the Commission in approving the Action Plan, the ALARA concept for SDMP sites is envisioned to include levels both above and below the decommissioning guidance levels, up to levels that could result in exposures of 1 mSv (100 mrem)/yr TEDE. Traditionally, the application of ALARA has been intended to require a licensee to reduce doses to levels below the regulatory requirements if it is cost-effective to do so. For residual contamination at SDMP sites, the ALARA analysis could be used to justify residual contamination levels above the guidance levels.

NRC staff is examining the feasibility of developing guidance on how to apply ALARA to residual contamination criteria at SDMP sites. Any proposed application of ALARA above the residual contamination criteria listed in the Action Plan, before the development of this guidance, will be provided to the Commission for approval. The generic application of ALARA to residual contamination criteria is being discussed and examined in the enhanced participatory rulemaking on radiological criteria for decommissioning.

#### 4.6.3 State Involvement

State agencies are currently involved in the remediation of 25 of the 48 SDMP sites. NRC intends to coordinate with the States to ensure that decommissioning activities are managed in an efficient and timely manner. The primary reason for State involvement is the presence of non-radioactive hazardous waste falling under the jurisdiction of State programs authorized under the Resource Conservation and Recovery Act (RCRA). Other reasons include

- the presence of radium contamination subject to State authority
- State and compact authority, pursuant to the Low-Level Radioactive Waste Policy Amendments Act, to be responsible for the disposal of low-level radioactive waste
- State authority, under subtitle D of RCRA, over proposed onsite disposal of solid wastes
- State authority, under the Energy Policy Act of 1992, to regulate the disposal of low-level radioactive wastes, if NRC exempts such waste from regulation
- the site being listed on the State's equivalent of the National Priority List

- State ownership of the site
- public concerns about activities at the site

In December 1992, the Chairman sent letters to the Governors of all States that contain SDMP sites asking that the States inform NRC of anticipated areas of State involvement in the decommissioning of the sites. NRC staff will continue to seek from State agencies an early identifi-

cation of what State requirements apply to decommissioning cases and will attempt to coordinate actions so that the licensee will address both NRC and State requirements. This coordination will include staff from the Office of State Programs and the NRC regional State liaison officers. If these staff coordination actions are unsuccessful in resolving conflicts in requirements, NRC staff will elevate the issues to higher levels of management as appropriate.

## 5 DECOMMISSIONING POLICY ISSUES

As NRC focused on the remediation of the SDMP sites, several issues emerged as impediments to the timely decommissioning of these sites. A primary objective of the SDMP is to identify these issues and ensure that the appropriate level of NRC staff resources are devoted to their resolution in order for the decommissioning of the SDMP sites to proceed in a timely manner. Several of these policy issues have generic implications for NRC's overall decommissioning program, or involve other matters, that must ultimately be decided by the Commission. Resolution of the policy issues discussed below will provide a regulatory framework for more efficient and consistent licensing actions for site remediation and decommissioning in the future.

NRC staff has been working on the issues listed below since 1990, when the first version of the SDMP was issued. Some of the issues have been resolved. Since this is the initial publication of the SDMP in the NUREG format, the resolved issues are included for completeness. Supplements to this NUREG will only list and discuss the open issues from the previous year. The discussion of the open issues includes estimated schedules, the NRC office with lead responsibility, and the NRC offices in supporting roles.

### 5.1 Open Issues

#### 5.1.1 Enhanced Participatory Rulemaking on Radiological Criteria for Decommissioning

NRC requirements for decommissioning and termination of license are contained in 10 CFR Parts 30, 40, 50, 70, and 72. However, these requirements do not contain generally applicable radiological criteria for decommissioning. Pending NRC rulemaking on radiological criteria for decommissioning, NRC will continue to consider existing guidance, criteria, and practices listed in the SDMP Action Plan. The use of the criteria in the Action Plan in the context of SDMP site decommissioning does not affect establishment of generic radiological criteria, for all NRC

licensee's, as is being developed in the enhanced participatory rulemaking.

Comprehensive residual contamination criteria will be established by developing technical bases and rulemaking and preparing associated regulatory guidance.

##### 5.1.1.1 Rulemaking

The NRC Office of Research (RES) has the lead in current rulemaking activities for radiological criteria for decommissioning. Activities that must take place to support rulemaking include conducting public workshops, outlining options for regulatory issues and approaches, preparing a generic environmental impact statement (GEIS), and coordinating with the U.S. Environmental Protection Agency (EPA) on associated rulemakings. This rulemaking will establish criteria for release of lands and structures for unrestricted use.

Actions related to this rulemaking, including schedules and resources, are discussed in SECY-92-249, "Final Plan for the Enhanced Participatory Rulemaking Process on the Radiological Criteria for Decommissioning," and in SECY-93-011, "Status Report on the Enhanced Participatory Rulemaking on the Radiological Criteria for Decommissioning." The rulemaking plan and schedule was published in the *Federal Register* on December 11, 1992 (57 FR 58727). NRC has conducted seven workshops around the country involving broad participation of States, citizen and environmental groups, Indian tribes, professional societies, and decommissioning contractors. Workshops were held from January through May 1993 in Chicago, Illinois; San Francisco, California; Boston, Massachusetts; Dallas, Texas; Philadelphia, Pennsylvania; Atlanta, Georgia; and Washington, D.C. Four public meetings on the GEIS scoping issue will be held in July 1993.

The NRC actions needed to complete rulemaking and the estimated dates for completion are given below.

- forward proposed rule and draft GEIS to Commission (lead: RES; support: LLWM, IMNS, OGC, FCSS, regions) April 1994

- issue proposed rule for comment May 1994  
(lead: RES; support: LLWM, IMNS, OGC, FCSS, regions)
- issue final rule (lead: RES; support: LLWM, IMNS, OGC, FCSS, regions) May 1995

#### 5.1.1.2 Development of Technical Bases for Decommissioning Lands and Structures

The staff is developing the technical bases to use in preparation of regulations containing radiological criteria for decommissioning. RES is supplying the needed technical bases by developing NUREG/CR-5512, "Residual Radioactive Contamination From Decommissioning," which is expected to be published, for interim use and comment, in three volumes and one supplement. Volume 1, which contains mathematical formulations with parameter values and references, was published in October 1992. Volume 2, which will contain the computer code with user manual and example applications, is expected to be published in May 1994. The publication date for Volume 3, which will contain sensitivity analyses and comparisons, has not yet been determined. The supplement will provide an interface for using a hierarchy of increasingly sophisticated ground water models in connection with the NUREG/CR-5512 methodology.

The NRC actions needed to develop technical bases for decommissioning land and structures and the estimated dates for completion are given below.

- complete NUREG/CR-5512, Volume 1 October 1992 (completed)
- complete NUREG/CR-5512, Volume 2 (lead: RES; support: LLWM, NRR, IMNS, FCSS) August 1994
- complete NUREG/CR-5512, Volume 3 (lead: RES; support: LLWM, NRR, IMNS, FCSS) to be determined (TBD)
- complete Supplement 1 to NUREG/CR-5512 (lead: RES; support: LLWM, IMNS, FCSS) TBD

#### 5.1.1.3 Regulatory Guide

A regulatory guide will be prepared containing radiological criteria for decommissioning and detailed guidance on an acceptable approach for demonstrating compliance with license termination requirements for unrestricted use.

The NRC actions needed to develop the regulatory guide and estimated dates for completion are given below.

- issue draft Regulatory Guide for comment (lead: RES; support: NRR, LLWM, OGC, FCSS) May 1994
- issue final Regulatory Guide (lead: RES; support: NRR, LLWM, IMNS, OGC, FCSS) May 1995

#### 5.1.2 Rulemaking on Timeliness in Decommissioning of Materials Facilities

As discussed in SECY-89-369, "Strategy for Decommissioning of Material Licensee Sites," NRC decommissioning regulations allow licensees discretionary timing for remediation and decommissioning activities. This has allowed some licensees to remain inactive without decommissioning or to maintain inactive portions of contaminated facilities. Even when all licensed operations are permanently terminated, the regulations do not provide definitive requirements on how soon final decommissioning plans must be developed, submitted, approved, or how soon decommissioning must be accomplished.

A memorandum from SECY to the EDO, January 29, 1990, instructed the staff to establish a timeliness criterion for the completion of decommissioning activities after cessation of operations and discussed certain variances to the requirement. A proposed rule containing timeliness criteria was issued in January 1993 (58 FR 4099) for a 75-day public-comment period.

NRC actions needed for this rulemaking and estimated dates for completion are given below.

- issue proposed rule for comment January 1993 (completed)
- issue final rule (lead: RES; support: IMNS, LLWM, FCSS, OGC, regions) January 1994

#### 5.1.3 Rulemaking on Decommissioning, Recordkeeping, and License Termination

NRC's rules on decommissioning specifically require licensees to keep all records important to decommissioning in one identified location. Such records include drawings of structures and equipment where radioactive materials were used or stored, documentation identifying the location of inaccessible residual contamination, detailed description of spilled radioactive materials, and the identification and characterization of wastes that have been disposed of on site. Section 3.1 of Regulatory Guide 3.65, "Standard Format and Content of Decommissioning Plans for Licensees Under 10 CFR 30, 40, and 70" (August 1989), issued to support the final decommissioning rule,

indicates that facility radiological history information should be submitted to NRC in the decommissioning plan.

In its report, "NRC's Decommissioning Procedures and Criteria Need To Be Strengthened," the General Accounting Office (GAO) recommended that, in addition to the above, NRC require licensees to specifically list in one document all land, buildings, and equipment involved with their licensed operations.

At the hearing before the Subcommittee on Environment, Energy and Natural Resources of the House Committee on Government Operations on August 3, 1989, NRC agreed with the GAO recommendation and committed to requiring licensees to specifically list in one document all land, buildings, and equipment involved with licensed operations. In addition, a history of the licensed operations would be included.

In October 1991, a proposed rule on recordkeeping was issued for public comment (56 FR 50524). NRC actions needed to complete this rulemaking and the estimated dates of completion are given below.

- Rulemaking requiring submission of a facility history:
 

initiate rulemaking requiring submission of facility history	September 1990 (completed)
publish proposed rule	October 1991 (completed)
publish final rule (lead: RES; support: LLWM, IMNS, FCSS, OGC)	June 1993
- Regulatory guide on recordkeeping:
 

publish draft regulatory guide for comment (lead: RES; support: IMNS, FCSS, LLWM)	December 1993
publish final guide (lead: RES; support: IMNS, LLWM, FCSS)	December 1994

#### 5.1.4 Review of Licensed Sites Terminated After 1965

In its report, GAO also recommended that NRC ensure that all contamination at sites is reduced to below the levels allowed in NRC's guidelines before releasing all or part of a site for unrestricted use.

At the hearing before the Subcommittee on Environment, Energy and Natural Resources of the Committee on Government Operations on August 3, 1989, NRC committed to request funds in FY91 to review the records of

sites decommissioned after 1965 to ensure that they were adequately remediated. NRC also committed (in a letter to Senator John Glenn, Chairman of the Committee on Governmental Affairs, dated September 26, 1989) to review the adequacy of decommissioning at sites where licenses were terminated after 1965. This study could identify formerly licensed sites requiring further evaluation or remedial action. On the basis of the study, additional sites would be added to the SDMP list, if necessary.

In addition to reviewing licenses terminated after 1965, the staff has initiated a review of licenses terminated before 1965. The review of pre-1965 terminated licenses will proceed in a similar fashion as described for the post-1965 terminations. The estimated completion date of June 1994 listed below applies to the post-1965 study only. The completion date of the pre-1965 terminated license reviews has not been determined.

NRC actions needed for the study of post-1965 terminated licenses, and estimated completion dates, are given below.

- begin study of sites decommissioned since 1965 September 1990 (initiated)
- complete study, including determination of sites to be added to SDMP (lead: IMNS; support: LLWM, FCSS) June 1994

#### 5.1.5 Guidance on the Conduct of Termination Surveys

NRC's rules on decommissioning require that licensees perform a radiation survey to demonstrate that the premises are suitable for release for unrestricted use. In its report, GAO recommended NRC ensure that licensees decommission their facilities in accordance with NRC's guidelines before NRC fully or partially releases a site for unrestricted use.

Another resulting action item from the Subcommittee on Environment, Energy and Natural Resources of the Committee on Government Operations hearing was the need for guidance on termination surveys. On September 28, 1989, NMSS requested that RES revise existing guidance to clarify the scope and rigor of licensee termination surveys conducted to ensure adequate remediation. New guidance on conducting termination surveys is under development by an NRC contractor. A draft report for comment was published in June 1992 as Draft NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination." NUREG/CR-5849 is intended to supersede NUREG/CR-2082, "Monitoring for Compliance With Decommissioning Termination Survey Criteria."

NRC actions needed to provide guidance on conducting termination surveys and estimated completion dates are given below.

- issue draft termination survey NUREG/CR for interim use and comment June 1992 (completed)
- issue final NUREG/CR-5849 after publication of final rule on radiological criteria for decommissioning (lead: RES support: LLWM, IMNS, FCSS) May 1995

### 5.1.6 Previous Disposals of Wastes Under 10 CFR 20.302 and 10 CFR 20.304

NRC regulations allow licensees to dispose of radioactive wastes on their own property and at locations other than licensed commercial disposal facilities. Before 1981, 10 CFR 20.304 permitted licensees without prior approval to make disposals on site limited to specifically given nuclide quantities and under specific conditions. The regulation required that records of these disposals and the location of the burial be kept. However, on October 30, 1980 (45 FR 71762), effective January 28, 1981, the NRC revoked 10 CFR 20.304 because generic authorization of these burials was inappropriate without licensees first notifying the NRC about the location of the burial, concentrations of radionuclides, and the form of packaging.

Although licensees can still make disposals under 10 CFR 20.302, the rule requires NRC authorization based on an evaluation of the proposed burial. This results in improved records and greater assurance that public health and safety will be adequately protected. To implement disposals under 10 CFR 20.302, NRC issued the Uranium and Thorium Branch Technical Position (46 FR 52061) in 1981 and additional guidance in 1986/1987 in three volumes of NUREG-1101, "Onsite Disposal of Radioactive Waste." NUREG-1101 provides guidance on contents of applications for disposal under 10 CFR 20.302, a method for performing a radiological assessment of the disposals, and an approach for estimating potential ground water contamination.

When the Commission approved the decommissioning regulations in 1988, it noted that NRC will take a hard look at the extent to which the site has been previously used to dispose of radioactive waste and will decide what remedial measures, including removal of such waste off site, are appropriate before the site can be released for unrestricted use and the license terminated. Disposals performed under 10 CFR 20.304 have, at several sites, required exhumation during decommissioning. In some cases, records of these disposals are limited or nonexistent. To effectively carry out decommissioning actions at contaminated sites, it will be necessary to develop proce-

dures for identifying those sites where previous burials took place and evaluating the acceptability of those previous burials. The acceptability of previous burials is being discussed in the Enhanced Participatory Rulemaking on Radiological Criteria for Decommissioning.

The staff is developing an information notice to inform NRC licensees of recent experience in decommissioning former onsite disposal sites. The staff is also developing a temporary instruction for NRC regional offices that will provide procedures for identifying previous burials.

- issue revised draft information notice and temporary instruction for comment (lead: LLWM; support: IMNS, FCSS, regions, OGC) July 1993
- issue final information notice and temporary instruction (lead: LLWM; support: IMNS, FCSS, regions, OGC) July 1993

### 5.1.7 Review of Non-Power Reactor License Terminations

Appendix B to this report lists the status of all decommissioned reactors. The Atomic Energy Commission (AEC) and NRC terminated the licenses of 60 critical assemblies and test and research reactors. There are also four experimental reactors now under DOE control. NRC staff will review the non-DOE facilities to ensure that no contamination above the NRC requirements still remains at these sites. Any sites that require further decommissioning will be added to the SDMP list for tracking.

A task order to review test and research reactor license termination files was initiated with the Oak Ridge Institute for Science and Education (ORISE) in August 1990. On June 18, 1991, ORISE submitted its report to NRC on the review of 59 docket files for test and research reactors with terminated licenses. ORISE concluded that the docket files for 28 of the previously licensed sites did not contain complete documentation supporting a conclusion that the site meets current unrestricted release guidelines. However, it maintained there was adequate information to conclude that the potential is low for any of the 28 sites to exceed the current release guidelines.

LLWM developed a strategy in conjunction with the NRR Non-Power Reactors and Decommissioning Project Directorate (ONDD), to further assess the potential for residual contamination at the 28 sites with incomplete documentation. The followup actions include reviewing the reactor design as a basis for possible contamination, evaluating the current status of the sites, attempting to locate missing records, and followup surveys, if necessary.

In July 1992, ONDD completed the investigation of the 28 potentially contaminated facilities. For each of the

facilities, the current contact, the location of the former reactor, and the current status of the facility was determined. Out of the 28 facilities, 4 will be resurveyed, additional information will be collected for 12, and no further action is needed for 12.

The NRC actions needed to complete the LLWM actions and the estimated date for completion are given below.

- Perform followup surveys and collect additional information (lead: LLWM; ONDD) October 1993

### 5.1.8 Development of Procedures To Ensure That Future License Terminations Meet NRC Requirements

In its report entitled "NRC's Decommissioning Procedures and Criteria Need To Be Strengthened," GAO cited several cases for which license terminations were not performed in accordance with NRC requirements. To ensure that future license terminations will meet NRC requirements, the NRC staff will develop procedures, in the form of a standard review plan (SRP), to ensure that appropriate decommissioning planning, inspections, recordkeeping (see Section 5.1.3), and surveys (see Section 5.1.5) are conducted.

The NRC actions needed to develop an SRP and estimated dates for completion are given below.

- develop materials license decommissioning SRP:
  - draft SRP July 1990 (completed)
  - develop final SRP June 1991 (completed)
- develop decommissioning inspection procedures:
  - develop draft inspection procedures in Manual Chapter 2800 (lead: LLWM; support: IMNS, FCSS, regions) October 1992 (completed)
  - develop final inspection procedures in Manual Chapter 2800 (lead: LLWM; support: IMNS, FCSS, regions) December 1993

### 5.1.9 Review and Modification, If Needed, of License Termination Procedures

The decommissioning rulemaking completed in June 1988 (53 FR 24018) modifies the license termination procedures used by licensees and the NRC staff. Therefore, the procedures in effect now will need to be updated to reflect the new regulatory requirements. To provide guidance to licensees and the NRC staff on terminating licenses, the NRC staff plans to issue a regulatory guide on the proce-

dural method for license termination for licenses under 10 CFR Parts 30, 40, and 70. Residual contamination criteria and licensee termination survey requirements are treated in the rulemaking and Draft NUREG/CR-5849 that are discussed in Sections 5.1.1 and 5.1.5 of this report.

The NRC actions need to provide this guidance and estimated dates for completion are given below.

- issue draft regulatory guide for comment (lead: RES; support: IMNS, LLWM, FCSS, OGC, regions) TBD
- issue final regulatory guide (lead: RES; support: IMNS, LLWM, FCSS, OGC) TBD

### 5.1.10 Consideration of a "Reopener" Rulemaking To Require Additional Decontamination

In SECY-89-369 (December 8, 1989), the Commission was informed of the staff's intention to develop procedures to provide notice to licensees that terminated licenses may be recalled if final NRC or EPA residual contamination standards indicate the need for further remediation. In an SRM dated January 31, 1990, the Commission requested NRC staff to expedite the residual contamination rulemaking and, as part of that rulemaking, provide a general notice to licensees that additional remediation may be necessary to comply with future EPA standards. However, the staff was directed not to develop specific procedures providing such notice to licensees; therefore, no rulemaking is contemplated to reopen terminated licenses as a result of more stringent EPA standards. In an SRM dated February 28, 1992, regarding the need to recall terminated licenses if future NRC standards are more restrictive than criteria currently in use by NRC, the Commission stated that if a licensee or responsible entity remediates a site under an NRC-approved decommissioning plan that meets the criteria at the time of approval of the plan, the NRC would not reopen the case because of any changes in NRC criteria or standards.

However, NRC may need the ability to reopen terminated licenses, or issue new licenses to site owners or former licensees as a contingency, if previously unknown contamination is found that is a significant health risk at either a formerly licensed or never-licensed site or if it is found that decommissioning was not completed in accordance with the approved plan. Also, a requirement is needed to compel reporting to NRC of the discovery of contamination above NRC's unrestricted use criteria by either former licensees or other persons. NMSS will send a "User Need Request Memorandum" to RES by September 1993 to initiate a rulemaking to require additional remediation if previously unknown contamination is discovered that is above criteria approved with the decommissioning plan or approved at license termination.

#### NRC actions and schedule:

- submit "User Need Request Memorandum" to RES to initiate rulemaking requiring additional remediation if previously unknown contamination identified (lead: LLWM; support: RES) September 1993
- initiate rulemaking (lead: RES; support: LLWM, IMNS, FCSS, regions) TBD

## 5.2 Resolved Issues

### 5.2.1 Coordination With Agreement States on SDMP Activities

The NRC staff has identified the sites of materials licensees that require remediation. In addition to these sites, there are also other licensed sites requiring remediation that are regulated under the Agreement States program. Actions taken on both the NRC and Agreement State licensed sites should ultimately be consistent and compatible. NRC requested Agreement States to identify materials sites requiring remediation. As of December 1992, approximately 50 sites were identified. OSP staff intend to continue to monitor Agreement State decommissioning activities.

### 5.2.2 Consideration of a Rule To Require Licensees To Implement More Stringent Future Decommissioning Standards

EPA is in the process of developing residual contamination criteria for unrestricted release and expects to complete its efforts in the mid-1990's. To have criteria available for terminating licenses in the meantime, the NRC is preparing rulemaking to formally adopt residual contamination criteria (see Section 5.1.1). Until this rulemaking is completed, licensees may be reluctant to decommission their sites, if future, more restrictive criteria may require them to take additional remedial actions at a later time.

The Commission discussed this issue in the SRM dated January 31, 1990, and requested that the NRC staff expedite the residual contamination rulemaking activities so that licensees will have an incentive to complete site decommissioning, rather than the current situation, which may encourage licensees to defer decommissioning pending issuance of NRC requirements. The Commission also requested that the staff provide a general notice to licensees, as part of the *Federal Register* notice for the rulemaking, that additional remediation may be necessary to comply with EPA standards promulgated in the future, and not to develop procedures to provide specific notice to licensees that licenses terminated in accordance with

NRC requirements may be recalled if forthcoming EPA regulations indicate a need for further remediation. If EPA should develop residual radioactivity standards, the NRC staff should emphasize to EPA the need (1) to grandfather those sites whose licenses have already been terminated in accordance with NRC requirements before issuance of such standards or (2) to demonstrate that EPA's standards result in significant and justifiable improvement in protecting human health and safety and the environment.

In response to this guidance, the NRC staff will provide general notice, as part of the *Federal Register* notice for the enhanced participatory rulemaking on radiological criteria for decommissioning described in Section 5.1.1.1, advising licensees of the potential need for additional remediation to comply with standards promulgated at a future date by EPA. There will be no rulemaking or procedures requiring licensees to implement more stringent future decommissioning standards.

### 5.2.3 Development of Enforcement Guidance for Decommissioning Financial Assurance Requirements

The financial assurance requirements for decommissioning, promulgated in the decommissioning rule, June 27, 1988, went into effect on July 27, 1990. It is likely that some licensees will not be in compliance with these new regulations because (1) they are unaware of the requirements; (2) they are making final arrangements to obtain a financial assurance mechanism; (3) they are unable to obtain a financial assurance mechanism; or (4) they refuse to obtain a financial assurance mechanism. To ensure that NRC takes a consistent enforcement approach in dealing with these noncompliances, the NRC staff prepared enforcement guidance addressing these issues in SECY-91-271, "Strategy for Enforcing the Financial Assurance Requirements of the Decommissioning Rule for Materials Licenses," August 27, 1991, which was accepted by the Commission.

### 5.2.4 Compelling Remediation by Responsible Parties at Unlicensed Sites

At SDMP sites where the license has been terminated, despite NRC staff efforts to work with responsible parties, the experience during SDMP implementation has been that former licensees are sometimes unwilling to perform further remediation. Issuing orders may be a means of compelling decommissioning in this situation.

The Commission's statutory authority to issue orders is found in Section 161 of the Atomic Energy Act (AEA) of 1954, as amended, and is not limited solely to licensees. The Commission's AEA authority to issue orders is broad and extends to any person (entity, i.e., individual,

corporation, or governmental agency) who (that) engages in conduct within the Commission's jurisdiction. In the past, NRC regulations for issuance of orders only addressed licensees. On April 3, 1990, NRC published a proposed rule (55 *FR* 12370) that would amend 10 CFR Part 2, Subpart B, to provide for the issuance of orders to persons subject to NRC jurisdiction, whether or not licensed by the Commission. The comment period on the proposed rule expired June 18, 1990. The final rule was published on August 15, 1991.

While NRC authority under Section 161 of the AEA is broad, it is generally phrased ("...the Commission is authorized to...prescribe such regulations or orders as it may deem necessary ... to govern any activity authorized pursuant to this Act...."). Thus, the legal framework for NRC decommissioning action is not fully articulated in the AEA. Unlike EPA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), NRC is granted no specific authority to itself engage in remediation actions, and there is no express AEA provision, as in CERCLA, imposing decommissioning liability on former owners, licensees, and transporters. OGC believes that NRC jurisdiction to issue decommissioning orders under Section 161 of the AEA extends clearly to persons currently in possession of materials subject to NRC regulation, whether or not such persons are licensees. Accordingly, persons currently owning contaminated sites are subject to NRC decommissioning orders, whether or not such persons are licensees. The liability under AEA of former owners and licensees who are not currently in ownership or possession presents a more difficult question that has not been definitely resolved.

OGC has separately recommended that rulemaking be conducted to establish criteria and procedures applicable to the decommissioning of never-licensed, as well as formerly licensed, contaminated sites. This concern is addressed by the rulemaking efforts described in Sections 5.1.1, 5.1.10, and 5.1.2 concerning radiological criteria for decommissioning, license reopening, and decommissioning timeliness, respectively. In the interim, staff will issue orders, when actions are necessary to protect public health and safety, on the basis of established criteria or guidance regarding decommissioning.

### 5.2.5 Compelling Decommissioning by Licensees

The NRC sometimes encounters licensees that are unwilling to proceed expeditiously with general or specific remediation actions. At many of the SDMP sites, contamination may be widespread at low concentrations and poses no immediate or short-term risk to the public. The NRC staff is continuing to work with licensees at SDMP sites to effect decommissioning. Should these efforts be

unsuccessful, staff actions, as permitted by 10 CFR 30.61, 40.71, and 70.61, may include unilaterally modifying terms of the license in the interest of public health and safety to include such general or specific decommissioning of the site as to be determined by the Commission. The procedure for unilateral modification of a license is by issuance of orders under 10 CFR 2.202. Orders are useful tools for establishing legal requirements and timeframes for remedial actions. However, this approach may result in litigation in establishing standards and timeframes for decommissioning. Litigation can be minimized by the promulgation of specific regulations, as described in Sections 5.1.1 and 5.1.2. These regulations address the radiological criteria for decommissioning and decommissioning timeliness and would force recalcitrant licensees to remediate sites or face substantial civil penalties.

Since these rulemakings may take several years to complete, the staff has taken interim steps to accelerate the decommissioning of SDMP sites. These steps are outlined in the "NRC Action Plan To Ensure Timely Cleanup of SDMP Sites" approved by the Commission on April 6, 1992, and published in the *Federal Register* on April 16, 1992 (57 *FR* 13386). The staff intends to proceed with site decommissioning in accord with this plan until the rulemakings on decommissioning timeliness and radiological criteria for decommissioning are completed.

No additional resources are needed for this activity.

### 5.2.6 Residual Non-Radioactive Contamination

There may be instances where residual radioactive contamination has been reduced to levels permitting release of the facility for unrestricted use and termination of the license; however, non-radioactive contamination above the limitations imposed by other agencies may remain.

The "General Requirements for Decommissioning Nuclear Facilities" (53 *FR* 24018, June 27, 1988) indicate that decommissioning activities do not include the removal and disposal of non-radioactive materials beyond that necessary to terminate the NRC license and that disposal of non-radioactive hazardous waste not necessary for NRC license termination is not covered by the regulations but would be treated by other appropriate agencies having responsibility over such wastes. Hence, NRC actions will be to notify responsible State or Federal agencies of the presence of non-radioactive contaminants remaining on site before terminating the NRC license.

If, however, other agencies are not responsive to the non-radiological hazards, NRC may enforce the remediation of chemical hazards generated by regulated activities in the area of decommissioning when the presence of the chemical hazard affects an activity normally regulated by NRC. (See memorandum from General Counsel to

Commissioners, dated September 23, 1986, Analysis of Jurisdictional Issues ["Regulatory Gap"] Associated With Nonradiological Hazards.)

No additional resources are needed for this activity.

### 5.2.7 Use of Superfund

In SECY-88-308 the NRC staff described 31 sites of materials licensees that had a sufficient level of contamination to require special attention from the staff. In SECY-89-224, the NRC staff recommended that NRC initiate discussions with EPA on procedures to make use of Superfund to help resolve decommissioning cases when NRC exhausts its own regulatory options.

In the SRM dated January 31, 1990, the Commission rejected the NRC staff's recommendation to pursue discussions with EPA on the development of a protocol governing the application of Superfund to contaminated sites. Instead, the Commission stated that the NRC staff should first consult with the Commission in those cases where Superfund should be considered. When necessary, the Commission instructed the NRC staff to submit a detailed discussion of the circumstances at the given site, the reason(s) that existing NRC regulatory authority was inadequate, and the objectives that would be served by the

application of Superfund to the site. In addition, the discussion should include an analysis of (1) the decommissioning standard that would apply under Superfund and the difference between that standard and the Atomic Energy Act standard; (2) the rights and authorities that the State would have if Superfund were extended to the site; and (3) the rights and authorities that private citizens would have to sue the Federal government or the licensee, using the Superfund provision for a citizen's suit. The SRM sufficiently resolves the issue of the use of Superfund and sets out the procedures to request action by the Commission.

In some cases, licensed sites are listed on the EPA's National Priority List (e.g., the Pesses Company site) and completion of decommissioning would be dependent on Superfund schedules and priorities. In other cases, such as West Lake Landfill, where an unlicensed site is involved and the potential hazard from chemical contaminants may dwarf the radiological hazard, decommissioning of the radioactive contamination will be an integral part of total site remediation and NRC will defer to the EPA Superfund restoration. NRC's efforts in those cases will be to encourage EPA to consider timely cleanup, follow EPA actions to ensure satisfactory remediation of radioactive materials, and continue discussion with EPA about sites that are candidates for Superfund (e.g., Safety Light).

## 6 SDMP ACTION PLAN

In late 1991, the staff completed an analysis of decommissioning issues (SECY-91-342, SECY-91-342A) affecting the timely decommissioning of SDMP sites. As a result of this analysis, and in response to the SRM dated February 28, 1992, the staff developed a plan to accelerate the decommissioning of SDMP sites. In SECY-92-106 (March 24, 1992), the staff requested that the Commission approve the plan. In an SRM dated April 6, 1992, the Commission approved the "Action Plan To Ensure Timely Cleanup of Site Decommissioning Management Plan Sites" and it was published in the *Federal Register* on April 16, 1992 (57 FR 13389). The Action Plan is reproduced in Appendix C.

The Action Plan outlines the Commission's current position on (1) residual contamination criteria, (2) finality of

decommissioning actions, (3) decommissioning timeliness, (4) site characterization, and (5) procedures to compel timely decommissioning. The issues of residual contamination criteria and decommissioning timeliness are the subjects of current rulemakings, that have been described in Sections 5.1.1 and 5.1.2. In SECY-92-317, the staff reported on the implementation of the action plan and concluded that the plan has been effective in raising the awareness of the Commission's expectations on the decommissioning of contaminated sites and that no revision of the Action Plan was required. Over the 7 months since SECY-92-317 was issued, the staff has not identified additional issues that would require the Action Plan to be revised and continues to recommend its implementation as written.

**APPENDIX A**

**Detailed SDMP Site Descriptions**

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<sup>1</sup> The Allied Signal Aerospace, Bendix Division site was released for unrestricted use and removed from the SDMP in 1992.

<sup>2</sup> All issues resolved; in the administrative process of removing site from the SDMP.

<sup>3</sup> Site may be removed from SDMP in 1993.

<sup>4</sup> All required actions to remove the site from the SDMP have been completed and the site has been removed from the SDMP. However, a summary of actions taken in 1992 leading to the site's removal from the list is included in this appendix.

# ADVANCED MEDICAL SYSTEMS, INC

## 1. Site Identification

Advanced Medical Systems, Inc.  
Cleveland, OH

License No.: 34-19089-01  
Docket No.: 030-16055  
License Status: Active  
Project Manager: D. Sreniawski, Region III  
LLWM Monitor: D. Orlando

## 2. Site and Operations

Advanced Medical Systems, Inc., (AMS) is currently authorized to store, train AMS personnel in the manufacture of NRC-approved sources and service teletherapy devices. AMS was previously authorized to manufacture sources for distribution. This authority was rescinded by NRC on May 31, 1991, because AMS no longer retained qualified manufacturing personnel. During an ORISE survey in 1985, surface contamination was found in a hot cell, the ventilation system, the dry waste storage area, the liquid waste area, and the holdup tank and piping. No offsite contamination was found. However, some detectable activity was found in sediments, soil, and vegetation in the southern portion of the AMS property.

AMS is located in an industrial and residential neighborhood on London Road on the east side of Cleveland, Ohio. The facility is in the northeastern portion of a large warehouse building formerly occupied by Picker Corporation, who used it for similar operations. AMS occupies about one quarter of the 736 m<sup>2</sup> (8000 ft<sup>2</sup>) building. The remainder of the building is currently unused. The facility occupies portions of three floors in the warehouse. The first floor consists of an office area, an isotope shop area, a hot cell, a shielded work room, and a storage area. The second floor area houses a mechanical equipment room and an exhaust ventilation equipment room. A liquid waste handling room and the former liquid waste holdup tank room and dry waste storage area are located in the basement. Waste is stored in a locked room with roped areas on the south side of the warehouse area.

After a 1985 assessment of the fire protection and operational safety programs at the facility, ORISE recommended that the licensee decontaminate numerous work areas (see above) in the facility. ORISE also recommended that the basement floor drain be plugged to prevent contamination of the sanitary sewer system. The ORISE survey showed contamination up to 9-E7 Bq (1.51-E6 dpm [disintegration per minute])/100 cm<sup>2</sup> in the hot cell access port in the isotope shop area. A water sample from the liquid waste room floor contained 6500 Bq (1.75-E5 pCi)/l of Co-60. The sediment from the loading dock drain also showed low, but detectable, levels of activity. No offsite contamination was detected.

On July 23, 1987, NRC issued AMS an order to clean the facility so that continued operations could be conducted safely. This order stated that decontamination was to begin no later than August 31, 1987. NRC later amended the order to require decontamination to be completed by April 1988. In November 1988, ORISE performed a survey of the facility that included analysis of samples from a sanitary sewer. Access to this sewer is prohibited by a locking manhole cover. Exposure rates of up to 5E-6 C/kg (20 mR)/hr were measured in the manhole. Water samples from the sewer showed Co-60 levels up to 5.6 Bq (150 pCi)/l and sediment samples showed up to 24 Bq (640 pCi)/g. No Cs-137 was detected. AMS completed cleanup to activity levels suitable for continued operation in 1989, with the exception of the waste holdup tank (WHUT) room, to contamination levels suitable for continuing operations. Exposure rates of 20 Sv (2000 rem)/hr at 1 foot (30 cm) have been measured in the WHUT room, making the activity level too high to compel cleanup at this time. NRC gave AMS permission to seal and monitor this room until radiation levels are low enough to permit remediation. The WHUT room remains sealed and cleanup of this room will be evaluated during the license renewal in December 1994. Unrestricted release criteria were not used.

## 3. Radioactive Wastes

The contaminated material at the AMS facility consists of equipment and concrete contaminated with Co-60 as well as Co-60 contaminated sludge in sewer piping. The concrete and equipment contain a wide range of activity

levels from relatively low exposure rates up to approximately 0.05 C/kg (200 R) at 1 meter from the WHUT in the WHUT room. Exposure rates for the contaminated sludge are up to 5E-6 C/kg (20 mR). In addition Co-60 pellets, used to manufacture sealed sources, may be present. The licensee is not currently using Cs-137, and the bulk of this isotope is in the form of sealed sources that were returned from customers. These sources are stored in a sealed source storage vault in the isotope shop.

#### **4. Description of Radiological Hazard**

The principal hazards associated with the AMS facility are direct exposure, inhalation, ingestion, intrusion, and ground water contamination. There is no immediate threat to the public health and safety. Direct exposure has been significantly reduced by the licensee's previous cleanup activities. Access to the high exposure rates and contamination in the WHUT room is prohibited by a concrete block wall. Sufficient shielding exists to reduce exposure rates to less than 8E-6 C/kg (30 mR)/hr outside the room. Inhalation and ingestion of radioactive material is minimized by high-efficiency particulate air (HEPA) filter ventilation systems and by protection of the hot cell and sealed rooms. Intrusion into the facility is unlikely because the facility is protected as a restricted area.

#### **5. Financial Assurance and Viable Responsible Organization**

In 1990 AMS provided a decommissioning funding plan and financial assurance statement to NRC. NRC staff estimated that decommissioning funding needed will exceed the amount provided by AMS. On July 7, 1992, AMS provided decommissioning financial assurance in the amount of \$750,000 as permitted by 10 CFR 30.35(c)(2). Pursuant to that same regulation, AMS will be required to submit a decommissioning funding plan before its next license renewal. The current AMS license expires on December 31, 1994.

On April 1, 1993, the Northeast Ohio Regional Sewer District (NEORS) filed a law suit against AMS for damages to its Southerly Plant from Co-60 contamination transmitted by liquid waste AMS released to the sanitary sewers. NRC staff cannot predict the impact on the financial posture of AMS if the NEORS suit is successful and results in significant damages. In addition, NEORS filed a petition pursuant to 10 CFR 2.206 on March 3, 1993, requesting NRC to modify the AMS license to require AMS to

- assume all costs resulting from the offsite release of Co-60 that has been deposited at the District's Southerly Treatment Plant
- decontaminate the sewer connecting the AMS London Road facility with the public sewer at London Road and continue decontamination of the sewers downstream as far as necessary

#### **6. Status of Decommissioning Activities**

As required by the NRC order, AMS has completed the cleanup to allow the facility to continue operations. The disposition of the WHUT room will be addressed during the license renewal in November 1994. AMS plans to continue operations and has no current plans to decommission the entire facility.

#### **7. Other Involved Parties**

As stated above, the NEORS lawsuit against AMS for damages to their Southerly Plant could be a concern if the suit is successful and results in mandatory awards that would jeopardize the funding for decommissioning.

The petition, also discussed above, NEORS filed on March 3, 1993, is another issue.

#### **8. NRC/Licensee Actions and Schedule**

AMS plans to continue operation and has no current plan to decommission. NRC Region III is evaluating options for addressing the financial assurance issue (see item 5 above). Upon NRC review and approval of an acceptable decommissioning funding plan, AMS will be removed from the SDMP list.

#### **9. Problems/Issues**

The ability of AMS to fund decommissioning may be affected by the lawsuit brought by NEORS.

# ALUMINUM COMPANY OF AMERICA

## 1. Site Identification

Aluminum Company of America  
Cleveland, OH

License No.: AEC Licensed C-5023  
Docket No.: 040-00501  
License Status: Expired February 28, 1961  
Project Manager: A. Huffert

## 2. Site and Operations

The Aluminum Company of America (ALCOA) Cleveland Works is a large, multiple function aluminum refining, casting, and finishing facility at 2210 Harvard Avenue in the villages of Newburgh Heights and Cuyahoga Heights, which are suburbs of Cleveland, Ohio. The permanent mold castings facility division area is located at the southeast corner of the Cleveland Works, comprising some 5665 m<sup>2</sup> (14 acres). This currently idle area of the site is being prepared for possible sale or reconstruction.

According to ALCOA personnel, thorium was used at the Cleveland Works Plant since 1900 by American Magnesium Company (AMC), which was a wholly-owned subsidiary. There is little information on the quantities and forms of thorium used at this site before 1954.

After 1954, ALCOA obtained an Atomic Energy Commission (AEC) license for possession and use of 726 kg (1600 pounds) of refined thorium for experimental purposes and the production of magnesium-thorium alloys at the Cleveland Works. AEC licensing records indicate that thorium was received in both powder and pellet forms, processed to make roller rings out of HM21XA ingot (a magnesium-thorium alloy), and then shipped to the Bendix Corporation in Kansas City, Kansas. Before the expiration of the license on February 28, 1961, all excess thorium was shipped back to Dow Chemical Company, the supplier. However, AEC licensing records also indicate that thorium wastes may have been buried in accordance with 10 CFR 20.304.

The former AEC licensee does not intend to reactivate this program. On January 12, 1981, the Nuclear Regulatory Commission (NRC) received a Certificate of Disposition of Materials (NRC Form 314) dated January 8, 1981, which certified disposal of all licensed material. Limited radiological surveys were performed at the site by NRC in 1980, by Oak Ridge Institute for Science and Education (ORISE) in 1985, by NUS Corporation in 1989, and by Remcor Corporation in 1990. Survey results reported by the latter two firms working for ALCOA showed thorium-232 contamination in several locations of the facility. However, these radiological surveys were not extensive enough to fully characterize the facility. Additional radiological surveys of the Cleveland Works facility was performed by ALCOA and NRC and its contractors in 1991 and 1992.

## 3. Radioactive Wastes

Approximately 41 m<sup>3</sup> (1450 ft<sup>3</sup>) of soil contaminated with greater than 0.37 Bq (10 pCi)/g thorium was shipped to a licensed facility in December 1991. The contaminated soil was located in a 30-meter (100-foot) x 12-meter (40-foot) area in the southeast corner of the property. Several buildings also contain contamination on building and equipment surfaces.

## 4. Description of Radiological Hazard

This site poses no immediate threat to the public health and safety as it is an industrial site with controlled access.

## 5. Financial Assurance/Viable Responsible Organization

ALCOA owns the site and is financially capable of funding the decommissioning.

## 6. Status of Decommissioning Activities

In September 1991, NRC reviewed and approved a remediation plan for contaminated soils located south of Building 71. Decontamination was performed between September and October 1991. Before disposal of the

contaminated soil in December 1991, ORISE performed a confirmatory survey of the area south of Building 71 and determined that this area satisfied the NRC thorium guideline for release for unrestricted use. One sample location exceeded the NRC guideline for depleted uranium (DU) and was subsequently remediated in 1992. In August 1992, ORISE surveyed the concrete pad where the soil was stored before to disposal and determined this area was remediated satisfactorily.

ORISE performed additional radiological surveys in November 1991 at locations where former AEC-licensed operations occurred, as well as other portions of the Cleveland Works facility, to determine if these areas contained residual contamination in excess of NRC guidelines. Scoping surveys of Buildings 65, 71, 107, 111, 119, and 120 and the current landfill indicated that radiological contamination exceeded NRC limits in Building 65. In February and March 1992, ALCOA submitted to NRC staff reports characterizing the radiological contamination in Building 65. In January 1993, ALCOA submitted a Building 65 remediation plan for NRC staff review and approval. In February 1993, NRC staff requested additional information from ALCOA to complete its review of the Building 65 remediation plan. In March 1993, the remediation plan was approved.

In May 1992, ALCOA requested from NRC staff a written release from further remediation obligations of the Permanent Mold Division area of the Cleveland Works facility. Because some of the buildings in this area were not previously surveyed for radiological contamination, NRC requested ORISE to perform scoping surveys of Buildings 21, 22, 24, 25, 26, 29, 70, and 72. The results of the ORISE scoping survey in August 1992 indicated that the mezzanine area of Building 25 was contaminated with DU in concentrations that exceeded NRC guidelines. In October 1992, NRC staff reviewed and approved a remediation plan for Building 25. Later that month, remediation of Building 25 was completed and a final radiological survey was sent to NRC for review. The results of an NRC confirmatory survey of the mezzanine area performed in October 1992 indicated that remediation efforts were successful, with no residual contamination identified above NRC unrestricted release criteria. In December 1992, ALCOA began demolishing buildings located in the Permanent Mold Division area and plans to continue demolition through Spring 1993.

Concerning the sanitary landfill located at the Cleveland Works facility and the disposition of thorium wastes from previous operations, NRC staff requested in May 1992 that ALCOA submit an analysis of whether thorium wastes exists at the landfill. In September and October 1992, ALCOA provided analyses that were based on interviews with employees and past thorium waste disposal practices. However, these analyses did not provide site characterization information from the landfill area or records of waste disposal, which did not exist. NRC staff considered the ALCOA analyses insufficient to support the conclusion that thorium-contaminated wastes are not present in the landfill. Further evaluation of the landfill is planned in 1993 that is based on the collection and analysis of ground water samples and possibly review of aerial photographs to locate areas where thorium might have been disposed.

## **7. Other Involved Parties**

No parties other than ALCOA and NRC are involved in the remediation work at this time. The Ohio Environmental Protection Agency (OEPA) and the Cuyahoga County Board of Health may become involved if subsurface characterization of the landfill is required.

## **8. NRC/Licensee Actions and Timing**

- |  |              |
|--|--------------|
| • ALCOA submits final radiation survey of Building 65  | June 1993    |
| • ALCOA responds to NRC letter concerning landfill   | August 1993  |
| • NRC performs a verification survey of Building 65 and release Building 65 for unrestricted use | August 1993  |
| • NRC determines if exhumation of wastes from landfill is necessary                              | October 1993 |

## **9. Problems/Issues**

It may be difficult to determine conclusively whether radioactive materials were previously disposed in the landfill.

# AMAX

## 1. Site Identification

Amax, Inc.  
Washington Bottom, Wood County, WV

License No.: SNM-1418  
Docket No.: 040-08820  
License Status: Active  
Project Manager: L. Bykoski, LLWM

## 2. Site and Operations

The site is located in Washington Bottom, Wood County, West Virginia, on the east side of the Ohio River. The engineered disposal cell containing the thorium and uranium occupies 6.1 hectares (15.16 acres) and is surrounded by a 2-meter (6-foot) high security fence. Four ground water monitoring wells have been monitored semiannually since 1985.

## 3. Radioactive Wastes

Zirconium ores containing low concentrations of uranium and thorium were processed at this site from 1957 to 1974, to produce zirconium metal, primarily for the Federal Government. Natural thorium and its decay products are the principal radionuclides. The maximum concentration in soil is about 1.6 wt. percent thorium.

## 4. Description of Radiological Hazard

This site poses no immediate threat to the public. The waste contains only low concentrations of natural thorium and uranium and is confined in an engineered cell.

## 5. Financial Assurance/Viable Responsible Organization

The site is owned by Amax, Inc. Well monitoring is performed by the State of West Virginia. Although, Amax has been responsible for site-related activities to date, this site will be transferred to the U.S. Department of Energy (DOE) as discussed below.

## 6. Status of Decommissioning Activities

The contaminated soil has been retained in an engineered disposal cell since December 1982. Well monitoring since then shows no signs of leakage of radionuclides.

## 7. Other Involved Parties

The State of West Virginia was involved in performing well monitoring. DOE will take title and custody of the site.

## 8. NRC/Licensee Actions and Timing

Amax is in the process of transferring this site to the DOE pursuant to the provisions of Title I, Subtitle D, Section 151 (c), of the Nuclear Waste Policy Act of 1982.

The NRC staff visited the site and met with DOE and Amax representatives in June 1990. After the visit, DOE decided that the existing monitoring wells on the site may not be adequate for its long-term needs. The staff met with DOE again in September 1990 to discuss DOE's concern about the wells and to formulate a procedure for turning over responsibility of the site to DOE.

In February 1990, Amax submitted a proposal for the financial arrangements it would make to support long-term maintenance of the Wood County site. After meeting and corresponding with DOE about the financial arrangements, NRC wrote Amax on June 12, 1991, setting forth NRC's conclusions with regard to adequate financial arrangements. Amax agreed to these by letter of June 29, 1991. By letter of August 9, 1991, NRC informed DOE that all of the conditions of the Nuclear Waste Policy Act of 1982 bearing on the site at

Parkersburg, West Virginia, had been satisfied and that the next step is for DOE to take title and custody of the site as required by the legislation.

In an April 9, 1992, letter to NRC, DOE stated that it remains committed to taking title and custody of the site. However, two issues remained to be resolved after this meeting: (1) DOE believed that NRC should write a re-opener clause into the license termination to protect the Government if non-radiological contaminants are present in concentrations sufficient to require further remedial action, and (2) DOE believed the financial arrangements, proposed by NRC, for Amax to pay for site monitoring are less than previously estimated by DOE. A meeting was held October 6, 1992, with representatives from Amax and DOE. DOE agreed to work with Amax to resolve the remaining financial assurance funding issues and to submit a schedule for taking title to the Amax site. Subsequently, DOE and Amax agreed on the level of funding and a transfer schedule was developed. DOE is scheduled to transfer the title before the end of June 1993.

## **9. Problems/Issues**

None.

## ANNE ARUNDEL COUNTY/CURTIS BAY

### 1. Site Identification

Anne Arundel County/Curtis Bay  
Baltimore, MD

License No.: STC-133  
Docket No.: 040-00341  
License Status: Terminated  
Project Manager: D. Orlando

### 2. Site and Operations

The Anne Arundel County/Curtis Bay site is located in a southern suburb of Baltimore in an industrialized area of Anne Arundel County, Maryland. The site encompasses approximately 35 hectares (87 acres) of open land and 10 abandoned warehouses. Thorium contamination exists in limited areas on the floors and in soil beneath and/or adjacent to the former warehouses.

Beginning in the late 1950's, the General Services Administration (GSA) stored thorium nitrate ( $\text{ThNO}_3$ ) (mantle and reactor grades, average 47% by weight) in fiber and steel drums at the Curtis Bay Depot under NRC License STC-133, as part of the National Defense Stockpile. In 1977 GSA notified NRC of its intention to excess the empty warehouses as part of a sale of Government land and buildings. Ten of these buildings (M-421 through M-425 and L-421 through L-425) are on land that was sold, and then transferred, to Anne Arundel County, in the late 1970's and early 1980's. In 1988 National Defense Stockpile responsibility was transferred to the Defense Logistics Agency (DLA).

The interior surfaces of the warehouses are of tongue-and-groove wood construction and exterior walls are covered with corrugated asbestos siding. Each building contains approximately 300 m<sup>2</sup> (3229 ft<sup>2</sup>) of floorspace. Brick pillars and wooden beams support the warehouses, creating a crawlspace under each building. Concrete loading docks remain along the east side of Buildings M-421 through M-424. Loading docks were removed from Buildings L-411 through L-415 to allow construction of a chain link fence that separates the property from the current Curtis Bay Depot.

The warehouses were constructed during World War I and are in an advanced state of deterioration. In 1977 NRC surveyed the warehouses and identified residual contamination in the tongue-and-groove joints of the wood flooring of several warehouses. In 1977 GSA remediation activities included removing various sized areas of the floors and walls as well as portions of subfloor beams and joists. Results of the NRC confirmatory survey of the buildings indicated that fixed residual activity limits were less than 17 Bq/(1000 dpm)/100 cm<sup>2</sup> for alpha contamination and less than 2.0E-4 cGy (0.2 mrad)/hr for beta-gamma contamination. Smear samples indicated that removable contamination levels were less than 4 Bq (200 dpm)/100 cm<sup>2</sup>. In 1977 soil contamination guidelines did not exist. Soil analysis at that time indicated that thorium was present in the soil in excess of the current 0.37 Bq (10 pCi)/g limits under Buildings L-412, L-413, L-414, M-421, M-422, and M-423.

In 1992 local residents raised concerns about the presence of residual contamination during consideration of the site as the location of a new detention center. In response, NRC requested ORISE to conduct a radiological survey of the warehouses and adjacent land to determine the current radiological status of the site. The ORISE survey revealed spotty thorium contamination of building surfaces and soil. Surface contamination levels exceeded the current NRC guidelines in eight of nine buildings. Removable activity levels exceeding 12,000 Bq (200 dpm)/100 cm<sup>2</sup> were observed in Buildings M-421 and M-422. Interior exposure rates in all buildings were below 1.3 nC/kg (5  $\mu$ R)/hr above background, at 1 meter (3.3 feet). Concentrations of thorium in surface soil exceeded BTP Option 1 limits at 27 locations adjacent to or beneath the former warehouses. At 15 of these locations subsurface soil also exceeded BTP Option 1 limits for thorium.

### 3. Radioactive Waste

Radioactive waste that will be generated from the remediation of this site will consist of slightly contaminated (thorium) wood, soil, and concrete. The ORISE survey indicated that most of the contaminated wood is present at or near the location of the previous (1977) remedial activities. Soil contamination exists in a limited number of

locations under or adjacent to the former warehouses. Some contaminated concrete also may exist adjacent to the loading docks and contaminated soil. The ORISE survey revealed concentrations of total thorium in the soil ranging from background levels up to about 23 Bq (640 pCi)/g. The volume of contaminated soil and wood requiring disposal in a licensed radioactive waste disposal facility is not expected to be extensive.

#### **4. Description of Radiological Hazard**

The site does not pose an immediate threat to the public health and safety. The 1992 ORISE survey revealed concentrations of total thorium in the soil ranging from background levels up to about 24 Bq (640 pCi)/g. This same survey found the maximum exposure rate at the highest soil concentration location was  $7.2E-15$  C/kg (28  $\mu$ R)/hr above background at 1 meter above the soil surface. If an individual worked outside on the site at the point of maximum exposure for an entire year (2000 hours), the person would receive about 0.56 mSv (56 mrem) attributable to thorium at the site from past operations, which is below the maximum acceptable public dose limit of 1 mSv(100 mrem)/yr contained in NRC's regulations (10 CFR Part 20). This exposure rate, however, was observed at only one location and the areal extent of contamination is limited. Consequently, a more realistic estimate of the dose under current conditions would be expected to be much less than 0.56 mSv and the public dose limit of 1 mSv/yr. However, the contamination exceeds current residual contamination criteria and DLA plans to remediate the site to below current criteria.

#### **5. Financial Assurance/Viable Responsible Organization**

Currently, the land and buildings are the property of Anne Arundel County. The DLA will be the lead agency for remediating the site; however, it believes that Anne Arundel County has some responsibility for removing the building walls and roof before DLA begins remedial activities.

#### **6. Status of Decommissioning Activities**

In January 1993 DLA determined that it would be the lead agency for remediating this site. A conceptual remediation plan was submitted to NRC in early February 1993. In April 1993 NRC met with DLA, Anne Arundel County, and the Maryland Department of the Environment and Resources (MDDER) to discuss the conceptual plan. DLA is currently developing the remediation plan in coordination with Anne Arundel County, the State of Maryland, and NRC.

#### **7. Other Involved Parties**

It is anticipated that the MDDER and the Anne Arundel County Department of Health will be involved in the remediation of this site. The buildings are clad in asbestos, siding that may be determined to be a toxic material (friable asbestos) and subject to regulation by MDDER. In addition, portions of the soil near the buildings may contain heavy metals. NRC staff has and will continue to coordinate remedial actions with these agencies.

This site has received substantial attention in the local media. It also has been the subject of inquiries by Maryland Congressman Wayne T. Gilchrest and U.S. Senator Paul S. Sarbanes (Maryland).

#### **8. NRC/Licensee Actions and Schedule**

- |  |               |
|--|---------------|
| • DLA submits conceptual decommissioning plan        | February 1993 |
| • NRC meets with DLA to discuss decommissioning plan | April 1993    |
| • public meeting on site                             | May 1993      |
| • DLA submits remediation plan                       | June 1993     |
| • complete remediation (tentative)                   | December 1993 |

#### **9. Problems/Issues**

None.

# ARMY, DEPARTMENT OF, ABERDEEN PROVING GROUND

## 1. Site Identification

Department of the Army  
Combat Systems Test Activity  
Aberdeen Proving Ground, MD

License No.: SMB-141  
Docket No.: 040-06354  
License Status: Active  
Project Manager: E. Ullrich, Region I  
LLWM Monitor: R. Abu-Eid

## 2. Site and Operations

The U.S. Army Aberdeen Proving Ground (APG) is an active test facility for the Department of Defense. One mission carried out at APG is to plan and conduct development tests, initial production tests, and other tests of ammunition for the various weapons systems within the Army inventory.

APG is located in southeastern Harford County, Maryland, about 48 km (30 miles) northeast of Baltimore, on two peninsulas near the head of the Chesapeake Bay. APG was designated as a permanent military post in 1919, but ordnance was probably tested at this area earlier. APG consists of two administratively controlled areas: the Aberdeen Area and the Edgewood Area. The Aberdeen Area comprises approximately 6900 hectares (17,000 acres) and is bordered on the north by Swan Creek and Chesapeake Bay, on the east by Chesapeake Bay, and on the south-southwest by the Bush River. Some 80 to 85 percent of the Aberdeen Area is composed of ballistic test ranges, impact areas, vehicle test tracks, and other test facilities. Many of the test facilities within the Aberdeen Area are operated by the Combat Systems Test Activity (CSTA). The Edgewood Area is not involved in this matter.

The topography of the Aberdeen Area is typified by gently rolling, low-lying terrain of the coastal plain consisting of open water, wetlands, marshlands, and woodlands. Elevations range from sea level to about 21 meters (70 feet) above mean sea level. The land surrounding the Aberdeen Area is used primarily for agriculture and manufacturing, although home construction is becoming increasingly important, especially in the Perryman area. Municipal water for the town of Aberdeen is obtained from wells located on the Aberdeen Area of APG near the northernmost boundary.

Testing of munitions containing depleted uranium (DU) has been conducted at various ranges on APG since the 1950's under NRC (then AEC) license. Testing of DU penetrators by CSTA (then called the Materials Test Directorate) was begun in the early 1970's at what is now the Outdoor Testing Range and at the Ford's Farm Range. The facility at Ford's Farm originally entailed testing penetrators against "hard" targets in the open air. An enclosure was constructed at Ford's Farm in the late 1970's to contain the aerosolization of the penetrator which occurs upon impact with a hard target, and the impact area for previous testing was remediated.

An additional enclosure for DU testing was constructed in late 1981 at the Bomb Throwing Device (BTD) Area and testing at Ford's Farm decreased. A new enclosed facility for DU testing was completed in 1991 at Ford's Farm. The old enclosure at Ford's Farm was rebuilt to accommodate target disassembly operations. Based on effluent monitoring, testing in enclosed ranges does not contribute significant uranium contamination to the environment. Used armor plate contaminated with DU from testing is currently stored outdoors on a concrete pad in a controlled area. However, CSTA is reviewing the need for covered storage for the contaminated armor and is looking into building specifications and costs. An armor reclamation facility at the BTD Area began operation in 1990.

Currently, penetrators are test-fired on the Outdoor Testing Range for accuracy and performance at "soft" targets positioned vertically and extending about 10 meters (33 feet) above the ground. The penetrators do not fragment as they pass through these cloth or plywood targets. Eventually the penetrators impact with the ground, skip along the surface, and finally stop on the surface or burrow into the ground. The Chesapeake Bay is about 500 meters (550 yards) from the edge of the impact area. In the past, penetrators were not retrieved on a routine basis because of unexploded ordnance were present in the impact area, which is about 8 km (5 miles)

long by 3.2 km (2 miles) wide. Two sand filled catch boxes were constructed behind the targets downrange in the fall and winter of 1989–1990 to expedite the trapping and recovery of expended penetrators and limit the amount of DU added to the environment. Each box consists of sand as a stop, surrounded on both sides and the rear by a wood frame and earth berms.

### **3. Radioactive Wastes**

An area approximately 8 km (5 miles) by 3.2 km (2 miles) in the Outdoor Testing Range is contaminated with approximately 82,000 kg (180,000 pounds) of fired DU rounds. The distribution of rounds is not uniform throughout the area. The Outdoor Testing Range also is contaminated with a large amount of unexploded ordnance.

### **4. Description of Radiological Hazard**

The site poses no immediate threat to public health and safety. Access to the site is controlled by guarded gates and there are additional controls on access to the various restricted areas. Environmental radiological monitoring based on analysis of some of the pathways that the radionuclides of interest would travel through the environment has been performed at the Outdoor Testing Range since 1980. The area where spent DU penetrators most likely are to be found is drained primarily by Mosquito Creek to the north and by Delph Creek to the south. Since 1979 samples of soil, water, vegetation, and sediment have been collected quarterly at Mosquito Creek and Delph Creek sampling points. The results of this monitoring show measurable amounts of uranium in some samples, but there is insufficient data to determine if this is naturally occurring or if it is the result of the test activity. The licensee states the uranium contamination is environmentally of low consequence because the rounds do not disintegrate in the environment and because of the low solubility of the DU compounds present in water.

The NRC is reviewing the site closely because the licensee wishes to continue testing DU penetrators indefinitely. The preliminary conclusion of the NRC is that environmental monitoring to date, supports the licensee's conclusions, but is not sufficiently comprehensive to support a conclusion by NRC that current DU may be allowed to remain in the environment and that testing may continue indefinitely. An enhanced environmental monitoring program (discussed below) has been instituted by the Army to better characterize the impact of the DU testing on the environment.

### **5. Financial Assurance/Viable Responsible Organization**

Based on the decommissioning rule, financial assurance certification was required and a statement of intent was provided to meet this requirement. The Army has provided a decommissioning cost estimate that is under review.

The Army is a viable government agency who has committed to enhanced environmental monitoring and all reasonable actions to control environmental impact and contamination.

### **6. Status of Decommissioning Activities**

The Outdoor Testing Range is in current use and the Army plans to use it for munitions testing for the foreseeable future; therefore, there is currently no plan to remediate the contaminated area to unrestricted use criteria. However, because the Army and NRC have concerns about the environmental impact of increased amounts of DU remaining in the Outdoor Testing Area, the Army has taken the following actions:

- Annual "recovery operations" have been performed to retrieve spent DU munitions from the Outdoor Testing Range. Since 1989 more than 14,000 kg (31,000 pounds) of DU has been recovered, of which more than 12,000 kg (26,000 pounds) has been recycled. The unexploded ordnance at the range presents personnel hazards during this activity.
- In 1989 and 1990, two "catch boxes" were constructed in the Outdoor Testing Area. These are structures 12 meters (40 feet) long by 12 meters wide by 9 meter (30 feet) high filled with sand. All DU munitions are tested at the Outdoor Testing Area fired at these catch boxes. The Army expects that more than half of the

penetrators will impact in the sand, making recovery of the rounds safer and reducing the amount of DU added to the environment.

- In 1989 Battelle Pacific Northwest Laboratories was contracted to evaluate the then current sampling procedures and results. Its evaluation was submitted to the Army in October 1989 and used to revise the environmental radiation monitoring ERM plan.
- Los Alamos National Laboratory began a study during 1989 to determine the environmental effects of DU munitions in the outdoor firing ranges at Aberdeen and Yuma Proving Grounds. The Phase I report of this study was issued in June 1990. Additional studies are in progress.
- Based on the results of the studies described above, the Army provided an extensive revision of its ERM plan with the renewal application submitted to the NRC in December 1990. Preliminary review of the ERM plan indicates it is much improved over the current ERM. Therefore, the licensee was required to implement the plan late in 1991, pending additional review by the NRC staff and request for modification by NRC.

As noted above, no site remediation is planned at this time. At this time, no significant environmental migration of DU has been found, although additional characterization is under way. Because the large area involved and the large amount of non-radioactive unexploded ordnance, it will be very difficult to decommission and release the Outdoor Testing Range for unrestricted use. The current NRC objective is to determine if the environmental impact of the continued firing of DU at this location is acceptable.

## 7. Other Involved Parties

Department of the Army is the only involved party.

## 8. NRC/Licensee Actions and Schedule

- |  |               |
|--|---------------|
| ● NRC requests additional information on ground water characteristics to complete review of revised ERM plan   | March 1993    |
| ● NRC completes review of revised ERM plan and requests any necessary modification   | August 1993   |
| ● licensee submits sampling and environmental data pursuant to revised ERM plan and other studies  | December 1994 |
| ● NRC removes site from SDMP, if termination of use and cleanup is not necessary (If termination is needed, NRC will meet with licensee and develop a schedule for termination and cleanup.) | June 1995     |

## 9. Problems/Issues

If evaluation of environmental data indicates that remediation is necessary and termination of use is required, decommissioning of the site will be difficult and expensive because of the large area and presence of non-radioactive unexploded ordnance and other hazards.

# BABCOCK AND WILCOX, APOLLO, PA

## 1. Site Identification

Babcock & Wilcox (B&W), Pennsylvania Nuclear Service Operations  
Apollo, PA

License No.: SNM-145  
Docket No.: 070-00135  
License Status: Timely renewal, but decommissioning  
Project Manager: K. McDaniel, FCCS  
LLWM Monitor: J. Shepherd

## 2. Site and Operations

The 2-hectare (5-acre) site is located in a mixed commercial/residential area next to the Kiskiminetas River in the center of Apollo Borough, which is in western Pennsylvania about 48 km (30 miles) northeast of Pittsburgh. The site facilitated a former uranium fuel processing and fabrication plant that has been decommissioned and deconstructed. Adjacent to the B&W site was a metal fabrication plant that also has been deconstructed.

In recent years, the plant has housed radioanalytical laboratories, principally for measurement of contamination in soil from the Apollo and nearby Parks Township sites.

Originally there was uranium contamination (1.1-74 Bq [30-2000 pCi]/g) in soil around the plant, the adjacent metal fabrication plant, four sewers, and the Kiskiminetas River bank. Fuel activities were discontinued and partial decontamination began in 1983.

Nuclear fuel manufacturing operations commenced in the main building in 1957 and were terminated in 1983. The primary operation was the chemical conversion of both low-enriched uranium (LEU) and high-enriched uranium (HEU) hexafluoride gas into uranium dioxide powder. HEU processing began in 1958 on the first floor of the main building. In 1963 most of this operation was relocated to the second floor and continued until 1978.

Small-scale LEU production also began on the first floor in 1958. Some of these facilities were moved to the second floor in 1960. A second small-scale production line was also established on the second floor later in 1960 and discontinued in 1962. The original small scale production line was replaced in 1963 by a large-scale, continuous production line on the first floor of the facility. It was discontinued in early 1983.

The laundry building was constructed in 1959 and began operations in late 1960. Initial activities consisted of decontaminating protective apparel for both B&W and outside customers, including the Government. In March 1965 an amendment to the laundry facility license was issued to allow decontaminating submarine control rod drive mechanisms for the United States Navy. These activities continued until February 1984.

The main B&W building was situated on the east side of the site. It consisted of approximately 0.4 hectare (1 acre) of roofed area bounded by the offsite area on the north, west, and south, and by the parking lot on the east. The main building was a two story structure that previously contained uranium processing and manufacturing facilities. The building was demolished and removed.

The parking lot, an approximately 1-hectare (2.5-acre) L-shaped area, was situated on the south and east portions of the Apollo site. Approximately 0.4 hectare of the total 1 hectare is owned by B&W, 0.4 hectare is leased by B&W, and the remaining 0.2 hectare (0.5 acre) is off site. The parking lot was bounded by the Kiskiminetas River on the west, Warren Avenue on the east, private property on the south, and the offsite area occupied by the neighboring industrial facility on the north. The laundry building, the small block building foundations, and several utility services were located in the parking lot.

An offsite area, which is not owned by B&W, is on the west and north sides of the site. It consists of approximately 1.2 hectare (3 acres) of land bounded by the Kiskiminetas River on the west, B&W property on the east, the parking lot on the south, and private property on the north. The neighboring main building, office building, south bay, paint shed, breezeway, and alcove were located in the offsite area and have been deconstructed. This area also contains the north, middle, and south sewer outfalls, several utility services, and a

portion of the riverbank. The fourth sewer outfall was associated with the former laundry facility and was therefore located on B&W owned property.

### 3. Radioactive Wastes

Originally there was uranium contamination in soil around the plant, the adjacent metal fabrication site, sewer lines under the site, and the Kiskiminetas River bank at the sewer outlets to the river. B&W estimated that about 10,640 m<sup>3</sup> (380,000 ft<sup>3</sup>) of soil were contaminated at a concentration between 1.1 and 74 Bq (30 and 2000 pCi)/g. There is also some Tc-99 from processing contaminated hexafluoride gas.

Contamination of the river bank to the west of the site, and of four sewer lines running under the site have been identified and are in the process of being remediated. Concentrations are similar to those given in the preceding paragraphs.

### 4. Description of Radiological Hazard

The site is controlled by B&W and poses no immediate threat to the public. The only substantial contamination at present is low-solubility uranium in soil. The median value for these concentrations is less than 7.4 Bq (200 pCi)/g. All materials known to be contaminated in excess of 74 Bq (2000 pCi)/g were removed from the site prior to December 31, 1991.

### 5. Financial Assurance/Viable Responsible Organization

The site is owned and all currently licensed activities are conducted by B&W. The site was previously owned by ARCO and Nuclear Materials and Equipment Corporation (NUMEC). B&W is willing and able to undertake necessary cleanup activities; the parent company has guaranteed \$750,000. An Act of Congress granted \$29 million that is included in the approximately \$58 million spent on the remediation of the site to date.

### 6. Status of Decommissioning Activities

B&W completed the site characterization and decommissioning plan in May 1992 and has made significant progress toward remediating the site. B&W proceeded at an accelerated pace, particularly through the last quarter of 1991, before the increase in burial costs that occurred on January 1, 1992. To that end, B&W has successfully removed all radioactive material contaminated to 74 Bq (2000 pCi) uranium per gram of soil to the Barnwell disposal facility in South Carolina. The remaining task is to dispose of the 11,000 m<sup>3</sup> (380,000 ft<sup>3</sup>) of slightly contaminated soil.

B&W has executed a contract with Envirocare for this disposal. However, Envirocare must have precise procedures to accept the Apollo waste because of special nuclear material (SNM) limits.

B&W plans to make the last shipment of contaminated soil by late May 1993. The final site surveys are planned for completion by October 1993.

### 7. Other Involved Parties

There is interest in this project by Congressman John Murtha who was instrumental in providing the \$29 million to aid decommissioning. A public interest group led by Cynthia Virostek filed a request for a Subpart L hearing, challenging the decommissioning plan and requesting immediate stop work of all decommissioning activities by the licensee and NRC. The petitioners' request for immediate cessation of site remediation activities was denied by the Presiding Officer on November 12, 1992 (LBP-92-31). The petitioners' hearing request was denied on February 5, 1993 (LBP-93-4).

### 8. NRC/Licensee Actions and Schedule

Ground water leaving the site will be monitored for at least 1 year after the confirmatory surveys indicate unrestricted release. At the conclusion of the ground water monitoring period, and if the monitoring results indicate ground water contamination limits are met, the license will be terminated.

- NRC confirmatory survey October 1993
- terminate license October 1994

**9. Problems/Issues**

None.

# BABCOCK AND WILCOX, PARKS TOWNSHIP, PA

## 1. Site Identification

Babcock & Wilcox (B&W), Pennsylvania Nuclear Service Operations  
Parks Township, PA

License No.: SNM-414  
Docket No.: 070-00364  
License Status: Active—timely renewal  
Project Manager: K. McDaniel, FCCS  
LLWM Monitor: J. Shepherd

## 2. Site and Operations

The 461-km<sup>2</sup> (114-acre) site is located in a rural area across the highway from the Kiskiminetas River in Parks Township, which is in western Pennsylvania about 56 km (35 miles) northeast of Pittsburgh.

There are three principal buildings on the site, formerly used for plutonium fuel fabrication, HEU fuel preparation, and zirconium/hafnium bar production. Fuel activities were discontinued in 1980, and the facilities were partially remediated at that time. Plutonium contamination has been identified in parts of the plutonium plant, and HEU contamination has been identified in the uranium plant. In addition, uranium and thorium wastes (from Apollo) are buried in trenches located on site. As a result of exhumation of the trenches in the mid-1960's, surface soil became contaminated. Surface soil remediation was completed and verified by the NRC in 1991.

In recent years, the plutonium and hafnium plants have been used for decontamination and refurbishment of nuclear reactor components and equipment. Previously, the AEC/NRC-licensed activities consisted mainly of plutonium fuel processing in Building A (1960-1980), radionuclide laboratory activities in Building B (1960-present), and HEU fuel processing in Building C (1972-1978). In addition, starting in 1960, Nuclear Materials and Equipment Corporation (NUMEC), a predecessor of B&W, conducted research and development activities and fabricated mixed plutonium/uranium fuels for the nuclear power industry. From 1961 through 1970, burials of uranium contaminated waste from a sister facility located in Apollo, Pennsylvania, were made on the Parks Township site (PTS) in accordance with 10 CFR 20.304, which was deleted in 1981.

Currently, the principal NRC-licensed activities conducted in Buildings A, B, and C at PTS consist of repair, maintenance, decontamination, and testing of nuclear service equipment and components contaminated with radioactive materials; low-level radioactive waste volume reduction by cutup and/or compaction; and remediation of facilities, equipment, and soil. On March 18, 1991, NRC approved a license amendment to permit the relocation of the licensee's soil analytical laboratory from its Apollo facility to Parks Township. On April 14, 1989, B&W submitted its license renewal request to NRC for the continuation of the PTS nuclear service operations. A revision to the renewal request is expected in May 1993. The licensee is currently active in timely renewal.

## 3. Radioactive Wastes

The radioactive material at PTS consists mainly of byproduct material contamination on/within equipment being serviced and of uranium and plutonium contamination and radwaste remaining from previous nuclear fuel fabrication operations.

At the 10 CFR 20.304 burial site, contaminated surface soil was completely remediated to less than 1.1 Bq (30 pCi)/g by 1991. The disposed material probably involves kilogram quantities of uranium and thorium in a volume of a few hundred thousand cubic feet. Plans to characterize the burial site are currently being developed by B&W.

## 4. Description of Radiological Hazard

The site is controlled and poses no immediate threat to public health and safety. The majority of the contamination presently at the site is in the burial site, which contains low-solubility uranium and thorium that NUMEC

disposed of before 1971. Building A is also contaminated. At the request of the NRC, the licensee has implemented a groundwater monitoring program for the burial site.

## **5. Financial Assurance/Viable Responsible Organization**

B&W owns the site and conducts all currently licensed activities. The license is currently active in timely renewal. The site was previously owned by ARCO and NUMEC. B&W is willing and able to undertake necessary cleanup activities. NRC has requested, but has not received, a decommissioning funding plan. B&W has asked for a schedular exemption until 1995 to submit the plan. NRC reviewed the exemption request and requested additional financial assurance for a total of \$10 million. B&W is reviewing NRC's request.

## **6. Status of Decommissioning Activities**

B&W plans to continue to use parts of the PTS facility for nuclear activities. However, the remediation of the plutonium plant is proceeding, and B&W is evaluating options for the final disposition of the 10 CFR 20.304 burial site.

NRC received from B&W, in January 1990, an acceptable ground water monitoring plan for the burial site. The program became operational during 1990. NRC has evaluated, and will continue to evaluate, the ground water monitoring data to determine if immediate remedial action is necessary at the 20.304 burial site. Also, B&W submitted a site characterization plan for the burial site on February 22, 1993.

A draft environmental assessment (EA) has been prepared on the license renewal application. A final EA is scheduled for April 30, 1993. NRC is scheduled to complete the PTS license renewal in May 1993.

## **7. Other Involved Parties**

Outside local parties have expressed an interest the PTS site. However, there is considerable local and Federal Government interest in the sister site, Apollo, and there has been exchange of material between the sites.

## **8. NRC/Licensee Actions and Schedule**

- |  |                |
|--|----------------|
| • NRC approves burial site characterization plan.                            | June 1993      |
| • licensee submits burial site characterization report                       | September 1993 |
| • NRC provides licensee comments on characterization report                  | October 1993   |
| • licensee submits decommissioning plan for burial site and unused buildings | December 1993  |
| • NRC approves decommissioning plan  | April 1994     |

## **9. Problems/Issues**

How to confidently characterize a heterogeneous waste disposal site. Determining if contaminated material should be exhumed and shipped to a waste disposal site or disposed of in situ.

# BP CHEMICALS AMERICA, INC.

## 1. Site Identification

BP Chemicals America, Inc.  
Lima, OH

License No.: SUB-908  
Docket No.: 040-07604  
License Status: Possession only  
Project Manager: M. (Sam) Nalluswami

## 2. Site and Operations

The site is located at the corner of Fort Amanda Road and Adgate Road on the southwest side of Lima, Ohio, and on the east side of the Ottawa River. The facility is an active petrochemical operation.

BP Chemicals America, Inc. (BPC), a subsidiary of British Petroleum, is authorized to possess and store depleted uranium (DU) waste incident to the remediation of the facility and plant areas at Lima. The DU waste resulted from the manufacture and use of a chemical catalyst containing DU by Vistron Corporation, the former owner of the property. The catalyst was used in a process to produce acrylonitrile, a basic component in the manufacture of plastics. Production and use of catalyst containing DU was discontinued in 1971.

The site contains several contaminated areas. The DU catalyst production building was remediated and released for unrestricted use in December 1988. Areas that remain contaminated include the Acrylo I and Acrylo II production areas, several chemical processing buildings, associated warehouses and loading docks, the grounds around these structures, and four ponds that contain both DU and chemical wastes listed as hazardous waste under the Resource Conservation and Recovery Act (RCRA).

## 3. Radioactive Wastes

The Acrylo II complex is an operating acrylonitrile chemical production system, although the DU catalyst is no longer used. There are several contaminated components in the system. The contaminated areas include the chemical reactors, catalyst hoppers, B quench coolers, and the waste water column. Of 363 swipes taken to determine removable contamination levels, only one exceeded 17 Bq (1000 dpm)/100 cm<sup>2</sup> (23.5 Bq [1410 dpm]/100 cm<sup>2</sup>). Fixed contamination measurements range from zero to 3573.3 Bq (214,400 dpm)/100 cm<sup>2</sup>. Exposure rate measurements range from 1.8E-9 C/kg (7 μR)/hr to 1.8E-8 C/kg (71 μR)/hr. Contamination extends throughout the system.

The contaminated ponds are the Celite Pond, the Deepwell Pond, the Burn Pond, and the V-1 Pond. The Celite Pond contains 2450 m<sup>3</sup> (86,400 ft<sup>3</sup>) of sludge, 4880 m<sup>3</sup> (172,250 ft<sup>3</sup>) of liquid waste, and 1790 m<sup>3</sup> (63,045 ft<sup>3</sup>) of contaminated soil. The Deepwell Pond contains 1030 m<sup>3</sup> (36,500 ft<sup>3</sup>) of sludge, 4230 m<sup>3</sup> (149,240 ft<sup>3</sup>) of liquid waste, and 3440 m<sup>3</sup> (121,500 ft<sup>3</sup>) of contaminated soil. The Burn Pond contains 9400 m<sup>3</sup> (332,100 ft<sup>3</sup>) of sludge, 1270 m<sup>3</sup> (44,800 ft<sup>3</sup>) of liquid waste, and 3480 m<sup>3</sup> (122,850 ft<sup>3</sup>) of contaminated soil. The V-1 Pond contains 5580 m<sup>3</sup> (197,100 ft<sup>3</sup>) of sludge, 4880 m<sup>3</sup> (172,250 ft<sup>3</sup>) of liquid waste, and 1790 m<sup>3</sup> (63,045 ft<sup>3</sup>) of contaminated soil.

The activity of the pond sludges ranges from 0.74 to 18.5 Bq (20 to 500 pCi)/g and the total activity of the sludge and contaminated soil ranges from 7770 MBq (0.21 Ci) to 74,000 MBq (2 Ci). The liquid waste concentrations range from 1.5E-9 MBq (4.0E-8 μCi)/ml to 8.5E-9 MBq (2.3 E-7 μCi)/ml. The ponds contain RCRA listed hazardous wastes KO11, KO13, and KO14. About 2000 55-gallon drums are present with less than 1.29 Bq (35 pCi)/g DU mixed in sandblast medium.

There has been no identified offsite contamination.

## 4. Description of Radiological Hazard

The BPC facility is located in an industrial area and is fenced and controlled. There is no identified offsite contamination, including well water contamination, and there is no evidence that the contamination is spreading. Maximum gamma exposure rates are 1.8E-8 C/kg (71 μR)/hr.

During a December 18, 1991, inspection of BPC, three Severity Level IV violations were identified. A notice of violation was issued on January 28, 1992. Two of these violations were administrative, but the third was for not posting the Acrylo I excavation area and the four ponds as "Caution Radioactive Materials" areas. The posting was completed on January 25, 1992.

The licensee submitted a dose assessment with the pond closure plan. The highest exposure rates to workers for normal closure operations were estimated to be equivalent to background. Doses to a maximally exposed individual from hypothetical accidents were estimated to be less than 25  $\mu$ Sv (2.5 mrem).

Based on the control of the site, the exposure rate data, and the concentrations of waste materials, there is no immediate threat to public health and safety.

## **5. Financial Assurance/Viable Responsible Organization**

The licensee submitted a decommissioning funding plan with a parent guarantee for \$10 million. The decommissioning funding plan was reviewed by NRC staff and a deficiency letter was transmitted to BPC on May 31, 1991. The licensee responded to the deficiency letter on November 11, 1992, and it is being reviewed by NRC staff. The licensee is currently performing remediation operations and is committed to complete decommissioning.

## **6. Status of Decommissioning Activities**

The catalyst production building and warehouse were decontaminated and released for unrestricted use on December 22, 1988. By letter dated January 3, 1990, BPC submitted the results of an October 1989 radiological survey and assessment of the internals of its Acrylo II Unit B reactor, associated components, and downstream equipment. In this letter BPC stated that a full-scale radiological assessment of the remaining contamination of the Lima facility was being conducted.

The licensee submitted a decommissioning plan for the Acrylo I and grounds areas on July 30, 1990, a decommissioning plan for the Acrylo IIB-reactor and associated components in March 1990, final remediation plans for the boneyard area, catalyst laboratory, soil laydown area, and Acrylo II control room laboratory on July 29, 1991, and a mixed waste pond closure plan on August 15, 1991. A revision to the mixed waste pond closure plan was submitted on February 28, 1992.

At the request of BPC, the NRC reviewed the Phase I plan for the mixed waste pond closure so that work could be started on an advanced schedule. While the Phase I work (pumping sludge and liquid waste from two ponds into another one) was covered under the current license, the NRC staff requested a safety analysis report and a health and safety plan for these activities. The Phase I Safety Analysis Report and Health and Safety Plan were submitted on July 10, 1991. NRC completed the review and issued a safety evaluation report (SER) on December 10, 1991.

In its approval of the Phase I mixed waste pond closure plan, NRC set a condition that liquid wastes would not be discharged to an EPA-approved deep-well injection system. Liquid wastes had been, previously discharged to the deep-well injection system under the assumption that these releases could be treated as effluent releases pursuant to 10 CFR Part 20, Appendix B. In 1970 and 1971, BPC submitted to AEC staff information on its deep-well injection system. The AEC staff, however, made no final determination on the acceptability of the discharges. The NRC staff considered these discharges to require a 10 CFR 20.302 disposal authorization. On February 3, 1992, the NRC staff confirmed a BPC commitment to request a 10 CFR 20.302 authorization for further use of the deep-well injection system. On July 20, 1992, the licensee requested a license amendment for the disposal of the pond water in the deep-well injection system. NRC staff issued the license amendment on September 9, 1992.

During the summer and fall of 1991, the licensee dismantled and remediated soil areas surrounding the Acrylo I reactor, but has not completed soil remediation. The licensee remediated the Acrylo II reactors A and B during a preplanned maintenance shutdown. BPC submitted final survey data on the chemical reactor internals on July 15, 1991. In June 1991 ORISE performed a confirmatory survey and found contamination above the release limits. The Acrylo II complex went back into operation and will continue to be held under license until further remediation is performed.

The licensee performed surveys on a large quantity of clean steel removed during the remediation of the Acrylo I reactor and several other plant areas. It submitted survey data to the NRC on July 30, 1991, and made a formal request for release of the steel was made on August 27, 1991. ORISE surveyed these metals in August 1991 and identified several contaminated pieces, which were segregated from the clean material. On October 7, 1991, the NRC staff approved the release of the steel meeting the release requirements.

On June 25, 1990, BPC requested a 10 CFR 20.302 disposal authorization for approximately 1700 drums of construction debris with DU contamination less than 1.3 Bq (35 pCi)/g. No hazardous chemical materials were in these wastes. A subsequent request was made on May 7, 1991. The NRC staff informed BPC that the request would be processed with the preparation of the required environmental assessments and the associated notification procedures; however, BPC subsequently informed the NRC that it wished to delay processing of this request.

The NRC staff published *Federal Register* notices on November 4 and 19, 1991, announcing consideration of the issuance of amendments for the decommissioning of the Acrylo I and II complexes, buildings, and grounds, and for closing the mixed waste pond. These notices also offered the opportunity for affected parties to request public hearings. No requests for public hearings were made in response to the two notices.

The Pacific Northwest Laboratory (PNL) was contracted to perform a radioactive dose assessment. PNL submitted a preliminary dose assessment. The NRC staff reviewed it and transmitted comments to PNL on February 2, 1993. The NRC staff also reviewed the sampling and analysis plan and transmitted the review comments BP Chemicals on February 16, 1993.

## 7. Other Involved Parties

The Ohio EPA is involved with the review of the hazardous chemical aspects of the mixed waste pond closure plan. The Ohio Department of Health also is following the progress at the site, but has not taken an active role in the reviews of the decommissioning plan submittals.

## 8. NRC/Licensee Actions and Schedule

- |   |               |
|---|---------------|
| ● NRC approves radiological pathway analysis (RESRAD)   | May 1993      |
| ● NRC finalizes dose assessment by PNL  | June 1993     |
| ● NRC approves financial assurance mechanism  | July 1993     |
| ● NRC finalizes ORISE Confirmatory Survey Reports on I Scrap Metal, II reactors A and B, and central warehouse/outdoor soil areas | July 1993     |
| ● NRC approves pond closure plan  | July 1993     |
| ● licensee submits termination survey of the ponds  | December 1994 |
| ● NRC performs confirmatory survey  | April 1995    |
| ● NRC prepares the environmental assessment and SER   | June 1995     |
| ● terminate license and release for unrestricted use  | December 1995 |

## 9. Problems/Issues

None.

# BUDD COMPANY

## 1. Site Identification

The Budd Company  
Philadelphia, PA

License No.: 37-05680-04  
Docket No.: 030-19963  
License Status: Active  
Project Manager: M. Roberts, Region I  
LLWM Monitor: M. Harvey

## 2. Site and Operations

In 1956 the Atomic Energy Commission (AEC) licensed the Budd Company to manufacture sealed Ir-192, Tm-170, and Co-60 sources in a hot-cell facility, primarily for use in industrial radiography, in its facility located at 2950 Roberts Avenue, Philadelphia, Pennsylvania. A small amount of unsealed Cs-137 also was used in the cell. In 1967 Budd shut down its hot-cell facility.

The hot cell is an "L" shaped structure of about 20 m<sup>2</sup> (200 ft<sup>2</sup>) in the corner of a much larger building. Following shutdown, a large amount of byproduct material and contaminated equipment was removed and properly disposed or transferred. The interior of the hot cell and contaminated areas outside the hot cell were generally cleaned, but not completely decontaminated. All access openings to the cell (door, shielded window opening, manipulator ports, ventilation and exhaust ports) were sealed with 40 cm (16 inches) of solid concrete block. In addition, structural steel barriers were added directly forward of the sealed door opening and the sealed shielded window opening to prevent accidental damage. A new license was issued for storage of contaminated material for progressive decay.

The interior of the enclosed hot cell was maintained as a restricted area until remediation began in July 1990. Access to the remainder of the facility is unrestricted. Ground water contamination is not a significant concern at this site because the activity was largely confined to the building.

## 3. Radioactive Wastes

At the time of facility shutdown, the quantity of Co-60 in the hot cell was estimated to be less than 5 Ci, with smaller quantities of Ir-192 and Tm-170. Ir-192 and Tm-170 were essentially absent at the time of remediation as a result of the extended decay time (25 years) and their short half lives (74 and 134 days, respectively). Before beginning remediation, it was estimated that no more than 1 Ci of Co-60 remained in the hot cell. Decommissioning produced about 1 Ci of radioactive material in 34 m<sup>3</sup> (1200 ft<sup>3</sup>) of radioactive waste. All radioactive waste was sent to a licensed facility for processing or repackaging for eventual disposal at a licensed low-level waste disposal facility.

## 4. Description of Radiological Hazard

The site never posed an immediate threat to the public health and safety. Radioactive material was contained in the reinforced concrete hot cell, which had all access ports sealed with concrete and mortar with structural steel coverings to prevent accidental entry. In addition, the licensee performed periodic testing for leakage. These surveys never indicated any leakage from the cell. As described below, all radioactive contamination has been removed from the hot cell, properly packaged, and shipped for licensed disposal.

## 5. Financial Assurance/Viable Responsible Organization

Budd continues to own the facility and was financially capable of carrying out the decommissioning activities. Budd provided financial assurance as required by 10 CFR 30.35. Approximately \$1 million has been spent to date on decommissioning and waste disposal activities at Budd.

## 6. Status of Decommissioning Activities

In May 1990 the licensee was informed that submission and implementation of a decommissioning plan for the hot cell was required. The licensee was informed at the time of the previous license renewal, about 5 years

earlier, that decontamination would be required in 1990. The licensee submitted a formal decommissioning plan in early November 1990. Region I approved the initial characterization activities described in this plan and the characterization was carried out in late December 1990. Measurements through ports drilled in the cell walls indicated low exposure rates inside the cell (a maximum of 1.2  $\mu\text{C}/\text{kg}$  [ $5 \mu\text{R}/\text{hr}$ ]). Samples obtained for analysis indicated little removable contamination. Based on these results, a final decontamination plan was submitted to, and approved by, NRC in April 1991.

The licensee's contractor performed the major tasks described in the decommissioning plan from July to December 1991. An overhead crane, the crane rail, ventilation ducts, two 1.2-meter (4-foot)-deep source wells, a 0.9-meter (3-foot)-deep stainless steel storage pit and other contaminated debris were removed from the hot cell. One of the source wells was estimated to contain 29,600 MBq (800 mCi) of Co-60 when it was removed, requiring a special disposal cask and liner. The superficial layers of the concrete walls and floor were mechanically removed from the interior of the cell. The concrete and some of the soil from under the source wells and storage pit also were removed. Samples taken from the remaining soil show little or no migration of the contamination. All waste generated was shipped to a licensed disposal facility.

During the remediation effort, NRC Region I conducted inspections to ensure that work was progressing safely and in accordance with the approved plan.

Fixed contamination found on the concrete floor just outside the hot cell, and at several other locations in the building housing the hot cell, necessitated additional remediation work and delayed the expected completion date. Budd completed the remediation in May 1992 and submitted a final survey report in September 1992. Confirmatory surveys by NRC verified that the site has been satisfactorily remediated. NRC staff are preparing documentation to support termination of the license and removing the site from the SDMP list. In SECY-93-062 (March 12, 1993) the staff informed the Commission that the remediation of the Budd site was completed and that the staff plans to terminate the license and remove the site from the SDMP list.

The staff is currently developing a position paper to clarify the NRC administrative actions required to terminate an SDMP to license. This paper should be completed and the Budd Company license terminated by May 1993. However, since all required remediation actions have been completed, the site has been removed from the SDMP list. This writeup has been included to document the actions taken in 1992 that lead to the completion of the Budd site remediation.

## **7. Other Involved Parties**

None.

## **8. NRC/Licensee Actions and Schedule**

- terminate license

May 1993

## **9. Problems/Issues**

None.

# CABOT CORPORATION, BOYERTOWN, PA

## 1. Site Identification

Cabot Corporation  
Boyertown, PA

License No.: SMB-920  
Docket No.: 040-06940  
License Status: Active—timely renewal  
Project Manager: Keith McDaniel, FCSS  
Project Monitor: C. Glenn

## 2. Site and Operations

The 647 km<sup>2</sup> (160 acre) Boyertown site, consisting of operation buildings and several sludge storage buildings is located in a rural setting in southeastern Pennsylvania, 2.4 km (1.5 miles) northeast of Boyertown. Cabot Corporation (Cabot) is currently licensed to process ores to extract tantalum and columbium and plans to continue these operations indefinitely. Natural uranium and thorium are present in the ores in sufficient concentration to require a source material license. Cabot received an AEC license for the Boyertown plant in 1963.

All three Cabot sites (e.g., Boyertown, Revere, and Reading) are on License SMB-920.

## 3. Radioactive Wastes

When ores are processed to extract tantalum and columbium, the resulting slag contains uranium and thorium. The combined concentration of uranium and thorium in the slag is a maximum of 2 percent by weight, but more typically a few tenths of a percent. Cabot does not consider these slags to be waste, but plans to keep them in storage for possible future recycling. Cabot is currently applying for building permits to construct an additional slag storage building. As of February 1992 Cabot was storing an estimated 18,000 m<sup>3</sup> (190,000 ft<sup>3</sup>) of slag.

Cabot is developing a process to recover uranium from the slag; the process should be in operation by 1993. After reprocessing the slag, it will contain residual uranium and thorium and therefore be classified as waste and sent to a disposal facility.

## 4. Description of Radiological Hazard

This site poses no immediate threat to public health and safety. Most of the uranium and thorium is contained in slags stored in concrete vaults.

## 5. Financial Assurance/Viable Responsible Organization

Cabot Corporation owns the site, is currently under license, and has the resources to decommission the site. Cabot submitted a letter of credit for \$750,000 as financial assurance for decommissioning of its three sites (Boyertown, Reading, and Revere). The staff requested a decommissioning funding plan as a supplement to the license renewal application.

## 6. Status of Decommissioning Activities

The plant is operating at present and no remediation activities are in progress. The licensee states the intention of removing all slags from the site when the facility is eventually closed. The need for interim remediation of the site will be evaluated during the renewal process. In a letter dated February 1, 1993, NRC requested Cabot to update its license renewal application to include a description of the current status of the slag stored on site and Cabot's plans for the future disposition of the slag. License renewal is expected to be completed in 1993.

## 7. Other Involved Parties

No significant third party involvement is anticipated.

## **8. NRC/Licensee Actions and Schedule**

- Cabot submits description of current status of slag stored on site and plans for future disposition April 1993
- Cabot submits decommissioning funding plan June 1993
- NRC evaluates need for interim remediation of Boyertown site December 1993

## **9. Problems/Issues**

None.

# CABOT CORPORATION, READING, PA

## 1. Site Identification

Cabot Corporation  
Reading, PA

License No.: SMB-920  
Docket No.: 040-06940  
License Status: Active—timely renewal  
Project Manager: C. Glenn

## 2. Site and Operations

The 2-hectare (5-acre) site is located in an industrial part of Reading, Pennsylvania. From 1967 through 1969, Cabot used a building on the site to process tin slag, extracting niobium and tantalum. Natural uranium and thorium were present in the slag in sufficient concentrations to require a source material license. Processing stopped in 1969, but ores and slags were stored at the site for some time thereafter. Cabot currently has no equipment or operations of any type on this site. Only a large empty building and slag pile remains. All three Cabot sites are currently on the same license (i.e., SMB-920).

## 3. Description of Wastes

The bulk of the waste associated with the Reading site is located on the side of an embankment located at the rear of the site. This waste, consisting mainly of tin slag, originated from ore processing operations at the Reading site and contaminated sand from Baltimore, Maryland. The waste from Baltimore primarily consists of sand containing fragments of tin slag. In total, approximately 546 m<sup>3</sup> (19,281 ft<sup>3</sup>) of slag and sand were dumped down the embankment consisting mostly of large chunks of slag weighing several tons each. The slag is a black, glass-like material with very low solubility.

During its July 1991 confirmatory survey, ORISE found other waste associated with the Reading site in the form of uranium and thorium contamination. Areas of high beta and gamma activity were found inside the processing building and in several locations outside the building. These areas appeared in isolated spots and ranged from 0.48 to 2.88 Bq (13 to 78 pCi)/g for uranium and from 0.48 to 1.88 Bq (13 to 51 pCi)/g for thorium.

## 4. Description of Radiological Hazard

This site poses no immediate threat to the public health and safety. The uranium and thorium are contained in insoluble slag. Cabot monitors the ground water in the vicinity of the slag pile and the general area for erosion.

## 5. Financial Assurance/Viable Responsible Organization

The site was never owned by Cabot, only leased. The current owner is Hamburg Fabricators. It is believed that Cabot can and will responsibly decommission the site. Cabot has submitted a letter of credit for \$750,000 as financial assurance for decontamination of its three sites (Boyertown, Reading, and Revere).

## 6. Status of Decommissioning Activities

Cabot remediated the building and its parking lot areas and has requested that these areas be released for unrestricted use. Cabot has not planned to request release of the dump portion of the site.

All ores and slags stored on the site have been removed except from the dump portion. Contaminated soil has been removed and transported to Cabot's Boyertown site. ORISE surveyed the building and parking lot in August 1991 and found some remaining contamination that Cabot is working to remove.

Staff has reviewed ORISE's confirmatory survey which was completed as a draft in February 1992. Preliminary information from the survey indicates that additional remediation will be required. It is projected that this site may be removed from the SDMP in 1994.

NRC staff suggested that Cabot transfer the dump site material from the Reading site to Boyertown in order to completely decommission the Reading site. Cabot claims to have no storage space available at Boyertown at this

time. However, when Cabot begins recycling the sludge material at Boyertown in 1993, the storage buildings will be emptied and the Reading dump material can be transferred.

NRC staff will request that Cabot prepare a plan to complete decommissioning the site and to identify any remaining contamination at the site. NRC also will work with Cabot to establish a separate possession-only license for the Reading site.

## **7. Other Involved Parties**

No significant third-party involvement is anticipated.

## **8. NRC/Licensee Actions and Schedule**

- NRC submits comments to ORISE on confirmatory survey report for buildings and grounds (excluding dump) April 1993
- ORISE submits final confirmatory survey report May 1993
- NRC informs licensee that additional remediation is required June 1993
- Cabot submits plan for additional remediation and final disposal of dump site material August 1993
- NRC approves plan October 1993

## **9. Problems/Issues**

NRC confirmatory survey identified several areas inside the process building and in surrounding soils that exceeded unrestricted release criteria.

The slag dump is contaminated with uranium and thorium. If the slag cannot be transferred to the Boyertown facility for processing, it will likely require disposal at a licensed disposal facility at considerable expense. Removal of the slag dump will also disrupt a wooded area adjacent to the Schuylkill River.

## CABOT CORPORATION, REVERE, PA

### 1. Site Identification

Cabot Corporation  
Revere, PA

License No.: SMB-920  
Docket No.: 040-06940  
License Status: Active—timely renewal  
Project Manager: C. Glenn

### 2. Site and Operations

The site is located in eastern Pennsylvania between Philadelphia and Allentown. Cabot processed ores and slags at the site to extract tantalum and columbium. Natural uranium and thorium were present in the ores and slags in sufficient concentration to require a source material license. No source material processing has occurred at the site in several years, and Cabot does not plan any more in the future. Cabot is actively processing non-licensable materials on the site.

All three Cabot sites are on the same license (i.e., SMB-920).

### 3. Radioactive Wastes

Trace quantities of natural thorium and uranium.

### 4. Description of Radiological Hazard

This site poses no immediate threat to the public health and safety. The licensee claims that the site is suitable for unrestricted release.

### 5. Financial Assurance/Viable Responsible Organization

Cabot Corporation owns the site and is currently under license. Cabot is a large company with the resources to decommission the site.

### 6. Status of Decommissioning Activities

The licensee performed remediation work at the site. Upon Cabot's request, ORISE performed a confirmatory survey of the site from July 22 through 26, 1991. The results of the survey indicate additional contaminated slag beneath the surface in the drum storage area and the old pit area. Cabot resurveyed these areas and confirmed the contamination. To adequately address the problem, Cabot is currently in the process of hiring a new remediation contractor to resurvey and perform the necessary excavations.

NRC reviewed ORISE's confirmatory survey of the Revere site and submitted questions to ORISE. The preliminary review indicates that additional remediation will be required. ORISE should provide a response by April 1993. NRC will forward a written response to Cabot by June 1993. This is about the same time Cabot's new remediation contractor will be in place.

After remediation is completed and NRC confirms the site is ready for unrestricted release, the staff will prepare an environmental assessment and safety evaluation report both of which will be completed in 1993. These will be enclosures to a Commission paper for site release that will be submitted to the Commission. Release of the site is expected by the end of 1994.

### 7. Other Involved Parties

No significant third-party involvement is anticipated.

### 8. NRC/Licensee Actions and Schedule

- |  |                |
|--|----------------|
| ● ORISE submits final confirmatory report                        | April 1993     |
| ● NRC submits final confirmatory report and guidance to licensee | June 1993      |
| ● Licensee submits remediation plan                              | September 1993 |
| ● NRC approves remediation plan                                  | December 1993  |

## **9. Problems/Issues**

**NRC confirmatory survey identified additional contamination requiring further remediation. NRC may need to develop specific criteria for decommissioning sites with pieces of contaminated slag distributed in soil.**

# CHEMETRON CORPORATION, BERT AVENUE

## 1. Site Identification

Chemetron Corporation  
Newburgh Heights, OH

License No.: SUB-1357  
Docket No.: 040-08724  
License Status: Timely renewal  
Project Manager: A. Huffert

## 2. Site and Operations

The Chemetron Bert Avenue site is a former uncontrolled landfill located in a mixed residential and industrial part of suburban Cleveland, a short distance from the Chemetron Harvard Avenue site. The site occupies about 28,328 m<sup>2</sup> (7 acres) and is bordered by industrial property and private residences.

Radiologically contaminated material from the Chemetron Harvard Avenue site was disposed at the Bert Avenue site in 1975, consisting of building rubble contaminated with depleted uranium and the chemical catalyst (C-21) manufactured at the Harvard Avenue facility. There is also antimony oxide slag containing natural uranium and fly ash and fire brick containing natural uranium and thorium at the Bert Avenue site.

## 3. Radioactive Wastes

The volume of contaminated material containing depleted uranium above 3.7 Bq (100 pCi)/g has been estimated to exceed 1981 m<sup>3</sup> (70,000 ft<sup>3</sup>) at this site. The licensee also estimates that there is over 28,300 m<sup>3</sup> (one million ft<sup>3</sup>) of potentially contaminated material with a concentration greater than 0.55 Bq (15 pCi) of U-238 per gram of soil. The 0.55 Bq (15 pCi)/g of U-238 in soil was selected by Chemetron to define a "clean" sample, which is a lower activity concentration than the Option 1 limit of the 1981 BTP (1.3 Bq [35 pCi] of total uranium per gram of soil or about 0.85 Bq [23 pCi] of U-238 per gram of soil).

Chemetron reported a maximum surface concentration of 87 Bq (2341 pCi) of U-238 per gram of soil. The most prominent area of surface contamination exceeds 37 Bq (1000 pCi) of U-238 per gram of soil and is located atop and along a steep slope. Surface contamination is also reported along the natural drainage ditches and ground water areas (seeps) that discharge into a swampy area.

Subsurface soil contamination is reported in two areas of the Bert Avenue site. The larger of the two areas is 60 meters (197 feet) long by about 30 meters (98 feet) wide, which is located below the surface of a steep slope. This large area contains the highest reported subsurface concentration of U-238 (338 Bq [9130 pCi]/g) at this site. The smaller contaminated area of subsurface soil is about 35 meters (115 feet) long and 10 meters (33 feet) wide.

The four piles of excavated soil (Piles A, B, C, and D) comprise about 1443 m<sup>3</sup> (51,000 ft<sup>3</sup>) and are reported to contain average U-238 concentrations of approximately 1.2 Bq (32 pCi)/g, 1.1 Bq (31 pCi)/g, 0.44 Bq (12 pCi)/g, and 0.59 Bq (16 pCi)/g, respectively.

Th-232 and Ra-226 concentrations in subsurface soil are reported to be below the 1981 BTP Option 1 limit for thorium contamination (0.37 Bq [10 pCi]/g) and the EPA limits for radium contamination (0.19 Bq [5 pCi]/g for surface soils and 0.56 Bq [15 pCi]/g for subsurface soils).

Radiological surveys of ground surfaces performed by NRC in 1991 indicate radiation exposure levels of less than 8 nC/kg (30 μR)/hr in restricted areas and less than 5 μC/kg (20 μR)/hr in unrestricted areas. Results of environmental radiation monitors (thermoluminescent dosimeters and air monitors) indicate that external and airborne radiation levels are consistent with natural background levels for the suburban Cleveland area.

On the basis of analysis of water samples from ground water monitoring wells and water seep locations, Chemetron reports concentrations of U-238 and Ra-226 below the EPA-proposed drinking water levels. Currently, the licensee is evaluating further the hydrogeology of the Harvard Avenue site to determine if there

is existing or the potential for future ground water contamination. However, there are no known drinking water wells near the site, as the local water source is a public drinking water system.

#### **4. Description of Radiological Hazard**

The critical pathway of radiation dose to a person exposed to land contaminated with DU is mainly from inhalation through the resuspension of particulates from contaminated soil. At the Harvard Avenue site, soil piles are covered with tarps to minimize soil resuspension. NRC has installed air sampling equipment to measure airborne contamination and environmental radiation dosimeters to measure radiation at the fence boundary. Airborne and direct gamma radiation measurements indicate radiation levels well below 10 CFR 20 limits for public exposure.

#### **5. Financial Assurance/Viable Responsible Organization**

The site is owned by McGean-Rohco, Inc., of Cleveland, Ohio. Chemetron Corporation of Providence, Rhode Island, holds the license. Chemetron had been owned by Allegheny International. Both filed for bankruptcy in February 1988. In September of 1990, Sunbeam/Oster became Chemetron's grandparent company in a buy-out of Allegheny International, lifting Chemetron out of bankruptcy. Sunbeam/Oster has provided a parent company guarantee in the amount of \$7,465,000 for decommissioning the Bert and Harvard Avenue sites.

#### **6. Status of Decommissioning Activities**

Dames and Moore has been assigned the responsibility of site manager for purposes of development and implementation of site characterization and remediation activities. Nuclear Energy Services is responsible for site radiological safety and support activities.

In April 1992, NRC staff issued an Order Modifying License (Effective Immediately) to Chemetron Corporation requiring submittal of a final site characterization report (SCR) for the Harvard Avenue and Bert Avenue sites by June 15, 1992. Chemetron responded to the Order Modifying License and requested a hearing and motion to set aside the immediate effectiveness of the Order. NRC staff developed a response to the hearing request, but the staff's response was superseded by a joint motion for approval of a Consent Order. In May 1992 an NRC Atomic Safety and Licensing Board approved the Consent Order proposed by NRC staff, which was developed to: (1) avoid protracted litigation on the basis for immediate effectiveness of the Order Modifying License; (2) require the licensee to submit to NRC a final SCR by June 15, 1992; and (3) supersede the Order Modifying License dated April 8, 1992.

In June 1992, Chemetron submitted to NRC a final SCR in accordance with the deadline established in the May 1992 Consent Order. The technical review of the final SCR, conducted by the State of Ohio Department of Health (ODH), the State of Ohio Environmental Protection Agency (OEPA), NRC contractors, and NRC staff, was completed on January 8, 1993. In general, the final SCR was considered acceptable for the purpose of developing a final site remediation plan, but based on the analysis of site characterization information collected during the Phase II site characterization study, NRC and OEPA staffs recommended that Chemetron install additional monitoring wells at the Bert Avenue site. Chemetron will respond to this recommendation in April 1993.

The licensee proposed, in its August 1991 remediation plan, to bury radioactive contaminated material from both sites at a closure cell located at the Bert Avenue site. These burials would be performed under the provisions of 10 CFR 20.302. However, at the request of local citizens, Chemetron stated in October 1991 that wastes present at the Harvard Avenue site would not be disposed of at the Bert Avenue site. Currently, Chemetron is reevaluating the viability of onsite disposal at the Bert Avenue site as a result of the OEPA solid waste permitting requirements for installation of such a disposal cell. For onsite disposal at the Bert Avenue site, Chemetron may have to consider certain OEPA solid waste siting requirements, such as the distance of the disposal cell to the nearest residence, the presence of a surface water stream, the distance to a shallow aquifer, and the location of the disposal cell in a ravine.

Chemetron verbally informed the staff that by April 30, 1993, it will submit a license amendment request to incorporate a condition that Chemetron shall submit a decommissioning plan by October 1, 1993.

NRC continues to meet regularly with the representatives of Chemetron and its consultants to discuss ongoing and future site characterization activities and site remediation.

## 7. Other Involved Parties

OEPA is responsible for enforcing the hazardous wastes requirements under the RCRA and has the authority to regulate RCRA hazardous wastes and mixed wastes. Under RCRA, OEPA has the authority to perform cleanup actions and recover costs from the principal responsible parties. OEPA also is responsible for ensuring that State of Ohio solid waste requirements are defined and met and has authority over sites that do not qualify under Superfund (Chemetron, for example). OEPA informed NRC in May 1992 that it shares joint jurisdiction over ongoing investigations and future remedial actions of the Bert Avenue site. In June 1992 OEPA sent a letter to Chemetron that provides OEPA's requirements for constructing a solid waste landfill at the Bert Avenue site located in Newburgh Heights, Ohio.

ODH coordinates radioactive material safety matters in offsite areas. ODH also participates on the Midwest Compact Commission and will identify Compact Commission requirements under the authority of the Low-Level Radioactive Policy Amendments Act that need to be met.

ODH and OEPA have participated in the review of Chemetron's June 1991 SCR, the August 1991 site remediation plan, the January 1992 Phase II site characterization plan, and the June 1992 final SCR. NRC, ODH, OEPA, and local officials also participate in public meetings in Newburgh Heights to discuss regulatory oversight of Chemetron's plans for decontaminating and decommissioning the Bert Avenue site and to ensure that local concerns are properly addressed. Public meetings were held in January and October 1991 and the next public meeting will be scheduled in 1993.

## 8. NRC/Licensee Actions and Schedule

- |  |  |
|--|--|
| ● NRC independent confirmation of final SCR, including audit of analytical labs used by licensee       | TBD  |
| ● amend license to establish date for licensee to submit a final site remediation plan                 | May 1993   |
| ● receive final site decommissioning plan from licensee and distribute to OEPA and ODH for review      | October 1993   |
| ● review and approve final site decommissioning plan and incorporate remediation schedule into license | 6 months after receipt of final site decommissioning plan    |
| ● complete site decommissioning activities, including final termination survey                         | 1 year after NRC approves of final site decommissioning plan |
| ● NRC confirmatory survey of Bert Avenue site  | 3 months after receipt of licensee termination survey        |
| ● termination of NRC license and release of Bert Avenue site for unrestricted use                      | 3 months after completion of NRC confirmatory survey         |

## 9. Problems/Issues

On March 29, 1993, Ohio EPA met with Chemetron staff to discuss options for obtaining Ohio EPA approvals depending on whether NRC found either BTP Option 1 (shipment of almost all the contaminated material offsite) or Option 2 (onsite disposal of most of the contaminated material) acceptable. If the NRC approves an Option 1 remediation, the Ohio EPA indicated that Chemetron could pursue remediation of solid wastes by (1) adequately addressing solid and hazardous waste characterization, excavation, site stabilization, and monitoring issues without formal Ohio EPA permits or (2) through administrative orders consistent with National Contingency Plan and Ohio EPA remedial program objectives. If the NRC approves an Option 2 remediation,

the Ohio EPA indicated that, if the landfill is intended for only the solid and radiologic wastes generated during remediation, the landfill would be subject to all Ohio EPA administrative requirements. However, Ohio EPA indicated that, if Chemetron expanded the scope of the remediation to include all the solid wastes on the site, Ohio EPA would be willing to consider remediation taking place under a remedial design/remedial action administrative order. If negotiations fail, Ohio EPA stated that it could propose alternative dispute resolution to the NRC, Chemetron, and the ODH. The licensee also needs to resolve the role of the Midwest Compact with respect to onsite disposal of wastes.

# CHEMETRON CORPORATION, HARVARD AVENUE

## 1. Site Identification

Chemetron Corporation  
Newburgh Heights, OH

License No.: SUB-1357  
Docket No.: 040-08724  
License Status: Timely renewal  
Project Manager: A. Huffert

## 2. Site Description

The Chemetron Corporation Harvard Avenue site is located in an industrial area of suburban Cleveland. The property required to be remediated is owned by McGean-Rohco, Inc., and occupies approximately 12,000 m<sup>3</sup> (3 acres). It is located on the west side of the McGean-Rohco property and is bordered by property owned by the Aluminum Company of America to the west of the site and a railroad line to the south of the site.

Chemetron was authorized to possess and use depleted UF<sub>6</sub> for conversion to U<sub>3</sub>O<sub>8</sub> in the production of a chemical catalyst used in the plastics industry. The catalyst was produced at the Harvard Avenue site in Building 21 from 1965 to 1972. Remediation of the site was attempted with varying levels of effort since 1972.

## 3. Radioactive Wastes

Portions of the Harvard Avenue site were contaminated with depleted uranium (DU) during catalyst production. In 1976 Chemetron disposed of 201,000 kg (443,000 pounds) of DU and an additional 308,000 kg (679,000 pounds) of material were shipped for disposal in 1978. Building 21 was dismantled in 1984 and excavation of contaminated soil also was completed in 1984. During 1985 approximately 195 m<sup>3</sup> (6900 ft<sup>3</sup>) of soil and building rubble was shipped to a low-level waste disposal facility. However, a radiological survey of the southern portion of the site later that year revealed additional soil contamination.

In 1989 a new contractor began remediation activities at the Harvard Avenue site and, in 1990 the estimated volume of radioactive contaminated material increased to over 1400 m<sup>3</sup> (50,000 ft<sup>3</sup>). Due to the identification of increased volumes of contaminated soil, a new site characterization plan was developed later that year.

It is estimated that approximately 75 percent of the Harvard Avenue site contains depleted uranium at a concentration greater than 1.3 Bq (35 pCi) of total uranium per gram of soil, with two discrete areas exceeding 2.6 Bq (70 pCi) of U-238 per gram of soil. The calculated average concentrations of radioactive contaminated material at this site is 1.3 Bq (34 pCi) of U-238 per gram of soil, which is equivalent to about 1.9 Bq (51 pCi) of total uranium per gram of soil. Chemetron reports maximum surface and subsurface concentrations of 3.9 Bq (107) and 3 Bq (81 pCi) of U-238 per gram of soil, respectively. Almost all of the contaminated material is located within the upper 0.6 meter (2 feet) of soil.

Chemetron estimates that there are over 8400 m<sup>3</sup> (300,000 ft<sup>3</sup>) of potentially radioactive contaminated material with a concentration greater than 0.55 Bq (15 pCi) of U-238 per gram of soil. The 0.55 Bq of U-238 per gram of soil was selected by Chemetron to define a "clean" sample, which is a lower activity concentration than the Option 1 limit of the 1981 BTP (1.3 Bq (35 pCi) of total uranium per gram of soil or about 0.85 Bq (23 pCi) of U-238 per gram of soil).

There is one pile of excavated soil at this site (Pile E), which comprises about 1400 m<sup>3</sup> (51,000 ft<sup>3</sup>). The average and maximum concentrations of U-238 in this soil pile are reported to be about 1.26 Bq (34 pCi) and 2.63 Bq (71 pCi)/g of soil, respectively.

Th-232 and Ra-226 concentrations in subsurface soil are reported to be below the NRC 1981 BTP Option 1 limit for thorium contamination (0.37 Bq [10 pCi]/g) and the EPA limits for radium contamination (0.19 Bq [5 pCi]/g for surface soils and 0.56 Bq [15 pCi]/g for subsurface soils).

On the basis of analysis of water samples from existing upgradient and downgradient wells, Chemetron reports concentrations of U-238 and Ra-226 below the EPA proposed drinking water levels. Currently, the licensee is

evaluating further the hydrogeology of the Harvard Avenue site to determine if there is existing or the potential for future ground water contamination. However, there are no known drinking water wells near the site, as the local water source is a public drinking water system.

#### **4. Description of Radiological Hazard**

The critical pathway of radiation dose to a person exposed to land contaminated with DU is mainly from inhalation through the resuspension in the air of particulates from contaminated soil. At the Harvard Avenue site, soil piles are covered with tarps to minimize soil resuspension. Airborne and direct gamma radiation measurements indicate radiation levels well below 10 CFR 20 limits for public exposure.

Radiological surveys of ground surfaces performed by NRC in 1991 indicate radiation exposure levels of less than 5 nC/kg (20  $\mu$ R)/hr in restricted areas and less than 4 nC/kg (15  $\mu$ R)/hr in unrestricted areas. Results of environmental radiation monitors (thermoluminescent dosimeters and air monitors) indicate that external and airborne radiation levels are consistent with natural background levels for the suburban Cleveland area. The owner of the site, McGean-Rohco, Inc., maintains access control and the restricted area is enclosed with a fence and a locked gate.

#### **5. Financial Assurance/Viable Responsible Organization**

The site is owned by McGean-Rohco, Inc., of Cleveland, Ohio. Chemetron Corporation of Providence, Rhode Island, holds the license. Chemetron had been owned by Allegheny International. Both filed for bankruptcy in February 1988. In September of 1990 Sunbeam/Oster became Chemetron's grandparent company in a buy-out of Allegheny International, lifting Chemetron out of bankruptcy. Sunbeam/Oster has provided a parent company guarantee in the amount of \$7,465,000 for decommissioning the Bert and Harvard Avenue sites.

#### **6. Status of Decommissioning Activities**

Dames and Moore has been assigned the responsibility of site manager for purposes of development and implementation of the remediation plan and associated activities. Nuclear Energy Services is responsible for site radiological safety and support activities.

In April 1992, NRC staff issued an Order Modifying License (effective immediately) to Chemetron Corporation requiring submittal of a final Site Characterization Report (SCR) for the Harvard Avenue and Bert Avenue sites by June 15, 1992. Chemetron responded to the Order Modifying License and requested a hearing and motion to set aside the immediate effectiveness of the Order. NRC staff developed a response to the hearing request, but the staff's response was superseded by a joint motion for approval of a Consent Order. In May 1992, an NRC Atomic Safety and Licensing Board approved the Consent Order proposed by NRC staff, which was developed to (1) avoid protracted litigation on the basis for immediate effectiveness of the Order Modifying License; (2) require the licensee to submit to NRC a final SCR by June 15, 1992; and (3) supersede the Order Modifying License dated April 8, 1992.

Chemetron submitted to NRC in June 1992 a final SCR in accordance with the deadline established in the May 1992 Consent Order. The technical review of the final SCR was conducted by the State of Ohio Department of Health (ODH), the State of Ohio Environmental Protection Agency (OEPA), NRC contractors, and NRC staff and was completed by January 8, 1993. In general, the final SCR was considered acceptable for the purpose of developing a final site remediation plan, but based on the analysis of site characterization information collected during the Phase II study, NRC and OEPA staffs recommended that Chemetron install additional monitoring wells at the Harvard Avenue site.

In June 1992, Chemetron remediated DU contamination discovered in the garage of a private residence located in Parma, Ohio. Radiologically contaminated lumber was taken from the Harvard Avenue site in the 1980's and used in the construction of the garage. NRC staff inspected this remediation activity and surveyed the premises to ensure that NRC guidelines for residual activity were met.

The licensee proposed, in its August 1991 remediation plan, to bury radioactive contaminated material from both sites at a closure cell located at the Bert Avenue site. These burials would be performed under the provisions of 10 CFR 20.302. However, at the request of local citizens, Chemetron stated in October 1991 that wastes present at the Harvard Avenue site would not be disposed of at the Bert Avenue site. Chemetron is currently reevaluating its proposed remediation plans for the Harvard Avenue. NRC and Chemetron plan to meet in April 1993 to discuss the licensee's plans for remediating the Harvard Avenue site.

## 7. Other Involved Parties

OEPA informed NRC in May 1992 that it shares joint jurisdiction over ongoing investigations and future remedial actions of the Bert Avenue site, but OEPA did not extend its jurisdiction to the Harvard Avenue site. OEPA is responsible for ensuring the hazardous wastes requirements under the Resource Conservation and Recovery Act (RCRA) and has the authority to regulate RCRA hazardous wastes and mixed wastes. Under RCRA, OEPA has the authority to perform cleanup actions and recover costs from the principally responsible parties. OEPA is responsible for ensuring that State of Ohio solid waste requirements are defined and met and also has authority over sites that do not qualify under Superfund (Chemetron, for example).

ODH coordinates radioactive material safety matters in offsite areas. ODH also participates on the Midwest Compact Commission and will identify Compact Commission requirements under the authority of the Low-Level Radioactive Policy Amendments Act that need to be met.

ODH and OEPA have participated in the review of Chemetron's June 1991 SCR, the August 1991 site remediation plan, the January 1992 Phase II site characterization plan, and the June 1992 final SCR.

## 8. NRC/Licensee Actions and Schedule

- |  |  |
|--|--|
| ● NRC independent confirmation of final SCR, including audit of analytical labs used by licensee   | TBD  |
| ● amend license to establish date for licensee to submit a final site remediation plan             | May 1993   |
| ● receive final site remediation plan from licensee and distribute to OEPA and ODH for review      | October 1993   |
| ● review and approve final site remediation plan and incorporate remediation schedule into license | 6 months after receipt of final site remediation plan    |
| ● complete site remediation activities, including final termination survey                         | 1 year after NRC approves of final site remediation plan |
| ● NRC confirmatory survey of Harvard Avenue site   | 3 months after receipt of licensee termination survey    |
| ● termination of NRC license and release of Harvard Avenue site for unrestricted use               | 3 months after completion of NRC confirmatory survey     |

## 9. Problems/Issues

Licensee needs to resolve issues concerning applicability of Ohio EPA solid waste regulations and resolve the role of the Midwest Compact with respect to onsite disposal of wastes.

## **CHEVRON CORPORATION** **(Formerly Gulf United Nuclear Fuels Corporation)**

### **1. Site Identification**

Chevron Corporation  
Nuclear Lake  
Pawling, NY

License No.: SNM-871  
Docket No.: 070-00903  
License Status: Terminated in 1975  
Project Manager: M. (Sam) Nalluswami

### **2. Site and Operations**

The 4.6E6-m<sup>2</sup> (1137-acre) site is located in a wooded, rural area near Pawling in Dutchess County, New York, about equidistant between Poughkeepsie, New York, and Danbury, Connecticut. The site includes a dammed lake of about 2.0E5 m<sup>2</sup> (50 acres), known locally as Nuclear Lake. The site now contains a portion of the Appalachian Trail.

Beginning in 1958, licensed nuclear fuels research and development were conducted at the site. Facilities included laboratories for fabrication and testing of uranium, thorium, and plutonium fuels, a hot cell, three research reactors (Dockets 050-0023, 050-00101, and 050-00290), and a sodium test loop. The original site owner and licensee was Nuclear Development Associates, which later became United Nuclear Corporation (UNC). The licenses were transferred in 1971 to a partnership formed by Gulf General Atomics (GA) (itself a partnership of Gulf Oil and Royal Dutch Shell) and UNC, known as Gulf United Nuclear Fuels Corporation (GUNFC). UNC retained ownership of the site and also was a co-licensee with GUNFC for the remaining two reactors, Dockets 050-00101 and 050-00290. (One reactor license, Docket 050-0023, had been terminated and replaced with a new license in June 1961.) Activities at the site were never resumed after December 1972, when a glove box explosion in the plutonium laboratory building resulted in substantial contamination. License renewal was still being actively pursued by GUNFC, however, as late as mid-1973.

As of September 27, 1973, GUNFC was a wholly-owned subsidiary of Gulf. UNC had no further responsibility to the NRC at this point since GUNFC continued as the licensee and continued to be responsible for all matters of NRC regulatory compliance. UNC continued to own the site and buildings which were leased to GUNFC.

On November 19, 1973, General Atomics Company (GAC) applied to the AEC for consent to acquire all the interests of Gulf (and GUNFC) in a number of licenses, including both the Pawling reactor licenses (R-49 and CX-25) and the special nuclear material license (SNM-871). Consent to the transfer was provided by letter from the AEC to GAC, dated December 14, 1973. Consent was provided with the understanding that GAC would assume all the "rights, duties, responsibilities, liabilities, and obligations of the Gulf Oil Corporation."

Upon completion of decommissioning and survey work, Gulf Nuclear Fuels Company (GNFC) sent a letter and a supporting survey report to the AEC dated March 11, 1974, requesting that Pawling site be deleted from SNM-871. The letter indicated that the absence of contamination had been verified at all buildings.

A letter from GNFC to the AEC, dated May 9, 1974, requested that the licensee name be changed to GAC. The letter stated that GNFC (formerly GUNFC) would become part of GAC retroactive to January 1, 1974. By letter dated May 23, 1974, License No. SNM-871 was amended to specify GAC as the licensee. Also, on July 19, 1974, a renewed License No. SNM-871 was issued to GAC.

A closeout survey and inspection was conducted by the AEC at the site during April 1974 (inspection report 70-903/74-01). According to the AEC inspection report dated April 24, 1974, remediation had been performed to levels specified as acceptable for unrestricted use at all the buildings. Following further removal of plutonium-contaminated soil from the Pawling site, License No. SNM-871 was terminated on July 14, 1975. The remaining reactor licenses had been terminated in June 1974 (Dockets 50-101 and 50-290).

Subsequently, there was a partial distribution of the assets of GAC to the partners (under which GA Technologies, Inc., wholly-owned by Gulf Oil Corporation, undertook all the NRC licenses of GAC) and GAC was

renamed as Valley Pines Associates (VPA) as of November 30, 1982. VPA continued to be owned by Gulf Oil Corporation and Scallop Nuclear, Inc. The names of the partners owning VPA have changed and VPA is now owned by Chevron U.S.A., Inc. (a wholly-owned subsidiary of Chevron Corporation and formerly Gulf Oil Corporation) and Shell Oil Company.

The site itself was sold in 1979 by Harpoon, Inc., a wholly-owned subsidiary of United Nuclear Corporation, to the U.S. Department of Interior (DOI) for use by the National Park Service (NPS).

### **3. Radioactive Wastes**

In February 1984 Nuclear Energy Services of Danbury, Connecticut, conducted a radiological survey of the site for the site owner, the NPS. During the course of that survey, it was discovered that a small area of the concrete floor in what was the waste storage building had fixed beta-gamma radiation levels of 0.25 to 0.35 mSv (25 to 35 mrem)/hr. The NPS notified NRC Region I of this condition by letter dated March 12, 1984. A verification survey was conducted by the NRC on May 22, 1984. Most of this contamination was removed from the area by destructive sampling on February 25 and 26, 1985.

The Oak Ridge Institute for Science and Education conducted a site-wide radiological survey for the NPS September 18 through 23, 1986. The ORISE survey report, issued in July 1988, identified limited areas of residual contamination in the plutonium laboratory and the multiple failure building. In the plutonium laboratory, there is fixed alpha (plutonium) contamination ranging to 0.6 MBq (9400 dpm)/100 cm<sup>2</sup> in the concrete flooring of five separate rooms, totaling approximately 230 m<sup>2</sup> (2500 ft<sup>2</sup>). In the same five rooms, there are two areas totaling about 15 m<sup>2</sup> (170 ft<sup>2</sup>), of fixed beta-gamma (Cs-137) contamination ranging to 720 MBq (12 million dpm)/100 cm<sup>2</sup>. ORISE reported the external exposure rate to be 7.7 nC/kg (30 μR)/hr at a height of 1 meter at the location of peak beta-gamma contamination. The surface contamination in the multiple failure building consists of only beta-gamma (Cs-137) contamination ranging to 6.6 MBq (110,000 dpm)/100 cm<sup>2</sup> over an area of several square meters. ORISE found surface Pu-239/240 contamination in soil, in isolated locations outside the buildings, ranging to 3.4 Bq (91 pCi)/g, and subsurface Cs-137 contamination at two other locations ranging from about 0.74 to 1.8 Bq (20 to 48 pCi)/g. A sample of sludge from the plutonium laboratory septic tank had 1.5E-2 Bq (0.41 pCi)/g of Pu-238, 0.2 Bq (5.95 pCi)/g of Pu-239/240, and 2.6E-2 Bq (0.71 pCi)/g of Cs-137. A single soil sample from under a downspout at the shield mock-up building had 0.6 Bq (15.5 pCi)/g of Cs-137.

Magnetometry and ground-penetrating radar showed 50 to 60 magnetic "anomalies" and "targets" within Nuclear Lake. Subsequent investigation by scuba divers has confirmed that the "anomalies" and "targets" consist of a jeep, an aluminum boat, and natural matter such as rocks and tree stumps not contaminated with radioactive materials. Sediment samples from Nuclear Lake indicate Cs-137 ranging to 0.4 Bq (9.9 pCi)/g and U-238 ranging to 0.6 Bq (16.5 pCi)/g. The peak Cs-137 concentration occurs near the location of the previous liquid waste discharge point. Sediment concentrations downstream from the dam are within the range of background or slightly above.

Wastes produced during remediation would include concrete rubble or scabbling waste from remediation of about 230 m<sup>2</sup> (2500 ft<sup>2</sup>) of concrete floor and some contaminated soil. Other wastes could develop if further studies identify additional contamination.

### **4. Description of Radiological Hazard**

The site poses no immediate threat to the public. The NPS controls access to the site and has a full-time caretaker on site. The building contamination above acceptable levels is fixed contamination and does not constitute a significant exposure hazard because of its limited use. The soil contamination is not severe and is not widespread. Contamination levels of sediment within and downstream of Nuclear Lake are slight and do not pose a radiological hazard. There is no evidence of contamination of water in the lake.

### **5. Financial Assurance/Viable Responsible Organization**

At the time of license termination in 1975, the licensee was GAC. GAC's successor in interest is VPA, a subsidiary of Chevron Corporation (Chevron). Chevron has undertaken the role of its subsidiary, VPA, and has been discussing site remediation with NRC and NPS. Chevron submitted a work plan for the soil remediation, and a health and safety plan. Chevron also submitted a decommissioning plan for the plutonium facility and the multiple failure building.

## 6. Status of Decommissioning Activities

On September 26, 1989, the NPS, NRC, and ORISE held a joint meeting to discuss options available to the NPS for additional surveys and remediation of the site. It was decided to contact the former licensee to determine its willingness to assume responsibility for remediation of the site.

NRC staff and representatives of Chevron, GA, and VPA held a telephone conference on February 14, 1990, to discuss the residual contamination and responsibility of the parties. On April 3, 1990, representatives of the NPS, NRC, and VPA met at Pawling to tour the site and discuss various remediation options.

On November 27, 1990, a Chevron attorney met with NMSS staff. It was explained that NRC could hold the last licensee responsible for all site remediation even though residual contamination might be the result of previous operations conducted by a former licensee. The Chevron representative indicated that Chevron would provide its position concerning further site characterization and remediation by January 1991.

Subsequently, a letter was received from Chevron dated January 24, 1991, stating that they were continuing to review the matter internally and asking questions about remediation criteria, further site characterization, waste disposal, and release for unrestricted use. NRC staff provided a response to Chevron's questions, including specific remediation criteria in a letter dated April 22, 1991. The letter stated that the NRC was looking to VPA to provide the necessary site remediation because VPA is the immediate successor in interest to the last licensee, GAC.

Further communications dwelled on Chevron's position that UNC, as the former licensee and site owner throughout licensed operations, also should be held responsible for site remediation. This was discussed in a conference call on July 25, 1991, and in a detailed explanation of NRC's position sent to Chevron in a letter dated August 20, 1991, and again, at length, in a meeting at NRC offices on November 20, 1991. In this meeting, Chevron indicated some willingness to participate in site remediation if certain concerns were adequately addressed. (On August 9, 1991, a site visit and tour was conducted, at Chevron's request, for the purpose of familiarizing three potential remediation contractors with the site and remediation needs.)

In another meeting held on December 13, 1991, at the Department of the Interior building in Washington, D.C., Chevron indicated its intent to provide a remediation proposal to the NPS by the end of the year.

By letter dated February 13, 1992, Chevron proposed to the NPS to provide project management for remediation of known areas of contamination and to pay 50 percent of the cost of remediation work. Under the Chevron proposal, NPS would pay 50 percent of remediation costs and 100 percent of the costs of radioactive waste disposal and nonradiological building demolition and debris removal. The NPS responded to Chevron's proposal by letter dated March 12, 1992, and indicated that there was no basis for assigning any portion of the remediation costs to the NPS.

On April 3, 1992, Chevron wrote a letter to NPS indicating that although Chevron has expended a great deal of effort and presented a significant offer to the NPS, to date, the NPS has not come forth with anything to satisfy Chevron's two fundamental requirements of cost sharing and an assurance that this would be Chevron's final remediation obligation. Due this situation, Chevron wrote that they cannot justify expending any more resources at this site and would take no further action.

The negotiations between Chevron and the NPS continued. NRC encouraged the negotiations and supported the shared responsibility between Chevron and the NPS in a letter dated October 30, 1992. Chevron submitted a work plan for soil remediation and a health and safety plan. The work plan, and the health and safety plan were reviewed and approved by the NRC staff on December 11, 1992. Chevron also submitted on February 17, 1993, a decommissioning plan for the plutonium facility and the multiple failure building. NRC reviewed the decommissioning plan for the plutonium facility and the multiple failure building and requested additional information on April 20, 1993. Chevron and NPS have signed a cooperative agreement to remediate the site.

## 7. Other Involved Parties

The New York State Department of Environmental Conservation sent representatives to the site visit and tour on August 9, 1991, and is being kept advised of significant developments.

## **8. NRC/Licensee Actions and Schedule**

- NRC issues confirmatory order TBD
- Chevron submits revised plan May 1993
- NRC approves decommissioning plan for plutonium facility and multiple failure building June 1993
- Chevron submits termination survey report September 1993
- NRC performs confirmatory survey October 1993
- NRC staff prepares commission paper December 1993
- NRC releases Chevron site for unrestricted use and removes site from SDMP list March 1994

## **9. Problems/Issues**

None.

## DOW CHEMICAL COMPANY

### 1. Site Identification

Dow Chemical Company  
Midland & Bay City, MI

License No.: STB-527  
Docket No.: 040-00017  
License Status: Timely renewal  
Project Manager: J. Parrott

### 2. Site and Operations

The Dow Chemical Company was granted a license by the Atomic Energy Commission (AEC) in 1956 to use thorium metal and compounds for the production of thorium-magnesium alloys. In 1962 the AEC issued Dow a new license encompassing operations at three locations: Bay City and Midland, Michigan, and Madison, Illinois. In 1973 the license was amended to authorize storage only or transfer of metal or process sludge to authorized recipients. Licensed operations resulted in the production of slag material and contaminated soil containing thorium that now require disposal.

Dow sold its Madison site in 1971 to Phelps Dodge Aluminum Corporation, which later merged with Consolidated Aluminum Corporation. The material at Madison was transferred to the Consolidated Aluminum Corporation pursuant to License No. STB-1097 (Docket No. 040-8088). This site has been subsequently remediated by Dow under the authority of the Illinois Department of Nuclear Safety.

Waste material and contaminated soil are being stored at the Midland and Bay City sites. The Bay City site also includes some contaminated material transferred there from the Wellman-Dynamics Corporation of Bay City, a licensee whose operations were similar to Dow. Dow has proposed to dispose of all the contaminated material from its Midland and Bay City sites at its Salzburg hazardous waste landfill, designed in accordance with the requirements of the RCRA and located in Midland.

#### Bay City Site

The Bay City site is located 1.6 km (1 mile) south of Saginaw Bay and 32 km (20 miles) east of Midland. The contaminated material is stored on a fenced-in Dow owned site that is controlled by Dow security. Another area, 23 by 45.7 meters (75 by 150 feet), used for the storage of some additional contaminated materials from the Wellman site is roped off and posted. In the disposal application submitted to the NRC on October 30, 1989, Dow estimated that 30,600 m<sup>3</sup> (1.08 x 10<sup>6</sup> ft<sup>3</sup>) of material requiring disposal was located at the Bay City site.

There are several monitoring wells around the site. Data from 96 well samples taken by Dow during 1985 show gross alpha levels ranging from less than 0.1 to 0.63 Bq (2.5 to 17 pCi)/l and gross beta levels between 0.3 and 65 Bq (8 and 1758 pCi)/l. Sampling performed by NRC staff in 1979 indicated gross alpha activity up to a maximum of 0.15 Bq (4 pCi)/l in six samples taken from wells, a near-by canal, and ponds. Sample data taken from monitoring wells in 1985 during an NRC inspection indicate thorium activity levels at background to 0.05 Bq (1.25 pCi)/l. More recent sampling data from Dow indicates that there are some elevated levels of Ra-228 (a daughter product of Th-232) in the ground water near the Bay City site.

#### Midland Site

Dow estimates the volume of contaminated material at the Midland site to be 9200 m<sup>3</sup> (324,000 ft<sup>3</sup>). The 49 meters by 91 meters (160 feet by 300 feet) Midland site is roped off and the contaminated material is covered by a 0.3-to-0.6-meter (1-to-2 feet) thick clay cap. Hydrologic information for the Midland site is not contained in the licensing files. Likewise, there is no ground water sampling data from this location. An NRC sample of sludge taken in 1983 from the pond adjacent to this burial contained Th-232 activity of 0.07 Bq (2 pCi)/g. More recent sampling data are not available.

#### Decommissioning History

In March 1979 Dow compared several methods for the disposal of the magnesium-thorium slag piles. It concluded that temporary storage in the existing configuration would be the best alternative until the State of Michigan can develop a disposal facility for these materials in accordance with NRC requirements.

In October 1979 the NRC requested that Dow provide a comprehensive plan for removal and disposal of the thorium-magnesium wastes. In February 1980 Dow agreed to provide site information, but continued to state that the wastes should remain in storage and not be removed. Site information was submitted to the NRC in August 1981.

In August 1981 Dow requested that the Midland site license be terminated based on survey results that indicated that the radioactivity levels met NRC guidelines for unrestricted release. At the same time, Dow also informed the NRC that the Bay City site slag storage pile had an average thorium concentration of 63 Bq (1700 pCi)/g. This pile had been graded and compressed to 0.76 meter (2.5 feet) thick and covered with a tar-based road sealant in 1978. Ground water monitoring wells had been installed around the site and a 2.1-meter (7-foot) chain link fence had been installed to secure the site.

In June 1982 NRC staff performed contamination surveys at the Midland site. The results of this survey indicated that contamination was still above NRC guidelines. NRC staff recommended that the site not be released for unrestricted use until the contaminated material was properly disposed of and a confirmatory survey performed by ORISE.

Later in 1982 Dow submitted a decommissioning plan for the Midland site. This plan proposed transferring all the contaminated material to the Bay City site. Because the State of Michigan objected to this plan and more contamination was discovered at the Wellman-Dynamics site, decommissioning activities were put on hold.

In 1987 Dow proposed moving the contaminated material at both the Midland and Bay City sites to the Salzburg Landfill on Salzburg Avenue in Midland. In January 1988 a draft 10 CFR 20.302 license application was provided for comment to the NRC and the State of Michigan. In October 1989 Dow submitted an application for the disposal of the Midland and Bay City contaminated material at the Salzburg landfill. The review of this application was completed on September 23, 1991, with input from U.S. Environmental Protection Agency (EPA) and the Michigan Department of Health (MDH). Dow responded to these comments by letter dated August 31, 1992, and requested an exemption from unrestricted release requirements by letter dated November 18, 1992. The Dow response to comments and exemption request are currently under review.

### **3. Radioactive Wastes**

In the Dow disposal application submitted to the NRC in October 1989, Dow conservatively estimated the total volume of contaminated material at the Bay City site to be 37,000 m<sup>3</sup> (1.08E6 ft<sup>3</sup>) with an average concentration of 7 Bq (188 pCi)/g and a range of 0.07 to 260 Bq (2 to 7000 pCi)/g Th-232. In 1978 Dow performed a leaching study of the slag material and concluded that even under aggressive conditions the waste would leach at very low rates. Exposure rates above the pile are up to 2.17E-9 C/kg (8.4 μR)/hr. Some of this material, 1200 m<sup>3</sup> (42,390 ft<sup>3</sup>) averaging about 2.2 Bq (60 pCi)/g, was transferred from the Wellman site. Dow estimates about 3.4 E11 Bq (9.2 Ci) of Th-232 at the Bay City location.

In the Dow disposal application submitted to the NRC in October 1989, Dow conservatively estimated the total volume of contaminated material at the Midland site to be 9200 m<sup>3</sup> (324000 ft<sup>3</sup>). The activity in the contaminated material varies substantially and ranges up to 74 Bq (2000 pCi)/g with an average of 1.1 Bq (29 pCi)/g Th-232. Dow estimates approximately 1.7E10 Bq (0.46 Ci) of Th-232 are in this material.

### **4. Description of Radiological Hazard**

The principal hazards associated with the contamination at the Midland and Bay City sites involve direct exposure, inhalation, ingestion, and intrusion. No immediate threat to public health and safety exists at either location. The direct exposure, inhalation, and ingestion hazards are low because the storage areas are covered (by an asphalt cover at the Bay City site and by a clay cover at the Midland site). However, the asphalt cover at the Bay City site is beginning to deteriorate. In 1978 Dow performed a study to determine the respirable fraction of the slag material. The respirable fraction was determined to be less than 0.1 percent. Of this fraction about 1.5 percent would be thorium. Both sites are within property protected by Dow security so intrusion hazards are minimized. The available ground water sampling data indicates that there has been minimal ground water contamination from this material. Because of the insoluble nature of the waste material, it is expected that the ground water hazard will remain low.

## 5. Financial Assurance/Viable Responsible Organization

On July 27, 1990, Dow submitted financial assurance in the amount of \$6,625,000 for its three NRC licenses, \$4,800,000 of which was for License STB-527. In Dow's response to comments on its 10 CFR 20.302 submittal, dated August 31, 1992, it estimated that the disposal of its waste in the Salzburg Landfill will cost \$4,978,000.

Dow is a large corporation, and is expected to have the financial viability to complete decommissioning of this license.

## 6. Status of Decommissioning Activities

On October 30, 1989, Dow submitted a 10 CFR 20.302 disposal application to the NRC for disposal of the Bay City and Midland wastes at the Salzburg Landfill. NRC reviewed the submittal and sent comments back to Dow on September 23, 1991. Dow responded to these comments on August 31, 1991. An NRC preliminary dose assessment, assuming unrestricted release of a burial in the Salzburg Landfill, has indicated that subsequent doses would exceed unrestricted use objectives. NRC sent Dow a letter dated December 20, 1991, indicating that the Salzburg Landfill may not be a viable option for the disposal of the Bay City and Midland wastes. NRC suggested that Dow look at an alternative to burial in a Salzburg Landfill disposal cell. NRC and Dow met in late April 1992 to resolve this issue. At that time it was suggested that some type of institutional control would be needed over the Salzburg Landfill if the thorium wastes were to be buried there. Dow followed up on this suggestion and applied for an exemption, by letter dated November 18, 1992, from the decommissioning unrestricted release provisions by proposing deed restrictions. This issue is currently under consideration by NRC.

## 7. Other Involved Parties

MDH and EPA provided comments on Dow's original 10 CFR 20.302 application. The Michigan Department of Natural Resources also has been involved in review of the proposed burial.

## 8. NRC/Licensee Actions and Schedule

- |   |              |
|---|--------------|
| • Commission decision on unrestricted release exemption request | June 1993    |
| • Dow submits decommissioning plan                              | August 1993  |
| • NRC approves decommissioning plan                             | October 1993 |
| • Dow completes decommissioning Bay City and Midland sites      | April 1995   |
| • Dow submits final survey of both sites                        | June 1995    |
| • NRC performs confirmatory survey                              | August 1995  |
| • NRC terminates license  | October 1995 |

## 9. Problems/Issues

To dispose contaminated material at location other than a licensed low-level waste facility, DOW will require an exemption from the unrestricted use criteria. Dow requested the exemption; the request is being reviewed by NRC.

# ELKEM METALS, INC.

## 1. Site Identification

Elkem Metals, Inc.  
Marietta, OH

License No.: Not licensed  
Docket No.: NA  
License Status: Terminated in 1985  
Project Manager: C. L. Pittiglio, Jr.

## 2. Site and Operations

The site is located in a rural industrial area, approximately 1.6 km (4 miles) from the town of Marietta, Ohio, which is located north on State Route 7 and County Road 10 and north of the Ohio River. The facility is an active manufacturer of manganese products that are used in the steel manufacturing industry. Elkem possesses an NRC license authorizing the use of fixed nuclear gauges; however, that licensed activity is not involved with this contamination problem.

## 3. Radioactive Wastes

During the early 1960's, Union Carbide Corporation processed tin slags at this facility for the production of tantalum-columbium metals. This activity was conducted under NRC Source Material License SMB-993. Process residues containing thorium and uranium were retained and stored on site. Operations were terminated in the early 1970's. This license was terminated on July 8, 1985, based on surveys conducted by the licensee's consultant and confirmatory surveys by ORISE. Records indicate that residues were disposed of by transfer to a commercial burial site and equipment was removed and buildings were remediated. Review of these records indicate that only one building was remediated (Building 77); however, there are no indications that the building that was used to process this material was ever remediated. An onsite special inspection conducted on January 30, 1992, indicates that the former process building (Simplex Storage Building A) contained process equipment, air ducts and vent lines contaminated with removable radioactive material (thorium). Radiation levels up to 0.6 nC/kg (2.5  $\mu$ R)/hr were detected. Various smear tests were taken and indicate a maximum of 1 MBq (17,000 dpm)/100 cm<sup>2</sup> of removable contamination. Further review of the records indicate that the extent of the contamination in an adjacent sludge pond was not evaluated.

## 4. Description of Radiological Hazard

This site poses no immediate threat to the public because it is an industrial site with controlled access. The Simplex Building has been posted with "Caution Radioactive Material" signs and personnel access is restricted.

## 5. Financial Assurance/Viable Responsible Organization

The site is owned by Elkem Metals, Inc. The former NRC licensee, Union Carbide, has assumed financial responsibility for decommissioning this facility through a covenant to the sale of the property to Elkem Metals.

## 6. Status of Decommissioning Activities

NRC issued a confirmatory action letter (CAL) to Elkem Metals on February 5, 1992. This CAL confirmed Elkem Metal's commitment to (1) restrict access to the area and post the area with "Caution Radioactive Material" signs, and (2) provide the Commission with a characterization plan and schedule within 30 days.

Characterization of the site commenced April 1992. Results of the characterization were issued in May 1992. Project plans for remedial action at Elkem were submitted to NRC in December 1992. In response to NRC comments, Elkem submitted a revised project plan in March 1993.

## 7. Other Involved Parties

No significant third-party involvement is anticipated.

**8. NRC/Licensee Actions and Schedule**

- NRC approves project plans
- Elkem completes remediation

May 1993

Within 6 months  
of project plan  
approval

**9. Problems/Issues**

None.

# ENGELHARD CORPORATION

## 1. Site Identification

Engelhard Corporation  
Plainville, MA

License No.: None  
Docket No.: 070-00139 (old)  
License Status: Terminated in 1962  
Project Manager: J. Parrott

## 2. Site and Operations

A subsidiary of Engelhard Corporation called D.E. Makepeace was licensed by the AEC to use enriched uranium for the fabrication of fuel elements from the late 1950's to the early 1960's. During this period, the licensee was allowed to discharge uranium contaminated effluent to an onsite septic system and to incinerate uranium contaminated solid waste on site. At license termination, only indoor areas were surveyed for release. The outdoor contamination was not discovered until the site became subject to characterization for the presence of hazardous wastes on site under RCRA. Because the contamination was from special nuclear material, and therefore not subject to regulation by RCRA, the EPA contacted the NRC in late 1991.

The site is currently operating but does not use licensable material. The majority of the approximately 10 hectare (25 acre) site is covered by buildings and parking lots. This site is adjacent to a small reservoir called Turnpike Lake. Engelhard is in the process of shutting down this facility.

## 3. Radioactive Wastes

Very little data exists on the radioactive wastes at this site. A gamma survey was done by Engelhard in 1988 on the buildings that existed at the time that licensed activities took place, and also around the septic system and pump house. Inside the buildings, maximum readings of  $1.8 \times 1.8E-8$  to  $2.1E-8$  C/kg (70 to 80  $\mu$ R)/hr were found in isolated areas. Sludge inside the unused septic tank also was found to be contaminated. Unverified preliminary sampling in the area of the old septic system have yielded gross alpha values as high as 2.4 Bq (66 pCi)/g in the soil and 48 Bq (1300 pCi)/l in the ground water. Areas of the site also are contaminated with heavy metals and organic solvents, so the potential exists for mixed wastes.

## 4. Description of Radiological Hazard

Access is not controlled to indoor areas suspected of being radiologically contaminated. However, this contamination is fixed and should be no hazard to plant workers. The suspected outdoor contaminated areas are under pavement. Access to the old septic tank is possible through a manhole in the parking lot. The radiological contamination detected so far is confined to the site. non-radiological hazardous waste has been detected in onsite soil and in ground water and offsite ground water.

## 5. Financial Assurance/Viable Responsible Organization

Because no license exists for this site, compliance with financial assurance regulations does not apply. Engelhard appears to be a financially viable company and seems willing to properly decommission this site. Engelhard has received an administrative order from the EPA Region I RCRA office to characterize and remediate the hazardous contamination associated with this site.

## 6. Status of Decommissioning Activities

On November 10, 1992, NRC staff participated in a public meeting in Plainville involving representatives of EPA Region I, the Massachusetts Department of Environmental Protection (DEP), and Engelhard Corporation. This meeting was held in conjunction with the release of the Public Involvement Plan prepared jointly by DEP and EPA. The Public Involvement Plan is applied to sites as designated by DEP in response to community interest in becoming involved in the remediation process.

NRC sent a letter to Engelhard on November 23, 1992, requesting that all samples taken for RCRA site characterization be analyzed for gross alpha and gross beta, or isotopic uranium in areas where elevated gross

alpha readings have already been found. This letter also outlined the residual contamination criteria that should be applied to the site soil as 1.1 Bq (30 pCi)/l total uranium, and 1.1 Bq (30 pCi)/l total uranium in ground water.

Engelhard is currently negotiating with EPA on the specifics of site characterization/ remediation under the RCRA order. So that the characterization/remediation of this site goes as efficiently as possible, NRC is requesting that Engelhard combine its RCRA site characterization efforts with the site characterization requested by NRC. However, if the EPA RCRA order process becomes unreasonably delayed in the negotiating phase, NRC will require Engelhard to act independently on the NRC request.

Engelhard submitted a decommissioning plan for the building contamination on April 21, 1993.

## **7. Other Involved Parties**

The EPA Region I RCRA office and Massachusetts DEP are involved at this site because of the hazardous waste contamination.

## **8. NRC/Licensee Actions and Schedule**

- NRC approves building interior decommissioning plan May 1993
- Engelhard submits radiological site characterization plan concurrent with RCRA site characterization plan October 1993
- NRC approves site characterization plan December 1993
- Engelhard submits site characterization data and decommissioning plan June 1994
- NRC approves decommissioning plan September 1994
- Engelhard completes decommissioning, submits verification survey data December 1994
- NRC performs confirmatory survey March 1995
- NRC releases site for unrestricted use August 1995

## **9. Problems/Issues**

Possibility for mixed waste at this site.

# FANSTEEL, INC.

## 1. Site Identification

Fansteel, Inc.  
Muskogee Plant  
Muskogee, OK

License No.: SMB-911  
Docket No.: 040-07580  
License Status: Active—timely renewal/possession only  
Project Manager: H. Spiro

## 2. Site and Operations

The facility is located on approximately 45 hectares (110 acres) in Muskogee County, Oklahoma, northeast of the city of Muskogee adjacent to an interstate highway and on the bank of the Arkansas River. Tin slags, ores, and ore concentrates were received and processed for the tantalum and niobium values. The natural uranium and thorium contained in the feed materials remain in the process residues. Fansteel ceased processing of feed materials containing natural uranium and thorium in 1990.

## 3. Radioactive Wastes

A single process building and liquid waste treatment facility are contaminated with small concentrations of natural uranium and thorium. Most of the natural uranium and thorium is found in the form of undissolved solid residues deposited in several settling ponds. Before September 1979 a large portion of these residues were collected in Pond 2, which is covered with plastic sheets and 15 to 30 cm (6 to 12 inches) of soil. Pond 3 was used for the collection of residues until the pond's liner failed in mid-1989. Following that time, the residues were collected by filtration or mechanical separation and stored in lined drums.

Historically, the natural thorium content in the feed materials exceeded the natural uranium content. However, during the final years of operation, this relationship was reversed because of Fansteel's increased dependence on tin slags and ore concentrates as feed materials.

The total quantities of natural uranium and thorium in Ponds 2 and 3 and several other clarification ponds are estimated to be 23,000 kg (25.4 tons) and 59,000 kg (65.0 tons), respectively. This represents a volume of approximately 11,000 m<sup>3</sup> (400,000 ft<sup>3</sup>). There is no indication of any offsite contamination at the present time.

The metal processing operations involved the use of solvents and extractants that may result in the residues being classified as mixed waste. Fansteel is performing radiological and non-radiological characterization of the facility and environment to determine the nature and extent of contamination.

## 4. Description of Radiological Hazard

This site poses no immediate threat to the public health and safety. The only substantial contamination outside of the settling ponds is natural uranium and thorium in low concentrations in the soil. Fansteel controls access to the site so inadvertent exposure by a member of the public to contamination on the site is unlikely. Ground water contamination is a potential problem because of past leakage of fluids from Pond 3 into the ground water and the detection of low pH values in the ground water.

The following estimates of gamma radiation exposure rates were obtained by a cursory radiation survey performed by NRC inspectors during several tours and radiation safety inspections of the Fansteel facility in November and December 1991. The exposure rate at a height of approximately 1 meter (3 feet) ranged from 1E-8 to 5E-8 C/kg (40 to 200  $\mu$ R)/hr in outside unsheltered areas covered by the tours. The contact exposure rates in various areas and equipment in buildings ranged to a maximum of approximately 5 E-7 C/kg (2000  $\mu$ R)/hr with an average of approximately 1 E-7 C/kg (400  $\mu$ R)/hr.

During an NRC inspection in April 1991, a violation of 10 CFR Part 20 was identified. The licensee failed to perform surveys of radioactive materials in air during the actual removal of equipment from the ball mill room

as required by 10 CFR Part 20.201(b), to demonstrate compliance with 10 CFR Part 20.103(a)(1). Also, adequate bioassay data was not obtained in a timely manner.

## **5. Financial Assurance/Viable Responsible Organization**

The site is owned by Fansteel, Inc., and all licensed activities are conducted by Fansteel. Fansteel accepts the responsibility for site remediation and has submitted an irrevocable standby letter of credit in the amount of \$750,000 as financial assurance for decommissioning. However, NRC reviews of several transmittals from Fansteel since 1990 have identified deficiencies in the wording of the standby trust agreement. NRC sent Fansteel a letter on March 1, 1993, requesting revisions.

## **6. Status of Decommissioning Activities**

Fansteel's license was revised on February 1, 1990, based on the licensee's renewal application and subsequent communications with the NRC. Since Fansteel had stated that it would cease operations early in 1990, NRC did not renew Fansteel's license. It therefore remains under "timely renewal."

Fansteel submitted a remedial assessment work plan (RAWP) in June 1990, which proposed a plan for site characterization. Staffs from the NRC, Oklahoma Water Resources Board, and Oklahoma Department of Health reviewed the work plan. After several reviews, the plan was approved by NRC on December 21, 1992. Fansteel's license was amended to incorporate a license condition requiring Fansteel to complete site characterization activities and report on them by December 31, 1993. To cover the site characterization work under a license, NRC extended the expiration date of the existing license to July 31, 1994.

In October 1991 Fansteel submitted an Alkaline Ponds Closure Plan for engineering and geological investigations for its proposed closure of the alkaline ponds 6, 7, 8, and 9. The APCP is a plan to characterize these ponds. A Conceptual Decommissioning Plan (CDP) was also prepared and submitted by Fansteel in August 1990. Both of these documents have been superseded by the current RAWP, and are no longer being considered.

During 1992 Fansteel investigated the option of resource recovery and onsite processing of sludges. In February 1992 Fansteel met with NRC and stated that it was no longer considering a joint venture involving onsite processing.

Fansteel's current plan is to export its contaminated sludges to a company in Thailand that will perform metals recovery operations in that country. In March 1993 Fansteel applied to NRC for an export license. In a letter dated April 12, 1993, NRC requested that Fansteel provide certain documents to assist in the review of Fansteel's proposed export option. These items include a schedule for export for disposal of sludges.

## **7. Other Involved Parties**

Oklahoma Water Resources Board and Oklahoma Department of Health are other involved parties in site remediation activities. Congressional interest in decontamination activities at this site also is evident from calls received by NRC Congressional Affairs from Congressman Synar's Office.

## **8. NRC/Licensee Actions and Schedule**

- Fansteel submits revised financial assurance documents April 1993
- NRC completes review of export proposal June 1993
- Fansteel completes site characterization work of remaining contamination and submits report to NRC December 1993

## **9. Problems/Issues**

Delay in decommissioning because of licensee's vacillation over planned disposition of the pond residues (processing, decommissioning, or export).

## HARTLEY AND HARTLEY (KAWKAWLIN) LANDFILL

### 1. Site Identification

Hartley and Hartley (Kawkawlin)  
Landfill Bay County, MI

Docket No.: 040-01790  
License Status: No license  
Project Manager: J. Parrott

### 2. Site and Operations

The former Hartley and Hartley Landfill, now owned by Waste Management of North America, Inc. (WMNA) and the adjacent Michigan Department of Natural Resources (MDNR) property are located in the Tobico Marsh Game Area north of Kawkawlin, which is northeast of Bay City. In 1962 it was discovered that the area, owned by a waste handler, Hartley and Hartley, was being used as a landfill.

In 1972 Hartley and Hartley sold out to SCA Services, Inc. of Somerville, Massachusetts. Hartley and Hartley continued to operate the site for SCA. In 1978 the landfill was closed because an onsite industrial waste incinerator was in noncompliance with State of Michigan incinerator effluent (non-radiological) requirements.

In 1980 the State of Michigan conducted an aerial radiological survey of the landfill area because its agencies were concerned that material, formerly used at a facility in St. Louis, Michigan, may have been disposed at the landfill. The survey indicated an excess of Tl-208, a daughter of Th-232, over the former Hartley and Hartley Landfill.

In May 1983 the Michigan Division of Radiological Health informed NRC that radioactive material was found in the SCA Services, Inc. landfill now owned by WMNA. Contamination also was found on the MDNR property. The material was identified as Th-232 and its daughter products and is believed to have come from an NRC-licensed activity. The material also contained magnesium. Dow Chemical, USA, and Wellman-Dynamics Corporation were two local organizations known to have used similar material. The State of Michigan requested an NRC investigation to determine if an NRC licensee was involved in the disposal of the material.

In August 1983 NRC performed independent sampling of soil and rock (or slag) in areas of high surface radiation. Direct surveys of these samples in their containers showed radiation levels of up to 2.5 times background. When surface material was removed the radiation levels did not change appreciably, indicating that the contamination extended deeper into the soil. It was not known how deep the contamination extended. The soil samples were split with the State of Michigan.

NRC staff interviewed several individuals who might be knowledgeable on the disposal of the contaminated material found in the former Hartley and Hartley Landfill. Representatives of Dow Chemical and Wellman-Dynamics Corporation were contacted. NRC learned that thorium-magnesium slag from Wellman-Dynamics was transferred to Dow until about 1970; however, when Dow stopped accepting this waste, it appears that it was disposed at the Hartley and Hartley Landfill in violation of AEC requirements.

In 1984 encapsulation measures were taken at the Hartley and Hartley Landfill and the adjacent MDNR property to isolate the migration of toxic chemical wastes. These toxic chemicals had been detected in surface waters at the site. Encapsulation measures included the installation of bentonite slurry walls, clay capping, and monitoring wells. The State of Michigan requested input from the NRC on whether the encapsulation measures being taken for the toxic chemicals also would provide protection for the radioactive hazard. The NRC staff agreed to have ORISE perform a survey that would be the basis for a hazard evaluation. The ORISE survey was undertaken in July 1984 before encapsulation began. Thoriated material was found in the Hartley and Hartley Landfill and on the MDNR property in a layer about 0 to 0.3 meters (0 to 1 foot) thick lying about 0.3 meters (1 foot) below the surface. An additional contaminated area was located on adjacent property still owned by Hartley. This contamination appeared to be confined to the surface and significantly less extensive in area than the contamination in the former Hartley and Hartley Landfill and the MDNR property.

NRC and State of Michigan staff concluded, on the basis of the ORISE survey, that the contamination levels exceeded Option 4 in the 1981 BTP on uranium and thorium wastes. They also concluded that the toxic

chemical and radioactive waste mixture would make the wastes unacceptable at a chemical or radioactive waste disposal site and agreed to implement a monitoring program and to place a restriction on the deed to prohibit intrusion activities. These measures would likely make the encapsulation measures acceptable for the thorium-magnesium slag. It appeared to be a suitable solution considering the lack of permitted or licensed disposal sites that would accept the wastes.

Monitoring wells were installed and a program implemented to require semiannual monitoring through 1990 and yearly thereafter through 2005, at which time, the site owner may demonstrate that additional monitoring is unnecessary. The samples were monitored for radioactivity as well as for toxic chemicals.

In an inspection in October 1984, a sample from a surface water source at the landfill was taken and analyzed. The sample showed a gross alpha activity level of 0.1 Bq (3 pCi)/l compared with the EPA limit of 0.56 Bq (15 pCi)/l for drinking water. Ground water samples taken since 1985 have continued to show very low activity levels.

No detailed hydrology data is available in the Hartley and Hartley Landfill file. However, the area is marshy and ground water sampling is required under the agreement between WMNA, the State of Michigan, and the NRC. There are residential wells in the area, but over the last 10 years fewer are being used as public drinking water systems become available. Sampling data obtained to date show thorium concentrations to be less than EPA gross alpha drinking water limits.

### 3. Radioactive Wastes

The contaminated material at the WMNA property and the adjacent MDNR property is an insoluble thorium-magnesium slag. A rough volume estimate for the MDNR property is 4250 m<sup>3</sup> (150,000 ft<sup>3</sup>) and 76 m<sup>3</sup> (2700 ft<sup>3</sup>) for the surface contamination on the WMNA property. The subsurface contamination at the WMNA property has not been well characterized. WMNA is currently undertaking a characterization of the subsurface contamination.

Direct radiation measurements taken by the State of Michigan and the EPA in 1983 at some locations on the WMNA and MDNR properties showed up to 2E-8 C/kg (80 μR)/hr at waist level, compared to background levels of 7.8 to 13E-10 C/kg (3 to 5 μR)/hr. Soil samples showed 1.3 to 24.8 Bq (36 to 670 pCi)/g (dry) of Th-232 with its daughter products, and 6 to 20 percent magnesium. Exposure rate measurements also were taken by NRC in 1983. The highest surface reading was 2.1E-7 μC/kg (800 μR)/hr with a background of 1.3E-9 to 1.6E-9 C/kg (5 to 6 μR)/hr. A grayish material usually covered the area where radiation levels ranged from 2.58E-8 to 1.55E-9 C/kg (100 to 600 μR)/hr. Sampling of soil and rock (or slag) showed Th-232 activity levels of 1.9 to 6.11 Bq (52 to 165 pCi)/g, Th-230 activity levels of 2.6 to 13.2 Bq (71 to 356 pCi)/g, and Th-28 activity levels of 1.4 to 4.44 Bq (39 to 120 pCi)/g. The presence of potassium-40, cesium-137, thallium-208, lead-212, lead-214, bismuth-212, bismuth-214, actinium-228, and protactinium-234 also was noted by gamma spectroscopy. One small area on the MDNR property had an activity level of 20.8 Bq (561 pCi)/g Th-232 and 19.5 Bq (527 pCi)/g Th-28.

### 4. Description of Radiological Hazard

The principal hazards associated with the contamination at the WMNA and MDNR properties involve direct exposure, inhalation, ingestion, and intrusion. No immediate threat to public health and safety exists. The direct exposure, inhalation, and ingestion hazards are low because of the containment measures taken at both the WMNA and MDNR properties. These containment measures include installation a clay cap and sides around the areas. However, containment measures have not been taken for the small contaminated area on the Hartley property.

The former Hartley and Hartley Landfill is fenced and under the control of WMNA. Deed restrictions have been added to the property. The MDNR property is owned by the State of Michigan and is encapsulated. Therefore, intrusion hazards will be low. Because the contaminated thorium material is in an insoluble form, groundwater hazards will be low. This is confirmed by the ground water and surface water monitoring program. Sampling data indicate that thorium levels continue to be well below the EPA gross alpha drinking water standards.

### 5. Financial Assurance/Viable Responsible Organization

There is no license for possession of radioactive material on any of these sites. Therefore, the financial assurance requirements in the 1988 decommissioning rule do not apply.

The former Hartley and Hartley Landfill is currently owned by WMNA, a very large corporation in the waste management business. The MDNR property is owned by the State of Michigan.

## 6. Status of Decommissioning Activities

On June 25, 1985, NRC staff met with Michigan Department of Public Health staff and reached an understanding to undertake an independent water monitoring program at the MDNR and WMNA sites.

No specific decontamination of the radioactive waste at these sites has been proposed. Once responsibility for the thorium wastes is determined by NRC, it will be incumbent on the responsible party(ies) to propose a decontamination plan for these wastes.

### MDNR Site

The encapsulation cell at this site has been slowly filling up with water. Because of this, MDNR has proposed to install a drainage system to remove and treat this water. The water has been found to be contaminated with hazardous waste. No radiological contamination has been detected in this water to date. In order for MDNR to construct this drainage system, the cover of the encapsulation cell will have to be breached. In addition, the thorium wastes contained in the cell will likely be disturbed. Since the disturbance of the thorium wastes and the processing of water are potential radiological health and safety concerns, the NRC is requiring MDNR to obtain a license.

### WMNA Site

This site has the same problem with their encapsulation cell as at the MDNR site. In addition, a portion of this site has thorium wastes disposed above ground. This site and subsurface contamination have not been well characterized. Therefore, WMNA is undertaking a site characterization process. However, WMNA will also be applying for a license to do leachate remediation similar to what MDNR will be doing.

## 7. Other Involved Parties

MDNR is involved at this site by virtue of the fact that part of the contamination is on property owned by them. MDH remains involved as an observer. The EPA has been involved in the past.

## 8. NRC/Licensee Actions and Schedule

### MDNR Site

- NRC issues license July 1993
- MDNR submits decommissioning plan July 1994

### WMNA Site

- WMNA applies for NRC license April 1993
- NRC issues license September 1993
- WMNA submits decommissioning plan September 1994

## 9. Problems/Issues

Thorium wastes are mixed with hazardous wastes.

## HERITAGE MINERALS

### 1. Site Identification

Heritage Minerals  
Lakehurst, NJ

License No.: SM-1541  
Docket No.: 040-08980  
License Status: Active—possession only/decommissioning  
Project Manager: E. Ullrich, Region I  
LLWM Monitor: H. Astwood

### 2. Site and Operations

The Heritage Minerals (Heritage) site consists of about 2800 hectares (7000 acres) near Lakehurst, New Jersey, of which between 400 and 485 hectares (1000 and 1200 acres) have been involved in the mining and processing of local ores. The processing plant, including the tailings piles, occupies about 200 hectares (500 acres). Heritage began operation at the site in 1987 and ceased processing operations in August 1990.

The Heritage site is located on the Atlantic Coastal Plain. The formations under the site are sandy and permeable to at least 450 meters (1500 feet), where some clay is encountered. Bedrock is not encountered until at least 950 meters (3000 feet). The uppermost aquifer at the site is the Cohansey. Depth below grade to the seasonal high water of this aquifer is about 1.8 meter (6 feet). From 1971 until 1982, ASARCO, the original owner, dredged sands containing titanium and other economically recoverable minerals, as well as small concentrations of uranium and thorium from about 15 to 21 meters (50 to 70 feet) below the site.

Beginning in 1987, Heritage processed the stockpiled mineral sands which were left behind as tailings from the previous mining operation by ASARCO. The sands were processed by physical methods to separate the economically valuable minerals, zircon and leucoxene (titanium oxide). The stockpiled sand (also referred to as "new feed"), which was the raw material for Heritage's plant, is a mixture of silica sand (about 70 percent), aluminum silicate minerals (15 percent), zircon, and leucoxene, and a trace amount of monazite sand and uranium (0.5 percent). Monazite is a complex phosphate of rare earth elements containing about 3.5-percent thorium chemically bound with the rare earth phosphates.

The Heritage plant processed the new feed to extract the zircon and leucoxene for commercial sale using gravimetric, electrostatic, and magnetic separation methods. Until 1989 the waste streams from each of the separation processes were recombined and pumped from the processing plant onto previously mined areas known as the tailings pile. The monazite sand is concentrated in one of the waste streams. The recombined tailings do not meet the legal definition of source material, although the waste stream containing the monazite sand does.

In 1989 NRC informed Heritage that because this waste stream met the definition of source material, it was in possession of source material in excess of quantities required to be licensed under 10 CFR Part 40 and directed Heritage to apply for an NRC license. Subsequently, Heritage submitted a license application to NRC (see below).

The current owner of the site (the parent company of Heritage) intends to build a housing development on the site following the end of Heritage operations and is awaiting various state and local permits. Development of the present plant location would take place last; the entire project is expected to last 20 years.

Heritage estimates that 530 m<sup>3</sup> (695 yd<sup>3</sup>) of monazite-rich sand remain on site. Heritage planned to sell the monazite-rich sand, but has been unable to do so.

### 3. Radioactive Wastes

The monazite, initially in the new feed, became concentrated during processing. Before 1989 all waste streams were recombined, including that containing the monazite, and sent to the tailings pile, producing a waste that averages 0.8 Bq (22 pCi) of natural thorium per gram of material.

At the time of an NRC inspection in January 1989, analysis of the recombined tailings indicated approximately 56 metric tons (60 tons) each of uranium and thorium in the tailings piles. The analysis also showed that the table concentrate (material containing valuable minerals and monazite resulting from wet gravimetric separation) had a source material concentration as high as 0.074 percent by weight and the subsequent monazite-rich waste (nonconducting and nonmagnetic tailings produced after further processing of the table concentrate) had a source material concentration as high as 0.585 percent by weight. On the basis on the result of the available analyses, primarily the thorium is concentrated in the monazite-rich product. In March 1989 Heritage submitted a license application. The license was issued in January 1991, covering only the processing plant and source material produced during processing and stored in the monazite pile. The NRC license does not include the tailings piles since this material was not produced under an NRC license and does not meet the definition of source material.

During the NRC inspection, background exposure rates were observed to be about 2 nC/kg (7  $\mu$ R)/hr in the vicinity of the site. Exposure rates at the dry mill building were about 13 nC/kg (50  $\mu$ R)/hr; in the area of the dry mill feed about 77 nC/kg (300  $\mu$ R)/hr; in the area of the dry mill tailings discharge about 62 nC/kg (240  $\mu$ R)/hr; and over the tailings pile about 8 nC/kg (30  $\mu$ R)/hr.

Following their application for a license in 1989 until operations ended in 1990, Heritage stopped re-combining the monazite-rich waste stream, which was then transferred to a separate "monazite pile." This pile is not pure monazite sand; Heritage speaks of it being a "monazite-rich product." Subsequent inspections measured exposure rates of up to 516 nC/kg (2000  $\mu$ R)/hr on contact with this pile. The thorium concentration in this material is about 150 Bq (4000 pCi)/g.

The licensee planned to sell the monazite-rich product and transfer it to other licensees. However, the licensee was unable to sell the monazite-rich sand, and closed operations before completing processing of the tailings piles.

#### **4. Description of Radiological Hazard**

There is no immediate threat to public health and safety. Heritage states that it has decontaminated the buildings and equipment to meet the criteria included in its license. The monazite sand was not chemically altered by the licensee's process and appears to be stable in the environment and not to readily become airborne.

Four ground water samples analyzed by the licensee showed no increase in radioactive contamination in this media.

Since Heritage has been unable to sell the monazite rich product, it submitted a proposal to the NRC in November 1991 for onsite disposal of the monazite pile. It has requested NRC approval to mix the 530 m<sup>3</sup> (695 yd<sup>3</sup>) of monazite-rich sand into the 78,400 m<sup>3</sup> (102,500 yd<sup>3</sup>) of sand tailings from which it was originally separated. Heritage stated it would consider deed restricting this portion of the property for use as a golf course, with appropriate cover material.

Heritage continues to seek a purchaser for the monazite pile and has identified a potential overseas customer. Heritage has obtained an export license and hopes to export the material.

#### **5. Financial Assurance/Viable Responsible Organization**

The licensee has submitted a decommissioning funding plan as part of its application for a license. The cost estimate is small and depends on the licensee being able to sell all source material generated during operations. However, Heritage has indicated that it will ensure that its decommissioning of the site is in full compliance with NRC regulations.

#### **6. Status of Decommissioning Activities**

On March 22, 1989, Heritage submitted a license application for source material that was previously unlicensed in order to correct the violation identified during an NRC inspection. However, in August 1990, Heritage announced that due to changing market conditions, the facility had been closed and that decommissioning would begin immediately. While Heritage committed to clean the plant site and the monazite storage area to meet NRC criteria, it asserted that NRC lacks jurisdiction over other areas. NRC Region I, after consultation

with NMSS and OGC, agreed with the licensee's position when NRC issued License SMB-1541 on December 13, 1990.

The licensee has cleaned the insides of the wet and dry mills, including the removal and decontamination of all pumps. Exposure rate surveys were performed using a micro-R meter and indicated that cleaning had been successful in most areas. However, exposure rates in the dry mill were measurably higher in the area near the monazite pile. Ten wipe samples were taken in areas with highest exposure rates and counted by their consultant. Results were less than 0.02 Bq (1 dpm) alpha and less than 0.5 Bq (30 dpm) beta. This decommissioning effort involved the labor of six persons for one month, and three persons for three additional months. Two employees remain on site.

The licensee has proposed to dispose of monazite sand by dilution. That request is under review. The State of New Jersey objects to NRC's decision that NRC jurisdiction does not extend to certain areas of the site that contain concentrations of thorium exceeding Option 1 of the 1981 BTP, but are less than the definition of source material and were not generated by NRC licensed activities. The NRC position has been reviewed and approved by senior managers and staff has no plans to change the determination on this matter.

## 7. Other Involved Parties

The State of New Jersey feels that NRC jurisdiction is too limited and does not cover enough of the site. It objects to the NRC position that some areas of the site that exceed NRC current criteria for release for unrestricted use are not subject to NRC regulation. Local government and citizens are very interested in the progress of decommissioning.

## 8. NRC/License Actions and Schedule

- NRC provides decision in response to the licensee's request to dispose by dilution July 1993
- NRC performs confirmatory survey of remediated area June 1994
- NRC terminates license December 1994

## 9. Problems/Issues

The State of New Jersey objects to the NRC regulatory position. The State of New Jersey has proposed waste storage, generation, and disposal regulations, which may complicate the resolution of these issues. NRC is reviewing the regulations.

# Kerr-McGEE, CIMARRON PLANT

## 1. Site Identification

Kerr-McGee Cimarron Plant (Cimarron Corporation)  
Crescent, OK

License Nos.: SNM-928 (uranium), SNM-1174 (mixed-oxide)  
Docket Nos: 070-00925 (uranium), 070-01193 (mixed-oxide)  
License Status: Active—possession only/decommissioning  
Project Manager: G. Comfort, FCSS  
LLWM Monitor: W. Lahs

## 2. Site and Operations

The 445-hectare (1100-acre) site is located in a rural part of central Oklahoma, 48 km (30 miles) north of Oklahoma City, in a predominantly farming area. There are two non-operating fuel fabrication plants on the site; one was used for mixed-oxide fuels and one for enriched uranium fuels. Fuel fabrication operations at both plants were terminated in 1975. In addition to the fuel fabrication plants, there were eight waste-water treatment settling ponds, of which three are currently open, and burial areas (for burials previously allowed under 20.304), which were licensed as part of the uranium plant. Five of the eight waste water treatment ponds were closed in 1977 and 1978.

As a result of operations, both fuel fabrication buildings were contaminated with uranium and plutonium. The settling ponds are contaminated with uranium while the burial areas (two additional areas recently discovered) contain uranium and trace amounts of thorium from waste disposal associated with offsite activities.

## 3. Radioactive Wastes

Low-solubility enriched uranium (ranging 2 to 9.1 percent U-235) contamination exists in the soil around the uranium plant and in the building itself, as well as in soil around the settling ponds and the burial grounds. The total volume of contaminated soil is greater than 14,000 m<sup>3</sup> (500,000 ft<sup>3</sup>), mostly with uranium concentrations between 1.1 Bq (30 pCi)/g and 3.7 Bq (100 pCi)/g of about 3 percent average enrichment. Uranium contamination also has been found in the ground water below the exhumed 20.304 burial area, along with chemical contamination. There is also a small amount of thorium contamination in the soil around this burial area.

The mixed-oxide plant has been remediated to below current standards. There is no significant plutonium contamination inside or outside the building. The mixed-oxide license has been terminated and that part of the site has been removed from the SDMP.

## 4. Description of Radiological Hazard

This access-controlled site poses no immediate threat to the public health and safety. Uranium and thorium contamination, in low concentrations, currently exists only in onsite soils.

The plutonium facility has been remediated. ORISE conducted confirmatory surveys in August 1988 and October 1989. These surveys showed that the criteria in "Policy and Guidance Directive FC 83-23: Termination of Byproduct, Source and Special Nuclear Material Licenses," dated November 4, 1983, have been met.

## 5. Financial Assurance/Viable Responsible Organization

The site is owned by Kerr-McGee's Cimarron Corporation and all licensed activities were conducted by Kerr-McGee. Kerr-McGee has provided a parent-company guarantee for \$750,000 applicable to the uranium license.

## 6. Status of Decommissioning Activities

Kerr-McGee submitted decommissioning plans for the mixed-oxide plant that were approved by the NRC. Kerr-McGee discussed plans for the uranium plant decommissioning with NRC. These plans have been partly approved. Kerr-McGee is performing remediation operations in accordance with its license. The NRC staff

requested additional information on the extent of uranium contamination in onsite soil. In August 1989, NRC approved a Kerr-McGee proposed method for measuring total uranium in soil.

Kerr-McGee has completed remediation of the mixed-oxide plant. The remediation of the uranium plant is currently in progress. Kerr-McGee has exhumed and shipped contents of the initially identified burial area and continues to remediate the building. It has surveyed for uranium contamination in the soil around the building and submitted a request for authorization (pursuant to 10 CFR 20.302) to dispose of 11,000 m<sup>3</sup> (400,000 ft<sup>3</sup>) of uranium-contaminated soil on the site under Option 2 of the 1981 BTP. During the week of October 13, 1991, Kerr-McGee notified NRC that two additional 20.304 burial pits were discovered about 50 meters (165 feet) east of the mixed-oxide plant boundary fence. Kerr-McGee is presently recharacterizing the site, including these burial areas.

On December 9, 1991, ORISE conducted a confirmatory survey of the exhumed 20.304 burial area and the older sanitary sewage lagoons with their associated berms and a loading dock. The survey confirmed that these areas had been adequately decontaminated.

NRC staff has prepared an environmental assessment (EA) in support of the termination of the mixed-oxide plant license and published a finding of no significant impact on February 12, 1993. The mixed-oxide license was terminated in February 1993.

NRC staff prepared an EA to evaluate a proposed disposal of uranium-contaminated soil on the Uranium plant site. Subject to conditions regarding the concentrations and solubility of the uranium, the staff has recommended that the disposal be approved as a step toward decommissioning the entire uranium plant site. NRC staff prepared SECY 91-398, December 9, 1991, on the mixed-oxide plant license termination and the proposed onsite disposal of uranium, as requested in the Staff Requirements Memorandum of January 31, 1990. On October 30, 1992, the Commission approved, with minor comments, the proposed actions outlined in the Commission paper.

## **7. Other Involved Parties**

This site is one of eight specifically addressed in the May 1989 General Accounting Office report "NRC's Decommissioning Procedures Criteria Need To Be Strengthened." The Oklahoma State Department of Health has been involved with regard to the chemical contamination at the site.

## **8. NRC/Licensee Actions and Schedule**

- NRC approves onsite disposal request May 1993
- uranium plant license termination Mid-1994  
(at the earliest)

# KERR-McGEE, CUSHING PLANT

## 1. Site Identification

Kerr-McGee Cushing Plant  
Cushing, OK

License No.: SNM-1999  
License Status: Active  
Docket No.: 070-03073  
Project Manager: D. Fauver

## 2. Site and Operations

The site is located halfway between Oklahoma City and Tulsa. Under Atomic Energy Commission (AEC) licenses SNM-695 and SMB-664, Kerr-McGee chemically processed enriched, normal, and depleted uranium and natural thorium at this site from 1962 through 1966. During this period, Kerr-McGee owned approximately 162 hectares (400 acres) of property to conduct AEC-licensed activities and operate an oil refinery. Materials were received in the form of UF<sub>6</sub>, mill concentrates, unirradiated scrap fuel elements, and various chemical compounds. The licensee converted uranium to other compounds suitable for use in the nuclear fuel cycle and produced metal alloys of uranium and thorium.

In 1966, the site was decommissioned in accordance with practices at the time and the license was terminated. Between 1972 and 1982, Kerr-McGee further decontaminated the site by shipping the more highly radioactive materials off site and burying some of the contaminated soil and trash in an existing refinery waste sludge pit (pit number 4) or in trenches located in the northeast corner of the tank farm area. Some soil contamination has been detected at levels higher than the Option 1 criteria of the 1981 BTP on uranium and thorium wastes around and in the former process buildings.

## 3. Radioactive Wastes

The Cushing site contains approximately 500 kg (1100 pounds) of uranium and 2000 kg (4400 pounds) of thorium, in about 18,000 m<sup>3</sup> (500,000 ft<sup>3</sup>) of contaminated soil, sediment, buried trash, and building rubble. The former process building also is contaminated.

There are areas of contamination containing thorium and uranium exceeding 1.3 Bq (35 pCi)/g in and around the former processing building. Kerr-McGee has found more uranium contamination under the building than anticipated, which may require removal of the building to gain access to contaminated soils. The soils and sediments in Skull Creek, which was a discharge point for processing effluent, contain concentrations up to 10 Bq (279 pCi)/g thorium and 36 Bq (968 pCi)/g uranium.

The northern area of the tank farm contains discrete and general areas of uranium and thorium contamination. Pit 4 contains hazardous waste and radionuclides with concentrations up to 1.3 Bq (34 pCi)/g of thorium and 0.6 Bq (18 pCi)/g of uranium. The hazardous waste in Pit 4 is an oily-acid sludge, which will be neutralized and made nonhazardous. A few tank berms contain radioactive waste, and closed trenches, located in the northeast area of the tank farm area, were used for contaminated soil burial during previous decommissioning activities. The berms and trenches contain up to 1.1 Bq (31 pCi)/g thorium and 0.8 Bq (21 pCi)/g uranium. The northern area also contains a berm previously used as a disposal area for laboratory trash and soil contaminated with up to 1.2 Bq (33 pCi)/g thorium and 4.0 Bq (107 pCi)/g uranium.

A small area south of the process buildings contains soil contaminated with Ra-226. The Ra-226 resulted from a small pipe scaling operation associated with the oil refinery and is not subject to NRC license.

## 4. Description of Radiological Hazard

This site poses no immediate threat to the public health and safety. The concentration of uranium and thorium in soils is low and the material does not become airborne readily. Kerr-McGee controls access to the site.

## 5. Financial Assurance/Viable Responsible Organization

Kerr-McGee owns the tank farm area and the former processing building and has pursued acquisition of other land and buildings that were owned by Kerr-McGee at the time of AEC-licensed operations. Kerr-McGee

appears willing and able to remediate radiologically contaminated site areas. An acceptable decommissioning funding was submitted as part of the license application to possess the contamination at the site.

## 6. Status of Decommissioning Activities

Decommissioning work completed to date has been in response to the consent order with the State of Oklahoma. NRC has been apprised of significant activities conducted under the consent order. A site characterization report summarizing the radiological conditions of the Cushing site was submitted on May 4, 1991. Additional characterization may be required.

The remediation of the contaminated soil continues around the process building, sediment and soil in Skull Creek, and surface contamination in the process building. The majority of contaminated soil excavated from these areas has been sorted by contamination level and retained on site pending a decision as to the disposal method. Soil with higher contamination levels has been shipped to Barnwell for disposal, along with contaminated material resulting from shotblasting the surfaces of the process building.

In a letter dated May 20, 1991, NRC informed Kerr-McGee that the remediation activities at the Cushing site must be in accordance with NRC requirements under an NRC license. In a followup meeting, held on June 7, 1991, Kerr-McGee agreed to apply, by September 15, 1991, for an NRC license to possess the radioactive contamination at the Cushing site. NRC provided Kerr-McGee with guidance on the preparation of the application on July 30, 1991. On October 17, 1991, the license application was submitted to NRC. On June 16 and July 10, 1992, NRC requested additional information on the license application. Because the additional information requested was substantial, Kerr-McGee chose to revise the application in its entirety. On September 25, 1992, the revised application was submitted to NRC.

NRC staff identified deficiencies in the licensee's decommissioning funding plan and financial assurance instrument proposed in the original and revised license application. After considerable correspondence between NRC and Kerr-McGee, an acceptable decommissioning funding plan and financial assurance mechanism was received by NRC on February 23, 1993. On April 6, 1993, a possession-only license for the special nuclear material at the Cushing site was issued to Kerr-McGee.

## 7. Other Involved Parties

A consent order was entered into by the Oklahoma State Department of Health and Kerr-McGee Corporation on May 4, 1990. The consent order required (1) the characterization of the entire site, and if necessary, controls to prevent the removal or inadvertent spread of contamination to adjacent properties; (2) evaluation and excavation of the contaminated soil around the process buildings, if necessary, to meet the 1981 BTP Option 1 limits; (3) decontamination of the process building surfaces to meet current NRC release criteria; and (4) submission of a feasibility study on remedial alternatives for the contamination in the northern portion of the site by May 1992.

Congressman Mike Synar is interested in the progress of decommissioning at the Cushing site.

## 8. NRC/Licensee Actions and Schedule

- Kerr-McGee submits a license amendment request proposing the boundaries of areas on Cushing site that will be addressed as contaminated during remediation June 1993
- NRC reviews proposed boundaries of contaminated areas and requests additional information (RAI) June 1993
- NRC approves designated boundaries of contaminated areas and issues amendment 30 days after Kerr-McGee response to RAI
- Kerr-McGee submits license amendment request proposing methods for controlling erosion from temporary on-site storage areas June 1993
- NRC reviews proposed erosion control methods and requests additional information July 1993

- NRC approves methods for controlling erosion and issues amendment 30 days after Kerr-McGee response to RAI
- Kerr-McGee submits license amendment request proposing decommissioning plan February 1994
- NRC reviews decommissioning plan and requests additional information April 1994
- NRC approves decommissioning plan and issues amendment 60 days after Kerr-McGee response to RAI

**9. Problems/Issues**

None.

## **LAKE CITY ARMY AMMUNITION PLANT (Formerly Remington Arms Company)**

### **1. Site Identification**

Department of the Army  
Lake City Army Ammunition Plant (LCAAP)  
Independence, MO

License No.: SUB-1195 (issued to Remington Arms Company, Inc.)  
Docket No.: 040-08303  
License No.: SUC-1380 (issued to Department of the Army)  
Docket No.: 040-08767  
License Status: SUB-1195—Retired as of 1986  
SUC-1380—Active, due for renewal in 1993  
Project Manager: K. Lambert, Region III  
LLWM Monitor: D. Orlando

### **2. Site and Operations**

Contamination at the Lake City Army Ammunition Plant (LCAAP) site arose from the assembly, testing, and demilitarization of cartridges containing depleted uranium (DU). DU was used at the LCAAP from the early 1960's through the mid-1980's.

The LCAAP continues to operate and has a current NRC license. Present operations do not include work with DU and should not increase the volume of the radiologically contaminated material already on site. The firing range containing the contaminated soil and sand is still used for the testing of non-radioactive munitions. The LCAAP is not expected to close in the near future.

The LCAAP is located in the western portion of Missouri, approximately 32 km (20 miles) east of Kansas City. The nearest town, Buckner (pop. about 3000), is located 5 km (3 miles) to the east of the LCAAP. The LCAAP is in an agricultural region. The major crops produced in this area are corn and soybeans, and there is considerable cattle and pig farming.

The LCAAP consists of approximately 1600 hectares (3909 acres). There are 30 major buildings on the facility and the facility is provided with 24-hour security. Currently, about 1000 individuals work at the LCAAP. Military personnel and their families (about 30 individuals) live on the facility property. The LCAAP is a Government-owned, contractor-operated facility. The Remington Arms Company operated the facility until November 1985 and held NRC License SUB-1195. The current contractor is the OLIN Corporation. This company holds NRC License 24-24576-01 for the possession and use of Cs-137 and Am-241 in fixed measuring gauges.

The LCAAP site consists of two production buildings and a firing range. The production buildings, 3A and 12A, were remediated as of April 1987. The firing range is located at the southeast portion of the LCAAP and is approximately 2500 meters by 300 meters (8200 feet by 1000 feet) in area. Three areas on the range, the 600-meter (2000-foot) bunker, the 2400-meter (7900-foot) impact area, and the sand storage pile are infiltrated with fragmented DU penetrators, lead, and unexploded munitions. These three areas together contain approximately 3500 kg (7700 pounds) or 57,000 MBq (1530 mCi) of DU. The 600-meter bunker (bullet catcher) was used to demilitarize approximately 44,000 cartridges, each containing 206 grams of DU. The sand storage pile is made up of sand from the 600-meter bunker and other bunkers on the firing range. The firing range is completely fenced and secured from unauthorized entry at all times. Contaminated areas on the range are posted and health physics personnel inspect the enclosure annually.

### **3. Radioactive Wastes**

Radioactive waste from the LCAAP site consists of contaminated soil from the firing range and sand from the sand storage pile. These materials are contaminated with DU, lead, and unexploded munitions. The volume of contaminated soil from the range is estimated to be 11,469 m<sup>3</sup> (15,000 yd<sup>3</sup>). The volume of contaminated sand is estimated to be 85,635 m<sup>3</sup> (112,000 yd<sup>3</sup>). The volume of contaminated sand is large because of the past practice of combining sand from all range bunkers at one storage location. This practice contributed to the presence of

lead and unexploded munitions in the sand. Because of the presence of lead and explosive material, the sand may be considered "mixed waste." The DU contaminated waste resulting from the remediation of Buildings 3A and 12A was containerized and disposed of in a licensed low-level disposal facility by Chem-Nuclear, the contractor responsible for remediating the buildings.

#### **4. Description of Radiological Hazard**

The principle hazards associated with this site are direct exposure, inhalation, ingestion, intrusion, and ground water contamination. On the basis of the conditions at the site, NRC staff believes that the DU contamination does not pose an immediate threat to the public health and safety. Direct exposure and intrusion is minimized because the site is fenced and is protected by 24-hour security. Inhalation, ingestion, and ground water contamination is minimized by the physical form of the DU. Most of the DU is in an insoluble solid form, that is not expected to readily migrate either through the atmosphere or through surface or ground water. The licensee has designated seven onsite locations where water samples are taken annually. An initial water sampling program in August and October 1988, did not reveal significant DU in any areas sampled. DU has not been detected in any subsequent water samples.

#### **5. Financial Assurance/Viable Responsible Organization**

In July 1990 the Department of the Army submitted a certification of financial assurance for decommissioning in the amount of \$750,000. A decommissioning funding plan will be submitted during the next license renewal in 1993.

#### **6. Status of Decommissioning Activities**

Currently, decommissioning activities are halted until a decommissioning plan has been submitted to and approved by NRC. The Department of the Army has allocated funds for characterizing the LCAAP site in FY 1993. Remediation could begin in FY 1994 if the Army allocates funds for decommissioning.

#### **7. Other Involved Parties**

Because of the presence of non-radiological hazardous materials (lead) in the soil and sand, the Environmental Protection Agency (EPA), and the Missouri Department of Natural Resources (MDNR) will be involved in the remediation of the site. The LCAAP is listed on EPA's National Priorities List (NPL). However, this listing was not for radioactive materials. NRC will coordinate remediation of this site with EPA and MDNR.

#### **8. NRC/Licensee Actions and Schedule**

- |   |                |
|---|----------------|
| ● licensee submits characterization/remediation plan and decommissioning schedule | April 1993     |
| ● NRC approves characterization plan  | June 1993      |
| ● licensee begins site characterization   | July 1993      |
| ● licensee submits site characterization report                                   | September 1993 |

#### **9. Problems/Issues**

Because of the presence of non-radiological hazardous materials in the soil and sand the waste generated from the remediation of this material may be classified as mixed waste.

# MAGNESIUM ELEKTRON

## 1. Site Identification

Magnesium Elektron, Inc.  
Flemington, NJ

License No.: (New application)  
Docket No.: 040-08984  
License Status: Pending  
Project Manager: Charles Gaskin, FCCS  
LLWM Monitor: H. Spiro

## 2. Site and Operations

Processing of purchased zircon flour to produce zirconium chemicals began at the site in 1952. Magnesium Elektron, Inc. (MEI), purchased the site in 1973. The facility is located in the rural area of Flemington in the west central portion of New Jersey. About 12 hectares (30 acres) of the 46-hectare (113-acre) site are used in the operation.

MEI separates the byproducts and impurities from the ore of zirconium and manufactures zirconium chemicals for other industries that further process it into finished products. The feed ore contains less than 0.05 percent by weight of uranium and thorium. However, the sludge generated could become licensable source material (greater than 0.05 weight percent uranium and thorium) because of the concentration resulting from precipitation and separation of the impurities. The sludge, containing the hydrates of uranium and thorium generated from this process, is stored in onsite ponds. MEI possesses about 45,000 m<sup>3</sup> (1,600,000 ft<sup>3</sup>) of sludge. There is no known use for this sludge.

After an inspection in January 1989, the NRC informed MEI that it was in possession of source material in excess of quantities required to be licensed under 10 CFR 40.3 (i.e., 0.05 weight percent). The NRC directed MEI to apply for a license. On August 7, 1989, MEI submitted a license application, which NRC reviewed. MEI has responded to NRC comments. The NRC is in the process of determining the adequacy of MEI's response.

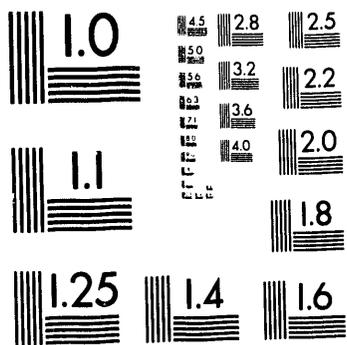
By letter dated August 11, 1992, MEI requested NRC to postpone any further licensing review until a clear need for an NRC license is determined by a detailed sludge characterization study. On September 14, 1992, MEI submitted a plan to characterize about 20,000 m<sup>3</sup> (700,000 ft<sup>3</sup>) of sludge contained primarily in four ponds. MEI believes that it does not possess licensable quantities of source material.

The site contains various buildings and effluent/sludge control ponds. Past use of unlined ponds on the site has resulted in a localized (mainly onsite) contaminated ground water plume containing 75 percent NaCl and 25 percent Na<sub>2</sub>SO<sub>4</sub>. MEI has closed or lined all onsite ponds as required by New Jersey Department of Environmental Protection. Ground water has not been analyzed for its radioactive content. The site rests on two different types of shale that has folded and fractured, allowing for penetration by water.

## 3. Radioactive Wastes

The contaminated sludge is a wet solid that contains, among other constituents, low concentrations of uranium and thorium. Approximately 2450 metric tons (2700 tons) of wet sludge are generated annually. The sludge is deposited in two cement settling basins and is periodically pumped to a containment pond for onsite storage. MEI states that sludge remains wet from the time of its generation to storage and that it is not expected to go dry at any point in the future while in MEI's possession.

At the NRC inspection in January 1989, one sample taken from the sludge bed indicated a source material concentration of 0.37 percent by weight on a dry basis. In addition to the sludge, one sample taken from the incoming zircon flour indicated a source material concentration of 0.05 percent (dry). Additional NRC's isotopic analyses done in 1989 on six core samples and eight surface samples of sludge contained in Pond 2 (unlined), which was subsequently closed, indicated average source material concentrations of 0.128 and 0.094 percent (dry), respectively. Sludge from Pond 2 was pumped into synthetically lined Ponds 6 Upper and 6 Lower.



**2 of 2**

## MINNESOTA MINING AND MANUFACTURING CO. (3M)

### 1. Site Identification

3M Kerrick Site  
Pine County, MN

License Nos.: SNM-764, SMB-239  
Docket Nos.: 070-00832, 040-01020  
License Status: Expired October 31, 1967  
Project Manager: A. Huffert

### 2. Site and Operations

This site, located about 8 km (5 miles) east of the city of Kerrick in Pine County, Minnesota, is owned by the Minnesota Mining and Manufacturing Company (3M) and was used for disposal of wastes contaminated with enriched uranium, natural uranium, and natural thorium. This site consists of approximately 2,100,000 m<sup>2</sup> (520 acres). The material originated from 3M's Twin Cities Army Ammunition Plant facility in Ardin Hills, Minnesota, which produced enriched uranium carbide fuel and utilized natural uranium and natural thorium for research activities. 3M made four burials at this site between December 7, 1966, and November 27, 1968.

### 3. Radioactive Wastes

Under the provisions of 10 CFR 20.304, 3M disposed of approximately 444 MBq (12 mCi) of 93 percent enriched uranium, 111 MBq (3 mCi) of natural uranium, and 56 MBq (1.5 mCi) of natural thorium. The four burials are reported to comprise over 566 m<sup>3</sup> (20,000 ft<sup>3</sup>) of steel drums, wooden crates, and unpackaged piping, ductwork, and other bulky contaminated material.

The chemical composition of all radioactive waste is not known, but according to 3M representatives, the majority of the uranium waste is in the form of uranium carbide.

### 4. Description of Radiological Hazard

Site access is controlled by fence. The nearest resident is located about 2.5 km (1.5 miles) from the site. There is no known offsite contamination from this burial site.

Enriched uranium and natural thorium concentrations in buried wastes exceed the concentration limits of Option 2 of the 1981 BTP. Natural uranium in the buried wastes exceed the Option 3 limit of the 1981 BTP.

Monitoring of the burial site has occurred irregularly since emplacement. In October 1972 representatives from the Minnesota Department of Health (MDH) collected water samples from nearby wells. In August 1977 3M collected water samples from areas sampled previously by MDH. In July and October 1992, NRC staff performed an environmental safety assessment and special safety inspection of the site. MDH, 3M, and Minnesota Pollution Control Agency (MPCA) staff participated in that inspection.

A review of all environmental sampling data taken from the site in 1992 indicates that the site does not appear to represent an immediate threat to the health and safety to the public or environment. Radiological surveys taken by 3M in August 1977 and June 1983 at 21 site locations recorded a maximum exposure rate of 18 nC/kg (70  $\mu$ R)/hr and an average exposure rate of 8 nC/kg (30  $\mu$ R)/hr, using radiological survey instruments that were state of the art at that time. Radiological surveys taken by NRC in July 1992 using more sensitive instruments recorded exposure rates between 2.5 nC/kg (10  $\mu$ R)/hr and 4.6 nC/kg (18  $\mu$ R)/hr, which is consistent with natural background in that area.

For thorium-contaminated wastes, the primary radiation hazard is from external exposures to gamma radiation. For natural uranium and enriched uranium, ingestion of contaminated ground water and inhalation of contaminated dust are the limiting exposure pathways.

### 5. Financial Assurance/Viable Responsible Organization

There is no financial assurance arrangement in place. However, the Office of General Counsel has concluded (August 9, 1990, memorandum on this subject) that NRC maintains jurisdiction over burials made under 10

CFR 20.302 and 20.304, even if the license has been terminated, as in this case. Therefore, 3M is legally responsible for maintaining the site and performing site remediation, if necessary. Because 3M is a very large corporation, it should be capable of funding remediation activities if required.

## 6. Status of Decommissioning Activities

NRC initiated an environmental sampling program at the site on July 20, 1992, that continued through October 20, 1992. The program consisted of direct radiation surveys, analysis of soils, water, vegetation, air particulates, radon, and thermoluminescent dosimeter (TLD) collection. During this period, 3M installed its own TLDs and radon monitor at the site and the MDH placed TLDs on site and split water, vegetation, and soil samples with NRC. On May 19, 1992, 3M collected ground water samples from various areas nearby the site.

NRC analyzed measurements of direct radiation, radon concentration, airborne particulates, vegetation, ground water, and soil. In an inspection report, dated February 3, 1993, NRC stated that the site does not present an immediate threat to the health and safety of the public or environment because the environmental measurements taken from around the burial site were consistent with natural background radiation levels in Minnesota. These findings were confirmed by data acquired and analyzed by 3M and the MDH.

The data obtained from the 1992 environmental sampling program will be used by NRC in a radiological dose assessment of the Kerrick site. The dose assessment will be used, in turn, to assist in determining if (1) no remedial action is necessary, (2) additional site-specific information is needed for the radiological dose assessment, or (3) waste should be exhumed.

## 7. Other Involved Parties

The MPCA and the MDH have reviewed a 1983 3M report concerning these disposals. The MPCA requested NRC review of the 3M report and that NRC provide to MPCA information on long-term monitoring requirements for this and other 20.304 burial sites. NRC staff maintain contact with the MPCA concerning its requests.

NRC, MDH, and 3M jointly collected and analyzed environmental samples from the site in 1992. NRC forwarded its findings to 3M, MDH, and MPCA in a letter dated February 3, 1993.

## 8. NRC/Licensee Actions and Schedule

- |  |             |
|--|-------------|
| • NRC inputs site-specific data contained in letter (dated February 3, 1993) into radiological dose assessment   | June 1993   |
| • NRC to arrange meeting between 3M, MPCA, MDH concerning radiological dose assessment   | August 1993 |
| • NRC to determine if (1) no action is necessary, (2) additional site-specific information is needed for radiological dose assessment, or (3) waste is to be exhumed | TBD         |
| • 3M to remediate landfill, if necessary   | TBD         |
| • NRC to release landfill for unrestricted use   | TBD         |

## 9. Problems/Issues

It appears that 3M disposed of radioactive wastes in conformance with the provisions of 10 CFR 20.304 and its license was terminated. Because 3M does not have an NRC license for this material, application of NRC enforcement tools may be required if NRC staff determines that exhumation of the waste or alternative action is required. 3M appears unwilling to perform such action.

# MOLYCORP, INC., WASHINGTON, PA

## 1. Site Identification

Molycorp, Inc.  
Washington, PA

License No.: SMB-1393  
Docket No.: 040-08778  
License Status: Renewed October 27, 1992  
Expires September 1, 1997  
Project Manager: C. Glenn

## 2. Site and Operations

The site consists of approximately 7 hectares (17 acres) in Washington, Pennsylvania. Between 1964 and 1970, Molycorp produced a ferrocolumbium alloy from a Brazilian ore that contained natural thorium at concentrations of 1 to 1.5 percent by weight. The operation resulted in the production of thorium-bearing slag that was used as fill over portions of the site. The site includes a number of buildings, eight holding ponds, and a large slag pile located in the southern part of the property. Molycorp is currently planning to decommission the site and terminate its license since it no longer processes source material at this facility.

## 3. Radioactive Wastes

There is thorium spread in low concentrations in the soil throughout most of the site, often exceeding 0.4 Bq (10 pCi)/g and in some locations as high as 99 Bq (2650 pCi)/g. Average thorium concentrations over most of the site are between 4 and 7 Bq (100 and 200 pCi)/g. Molycorp estimates that there is 110,000 kg of thorium on site in the form of contaminated soils and slags. There is currently no indication of any mixed waste on site.

The inventory and concentration of Th-232 was measured in the above-ground slag pile on the southern part of the site. A 1975 report and analysis of activity by gamma spectrometry indicates that the concentration of Th-232 in the slag pile is 46.2 Bq (1250 pCi)/g. The slag is present in a stabilized configuration in a 7000 m<sup>3</sup> (249,000 ft<sup>3</sup>) pile covered with vegetation.

## 4. Description of Radiological Hazard

There is a fence around the site so there is no immediate threat to the public health and safety. Some contamination extends beyond the fenceline mainly on the banks of Chartier's Creek. Low concentrations of thorium are present in soils and slags in the western portion of the site. There is no evidence of further spreading of contamination.

Radioactivity levels have been measured at the following locations on site:

- Building 34 has alpha contamination (fixed) up to 1.5 Bq (92 dpm)/100 cm<sup>2</sup>; beta contamination (fixed) up to 145 Bq (8680 dpm)/100 cm<sup>2</sup>; and direct radiation levels up to 44 nC/kg (169 μR)/hr and the source of contamination is suspected to be below the floor.
- Well, creek, and storm drain lines have gross alpha levels less than 0.19 Bq (5 pCi)/l and gross beta levels less than 0.74 Bq (20 pCi)/l.

## 5. Financial Assurance/Viable Responsible Organization

The site is owned by Molycorp, and all licensed activities were conducted by Molycorp. Molycorp is a wholly-owned subsidiary of Unocal, an oil company, and has expressed a willingness to commit the necessary resources to decommission and remediate contaminated portions of the site in a complete and timely manner. Molycorp has submitted a letter of credit for \$750,000.

## 6. Status of Decommissioning Activities

An NRC contractor conducted a radiological survey of the site in 1985, which identified elevated levels of thorium in the dikes that separate the holding ponds and indicated the potential of subsurface contamination in

the western portion of the site. In 1990 Molycorp completed a subsurface survey to characterize the thorium contamination across the western portion of the site. Molycorp submitted this report to NRC in July 1992.

In August 1992 Molycorp submitted a pond closure plan to NRC and the Pennsylvania Department of Environmental Resources (PADER) for approval to initiate the closure of eight surface ponds. NRC staff reviewed Molycorp's subsurface survey report and pond closure plan and transmitted comments to Molycorp and PADER. Molycorp is expected to resubmit the Pond Closure Plan to NRC and PADER for approval in May 1993.

In October 1992 Molycorp's license was renewed. This license renewal includes an amendment incorporating a schedule for decommissioning the site. In November 1992 Molycorp submitted a site characterization plan (SCP) to NRC for approval. NRC staff reviewed Molycorp's SCP and transmitted comments to Molycorp in February 1993. Molycorp expects to submit a revised SCP in April 1993. Molycorp submitted a decommissioning alternatives report in February 1993. In April 1993 NRC provided comments on this report.

## **7. Other Involved Parties**

PADER is also involved in reviewing and monitoring Molycorp's decommissioning plans and activities at this site.

## **8. NRC/Licensee Actions and Schedule**

The following decommissioning milestones have been incorporated into Molycorp's license:

- |   |   |
|---|---|
| ● submit site characterization report     | 8 months after NRC's approval of the SCP  |
| ● submit site decommissioning plan to NRC | 6 months after initial submittal of a SCR |
| ● complete site decommissioning           | May 30, 1995                              |

## **9. Problems/Issues**

The site contains large volumes of slag contaminated with Th-232 in concentrations up to 98 Bq (2600 pCi)/g, which limits viable decommissioning alternatives.

## MOLYCORP, INC., YORK, PA

### 1. Site Identification

Molycorp, Inc.  
York, PA

License No.: SMB-1408  
Docket No.: 040-08794  
License Status: Active—timely renewal  
Project Manager: Tom Wenck, FCCS  
LLWM Monitor: C. Glenn

### 2. Site and Operations

The 2.5-hectare (6-acre) site in York, Pennsylvania, is used to process lanthanide ores and concentrates containing low concentrations of thorium and uranium. Molycorp's license allows them to possess up to 100,000 kg (220,000 pounds) of thorium and 315 kg (690 pounds) of uranium. In a January 1993 letter to NRC, Molycorp announced that all licensed operations using source material have ceased at the York site.

### 3. Radioactive Wastes

The residue presently stored on site, includes uranium and thorium, packaged in 101 55-gallon plastic drums and a few 1135-kg (2500-pound) bags. Bagged material is being sent off site to Molycorp's facility in Mountain Pass, California, for further processing. Material contained in the 55-gallon drums is mixed waste containing lead. This material is being processed on site to separate the lead, in accordance with a procedure approved by the State. The resulting non-hazardous ore containing thorium will be shipped to Mountain Pass for further processing.

There are low levels of thorium in the soil throughout the site. In 1987 contaminated residues and soil containing up to 26 Bq (700 pCi)/g Th-232 and some U-238 and Ra-226, were excavated from a landfill located on site and shipped to Mountain Pass for further processing. An additional 100 m<sup>3</sup> (3,600 ft<sup>3</sup>) of residues and soil containing up to 2.6 Bq (70 pCi)/g Th-232 is being excavated from another onsite landfill for shipment to Mountain Pass for further processing.

### 4. Description of Radiological Hazard

This site poses no immediate threat to the public health and safety and site access is controlled. The only substantial contamination is from thorium and uranium in the soil and buildings and a limited number of 55-gallon drums of residue material.

On the basis on a radiological survey done by an NRC contractor in 1985, direct gamma exposure rates were measured up to 18 nC/kg (70  $\mu$ R)/hr at 1 meter (3.3 feet) above the surface and 25 nC/kg (96  $\mu$ R)/hr on contact at the site perimeter. At the site perimeter, exposure rates were measured up to 15 nC/kg (59  $\mu$ R)/hr at 1 meter above the surface and 126 nC/kg (490  $\mu$ R)/hr on contact. Soil samples collected outside the site perimeter showed that Th-232, U-238, and Ra-226 concentrations were as high as 12, 4.1, and 3.3 Bq (320, 110, and 90 pCi)/g, respectively. Well water samples indicated gross alpha and gross beta concentrations less than 0.44 and 1.55 Bq (12 and 42 pCi)/l, respectively. Since the 1985 NRC survey, Molycorp has shipped most of the radioactive material containing elevated levels of thorium, uranium, and radium to its Mountain Pass facility. Therefore, the current radiation levels are expected to be much lower than what is indicated above.

Molycorp-York was cited on January 8, 1992, for violating 10 CFR 20.201(6) involving inadequate site surveys.

### 5. Financial Assurance/Viable Responsible Organization

The site is owned by Molycorp; all licensed activities were conducted by Molycorp. Molycorp is able and generally willing to undertake necessary remediation operations. Molycorp has submitted a financial assurance guarantee for \$750,000.

### 6. Status of Decommissioning Activities

Molycorp submitted a revised conceptual decommissioning plan in December 1991 as part of its license renewal application. At the time of decommissioning, Molycorp anticipates remediating the facility by use of high

pressure water spray and/or sandblasting, in conjunction with disposal at a licensed facility of some parts of buildings and flooring. Molycorp anticipates disposing offsite about 500 m<sup>3</sup> (18,000 ft<sup>3</sup>) of soil contaminated with thorium.

Molycorp has completed a scoping survey of the site. The results of this survey were provided to NRC during a meeting on March 4, 1993. Data from this survey will be used to generate a conceptual decommissioning plan and a site characterization plan by July 1993. A revised environmental report and ground water study was submitted to NRC on July 7, 1992. Molycorp is currently separating lead from the lanthanide values contained in the 102 55-gallon drums. Negotiations are underway between the State of California and Molycorp regarding a Molycorp proposal to ship approximately 100 m<sup>3</sup> (3600 ft<sup>3</sup>) of contaminated soil to California for processing.

## **7. Other Involved Parties**

No other parties are involved in radiological cleanup activities at this site.

## **8. NRC/Licensee Actions and Schedule**

- Molycorp submits site characterization plan July 1993

## **9. Problems/Issues**

None.

# NORTHEAST OHIO REGIONAL SEWER DISTRICT/SOUTHERLY PLANT

## 1. Site Identification

Northeast Ohio Regional Sewer District  
6000 Canal Road  
Cleveland, OH

License No.: 34-17726-02  
Docket No.: 030-18276  
License Status: (Not a licensed facility for Co-60)  
Project Manager: M. (Sam) Nalluswami

## 2. Site and Operations

The Northeast Ohio Regional Sewer District/Southerly Plant (NEORS/SP) is a waste water (sewage) treatment plant servicing large areas of Cleveland, Ohio. The treatment includes incineration of sludge, transport of the ash in slurry form to settlement/ evaporation ponds, and eventual removal of the dried product as onsite fill.

The NEORS/SP was found to have Co-60 soil contamination during an aerial monitoring survey flight in April 1991. The survey was performed to monitor another facility in nearby Newburgh Heights, Ohio, and the identification of the NEORS/SP site was incidental. Immediate followup site visits and surveys confirmed the contaminant was Co-60 in the soil with readings  $7.74E-9$  to  $1.55E-8$  C/kg (30 to 60  $\mu$ R)/hr at 1 meter (3.3 feet) including background. Two soil samples from the area showed  $1.0E-6$  to  $2.9E-6$  MBq (27 to 79 pCi)/g of Co-60. The areas involved were at the north end of the site where fill had been transferred in the late 1970's or early 1980's and at the southeast end where three settling ponds and another fill area are located.

## 3. Radioactive Wastes

The contaminated material appears to be sludge resulting from the treatment of sewage obtained from the City of Cleveland, which has been incinerated to ash, transferred as a water slurry to settling ponds, then moved again as fill when the ponds reached capacity.

ORISE performed radiological characterization on September 16-25, 1991, and March 16-26, 1992, around the north fill area (36,000 m<sup>2</sup>), sanitary ponds area (60,000 m<sup>2</sup>), south fill area (20,000 m<sup>2</sup>) and Imhoff tank area (7200 m<sup>2</sup>). Exposure rate measurement scans identified 111 areas involving 8500 m<sup>2</sup> with elevated levels of direct radiation ranging from  $3.9E-9$  to  $1.5E-7$  C/kg (15 to 580  $\mu$ R)/hr.

The maximum concentrations in surface soil samples were  $2.5E-4$  MBq (6,798 pCi)/g for the north fill area,  $2.0E-4$  MBq (5,390 pCi)/g for the south fill area,  $3.7E-9$  MBq (0.1 pCi)/g for the Imhoff tank area, and  $3.7E-4$  MBq (9990 pCi)/g for the sanitary ponds area. The maximum concentrations in subsurface soil samples (15-350 cm depth) were  $2.9E-4$  MBq (7733 pCi)/g for the north fill area,  $1.2E-3$  MBq (31,200 pCi)/g for the south fill area,  $6.4E-5$  MBq (1730 pCi)/g for the sanitary ponds area, and  $1.3E-4$  MBq (3550 pCi)/g for the Imhoff tank area. (One surface sample in the sanitary ponds area showed  $1.1E-1$  MBq (3,000,000 pCi)/g, which is not considered to be representative.)

## 4. Description of Radiological Hazard

The site poses no immediate threat to the public with the sewer district maintaining adequate security of the contaminated areas.

## 5. Financial Assurance/Viable Responsible Organization

The NEORS/SP license is for sealed Cs-137 sources for use in industrial gauges and not related to the Co-60 contamination of the sludge. NEORS/SP is not licensed to possess Co-60. Since the contamination exists on county property, the NRC currently considers NEORS/SP (a local government agency) responsible for the Co-60 contamination.

## 6. Status of Decommissioning Activities

ORISE performed radiological surveys and assessments of the site during September 1991 and March 1992. NEORS/SP has hired a consultant and a remediation contractor. It submitted project schedules on

December 30, 1992, for lagoon cleaning and remediation, and a site operations plan and a radiological control plan on January 11, 1993. The project schedules were reviewed and comments were transmitted to the NEORSD/SP on January 15, 1993. The site operations plan and the radiological control plan were reviewed and comments were provided on February 19, 1993.

## 7. Other Involved Parties

Since this is a waste water treatment facility, OEPA and/or U.S. EPA may be involved in the resolution of the issue, in addition to other State, county, and city of Cleveland agencies.

## 8. NRC/Licensee Actions and Schedule

### Lagoon Cleaning:

- NRC approves lagoon decommissioning plan April 1993
- NEORSD/SP submits lagoon final survey July 1993
- NRC performs lagoon confirmatory survey August 1993
- NRC informs NEORSD/SP that lagoons meet unrestricted release criteria October 1993

### Other Site Areas:

- NEORSD/SP submits SCP May 1993
- NRC reviews SCP and requests additional information June 1993
- NEORSD/SP submits revised SCP July 1993
- NRC approves site characterization strategy July 1993
- NRC approves site characterization report January 1994
- NEORSD/SP submits decommissioning strategy March 1994
- NRC reviews decommissioning strategy and requests additional information April 1994
- NEORSD/SP submits revised decommissioning plan May 1994
- NRC approves decommissioning plan June 1994

## 9. Problems/Issues

On April 1, 1993, NEORSD filed a law suit against Advanced Medical Systems (AMS) for damages to their Southerly Plant from Co-60 contamination transmitted by liquid waste released by AMS to NEORSD sanitary sewers. The staff cannot predict the impact on the financial posture of AMS if the NEORSD law suit is successful and results in significant damages. In addition, NEORSD filed a petition pursuant to 10 CFR 2.206 on March 3, 1993, requesting NRC to modify the AMS license to require AMS to

- assume all costs resulting from the offsite release of Co-60 that has been deposited at NEORSD's southerly Plant
- remediate the sewer connecting the AMS London Road facility with the public sewer at London Road and continue remediation of the sewers downstream as far as necessary

# NUCLEAR METALS, INC.

## 1. Site Identification

Nuclear Metals, Inc.  
Concord, MA

License Nos.: SMB-179, SUB-1452  
Docket Nos.: 040-00672, 040-08866  
License Status: Active  
Project Manager: M. Roberts, Region I  
LLWM Monitor: W. Lahs

## 2. Site and Operations

Nuclear Metals, Inc. (NMI) has manufactured products from depleted uranium (DU) for military, industrial, and medical applications since 1958. The licensee plans to continue operations at the site indefinitely.

The source of uranium in the area to be decommissioned at the NMI site was the discharge of neutralized pickling liquor (nitric acid) containing oxidized copper and depleted uranium (DU) to an unlined holding basin between 1958 and 1985. The discharge to the holding basin ceased when the licensee began using an acid recycling process in 1985. The basin was covered with a synthetic cover in 1986 to prevent water infiltration.

The facility consists of five major buildings and the holding basin on a 12-hectare (29.5-acre) site in the West Concord Industrial Park, Concord, Massachusetts. The area is partially wooded and includes a number of natural ponds and bogs. The adjacent lands to the east and south of the site are residential. The nearest residence is approximately 300 meters (981 feet) from the facility.

## 3. Radioactive Wastes

The holding basin contains about 2,750 m<sup>3</sup> (3,500 yd<sup>3</sup>) of material containing approximately 115,000 kg (250,000 pounds) DU and over 225,000 kg (500,000 pounds) non-radioactive copper.

Current manufacturing activities produce a steadily decreasing amount of radioactive waste per year for disposal at licensed disposal sites.

## 4. Description of Radiological Hazard

There is no immediate threat to the public health and safety. The holding basin is completely fenced and access is controlled through gates.

The licensee has had a contractor perform ground water monitoring since 1981. This monitoring program has documented the movement of non-radioactive nitrate compounds to a nearby stream, but has not given clear evidence of offsite migration of DU through the ground water. The semi-annual monitoring program includes sampling of the water supply used by the licensee, the licensee's discharges, ground water from more than 19 wells, and surface waters at about 24 locations on and off the NMI site. Soil and sediment samples also are collected and analyzed. The highest concentrations of DU measured have been in wells HB-7 and HB-8, which are located within a few feet of the holding basin. NMI believes these wells actually penetrate material discharged early in the use of the basin and, therefore, that the sampling results obtained from them do not indicate migration of uranium. DU concentrations in these wells peaked in 1983 at about 1,500 parts per billion (ppb), but have dropped and stabilized (at around 100 ppb) for the last four to five years. The contractor also has conducted various studies to determine the hydrogeology of the site.

In 1980 elevated levels of volatile organic compounds (VOCs) were measured in two wells. On the basis of an apparent ground water contamination with VOCs and presence of the unlined holding basin containing DU, the Commonwealth of Massachusetts, Department of Environmental Protection (DEP) classified Nuclear Metals as a "priority disposal site." This classification requires that DEP review and approve all remedial actions at the site. On the basis of corrective actions taken and current measurements, NMI believes that VOCs are no longer a problem. However, in accordance with commitments made as part of the Massachusetts

Contingency Plan Phase II comprehensive site assessment process, the licensee has installed several new monitoring wells and will perform additional soil and sediment sampling to more fully characterize the site.

In 1982 ORISE conducted an environmental survey at the site, and in 1985 EG&G conducted an aerial radiological survey over the site. The results of these surveys were in agreement with the results of the licensee's environmental and effluent monitoring programs. Offsite radiation measurements were in the background baseline range.

## 5. Financial Assurance/Viable Responsible Organization

NMI has stated that it is totally committed to complete remediation and decommissioning of the holding basin and its contents. It has provided an irrevocable letter of credit for \$750,000 as decommissioning funding. The licenses require submission of a decommissioning funding plan, including an actual cost estimate, on or before July 1, 1993.

## 6. Status of Decommissioning Activities

Since 1985, when the holding basin was closed, the licensee has been working to develop a plan to decommission the holding basin and remove its contents. This activity has resulted in periodic discussions between the NRC, the Commonwealth of Massachusetts, the Concord Board of Health, and NMI.

Presently, NMI is exploring two options for treatment of the holding basin: (1) recycling the material in the basin for resource recovery (a pilot project to determine economic feasibility of recycling is in progress, this included sampling of the contents of the basin) or (2) sending the basin contents to a licensed burial site for disposal.

The licensee submitted a brief description of a decommissioning plan as part of its request to renew the license in 1989. In December 1991 the licensee met with NRC to discuss a tentative removal and disposal plan it is developing. Implementation of this plan, which involves recovery and recycling of the copper and uranium, is dependent on the acceptability of the plan by a number of regulatory groups. NRC staff met with the licensee and representatives of the Commonwealth of Massachusetts several times in 1992 to negotiate a schedule for submission of a site characterization report and a decommissioning plan. These discussions are continuing. On October 20, 1992, NMI submitted a draft outline for the holding basin site characterization report. The site characterization report was submitted February 12, 1993.

## 7. Other Involved Parties

A factor in the process is that the Massachusetts DEP has classified NMI as a "priority disposal site." The licensee states that this requires that a detailed process must be followed for developing the decommissioning plan and that DEP must approve all remedial actions at the site.

There is significant interest in the site by local citizens and the Concord Board of Health.

## 8. NRC Actions and Schedule

- NRC meets with NMI to discuss schedule for submittal of decommissioning plan May 1993
- NRC reviews holding basin characterization report and requests additional information September 1993
- NMI submits revised characterization report October 1993
- NRC approves characterization report December 1993
- NMI submits decommissioning plan and schedule June 1994
- NRC reviews decommissioning plan and schedule requests additional information September 1994
- NRC approves plan and schedule December 1994

## 9. Problems/Issues

- NMI continues to explore options for treatment of the contents of the holding basin. NMI indicates that to make reprocessing and recycling of material in holding basin economically viable, it must be accomplished over an extended time (5 to 7 years).
- Massachusetts DEP has classified NMI as a “priority disposal site.” NRC has been in communication with DEP and does not anticipate significant delays caused by DEP; however, NMI believes this process will significantly increase the time necessary to complete the project.
- The copper claimed by reprocessing may be slightly contaminated, raising the issue of recycling.

# OLD VIC, INC.

## 1. Site Identification

Old Vic, Inc.  
Cleveland, OH

License No.: 31-26394-01  
Docket No.: 030-19594  
License Status: Active  
Project Manager: K. Lambert, Region III  
LLWM Monitor: D. Orlando

## 2. Site and Operations

Until 1987 the licensee actively used radionuclides at the facility, a five-story brick structure, to conduct research, calibrate instruments, and manufacture electronic components. The major activities that resulted in past facility contamination were the production of electronic tubes containing Ra-226 and Ni-63 as ionization sources. Currently, most of the building is unoccupied. A portion of the second floor is used by a plumbing company to store excess equipment. Two locations on the second floor exhibited exposure rates in excess of the NRC's unrestricted use criteria. A representative of the plumbing company has indicated that access to the building is limited and those individuals entering the building are instructed to remain away from these two areas. As of February 1992, the two areas have been roped off and posted with caution radioactive material signs.

The licensee began decommissioning the facility in October 1988 and performed a final survey in August 1989. Its final survey indicated that the facility was remediated to levels acceptable for unrestricted use. A confirmatory survey by ORISE in May 1990 identified multiple locations that were above NRC unrestricted use criteria. On March 23, 1992, the license issued to Victoreen, Inc. was terminated and a new possession-only license was issued to Old Vic, Inc. This action was taken at the request of Victoreen's parent company, 21 International Holdings, to allow the parent company to assume responsibility for the decommissioning of the facility.

The licensee, Old Vic, Inc., has contracted with Chemical Waste Management to characterize the facility and remediate the remaining contamination. The licensee submitted a characterization and remediation plan in May 1992. NRC authorized characterization of the facility in July 1992. NRC authorized remediation of the facility in September 1992. The licensee submitted an interim report on the characterization in October 1992. The licensee has completed remediation of the facility and submitted a final survey report in February 1993.

## 3. Radioactive Wastes

The predominant contaminants at the Victoreen facility are Ra-226 and Ni-63. These radioisotopes are found on building structures such as walls and floors.

## 4. Description of Radiological Hazard

The site poses no threat to the public. The building site is maintained under 24-hour security with access limited to those individuals associated with Victoreen or the plumbing company. The plumbing company limits access to the facility to less than 10 individuals. These individuals have received radiation safety training.

## 5. Financial Assurance/Viable Responsible Organization

Because the licensee believed that decommissioning had been completed and had requested license termination in early 1990 a decommissioning funding plan or financial certification was not submitted to NRC in accordance with the decommissioning financial assurance requirements. On March 23, 1992, Old Vic, Inc. assumed responsibility for the decommissioning of this facility. In September 1992, NRC staff requested that the licensee provide adequate financial assurance information. The licensee submitted financial assurance information in November 1992. NRC staff is currently reviewing this information.

## 6. Status of Decommissioning Activities

The licensee previously submitted a termination survey in support of releasing the facility for unrestricted use. A confirmatory survey by ORISE identified multiple locations that were above NRC unrestricted release

criteria. The total alpha and beta-gamma activities ranged from 17 to 70 Bq (32–4200 dpm)/100 cm<sup>2</sup> and 3 to 16,400, Bq (200–980,000 dpm)/100 cm<sup>2</sup>, respectively. Of the 206 surface activity measurements, 57 exceeded the Ra-226 guidelines.

The licensee has characterized the facility to identify all areas requiring additional remediation. The licensee completed remedial activities in January 1993 and submitted a final survey report and request for license termination in February 1993.

## **7. Other Involved Parties**

Because of the presence of Ra-226, the Ohio Department of Health has requested that the licensee file a radioactive materials registration with that agency. NRC is currently cooperating with the State of Ohio on the decommissioning of this facility.

## **8. NRC/Licensee Actions and Schedule**

- |   |            |
|---|------------|
| • NRC conducts confirmatory survey        | April 1993 |
| • NRC approves confirmatory survey report | May 1993   |
| • NRC staff prepares Commission paper     | June 1993  |
| • NRC terminates license                  | July 1993  |

## **9. Problems/Issues**

None.

# PERMAGRAIN PRODUCTS, INC.

## 1. Site Identification

Permagrain Products, Inc.  
Media, PA

License No.: 37-17860-01; 37-17860-02  
Docket No.: 030-13573; 030-29288  
License Status: Active  
Project Manager: M. Bouwens, Region I  
LLWM Monitor: H. Spiro

## 2. Site and Operations

The Permagrain site is located in the Quehanna Wild Area, part of the Moshannon State Forest, in north central Pennsylvania, about 80 km (50 miles) northwest of State College. The nearest population center, Karthaus, Pennsylvania, is 19 km (12 miles) away with a population of 2500. The building was built in 1957 to house a research reactor and hot cells which were intended for the examination of various irradiated materials as part of a research and development program. This program and the reactor were only active for a very brief period, ending in about 1960. In 1960 Curtiss-Wright, the original owner, donated the site to the Pennsylvania State University. The land and buildings are now owned by the Pennsylvania Forest Service and are leased to the current licensee. Various companies have leased and operated the facility since 1960, including Martin Marietta, Arco, NUMEC, and the current licensee. All irradiated fuel was removed from the site in the 1960's.

Permagrain, a company formed by several former site employees, purchased the operation from Arco in 1978. NRC License 37-17860-01 authorizes the use of the former reactor pool as an underwater irradiator to produce plastic impregnated wood products for commercial sale. Co-60 contained within sealed sources is used for irradiations. NRC License 37-17860-02 authorizes the possession of contamination from former operations, such as the manufacture of sealed sources.

## 3. Radioactive Wastes

The radioactive contamination is in inactive portions of the building and equipment including ventilation systems, drainage systems, storage tanks, hot cells, a chemistry laboratory, and a decontamination room. Isolated areas of contamination also are found on a crane walkway and various support structures for the building. The principal contaminant is Sr-90, which was used by Martin Marietta between 1962 and 1967 when it leased the hot cells for production of heat sources containing large amounts (as much as  $3.0 \times 10^{15}$  Bq [80,000 Ci] each) of Sr-90. The volume of contaminated material has not been estimated, but it is estimated that less than 555 MBq (15 mCi) of Sr-90 remain in the facility. One hot cell also contains small amounts of unsealed Co-60 which as used by Arco before 1978.

## 4. Description of Radiological Hazard

There is no immediate threat to public health and safety. The contamination is confined to facilities on site and there is no public access to these facilities. The licensee maintains an active radiation safety and effluent monitoring program.

Measurements taken by the Commonwealth of Pennsylvania, EG&G, and ORISE indicate that no ground water contamination is occurring as a result of past activities at the site, thus indicating no evidence of migration of radioactive materials from the facility.

## 5. Financial Assurance/Viable Responsible Organization

Permagrain is probably not financially capable of decontaminating the site; however, the Commonwealth of Pennsylvania, as owner of the property, has accepted responsibility for providing the financial resources required for decommissioning and has signed a statement of intent submitted by the licensee as financial assurance. In a lease agreement between Permagrain and the Pennsylvania Department of Environmental Resources (PADER), PADER acknowledges that Permagrain is not financially responsible for decommissioning of the site. The Pennsylvania Forest Service is a part of PADER.

NRC has reminded Permagrain that, notwithstanding the financial agreements with PADER, the responsibility for compliance with NRC requirements for site characterization and decommissioning rests with the licensee, Permagrain.

## 6. Status of Decommissioning Activities

The licensee and PADER have worked together for about 2 years to develop a plan for characterizing the site with State funds. As a result of those activities, PADER has contracted with Canberra Nuclear to develop a characterization plan and to characterize the site. Field work for the site characterization began in September 1991 under the supervision of the licensee and another consultant and was largely completed by January 31, 1991. NRC inspected the implementation of the characterization plan in December 1991. The licensee submitted preliminary data from the characterization to NRC in June 1992. PADER submitted a draft characterization report, including recommended remedial activities on behalf of Permagrain in September 1992. These reports appear to fulfill the requirements in Permagrain's license regarding site characterization and planning for decommissioning. PADER submitted a draft remediation plan in September 1992. An NRC inspection in November 1992 confirmed that access to contaminated areas is adequately controlled.

## 7. Other Involved Parties

The Commonwealth of Pennsylvania owns the property, and has apparently entered into contractual arrangements with Permagrain to fund the decommissioning.

## 8. NRC Actions Needed and Schedule

- |  |               |
|--|---------------|
| • NRC reviews site characterization report   | June 1993     |
| • NRC reviews and approves the site decommissioning plan   | January 1994  |
| • NRC inspects implementation of decommissioning plan  | Summer 1994   |
| • NRC reviews and approves final survey by the licensee  | June 1995     |
| • NRC performs confirmatory survey   | August 1995   |
| • NRC releases contaminated area for unrestricted use and terminates license authorizing contamination | December 1995 |

## 9. Problems/Issues

Availability of State funds.

# PESSES COMPANY (METCOA)

## 1. Site Identification

Pesses Company (Metcoa)  
Pulaski, PA

License No.: STB-1254  
Docket No.: 040-08406  
License Status: Expired July 31, 1986 (licensee bankrupt)  
Project Manager: M. Roberts, Region I  
LLWM Monitor: H. Spiro

## 2. Site and Operations

The Metallurgical Corporation of America (Metcoa) also referred to as the Pesses Company site, is a defunct metal reclaiming facility that was abandoned, without informing the NRC, after the company declared bankruptcy in 1983. The NRC became aware of the abandonment during a routine inspection in September 1984. Materials handled at the facility during operation from 1975 to 1983 included low-level radioactive compounds, such as ores containing uranium and thorium; thoriated magnesium and nickel; and non-radioactive metals, such as chromium, cobalt, lead, cadmium, and copper.

The site is located on 8.9 hectares (22 acres) in a rural agricultural area in western Pennsylvania. A 2.4-hectare (6-acre) portion of the site, surrounded by a fence, contains four interconnected buildings that were used for scrap metal reprocessing and ferrocolumbium production.

Approximately 550 people in 138 homes live within 1.6 km (1 mile) of the site. An open-air farmers' market operates near the site throughout the year.

While the NRC license authorized disposal of slag waste products containing uranium and thorium by burial, it is uncertain whether onsite disposals actually took place. The licensee claims that no disposals took place and no specific burial sites were found during site surveys. However, there is radioactive soil contamination at various locations on site.

On January 22, 1986, the NRC issued an order requiring the licensee or its successor to submit a decommissioning plan, complete the remediation, perform a final survey and submit a report of the survey results to the NRC, and control entry to the site until the NRC could confirm that the remediation had been properly performed. The licensee failed to comply with the order.

## 3. Radioactive Wastes

When NRC first identified the abandonment of the site, there was a wide variety of magnesium-thorium and nickel-thorium scrap, nonhazardous scrap metal, obvious soil contamination with radioactive materials and hazardous waste, ore and other debris spread around the site and buildings.

Following stabilization and preliminary inventory by the U.S. Environmental Protection Agency (EPA) and before Phase One of the removal action (discussed below), approximately 1500 drums, totes (large metal boxes of varying size), and overpacks of various waste were stored at the site.

The site also contained about 1,000 m<sup>3</sup> (1,300 yd<sup>3</sup>), in four piles, of contaminated soil and a low solubility, siliceous slag material. Much of these materials were contaminated with thorium. Surface soil was found to be contaminated with natural thorium up to 90 Bq (2,410 pCi)/g. Exposure rates around the drums and piles were typically 30 to 50  $\mu$ R/hr with some exposure rates up to 1,000  $\mu$ R/hr. Other wastes on the site included approximately 600 m<sup>3</sup> (800 yd<sup>3</sup>) of hazardous wastes containing chromium, lead, and cadmium.

## 4. Description of Radiological Hazard

The NRC contracted with ORISE to perform a radiological survey that was completed in November 1985 and revealed elevated levels of radiation exposure rates from the waste generated by the metal processing operation. Soil samples collected also contained elevated levels of lead, chromium, and cadmium. The NRC brought

the site to the attention of the Pennsylvania Department of Environmental Resources (PADER). PADER then conducted its own site assessment, including sampling, which confirmed the NRC findings. PADER requested that EPA perform a site assessment to investigate the potential threat to public health and the environment.

Between June and September 1986, Roy F. Weston, Inc. (Weston), the EPA onscene coordinator, performed a comprehensive site assessment that included soil, drum, surface water, and ground water sampling. Geophysical surveys also were conducted, including a magnetometer survey and ground penetrating radar.

The principal hazards associated with the contamination and wastes at the Metcoa site involve inhalation, ingestion, intrusion and ground water. No immediate threats to public health and safety exist. Stabilization measures, including placement of nonpermeable (visquene) and geotextile fabric covers over piles, have been taken to minimize the transport of radioactive materials from the site. When deterioration of visquene and geotextile barriers occurred, restabilization was initiated. The inhalation and ingestion hazards are considered to be minimal. The intrusion hazard is minimized by the fencing around the contaminated areas and local police security. Soil samples taken as part of the Phase Two activities at the site have identified thorium activity ranging from environmental levels to as high as 12 Bq (315 pCi)/g.

Specific hydrological data is unavailable; however, surface drainage patterns were studied in the stabilization program so that barriers to sediment transport could be installed. One well exists on the site. This well and surface water in streams, drainage ditches, and ponds were sampled in the ORISE site survey. No contamination in water or sediment samples was found. Buchanan Run is a small stream that flows adjacent to the site. The thorium contained in the waste slag has a very low solubility and is not expected to result in contamination of ground water supplies. Samples of surface waters and ground water confirm that radioactive materials have not migrated to these media.

## **5. Financial Assurance/Viable Responsible Organization**

The Pesses Company possession limit is 100,000 kg (22,000 lb) of source material containing 2000 kg (4400 lb) of thorium 16 GBq (440 mCi). Under this possession limit a decommissioning funding plan would be required. However, the licensee is bankrupt and its remaining assets are insufficient to fund the site cleanup. Initial stabilization efforts were funded by the EPA. The potentially responsible parties (PRPs) funded the restabilization efforts and the removal activities to date.

The NRC also became a party in the bankruptcy litigation. The bankruptcy court ruled that the NRC had the same claim to the licensee's assets as an unsecured creditor and no assets were made available as a result of the litigation.

## **6. Status of Decommissioning Activities**

On the basis of information generated by the various surveys, EPA stabilized the site in 1987 and began a thorough investigation of the source(s) of the contamination. Weston, an EPA contractor for the PRPs of this site, conducted the site stabilization phase of the cleanup.

OH Materials, Inc., of Findlay, Ohio was the prime contractor responsible for staging and securing of waste materials. These activities consisted of creating bulk (slag waste) staging piles and covering the piles with a combination of visquene and geotextile fabrics. Included in the activities were the staging of approximately 1500 drums located onsite. Approximately 1000 m<sup>3</sup> (1300 yd<sup>3</sup>) of hazardous waste were collected in four piles. Weston issued a report documenting the site and the stabilization activities. The visquene and geotextile fabric coverings subsequently deteriorated and became ineffective in minimizing the infiltration of water and preventing transport of sediments as a result of the action of wind and water. In November 1988 the PRPs proposed to restabilize these waste piles. This restabilization took place in November 1989.

On August 13, 1990, the EPA began a removal operation after offering the PRPs the opportunity to sign a consent order and control the removal action themselves, thereby avoiding potential penalties. On August 17, 1990, a group of the PRPs agreed to the order and submitted Phase One of a removal work plan for approval. The EPA and NRC reviewed the plan and EPA formally approved the plan in October 1990. Work commenced in November 1990.

Phase One of the plan primarily involved setting up a base of operations at the site and initiating a screening program for the wastes, followed by disposal of as much waste as possible. Wastes were classified as

non-hazardous and non-radiological, hazardous, radiological or mixed waste (hazardous and radiological) by direct monitoring or through analysis of previously taken samples. Phase One was completed in April 1991 and resulted in the removal of 861 drums and 20 larger containers of radioactive waste, 90 containers of hazardous waste, 870 m<sup>3</sup> (1134 yd<sup>3</sup>) of radioactive or hazardous wastes and 17,000 liters (4500 gallons) of contaminated liquids. Each type of waste was sent to appropriately approved or licensed facilities for processing, packaging, and disposal. About 270 m<sup>3</sup> (350 yd<sup>3</sup>) of non-radioactive, non-hazardous waste were disposed locally. No mixed wastes were removed from the site. An NRC inspector visited the site in December 1990 to review the activities associated with Phase One.

While Phase One of the remediation plan was underway, the PRPs contractor submitted a Phase Two work plan. This portion of the work plan also was reviewed by EPA, PADER, and NRC and approved by EPA. Phase Two involved further characterization of the site through analysis of soil samples, a radiological survey of the site at defined grid points and a further magnetic survey. The field work for Phase Two commenced in August 1991 and was completed in December 1991. NRC inspectors visited the site in August 1991 to review site activities. A report of the results of Phase Two activities, which includes the results of the sample analyses, was provided to EPA and NRC in May 1992. The report also describes options for handling the remaining wastes on the site.

EPA and NRC reviewed and commented on the Phase Two report. On December 31, 1992, EPA issued a draft consent order to the PRPs, which requires them to initiate excavation of the radiologically contaminated soils and treat and/or dispose of the mixed waste. This phase of the removal project is not likely to start before early to mid-1993.

## **7. Other Involved Parties**

EPA has the lead responsibility for cleanup activities at this site. EPA and NRC have both reviewed and approved remediation plans prior to implementation and will continue to do so. NRC has and will continue to assist EPA in monitoring the progress of work. An NRC inspector visits the site to review activities at least once each year.

## **8. NRC Actions and Schedule**

NRC is maintaining contact with EPA regarding resolution of final cleanup issues and will assist EPA in review of work plans to ensure compliance with relevant NRC guidance and appropriate monitoring of the progress of work. As in previous phases of the work, NRC will continue to inspect site activities as needed. It is important to recognize that EPA normally relies on the final survey performed by the PRP contractor to release sites for unrestricted use. Since NRC will plan to perform its own confirmatory survey, close coordination with the PRPs and EPA will be important as the PRPs complete the removal action.

Dates are tentative and based on EPA estimates of site milestones.

- |   |             |
|---|-------------|
| ● NRC reviews and comments on work plan provided by PRP's   | Summer 1993 |
| ● NRC inspects ongoing removal activities   | Fall 1993   |
| ● NRC reviews EPA analytical data   | Fall 1993   |
| ● NRC performs final confirmatory survey  | 1995        |
| ● NRC documents remediation and final survey and agreement that site may be released for unrestricted use | TBD         |

## **9. Problems/Issues**

Present plans do not address disposal of mixed waste at this site. The PRPs have begun to characterize the waste and plan to dispose of hazardous and radioactive that are separate and then address the mixed waste.

# RMI TITANIUM COMPANY

## 1. Site Identification

RMI Titanium Company  
Ashtabula, OH

License No.: SMB-602  
Docket No.: 040-02384  
License Status: Renewed on October 15, 1991,  
Expires October 31, 1996  
Project Manager: M. (Sam) Nalluswami

## 2. Site and Operations

The RMI Titanium Company's (RMI) extrusion plant consists of 25 buildings on 10.5 hectares (26 acres). RMI performed uranium metal extrusion for the DOE from 1962 to 1988. The DOE uranium averaged about 1 percent enrichment; maximum enrichment was 2.1 percent. RMI is also licensed by NRC to possess 5000 kg (11,000 pounds) of natural uranium and 300,000 kg (660,000 pounds) of DU. Since November 1, 1990, the only licensed activities conducted at the RMI site were related to decommissioning.

## 3. Radioactive Wastes

Ground water contamination has been found near a former onsite evaporation pond. Samples from monitoring wells showed a maximum of  $3.1E-4$  MBq (8,380 pCi)/l uranium per liter and  $2.3E-2$  MBq (625,000 pCi)/l Tc-99.

Trichloroethylene (TCE) has also been found in the ground water (maximum of 440,000  $\mu$ g/l) making a mixed waste concern. Soil/sediments showed maximum concentrations of  $3.6E-5$  MBq (963 pCi)/g of the total uranium,  $3.1E-6$  MBq (83 pCi)/g of Tc-99 and 1,120  $\mu$ g/g of TCE.

The largest portion of contamination is inside the extrusion building. Remediation will result in the generation of approximately 9,500,000 kg (21,000,000 pounds) of waste consisting of miscellaneous structural materials. It is unknown at this time the percentage of this projected waste that is considered contaminated. Additional data are required to estimate wastes from equipment, ground water, and soil.

## 4. Description of Radiological Hazard

This site is controlled and poses no immediate threat to the public health and safety. However, it appears that the ground water may need to be treated to achieve proposed residual contamination levels at RMI's facility boundary. The maximum background radiation level (gamma exposure rate) at 1 meter above the surface is 2.6 nC/kg (10  $\mu$ R)/hr.

## 5. Financial Assurance/Viable Responsible Organization

The licensee submitted its final draft decommissioning plan and financial plan to NRC in December 1991. This plan indicates that DOE has accepted full financial responsibility. The funds for the project are requested by DOE through the annual congressional budgeting process. DOE provided a letter to RMI attaching a statement of intent from DOE as a financial assurance instrument. NRC sent a letter to RMI asking for a statement of intent and exemption request satisfying appropriate regulatory requirements.

## 6. Status of Decommissioning Activities

RMI submitted the following draft documents on September 27, 1991: (1) outline of characterization plan and decommissioning and remediation plan, and (2) decommissioning financial assurance plan and decommissioning funding plan. NRC received the final draft decommissioning plan in December 1991. RMI submitted its plan to EPA in October 1991. NRC reviewed the decommissioning plan and requested additional information on March 2, 1993.

Decommissioning efforts of the soil surrounding the buildings has been initiated. Currently, the licensee has placed a high priority on surveys and remediation of offsite locations. RMI is planning to ship contaminated waste materials to the DOE Nevada Test Site.

The following tasks have been initiated:

- conduct pre-decommissioning radiological characterization surveys of soil, ground water and facilities
- remove remaining source nuclear material and hazardous material required to prepare the site for remediation and decommissioning efforts
- conduct planning, engineering and procurement activities for the decommissioning project
- remediate soil, ground water, and facility structures and utilities, as needed
- maintain site health and safety support services (e.g., as low as reasonably achievable, health physics, construction safety, monitoring)
- package and transport all decommissioning project waste to an appropriate disposal facility
- submit RMI procedures for surface contamination surveys to NRC for comments

A routine inspection was performed during the week of February 10, 1992, and included a followup to the deficiencies in the licensee's analytical process, which was identified by ORISE in December 1990.

## **7. Other Involved Parties**

Since RMI was a contractor to DOE, full financial responsibility has been accepted by DOE. WEMCO (Westinghouse Environmental Management Company of Ohio), as a result of having RMI's DOE contract assigned to it in September 1987 by DOE, is responsible for administering the funding provided by DOE for the remediation and restoration project. RMI is a subcontractor to WEMCO and RMI is responsible for managing the project. U.S. EPA is involved as a result of the presence of nonradioactive hazardous materials.

## **8. NRC/Licensee Actions and Schedule**

- |  |          |
|--|----------|
| • RMI submits schedule for site characterization plan                                | May 1993 |
| • DOE submits statement of intent and RMI's exemption request on financial assurance | May 1993 |
| • NRC approve decommissioning plan   | TBD      |
| • complete decommissioning activities  | TBD      |
| • complete verification surveys  | TBD      |
| • complete termination surveys and terminate license                                 | TBD      |

## **9. Problems/Issues**

None.

**RTI, INC.**  
**(Formerly Process Technology of North Jersey, Inc.)**

**1. Site Identification**

RTI, Inc.  
Rockaway, NJ

License No.: 29-13613-02  
Docket No.: 030-07022  
License Status: Active  
Project Manager: E. Ullrich, Region I  
LWM Monitor: W. Lahs

**2. Site and Operations**

RTI, Inc., is licensed by NRC to perform service irradiations on a variety of items using up to 1.1E5 TBq (3 million Ci) of Co-60 in-air irradiator. The sealed Co-60 sources are stored in a pool of water for shielding when not in use.

Leakage from the sources in the 1970's resulted in Co-60 contamination of the irradiator storage pool. Contamination of soil in restricted areas resulted from burials of waste materials and discharge of the effluent produced by regeneration of the licensee's demineralizers used to remove Co-60 from the storage pool. Specific actions to characterize and remediate the site have been submitted by RTI and approved by NRC, and progress in remediating the site has been made (removal of contamination and waste from unrestricted areas).

The site is located in a suburban location on approximately 6 hectares (15 acres). Facility buildings (an office building, irradiator facility, and various warehouses) and work areas occupy 2 hectares (5 acres) of a restricted access portion of the site on the north side of Lake Denmark Road about 90 meters (300 feet) south of Lake Denmark. RTI also owns about 81 hectares (201 acres) of unrestricted land on the south side of the road.

**3. Radioactive Wastes**

In 1975 and 1976, leaking Co-60 sources contaminated the water in the irradiator storage pool. This contamination was not immediately identified and flocculent and other cleaning agents used in cleaning the pool of dirt and algae, apparently at the time thought to be free of radioactive contamination, were swept onto the ground south of the irradiator building. Also, water used to backwash and regenerate the demineralizers was released in this area. While the licensee states the discharge met the limits in 10 CFR Part 20 for a release to unrestricted areas, this practice apparently resulted in buildup of Co-60 in the soil. This area has been designated as Area D in the licensee's most recent correspondence. It covers about 140 m<sup>2</sup> (1,500 ft<sup>2</sup>).

During 1976 and 1977, the licensee disposed of solid radioactive waste by burial on site. These burials were intended to be made pursuant to 10 CFR 20.304. The only documented burials were located in the northern corner of the 2-hectare (5-acre) fenced area of the site. These burials resulted in soil contamination with Co-60 in the areas around the burials. The documents describing these burials were discovered in 1986 by recently hired managers at RTI. The areas where the burials were made are designated areas A and B in the licensee's correspondence.

There is also a surface water runoff path leading toward Lake Denmark (Area C) that has elevated Co-60 concentrations (composite sample of soil contained 0.6 Bq (17 pCi)/g).

**4. Description of Radiological Hazard**

There is no immediate threat to public and safety. Previously discovered buried drums of radioactive waste material and most of the contaminated soil have been removed, leaving only contaminated soil in the restricted area. External exposure rates within the 2-hectare (5-acre) area are less than 6 nC/kg (22 μR)/hr above background. In the unrestricted areas, radiation levels from Co-60 contaminated soil are less than 3 nC/kg (11 μR)/hr above background.

## 5. Financial Assurance/Viable Responsible Organization

On the basis of possession limits for Co-60 contamination in the license, the licensee is required to provide financial assurance in the amount of \$750,000 to satisfy the decommissioning rule requirements. RTI has provided adequate financial assurance for the sealed sources in the irradiator (\$75,000) and argues that the possession limit for Co-60 contamination in its license should be reduced based on surveys and decontamination accomplished to date. This request to amend the license is under review.

## 6. Status of Decommissioning Activities

In 1987, in response to Confirmatory Action Letter 87-92, the licensee agreed to characterize the radioactive waste burial site by (1) performing a radiation level survey of the entire 2-hectare (5-acre) fenced site, (2) having a magnetometry scan of the site performed by a qualified contractor, and (3) developing a remediation action plan for any contamination identified. The results of the magnetometry scan of the north corner were submitted to NRC in April 1987. The radiation level survey results were submitted in May 1987. A remediation action plan for removal of buried material identified as a result of these surveys was submitted in May 1987.

Drums and waste from the north corner burial site were removed between June and September 1987 and sent for disposal as radioactive waste.

In July 1989 the licensee proposed to remediate the areas inside the 2-hectare (5-acre) fenced site to 0.55 Bq (15 pCi)/g of Co-60 per gram of soil and maintain the area as a restricted area for at least 5 years (one half-life for Co-60). In May 1990 NRC agreed providing the licensee committed to further remediation if the areas were to be released for unrestricted use. The NRC also requested that the licensee provide evidence to demonstrate that no additional buried radioactive material or soil contamination in excess of 0.3 Bq (8 pCi)/g of Co-60 per gram of soil remained on site, provide plans to monitor migration of Co-60 contamination remaining, and provide the results of surveys performed to show that remediation activities had been completed as proposed.

In July 1990 the licensee proposed to take a core sample to determine if there was additional radioactive material buried and to perform quarterly monitoring of water from existing wells to detect any migration of Co-60 in the ground water. The licensee removed several areas of contaminated soil and sent the material for disposal as radioactive waste.

In January 1991 the licensee submitted results of surveys performed after these remediation activities. No soil samples were taken. One bore sample was taken in Area A to determine the depth of contamination and to attempt to determine if additional buried material existed in that area. Water samples were not taken from wells because the licensee found that Co-60 contamination only on the surface soil.

Available information is being evaluated to determine if NRC can approve the licensee's request that the NRC accept the remediation and surveys and reduce the possession limits in the license or if additional sampling is required before those changes. NRC visited the site in December 1991 to view the remediated areas and assist with the evaluation. NRC requested additional information on the site's radiological status on September 11, 1992. RTI submitted a partial response on October 18, 1992.

## 7. Other Involved Parties

The New Jersey Department of Environmental Protection and Energy has been studying ground water contamination from activities involving hazardous materials on the property south of Lake Denmark Road and plastic monomers in the restricted area.

## 8. NRC Actions and Schedule

- NRC evaluates the need for additional surveys by licensee March 1993
- NRC requests additional information from or work by licensee September 1993
- NRC performs confirmatory survey September 1994
- NRC reduces license limits authorizing storage of contaminated materials June 1995

## 9. Problems/Issues

There is some concern about the licensee's ability to fund the decommissioning of the site.

# SAFETY LIGHT CORPORATION

## 1. Site Identification

Safety Light Corporation  
Bloomsburg, Pennsylvania

License Nos.: 037-00030-02; 37-00030-08  
Docket Nos.: 030-05980; 030-05982  
License Status: Renewals denied—hearing requested  
Project Manager: P. Vacca, NMSS/IMNS  
LLWM Monitor: J. Parrott

## 2. Site and Operations

The Safety Light Corporation (SLC) site is located in central Pennsylvania approximately 1 km (0.6 mile) east of Almedia in South Centre Township along Old Berwick Road. Larger population centers nearby include Bloomsburg about 4 km (2.5 miles) west and Berwick about 4.8 km (3 miles) east of the site. The approximately 40,500-m<sup>2</sup> (10-acre) site is located 149 meters (490 feet) above mean sea level on an old terrace and floodplain on the north bank of the Susquehanna River.

In the late 1940's, United States Radium Corporation (USRC) began manufacturing and distributing self-illuminating watch and instrument dials and conducted other activities involving the use of a wide variety of radioactive materials. In early work, the principal radionuclide was Ra-226, a material not regulated by the Atomic Energy Commission (AEC). Later, AEC-licensed work involved the use of many radionuclides, including H-3, Sr-90, Cs-137, and Am-241. Since approximately 1968, H-3 has been the only radionuclide in use; it is used in the manufacture of self-illuminating exit signs and other similar products. Since the early 1980's, following a complex series of reorganizations, corporate name changes, and sales of corporate entities, SLC has conducted H-3 manufacturing and distribution activities at the Bloomsburg site. (The corporate reorganizations and transfers are the subject of ongoing litigation before the ASLB involving jurisdictional issues.)

Contamination is found in buildings, soil, and ground water. There are few, if any, records of materials buried or disposed of at the site. Many of the approximately 17 structures on the Bloomsburg site were previously used for radioactive work, are contaminated and/or in disrepair, and now are either unused or used primarily for storage of contaminated equipment. In addition to radioactive contamination at the Bloomsburg site, there is also contamination resulting from a fuel oil spill and there may be contamination from various chemicals and heavy metals used on site.

USRC terminated use of radionuclides other than H-3 in the late 1960's. At that time the AEC licensed it to decontaminate the site and prepare it for eventual release for unrestricted use. By the late 1970's little had been accomplished. In 1978 USRC identified more than 32 contaminated areas on the site and proposed a decontamination program to mitigate the contamination, beginning with those identified areas. This program, however, has not been fully implemented. A considerable portion of the site is still contaminated with varying levels of Ra-226, H-3, Sr-90, and Cs-137. Some of these areas continue to release activity into the ground water system and soil. In addition, only limited survey information is available to determine the extent of contamination.

## 3. Radioactive Wastes

Several studies (i.e., by Radiation Management Corporation (RMC) in 1979, ORISE in 1982 and Chem-Nuclear Systems, Inc. (CNSI) in 1990) indicated widespread contamination of buildings, equipment, soil, ground water, and other outdoor areas of the Bloomsburg site at levels exceeding those acceptable for release for unrestricted use. For the most part, ORISE found higher concentrations in individual samples from the site than were found by RMC or CNSI. The ORISE data are shown below.

<i>Contaminants</i>	<i>Maximum Concentration</i>		<i>Average Concentration</i>	
	<i>Bq/g</i>	<i>(pCi/g)</i>	<i>Bq/g</i>	<i>(pCi/g)</i>
<i>In soil:</i>				
Sr-90	0.57	(15.4)	0.13	(3.5)
Cs-137	23.5	(631)	0.74	(20.1)
Ra-226*	24.8	(672)	0.53	(14.3)
<i>In ground water:</i>				
H-3	2670**	(72,200**)	362	(9790)
Sr-90	2300	(62,100)	400	(10,800)
Cs-137	2.10	(57)	1.16	(31.3)
Ra-226*	0.34	(9.1)	0.041	(1.1)

\*NRC does not have regulatory authority over Ra-226.

\*\*In 1990 CNSI measured 5,100 Bq (138,000 pCi)/l.

The 1990 CNSI partial site characterization study indicated that ground water tends to move toward the south (i.e., toward the river). However, the limited nature of that study did not rule out the possibility that there may be some flow toward the adjacent properties on the east or west.

Contamination also has been detected off site. Soil contaminated with Cs-137 was detected on the property to the east (i.e., on the Vance-Walton property). Much of this contamination was removed and relocated to the Bloomsburg site. Ground water off site has shown evidence of radioactivity. Offsite wells have shown evidence of H-3 with the highest level, 1110 Bq (30,000 pCi)/l, recorded at the Vance-Walton well. This value is above the U. S. EPA maximum contaminant level of 740 Bq (20,000 pCi)/l. The 1990 CNSI study also showed evidence of Sr-90 in ground water samples taken from properties to the east and west of the Bloomsburg site. (Note that in the late 1980's, SLC bought the Vance-Walton property and the staff does not believe that offsite wells are currently used for drinking water.)

Current NRC-licensed activities at the Bloomsburg site involve manufacture and distribution of H-3 containing products. These activities generate radioactive wastes, some of which are packaged and stored onsite; they also lead to environmental releases of H-3, which are believed to be responsible for observed H-3 contamination on site and off site.

There has been no formal estimate of the volume of waste that would be generated during site decontamination. However, in a December 1991 report, CNSI estimated the costs of certain tasks associated with site characterization and partial remediation, as outlined below.

<i>Brief Description of Task</i>	<i>Estimated Cost (\$)</i>
• geophysical and radiological survey	320,000
• excavate underground silos; store waste on site	956,900
• same as task above, but if material is not mixed waste, dispose of it as low-level radioactive waste	2,203,300
• characterize only underground silos, lagoons, plant dumps, abandoned canal	835,700
• characterize site (except buildings, equipment, etc.)	1,108,900
• same as task above, but includes buildings, etc.	1,224,500

In early 1991, the licensees estimated that the cost of decommissioning the Bloomsburg site was in the range of \$1 to 20 million. As indicated above, the 1991 CNSI report modified the lower end of the range by estimating that, if certain criteria were met, the cost of remediating the silo area alone would be approximately \$2.2 million. Without a complete site characterization, neither the 1991 CNSI report nor any other document submitted by the licensees provides a realistic estimate of the total cost of decommissioning the Bloomsburg site.

#### **4. Description of Radiological Hazard**

The principal hazards associated with the contamination at the Bloomsburg site are radiation doses to humans resulting from direct exposure, inhalation, and ingestion pathways. The contaminated areas are fenced and posted as required by 10 CFR Part 20, thus minimizing the effects of intrusion. Inhalation and ingestion pathway doses have been estimated to be 0.2  $\mu\text{Sv}$  (0.02 mrem)/yr effective whole-body equivalent for worker inhalation and 272  $\mu\text{Sv}$  (27.2 mrem)/yr to the bone, and 15  $\mu\text{Sv}$  (1.5 mrem)/yr effective whole-body equivalent for ingestion of food grown on site. Ground water from an offsite well (Vance-Walton) indicates H-3 levels at or above EPA recommendations. Drinking ground water obtained from onsite wells could result in a bone dose of 54,000  $\mu\text{Sv}$  (5400 mrem)/yr and an effective whole-body equivalent dose of 4,000  $\mu\text{Sv}$  (400 mrem)/yr. These doses are well above EPA interim drinking water standards. Note that drinking water is not now taken from onsite ground water sources, but this could occur if the site is released for unrestricted use.

#### **5. Financial Assurance/Viable Responsible Organization**

SLC has several licenses, two of which authorize possession and use of types and quantities of radioactive material that necessitate compliance with 10 CFR 30.35, which requires financial assurance for decommissioning a site. If a licensee has more than one license per site, such as SLC, the rule requires the submission of a certification of financial assurance (CFA) in the amount of \$750,000 per license or a site-specific decommissioning funding plan (DFP) by July 27, 1990. Further, if a licensee initially chose to submit a CFA rather than a DFP, it would have been required to supplement any pending renewal application with a DFP by July 27, 1990. The licensees have not submitted a CFA or DFP; as a result, on February 7, 1992, the staff denied the applications for renewal of the two licenses that are subject to 10 CFR 30.35.

[Note: SLC contests the statements in the previous paragraph concerning the requirements that a holder of multiple licenses must submit more than one CFA, and that licensees must have submitted a DFP to supplement any pending license renewal application by July 27, 1990, as an incorrect interpretation of the rule, in its on-going litigation challenging the staff's denial of its license renewal applications. In addition, SLC contends that it has provided various assurances that constitute an adequate CFA under the rule, comprised of (1) \$125,000 which SLC spent on a partial site characterization in response to a 1989 staff Order; (2) \$600,000 it received in settlement of various claims against its liability insurance carriers; (3) a promise to continue its insurance litigation and to pursue any claims it may have against the U.S. Departments of Defense and the Navy; and (4) a promise to devote one-half of its future operating profits to site decontamination.]

On January 29, 1993, the staff issued an Immediately Effective Order to prevent SLC from proceeding to take any further steps to implement its announced transfer of assets, or any other major transfer of assets that may reduce its ability to comply with the staff's March and August 1989 Orders and the February 1992 Order that accompanied the denial of its license renewal applications. A hearing has been requested on this Order.

#### **6. Status of Decommissioning Activities**

SLC fenced and posted contaminated areas of the Bloomsburg site and arranged for CNSI to perform a partial site characterization in mid-1990 (studying the groundwater flow regime). SLC has also represented to the staff that it is setting aside certain funds received from its insurance carriers, for the purpose of site characterization and remediation (which funds it has indicated might also be used to pay its litigation expenses, including attorneys' fees and expert witness fees, in its ongoing litigation challenging various staff orders and the denial of its license renewal applications).

#### **7. Other Involved Parties**

No other involved parties.

#### **8. NRC/Licensee Actions and Schedule**

Actions to be taken will be dependent on the results of on-going hearings.

#### **9. Problems/Issues**

See above.

# SCHOTT GLASS TECHNOLOGIES, INC.

## 1. Site Identification

Schott Glass Technologies, Inc.  
Duryea, PA

License No.: STB-988  
Docket No.: 040-07924  
License Status: Active—possession only/decommissioning  
Project Manager: E. Reber, Region I  
LLWM Monitor: H. Spiro

## 2. Site and Operations

Between 1969 and 1980, Schott Glass produced special optical glass containing up to 30 percent thorium by weight at its facility in Duryea, Pennsylvania. Glass actually produced varied from 8 percent to 23 percent thorium by weight. After production ended in 1980, radioactive surveys of the property indicated that some scrap glass from this production was deposited in a landfill located on the Schott property adjacent to buildings on site. This landfill contains primarily nonradioactive glass scrap, other materials used at the plant and native soil.

The landfill is adjacent to the Schott Glass building in an industrial park. The area, zoned industrial, is in the Pocono Mountains with relatively low surrounding population density. Residential growth is considered unlikely by the licensee.

The base of the landfill is undisturbed, relatively impervious clay soil indigenous to the area. The geology below the natural soil is sedimentary rock (principally shale). There is evidence of abandoned mine shafts in the area. There are no surface waters in the immediate vicinity. The ground water is of poor quality and is generally not used.

## 3. Radioactive Wastes

The contaminated wastes in the landfill include (1) soil contaminated with scraps of thoriated glass from the manufacture of optical glass and (2) a small amount of refractory tile that lined the ovens of the Schott plants containing small amounts of natural thorium and uranium. The tiles contain less than 0.05 percent thorium plus uranium by weight and, therefore, are exempt from the requirement for an NRC license.

The landfill occupies a parabolically-shaped area approximately 75 meters (250 feet) wide and 75 meters (250 feet) long at the rear and one side of the Schott building. Landfill material extends to a maximum depth of approximately 6 meters (20 feet). The licensee estimates that the volume of the landfill material is approximately 9100 m<sup>3</sup> (10,000 yd<sup>3</sup>) because it does not extend to a uniform depth of 6 meters (20 feet).

Laboratory analysis of five samples from four locations on and around the landfill indicate that the average concentration of natural thorium is approximately 0.07 Bq (2 pCi)/g, approximately typical environmental concentrations. The concentration of thorium in the glass scrap obtained from one of the soil samples is 175 Bq (4710 pCi)/g.

The concentration of thorium in individual pieces of the glass scrap is above the amount allowed to be disposed under Option 1 in the BTP. The licensee estimates that the thoriated glass in the landfill contains a total of 450 kg (1000 pounds) of thorium. Using 7600 m<sup>3</sup> (10,000 yd<sup>3</sup>) as the total volume, a conservative density of 2 g/cm<sup>3</sup> for all of the material in the landfill and the specific activity of natural thorium of 8,140 Bq (2.2 x 10<sup>-7</sup> Ci)/g, the average concentration of thorium in the landfill is about 0.2 Bq (6.5 pCi)/g. This is less than the value of 0.37 Bq (10 pCi)/g for Option 1 in the 1981 BTP.

## 4. Description of Radiological Hazard

There is no immediate threat to public health and safety. The waste onsite is in the form of source material (thorium) in glass scraps. The contamination is trapped in the glass scrap and is, therefore, very unlikely to migrate off site.

A radiation survey of the landfill area yielded exposure rates ranging from 8 nC/kg to 90 nC/kg (30 to 350  $\mu$ R)/hr. The average exposure rate in the landfill area is less than 52 nC/kg (200  $\mu$ R)/hr.

## **5. Financial Assurance/Viable Responsible Organization**

The licensee has submitted a decommissioning plan for terminating the license. Although there is no financial assurance in the plan, the licensee has indicated that resources are available, and that the plan will be implemented when approved by all reviewing parties.

## **6. Status of Decommissioning Activities**

Schott submitted a plan, dated June 30, 1988, for the decontamination and disposal of the scrap material by burial on site pursuant to 10 CFR 20.302. The plan consisted of (1) preliminary survey of the property, (2) collection and storage of immediately recoverable pieces of thoriated glass scrap from the landfill area, (3) excavation of the entire landfill area to a depth of 1.2 meters (4 feet) below the planned final grade, (4) placement of collected thoriated glass scraps at the excavated depth of greater than 1.2 meters (4 feet) below final grade, (5) placement of clean overburden to a depth of 1.2 meters (4 feet), and (6) a final survey. Thus, the thoriated glass scrap was proposed to be placed in the landfill at a minimum burial depth of a 1.2 meters (4 feet).

Schott estimated the cost to remove, transport, and dispose the contaminated material at a licensed disposal facility to be about \$18 million in 1988. The plan also discussed the site characteristics favoring the planned disposal at the site. These include the fact that the landfill is in an area with only industrial activities, no foreseeable reason for residential growth on this specific land, and the ground water in the area is of poor quality and not generally used.

NRC reviewed the Schott plan and found that the proposed disposal could be authorized under NRC's 1981 BTP subject to certain conditions. These included requiring that any thoriated glass scrap that is collected during implementation of the plan be disposed in a licensed low-level waste disposal facility and assuring appropriate notification of the local government.

The licensee satisfactorily responded to the NRC request, and the modified plan was formally approved on May 29, 1990. The licensee began decommissioning activities in June 1990. During these activities the licensee discovered lead-containing compounds (a hazardous waste regulated by the Pennsylvania Department of Environmental Resources [PADER]) in the area.

The licensee performed an assessment of the lead contamination and found that it was primarily lead oxide, an ingredient used in the manufacture of various types of glass. An eroded area of the landfill allowed some of the lead contamination to be transported to an athletic field down gradient from the landfill. Based on sampling by the licensee, no thorium was transported with the lead. The licensee removed the lead contaminated soil from the athletic field and plans to dispose of it in accordance with hazardous materials disposal regulations. It is negotiating with PADER to develop an acceptable site closure plan. A proposed final plan was submitted to PADER in late September 1991. NRC staff met with PADER to discuss concerns and answer questions about NRC's position. The plan was modified in response to PADER comments and the modified plan submitted to both PADER and NRC in November 1992. The modified plan includes less disturbance of the existing landfill, a better final cap, and improved storm water management from the original plan. The licensee states it will implement the site closure plan as soon as PADER and NRC approvals are obtained.

The plan, as previously approved, and unchanged in the modified plan, relies significantly on averaging of concentrations in discrete pieces of glass found in the landfill to demonstrate compliance with the BTP. Also, under the modified plan no thoriated glass will be removed from the landfill prior to closure. Therefore, the Commission's approval will be sought before approval of the modified plan.

## **7. Other Involved Parties**

PADER is currently reviewing the licensee's revised decommissioning plan.

## **8. NRC/Licensee Actions and Schedule**

- NRC staff submits commission paper describing modified closure plan and bases April 1993
- Commission approves/disapproves modified closure plan June 1993
- NRC inspects implementation of plan Summer 1993
- NRC performs confirmatory survey December 1993
- NRC terminates license June 1994

## **9. Problems/Issues**

Potential for mixed waste.

# SEQUOYAH FUELS CORPORATION

## 1. Site Identification

Sequoyah Fuels Corporation Fuel Cycle Facility  
Gore, OK

License No.: SUB-1010  
Docket No.: 040-08027  
License Status: Timely renewal  
Project Manager: M. Horn, FCSS  
LLWM Monitor: J. Shephard

## 2. Site and Operations

The site is located approximately 40 km (25 miles) southwest of Muskogee, Oklahoma. Beginning in 1970, under Atomic Energy Commission (AEC) license SUB-1010, Kerr-McGee Corporation chemically processed natural uranium from yellow cake ( $U_3O_8$ ) to uranium hexafluoride ( $UF_6$ ). In 1987 a facility was added to convert depleted  $UF_6$  ( $DUF_6$ ) to uranium tetrafluoride ( $DUF_4$ ). In addition to processing uranium, Sequoyah Fuels Corporation (SFC) treats the raffinate and then uses it as a fertilizer on company property. The operating facility occupies 34 hectares (85 acres) of a 850-hectare (2100-acre) site. Sequoyah Holding Company, a parent of SFC, owns an additional plot of 4047 hectares (10,000 acres) about 11 km (7 miles) west of the facility, which is used for additional raffinate spreading.

In 1988 General Atomics (GA) purchased Sequoyah Holding Company from Kerr-McGee. In 1990 SFC applied for renewal of its license. In 1990-1991, following discovery of high concentrations of uranium in the soil during excavation of tanks, SFC conducted a facility environmental investigation (FEI). This study showed extensive uranium, nitrate, fluoride, and some arsenic contamination of the soil and local ground water throughout the site. The buildings also are contaminated from process leakage and residual material from the 1986 accident, in which a  $UF_6$  cask overpressurized and ruptured.

In February 1993 SFC notified the NRC pursuant to 10 CFR 40.42(b) that it will cease  $UF_6$  operation immediately and cease  $DUF_4$  production by the end of July 1993. SFC plans to decommission the facility after it stops operations.

## 3. Radioactive Wastes

By the licensee's estimates, there are several million cubic feet of material and soil contaminated with uranium, nitrates, and fluorides throughout the 34-hectares (85-acre) facility. Two levels of ground water beneath the plant also are contaminated with these materials, and there is evidence of arsenic in the soil and ground water. The raffinate ponds and fertilizer pond areas also are contaminated with nitrates and ammonia. In the shallow ground water under the main process building (MPB) and the solvent extraction (SX) building areas, total uranium concentrations ranged from 20,000  $\mu\text{g/l}$  to 36,000  $\mu\text{g/l}$ . In a deeper sandstone/shale ground water, total uranium concentrations ranged from 1040  $\mu\text{g/l}$  to 1420  $\mu\text{g/l}$ . Nitrate concentration in the deeper sandstone/shale ground water ranged from 1000 mg/l to 4350 mg/l in the vicinity of an inactive pond west of the MPB.

The east portion of the site, including the MPB, the SX building, the yellow cake ( $U_3O_8$ ) storage area, and the area around them, is heavily contaminated with uranium, nitrates, fluorides, and other process chemicals. The north end of the site contains a fluoride holding basin, a storage area for empty  $UF_6$  cylinders, and wastes from the 1986  $UF_6$  cylinder explosion. The west side includes clarifier ponds, fluoride settling ponds, and a closed raffinate storage pond that is contaminated to less than 74 Bq (2000 pCi)/g. The south end of the site encompasses one raffinate sludge storage pond and four raffinate and ammonium nitrate (treated raffinate) ponds. There is evidence of significant chemical and some radioactive contamination of both the aquifers underlying the site, but no offsite contamination has been identified. In addition, there is a significant amount of contaminated material stored on site, including 55 gallon drums of yellow cake, packaged waste from previous remediation efforts, and surplus equipment. The site also contains two burial areas that were made under the former 10 CFR 20.304.

#### **4. Description of Radiological Hazard**

This site poses no immediate threat to the public health and safety. The licensee controls access to the site. There is no evidence that ground water contamination has migrated beyond the site boundaries, although the deeper ground water aquifer does extend beyond the site boundaries.

#### **5. Financial Assurance/Viable Responsible Organization**

SFC has an approved financial instrument for \$750,000. In 1990, SFC submitted an application for license renewal 10 CFR 40.36, including a proposed financial instrument for \$2 million for decommissioning. The staff is reviewing the application. In February 1993, SFC notified the NRC, pursuant to 10 CFR 40.42(b), that it intended to cease all licensed activities by summer 1993. A funding plan is required and was provided in conjunction with the application for license renewal; however, because SFC has decided not to renew its license, financial assurance pursuant to the decommissioning funding rule has not been provided. SFC has submitted a preliminary plan that outlines the course of action for decommissioning. Based on that plan, which assumes onsite disposal and no licensee perpetual care for the site, the estimated direct cost is approximately \$21 million. The licensee's proposed plan is currently being reviewed by the staff. In the plan, the source of projected revenues for decommissioning are the future sale of UF<sub>6</sub> by ConverDyne, a marketing company formed by subsidiaries of GA and Allied Signal, and a small income from use of the fertilized land. SFC has not offered to provide any financial assurance in support of its proposal to fund decommissioning costs from revenues.

#### **6. Status of Decommissioning Activities**

SFC conducted an extensive site characterization program, the FEI. SFC agreed to implement the ground water monitoring plan submitted as part of the 1990 license renewal application. The former raffinate holding area, known as Pond 2, has been remediated to approximately 74 Bq (2000 pCi)/g. Routine cleaning of the UF<sub>6</sub> facility is in progress, and the UF<sub>4</sub> facility is still in operation. Characterization of the buildings, the stored materials, including wastes from the 1986 accident, and the 10 CFR 20.304 burial has not begun.

#### **7. Other Involved Parties**

EPA Region VI is in the process of issuing a 3008(h) order (RCRA Interim Status Corrective Action Order). The intervenor group Native Americans for a Clean Environment (NACE) has petitioned for a Subpart L hearing on the license renewal application. The Cherokee Indian Nation has an interest in the site because of the Trail of Tears burial site and traditional lands in the area. The Cherokee Nation and the State of Oklahoma (not an Agreement State) also have intervenor status for the license renewal application. The Corps of Engineers has an interest because the deeper ground water from the site surfaces on the banks of the Illinois River and the Arkansas River/R. S. Kerr Reservoir, which is Corps property.

#### **8. NRC/Licensee Actions and Schedule**

- NRC decision on withdrawal of license renewal application June 1993
- NRC accepts/rejects response to December 1992 DFI June 1993
- SFC and EPA sign 3008(h) order June 1993
- SFC submits 40.42 notification on the DUF4 process July 1993
- SFC submits site characterization plan September 1993
- NRC approval of site characterization activities January 1994
- SFC begins site characterization January 1994
- SFC submits preliminary site characterization report October 1994
- NRC approval of site characterization March 1995
- SFC submits preliminary decommissioning plan October 1995

#### **9. Problems/Issues**

The major problems identified are onsite disposal of large quantities of radiologically and chemically contaminated materials and the lack of financial assurance to support the proposed long-term decommissioning effort. There is potential for extensive litigation by intervenors during the decommissioning of the SFC site.

# SHIELDALLOY METALLURGICAL CORPORATION, CAMBRIDGE, OHIO

## 1. Site Identification

Shieldalloy Metallurgical Corporation  
Cambridge, OH

License No.: SMB-1507  
Docket No.: 040-08948  
License Status: Active  
Project Manager: C. Glenn

## 2. Site and Operations

The site is located south of Cambridge, Ohio. The previous owners of the site had processed niobium ore containing licensable quantities of thorium and uranium. The radionuclides from the ores became incorporated into waste slag and are stored in two separate piles (west and east) on site. Shieldalloy has remediated the site so that all waste slag is contained in the two slag piles.

## 3. Radioactive Wastes

The west pile originally consisted of approximately 272,000 metric tons (300,000 tons) of slag and soil covering 30,800 m<sup>2</sup> (7.6 acres) with the following average concentrations:

- Th-232: 0.05 Bq (1.4 pCi)/g
- U-238: 0.11 Bq (3 pCi)/g
- Ra-226: 0.088 Bq (2.4 pCi)/g

Following site remediation, an additional 127,000 metric tons (140,000 tons) of higher-concentration slag and soil was added. The additional material has the following average concentrations:

- Th-232: 1.55 Bq (42 pCi)/g
- U-238: 1.99 Bq (54 pCi)/g
- Ra-226: 1.55 Bq (42 pCi)/g

The crown of the pile has about 1.2 meters (4 feet) of cover material consisting of Chemfix (a treated, clay-like material), geotextile material, and sand. Some vegetation has established itself on the pile. In limited areas of the north and west faces of the pile, erosion of the sand has occurred exposing the geotextile layer.

The east pile is uncovered and consists of approximately 81,600 metric tons (90,000 tons) of slag covering 10,500 m<sup>2</sup> (2.6 acres). The east pile is fenced and posted. Average concentrations are as follows:

- Th-232: 0.15 Bq (4 pCi)/g
- U-238: 0.77 Bq (21 pCi)/g
- Ra-226: 2.44 Bq (66 pCi)/g

## 4. Description of Radiological Hazard

The site poses no immediate threat to the public. The contamination consists of radium and uranium and thorium in rock-like slag material. A leachability test conducted by Shieldalloy in 1991 in accordance with ANSI 16.1 for similar slag material stored at its facility in Newfield, New Jersey, facility, indicated that diffusive leaching of radium, uranium, and thorium is insignificant. Exposure rates over the west pile are at background levels. Because the east pile is uncovered, exposure rates there significantly exceed background at an average of 0.029  $\mu\text{C}/\text{kg}$  (115  $\mu\text{R}/\text{hr}$ ).

In 1989 EPA analyzed surface water and sediment samples from a stream that runs through the site. Surface water results indicated gross alpha levels ranging from 0 to 208 Bq (0 to 5621 pCi)/l and gross beta levels ranging

from 0.037 to 17.6 Bq (1 to 476 pCi)/l. The results also indicated levels of several metals including vanadium, chromium, nickel, lead, selenium, and zinc in surface water, ground water, and sediments. It has not been determined if the slag piles are a source of the contamination. It should be noted that strip mines are located upstream from this facility and that the highest radioactivity levels were associated with upstream surface water and sediment samples. Additional sampling recently performed by EPA combined with the results of sampling planned by the licensee should resolve this issue by the end of 1993.

## **5. Financial Assurance/Viable Responsible Organization**

The site is owned by Shieldalloy Metallurgical Corporation. Although licensable activities were undertaken by previous owners, Shieldalloy is able and willing to undertake necessary remediation but is unwilling to dispose of radioactive material offsite. Shieldalloy believes that offsite disposal of material having concentrations greater than Option 1 of the 1981 BTP is an unreasonable requirement considering the current dose levels from the piles. Shieldalloy has indicated that offsite disposal is not a financially possible option for them. Offsite disposal of this material would be at least \$75 million (estimated at \$30 per cubic foot). Shieldalloy currently holds financial assurance of \$750,000.

## **6. Status of Decommissioning Activities**

Shieldalloy has remediated all of the site to BTP Option 1 levels except the slag piles. NRC has performed confirmatory surveys of the remediated areas. Two localized areas remain slightly above BTP Option 1 levels.

Shieldalloy submitted a decommissioning plan for the west pile in February 1990, which proposed in situ disposal. NRC informed the licensee that the plan could not be approved as submitted because a large portion of the higher-concentration slag and soil placed on the original pile exceeded BTP Option 2 concentrations. NRC met with the licensee to discuss this issue in August 1991 and May 1992. The licensee intends to conduct a comprehensive analysis of decommissioning options (including a site-specific pathways analysis) and costs for the west and east piles. This analysis will be documented in a technical basis document. One of the options under consideration is to request an exemption from the unrestricted release requirement and pursue NRC authorization for onsite disposal under 10 CFR 20.302.

In November 1992, NRC approved the licensee's workplan for developing the technical basis document that will be submitted to NRC in May 1993 and should provide the technical support for the licensee's proposed decommissioning option. The licensee will submit a site-wide decommissioning plan and schedule for the west and east piles on the basis of the technical basis document. This site-wide decommissioning plan will supersede the February 1990 West Pile Decommissioning Plan.

In response to results from the surface water sampling conducted by EPA Region V in 1989, and NRC's request, Shieldalloy prepared a plan for groundwater and surface water monitoring and sediment sampling. This plan is designed to better characterize ground water, surface water, and sediments in and around the site. The licensee also will use data to investigate potential overland transport of contamination from the slag piles (via surface runoff) to the stream that runs through the site.

The licensee submitted this program to EPA and NRC in May 1992. NRC provided comments on the monitoring plan in August 1992. Monitoring is scheduled to begin in the early spring of 1993.

## **7. Other Involved Parties**

On the basis of its 1989 sampling results and its conclusions from a preliminary site assessment completed in early 1993, EPA has decided to collect additional data before preparing a site inspection report and possible hazard ranking. EPA's focus is on the non-radiological hazardous materials at the site rather than the radiological contamination. In April 1993, EPA conducted additional sediment and water sampling on site. The site inspection report will recommend whether a hazard ranking score should be developed for the site for possible inclusion on the National Priorities List. EPA expects to complete the site inspection report by the fall of 1993. The Ohio Environmental Protection Agency (OEPA) is involved in addressing non-radiological aspects at the site. OEPA has specifically expressed concerns about the potential effect of the site on adjacent wetlands and potential leaching of chromium from the west pile capping material. The Ohio Department of Health (ODH) is following progress at the site but has not taken an active role. NRC has committed to provide EPA, OEPA, and ODH an opportunity to review and comment on all documents that the licensee submits to NRC.

NRC is considering the most efficient and effective way to work with OEPA and EPA to satisfy their concerns about non-radiological hazards at the site while ensuring satisfactory decommissioning of material subject to NRC jurisdiction.

## **8. NRC/Licensee Actions and Schedule**

- licensee submits technical basis document for decommissioning (includes site-specific pathways analysis and analysis of decommissioning alternatives and costs) May 1993
- NRC prepares Commission paper on general decommissioning policy options July 1993
- NRC approves technical basis document for decommissioning December 1993
- licensee submits site-wide decommissioning plan and schedule May 1994

## **9. Problems/Issues**

The most significant problem is the licensee's lack of funds necessary to dispose of higher concentration slag offsite. The only other alternatives are for the licensee to apply for an exemption from the unrestricted release requirement or for other disposal options under 10 CFR 20.302.

# SHIELDALLOY METALLURGICAL CORPORATION, NEWFIELD, NJ

## 1. Site Identification

Shieldalloy Metallurgical Corporation  
Newfield, NJ

License No.: SMB-1507  
Docket No.: 040-07102  
License Status: Active—timely renewal  
Project Manager: Gary Comfort, FCSS  
LLWM Monitor: C. Glenn

## 2. Site and Operations

Specialty ferro alloys are manufactured at this facility. The site covers 27 hectares (67 acres) in Newfield, New Jersey. Operations began in 1955 and are on-going. There are multiple buildings on the property; however, all smelting operations involving source material are conducted in a foundry near the west central portion of the site. Licensed ores are stored in a warehouse near the foundry. Licensed slag containing thorium and uranium is located in two piles (standard ratio and high ratio) in a controlled area. Exhaust air from processing activities passes through baghouse dust collectors. Dust collected in the baghouses is considered as licensed material and is accumulated in a pile located within the confines of the controlled area. These piles are described below.

Standard Ratio Pile -- this pile consists of 42,000 metric tons (46,100 tons) of slag in a volume of 16,800 m<sup>3</sup> (595,000 ft<sup>3</sup>). The slag contains concentrations of Th-232 averaging 19.1 Bq (516 pCi)/g, Ra-226 averaging 4.55 Bq (123 pCi)/g, and U-238 averaging 7.47 Bq (202 pCi)/g.

High Ratio Pile -- this pile consists of 3200 metric tons of slag in a volume of 1000 m<sup>3</sup> (35,000 ft<sup>3</sup>). The slag contains concentrations of Th-232 averaging 13.5 Bq (366 pCi)/g, Ra-226 averaging 2.6 Bq (69 pCi)/g, and U-238 averaging 3.9 Bq (105 pCi)/g.

Baghouse Dust Pile -- this pile consists of 12,000 metric tons (13,400 tons) of lime dust in a volume of 15,000 m<sup>3</sup> (530,000 ft<sup>3</sup>) with concentrations of Th-232 averaging 2.0 Bq (55 pCi)/g and Ra-226 and U-238 each averaging 0.59 Bq (16 pCi)/g.

Processing of non-radioactive materials in other (i.e., non-licensed) facilities on the site has resulted in a plume of chemical (non-radioactive) contamination in the ground water (primarily chromium). This has caused the site to be a high-priority listing on the Superfund National Priorities List (NPL). Ground water remediation is ongoing.

## 3. Radioactive Wastes

Soils around the piles, and at numerous locations around the main yard of the site and foundry building, are contaminated. Average soil concentrations of Th-232, Ra-226, and U-238 are 1.06 Bq (28.6 pCi)/g, 0.31 Bq (8.4 pCi)/g, and 0.39 Bq (10.5 pCi)/g, respectively.

Some offsite contamination has occurred. Levels of radionuclides in some soil samples outside the perimeter fence exceed 0.37 Bq (10 pCi)/g above background for thorium and radium and 1.3 Bq (35 pCi)/g for uranium. Certain offsite locations on Haul Road, which leads from the southern perimeter of the site to Weymouth Road, have elevated levels of direct gamma radiation (greater than 0.00258  $\mu\text{C}/\text{kg}$  [10  $\mu\text{R}$ ]/hr above background). Haul Road and its immediate vicinity have not been adequately characterized.

Since December 1989 Shieldalloy has been performing quarterly gross alpha and gross beta analyses on grab samples obtained from 5 wells located on-site and down-gradient, and 1 well located on-site and up-gradient from the Source Material Storage Yard (SMSY). These samples have occasionally indicated elevated concentrations, the highest being 2.5 Bq (67 pCi)/l gross alpha and 20 Bq (530 pCi)/l gross beta. Sediments from area drainage pathways leading from the site indicate some locations of contamination at and just beyond the plant perimeter but there is no accumulation of radioactivity in area surface water.

#### 4. Description of Radiological Hazard

Site access is controlled. The site poses no immediate threat to the public health and safety. The contamination present is relatively insoluble radium, thorium, and uranium in the slag, baghouse dust piles, and soil. Diffusive leaching of each of these radionuclides from the slag was determined to be insignificant in a leachability test performed in 1991/92 by Shieldalloy in accordance with ANSI 16.1. Low concentrations of Th-232, U-238, and Ra-226 in subsurface soil and water provide additional evidence that contamination from the site operations is not migrating into the soil or ground water. Soil contaminants appear to be limited to the upper 30(60 cm (1-2 feet) of soil. A likely pathway and source of contamination beyond the controlled areas appears to be overland runoff from the baghouse dust piles and from spills and fugitive emissions that might occur during routine unloading of dust from the bag houses into trucks and during transport to the SMSY. The nature and extent of this contamination has been partially determined by the site characterization report submitted in April 1992. Shieldalloy will be asked to take appropriate cleanup and mitigative measures.

A walkover survey indicated elevated gamma exposure rates of up to 45 nC/kg (175  $\mu$ R)/hr at 1 meter above the surface at the perimeter fence. Most of the elevated levels are due to gamma shine originating from the licensed slag piles.

Radiation doses to the worker and the nearest resident are expected to be within the limits of 10 CFR Part 20.

#### 5. Financial Assurance/Viable Responsible Organization

Shieldalloy is owned by Metallurg, Inc., and all licensed activities were conducted by Shieldalloy. Shieldalloy seems able and willing to undertake cleanup activities but claims that in the absence of insitu disposal, or recovery of useful material, it does not have the means to fund offsite disposal of licensed material.

Shieldalloy currently holds financial assurance in the amount of \$750,000.

#### 6. Status of Decommissioning Activities

Shieldalloy has stated that they are committed to decommissioning the facility at the cessation of operations. Shieldalloy is emphasizing new procedures and housecleaning techniques to keep any newly produced licensed material within controlled areas. There is no expectation for a detailed decontamination plan any time in the near future since the facility is still operating.

In conjunction with a survey for nonradiological hazards for the New Jersey Department of Environmental Protection for Superfund remediation activities, Shieldalloy has completed a limited survey of radioactivity on site and in the site vicinity. A radiological characterization report was finalized in April 1992.

#### 7. Other Involved Parties

The site is on the NPL, so NRC activities are being conducted in coordination with the New Jersey Department of Environmental Protection and the U.S. EPA.

#### 8. NRC/Licensee Actions and Schedule

- environmental assessment September 1993
- safety evaluation report December 1993

#### 9. Problems/Issues

Shieldalloy's lack of funds to dispose of licensed material off site. Shieldalloy is currently generating waste at a rate which will exceed their possession limits in 1996 or 1997. NRC has told Shieldalloy that the possession limits will not be increased if an acceptable decommissioning funding plan has not been submitted.

# TEXAS INSTRUMENTS, INC.

## 1. Site Identification

Texas Instruments, Inc.  
Attleboro, MA

License No.: SNM-23  
Docket No.: 070-00033  
License Status: Decommissioning—expiration date removed by amendment  
Project Manager: J. Roth, Region 1  
LLWM Monitor: J. Shepherd

## 2. Site and Operations

The Texas Instruments, Inc. (TI), facility is located in Attleboro, Massachusetts, south of Boston on Route 123. The site was originally owned by the General Plate Division of Metals and Controls, Inc., when it began to fabricate enriched uranium foils in 1952. That company later merged with TI who fabricated nuclear fuel for the U.S. Navy and for commercial customers during the period from 1957 to 1983. Other than possession of the contamination and any necessary decontamination, licensed activities no longer take place at this location.

The TI site is approximately 40 hectares (100 acres) in size. Fuel fabrication operations performed under contract to the Atomic Energy Commission (exempt from the requirement for a license) took place in about six buildings. Operations performed under the NRC (originally AEC) license took place in one part of one building (Building 10) having an area of about 930 m<sup>2</sup> (10,000 ft<sup>2</sup>).

Some noncombustible uranium and thorium scrap metal and machinery were buried on site in a disposal area of about 1.1 hectares (2.7 acres) between Buildings 11 and 12. This burial site was disturbed during construction of Building 12 in the late 1960's, and contaminated soil may have been distributed over the construction site or moved to a location off site. For these reasons the potentially contaminated area covers approximately 5.1 hectares (12.7 acres) on site and an unknown quantity off site at a former landfill.

## 3. Radioactive Wastes

Material remaining at the Attleboro site consists only of contaminated soil. The buildings were decontaminated, and a final survey of the buildings made in January 1985 indicated that no contaminated material exceeding the criteria of Regulatory Guide 1.86.

An unknown quantity of contaminated soil and metal scrap containing at least 1110 MBq (30 mCi) of U-235 and natural uranium in the oxide form were buried at the site in an area of originally 1.1 hectare (2.7 acres) until 1964. The disposal area is described as being at least 1.2 meter (4 feet) deep and covered with a soil cap of unknown thickness. There is no indication that any liner material was used or that any natural liner exists. An NRC transit survey conducted in 1985 indicated that an unknown quantity of material may have been removed from the 1.1-hectare (2.7-acre) disposal area. It is believed that this material, contaminated with uranium, was disposed at a private landfill on property owned by Mr. P. Shpack in Norton and Attleboro, which operated from 1946 to 1965.

Samples taken at the Shpack landfill site include a metal casting, soils, mud, and ground water. The metal casting containing about 40-percent total uranium enriched to about 20-percent U-235 had a contact exposure of approximately 0.2 mSv (20 mrem)/hr. Depleted, natural, and enriched uranium was found in the soil samples at concentrations ranging from 0.05 Bq (1.35 pCi)/g to 8300 Bq (225,000 pCi)/g. However, all the water samples were at background levels. Following a survey of other licensees in the area, NRC concluded that it is likely that some of these materials resulted from work performed by Metals and Controls (now TI) under contract to the Atomic Energy Commission. The radioactive wastes found at the landfill are considered to be typical of what may have been disposed at the TI burial site in Attleboro. In December 1980 DOE placed the Shpack landfill under the Formerly Utilized Site Remedial Action Program (FUSRAP) to develop appropriate response actions for the cleanup of the radionuclides at the Shpack landfill. In addition, TI, along with several other companies entered into a consent order with EPA regarding the landfill.

#### 4. Description of Radiological Hazard

The principal hazards associated with the contamination at the TI site in Attleboro involve inhalation, ingestion, intrusion, and ground water. Because only small amounts of material remain on the site, there is minimal hazard remaining at this facility. Information from the ground water monitoring wells that were installed in 1980 through 1983 indicated that concentrations of radioactive material in the ground water were at background levels.

Regarding the radiological hazard at the Shpack landfill, TI has engaged a contractor to characterize the uranium contamination and to coordinate with DOE. Since the landfill is part of a DOE FUSRAP site and TI is a party to the consent order with EPA, NRC will not consider the landfill further.

#### 5. Financial Assurance/Viable Responsible Organization

The possession limit listed in this license is 700 grams of U-235 (approximately 1700 MBq [45 mCi]). Although the decommissioning rule required the licensee to have a financial certification in the amount of \$750,000 by July, 1992, a financial certification has been submitted in the amount of \$380,000. Because the licensee is decommissioning the facility, the license expiration date was removed by license amendment on May 5, 1982.

TI is a very large company that is not in financial difficulty and is considered to be capable of providing the required financial assurance. With respect to the Shpack landfill, under an EPA consent order, an annual financial assurance certification for the estimated costs of work to be performed is required.

#### 6. Status of Decommissioning Activities

TI submitted a decommissioning plan on July 20, 1978. NRC approved this plan on October 9, 1978. A detailed decontamination plan was submitted to the NRC in August 1981. In accordance to this detailed plan, in 1983 cleaned up contamination remaining within the buildings at the Attleboro site. ORISE performed a survey of these buildings for the NRC in January 1985. A decommissioning plan for the burial site was submitted to the NRC for approval in July 1992. NRC approval of this plan was issued in August 1992 and the licensee initiated remediation activities at that time. NRC performed a verification survey during December 1992. During this survey it was determined that further remediation was required. The licensee is performing that remediation at this time.

NRC staff verbally requested on numerous occasions that TI provide documentation acknowledging that the radioactive material apparently removed from the Attleboro burial site was transferred to the Shpack landfill. TI, however, has not provided this acknowledgement probably due to possible liability concerns with respect to the Shpack landfill cleanup.

EPA designated the Shpack landfill as a Superfund site and issued a consent order for a remedial investigation feasibility study on September 14, 1990. EPA's "Findings of Fact," as detailed in their consent order, state that EPA has reason to believe that Settling Party, TI, arranged for disposal of hazardous substances, including uranium wastes, at the Shpack Landfill. Based on this finding and all other information available to NRC, the NRC staff considers the material in the Shpack landfill likely to be that removed from the Attleboro site and plans to proceed from that conclusion.

#### 7. Other Involved Parties

DOE and EPA are involved in cleanup of Shpack landfill.

#### 8. NRC/Licensee Actions and Timing

- TI submits final survey report for excavated area April 1993
- NRC performs confirmatory survey for excavated area May 1993
- TI submits final survey report for burial area surface July 1993
- NRC performs confirmatory survey of burial area surface August 1993
- NRC releases site for unrestricted use March 1994

**9. Problems/Issues**

None.

# UNITED NUCLEAR CORPORATION RECOVERY SYSTEMS

## 1. Site Identification

UNC Recovery Systems  
Wood River Junction, RI

License No.: SNM-777  
Docket No.: 070-00820  
License Status: Current (until termination by the Commission)  
Project Manager: J. Parrott

## 2. Site and Operations

The site is located in southwestern Rhode Island and occupies 451 hectares (1114 acres) on both sides of the Pawcatuck River. United Nuclear Corporation (UNC) operated an enriched uranium scrap recovery facility from 1964 until 1980. The site contained buildings, lagoons, and a burial ground. The operational portion of the site covered an area of 2.3 hectares (5.6 acres).

The facility processed various types of unirradiated scrap to reclaim uranium for reuse as fuel for nuclear reactor operations. Although primarily unirradiated fuel elements were processed, slightly irradiated fuel elements from zero power test reactors were processed from 1967 to 1980. Additionally, UNC experienced a nuclear criticality excursion in 1964. Therefore, fission products were present and had to be considered during decommissioning activities. U-235 enrichment in the scrap ranged from a few percent to greater than 90 percent. The scrap processed in the facility for uranium recovery was received in several different matrices; included were zirconium, ceramics, aluminum, carbon, thorium, and contaminated wastes of varying kinds. The process used at the facility included acid digestion with nitric and hydrofluoric acids and organic separation with tributyl phosphate and kerosene. In addition to these, the following chemicals were used in the recovery process and were present in the wastes in varying concentrations: aluminum nitrate, calcium hydroxide, mercury, sodium carbonate, sodium hydroxide, and potassium hydroxide.

Solid wastes from the process were shipped off site. Liquid wastes were originally discharged to the Pawcatuck River through a drain pipe. From 1966 to 1979, liquids were discharged into lined lagoons. From 1979 until the facility closed, storage tanks were used for liquid wastes.

Between 1974 and 1977, the Rhode Island Water Resources Board drilled several test wells on UNC property to obtain water quality information. This testing program resulted in the discovery of above background levels of radioactivity and nitrate ( $\text{NO}_3$ ) in the ground water under UNC property. UNC responded by initially drilling 10 observation wells between the plant and the Pawcatuck River to assess the contamination problem. Additional wells were added later. The U.S. Geological Survey also installed a number of wells. Review of the data revealed that the plume extended from the lagoons to the Pawcatuck River a distance of about 460 meters (1500 feet).

By letter dated April 29, 1980, UNC informed the NRC of its plans to terminate recovery operations and initiate decommissioning. UNC characterized and decontaminated the facility in conjunction with ORISE confirmatory surveys. These activities were completed in 1989. By letter dated July 19, 1990, UNC requested the site be released for unrestricted use and its license terminated.

## 3. Radioactive Wastes

The contamination consisted of enriched uranium and fission products on surfaces and in soil, and ground water. In a few isolated unrestricted areas, ORISE found peak total uranium residual soil concentrations above 1.1 Bq (30 pCi)/g. However, when averaged over a grid block or adjacent land areas these isolated areas satisfied the release criteria. Likewise in the restricted area, some isolated hotspots satisfied the release criteria when averaged over their grid or over adjacent grids. The highest exposure rate measured at the site, after the completion of remediation activities, was 2.58 nC/kg ( $10 \mu\text{R}$ )/hr above background at 1 meter (3.2 feet) above the surface.

## 4. Description of Radiological Hazard

Surface and soil contamination has been remediated to the point of being acceptable for unrestricted release. Residual ground water contamination by Sr-90 and  $\text{NO}_3$  remains. The last ground water sampling took place in

1990. The highest Sr-90 concentration measured at that time was 1.24 Bq (33.6 pCi)/l and the highest NO<sub>3</sub> was 257 mg/l. The proposed Sr-90 EPA drinking water standard is 1.6 Bq (42 pCi)/l. The NO<sub>3</sub> drinking water standard of the U.S. Environmental Protection Agency (EPA) is 10 mg/l; however, NRC does not regulate, non-radiological substances like NO<sub>3</sub>.

As a result of natural flushing, the ground water Sr-90 and NO<sub>3</sub> concentrations have been going down over the years since the plant ceased operations. The contaminated ground water plume is discharged into the Pawcatuck River on site and is diluted to below detectable levels.

## **5. Financial Assurance/Viable Responsible Organization**

UNC has already financed the decontamination of the radiological contamination at this site.

## **6. Status of Decommissioning Activities**

The site has been remediated to NRC specifications. The ORISE confirmatory surveys of this site indicate that it is suitable for unrestricted release. However, NO<sub>3</sub> contamination remains in the ground water above EPA standards.

A meeting was held in Providence, Rhode Island, on February 11, 1993, between staff from NRC, UNC and the State of Rhode Island Departments of Administration and Environmental Management to try to resolve the issue. The State is recommending against delicensing at this time unless certain conditions are met by the licensee. NRC and the licensee are working with the State to ensure that their concerns are met allowing NRC to terminate the license.

## **7. Other Involved Parties**

Parties involved in this site are the Rhode Island Departments of Administration, Environmental Management, and Health; the Narragansett Indian Tribe; and the U.S. Department of Interior. Other interested parties are the Rhode Island Governor's Office and the Town of Charlestown, Rhode Island.

## **8. NRC/Licensee Actions and Schedule**

- |   |                |
|---|----------------|
| • State of Rhode Island takes regulatory responsibility for the groundwater nitrate contamination | June 1993      |
| • public meeting on license termination   | August 1993    |
| • NRC terminates license  | September 1993 |

## **9. Problems/Issues**

The State of Rhode Island is concerned that there is nitrate contamination in on site groundwater above EPA drinking water standards. Because of this, they may not recommend that the license be terminated.

# UNITED TECHNOLOGIES/PRATT & WHITNEY

## 1. Site Identification

United Technologies/Pratt & Whitney  
Middletown, CT

License No.: 06-00550-03  
Docket No.: Unknown  
License Status: Terminated June 21, 1971  
Project Manager: M. Roberts, Region I  
LLWM Monitor: B. Lahs

## 2. Site and Operations

The Pratt & Whitney (P&W) facility is comprised of approximately 450 hectares (1100 acres) located on the west bank of the Connecticut River 8 km (5 miles) southeast of Middletown, Connecticut. P&W has operated the site in Middletown for the development and manufacture of aircraft engines since 1957. At that time the site was owned by the U.S. Government and operated under contract. Of the approximately 34 major buildings on the site, 22 were identified as locations where radioactive material may have been used or stored during operations at the site. Building 450 is the only building on site with significant radioactive contamination.

Building 450 was used between June 1960 and August 1965 for the Connecticut Advanced Nuclear Engine Laboratory (CANEL) Project, which operated under AEC Contract AT(30-1)2789. The CANEL Project included the examination of test fuel elements and other reactor components for proposed experimental high-temperature reactors. The radioactive material included about  $2E16$  Bq (500,000 curies) of mixed fission products, activated structural material, and fuel specimens.

The U.S. Army Corps of Engineers constructed Building 450 between 1956 and 1960 for the U.S. Air Force. The building is a  $3000 \text{ m}^2$  (32,000  $\text{ft}^2$ ), two-story structure located on the northwest corner of the site. The building contained a row of seven hot cells, a fan room, a liquid waste retention vault, subfloor storage pits, and associated underground liquid waste drain lines. The liquid waste retention vault is an underground room located adjacent to the east side of the building. The vault contains five tanks, which apparently were used to hold liquid waste from operations inside Building 450 before analysis and discharge. The storage pits are located east of the block of hot cells inside Building 450. The pits were probably used to store large quantities of radioactive material before or after they were processed in the hot cells. There are six small storage pits and five large storage pits.

After the AEC contract activities were discontinued in August 1965, the U.S. Government sought to dispose of the property. In May 1966, P&W purchased the site from the U.S. General Services Administration. In June 1966, P&W was granted an AEC Byproduct Material License 06-00550-03. The license authorized the possession of  $1.8E11$  Bq (5 Ci) mixed fission products in the form of surface contamination which remained in Building 450. Most of the surface contamination was located in the hot cells. All accessible surfaces were cleaned and painted to minimize the potential for inadvertent removal of the contamination.

At the request of P&W, AEC issued several license amendments to License 06-00550-03 between 1966 and 1971. The amended license authorized P&W to use the hot cells to prepare Co-60, Cs-137, Po-210, Sr-90, Sb-124, and Ir-192 sources. Various chemical and physical forms of the isotopes were authorized. The maximum amount of radioactivity for each isotope ranged from hundreds of curies to tens of thousands of curies.

P&W conducted remediation activities in Building 450 in 1970 and confirmed in a letter dated November 12, 1970, that only Co-60 and Cs-137 contamination remained in the hot cells. P&W provided a remediation report with a letter dated April 13, 1971, that requested the AEC to terminate License 06-00550-03. The letter stated that all radioactive waste and miscellaneous sources had been properly disposed. The letter also requested that certain byproduct material authorized by License 06-00550-03 be transferred to License 06-07522-02. License 06-07522-02 was issued to P&W for a facility in East Hartford, Connecticut. The remediation report stated that radiation and contamination levels met the guidelines for unrestricted use that were applicable at the time. The license was terminated by the AEC on June 21, 1971.

Between April 13, 1971, and June 1, 1992, the hot cells were locked and secured. They were not used for any purpose and no work took place inside the hot cells during this period.

### **3. Radioactive Wastes**

P&W's contractor Radiation Safety Associates, Inc. (RSA), performed a radiological survey in June 1992 in and around Building 450. The survey results of the hot cells (1-7), storage pits, liquid waste retention vault, and areas outside the hot cells were provided to NRC in a report dated June 24, 1992. The report stated that gamma exposure rates measured at waist height inside the hot cells ranged between 5 and 10 nC/kg (20 and 40  $\mu$ R)/hr. beta-gamma contamination was found to be as high as 1.4E8 Bq (2.3E6 dpm)/100 cm<sup>2</sup>. Removable beta-gamma contamination was measured as high as 1.4E6 Bq (2.3E4 dpm)/100 cm<sup>2</sup>; however, the majority of the measurements showed levels below 60,000 Bq (1,000 dpm)/100 cm<sup>2</sup>. Alpha contamination was not detected in any measurements. Soil contamination was detected under the sump in the floor of hot cells 3 and 4. The gross beta activity measured in the soil samples from beneath the sumps was 0.5 Bq (12 pCi)/g and 1.0 Bq to 1.1 Bq (24 to 27 pCi)/g for cells 3 and 4, respectively.

A radiological survey of the six small storage pits and three of the five large storage pits indicated radioactive contamination levels indistinguishable from background. However, large storage pits 1 and 2 were found to contain a total of seven spots of localized fixed contamination with the highest measurement being 4E6 Bq (66,665 dpm)/100 cm<sup>2</sup>.

A radiological survey of the liquid waste storage area, including the interior of two of the five storage tanks, showed no contamination present. However, six hot spots of fixed contamination were found on the interior of tanks 2, 4, and 5. Each hot spot was less than one half-inch in diameter and measured between 1.8E6 Bq (30,000 dpm)/100 cm<sup>2</sup> and 4.8E6 Bq (80,000 dpm)/100 cm<sup>2</sup>. Tank 5 had one spot of removable contamination that measured 2.5E 4 Bq (408 dpm)/100 cm<sup>2</sup>.

Exposure rate measurements were made with a sodium iodide micro-R meter outside the block of hot cells and in the vicinity of the blocks that cover the storage pits. The measurements ranged between 1.3 to 2.1 nC/kg (5 to 8  $\mu$ R)/hr, which is the same range for natural background radiation in other areas of Building 450. Exposure rate measurements in the grassy areas outside Building 450 were in the range of 2.6 to 3.1 nC/kg (10 to 12  $\mu$ R)/hr. Wipe surveys and direct frisk surveys performed outside the block of hot cells showed no removable or fixed contamination distinguishable from natural background radiation.

### **4. Description of Radiological Hazard**

Based on the knowledge of site operations and the results of the characterization survey, the significant radiological contaminants in Building 450 were determined to be Cs-137 and Co-60. The average activity fractions of these isotopes in Building 450 is about 98-percent Cs-137 and 2-percent Co-60 with the majority of the contamination confined to the hot cells.

Radiological surveys also were conducted in the 21 site buildings where radioactive material may have been used during the CANEL project and during licensed activities. One contaminated object was found during the surveys and was disposed as radioactive waste. Licensed material (thorium as nickel-thoria alloy parts) was found in Building 10; however, this is an authorized location of use for this material under P&W's License SMB-151.

### **5. Financial Assurance/Viable Responsible Organization**

There is no financial assurance for this site. However, P&W has stated that they will remove all contamination in Building 450 to levels below the current NRC guidelines for surface and soil contamination.

### **6. Status of Decommissioning Activities**

In 1992 P&W decided to demolish the hot cells located in Building 450 and transform the building into a warehouse. Since the only survey information of the building was 21 years old, P&W hired RSA to perform a radiological characterization of the building. RSA performed the survey of Building 450 in June 1992. RSA submitted a copy of its survey report and decommissioning plan to NRC in July 1992. Although there is no current NRC license for the radioactive material in Building 450, P&W and RSA agreed to conduct the decommissioning of the facility in accordance with applicable regulations in 10 CFR Parts 19 and 20 and the

written decommissioning plan. P&W also agreed to conduct radiological surveys of other site buildings that may have been contaminated with radioactive material from past licensed operations and research and development operations conducted during the time that the facility was operated under contract with the U.S. Government.

On August 23 and November 16 and 17, 1992, the NRC inspected the remediation activities at the P&W site. No safety concerns were identified during these inspections. During the November inspection, P&W requested an expedited review of the survey data for the hot cell pits and NRC's agreement that these areas may be released for unrestricted use so that support columns could be constructed and the remaining hot cell walls demolished. The inspector reviewed the data for cells 1, 2, and 7 during the inspection. Based on the review of this data, the inspector verbally confirmed that these three areas meet current criteria for release for unrestricted use and could be filled with concrete. Further review of hot cell survey data was conducted upon the receipt of additional data received by the NRC in letters dated November 24 and November 30, 1992. Based on the information submitted in these letters, hot cell pits 3, 4, 5, and 6 were released for unrestricted use and P&W was permitted to fill them with concrete. However, the release of the hot cell pits for unrestricted use was on the condition that survey data for all the hot cells would be included in a single comprehensive report along with survey data from the remainder of Building 450.

Decontamination activities were completed on December 21, 1992. The final survey report was submitted to the NRC on February 2, 1993. The survey report is currently undergoing NRC review.

## 7. Other Involved Parties

The U.S. Environmental Protection Agency (EPA) is completing actions on the closure of a RCRA hazardous waste landfill on the P&W Middletown site. From its review of historical information, ERA has concerns regarding, but no specific evidence of, radioactive material buried on the site. Monitoring wells are to be installed at various locations around the site to monitor ground water. The EPA has concerns that buried radioactive material could be discovered during the installation of the monitoring wells. ERA provided advice on procedures that, if included in P&W's well placement procedures, would provide adequate identification and control of contamination, if any is encountered.

The State of Connecticut has performed exposure rate measurements, soil samples, and sediment samples downstream of the former effluent outfall. The exposure rate measurements were indistinguishable from background. Analysis of the soil and sediment samples have not indicated concentrations of radioactive material beyond the normal range of background. The State of Connecticut is satisfied that there is no current significant hazard on the site as a result of radioactive material; however, it continues to remain an interested party.

## 8. NRC/Licensee Actions and Schedule

- review P&W's final survey report June 1993
- perform final NRC survey July 1993

## 9. Problems/Issues

None.

## **WATERTOWN ARSENAL/MALL**

### **1. Site Identification**

Watertown Arsenal/Mall  
Watertown, MA

License Nos.: 20-01010-04; SUB-238; SNM-244  
Docket Nos.: 030-04593; 040-02253; 070-00263  
License Status: Active  
Project Manager: M. Bouwens, Region I  
LLWM Monitor: D. Orlando

### **2. Site and Operations**

The Watertown Arsenal/Mall Area site is on approximately 37 hectares (92 acres) along the north branch of the Charles River approximately 11 km (7 miles) west of Boston, Massachusetts. The entire site was known as the Watertown Arsenal until the late 1960's when the eastern half was excessed and the western half was renamed the Materials Technology Laboratory (MTL). The site is still commonly known as the "Watertown Arsenal" or simply the "Arsenal" in the local area. The site extends west along Arsenal Street approximately 2 km (1.2 mile) from the intersection of Arsenal Street and Charles River Road. The main entrance to the former Arsenal is on Arsenal Street approximately one kilometer (0.6 mile) west of this intersection. At the main entrance, a roadway runs south from Arsenal Street, bisecting the site and connecting with the intersection of North Beacon Street and Charles River Road, which forms the southern site boundary. The area east of the main entrance is owned by the Watertown Redevelopment Authority (the Mall Area) while the area to the west remains under U.S. Army control (the current Materials Technology Laboratory (MTL Area), formerly the Watertown Arsenal).

#### **Mall Area**

Beginning in 1946, work involving radioactive materials was conducted at various locations within the then Watertown Arsenal, which encompassed the entire site. In 1946 the Massachusetts Institute of Technology (MIT) moved a research program on African ore (containing uranium) to Building 421 of the Watertown Arsenal (now in the Mall Area) for the Manhattan Engineering District (MED). In 1953 the AEC transferred these operations to another laboratory outside the Arsenal.

Also now in the Mall Area, Building 34 housed a uranium machine shop, a portion of Building 41 contained a foundry that was used for uranium work, and Building 421 was used for uranium processing. Army operations involving depleted uranium continued under license in the Mall Area until sometime between 1965 and 1967. In 1967 this area, including the sites of Buildings 34, 41, and 421, was excessed and later transferred to the U.S. General Services Administration (GSA). Sometime after 1968, the Mall Area was sold to the Watertown Redevelopment Authority (WRA).

Buildings 421, 34, and 41 were razed after transfer to the GSA and only the concrete floor slabs, access driveways, and underground utility service trenches remained. During the early 1980's, these areas were used as parking lots. The entire area was gradually converted to sites for rental living units and commercial business use. Currently, a shopping mall, associated parking lots and residential condominium units are on the Mall Area.

In the late 1970's, the former Watertown Arsenal was identified by the U.S. Department of Energy (DOE) as an area where Manhattan Engineering District activities had occurred. The DOE reviewed historical records regarding the site and investigated to determine if DOE has authority to conduct remedial action at the Mall Area. On the basis of the available data, in April 1986, the DOE determined that there was not sufficient information to provide DOE authority under the Atomic Energy Act to perform cleanup activities and eliminated this site from Formerly Utilized Site Remedial Action Program (FUSRAP) consideration.

#### **MTL Area**

At the MTL Area, a number of facilities, including Buildings 43, 312, 292, 97, and 100, have been used for work with depleted uranium and other radioactive materials from the 1940's until very recently. These include NRC

licensed uranium and thorium operations (alloy fabrication and utilization for research, development, and prototype testing of depleted uranium specimens, projectiles, or penetrators).

In 1960 a research reactor was constructed at the Arsenal for use in neutron radiography. The reactor was deactivated in 1970. A decommissioning plan for the reactor was submitted to NRC in October 1991 and an order to decommission the reactor was issued in June 1992. Decommissioning is proceeding and license termination is expected in 1993. The decommissioning of the reactor is not considered part of the SDMP.

The MTL Area is scheduled for decommissioning and closure by 1996. Therefore, the Army has reduced operations at the site and is conducting decommissioning operations.

Information concerning the hydrology and characterization of the ground water of the site is based primarily on sampling done during 1988. Ground water flow is generally to the south, towards the Charles River. In the northeast corner of the site, flow is initially to the southeast, but then turns south. The deeper aquifers have not been characterized because no deep drinking wells exist in the vicinity of the site. Most surface water from both the MTL and the Mall Areas is captured by storm sewers and discharged to the Charles River. The licensee plans additional ground water sampling during decommissioning activities.

### 3. Radioactive Wastes

#### Mall Area

Available records do not indicate whether the AEC or the Army surveyed Building 421 before its release and demolition. However, records do indicate that Buildings 34 and 41 were surveyed in 1967 and found to be contaminated in excess of the then prescribed criteria for uncontrolled release. Buildings 34 and 41 were to be decontaminated and surveyed by Isotopes, Inc., a contractor, prior to their transfer to GSA and, ultimately, to the WRA. The Army was to perform independent verification surveys. A copy of the survey conducted by Isotopes, Inc. of Building 41 has been located; however, other survey records have not been located. In any case, the buildings and surrounding areas were released to GSA for unrestricted use.

In 1980 Argonne National Laboratory (ANL) reported finding three small spots of radioactive contamination that exceeded DOE FUSRAP guidelines during direct instrument surveys of the pad of Building 421 and the south wall of Building 331 (nearest building to the pad). Smears indicated that the contamination was fixed, and the analysis of one sample identified the contamination as natural uranium. Other direct instrument measurements showed no readings above natural background. Analyses of soil and water samples and measurements of radon in the air gave no indications of radiation levels above natural background. One Building 41 concrete pad floor drain sludge sample and the suspended solids from a water sample showed slightly elevated levels of uranium 0.2 to 0.4 Bq (5.8 to 12.0 pCi)/g.

During the ANL radiological assessment of the Building 421 site. Buildings 34 and 41 were identified as areas also involved in uranium operations during the AEC era. In 1981 ANL surveyed Buildings 34 and 41. Levels of radioactive contamination in excess of the DOE FUSRAP guidelines were measured at Building 34. At the Building 34 site, contamination in excess of natural background was found in 5 out of 15 soil corings from the perimeter of the pad. In addition, 33 spots of fixed uranium contamination were found on the concrete pad. The volume of contaminated concrete was not estimated. No contamination was found on the Building 41 pad; however, two-thirds of the concrete pad was covered with soil up to 1.2 meters (4 feet) thick. One of the soil corings taken adjacent to the Building 41 pad had slightly elevated levels of uranium.

NRC staff evaluated these results and concluded that, although contamination levels above background levels were measured on the concrete pad for Building 34, only six locations on the concrete pad appear to have exceeded current release for unrestricted use criteria for surface contamination. Of these six locations, one produced a contact exposure rate of 1.8  $\mu\text{C}/\text{kg}$  (7 mR)/hr over an area less than 100  $\text{cm}^2$  (15.5  $\text{in}^2$ ), while the other five measurements ranged between 0.077 and 0.4  $\mu\text{C}/\text{kg}$  (0.3 and 1.5 mR)/hr and covered a total area of only 9000  $\text{cm}^2$  (1400  $\text{in}^2$ ). The reported contact gamma count rate for these locations generally correlates with the reported contact dose rate. The majority of the surveyed locations showed contact radiation dose rates within current NRC criteria for release for unrestricted use. At all locations, measured radiation levels at 1 meter (3.3 feet) above the surface were not in excess of natural background. The staff estimates that the area of the concrete pad for Building 34 was 3600  $\text{m}^2$  (38,800  $\text{ft}^2$ ).

The contamination levels in the soil along the perimeter of the concrete pads for Buildings 34 and 41 appear to have been below the limits established for Option 1 of the 1981 BTP. This means the soil met current criteria for release for unrestricted use. The survey report also shows contamination in the sanitary sewer system; however, these levels are also below those established for Option 1. The survey report states the property was under the control of the WRA at the time of the survey.

Records currently available to the Army and the NRC do not clearly establish that necessary decontamination occurred before the property was released for unrestricted use. However, every indication is that this is due to a lack of records. From available records, the Army was clearly required to complete the decontamination and had made plans to accomplish it. The NRC and the Army are working to determine what actually occurred.

#### **MTL Area**

Building 43 contained furnaces, presses and other machine shop equipment used with depleted uranium. In December 1991 efforts began in Building 43 to remove all of the contaminated equipment. All of the contaminated equipment has been removed from Building 43 and approximately half of the Building has been decontaminated. Radioactive waste is being shipped to the Chem-Nuclear low-level Radioactive Waste Disposal Facility in Barnwell, South Carolina. Contaminated equipment from Building 43 is sent to the Chem-Nuclear Defense Consolidation Facility also in Barnwell, South Carolina where the salvageable equipment is separated from the contaminated material equipment before disposal at the lot level waste disposal facility.

Building 312 contains two machine shops where beryllium and depleted uranium were used. Surveys by an Army contractor indicate that some of the equipment in Building 312 is contaminated with both depleted uranium and beryllium. The Army will develop a plan for managing the mixed waste generated by the remediation of this area and the equipment. The plan will be reviewed and approved by NRC before it is implemented.

### **4. Description of Radiological Hazard**

#### **Mall Area**

The principal hazards associated with the contamination at the Mall Area site east of the main entrance involve potential ingestion and ground water contamination. Even if no decontamination took place prior to release of the area for unrestricted use, no immediate threat to public health and safety exists due to the relatively low concentrations and small amount of uranium then on the site. The extensive addition of concrete foundations reduces the hazard even more.

#### **MTL Area**

The hazards in the MTL Area are those presented by a typical military industrial research and development program involving radioactive material. However, these are controlled by the active radiation safety program.

### **5. Financial Assurance/Viable Responsible Organization**

The Army provided explicit financial assurance for the MTL Area. The Army agrees that they are responsible for demonstrating that the Mall Area meets current criteria for release for unrestricted use.

### **6. Status of Decommissioning Activities**

#### **Mall Area**

The Army provided a schedule and plan for resolving the status of the Mall Area in August 1992. This includes a preliminary assessment of the need for additional action in that area by March 1993. The assessment will include a determination of whether that area is suitable for unrestricted use in its current condition.

#### **MTL Area**

In preparation for closure of the MTL Area, the Army hired The Roy F. Weston Company to characterize the facilities at the MTL Area and develop a decommissioning plan. A draft site characterization was submitted to NRC in a report dated August 1991. The report shows Buildings 43, 312 and other areas having depleted

uranium contamination. A Facility Decommissioning Plan was submitted to NRC in April 1992 and was partially approved in July 1992. The Army and its contractors are conducting extensive decommissioning activities in the MTL Area. These include remediation of Buildings 43, 312, 39, and 313 and final surveys of Buildings 242, 39, 311, 97, and 313. The MTL is scheduled to close by September 1995 in accordance with the Base Closure and Realignment Act. The Army is investigating the Mall in conjunction with the MTL area.

An inventory of all depleted uranium stock and waste has taken place. All depleted uranium stock has been packaged for shipment. Usable stock and waste are being shipped to Barnwell for disposal.

## **7. Other Involved Parties**

Local citizen groups and officials of the Commonwealth of Massachusetts follow activities closely.

## **8. NRC Actions and Schedule**

- NRC reviews preliminary assessment of the Mall Area June 1993
- NRC gives final approval of MTL Decommissioning plan June 1993
- NRC reviews corrective action plan for Mall Area (if necessary) June 1994
- NRC reviews Army Final Survey January 1995
- NRC performs confirmatory survey June 1995
- Release Site for Unrestricted Use and terminate license June 1996

## **9. Problems/Issues**

Potential offsite disposal of radioactive material.

# WATERTOWN GSA

## 1. Site Identification

General Services Administration  
Boston, MA

License Status: None  
Project Manager: M. Bouwens, Region I  
LLWM Monitor: D. Orlando

## 2. Site Description

The Watertown GSA site comprises 5 hectares (12 acres) located along the north branch of the Charles River approximately 11 km (7 miles) west of Boston, Massachusetts. The site is located north of Arsenal Street between Greenough Boulevard on the east and Coolidge Avenue to the west. The site extends north along Greenough Boulevard approximately 530 meters (1750 feet) and west along Arsenal Street approximately 240 meters (800 feet). The site is currently controlled by the U.S. General Services Administration (GSA).

Beginning in 1946 the area that is now the Watertown GSA site was part of the Watertown Arsenal and was used for depleted uranium operations conducted by the U.S. Army as part of the activities of the Manhattan Engineering District (MED). This area was used for packaging and storing radioactive waste, burning uranium scrap, and staging radioactive waste shipments. Army operations involving depleted uranium apparently continued partly under AEC license and partly under AEC prime contractor exemption in this area of the Arsenal until June 1967 when records become somewhat unclear. In 1968 the site was apparently transferred to GSA as excess property.

In 1980 the GSA site was identified by DOE as an area involved in uranium operations between 1946 and 1953. In the early 1980's, the DOE reviewed historical records regarding the site and investigated to determine if DOE had authority to conduct remedial action at the Arsenal based on activities conducted by MED or the former AEC. Records found by DOE indicated the GSA site was surveyed in 1967 and found to be contaminated in excess of the criteria then in use for uncontrolled release. Some decontamination apparently was performed at the site and then control of the site was transferred to GSA. According to some available records, the radiation levels met the guidelines for unrestricted use except for some areas on a concrete pad and the surrounding soil. The site was apparently transferred to GSA in a contaminated condition.

The topography of the site has been reshaped to varying degrees by construction activities in this densely populated area. The site is essentially flat and is located on a segment of what was once a swampy flood plain of the Charles River. Recent filling activities by man have raised the level of the site to form a terrace above the former swamp surface of between 1.8 and 2.4 meters (6 and 8 feet) above sea level. An artificial retaining wall exists along the western property boundary of the site.

Drainage of the site is complex and results from the interaction of natural drainage processes with modifications made at the site. The natural drainage pattern before filling and construction activities involved transport of surface runoff to several tributaries that dissected the site and discharged to the Charles River. These tributaries have since been removed or modified. A small stream reportedly traversed the center of the site from higher terrain to the west, but this was filled in the early 1900's. A second stream that emptied Swains Pond was rerouted to its current configuration and it currently passes by the southern boundary of the site.

Properties abutting the GSA site contain a mixture of recreational, residential, light industrial, and commercial uses. The area between the GSA site and Coolidge Avenue to the west is zoned heavy industrial, the area to the north is residential, the area to the east and southeast is open space conservancy, and a portion to the south is light industrial. This area to the south encompasses a portion of the current U.S Army property at the former Watertown Arsenal. The GSA site itself is zoned as open space conservancy.

## 3. Radioactive Wastes

In 1981 Argonne National Laboratory (ANL) surveyed the GSA site for the U.S. Department of Energy (DOE) and found levels of uranium contamination in excess of the DOE Formerly Utilized Site Remedial Action

Project guidelines. Soil concentrations were as high as 960 Bq (26,000 pCi) of uranium per gram of soil in one location and one to 200 Bq (5400 pCi)/g in several other locations. The average soil activity concentration was estimated to be 9 Bq (240 pCi)/g and the radiation exposure levels were about 5 to 8 nC/kg (20 to 30  $\mu$ R)/hr. Contamination reached to a depth of 1.8 meter (6 feet) in some places.

The total volume of contaminated soil was estimated to be no larger than 12 m<sup>3</sup> (425 ft<sup>3</sup>). All buildings were found to be free of residual radioactivity. In November 1986 the NRC conducted a confirmation survey on the GSA site and concluded that no changes in the activity levels had occurred since the ANL survey.

#### **4. Description of Radiological Hazard**

The principal hazards associated with the contamination at the Watertown GSA site involve intrusion and ground water contamination. There are no immediate threats to public health and safety because the concentrations are relatively low and the amount of uranium on the site is small. The migration potential to ground water systems is expected to be small because the uranium is expected to be relatively insoluble. Access to the contaminated areas of the site is restricted providing little potential for intrusion.

#### **5. Financial Assurance/Viable Responsible Organization**

Because there is no license, there are no possession limits established for the site. However, the amount of uranium contamination on the site is likely far below that which would require financial assurance under the current rule. The site is under the control of the GSA, which has expended significant resources in the evaluation and remediation of the site. It appears likely GSA will complete the decommissioning.

#### **6. Status of Decommissioning Activities**

On the basis of the available data, DOE determined in April 1986 that there was not sufficient information regarding the cause or source of the uranium contamination at this site to provide DOE authority under the Atomic Energy Act to perform decommissioning activities at the site. Therefore, DOE eliminated the site from FUSRAP consideration. DOE then notified NRC, EPA and the Commonwealth of Massachusetts of their findings.

On October 15, 1986, NRC requested that GSA apply for a license to cover possession of the contaminated site until release requirements were met and to submit a decommissioning plan. Subsequently, GSA agreed to promptly perform the needed cleanup, but has not applied for a license.

In 1988 GSA contracted with Chem-Nuclear Systems, Inc. to remediate the site and remediation operations began that year. Although the high-water table limited activities that year, a concrete pad contaminated with uranium was removed and disposed. Remediation resumed in 1989, but the discovery of an underground petroleum storage tank and volatile organic compounds in the ground water limited activities. GSA's contractor believes these compounds are coming from an adjacent property (one which was used extensively as a landfill for organic materials) rather than the tank. Onsite sampling was performed in the spring and summer of 1990 by Chem-Nuclear. On October 1990, a comprehensive site assessment of the Watertown GSA site was prepared by the contractor and submitted to GSA. This assessment was forwarded to NRC for review in May 1991:

The assessment recommends that a small amount of additional uranium contamination be removed and a protective "cap" be applied to limit human exposure to the other hazardous wastes present. The land would then be provided to another government entity for use as a park with restrictions on access below the surface after complete remediation and capping. Shortly after submission of the assessment, the Army Corps of Engineers, New England Division (NED), and GSA agreed that the NED would assume management of the site. In October 1992 NED submitted a proposed scope of work describing how it will complete the decommissioning of the site on behalf of GSA. It also has agreed to provide an assessment of previous decommissioning activities and the current radiological condition of the site by March 1993.

#### **7. Other Involved Parties**

Local citizen groups and Commonwealth of Massachusetts officials follow activities closely.

## **8. NRC/Licensee Actions and Schedule**

- NRC approves work plan
- inspect additional remediation activities
- GSA submits final survey
- NRC performs confirmatory surveys
- release site for unrestricted use

April 1993

Summer 1993

September 1993

March 1994

July 1994

## **9. Problems/Issues**

Presence of high water table and potential hazardous wastes at the site.

# WESTINGHOUSE ELECTRIC CORPORATION, WALTZ MILL

## 1. Site Identification

Westinghouse Electric Corporation  
Advanced Power Systems Division  
Pittsburgh, PA  
(Site located at Madison, PA (known as the Waltz Mill site))

License No.: SNM-770  
Docket No.: 070-00698  
License Status: Active  
Project Manager: E. Reber, Region I  
LLWM Monitor: C. Glenn

## 2. Site and Operations

The Waltz Mill site is located near Madison and Yukon, Pennsylvania, on approximately 340 hectares (850 acres) in a sparsely settled area. The site is fenced and provided with continuous security. There are 13 major buildings including the Westinghouse test reactor (WTR, License TR-2) located at the site. The WTR first went critical in 1959, experienced a core disruption in April 1960, and was rebuilt and returned to service in December 1960. The WTR was permanently shut down in March 1962. All fuel was removed from the site and the reactor facility was partially dismantled, but not completely decontaminated. The WTR reactor license now authorizes possession only and expires in November 1993. Possession only licenses for research and test reactors will not be renewed unless necessary to protect the health and safety of the public. The NRR staff has discussed with Westinghouse (WEC) the submission of a decommissioning plan for staff review. Decommissioning of the reactor facility is a separate action, not associated with the SDMP. The reactor facility continues to be maintained as a restricted area by the licensee. The WTR site liquid waste retention basin, the evaporator plant, and certain tanks previously associated with, and contaminated during operation of, WTR are now possessed under License SNM-770 (separate from the reactor license) and are part of the licensee's current waste disposal facility.

The waste disposal facility consists of the site liquid waste retention basin, five tanks used for liquid radioactive waste storage and processing, a concrete pad for storage and sorting of solid waste, and a concrete block building that houses an ion exchange system for processing of radioactive water. The site radioactive drain systems converge into a single 40-cm (16-inch) cast iron pipe, which formerly discharged to the site liquid waste retention basin but now discharges into the radioactive waste storage tanks. The water collected in the tanks is appropriately analyzed and processed before discharge or other disposal.

Three retention basins that had been used in connection with operation and cleanup of the WTR facility were stabilized by folding the liners and covering them with soil many years ago. The contamination contained in these basins is authorized by License TR-2.

The Advanced Energy Systems Division of WEC is the landlord for the Waltz Mill site. In addition to WTR, since at least 1963, source, byproduct, and special nuclear material have been used in a variety of chemical and physical forms in various laboratories and associated facilities. WEC currently carries out a wide range of engineering design, research, development, and services involving licensed material at this site. Decontamination of contaminated metal components from nuclear power plants to reduce the volume of radioactive waste disposed in licensed sites is performed as a service. Nuclear laundry, liquid waste treatment, waste storage, and waste packaging operations also are present.

## 3. Radioactive Wastes

The Waltz Mill site includes radioactive contamination in various active and inactive buildings, systems, possibly in the closed and stabilized waste retention basins, and as Sr-90 in ground water. With regard to the ground water contamination, in November 1982 License SNM-770 was amended to require quarterly sampling of ground water from seven wells surrounding the site liquid waste retention basin. Since that time WEC has submitted quarterly reports to the NRC summarizing the results of the monitoring program and the status of its study to identify the source of the contamination. As part of its attempts to understand the contamination, the

licensee has increased the number of monitoring wells to 38. A geotechnical consultant to the licensee has concluded that the ground water containing the contamination is flowing in the fractured bedrock (upper 3 to 4.5 meters [10 to 15 feet]) underlying the waste disposal facility.

The source of the ground water contamination has been suspected to be leakage from the site liquid waste retention basin since the highest concentrations of Sr-90 are measured in the wells closest to the basin. Concentrations as high as 220 Bq (6,200 pCi)/l gross beta and 110 Bq (2,900 pCi)/l of Sr-90 have been measured. However, it has not been conclusively shown that the basin is leaking. Although the ground water flow direction is toward Calleys Run (located south of the basin), two test holes located north of the basin have shown Sr-90 concentrations of up to 4 Bq (120 pCi)/l. A review of WTR records by the licensee found that three retired catch basins, now dirt filled, had at one time contained highly contaminated water from the reactor. One of these basins is located north of the two test holes. It is, therefore, possible that these basins are the source of the contamination. The NRC on several occasions has split samples of ground water with WEC for analysis. The NRC results were consistent with WEC results.

In an attempt to identify the source of the ground water contamination, WEC performed fluorescent dye tests and visually inspected the underground drain line that carried all contaminated water to the site liquid waste retention basin. None of the ground water well samples indicated the presence of the fluorescent dye. No evidence of breaks or leaks in the drain piping was detected.

Dry radioactive waste is routinely generated by the licensee's service activities, but the licensee is prohibited from storing this radioactive waste for more than 12 months. The licensee routinely disposes of this material by transfer to a waste broker. WEC has a small quantity (0.4 m<sup>3</sup> [15 ft<sup>3</sup>]) of mixed waste (hazardous and radioactive) in storage. This waste was produced by freon decontamination operations. Freon is no longer used for this purpose.

#### **4. Description of Radiological Hazard**

The possible radiological hazards associated with the Waltz Mill site involve inhalation, ingestion, intrusion, and movement of onsite contaminated ground water to the unrestricted area. No immediate threat to public health and safety exists. The liquid waste retention basins, which may still contain contamination have been closed and stabilized, eliminating airborne, surface water and wind transport from those locations. WEC controls intrusion into contaminated areas by fencing, continuous security, and an active radiation safety program. Since 1982 WEC has been increasing its activities at this site including maintenance and decontamination of contaminated metal components, waste sorting, reduction, and packaging and laundry of contaminated clothing. Partly as a result of these activities, frequent routine radiological surveillances of effluents and environmental samples are conducted. Releases in excess of NRC limits have not occurred and contamination in excess of NRC limits has not been identified in environmental samples off site.

#### **5. Financial Assurance/Viable Responsible Organization**

The licensee's possession limits require that WEC provide a decommissioning funding plan. WEC has made a submission to NRC concerning financial assurance. The NRC is currently reviewing WEC's financial assurance submission and a possible rule change and a license renewal application.

Since WEC is a very large company with extensive resources, it is expected to have the capability to fund any cleanup activities needed.

#### **6. Status of Decommissioning Activities**

WEC continues a program it began in the summer of 1986 to pump the ground water from the monitoring well nearest the site liquid waste retention basin and to treat the liquid through an ion-exchange column. This operation has resulted in much lower ground water concentration levels.

A decommissioning plan for the facilities under License SNM-770 was submitted to the NRC on June 22, 1978. Revisions were submitted on August 30 and November 13, 1978. On December 22, 1978, NRC approved the plan as an amendment to License SNM-770. This decommissioning plan is very general and does not specifically address all of the current issues and implementation is not required at any specific time.

During a meeting on May 13, 1992, between NRC and WEC, WEC stated their intentions to remediate the inactive facilities on the site and establish a schedule for the decommissioning activities. During a meeting on

November 22, 1992, with NRC staff, WEC committed to a specific schedule of actions and reiterated their intention to remediate the site so that it can be removed from the SDMP list as soon as possible. The schedule provided at that time includes submitting a characterization plan for NRC review in March 1993 and a final characterization report in late 1993. Once the characterization report is approved a decommissioning schedule will be developed. Consideration will be given to incorporating the milestones in this schedule as requirements in the license.

WEC representatives also stated they planned to request that authorization for the contamination in the retention basins be transferred from License TR-2 to License SNM-770 to facilitate characterization and decommissioning of these areas. NRC staff indicated they would carefully consider such a request. WEC filed such a request in December 1992 and it is being reviewed.

## **7. Other Involved Parties**

There is currently no significant third-party involvement at the site.

## **8. NRC Actions and Schedule**

- licensee submits site characterization plan March 1993
- NRC comments on characterization plan June 1993
- NRC completes review of license renewal application and issues renewed license June 1994
- licensee submits site characterization report March 1994
- NRC reviews characterization report and requests additional information June 1994
- NRC approves characterization report October 1994
- NRC reviews decommissioning plan and schedule December 1994

## **9. Problems/Issues**

WEC has not been able to identify source of ground water contamination.

# WEST LAKE LANDFILL

## 1. Site Identification

West Lake Landfill  
Bridgeton, St. Louis County, MO

Docket Nos.: 040-08035  
040-08801  
License Status: None  
Project Manager: J. Parrott

## 2. Site and Operations

The West Lake landfill property, owned by Laidlaw and Rockroad, Inc., is a 81-hectare (200-acre) tract on the outskirts of the city of St. Louis. Limestone was quarried there from 1939 to 1987, and an unregulated landfill was operated on part of the site from 1962 to 1974. About  $3.9E7$  ( $8.6 E7$  pounds) of contaminated soil, from Cotter Corporation's Latty Avenue site, was placed in the landfill in 1973. A concrete plant is operating on site, as well as a 8.9-hectare (22-acre) demolition landfill and a 21-hectare (52-acre) sanitary landfill. The property is on the border of the Missouri River Valley about 1.9 km (1.2 mile) from the river.

EPA has the lead on the remediation of this site under the Superfund program. EPA has identified four potentially responsible parties (PRPs) for the Superfund remediation of this site, these are Cotter Corporation, Laidlaw Waste Systems, Rock Road Industries, and the U. S. Department of Energy.

## 3. Radioactive Wastes

Two areas on the site have a layer of radiologically contaminated soil, mostly covered with 0.9 to 6.1 meters (3 to 20 feet) of other waste. The larger area in the northern site area comprises about 5.3 hectares (13 acres) and contains about  $99000 \text{ m}^3$  ( $3.5E6 \text{ ft}^3$ ) of soil contaminated to at least  $0.2 \text{ Bq}$  ( $5 \text{ pCi}$ )/g Ra-226. This contaminated soil forms a more or less continuous layer from 0.6 to 4.6 meters (2 to 15 feet) in thickness and lies above 4.9 to 6.1 meters (16 to 20 feet) of landfill debris. The smaller area to the south covers 1.2 hectares (3 acres) and contains about  $14,000 \text{ m}^3$  (500,000 feet). This soil body lies above a former quarry pit that was filled with debris.

The average Ra-226 concentration is about  $3.3 \text{ Bq}$  ( $90 \text{ pCi}$ )/g, uranium radioactivity concentrations average appreciably smaller, and the Th-230 concentrations are 20 to 100 times those of Ra-226. The contamination originated with residues from extraction of uranium and radium from very rich uranium ores for the AEC.

## 4. Description of Radiological Hazard

This site poses no immediate threat to the public. Radioactivity has been detected in ground water monitoring wells on site, indicating slight contamination above background.

## 5. Financial Assurance/Viable Responsible Organization

As stated above, EPA has the lead on the remediation of this site under the Superfund program. Under this program all remediation costs are provided by the PRPs or guaranteed through the fund.

## 6. Status of Decommissioning Activities

The NRC had a radiological survey performed in 1981 and an environmental characterization of the site performed in 1983. NRC previously informed Cotter Corporation that it is being held responsible for site remediation and asked for its plans for remedial action. However, no site remedial action was done. The property owner has not allowed any more waste to be dumped in these areas.

On August 30, 1990, the EPA listed the site on the Comprehensive Environmental Response, Compensation, and Liability National Priorities List for Uncontrolled Hazardous Waste Sites and ranked it as site number 1003 (55 FR 35502). In discussions between NRC and Cotter Corporation in November 1990, it was acknowledged that EPA is taking the lead for site remediation activities. A letter from NRC to EPA dated March 18, 1991, confirmed this arrangement.

## **7. Other Involved Parties**

EPA is currently working to establish a scope-of-work agreement with the PRPs to remediate the site. NRC will monitor EPA activities and progress on this case. NRC will ensure that there is a satisfactory cleanup arrangement and that the disposal of any removed waste material is in accordance with NRC requirements.

## **8. NRC/Licensee Actions and Schedule**

- |  |                |
|--|----------------|
| ● PRPs sign scope-of-work agreement    | March 1993     |
| ● PRPs submit work plan to EPA         | May 1993       |
| ● EPA requests NRC review of work plan | September 1993 |
| ● NRC completes review of work plan    | January 1994   |

## **9. Problems/Issues**

Because EPA is the lead agency, NRC does not exercise control over remediation activities.

# WHITTAKER CORPORATION

## 1. Site Identification

Whittaker Corporation  
Greenville, PA

License No.: SMA-1018  
Docket No. 040-07455  
License Status: Active—possession for storage only  
Project Manager: L. Bykoski

## 2. Site and Operations

Beginning in the 1960's, Mercer Alloys, a firm in Greenville, Pennsylvania, and a predecessor of Whittaker Metals Corporation, produced ferro-columbian and ferro-nickel alloys by an aluminothermic melting process. Columbian ores and nickel scrap used in this operation contained licensable concentrations up to approximately 2 percent of thorium. Process slag containing thorium was retained on site. Natural and depleted uranium were unwanted contaminants of some of the feed-metal scrap; slags containing low-levels of uranium contamination are also present on the site. Concentrations of Ra-226 have been noted in some of the waste slags.

Whittaker terminated all manufacturing operations involving source material in 1974. Currently, no processing is done at the site; the license is for storage of the contaminated materials. The site is located about 5.6 km (3.5 miles) south of Greenville on the west side of the Shenango River. The site is an irregularly shaped parcel of about 2.4 hectares (6 acres) near the river. The surface of the property has been built up over a period of about 40-50 years through repeated disposal of building rubble, scrap metal, general trash, and foundry slag. The present surface is generally level. The central and southern portions of the property are predominantly slag. The northern portion contains slag with other rubble and waste—some dating to the early use as an Army supply base (during World War II).

There are no buildings on the property. The property contains about 20 storage bins which contain about 70 drums and boxes containing contaminated material or in some cases soil which act as shields at the fence line. The site also contains some uncontaminated empty shipping containers. There is no known mixed waste on the property.

## 3. Radioactive Wastes

The slag material contains natural thorium and uranium. ORISE estimated the total volume to be 28,000 m<sup>3</sup> (1,000,000 ft<sup>3</sup>). Thorium concentrations range from less than detectable levels to 251 Bq (6779 pCi)/g of total thorium. Concentrations of U-238 and Ra-226 also vary considerably with the highest levels being 8 Bq (2179 pCi)/g and 8 Bq (226 pCi)/g, respectively.

## 4. Description of Radiological Hazard

The site poses no immediate threat to the public. Quarterly ground water sampling since 1974 has not shown any significant offsite migration of radionuclides. Ground water results have shown slightly elevated levels (a few pCi/l from wells on the slag site, generally in the central part of the site (wells W8, W9, W14)). Leaching studies performed on the slag by ORISE show that, under conditions encountered in nature, the slags are not going to leach to any significant degree.

The site area is fenced to control access. Whittaker also maintains an access control program and the general public will not have access to the site. On a semiannual basis, the licensee conducts a monitoring program that consists of a visual inspection of the site for erosion. The licensee conducts an annual monitoring program that consists of sampling ground water from monitoring wells present in the slag area and analyzing alpha and beta activity as well as measuring direct radiation levels at 1 meter above the ground at all boundaries of the site. During radiation monitoring conducted the week of December 7 through 10, 1992, the riverside locations along the rear of the property had readings ranging from 2  $\mu\text{C}/\text{kg}$  (8  $\mu\text{R}$ )/hr to 64  $\mu\text{C}/\text{kg}$  (250  $\mu\text{R}$ )/hr.

## 5. Financial Assurance/Viable Responsible Organization

The licensee has provided a \$750,000 irrevocable standby letter of credit, which is currently under review. The licensee also provided an acceptable standby trust agreement.

## 6. Status of Decommissioning Activities

An area adjacent to the site known as Greenville Metals was remediated and released by NRC in 1985 for unrestricted use. This property was subsequently sold.

License renewal date is September 30, 1993, at which time an extension to the expiration date will be provided.

Whittaker's consultant met with NRC staff on January 24, 1992, to discuss possible options for decommissioning and was informed of NRC's strong interest in accelerating the decommissioning process. On October 22, 1992, NRC approved a license amendment permitting Whittaker to collect preliminary data needed to support a site characterization plan.

## 7. Other Involved Parties

Any movement of material along the Shenango River would involve the Army Corps of Engineers.

## 8. NRC/Licensee Actions and Timing

- request Whittaker to submit an amendment request to extend license expiration date June 1993
- Whittaker submits site characterization plan July 1993
- Whittaker submits characterization report January 1994
- Whittaker submits decommissioning plan September 1994
- Whittaker submits final survey data November 1996
- NRC performs confirmatory survey March 1997
- staff prepares Commission paper June 1997
- terminate license December 1997

## 9. Problems/Issues

None.

# WYMAN-GORDON COMPANY

## 1. Site Identification

Wyman-Gordon Company  
North Grafton, MA

License Status: License terminated  
Project Manager: T.C. Johnson

## 2. Site and Operations

The Wyman-Gordon Company (WG) makes large titanium forgings for the aerospace industry. Between 1958 and 1971, WG had several Atomic Energy Commission licenses for the possession and use of magnesium-thorium alloys and uranium. These materials were used in the manufacture of forgings for Department of Defense classified projects. The last of these licenses was terminated in 1971. At the North Grafton site, magnesium-thorium alloys containing between 2- and 3-percent thorium were disposed on site under 10 CFR 20.304. These disposals became a significant media issue on September 23, 1990, when an article appeared in the *Worcester Telegram* describing the disposal and 1983 and 1984 ground water sampling issues.

In 1983 WG sampled on site monitoring wells in the immediate vicinity of the disposal area, which is located in the northeast corner of the site. The results showed gross alpha, gross beta, and radium levels that exceeded U.S. Environmental Protection Agency (EPA) drinking water requirements. Because of a large amount of scatter in the data, additional sampling was performed by WG and by the Commonwealth of Massachusetts in 1983 and 1984. The resampling results showed radioactivity levels to be well within the EPA requirements. On the basis of these results, both WG and the Commonwealth considered that there was no threat to public health and safety. However, no formal analysis closing out this issue was documented by either WG or by the Commonwealth. Further complicating the issue, an attorney for WG, without authorization from WG, transmitted a letter to the Commonwealth requesting that the initial sampling data be held confidential until new sampling could be taken.

A consultant to WG had previously done a detailed hydrologic study of the WG site in support of submittals made by WG to the EPA for compliance with Resource Conservation and Recovery Act (RCRA). This site investigation included mapping the hydrogeologic system and the installation of monitoring wells, including in the area immediately downstream from the magnesium-thorium disposal area. Three wells are located within 30 meters (100 feet) of the disposal area. Two of these wells are sampled annually by the consultant and analyzed for hazardous chemical constituents. No radioactive assays have been performed since 1984. A third well is located between two smaller disposal locations within the disposal area. Ground water sampling was performed in October 1990 on samples from the three onsite wells adjacent to the disposal area and five offsite private wells. The assay results indicate no ground water contamination in excess of EPA drinking water limits for gross alpha and gross beta. Assays of sediment samples from the onsite wells indicate no thorium migration above background levels.

## 3. Radioactive Wastes

Approximately 22,600 kg (50,000 pounds) of the alloy material was disposed in an area in the northeast corner of the site. The disposed material included scrap that had no recycle value and contaminated equipment such as grinders and other tools. The magnesium-thorium alloy wastes are buried and covered by 1.2 meter (4 feet) of soil. The material is in an insoluble form. Radiation surveys taken immediately over the disposal trenches indicate background levels of radiation.

## 4. Description of Radiological Hazard

There is no immediate threat to public health and safety. Ground water and ground water sediment sample analyses indicate no migration of thorium and compliance with EPA drinking water requirements. The entire area is fenced and access controlled.

## 5. Financial Assurance/Viable Responsible Organization

WG is one of the largest manufacturers of large titanium forgings for the aerospace industry and is financially capable of cleanup activities if remediation is required. Financial assurance requirements in the decommissioning rule do not apply because the AEC licenses were terminated.

## 6. Status of Decommissioning Activities

The September 23, 1990, newspaper article prompted local State Senator John Houston to call a meeting of Commonwealth and NRC regulators and Town Selectmen to discuss the roles and responsibilities of each agency. This meeting was held on September 27, 1990. At this meeting, it was agreed that

- The Commonwealth and the NRC would participate in a split sampling program of ground water samples taken on site and off site.
- The Massachusetts Department of Public Health would take offsite samples from several public wells located in the vicinity of the disposal area.
- After the sample analyses were obtained and evaluated, the Town Selectmen would call a public meeting and report the results.

NRC sample assays were performed by the Radiological and Environmental Sciences Laboratory (RESL) in Idaho Falls, Idaho, and the assay data were transmitted to WG, State Senator Houston, Town of Grafton Selectmen, and Massachusetts regulatory agencies on December 10, 1990. On January 29, 1991, NRC staff participated in a public meeting in Grafton to discuss the results of the ground water sampling. Also in January 1991, the NRC requested WG to provide a dose assessment of the disposal area. In a letter dated March 11, 1991, WG informed the NRC staff that they would not perform a dose assessment, but would support the staff by providing data that were available.

In February 1993, NRC completed a draft dose assessment of the WG site. This draft dose assessment indicates that magnesium-thorium wastes should be remediated because predicted future doses are in excess of 10 mSv (1,000 mrem)/yr. A copy of the dose assessment has been sent to WG, local and State officials for comment by letter dated February 23, 1993. At the request of Wyman-Gordon and the Grafton Selectmen the comment due date was extended to May 14, 1993.

## 7. Other Involved Parties

The NRC staff has committed to keep the local and State government officials informed of all activities at the WG site.

## 8. NRC/Licensee Actions and Schedule

- interested parties submit comments on dose assessment May 1993

## 9. Problems/Issues

None.

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**APPENDIX B**

**Reactor Decommissioning Status**

**Table 1 Shut Down Power Reactors**

<b>Docket No. Reactor</b>	<b>Thermal Power</b>	<b>Location</b>	<b>Shut Down</b>	<b>Present Status</b>	<b>Fuel on Site</b>
50-3 Indian Point 1 (PWR)	615 MW	Buchanan New York	10/31/74	Possession Only lic.	Yes
50-10 Dresden 1 (BWR)	700 MW	Morris Illinois	10/31/78	Possession Only lic.	Yes
50-16 Fermi 1 (fast breeder)*	200 MW	Monroe Co. Michigan	09/22/72	SAFSTOR Approved	No
50-18 GE Vallecitos Boiling Water Reactor (BWR)*	50 MW	Alameda Co. California	12/09/63	SAFSTOR Approved	No
50-29 Yankee Rowe (PWR)	600 MW	Franklin Co. Massachusetts	10/01/91	Possession Only Lic.	Yes
50-114 Carolinas-Virginia Tube Reactor (pressure tube, heavywater)	65 MW	Parr S. Carolina	01/--/67	Byproduct Lic. (State)	No
50-130 Pathfinder (nuclear superheat BWR)*	190 MW	Sioux Falls S.Dakota	09/16/67	DECON NRC 10 CFR Part 30	No
50-133 Humboldt Bay 3 (BWR)*	200 MW	Eureka California	07/02/76	SAFSTOR Approved	Yes
50-171 Peach Bottom 1 (HTGR)*	115 MW	York Co. Pennsylvania	10/31/74	SAFSTOR Approved	No
50-206 San Onofre 1 (PWR)	1347 MW	San Clemente California	11/30/92	Possession Only Lic.	Yes
50-267 Fort St. Vrain (HTGR)*	842 MW	Platteville Colorado	08/18/89	DECON Approved	Yes
50-312 Rancho Seco (PWR)	2772 MW	Sacramento California	06/07/89	Possession Only Lic.	Yes
50-320 Three Mile Island 2 (PWR)	2772 MW	Middletown Pennsylvania	03/28/79	Shut Down Defueled	No
50-322 Shoreham (BWR)*	2436 MW	Suffolk Co. New York	06/28/89	DECON Approved	Yes
50-344 Trojan (PWR)	3411 MW	Portland Oregon	11/09/92	To Be Determined	Yes
50-409 LaCrosse (BWR)*	165 MW	LaCrosse Wisconsin	04/30/87	SAFSTOR Approved	Yes

\*Project management assigned to NMSS.

**Table 2 Shut Down Test and Nuclear Ship Reactors—  
In SAFSTOR With Continued License**

<b>Docket No. Reactor</b>	<b>Thermal Power</b>	<b>Location</b>	<b>Present Status</b>	<b>Fuel on Site</b>
<i>Test Reactors</i>				
50-22 Westinghouse Test Reactor (pool type)	60 MW	Waltz Mill Pennsylvania	Possession Only Lic.	No
50-30 NASA Plum Brook (pool type)	60 MW	Sandusky Ohio	Possession Only Lic.	No
50-70 General Electric Test Reactor (pool type)	50 MW	Alameda Co. California	Possession Only Lic.	No
50-146 Saxton (PWR test)	28 MW	Saxton Pennsylvania	Possession Only Lic.	No
50-183 GE EVESR* (exp. superheat)	17 MW	Alameda Co. California	Possession Only Lic.	No
50-200 B&W BAWTR (pool type)**	6 MW	Lynchburg Virginia	Byproduct Lic. (NRC)	No
50-231 Southwest Experimental Fast Oxide Reactor (sodium cooled)	20 MW	Strickler Arkansas	Byproduct Lic. (St.)	No
<i>Nuclear Ship</i>				
50-238 NS Savannah (PWR)	80 MW	Charleston S. Carolina	Possession Only Lic.	No

- \* EVESR = ESADA (Empire States Atomic Development Associates) Vallecitos Experimental Superheat Reactor.
- \*\* Byproduct License - Project management assigned to NMSS for the Babcock & Wilcox Nuclear Development Center Test Reactor.

**Table 3 Shut Down Research Reactors—Continued License**

<b>Docket No. Reactor</b>	<b>Thermal Power</b>	<b>Location</b>	<b>Present Status</b>	<b>Fuel on Site</b>
50-47 Watertown Arsenal U.S. Army (pool type)	5 MW	Watertown Massachusetts	DECON Approved	No
50-54 Cintichem (pool type)	5 MW	Tuxedo New York	DECON Approved	NO
50-72 Univ. of Utah (AGN-201-107)	5 W	Salt Lake City Utah	DECON Not Approved	
50-77 Catholic Univ. (AGN-201)	0.1 W	Washington D.C.	DECON Approved	Yes
50-139 Univ. of Washington (Argonaut)	100 kW	Seattle	Shut Down	No
50-142 Univ. of CA (Argonaut)	100 kW	Los Angeles California	DECON Approved*	No
50-148 Univ. of Kansas (pool)	10 kW	Lawrence Kansas	DECON Approved	No
50-185 NASA MOCKUP (pool type)	100 kW	Sandusky Ohio	Possession Only Lic.	No
50-192 Univ. of Texas (pool)	250 kW	Austin Texas	DECON Approved	NO
50-262 Brigham Young (L-77)	10 W	Provo Utah	DECON Approved	No
50-396 Univ. of Virginia (CAVALIER)**	100 W	Charlottesville	DECON	No

\* License terminated. NRC Atomic Safety Licensing Board Dismantling Order in effect.

\*\* CAVALIER = Cooperatively Assembled Virginia Low-Intensity Educational Reactor.

**Table 4 Decommissioned Research Reactors (License Terminated)**

<b>Docket No. Reactor</b>	<b>Thermal Power</b>	<b>Location</b>	<b>Date Lic. Terminated</b>
50-1 Illinois Institute of Technology (water boiler research)	100 kW	Chicago Illinois	04-28-72
50-4 USN Research Laboratory (pool type)	1 MW	Washington D.C.	03-18-71
50-6 Battelle Memorial Institute (pool type)	2 MW	Columbus Ohio	12-22-87
50-8 North Carolina State (aqueous homogeneous)	100 W	Raleigh N. Carolina	09-07-66
50-17 Industrial Reactor Labs. (pool type)	5 MW	Plainsboro New Jersey	11-04-77
50-43 U.S. Naval Post-Graduate School (AGN-201)	0.1 W	Monterey California	10-11-72
50-50 North American Aviation (L-47 homogeneous)	5 W	Canoga Park California	06-30-58
50-58 Oklahoma State University (AGN-201)	0.1 W	Stillwater Oklahoma	03-19-74
50-60 U.S. Navy Hospital (AGN-201M)	5 W	Bethesda Maryland	06-24-65
50-64 University of Akron (AGN-201)	0.1 W	Akron Ohio	10-09-67
50-84 University of California (AGN-201)	0.1 W	Berkeley California	08-23-66
50-87 Westinghouse Training Reactor (pPool)	10 kW	Zion Illinois	10-27-88
50-94 Rockwell International (L-77)	10 W	Canoga Park California	02-11-82
50-98 University of Delaware (AGN-201)	0.1 W	Newark Delaware	02-26-79
50-99 BOW Lynchburg (pool)	1.0 MW	Lynchburg Virginia	07/20/82
50-101 Gulf United Nuclear (lattice test rig)	100 W	Pawling New York	06-25-74
50-106 Oregon State (AGN-201)	0.1 W	Corvallis Oregon	11-10-81
50-111 North Carolina State (pool type)	10 kW	Raleigh N. Carolina	01-13-83
50-112 University of Oklahoma (AGN-211)	100 W	Norman Oklahoma	02-14-90

Table 4 (Continued)

Docket No. Reactor	Thermal Power	Location	Date Lic. Terminated
50-114 William March Rice University (AGN-211)	15 W	Houston Texas	09-26-67
50-122 University of Wyoming (L-77)	10 W	Laramie Wyoming	12-05-75
50-124 Virginia Tech (pool)	100 kW	Blacksburg Virginia	08-11-88
50-129 West Virginia (AGN-211 P)	75 W	Morgantown W. Virginia	09-07-84
50-135 Walter Reed Medical Center (L-54, homogeneous solution)	50 kW	Washington D.C.	07-26-72
50-141 Stanford University (pool type)	10 kW	Stanford California	06-21-83
50-147 Rockwell Inert. California	200 W	Canoga Park	10-01-80
50-167 Lockheed (pool type)	10 W	Dawson Co. Georgia	09-01-60
50-187 Northrop (TRIGA Mark F)	1 MW	Hawthorne California	06-29-86
50-172 Lockheed (radiation effects reactor)	3 MW	Dawson Co. Georgia	08-31-71
50-202 University of Nevada (L-77)	10 W	Reno Nevada	02-24-75
50-212 General Dynamics (fast critical assembly)	500 W	San Diego California	03-05-65
50-216 Polytechnic Inst. N.Y. (AGN-201M)	0.1 W	Bronx New York	12-21-77
50-224 Univ. of California Berkeley (pool)	1.0 MW	Berkeley California	03-08-91
50-227 General Atomic Co. (TRIGA Mark III)	1.5 W	San Diego California	12-10-75
50-235 Gulf General Atomic (APFA)	500 W	San Diego California	10-22-69
50-240 Gulf General Atomic (HTGR)	100 W	San Diego California	04-02-73
50-253 Gulf Oil Corp. (APFA III)	500 W	San Diego California	08-10-73
50-267 Georgia Tech. (AGN 201)	0.1 W	Atlanta Georgia	01-07-86

**Table 4 (Continued)**

<b>Docket No. Reactor</b>	<b>Thermal Power</b>	<b>Location</b>	<b>Date Lic. Terminated</b>
50-294 Michigan State (TRIGA Mark 1)	250 OW	East Lansing Michigan	04-05-90
50-310 NUMEC and Common- wealth of Pa. (pool)	1 MW	Quehanna Pennsylvania	12-02-66
50-375 Rockwell Inert. (L-85)	3 OW	Canoga Park California	04-08-87
50-394 California Polytechnic (AGN-201)	0.1 W	San Luis Obispo CA.	07-19-85
50-433 Univ. of California (L-77)	10 W	Santa Barbara California	11-17-89
50-406 Tuskegee (AGN 201)	0.1 W	Tuskegee Alabama	11-02-84
50-538 Memphis State University	0.1 W	Memphis Tennessee	10-19-88

**Table 5 Decommissioned Critical Facilities (License Terminated)**

<b>Docket No. Reactor</b>	<b>Max. Power</b>	<b>Location</b>	<b>Date Lic. Terminated</b>
50-13 Babcock & Wilcox (split table)	1 kW	Lynchburg Virginia	02-26-88
50-14 Battelle Memorial (plastics moderated critical assembly)	200 W	W. Jefferson Ohio	05-11-70
50-23 Nuclear Development Corp. of America (crit. exp.)	100 W	Pawling New York	06-22-61
50-24 General Electric (BWR crit. exp.)	200 W	Alameda Co. California	12-01-69
50-34 Westinghouse Electric Corp. (PWR crit. exp.)	1 KW	Waltz Mill Pennsylvania	12-08-69
50-37 Gen. Dynamics (CIRGA zirconium hydride moderator)	25 W	San Diego California	03-15-60
50-38 Martin-Marietta Corp. (crit. exp.)	10 W	Baltimore Maryland	07-30-69
50-75 NASA (ZPR-1, solution type)	100 W	Cleveland Ohio	10-13-73
50-87 Westinghouse Electric Corp. (crit. exp.)	100 W	Waltz Mill Pennsylvania	01-26-72
50-108 Allis Chalmers (crit. exp.)	100 W	Greendale Wisconsin	01-20-67
50-153 Westinghouse (CVTR mockup, heavy water)	3 kW	Waltz Mill Pennsylvania	04-24-63
50-154 Martin Marietta (fluidized bed crit. exp.)	10 W	Middle River Maryland	02-07-66
50-191 Babcock & Wilcox (plutonium recycle crit. exp.)	50 kW	Lynchburg Virginia	06-01-73
50-197 NASA (ZPR-2 solution type)	100 W	Cleveland Ohio	10-13-73
50-203 GE (mixed spectrum crit. assembly)	400 W	Alameda Co. California	03-11-68
50-234 Gulf Oil Corp. (thermalionic)	200 W	San Diego California	08-10-73
50-246 General Dynamics Corp. (ACRE)	10 kW	San Diego California	12-30-66
50-290 Gulf United Nuclear (water mod. proof test fac.)	100 W	Pawling New York	06-25-74
50-360 Battelle Pacific Northwest Laboratory (plutonium recycle)		Richland Washington	10-07-81

**Table 6 Decommissioned Demonstration Nuclear Power Plants (AEC/DOE owned) Not Licensed (Operating Authorization Under 10 CFR Part 115)**

<b>Docket No. Reactor</b>	<b>Thermal Power</b>	<b>Location</b>	<b>Shut Down</b>	<b>Present Status</b>
115-1 Elk River (BWR)	58.2 MW	Elk River Minnesota	1968	Dismantled Federal Control Terminated
115-2 Piqua (organic cooled)	45.5 MW	Piqua Ohio	1966	Entombed DOE Monitoring
115-3 Hallam (sodium cooled)	256 MW	Hallam Nebraska	1964	Entombed DOE Monitoring
115-4 Bonus (BWR nuclear superheat)	50 MW	Rincon Puerto Rico	1968	Entombed DOE Monitoring
<b>Decommissioned DOE-Owned Power Reactor - No License or Part 115 Authorization</b>				
Shippingport (PWR)	236 MW	Shippingport Pennsylvania	1982	Dismantling Complete 1989

**APPENDIX C**

**NRC Action Plan to Ensure Timely Cleanup of SDMP Sites**

authority of the Commission in the State under chapters 6, 7, and 8, and section 161 of the Act with respect to the following materials:

- A. Byproduct materials as defined in section 11e.(1) of the Act;
- B. Source materials; and
- C. Special nuclear materials in quantities not sufficient to form a critical mass.

#### Article II

This Agreement does not provide for discontinuance of any authority and the Commission shall retain authority and responsibility with respect to regulation of:

- A. The construction and operation of any production or utilization facility;
- B. The export from or import into the United States of byproduct, source, or special nuclear material, or of any production or utilization facility;
- C. The disposal into the ocean or sea of byproduct, source, or special nuclear waste materials as defined in regulations or orders of the Commission;
- D. The disposal of such other byproduct, source, or special nuclear material as the Commission from time to time determines by regulation or order should, because of the hazards or potential hazards thereof, not be so disposed of without a license from the Commission;
- E. The land disposal of source, byproduct and special nuclear material received from other persons; and
- F. The extraction or concentration of source material from source material ore and the management and disposal of the resulting byproduct material.

#### Article III

This Agreement may be amended, upon application by the State and approval by the Commission, to include the additional area(s) specified in article II, paragraph E or F, whereby the State can exert regulatory control over the materials stated herein.

#### Article IV

Notwithstanding this Agreement, the Commission may from time to time by rule, regulation, or order, require that the manufacturer, processor, or producer of any equipment, device, commodity, or other product containing source, byproduct, or special nuclear material shall not transfer possession or control of such product except pursuant to a license or an exemption from licensing issued by the Commission.

#### Article V

This Agreement shall not affect the authority of the Commission under subsection 161 b. or f. of the Act to issue rules, regulations, or orders to protect the common defense and security, to protect restricted data or to guard against the loss or diversion of special nuclear material.

#### Article VI

The Commission will use its best efforts to cooperate with the State and other Agreement States in the formulation of standards and regulatory programs of the State and the Commission for protection against hazards of radiation and to assure that State and Commission programs for protection against hazards of radiation will be coordinated and compatible. The State will use its best efforts to cooperate with the Commission and other Agreement States in the formulation of standards and regulatory programs of the State and the Commission for protection against hazards of radiation and to assure that the State's program will continue to be compatible with the program of the Commission for the regulation of like materials. The State and the Commission will use their best efforts to keep each other informed of proposed changes in their respective rules and regulations and licensing, inspection and enforcement policies and criteria, and to obtain the comments and assistance of the other party thereon.

#### Article VII

The Commission and the State agree that it is desirable to provide reciprocal recognition of licenses for the materials listed in article I licensed by the other party or by any Agreement State. Accordingly, the Commission and the State agree to use their best efforts to develop appropriate rules, regulations, and procedures by which such reciprocity will be accorded.

#### Article VIII

The Commission, upon its own initiative after reasonable notice and opportunity for hearing to the State, or upon request of the Governor of the State, may terminate or suspend all or part of this Agreement and reassert the licensing and regulatory authority vested in it under the Act if the Commission finds that (1) such termination or suspension is required to protect the public health and safety, or (2) the State has not complied with one or more of the requirements of section 274 of the Act. The Commission may also, pursuant to section 274 of the Act, temporarily suspend all or part of this Agreement if, in the judgment of the

Commission, an emergency situation exists requiring immediate action to protect public health and safety and the State has failed to take necessary steps. The Commission shall periodically review this Agreement and actions taken by the State under this Agreement to ensure compliance with section 274 of the Act.

#### Article IX

This Agreement shall become effective on April 1, 1992, and shall remain in effect unless and until such time as it is terminated pursuant to article VIII.

Done at Rockville, Maryland in triplicate, this 16th day of March, 1992.

For the United States Nuclear Regulatory Commission, Ivan Selin, Chairman.

Done at Augusta, Maine, in triplicate, this 25th day of March, 1992.

For the State of Maine, John R. McKernan, Jr., Governor.

Dated at Rockville, this 9th day of April, 1992.

For the United States Nuclear Regulatory Commission,

Sheldon A. Schwartz,

Deputy Director, Office of State Programs.

[FR Doc. 92-8839 Filed 4-15-92; 8:45 am]

BILLING CODE 7590-01-M

#### Action Plan to Ensure Timely Cleanup of Site Decommissioning Management Plan Sites

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Notice of availability of NRC action plan.

**SUMMARY:** The NRC has developed an Action Plan to describe the approach the agency will use to accelerate the cleanup of radiologically contaminated sites listed in NRC's Site Decommissioning Management Plan (SDMP). The objective of this plan is to communicate the Commission's general expectation that sites listed in the SDMP be cleaned up in a timely and effective manner. This plan (1) identifies existing criteria to guide cleanup of contaminated soils, structures, and equipment and emphasizes site-specific application of the As Low As Reasonably Achievable (ALARA) principle; (2) states the NRC's position on the finality of decommissioning decisions; (3) describes the NRC's general expectation that SDMP site cleanup will be completed within a 4-year timeframe after operations cease or 3 years after the issuance of an initial cleanup order; (4) identifies currently available guidance on site

characterization work in support of decommissioning; and (5) describes the process the NRC staff will use to establish and enforce schedules for timely cleanup on a site-specific basis.

**ADDRESSES:** Other documents referenced in this notice may be reviewed and/or copies for a fee from the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC 20555.

**FOR FURTHER INFORMATION CONTACT:** John A. Austin, Chief, Decommissioning and Regulatory Issues Branch, Division of Low-Level Waste Management and Decommissioning, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301) 504-2560.

**SUPPLEMENTARY INFORMATION:**

**I. Introduction and Purpose**

Over the past several years, the Nuclear Regulatory Commission (NRC) has identified over 40 nuclear material sites that warrant special attention by the Commission. These sites have buildings, former waste disposal areas, large piles of tailings, groundwater, and soil contaminated with low levels of uranium or thorium (source material) or other radionuclides. Consequently, they present varying degrees of radiological hazard, cleanup complexity, and cost. Some of the sites are still under the control of active NRC licenses, whereas licenses for other sites may have already been terminated or may have never been issued. At some sites, licenses are financially and technically capable of completing cleanup in a reasonable timeframe, whereas at other sites, the licensee or responsible party is unable or unwilling to perform cleanup. In addition, the sites are currently in various stages of decommissioning. At some sites, licensees have initiated decommissioning, whereas at other sites, decommissioning has not yet been planned or initiated.

The NRC believes that the best approach for minimizing the potential for unnecessary radiation exposures and environmental contamination in the future is to ensure that these sites are cleaned up in a timely and effective manner. In 1990, the NRC implemented the Site Decommissioning Management Plan (SDMP) to identify and resolve issues associated with the timely cleanup of these sites. The SDMP provides a comprehensive strategy for NRC and licensee activities dealing with the cleanup and closure of contaminated nuclear material facilities over which the NRC has jurisdiction. The appendix to this document lists the sites that are

currently included in the SDMP (the SDMP does not include more routine decommissioning cases such as nuclear power reactors). The SDMP has been effective in ensuring coordination and resolution of some of the policy and regulatory issues affecting site decommissioning. Progress on actual site remediation, however, continues to be slow. The limited progress to date has prompted the Commission to direct the NRC staff to initiate actions to accelerate the cleanup of SDMP sites.

It should be noted that this Action Plan itself does not contain enforceable standards and is not intended to create new rights or obligations on third parties or to preclude litigation of properly framed issues in any pending proceeding. Implementation of this plan may result in the establishment of legally binding requirements by order or license amendment that may be enforced on a site-specific basis. However, nothing in this Action Plan is intended to affect hearing rights associated with such orders or licensee amendments or the hearing rights of parties to presently pending adjudications and, to the extent that rules promulgated in accord with 5 U.S.C. 553 are not applicable, each case will be judged on its own merits.

**II. Action Plan**

In accordance with the overall objective of ensuring timely and effective cleanup of SDMP sites, the NRC staff will review site-specific plans and take decommissioning actions consistent with the following elements:

**A. Cleanup Criteria**

Pending NRC rulemaking on generic radiological criteria for decommissioning, the NRC will continue to consider existing guidance, criteria, and practices listed below to determine whether sites have been sufficiently decontaminated so that they may be released for unrestricted use, pursuant to, or consistent with, the decommissioning rules in 10 CFR 30.36, 40.42, 50.82, 70.38, and 72.54. These cleanup criteria will be applied on a site-specific basis with emphasis on residual contamination levels that are ALARA.

1. Options 1 and 2 of the Branch Technical Position "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (46 FR 52601; October 23, 1981).

2. "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," Policy and Guidance Directive FC 83-23,

Division of Industrial and Medical Nuclear Safety, November 4, 1983.

3. "Termination of Operating Licenses for Nuclear Reactors," Regulatory Guide 1.86, June 1974, Table 1, for surface contamination of reactor facility structures. Also Cobalt-60, Cesium-137, and Europium-152 that may exist in concrete, components, and structures should be removed so the indoor exposure rate is less than 5 microrentgen per hour above natural background at 1 meter, with an overall dose objective of 10 millirem per year (cf. Letter to Stanford University from James R. Miller, Chief, Standardization and Special Projects Branch, Division of Licensing, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, April 21, 1982, Docket No. 50-141).

4. The Environmental Protection Agency's (EPA's) "Interim Primary Drinking Water Regulations," 40 CFR part 141 (41 FR 38404; July 9, 1976). In accordance with FC 83-23, the maximum contaminant levels for radionuclides in public drinking water as established by the EPA should be used as reference standard for protection of groundwater and surface water resources.

5. The EPA's "Persons Exposed To Transuranium Elements In The Environment" (42 FR 60956; November 30, 1977). This document provides guidelines for acceptable levels of transuranium elements in soil.

The criteria of this section will be considered in establishing site-specific ALARA levels for each of the SDMP sites in license amendments and orders.

**B. Finality**

The NRC's decision to terminate a license will relieve the licensee from any further obligation to the NRC to conduct additional cleanup, as long as the licensee decommissioned the site in full accordance with an approved decommissioning plan. The licensee will demonstrate compliance with the cleanup levels described in the decommissioning plan by performing a radiologic survey of the site prior to license termination. The NRC usually conducts an independent survey to confirm the accuracy of the licensee's termination survey. Therefore, if a licensee or responsible party cleaned up a site, or was in the process of cleaning up a site, under an NRC-approved decommissioning plan, the NRC will not require the licensee to conduct additional cleanup in response to NRC criteria or standard established after NRC approval of the plan. An exception to this case would be in the event that additional contamination, or

noncompliance with the plan, is found indicating a significant threat to public health and safety. Noncompliance would occur with a licensee or responsible party does not comply with an approved decommissioning plan, or provides false information.

The NRC will inform EPA about specific decommissioning actions at sites. NRC will also inform State and local agencies that have jurisdiction over aspects concerning decommissioning actions.

#### C. Timing

The NRC staff will address the timing of SDMP site cleanups on a case-by-case basis, with the expectation that cleanup generally be completed within about 4 years after operations that caused the contamination cease or 3 years after issuance of an initial cleanup order. To achieve this objective, major decommissioning milestones should be established within the following timeframes:

1. As soon as practical, but generally not later than 12 months after notification by the NRC that decommissioning is expected to commence, the licensee or responsible party identified by the NRC should submit to the NRC an adequate site characterization report, if that has not yet been completed. The NRC encourages early and substantive coordination and communication between the licensee or responsible party in planning for site characterization, including NRC review of site characterization plans.

2. As soon as practical, but generally not later than 6 months after NRC approval of the site characterization report, the licensee or responsible party should submit to the NRC a site decommissioning plan for approval based on the site characterization results. The decommissioning plan should include schedules for completing site decommissioning work in a timely and effective manner, including plans to dispose of contaminated materials either onsite pursuant to 10 CFR 20.302 (or 10 CFR 20.2002 of the revised 10 CFR part 20), or at a licensed disposal facility offsite.

3. As soon as practical, but generally not later than 18 months after NRC approval of the site decommissioning plan, the licensee or responsible party should complete all decommissioning work and termination surveys, so that sites or facilities can be released for unrestricted use after termination of the license, as appropriate.

In implementing this approach, the NRC will establish specific and enforceable milestones for each phase

of decommissioning through license amendments or orders. These schedules will provide flexibility to allow a licensee or responsible party to demonstrate good cause for delaying cleanup based on technical and risk reduction considerations, or for reasons beyond their control. NRC recognizes that at sites containing hazardous chemical wastes, schedules will depend, at least in part, on the necessary reviews and approvals by other responsible agencies (e.g., EPA or State agencies).

#### D. Site Characterization

Inadequate site characterization has been one of the technical issues that has delayed timely approval and implementation of site-specific decommissioning actions. Therefore, the NRC is developing new guidance on the content of acceptable site characterization programs conducted in support of decommissioning actions. The NRC has developed a draft "Guidance Manual for Conducting Radiological Surveys in Support of License Termination" (NUREG/CR-5849)<sup>1</sup> through Oak Ridge Associated Universities. This draft manual, which will be published for interim use and evaluation in April 1992, should be consulted regarding general aspects of site characterization activities. In addition, this draft manual should be used by licensees when conducting radiological surveys in support of license terminations in the interim until the manual is finalized. NRC is developing additional guidance on specific aspects of site characterization, such as hydrogeologic assessment of contaminated sites.

Until specific NRC guidance on site characterization is developed, licensees should continue to review relevant information from existing documents on site characterization such as those identified below. Although NRC recognizes that these documents do not completely address site characterization needs for decommissioning, use of these references, in addition to site-specific consultation with the NRC staff, will help ensure that site characterization is appropriately planned and conducted so that final site characterization reports are submitted with minimal deficiencies and in a timely manner. The following documents, available from the NRC Public Document Room, should be

<sup>1</sup> A free single copy of draft NUREG/CR-5849 may be requested by writing to the U.S. Nuclear Regulatory Commission, Attn: Distribution and Mail Services Section, room P-130A, Washington, DC 20555. A copy is also available for inspection and/or copying in the NRC Public Document Room, 2120 L Street, NW, (Lower Level), Washington, DC.

reviewed regarding general aspects of site characterization activities:

1. "Survey Procedures Manual for the ORAU Environmental Survey and Site Assessment Program," Oak Ridge Associated Universities, March 1990.
2. "Laboratory Procedures Manual for the Environmental Survey and Site Assessment Program," Revision 5, Oak Ridge Associated Universities, February 1990.
3. "Quality Assurance Manual for the Oak Ridge Associated Universities' Environmental Survey and Site Assessment Program," Revision 3, Oak Ridge Associated Universities, February 1990.
4. "Monitoring for Compliance With Decommissioning Termination Survey Criteria," NUREG/CR-2082,<sup>2</sup> June 1981.
5. "Guidance on the Application of Quality Assurance for Characterizing a Low-Level Radioactive Waste Disposal Site," NUREG-1383, October 1990.

#### E. Procedures to Compel Timely Cleanup

The NRC staff will seek voluntary cooperation by licensees or other responsible parties in establishing and implementing decommissioning plans in accordance with the objectives of this Action Plan. For sites with active NRC licenses, an approved decommissioning plan that includes appropriate schedules and cleanup levels will be incorporated into the license by amendment through normal licensing procedures. For sites with joint licenses (i.e., facilities that possess both a materials and a non-power reactor license), a coordinated approach under both licenses will be taken in establishing appropriate schedules and plans for decommissioning. If a site is not under an active license, the NRC may impose a decommissioning plan by order.

In cases where voluntary cooperation is ineffective in establishing acceptable schedules for completing decommissioning actions, the NRC will establish legally binding requirements and take enforcement action, as necessary, to compel timely and effective cleanup of SDMP sites. Demands for Information may be used to establish licensee commitments to perform major decommissioning activities. Enforcement actions may

<sup>2</sup> Copies of NUREGS may be purchased from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies are also available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. A copy is also available for inspection and/or copying at the NRC Public Document Room, 2120 L Street, NW, (Lower Level), Washington, DC.

include issuance of orders, including immediately effective orders, to compel actions by licensees or other responsible parties. If necessary, NRC will issue orders requiring payment of funds into a decommissioning escrow account when a licensee or responsible party fails to meet an agreed upon schedule and has not already established an adequate decommissioning fund pursuant to, or consistent with, the decommissioning funding rules (10 CFR 30.35, 40.36, 50.82, 70.25, and 72.30). The amount of the escrow account will be based upon and be consistent with the estimated cost required to complete site cleanup. Other enforcement actions may include escalated payment of funds into the escrow account based on a licensee's or responsible party's failure to comply with the order. Accumulations into that account will be dedicated for use to finance the cleanup of the site. Finally, the NRC will consider issuing civil penalties where (1) the licensee or responsible party fails to comply with an order compelling payment into an escrow account; or (2) the licensee or responsible party fails to comply with a requirement or an order compelling cleanup when there is already sufficient decommissioning funding. Additionally, NRC may seek court injunctions to compel enforcement of these orders.

Dated at Rockville, Maryland, this 10th day of April, 1992.

For the Nuclear Regulatory Commission,  
John H. Austin,  
Chief, Decommissioning and Regulatory Issues Branch, Division of Low-Level Waste Management and Decommissioning, Office of Nuclear Material Safety and Safeguards.

## APPENDIX—EXISTING SDMP SITES

Site name	Location
Advanced Medical Systems	Cleveland, OH.
ALCOA	Cleveland, OH.
AMAX	Wood County, WV.
Aberdeen Proving Ground	Aberdeen, MD.
Army Arsenal	Watertown, MA.
Babcock and Wilcox	Apollo, PA.
Babcock and Wilcox	Parks Township, PA.
BP Chemicals	Lima, OH.
Budd Company	Philadelphia, PA.
Cabot Corporation	Boyetown, PA.
Cabot Corporation	Reading, PA.
Cabot Corporation	Revere, PA.
Chemtron Corporation (Bert Ave.)	Cleveland, OH.
Chemtron Corporation (Harvard Ave.)	Cleveland, OH.
Chevron Corporation	Pawling, New York.
Dow Chemical	Midland, MI and Bay City, MI.
Elkem Metals	Marietta, OH.
Englehard	Plainville, MA.
Fansteel	Muskogee, OK.
General Services Administration	Watertown, MA.

## APPENDIX—EXISTING SDMP SITES—Continued

Site name	Location
Hartley and Hartley	Bay County, MI.
Heritage Minerals	Lakehurst, NJ.
Kerr-McGee (Cimarron)	Creacent, OK.
Kerr-McGee	Cushing, OK.
Magnesium Elektron	Flamington, NJ.
Molycorp	Washington, PA.
Molycorp	York, PA.
NE Ohio Regional Sewer District	Cuyahoga Heights, OH.
Nuclear Metals	Concord, MA.
Pernagrain	Media, PA.
Pesses Chemical	Pulaski, PA.
Remington Arms Company	Independence, MO.
RMI Titanium	Ashtabula, OH.
RTI, Inc.	Rockaway, NJ.
Safety Light Corporation	Bloomsburg, PA.
Schott Glass	Duquesne, PA.
Shieldalloy	Cambridge, OH.
Shieldalloy	Newfield, NJ.
Texas Instruments	Attleboro, MA.
United Nuclear Corporation	Wood River Junction, VT.
Victoreen	Cleveland, OH.
Westinghouse (Waltz Mill)	Madison, PA.
West Lake Landfill	St. Louis, MO.
Whittaker Metals	Greenville, PA.
Wyman-Gordon	North Grafton, MA.
3M Company	Kerrick, MN.

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BILLING CODE 7590-01-M

## PENNSYLVANIA AVENUE DEVELOPMENT CORPORATION

## Public Information Collection Requirements Submitted to OMB for Review

PADC has submitted (on April 1, 1992) the following public information collection requirement to OMB for review and clearance under the Paperwork Reduction Act of 1980, Pub. L. 96-511 (44 U.S.C. ch. 35). Copies of the submission may be obtained by calling the PADC clearance officer listed. Send comments to the OMB reviewer listed and to the PADC clearance officer.

## Pennsylvania Avenue Development Corporation

OMB Number: 3206.

Form Number: No form number available; information requested in the Quarterly Workforce Report for the Federal Triangle Development Project in Washington, DC.

Title: Quarterly Workforce Report.

Description: Under the authority of the Pennsylvania Avenue Development Corporation Act, as amended (Pub. L. 92-578), and PADC's Affirmative Action Policy and Procedure, 98 CFR part 906, PADC has requested the developer of the Federal Triangle site in Washington,

DC to obtain, on a voluntary basis, detailed statistics of racial and ethnic composition of the construction workforce on the project.

Respondents: Construction contractors.

Clearance Officer: Talbot J. Nicholas II, Attorney, (202) 724-4055, PADC, suite 1220 North, 1331 Pennsylvania Avenue, NW., Washington, DC 20004.

OMB Reviewer: Elizabeth Harker, (202) 395-3750, Office of Information and Regulatory Affairs, Office of Management and Budget, New Executive Office Building, 725 17th St., NW., Washington, DC 20503.

Dated: April 10, 1992.

M.J. Brodie,

Executive Director.

[FR Doc. 92-8793 Filed 4-15-92; 8:45 am]

BILLING CODE 7530-01-M

## SECURITIES AND EXCHANGE COMMISSION

## Forms Under Review by Office of Management and Budget

Agency Clearance Officer—Kenneth Fogash (202) 272-2142.

Upon written request, copy available from: Securities and Exchange Commission, Office of Filings, Information and Consumer Services, Washington, DC 20549.

Extension

Rule 206(3)-2—File No. 270-218  
Rules 8b-1 through 8b-32—File No. 270-135

Notice is hereby given pursuant to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*), that the Securities and Exchange Commission (Commission) has submitted a request for extension for Rule 206(3)-2 under the Investment Advisers Act of 1940 (17 CFR 275.206(3)-2) and Rules 8b-1 through 8b-32 (17 CFR 270.8b-1 to 270.8b-32), a family of rules under section 8(b) of the Investment Company Act of 1940.

Rule 206(3)-2 permits registered investment advisers to comply with section 206(3) of the Investment Advisers Act of 1940 by obtaining a blanket consent from a client to enter into agency cross transactions, provided certain disclosure is made to the client. Approximately 100 respondents utilize the rule annually, necessitating about 122 responses each year, for a total of 12,200 responses. Each response requires about .5 hours, for a total of 6,100 hours.

Rules 8b-1 through 8b-32 provides standard instructions to guide persons

**DATE  
FILMED**

12 / 9 / 93

**END**

