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ORNL/ER-390

**ENVIRONMENTAL  
RESTORATION  
PROGRAM**

**3001 Canal Radiological Characterization  
and Waste Removal Report,  
Oak Ridge National Laboratory,  
Oak Ridge, Tennessee**

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UCN-17560 (6 8-95)

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Energy Systems Environmental Restoration Program

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Oak Ridge, Tennessee**

Date Issued—December 1996

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Prepared for the  
U.S. Department of Energy  
Office of Environmental Management  
under budget and reporting code EW 20

Environmental Management Activities at the  
OAK RIDGE NATIONAL LABORATORY  
Oak Ridge, Tennessee 37831  
managed by  
LOCKHEED MARTIN ENERGY SYSTEMS, INC.  
for the  
U.S. DEPARTMENT OF ENERGY  
under contract DE-AC05-84OR21400

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# 3001 CANAL RADIOLOGICAL CHARACTERIZATION AND WASTE REMOVAL REPORT

## 1.0 Introduction

An underground steel reinforced concrete transfer and storage canal was built in 1943 and operated as an integral part of the Oak Ridge Graphite Reactor Building (3001) until 1963 when the reactor was shutdown. During operation, the canal was used for under water transfer of irradiated materials and other metals from the reactor in Building 3001 to the Building 3019 hot cell for further processing. After shutdown of the reactor, the canal was used for storage of irradiated materials and fission products until 1990 when the larger materials were removed and stored in the Department of Energy (DOE) approved solid waste management storage facilities. At that time it was discovered that a considerable amount of sludge had accumulated over the intervening years and subsequent analysis showed that the sludge contained Resource Conservation and Recovery Act (RCRA) materials that violated quantities allowed by the RCRA regulations. It was also recognized in 1990 that the canal was losing water to evaporation and the ground at the rate of approximately 400 gallons per day. To maintain water quality; i.e., radionuclide content at or near DOE derived concentration guidelines (DCG), the water in the canal is constantly demineralized using a demineralizer in the Building 3001 and demineralized make up water is supplied from the Building 3004 demineralizer.

Because the sludge was contaminated with RCRA metals, the canal went through another clean-up in 1992 to remove the RCRA metals and a RCRA Interim Closure Certification was received in 1992.<sup>1</sup> Tennessee Department of Environmental Conservation (TDEC) concurred with this closure in 1993.<sup>2</sup> At that time, the canal was left with five 55 gallon drums approximately one third full of solid low-level waste that had been covered by the sludge. A few higher radioactive waste items were distributed between four baskets and hung off the sides of the pool by ropes secured to the walls of the canal and a few contaminated tools were left in the area.

In fiscal year 1996 Lockheed Martin Energy Systems (LMES) planned to remove the last of the stored material in the drums and baskets along with the contaminated tools and prepare the canal for replacing the water with a controlled low-strength material (CLSM) in 1997, to eliminate the daily water loss, minimize the surveillance and maintenance cost on the canal area, and still shield the radionuclide contaminated walls of the canal.

This report summarizes the 3001 Canal Clean-up Task and the solid waste removed from the 3001 Canal in 1996 in accordance with ADS 3314 Work Breakdown Structure (WBS) 6.1.14.01.03.50.05 Incentive Task Order.

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<sup>1</sup> *Closure Certification Report for the 3001 Storage Canal at Oak Ridge National Laboratory*; DOE/OR-1056&D1, 92-225-161-68; October 1992; Radian Corporation; Oak Ridge, Tennessee

<sup>2</sup> Letter: Tiesler, Tom to Les Price; *Closure Certifications, 3001 Storage Canal, Oak Ridge National Laboratory (X-10)*, TN1 89 009 0003; May 17, 1993; State of Tennessee Department of Environment and Conservation; Oak Ridge, Tennessee

## 2.0 Summary and Conclusions

All solid waste items in the canal that could be picked up without vacuuming were placed into either one of the five drums or a new basket, depending on its activity. Subsequently, all of the drums and baskets containing low level material were removed from the canal, characterized, wrapped/bagged, and placed in concrete vaults containing B-25 boxes. One basket containing a high concentration of cobalt had its contents sized and placed in a tungsten cask before being placed in the concrete vault in order to achieve ALARA goals. These vaults will be stored at Solid Waste Storage Area 6 at ORNL.

A total of 2,268 pounds of solid waste was generated during this removal task containing the following quantities of isotopes:

87.07010077495 Ci	<sup>60</sup> Co
9.42260619960 Ci	<sup>137</sup> Cs
0.00340457970 Ci	<sup>90</sup> Sr
0.00000019546 Ci	<sup>241</sup> Am
0.00005891391 Ci	<sup>239</sup> Pu
0.00001890410 Ci	<sup>238</sup> Pu
0.00006563300 Ci	<sup>244</sup> Cm
0.00689000000 Ci	<sup>108m</sup> Ag
96.50314520072 Ci	Total

## 3.0 Waste Removal Operation

### 3.1 WBS 6.1.14.01.03.50.05.01.05, Project Management

The Clean-up Task was started on May 20, 1996 and safely completed on September 20, 1996 as planned.

### 3.2 WBS 6.1.14.01.03.50.05.01.10, Site Survey

The last comprehensive radiological survey was performed on the canal area on May 1, 1995. When compared with more recent partial surveys, it was concluded to be acceptable for this task and can be found in the Comprehensive Work Plan.<sup>3</sup> The radiation levels from the drums and baskets are shown in Figure 1 in parentheses by the drum numbers. The latest canal water analyses for radionuclides are shown in Figures 2 - 4<sup>4</sup> which encompass the field work period. The peak in March 1996 and subsequent drop in radionuclide content was due to a demineralizer resin regeneration at the beginning of March.

<sup>3</sup> Owen, R. S., *Comprehensive Work Plan*; WP-ERPS-3001/R0; July 15, 1996; ORNL Waste Management Document Center; Oak Ridge, Tennessee

<sup>4</sup> E-Mail: Gideon, Joan to Cofer, T. J.; *Special Project 1282*; September 10, 1996; Analytical Services Organization; ORNL; Oak Ridge, Tennessee

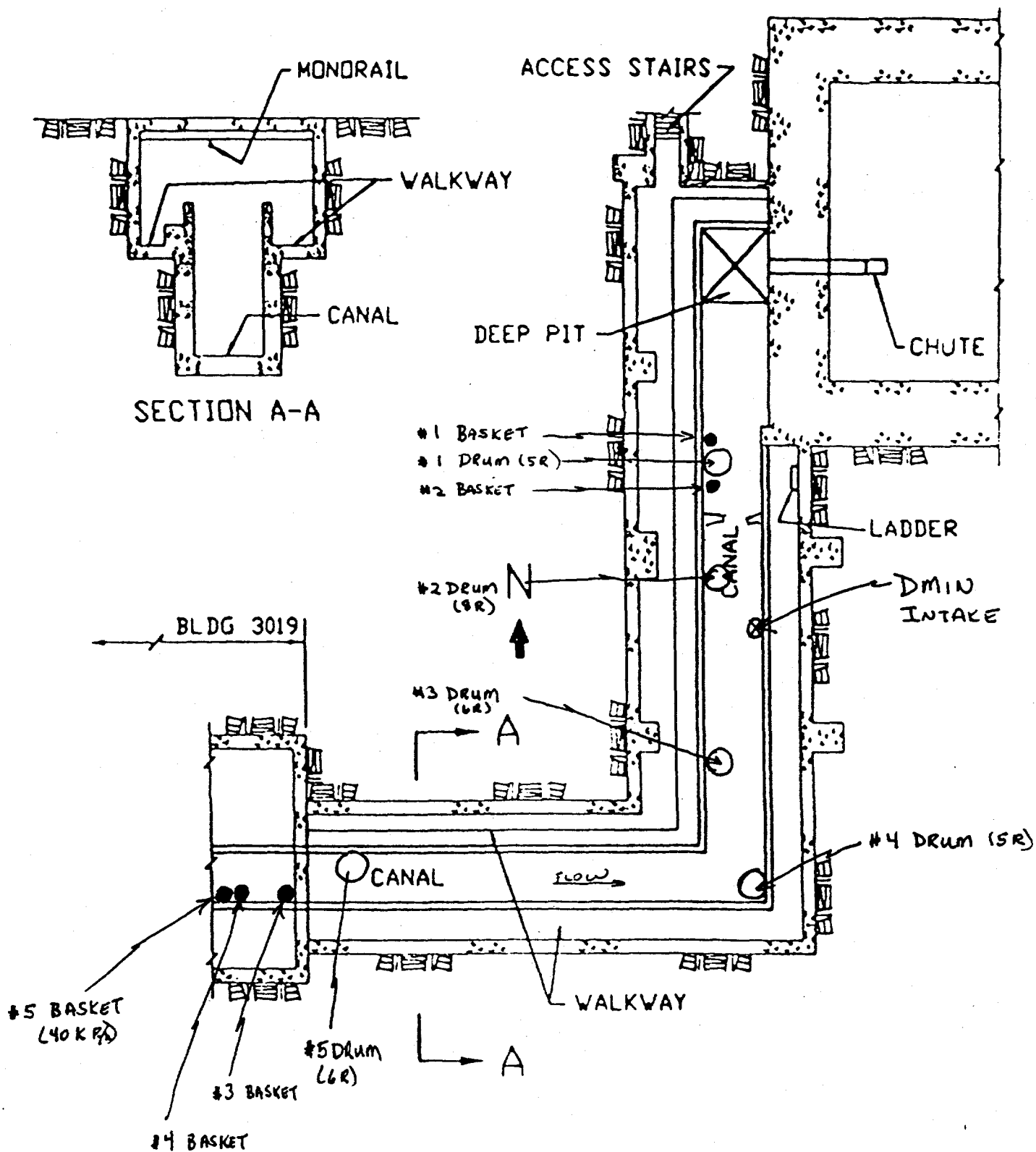


Figure 1: 3001 Canal Layout and Location of Drums and Baskets



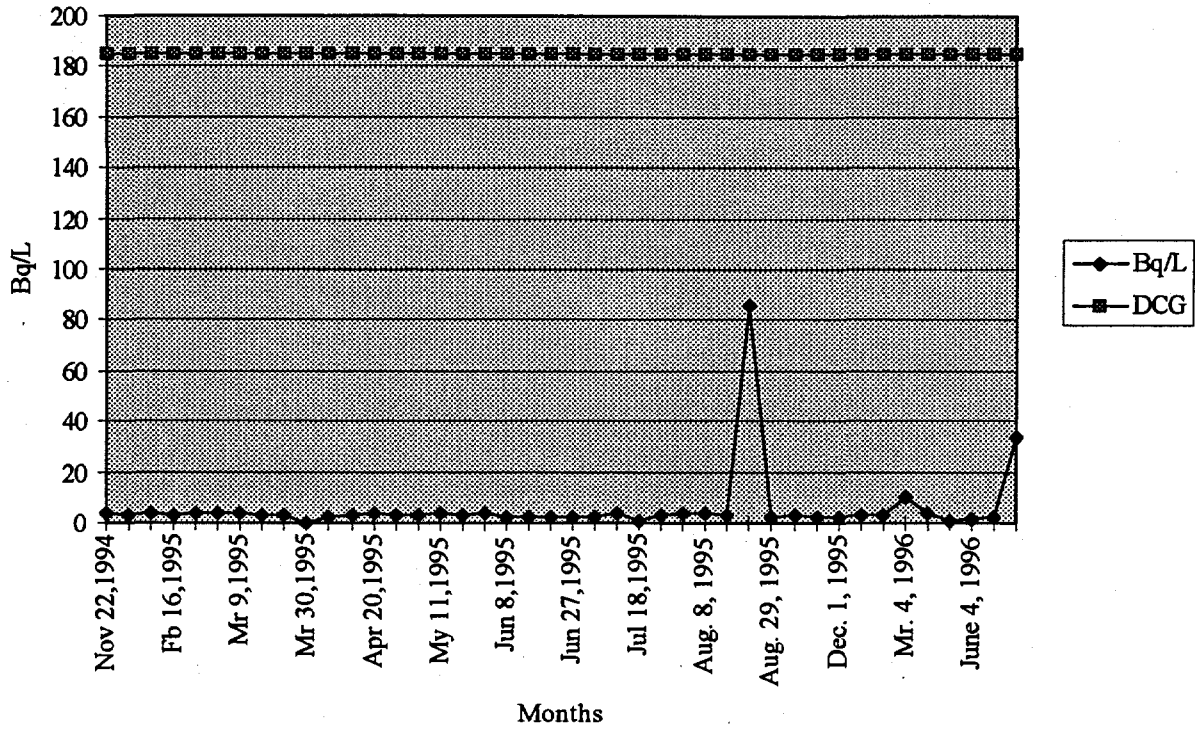


Figure 2: <sup>60</sup>Co Content in 3001 Canal Water

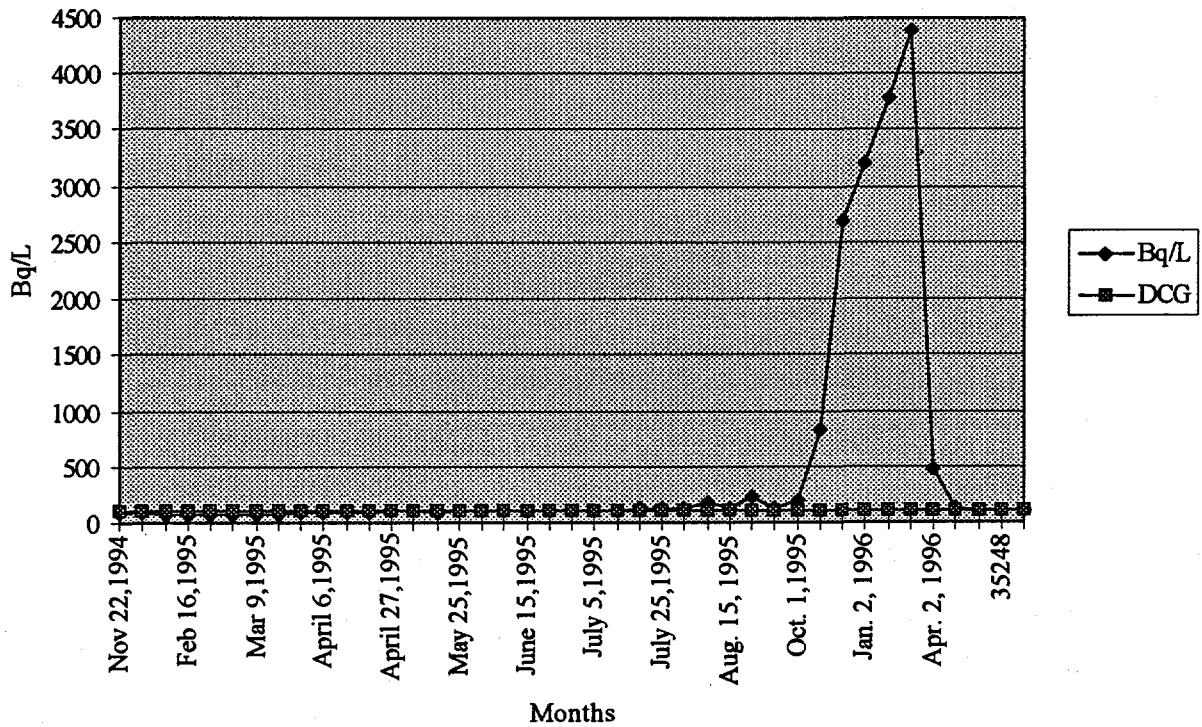


Figure 3: <sup>137</sup>Cs Content in 3001 Canal Water

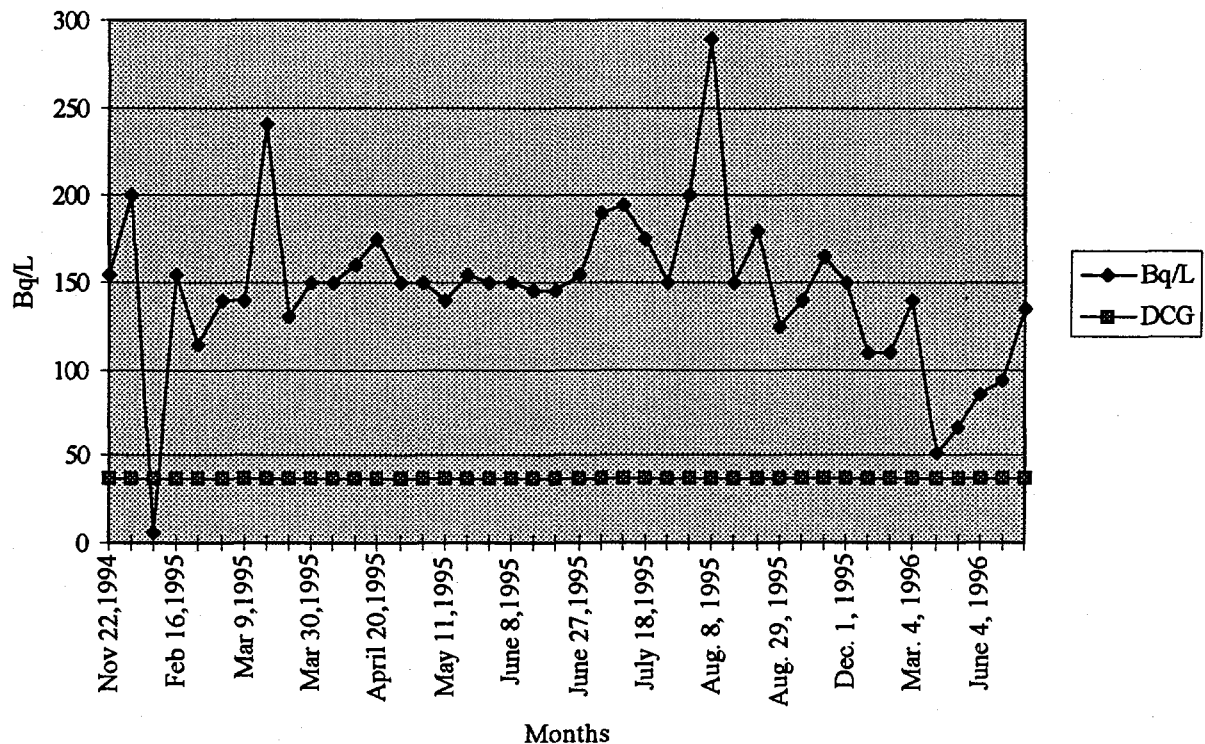


Figure: 4 <sup>90</sup>Sr Content in 3001 Canal Water

### 3.3 WBS 6.1.14.01.03.50.05.01.15, Supporting Documents

The 3001 Canal Clean-up Task was deemed a Hazardous Waste Operation (HAZWOPER) task. A team of LMES and LMER people (see Acknowledgments) were used to accomplish the task. The Safety and Health Evaluation and Support Team prepared the Site Safety and Health Plan.<sup>5</sup> The Chemical Technology Division (CTD) prepared the Comprehensive Work Plan,<sup>6</sup> and the ALARA Plan.<sup>7</sup> Since CTD personnel were selected to perform the waste removal, the following CTD procedures were used:

- RTS-002, Development, Review, and Control of Procedures
- RTS-023, RTS Facility Management
- RTS-024, Solid Low-Level Waste Handling
- RTS-025, Transuranic Waste Handling
- RTS-026, Conduct of Operations
- RTS QAP-X-91-CT-006, Rev. 1

<sup>5</sup> Rowland, Greg, *HAZWOPER Work Plan Site Health and Safety Plan for Removal, Packaging, and Characterization of Radioactive Debris in the Storage Canal at the Graphite Reactor Building 3001*; ES&H-ERPS-3001/R0; July 11, 1996; ORNL Waste Management Document Center; Oak Ridge, Tennessee

<sup>6</sup> Owen; *Ibid.*

<sup>7</sup> Haff, K. W. and Owen, R. S.; *ALARA Plan for Removal, Packaging, and Characterization of Radioactive Materials from the Storage Canal at the ORNL Graphite Reactor Building 3001*; ALAR-ERPS-3001/R0; July 15, 1996; ORNL Waste Management Document Center; Oak Ridge, Tennessee

It was concluded that a task specific Waste Management Plan and Hoisting, Lifting, and Rigging Plan would not be required because of CTD's internal procedures and cross training requirements.

The Site Safety and Health Officer was supplied by the Radiation Protection Office who kept the official log book for the waste removal operations in the canal area. This log book may be found in the 3001 Canal Clean-up file in the ORNL Waste Management Document Center.

### **3.4 WBS 6.1.14.01.03.50.05.01.20 Facility Stabilization**

The Project Management Review was completed and approval to start field work was received. Field work started on July 16, 1996. Because of ALARA concerns for workers in the building and visitors in the Visitors Center, all waste was removed on second shift after the Visitors Center was closed and non-related workers were removed from the building. Pre-job briefings with all workers were conducted every day. Because of the heat and humidity and level C personal protective equipment worn by all workers in the contaminated and radiation areas where work was being conducted, work in the canal area was limited to no more than 1:15 hours at a time.

All loose debris on the canal bottom were picked up, checked for radiation levels, and placed into drum # 5. Items in old baskets were put into a new basket; so the basket could be moved under water without fear of the bottom falling out. The old baskets were checked for radiation, found to be below background radiation levels, and then placed in drum #5. Only one drum per day was scheduled to be removed because of the 1:15 hours at a time working conditions.

Because of the level of radiation expected from the drums, each drum was raised out of the water using a commercial drum lifting fixture until only the drum's contents remained submerged below the canal water level. The water was pumped from the drums using a commercial 55 gallon drum pump with a screen over the suction end of the pipe and through a five micron bag filter back into the canal. Then twenty-five pounds of Adsorb were placed into each drum, the drum raised until the water could be wiped off and radiological smear samples taken, radiation contact readings recorded, plastic bag wrapped, raised to ground level in the hatch room above the canal, wrapped with another bag, and radiation reading recorded on the outside of the bags and one meter away. Using the NOMAD system connected to a portable computer, a spectral scan was performed on each drum and saved on the computer for later analysis and reporting.

Drums #1, 2, and 3 were placed into the first concrete vault for subsequent storage. Other low level compactible and non-compactible radiological waste bags were thrown in around the drums to fill the vault, add additional shielding of the drums, and to keep them in place while transporting the vaults to their storage location. Drums #4 and 5 were placed into a second vault. The contents of the last basket containing the higher radiation emitting items were loaded into a tungsten cask under water, the cask drained of water, the lid bolted shut, the cask wiped down, and subsequently treated as the other drums were treated. This cask was placed into the second concrete vault with drums #4 and 5. Again, other low level radiological waste generated during this task was packed around the larger items.

Tools which had no potential future use because of their special function for this task were cut up and placed into a final B-25 box with other radiological waste generated during this task. The Herculite placed on the floor of the canal walk area was left to provide improved safety for the workers during the stabilization of the canal in FY 1997.

A list of the waste removed from the canal showing the isotopes and quantities by container can be found in Attachment I. Dose rates measured on the drums, tungsten cask, concrete vaults, and B-25 box, and as documented on the respective packing lists for the waste<sup>8</sup> are listed in Table 1.

Container ID	$\beta$ - $\gamma$ Surface Dose Rate (mRem/hr)	$\beta$ - $\gamma$ Dose Rate at 1 Meter (mRem/hr)
Drum #1	5000	400
Drum #2	5000	500
Drum #3	1000	75
Vault #1	70	17
Drum #4	7000	500
Drum #5	7000	1000
Tungsten Cask	12000	1500
Vault #2	800	100
B-25 Box	7	N/A

**Table 1: Dose Rates Measured on 3001 Canal Waste Containers**

This waste was accepted by the ORNL Waste Management Organization for storage in SWSA 6.

The completion of this report completes this WBS 6.1.14.01.03.50.05 Incentive Task Order.

<sup>8</sup> 3001 Canal Clean-up Task Waste Packing Lists; WPL-ERPS-3001/R0; September 16, 1996; ORNL Waste Management Document Center, Oak Ridge, Tennessee

## ACKNOWLEDGEMENTS

Thanks to each of the following people on the Canal Clean-up Team for their generous, competent, and timely support in making and keeping this task safe, successful, and on schedule.

- Bryan Bolden, Dan Brown, and Pedro Gonzalez for their rad protection support.
- Tim Cofer, Mark Easton, and Rick Chadwick for their Facility Management, maintenance and task oversight support.
- Sheila Cox for her Site Safety and Health Officer guidance and support, as well as her rad protection support at other times.
- Mike Evans for review and/or revision of existing Chem Tech Waste Management Plans to make them applicable for this task and for his role as Waste Management Certification Officer.
- Jo Ellen Francis for her continued assistance and guidance in the preparation of the ALARA Plan. And for supplying the Site Safety and Health Officer and all of the radiation protection personnel, as well as her continued on site rad protection advice and support throughout the task.
- Karl Haff and Steve Owens for preparation of the Comprehensive Work Plan and ALARA Plan and continued support of the task with a competent, professional, enthusiastic field crew throughout.
- Larry Hawk for the Project Manager and Project Management Review support.
- Alan Ladd for quick waste documentation review, approval, and disposition.
- Rebecca Marcum and Hollis Wooten for their cost accounting support.
- Gloria Mei, Janet Westbrook, and Kurt Geber for their support in preparation of the ALARA Plan and subsequent field support.
- Steve Meyers and associates for their support and expertise in characterizing the waste.
- Kathy Rice, Karl Haff, Steve Owens, Tommy Miner, Jo Ellen Francis, Sam Wood, Brad McClelland, Greg Rowland, Kent Hepworth, and Charlie Shipp for their help in developing a reasonable estimate and schedule for this task.
- Carl Miles for his assistance in planning, estimating, and arranging field support.
- Tommy Miner and his crew of Chem Tech operators for leading and conducting all of the field work in a safe, efficient, professional manner. His crew included R. Barnes, W. Bolinger, A. Larson, L. Lawson, S. Mathews, T. McNabb, S. Paskell, and C. Richeson plus others, I am sure, who worked in the background.
- Greg Rowland and the Safety and Health Evaluation Support Team for preparation of the Site Safety and Health Plan and continued support through the task.
- Steve Owens, Mike Evans and Greg Larson for waste characterization computations and general project support.
- Robert Sherles, Kent DeRoos, and Betty Miller for their support in getting the task kicked off successfully.
- Peter Souza for preparing the NEPA Evaluation.
- Sam Wood for scheduling the Plant and Equipment personnel during site preparation of the cranes.

**ATTACHMENT I**

**LISTING OF WASTE <sup>9</sup> REMOVED FROM  
3001 CANAL DURING THE  
WBS 6.1.14.01.03.50.05 INCENTIVE TASK ORDER**

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<sup>9</sup> Ibid.

**ATTACHMENT I: LISTING OF WASTE REMOVED FROM 3001 CANAL IN ACCORDANCE WITH WBS 6.1.14.01.03.50.05  
INCENTIVE TASK ORDER**

Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019518430			X10C9600208	Wire, glass, metal, wood, plastic, paper	559	.77	IWMF-Pad SWSA-6
Total	Co-60	0.00000076500	X10C9600208				
Total	Cs-137	0.00000612000	X10C9600208				
Total	Sr-90	0.00000459000	X10C9600208				
Total	Am-241	0.00000019300	X10C9600208				
Total	Pu-239	0.00000153000	X10C9600208				
Total	All	0.00001319800	X10C9600208	High contact rad. reading on box = 7 mR/hr.	559		IWMF-Pad SWSA-6

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Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019604306	Co-60	1.02000000000	X10C9600860	55 gal. drum of metal and rubble (50.0 lbs net)	200	7.35	7822J, SWSA 6
	Cs-137	0.08620000000					
	Sr-90	0.00100000000					
	Pu-239	0.00001690000					
	Pu-238	0.00000556000					
	Cm-244	0.00001930000					
X1019518378	Co-60	0.60300000000	X10C9600860	55 gal. drum of metal and rubble (50.0 lbs net)	175	7.35	7822J, SWSA 6
	Cs-137	0.05080000000					
	Sr-90	0.00100000000					
	Pu-239	0.00001690000					
	Pu-238	0.00000556000					
	Cm-244	0.00001930000					
X1019517801	Co-60	85.30000000000	X10C9600860	Tungsten cask filled with metal debris (2.0 lbs net)	550	2	7822J, SWSA 6
	Cs-137	9.00000000000					
	Sr-90	0.00000793000					
	Pu-239	0.00000013400					
	Pu-238	0.00000004410					
	Cm-244	0.00000015300					
X1019517786	Cs-137	0.00000000600	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble (2.0 lbs net)	23	2	7822J, SWSA 6
	Sr-90	0.00000000450					
	Pu-239	0.00000000150					
	Am-241	0.00000000019					
	Co-60	0.00000000075					



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Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019517787	Co-60	0.00000000500	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	10	1.5	7822J, SWSA 6
	Cs-137	0.00000004000					
	Sr-90	0.00000003000					
	Am-241	0.00000000126					
	Pu-239	0.00000001000					
X1019517788	Co-60	0.00000000005	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	15	2.05	7822J, SWSA 6
	Cs-137	0.00000000040					
	Sr-90	0.00000000030					
	Am-241	0.00000000001					
	Pu-239	0.00000000010					
X1019517789	Co-60	0.00000000050	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	20	2.05	7822J, SWSA 6
	Cs-137	0.00000000400					
	Sr-90	0.00000000300					
	Am-241	0.00000000013					
	Pu-239	0.00000000100					
X1019517790	Co-60	0.00000000010	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	15	2.05	7822J, SWSA 6
	Cs-137	0.00000000080					
	Sr-90	0.00000000060					
	Am-241	0.00000000003					
	Pu-239	0.00000000020					

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Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019517791	Co-60	0.0000000005	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	10	2	7822J, SWSA 6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517792	Co-60	0.0000000010	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	15	2	7822J, SWSA 6
	Cs-137	0.0000000080					
	Sr-90	0.0000000060					
	Am-241	0.0000000003					
	Pu-239	0.0000000020					
X1019517793	Co-60	0.0000000005	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	5	1	7822J, SWSA 6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517794	Co-60	0.0000000005	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	10	1.5	7822J, SWSA 6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					

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Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019517795	Co-60	0.0000000010	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	5	1.5	7822J, SWSA 6
	Cs-137	0.0000000080					
	Sr-90	0.0000000060					
	Am-241	0.0000000003					
	Pu-239	0.0000000020					
X1019517796	Co-60	0.0000000005	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	15	2.5	7822J, SWSA 6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517797	Co-60	0.0000000100	X10C9600860	Non-compactible waste from D&D, wire sling, plastic, and rubble	30	2	7822J, SWSA 6
	Cs-137	0.0000000800					
	Sr-90	0.0000000600					
	Am-241	0.0000000025					
	Pu-239	0.0000000200					
X1019517798	Co-60	0.0000000010	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	10	2.5	7822J, SWSA 6
	Cs-137	0.0000000080					
	Sr-90	0.0000000060					
	Am-241	0.0000000003					
	Pu-239	0.0000000020					

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Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019517799	Co-60	0.00000000010	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	10	2.5	7822J, SWSA 6
	Cs-137	0.00000000080					
	Sr-90	0.00000000060					
	Am-241	0.00000000003					
	Pu-239	0.00000000020					
X1019517800	Co-60	0.00000000030	X10C9600860	Non-compactible waste from D&D, plastic, paper and rubble	45	3	7822J, SWSA 6
	Cs-137	0.00000000240					
	Sr-90	0.00000000180					
	Am-241	0.00000000008					
	Pu-239	0.00000000060					
Total	Co-60	86.92300000830	X10C9600860				7822J, SWSA 6
Total	Cs-137	9.13700006640	X10C9600860				7822J, SWSA 6
Total	Sr-90	0.00200797980	X10C9600860				7822J, SWSA 6
Total	Am-241	0.00000000209	X10C9600860				7822J, SWSA 6
Total	Pu-239	0.00003395060	X10C9600860				7822J, SWSA 6
Total	Pu-238	0.00001116410	X10C9600860				7822J, SWSA 6
Total	Cm-244	0.00003875300	X10C9600860				7822J, SWSA 6
Total	All	96.06209192429	X10C9600860	High contact rad. reading on box = 800 mR/hr & 100 mR/hr at one meter	1163	46.85	7822J, SWSA 6

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Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X10I9517766			X10C9600868	55 gal drum containing Metal, Rubble, Absorbent	145	7.3	IWMF-Pad SWSA-6
	Co-60	0.08370000000					
	Cs-137	0.15100000000					
	Cm-244	0.00000896000					
	Pu-238	0.00000258000					
	Pu-239	0.00000781000					
	Sr-90	0.00046400000					
X10I9517767			X10C9600868	55 gal drum containing Metal, Rubble, Absorbent	120	7.3	IWMF-Pad SWSA-6
	Co-60	0.03170000000					
	Cs-137	0.06730000000					
	Cm-244	0.00000896000					
	Pu-238	0.00000258000					
	Pu-239	0.00000781000					
	Sr-90	0.00046400000					
X10I9517768			X10C9600868	55 gal drum containing Metal, Rubble, Absorbent	145	7.35	IWMF-Pad SWSA-6
	Co-60	0.03170000000					
	Cs-137	0.06730000000					
	Cm-244	0.00000896000					
	Pu-238	0.00000258000					
	Pu-239	0.00000781000					
	Sr-90	0.00046400000					
Ag-108	0.00689000000						
X10I9517773			X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	10	2	IWMF-Pad SWSA-6
	Co-60	0.00000000005					
	Cs-137	0.00000000040					
	Sr-90	0.00000000030					
	Am-241	0.00000000001					
Pu-239	0.00000000010						

**ATTACHMENT I: LISTING OF WASTE REMOVED FROM 3001 CANAL IN ACCORDANCE WITH WBS 6.1.14.01.03.50.05  
INCENTIVE TASK ORDER**

Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019517774	Co-60	0.0000000005	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	12	2	IWMF-Pad SWSA-6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517775	Co-60	0.0000000005	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	20	2	IWMF-Pad SWSA-6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517776	Co-60	0.0000000005	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	5	0.8	IWMF-Pad SWSA-6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517777	Co-60	0.0000000005	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	6	1	IWMF-Pad SWSA-6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					

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INCENTIVE TASK ORDER**

Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019517778	Co-60	0.0000000005	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	15	2	IWMF-Pad SWSA-6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517779	Co-60	0.0000000005	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	10	1	IWMF-Pad SWSA-6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517780	Co-60	0.0000000005	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	8	1.5	IWMF-Pad SWSA-6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					
X1019517781	Co-60	0.0000000005	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	10	1.5	IWMF-Pad SWSA-6
	Cs-137	0.0000000040					
	Sr-90	0.0000000030					
	Am-241	0.0000000001					
	Pu-239	0.0000000010					

**ATTACHMENT I: LISTING OF WASTE REMOVED FROM 3001 CANAL IN ACCORDANCE WITH WBS 6.1.14.01.03.50.05  
INCENTIVE TASK ORDER**

Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
X1019517782	Co-60	0.0000000050	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	5	1.5	IWMF-Pad SWSA-6
	Cs-137	0.0000000400					
	Sr-90	0.0000000300					
	Am-241	0.0000000013					
	Pu-239	0.0000000100					
X1019517783	Co-60	0.0000000030	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	30	3	IWMF-Pad SWSA-6
	Cs-137	0.0000000240					
	Sr-90	0.0000000180					
	Am-241	0.0000000003					
	Pu-239	0.0000000060					
X1019517784	Co-60	0.0000000040	X10C9600868	Non-compactible waste from D&D, plastic, paper and rubble	5	1	IWMF-Pad SWSA-6
	Cs-137	0.0000000320					
	Sr-90	0.0000000240					
	Am-241	0.0000000010					
	Pu-239	0.0000000081					



**ATTACHMENT I: LISTING OF WASTE REMOVED FROM 3001 CANAL IN ACCORDANCE WITH WBS 6.1.14.01.03.50.05  
INCENTIVE TASK ORDER**

Waste Ident. No.	Isotope	Quantity (Ci)	Container Ident. No.	Description	Gross Weight (lbs.)	Volume (cu. ft.)	Storage Location
Total	Co-60	0.14710000165	X10C9600868			41.25	IWMF-Pad SWSA-6
Total	Cs-137	0.28560001320	X10C9600868				IWMF-Pad SWSA-6
Total	Sr-90	0.00139200990	X10C9600868				IWMF-Pad SWSA-6
Total	Am-241	0.00000000037	X10C9600868				IWMF-Pad SWSA-6
Total	Pu-239	0.00002343331	X10C9600868				IWMF-Pad SWSA-6
Total	Pu-238	0.00000774000	X10C9600868				IWMF-Pad SWSA-6
Total	Cm-244	0.000026880000	X10C9600868				IWMF-Pad SWSA-6
Total	Ag-108	0.006890000000	X10C9600868				IWMF-Pad SWSA-6
Total	All	0.441040078433	X10C9600868	High contact rad. reading on box = 70 mR/hr & 17 mR/hr at one meter.	546	41.25	IWMF-Pad SWSA-6
Total 3 Boxes	Co-60	87.07010077495					
Total 3 Boxes	Cs-137	9.42260619960					
Total 3 Boxes	Sr-90	0.00340457970					
Total 3 Boxes	Am-241	0.00000019546					
Total 3 Boxes	Pu-239	0.00005891391					
Total 3 Boxes	Pu-238	0.00001890410					
Total 3 Boxes	Cm-244	0.00006563300					
Total 3 Boxes	Ag-108	0.006890000000					
Total 3 Boxes	All	96.50314520072			2268	211.95	SWSA-6

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