INEL-96/0073
March 1996

Idaho
National
Engineering
Laboratory

Review of Private Sector and Department of Energy Treatment, Storage, and Disposal Capabilities for Low-Level and Mixed Low-Level Waste

Richard A. Willson
Lynn W. Ball
Jeffrey D. Mousseau
Robert B. Piper

Lockheed
Idaho Technologies Company

INEL-96/0073

Review of Private Sector and Department of Energy Treatment, Storage, and Disposal Capabilities for Low-Level and Mixed Low-Level Waste

Richard A. Willson
Lynn W. Ball
Jeffrey D. Mousseau
Robert B. Piper

Published March 1996

Idaho National Engineering Laboratory
Lockheed Idaho Technologies Company
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-94ID13223

ABSTRACT

This report is an update of a report that had summarized the current and near-term private sector vendor capability for the treatment, storage, and disposal of low-level and mixed low-level waste (LLW). The report was written for the Idaho National Engineering Laboratory (INEL) with the objective of updating and expanding the report entitled "Review of Private Sector Treatment, Storage, and Disposal Capacity for Radioactive Waste," (INEL-95/0020, rev. 1, April 1995). For this revision, a more comprehensive research was undertaken to identify companies in addition to the companies previously identified. Because this document will be used to identify private sector vendors that may be able to handle U.S. Department of Energy (DOE) LLW and mixed LLW streams, it was decided that current DOE capabilities should also be identified. This would encourage cooperation between DOE sites and the various states and, in some instances, may result in a more cost-effective alternative to privatization.

DISCLAIMER

CONTENTS

TABLES

ACRONYMS

ADCO	ADCO Services, Inc.
AEC	American Ecology Corporation
AHP	Applied Health Physics, Inc.
ALARON	ALARON Corporation
Ames	Ames Laboratory
ANLE	Argonne National Laboratory-East
ANLW	Argonne National Laboratory-West
AOT	Aerojet Ordnance Tennessee
ARLM	Automated Radioactive Laundry Monitor
ARMS™	Advanced Recyclable Media System
ARS	Advanced Recovery Systems, Inc.
ASC	Analytical Services Center
ATG	Allied Technology Group, Inc.
B&W	Babcock and Wilcox
BCL	Battelle Columbus Laboratories
BNFL	British Nuclear Fuels Limited, Inc.
BNL	Brookhaven National Laboratory
CAI	Controlled Air Incinerator
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH	Contact-Handled
CI	Colonie Interim Storage Site
CNSI	Chem-Nuclear System, Inc.
D&D	decontamination and decommissioning
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
dpm	disintegrations per minute
DSSI	Diversified Scientific Service, Inc.
DST	Double-Shell Tank
DT	Diversified Technologies Services, Inc.
DTC	Debris Treatment and Containment
DVRS	Decontamination and Volume Reduction System
E&E	Ecology and Environment, Inc.
EAI	Environmental Alternatives, Inc.
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ETEC	Energy Technology Engineering Center
ETF	Effluent Treatment Facility
ETI	Eastern Technologies, Inc.
FEMP	Fernald Environmental Management Project
FHA	Frank W. Hake Associates

FNAL	Fermi National Accelerator Laboratory
FT	Framatome Technologies, Inc.
FTI	Fluid Tech, Inc.
GJPO	Grand Junction Project Office
GTCC	Greater-Than-Class C
HANF	Hanford Site
HAZ	hazardous
HEPA	high-efficiency particulate air
HLW	High-level waste
HWMF	Hazardous Waste Management Facility
HWTF	Hazardous Waste Treatment Facility
ICPP	Idaho Chemical Processing Plant
IDM	IDM Environmental Corporation
INEL	Idaho National Engineering Laboratory
INS	Interstate Nuclear Services Corporation
IT	International Technology Corporation
ITRI	Inhalation Toxicology Research Institute
K-25	K-25 Site
KCP	Kansas City Plant
kg	kilogram
LADS	Liquid Abrasive Decon/Cleaning System
LBL	Lawrence Berkeley Laboratory
LDR	Land Disposal Restrictions
LEHR	Laboratory for Energy-Related Health Research
LITCO	Lockheed Idaho Technologies Company
LLNL	Lawrence Livermore National Laboratory
LLW	Low-level waste
LSA	Low-specific activity
MITI	Materials Inventory and Tracking Information
MLLW	Mixed low-level waste
Mound	Mound Plant
MSC	Manufacturing Sciences Corporation
MTRU	Mixed transuranic
MWSF	Mixed Waste Storage Facility
MWTF	Mixed Waste Treatment Facility
NDC	Non-Destructive Cleaning, Inc.
NFS	Nuclear Fuel Services, Inc.
NMI	Nuclear Metals, Inc.
NRC	Nuclear Regulatory Commission
NSSI	Nuclear Sources & Services, Inc.
NTS	Nevada Test Site
ORNL	Oak Ridge National Laboratory

PCB	polychlorinated biphenyl
PGDP	Paducah Gaseous Diffusion Plant
PIN	Pinellas Plant
PORTS	Portsmouth Gaseous Diffusion Plant
PPPL	Princeton Plasma Physics Laboratory
PUREX	Plutonium/Uranium Extraction
PX	Pantex Plant
R&D	research and development
RCRA	Resource Conservation and Recovery Act
RF	Rocky Flats Environmental Technology Site
RH	Remote-Handled
RRC	Radiac Research Corporation
RSO	Radiation Service Organization, Inc.
RWMS	Radioactive Waste Management Site
SCDHEC	South Carolina Department of Health and Environmental Control
SEG	Scientific Ecology Group, Inc.
SES	Sevenson Environmental Services, Inc.
SLAC	Stanford Linear Accelerator Laboratory
SNLA	Sandia National Laboratory-Albuquerque
SNLL	Sandia National Laboratory-Livermore
SNM	Special Nuclear Material
SPR	Sandia Pulse Reactor
SRS	Savannah River Site
SWSA	Solid Waste Storage Area
TA	Technical Area
TCLP	Toxicity Characteristic Leaching Procedure
TDF	Treatment Development Facility
TDL	Technology Development Laboratory
TGA	Thomas Gray and Associates, Inc.
TRCR	Texas Regulations for Control of Radiation
TRU	Transuranic
TSCA	Toxic Substance Control Act
TSD	treatment, storage, and disposal
TTI	Trycon Technologies, Inc.
VRR	volume reduction ratio
VSL	Vitreous State Laboratory
WAMAC	Waste Monitoring and Compaction Facility
WCSI	Waste Control Specialists, Inc.
WERF	Waste Experimental Reduction Facility
WROC	Waste Reduction Operations Complex
WSS	Weldon Spring Site
WVDP	West Valley Demonstration Project

1.0 INTRODUCTION

Private sector capacity for treatment, storage, and disposal (TSD) of various categories of radioactive waste has been researched and reviewed for the Idaho National Engineering Laboratory (INEL) by Lockheed Idaho Technologies Company, the primary contractor for the INEL. The purpose of this document is to provide assistance to the INEL and other U.S. Department of Energy (DOE) sites in determining if private sector capabilities exist for those waste streams that currently cannot be handled either onsite or within the DOE complex.

The survey of private sector vendors was limited to vendors currently capable of, or expected within the next five years to be able to perform one or more of the following services:

- Low-level waste (LLW) volume reduction, storage, or disposal
- Mixed LLW treatment, storage, or disposal
- Alpha-contaminated mixed LLW treatment
- LLW decontamination for recycling, reclamation, or reuse
- Laundering of radioactively-contaminated laundry and/or respirators
- Mixed LLW treatability studies
- Mixed LLW treatment technology development.

Section 2.0 of this report will identify the approach used to modify vendor information from previous revisions of this report. It will also illustrate the methodology used to identify any additional companies. Section 3.0 will identify, by service, specific vendor capabilities and capacities.

Because this document will be used to identify private sector vendors that may be able to handle DOE LLW and mixed LLW streams, it was decided that current DOE capabilities should also be identified. This would encourage cooperation between DOE sites and the various states and, in some instances, may result in a more cost-effective alternative to privatization. The DOE complex has approximately 35 sites that generate the majority of both LLW and mixed LLW. Section 4.0 will identify these sites by Operations Office, and their associated LLW and mixed LLW TSD units.

2.0 APPROACH

The vendors identified in revision 1 of the *Review of Private Sector Treatment, Storage, and Disposal Capacity for Radioactive Waste* document (INEL-95/0020) were contacted by phone to verify names, addresses, and telephone and telefax numbers. Vendor profiles and capability descriptions from the 1995 report were telefaxed to each vendor (see Appendix B). Each vendor was asked to review the capability description and company profile, make any necessary revisions on the telefax, and return the information as soon as possible. For vendors that did not respond, it was assumed that no changes were required.

Sources of existing information and new information were used to compile a list of potential vendors to add to the existing report. Existing sources of information included letter reports previously prepared by EG&G Idaho (a former management and operating contractor at the Idaho National Engineering Laboratory) for the Private Sector Participation Initiative, Garrison and Mousseau (1993), and Piper and Mousseau (1993). Additional sources of information were the *Nuclear News: Buyers Guide* (American Nuclear Society 1995) and the 1996 issue of the *Nuclear Plant Journal Product & Service Directory*, which contained listings of vendors that provide waste management services. Companies were identified as candidate vendors from the compiled list according to the type of waste management services advertised (i.e., mixed waste and/or low-level waste), and to some extent, professional knowledge of the companies.

The vendors were contacted by phone and questioned concerning the types of services performed by their company. If any positive answers were received within the seven technical service areas identified for the report, a telefax was sent to the vendor's point of contact (See Appendix A). The telefax consisted of a cover letter, a questionnaire, and a sample vendor profile.

The questionnaire was used to determine the extent of each vendor's current and near-term low-level waste (LLW) and/or mixed LLW capabilities. The response to the questionnaire and any additional literature (e.g., brochures, copies of licenses or permits) provided by the vendors were used to categorize each vendor according to the seven services previously identified and to develop the capability descriptions and company profiles (See Appendix B).

The level of detail about each vendor in this report varies as a result of the completeness of the information provided by individual vendors. In some cases, vendors provided only limited responses to the questionnaire and did not followup with more detailed brochures or company literature. However, others provided a great deal of information on licenses, treatment technologies, and capacities.

3.0 RESULTS OF REVIEW

Of the 26 companies surveyed last year, 24 were contacted by telephone to provide updated information. Eleven companies provided responses that were incorporated into this revision. For the other thirteen that did not respond, it was assumed that they were satisfied with the information presented concerning their company. One company, IC Technologies, Inc., could not be reached by telephone or directory assistance and was removed from the report. Another company, Diversified Scientific Service, Inc., (DSSI) was identified as being operated by Chem-Nuclear System, Inc. (CNSI). The information from DSSI was therefore incorporated with the CNSI information.

In addition to the original 26 companies, 274 companies were identified that could potentially provide one or more of the services desired. After initial contact with their representatives, 100 companies were sent questionnaires to assess their capabilities. Responses were received by 52 vendors, and based on the responses, an additional 24 companies were added to the report. Their capability descriptions and profiles are included herein. Table 3-1 identifies the companies presented in this report and the category of services that they provide.

3.1 Low-Level Waste Volume Reduction, Storage, or Disposal

3.1.1 ADCO Services, Inc.

ADCO Services, Inc., (ADCO) is currently licensed by the Nuclear Regulatory Commission (NRC) and has the capacity to store approximately 113 m^3 (4,000 ft^3) of low-level waste (LLW). In addition, ADCO can volume reduce LLW with a ram flat compactor. No other information was provided.

3.1.2 Advanced Recovery Systems, Inc.

Advanced Recovery Systems, Inc., (ARS) has successfully developed a system to reduce the volume of LLW solutions. Systems were successfully tested and implemented to extract cesium and cobalt from high nitrate-bearing waste solutions. A "clean" sodium nitrate salt stream is synthesized and meets specifications for chemical process industry feed.

3.1.3 Afftrex, Ltd.

Afftrex performs volume reduction treatment of LLW at several Department of Energy (DOE) sites. The company applies the processes of segregation, sizing, destructive and nondestructive disassembly for improved survey accessibility, and decontamination by mechanical and nonhazardous chemicals.

3.1.4 ALARON Corporation

Located in Wampum, Pennsylvania, the ALARON Corporation (ALARON) Service Facility provides a full range of waste processing services for metals, noncompactibles, compactibles, and dry allowable wastes. ALARON operates under NRC licenses that permit them to handle a full spectrum of radioisotopes and physical materials including the following:

- Byproducts and source materials with atomic numbers 1-96, up to 100 curies total

Table 3-1. Vendor summary.

Vendor	LLW Volume Reduction, Storage, or Disposal	Mixed LLW Treatment, Storage, or Disposal	Alpha-Contaminated Mixed LLW Treatment	LLW Decontamination/ Recycling	Laundering of Rad-Contaminated Laundry and/or Respirators	Mixed LLW Treatability Studies	Mixed LLW Treatment Technology Development
ADCO Services, Inc.	X						
ADTECHS Corporation		X				X	X
Advanced Recovery Systems, Inc.	X	X	X	X		X	
Afftrex, LTD.	X			X	X	X	X
ALARON Corporation	X			X		X	X
Allied Technology Group, Inc.	X	X	X	X		X	X
American Ecology Corporation	X	P		X		X	X
Applied Health Physics, Inc.				X			X
B&W Nuclear Environmental Services, Inc.	X	X		X		X	
Bartlett Nuclear Inc.	X	P		X	X		X
British Nuclear Fuels Limited, Inc.	X	X		X			
Brown & Root Environmental						X	X
Chem-Nuclear Systems, Inc.	X	X	X	X		X	X
COGNIS, Inc.		X		X		X	X
Diversified Technologies Services, Inc.	X	X	X			X	
Duke Engineering and Service, Inc.						D	
Eastern Technologies, Inc.					X		
Ecology and Environment, Inc.						X	X
ElChroM Industries, Inc.						X	X
Envirocare of Utah, Inc.		X	X			X	
Environmental Alternatives, Inc.				X		X	X
Fluid Tech, Inc.	X	X	X			X	X
Framatome Technologies, Inc.		X	X	X		X	X

Table 3-1. (continued)

Vendor	LLW Volume Reduction, Storage, or Disposal	Mixed LLW Treatment, Storage, or Disposal	Alpha-Contaminated Mixed LLW Treatment	LLW Decontamination/ Recycling	Laundering of Rad-Contaminated Laundry and/or Respirators	Mixed LLW Treatability Studies	Mixed LLW Treatment Technology Development
Frank W. Hake Associates	X			X			X
Gencorp Aerojet	X			X	X		X
GTS Duratek	X	X				X	X
Hazen Research, Inc.						X	X
IDM Environmental Corporation				X			
INET Corporation	X						
International Technology Corporation	P	P				X	X
Interstate Nuclear Services Corporation				X	X		
Manufacturing Sciences Corporation	X			X	X		
Maxim Technologies, Inc						X	X
M.J.W. Corporation, Inc.				X			X
Non-Destructive Cleaning, Inc.				X			
Nuclear Fuel Services, Inc.	X	X		X	X	X	
Nuclear Metals, Inc.	X			X			
Nuclear Sources & Services, Inc.	X	X	X	X		X	X
Octagon/Power Systems Energy Services, Inc.					X		
Radiac Research Corporation	X						
Radiation Service Organization, Inc.	X			X			
RUST Clemson Technical Center		X		X		X	X
Scientific Ecology Group, Inc.	X	X	X	X		X	X
Sevenson Environmental Services, Inc.	X	X	X			X	X
Thomas Gray and Associates, Inc.	X			X			

Table 3-1. (continued)

Vendor	LLW Volume Reduction, Storage, or Disposal	Mixed LLW Treatment, Storage, or Disposal	Alpha-Contaminated Mixed LLW Treatment	LLW Decontamination/ Recycling	Laundering of Rad-Contaminated Laundry and/or Respirators	Mixed LLW Treatability Studies	Mixed LLW Treatment Technology Development
Trycon Technologies, Inc.	P			P	P		
U.S. Ecology	I	I		I			
Waste Control Specialists, Inc.	P	P					P

X - Provides the service specified
P - Plans to provide the service specified
D - Currently only provides services for Duke Power Company-generated wastes.
I - Currently only provides service for institutional clients, hospitals, and universities.

- Up to 250 grams of special nuclear material and 10 grams of plutonium
- Up to 1,000 kilograms of depleted uranium in any form.

In addition, ALARON can provide supercompaction of dry, active LLW at a capacity of 5,700 m^3 (200,000 ft^3) annually. ALARON is also capable of reducing the volume of 3,400 m^3 (120,000 ft^3) annually of radioactively-contaminated metals by segmentation and dense packaging. Its NRC License No. 37-20826-01 expired in 1990, but they currently operate under an indefinite extension. ALARON's other NRC License, No. 37-20826-02, expired September 30, 1994, but was also extended for an indefinite period.

3.1.5 Allied Technology Group, Inc.

Allied Technology Group, Inc., (ATG) operates a fully-licensed supercompactor and storage facility in Richland, Washington, providing volume reduction services. ATG has the resources to provide supercompaction services at other sites. ATG has designed their own mobile supercompactor with unique features. The supercompactor has a horizontal ram for low vertical profile. It is capable of compacting 75 drums per shift, while being operated by two technicians. Costs per drum are $50 to $75, commercial rate, depending upon contents. ATG's annual capacity is 14,170 m^3/yr (500,000 ft^3/yr) using sizing, shredding, in-barrel compaction, and supercompaction. Their available storage capacity is 4,250 m^3 (150,000 ft^3).

3.1.6 American Ecology Corporation

American Ecology Corporation (AEC), formerly Quadrex, operates a facility in Oak Ridge, Tennessee, that is currently licensed to perform volume reduction on approximately 28,000 m^3 (1.0E+06 ft^3) of LLW annually. The facility, the American Ecology Recycling Center, operates under a Radioactive Material License from the State of Tennessee (License No. R-01037-J95) that expired October 31, 1995. AEC began the renewal process during the summer of 1995 and expects state approval but with some contingencies. AEC's compactible processing system uses a combination of sorting, pre-surveying, decontamination, and supercompaction to achieve high-volume reduction percentages (85 percent or better). Wastes introduced for volume reduction are unpacked, sorted, and pre-surveyed. Material sufficiently low in activity to suggest it is not contaminated is removed from the waste stream and sent to the survey department, where it is surveyed through an automated waste monitor. Material that meets the recycle center's licensed release criteria is released for disposal in a commercial landfill. The material that does not pass inspection is pre-compacted in AEC specially-designed baling equipment, which results in orthogonal compaction. This technique applies force along all three axes instead of just one. Finally, the waste volume is further reduced in a 2.0E+06-kilogram (kg) (2,200-ton) supercompactor. The orthogonal compaction technique results in an additional 10 to 15-percent volume reduction over standard uni-direction drum compaction followed by supercompaction. AEC also offers an incineration option for portions of bulk waste sent to the facility. Although AEC does not operate an incinerator, incinerable waste can be separated from nonincinerable waste and shipped to an incinerator. The facility may accept waste containing mixed activation and mixed fission products with atomic numbers from 3 to 83, source material such as natural or depleted uranium, small quantities of special nuclear material and transuranics, and sealed sources.

3.1.7 Babcock and Wilcox Nuclear Environmental Services, Inc.

Babcock and Wilcox (B&W) Nuclear Environmental Services, Inc., capabilities and facilities support the waste management needs of the B&W company's Naval Nuclear Fuel Division. B&W

maintains a fully equipped research and development (R&D) center at its Lynchburg Technology Center in Lynchburg, Virginia. B&W has high-limit, source, by-product, and special nuclear material licenses. B&W utilizes a supercompaction method to achieve volume reduction treatment of LLW. Treatment capacity information was not provided.

3.1.8 Bartlett Nuclear, Inc.

Bartlett Nuclear, Inc., has a Mobile Waste Monitor/Volume Reduction System, which is a self-contained trailer designed to monitor all dry waste leaving a site. The waste monitor will detect 5000 disintegrations per minute (dpm) above background levels, assuming uniform distribution per 50-pound bag of waste. This measurement is at the 95 percent probability of detection. Bartlett also has a Thermo Electron Plasma Arc unit that has the ability to cut up to four-inch-thick stainless steel to the thickness of light gauge sheet metal.

3.1.9 British Nuclear Fuels Limited, Inc.

British Nuclear Fuels Limited, Inc., (BNFL) is currently developing the Waste Monitoring and Compaction Facility (WAMAC) at the Sellafield LLW disposal site in Sellafield, United Kingdom. At the WAMAC, drums and boxes will be compacted using a 5,000-metric ton (5,512 ton) hydraulic press. Once compacted, the waste will be packaged and shipped to the Drigg Grouting Facility where the void spaces will be filled with grout. The waste is then disposed in vaults at the Sellafield LLW Disposal Facility, also operated by BNFL. The WAMAC facility is scheduled to become operational in early 1995. Applicable regulatory licensing information for these overseas facilities was not provided, nor was information on facilities in this country.

3.1.10 Chem-Nuclear Systems, Inc.

CNSI operates a disposal facility in Barnwell, South Carolina. This disposal facility is the only disposal facility to operate without interruption since commencing operations in 1971. CNSI owns more than 1,000 acres of property surrounding the Barnwell site and is currently licensed to perform disposal operations within a 300-acre site boundary. To date, less than 75 acres of the site has been used for disposal operations. In 1995, CNSI disposed of approximately 13,750 m^3 (485,000 ft^3) of LLW.

3.1.11 Diversified Technologies Services, Inc.

Diversified Technologies Services, Inc., (DT) has a mobile treatment unit for sludge dewatering, drying, volume reduction and polymer solidification for treating 1,000 lbs/hr of solids. DT offers the use of thermosetting polymers for in-situ solidification of wastes and reverse osmosis processes for volume reduction of liquid wastes. DT will offer onsite waste treatment using self-contained, skid-mounted equipment.

3.1.12 Fluid Tech, Inc.

Fluid Tech, Inc., (FTI) markets patented solidification/stabilization agents, developed for the efficient and economical disposal of LLW, mixed LLW, and hazardous waste. FTI products can be blended for specific applications, with emphasis to the hazardous constituents. The basis products of FTI are Aquaset®, Aquaset II®/Petroset®, Aquaset II®-H/Petroset-H, and Petroset II®.

3.1.13 Frank W. Hake Associates

Frank W. Hake Associates (FHA) is licensed by the NRC to volume reduce LLW via compaction. In addition, FHA can volume reduce LLW by providing decontamination of contaminated metals via abrasive blast, chemical bath, hydrolase, tumbling, and ultrasonics. No other information was provided.

3.1.14 Gencorp Aerojet

Gencorp Aerojet's treatment capabilities consist of volume reduction through agglomeration, compaction, consolidation, and incineration. The company also has the ability to improve radioactive waste forms via various decontamination methods. No capacity information was available.

3.1.15 GTS Duratek

GTS Duratek currently vitrifies approximately 280 m^3/yr (10,000 ft^3/yr) of LLW. GTS Duratek uses the DuraMelter™ technology in two basic vitrification chemistry modes: minimum-additive and additive. In both modes, the melter feed can be solid or liquid. GTS Duratek has six models of the DuraMelter™, varying in size and capacity. Their waste loading achieves up to a 3:1 volume reduction ratio (VRR).

GTS Duratek has entered into a joint venture called DuraChem™ with CNSI to build and operate a LLW vitrification plant at CNSI's Barnwell, South Carolina, waste management facility. The business is targeted on processing commercial nuclear power plant "wet" wastes such as filter media, ion exchange resins, and wastewater evaporator concentrates, in addition to waste from industrial facilities, hospitals, and laboratories.

3.1.16 INET Corporation

The INET Corporation has the resources to provide volume reduction services and equipment. INET can provide both onsite and mobile reduction unit services. INET's supercompactor, the Superpack®, is a fourth generation, hydraulically-operated supercompactor, with the highest commercially available ram force of 2,200 tons. The Superpack® is available in both fixed-base and trailer-mounted models.

INET's control and drum handling experience includes not only the Programmable Logic Control for Superpack®, but also includes ten years of experience with the IMS® Intelligent Monitor and Control System.

3.1.17 International Technology Corporation

The International Technology Corporation (IT) currently does not have the capability to treat or store LLW. However, IT has formed teaming agreements with a number of other companies and will apply for a license to store and treat LLW.

3.1.18 Manufacturing Sciences Corporation

Manufacturing Sciences Corporation (MSC) has the capacity to store 180 land-sea vans of contaminated scrap metal at any one time. This equates to approximately 20,000 m^3 (700,000 ft^3) or 10,000 tons of metal. The facility is at about 30% of capacity.

3.1.19 Nuclear Fuel Services, Inc.

Nuclear Fuel Services, Inc., (NFS) has created the Decontamination and Volume Reduction System (DVRS). DVRS is a waste management tool used in decontamination and decommissioning (D&D) projects. Use of this system has resulted in achieving VRR of approximately 5:1.

3.1.20 Nuclear Metals, Inc.

Nuclear Metals, Inc., (NMI) claims to provide volume reduction services for LLW but information on the company's capabilities was not provided.

3.1.21 Nuclear Sources & Services, Inc.

Nuclear Sources & Services, Inc., (NSSI) is currently licensed by the State of Texas Bureau of Radiation Control to accept, treat, and store LLW. The facility has been licensed since 1971. NSSI is authorized to store up to 4,000 55-gallon drums and 58,500 gallons of bulk tanked liquids. NSSI volume reduces all radioactive wastes with a low-pressure compactor unit. Volume reductions of 3-5:1 are realized. The unit can process 850 to 1400 m^3/yr (30,000 to 50,000 ft^3/yr).

3.1.22 Radiac Research Corporation

The Radiac Research Corporation is permitted to store approximately 119 m^3 (4,200 ft^3) of LLW for a maximum of one year. No other information was provided.

3.1.23 Radiation Service Organization, Inc.

Radiation Service Organization, Inc., (RSO) is licensed by the State of Maryland Department of the Environment to provide short-term storage of LLW. RSO currently stores approximately 140 m^3 (5,000 ft^3) annually and has a total storage capacity of 280 m^3 (10,000 ft^3).

3.1.24 Scientific Ecology Group, Inc.

Scientific Ecology Group, Inc., (SEG) has several methods of volume reduction for LLW. SEG currently operates an incinerator licensed for radioactive waste in Oak Ridge, Tennessee, which provides a VRR as high as 200:1. SEG has installed another incinerator that was to be fully operational by the summer of 1995. This incinerator is dedicated to processing DOE wastes. Waste accepted for the SEG incinerators must be less than 200 mR/hr. Processing of Idaho National Engineering Laboratory (INEL) dry active waste treated by SEG in 1994 achieved a VRR of 320:1.

After incineration, ash samples are taken and tested to ensure compliance with Resource Conservation and Recovery Act (RCRA) requirements. The ash is then compacted using the SEG ULTRACompactor™ to maximize volume reduction and provide a more stable waste form. If ash does not pass RCRA requirements for disposal, SEG will stabilize the bottom ash to meet those requirements. Radioactively-contaminated oil is also burned in the SEG incinerator, achieving a 100-percent volume reduction. The oil's activity level must be less than 200 mR/hr. SEG has successfully incinerated over 3 million ft^3 of contaminated materials since beginning incineration services in 1990.

The SEG Metal Processing Facility is capable of processing approximately 12 million kg per year (13,000 tons per year) of slightly-contaminated or activated metal for use in DOE's high-energy physics programs, in the manufacture of containers for radioactive waste storage or burial, and for

unrestricted release. SEG's Oak Ridge facility houses a 20-ton, 7,200-kilowatt induction furnace that can melt carbon and stainless steel, copper, brass, and lead.

SEG operates a supercompactor (called the SEG ULTRACompactor™) that crushes drums and boxes with a force of 4.5E+06 kg (1.0E+07 lb) achieving a VRR of 10:1. The ULTRACompactor™ processes approximately 2,000 m^3 (70,000 ft^3) of waste each month. Typical wastes processed include nonincinerable paper, plastic, wood, asbestos, and small metal items. The ULTRACompactor™ is the largest commercial waste compactor available in the world for processing dry active waste. It has the unique ability to process 52-gallon drums, 55-gallon drums, and 4 x 3 x 3-ft metal boxes. The ability to compact boxed materials gives SEG the capability of compacting materials/items previously considered noncompactible (i.e., motors, pumps, piping, valves, and conduits).

For compaction, SEG typically accepts waste with a maximum dose rate of 5 R/hr on contact, but can handle material with higher dose rates on a case-by-case basis. All wastes in excess of 200 mR/hr must be identified prior to shipment, and all waste exceeding 1 R/hr must be packaged in a drum to minimize direct handling. Asbestos can also be compacted in scheduled campaigns. SEG complements its ULTRACompactor™ with the Transuranic (TRU) Press, a compactor devoted to reducing the volume of TRU waste. Quantities of TRU waste are kept within the limits specified in SEG's Radioactive Material License (see Appendix C). A mobile supercompactor, fully contained with all the essential elements for compacting drums, is also available to customers for onsite operation.

The SEG vacuum compression dewatering of spent powdered filter and ion-exchange media provides in-container volume reduction. A compressive force of 113,000 kg (250,000 lb) surrounds the waste form, closing interstitial spaces and squeezing water from the waste solids. The final processing step is a high-vacuum compression cycle to ensure there is no free water in the waste.

3.1.25 Sevenson Environmental Services, Inc.

Sevenson Environmental Services, Inc., (SES) has patented a MAECTITE® treatment process that has been successfully used for the treatment of RCRA-contaminated materials. Recently, SES has been conducting treatability studies on Naturally-Occurring Radioactive Material. Results of the study were favorable and SES is looking to conduct additional studies that would eventually allow them to process LLW on a full-scale basis.

3.1.26 Thomas Gray and Associates, Inc.

Thomas Gray and Associates, Inc., (TGA) provides storage of LLW at both their Orange and Turlock, California, facilities. Combined, both facilities provide a total storage capacity of approximately 1,560 m^3 (55,000 ft^3). In addition to storage of LLW, TGA's Turlock facility has a box compactor with an annual capacity of approximately 1,475 m^3 (52,000 ft^3). The box compactor has an exertion force of 400,000 pounds of pressure and is used to compact dry waste into reinforced 4 x 4 x 6-ft metal boxes containing a usable 90 ft^3 of storage area.

3.1.27 Trycon Technologies, Inc.

Although known primarily as a supplier of both portable and fixed decontamination systems, Trycon Technologies, Inc., (TTI) would like to expand their services to include the volume reduction and decontamination of LLW. No other information was provided.

3.1.28 U.S. Ecology

U.S. Ecology provides volume reduction services for LLW. This service is limited to institutional clients, hospitals, and universities. No further information was provided by the company.

3.1.29 Waste Control Specialists, Inc.

Waste Control Specialists, Inc., (WCSI) is a Texas corporation operating a 16,073-acre tract near the southern and eastern extreme of the New Mexico-Texas border. Their facility, which is permitted to receive all hazardous and toxic wastes, is focused on expanding its scope of operations through acquisition of authorizations for treatment, storage, and disposal of LLW, mixed LLW, and by-product materials including §11e.(2) mine tailings. When operational, WCSI will provide the only facility in existence permitted for treatment, storage, and landfill disposal of LLW, by-product materials, and all RCRA, Toxic Substance Control Act (TSCA), and RCRA- and TSCA-mixed LLW.

3.2 Mixed LLW Treatment, Storage, or Disposal

3.2.1 Advanced Recovery Systems, Inc.

ARS, formerly Ekotek and a subsidiary of NFS, has patented processes to treat a variety of hazardous and mixed wastes. These processes are as follows:

- DeCaF-Recovery of fluorine and metal from radioactive wastes
- DeHg-Mercury treatment process
- DeAct-Soil washing to extract actinide contamination
- DeCl-Recovery of rare earths and scandium from process residues
- TherMag-Recovery of fluorine, magnesium, and uranium from refractive waste.

3.2.2 ADTECHS Corporation

The ADTECHS Corporation currently operates a mobile wet oxidation system for the removal of organics from mixed LLW. No other information was provided.

3.2.3 Allied Technology Group

ATG is planning to expand their services to include mixed LLW waste. A RCRA Part B Permit application has been submitted to the Washington Department of Ecology in January, 1996, to support the development of a Mixed Waste Facility at Richland, Washington, which will treat and stabilize mixed LLW for safe and permanent disposal. The main process components fall into three major categories: in-tank treatment systems, which will be permitted in accordance with Washington Dangerous Waste Regulation 173-303-640, referred to as "Tank Systems;" miscellaneous systems, which will be permitted under Washington Dangerous Waste Regulation 173-303-670, referred to as "Thermal Systems;" and process support and ancillary systems. The Tank Systems consist of receiving, shipping and staging tanks; pre-treatment tanks; and treatment tanks. The Thermal Systems consist of gasification/vitrification and mercury retort units.

The following treatment methods will be available:

- Stabilization---incoming waste will be routed to one of the four stabilization mixers. The four mixers perform bulk, solids, in-container, and polymer stabilization.
- Neutralization---provided to pre-treat waste that must be neutralized before stabilization.
- Chemical oxidation---provided to pre-treat waste that must be oxidized before stabilization.
- Chemical reduction---provided to pre-treat waste that must be reduced before stabilization.
- Physical extraction---removing surface contamination from waste designated "debris".
- Macroencapsulation---both a grout and a polymer macroencapsulation process are provided.
- Deactivation---a deactivation agent is added to deactivate water-reactive waste.
- Thermal treatment---gasification/vitrification methods are used to treat the waste.
- Mercury treatment---waste contaminated with mercury is heated in a vacuum (retort) chamber. The mercury vapor is condensed and amalgamated.
- Mercury amalgamation---elemental mercury contaminated with material is amalgamated by mixing with zinc or copper.

ATG anticipates commercial operation of the nonthermal units by the middle of 1998, and the Thermal Systems should be ready for commercial operation by the middle of 1999.

3.2.4 American Ecology Corporation

AEC is not currently capable of treating mixed waste, but has applied for a RCRA permit to treat small quantities of mixed LLW via thermal treatment.

3.2.5 Babcock and Wilcox Nuclear Environmental Services, Inc.

B&W capabilities and facilities are currently reserved solely for the support of waste management needs of the Babcock and Wilcox company's Naval Nuclear Fuel Division. B&W maintains a fully equipped R&D center at its Lynchburg Technology Center in Lynchburg, Virginia. B&W has high-limit, source, by-product, and special nuclear material licenses. B&W uses the following methods to treat mixed LLW: neutralization, microfiltration, microwave separation, compaction, stabilization/solidification, distillation, and delisting. Treatment capacity information was not provided.

3.2.6 Bartlett Nuclear, Inc.

Bartlett does not currently operate any facilities that can handle mixed LLW; however, the company does have the capability to provide a facility for the thermal treatment of dry active waste, metal melting, and vitrification of other waste forms, including low activity spent resins.

3.2.7 British Nuclear Fuels Limited, Inc.

BNFL has facilities operating in the United Kingdom that vitrify and grout liquid radioactive waste and encapsulate solid radioactive waste. BNFL can also treat soil contaminated with heavy metals at waste-generating sites. BNFL, in cooperation with Raytheon Engineers and Constructors, has an interest in providing turnkey treatment, transportation, and packaging for INEL mixed wastes.

3.2.8 Chem-Nuclear Systems, Inc.

CNSI, which includes DSSI, operates a fully-licensed mixed LLW processing facility in Kingston, Tennessee, that is capable of burning radioactively-contaminated solvents as waste fuel for power production. The solvent processing facility employs an industrial boiler to combust solvents to generate electricity for the facility's in-house use and for sale to electric companies. The waste fuel boiler system is equipped with a dual fuel burner designed to use propane and waste as fuel to maintain boiler operating conditions within regulatory and permit requirements. Propane is used to bring the steam generator up to the required operating temperature and pressure before introducing the waste fuel into the burner. DSSI typically receives wastes in five-gallon containers to 55-gallon drums, which are segregated by compatibility and BTU value. The wastes are then decanted into one of three 10,000-gallon tanks that feed into boilers.

DSSI's radiological license allows it to receive solvents containing over 2,000 isotopes, including mixed LLW containing special nuclear material from DOE and U.S. Department of Defense (DoD) facilities. DSSI can accept an extensive list of F-, D-, and U-listed hazardous wastes. The facility can burn approximately 3,030 m^3 (106,950 ft^3) at 80% capacity of mixed LLW solvents per year. DSSI requires a fuel blending analysis of a generator's waste prior to acceptance. Waste generators can provide this information or utilize DSSI's analytical laboratory capabilities, which support their own waste blending activities. DSSI's analytical laboratory is not equipped to perform waste characterization. Stabilized ash from the processing facility is sent to Envirocare of Utah, Inc.

3.2.9 COGNIS, Inc.

COGNIS, Inc., has developed processes for lead remediation, metal remediation, and heavy metal recovery. Although these processes have been demonstrated and performed successfully in a nonradioactively-contaminated environment, COGNIS indicated that their capabilities will be extended to include radioactively-contaminated materials. COGNIS is the first company to successfully put a soil washing/soil leaching plant in the field, and because the plant is transportable, the technology could have a large impact on mixed LLW volume reduction and remediation.

3.2.10 Diversified Technologies Services, Inc.

DT does not currently have any licensed facilities to treat mixed LLW. However, the company has applied for an NRC license and has a permit to conduct treatability studies, specializing in solidification of LLW and mixed LLW, at its facility in Knoxville, Tennessee. The company expected approval of the NRC license application by May 1995. The facility will use a Vinyl Ester Resin In-Situ system, vinyl ester styrene, polyethylene, and sulphur polymer to solidify incinerator ash, powders, sludges, and filter media to form a more stable waste form than cement or bitumen solidification. The facility can also dewater waste using a high velocity vacuum. In addition, DT will also be able to perform onsite solidification services using self-contained skid-mounted units.

3.2.11 Envirocare of Utah, Inc.

Envirocare of Utah, Inc., operates a licensed LLW and mixed LLW treatment and disposal facility 120 km (75 miles) west of Salt Lake City, Utah. Envirocare operates under a Radioactive Material License and a RCRA permit. Its Radioactive Material License has recently been amended to allow the acceptance of 63 isotopes. The concentration limits are low and specific to each isotope. Acceptable hazardous wastes include characteristic waste codes D001 through D043, listed wastes F001 through F012, F019, F024, F028, F039, K011, K013, K050, K051, K052, K061, K069, and several P-listed and U-listed wastes. The RCRA Part B permit was modified and approved by the State, which allows Envirocare to treat lead-contaminated waste and other debris using macroencapsulation. The process will use a polymer extrusion process that meets RCRA treatment methods prior to disposal. The treatment capability of the facility also includes nonthermal stabilization. The stabilization process will employ chemical treatments to reduce waste extract concentrations of hazardous constituents to meet Land Disposal Restrictions (LDR) prior to land disposal.

3.2.12 Fluid Tech, Inc.

FTI markets patented solidification/stabilization agents, developed for the efficient and economical disposal of LLW, mixed LLW, and hazardous waste. FTI products can be blended for specific applications, with emphasis on the hazardous constituents. The basis products of FTI are Aquaset®, Aquaset II®/Petroset®, Aquaset II®-H/Petroset-H, and Petroset II®.

3.2.13 Framatome Technologies, Inc.

Framatome Technologies, Inc., (FT) provides mobile services related to chemical cleaning, decontamination, liquid volume reduction, and general liquid waste processing capabilities. Specific technology capabilities include:

- Neutralization
- Solidification
- Absorption
- Ion exchange
- Filtration
- Chemical and thermal destruction of organics.

The company provides onsite services by utilizing numerous tanks ranging from 250 to 40,000 gallons, Mobile Chemistry Laboratories, evaporators, and high-efficiency particulate air (HEPA) filtration.

3.2.14 GTS Duratek

GTS Duratek currently vitrifies 700,000 gallons/year of mixed LLW. GTS uses its patented DuraMelter™ vitrification furnace and processes to make a product that is almost all waste material. Their waste loading achieves up to a 3:1 VRR. GTS's DuraMelter™ comes in six models with varying sizes and capacities.

3.2.15 International Technology Corporation

The IT Corporation currently does not have the capability to treat or store mixed LLW. However, the company has formed teaming agreements with a number of other companies and will apply for a permit to store and treat mixed LLW.

3.2.16 Nuclear Fuel Services, Inc.

NFS has development and engineering facilities for researching and evaluating remediation processes for treating LLW and mixed LLW, including uranium, plutonium, and thorium; minimizing waste; and resource recovery. NFS also claims to have the capacity to store mixed LLW; however, no specific details were provided by the company.

3.2.17 Nuclear Sources & Services, Inc.

NSSI states that they are authorized to store up to 4,000 55-gallon drums and 58,500 gallons of tanked liquids. The following mixed LLW treatments were noted:

- Blending of wastes to form a fuel;
- Neutralization, oxidation, reduction, and other chemical reactions to render wastes less hazardous or more suitable for offsite disposal or onsite processing;
- Recycling of solvents;
- Centrifugation, filtration, and ion exchange;
- Solidification or stabilization in containers and portable equipment;
- Chemical and/or mechanical treatment to accomplish separation, settling, or clarification;
- Removal of hazardous constituents by absorption on solid media;
- Drying of solids to meet offsite disposal criteria; and
- Operation of a mercury retort unit.

3.2.18 RUST Clemson Technical Center

RUST, in cooperation with DSSI, operates a mixed LLW treatment facility in Oak Ridge, Tennessee, and has an Environmental Protection Agency (EPA) license allowing for liquid mixed LLW thermal destruction at a rate of 700,000 gallons per year.

3.2.19 Scientific Ecology Group, Inc.

SEG has vitrification technology for organic, wet, or aggregate wastes. The vitrification produces a waste form that needs no reprocessing. SEG has a mobile vitrifier. It is an electric joule-heated melter equipped with complete off-gas treatment and process monitoring systems. It provides flexible operating characteristics for a wide range of waste feeds.

SEG has a patented synthetic detoxifier system that performs a very high-temperature steam reforming process similar to coal gasification. For safety purposes, it operates without oxygen at atmospheric pressure and does not employ incinerator technology. Essentially, the steam reforming process breaks down all organic wastes into carbon dioxide and steam. Applications for this process include waste solvents, aqueous wastes, paint sludges, laboratory wastes, degreasing sludges, and off-spec mixed organics. SEG was testing this technology at the Tennessee site during the spring of 1995.

Finally, SEG is capable of solidifying mixed LLW waste onsite at clients' facilities. It is currently operating this process at Oak Ridge National Laboratory. Wastes requiring stabilization are solidified in high-integrity containers, while wastes not requiring stabilization are solidified in steel liners.

SEG currently operates under a Radioactive Material License and an interim status RCRA permit. SEG expected to receive a RCRA Part B permit to treat, store, or dispose of mixed LLW in 1995. SEG decontaminates and recycles LLW metals. SEG states that it has the largest, most technologically advanced metal decontamination facility with the only dedicated foundry for radioactive metals in the United States. Most metals are decontaminated via high-pressure water, steel shot, or glass bead blasting. Metals, including steel, stainless steel, copper, brass, and lead are routinely released by SEG. SEG also melts LLW metal into blocks used for shielding at DOE facilities. Stainless steel, carbon steel, and aluminum are commonly processed in this fashion. Over 15 million pounds of contaminated metals were processed for re-use or release in 1993.

3.2.20 Sevenson Environmental Services, Inc.

SES has patented a MAECTITE® treatment process that has been successfully for the treatment of RCRA contaminated materials. Recently, SES has been conducting treatability studies on Naturally-Occurring Radioactive Material. Results of the study were favorable and SES is looking to conduct additional studies that would eventually allow them to process mixed LLW on a full-scale basis.

3.2.21 U.S. Ecology

U.S. Ecology indicated that their mixed LLW capability is limited to treating scintillation vials. No other information was provided by the company.

3.2.22 Waste Control Specialists, Inc.

WCSI is a Texas corporation operating a 16,073-acre tract near the southern and eastern extreme of the New Mexico-Texas border. Their facility, which is permitted to receive all hazardous and toxic wastes, is focused on expanding its scope of operations through acquisition of authorizations for treatment storage, and disposal of LLW, mixed LLW, and by-product materials including §11e.(2) mine tailings. When operational, WCSI will provide the only facility in existence permitted for treatment, storage, and landfill disposal of LLW, by-product materials, and all RCRA, TSCA, and RCRA- and TSCA-mixed LLW.

3.3 Alpha-Contaminated Mixed Low-Level Waste Treatment

3.3.1 Advanced Recovery Systems, Inc.

ARS, formerly Ekotek and a subsidiary of NFS, has patented processes to treat a variety of hazardous and mixed wastes. These processes are as follows:

- DeCaF-Recovery of fluorine and metal from radioactive wastes
- DeHg-Mercury treatment process
- DeAct-Soil washing to extract actinide contamination
- DeCl-Recovery of rare earths and scandium from process residues
- TherMag-Recovery of fluorine, magnesium, and uranium from refractive waste.

3.3.2 Allied Technology Group.

ATG has applied to the state of Washington for treatment of alpha-contaminated waste at their planned Richland, Washington, facility. Section 3.2.2 provides a description of the planned facility.

3.3.3 Chem-Nuclear Systems, Inc.

CNSI, of which DSSI is a part, is capable of accepting mixed LLW solvents containing TRU waste, including plutonium and americium-241, at their mixed LLW processing facility in Kingston, Tennessee. DSSI's license enables the facility to accept special nuclear and source material from DOE and DoD facilities, and over 2,000 other radionuclides. The radionuclides and concentration limits are stated in the Radioactive Material License and the facility's waste acceptance criteria.

3.3.4 Diversified Technologies Services, Inc.

Although the company claimed a capability for treating alpha-contaminated mixed LLW, no specific information concerning the company's capabilities was included in their response to this survey.

3.3.5 Envirocare of Utah, Inc.

Envirocare operates a licensed LLW and mixed LLW treatment and disposal facility 120 km (75 miles) west of Salt Lake City, Utah. Envirocare operates under a Radioactive Material License and a RCRA permit. Its Radioactive Material License has recently been amended to allow the acceptance of 63 isotopes. The concentration limits are low and specific to each isotope. Acceptable hazardous wastes include characteristic waste codes D001 through D043, listed wastes F001 through F012, F019, F024, F028, F039, K011, K013, K050, K051, K052, K061, K069, and several P-listed and U-listed wastes. The RCRA Part B permit was modified and approved by the State, which allows Envirocare to treat lead-contaminated waste and other debris using macroencapsulation. The process will use a polymer extrusion process that meets RCRA treatment methods prior to disposal. The treatment capability of the facility also includes nonthermal stabilization. The stabilization process will employ chemical treatments to reduce waste extract concentrations of hazardous constituents to meet LDR prior to land disposal.

3.3.6 Fluid Tech, Inc.

Although FTI claimed to have the capability for treating alpha-contaminated mixed LLW, the company did not provide any specific information.

3.3.7 Framatome Technologies, Inc.

FT states that their mobile services can be applied to alpha-contaminated mixed LLW, but no supporting information was provided by the company.

3.3.8 Nuclear Sources & Services, Inc.

NSSI states that their permit allows them to store and treat alpha-contaminated (<100nCi/g) mixed LLW. No specific details were provided.

3.3.9 Scientific Ecology Group, Inc

SEG currently operates a TRU waste compactor, specially equipped to address the hazards of processing TRU waste. The TRU Press is specifically constructed and licensed for the special processing containment requirements of transuranically-contaminated (alpha-emitting) dry active waste. The SEG TRU Press is said to deliver the highest VRRs possible in the world for compacting TRU waste. SEG is the only commercial company in the United States to supercompact TRU waste. A 520-ton hydraulic press provides the compaction force to compress waste packaged in 43-, 52-, and 55-gallon drums or 79- and 89-gallon leak-tight overpack containers. The TRU Press is computer-controlled in the same manner as the ULTRACompactor™, and incorporates many of the same features to ensure safe operation. The entire compactor unit is contained to preclude the spread of contamination, and negative pressure is maintained on the containment.

3.3.10 Sevenson Environmental Services, Inc.

SES has patented a MAECTITE® treatment process that has been successfully for the treatment of RCRA contaminated materials. Recently, SES has been conducting treatability studies on Naturally-Occurring Radioactive Material. Results of the study were favorable and SES is looking to conduct additional studies that would eventually allow them to process alpha-contaminated mixed LLW on a full-scale basis.

3.4 LLW Decontamination and Recycling Services

3.4.1 Advanced Recovery Systems, Inc.

ARS, a subsidiary of NFS, has completed several resource recovery projects in evaluations of wastes and has successfully demonstrated its expertise in the recovery of rare earth and precious metals. Project experience also includes recovery of tantalum, niobium, scandium, uranium, thorium, radium, lead, arsenic, zirconium, yttrium, mercury, and fluorine from a variety of waste forms. ARS has used its proprietary processes including DeCaF, DeHg, DeAct, DeCl, TherMag, and CrystX to decontaminate LLW for metals reuse, recycling and/or free release.

3.4.2 Afftrex, Ltd.

Afftrex provides decontamination of LLW metals services at several DOE sites. The primary decontamination techniques used are broadly classed as mechanical and chemical. Techniques include grinding, sanding, machining, chemical wiping, and strippable paints.

3.4.3 ALARON Corporation

The ALARON Service Facility, located in Wampum, Pennsylvania, accepts a full range of radiologically-contaminated components for decontamination and volume reduction including turbine rotors; low- and high-density spent fuel racks in all alloys; tube and shell heat exchangers in all alloys; feedwater spargers; boilers; tanks; and high rad components, such as recirculation piping and feedwater heaters. ALARON decontaminates LLW metals by destructive and nondestructive techniques. Techniques used by ALARON include chemical etching, multimedia abrasive blasting, needle scaling, grinding, and manual wipe-down. ALARON is also capable of using customer-specified techniques for decontamination. Their onsite capacity is 2,300 m^3 (80,000 ft^3). The company's two NRC licenses, No. 37-20826-01 and No. 37-20826-02, allow it to accept radionuclides with atomic numbers from 1 to 96, depleted uranium, and source and special nuclear material. License No. 37-20826-01 expired in 1990, but has been extended indefinitely. License No. 37-20826-02 expired September 30, 1994, but was also extended indefinitely.

3.4.4 Allied Technology Group, Inc.

ATG's decontamination facility, located in Richland, Washington, uses techniques such as grit blasting, plasma arc, mechanical descaling, electropolishing, Freon cleaning, and high-pressure water blasting. ATG also operates facilities in California under a Radioactive Material License and has a RCRA Part B Permit application in progress to develop a Mixed Waste Treatment/Storage Facility in Richland, Washington. ATG currently provides services to decontaminate filters, machinery, equipment, and other contaminated items. ATG can provide these services onsite and at clients' facilities using mobile decontamination units. ATG uses destructive decontamination methods and their annual operating capacity is 5,670 m^3/yr (200,000 ft^3/yr).

3.4.5 American Ecology Corporation

AEC can decontaminate metals that are surface-contaminated. AEC is licensed by the State of Tennessee to decontaminate radioactive materials and to unconditionally release those materials determined to have been decontaminated below stated license limits. AEC is licensed to process up to 28,000 m^3 (1.0E+06 ft^3) of waste annually. The recycle center's license (No. R-01037-J95) expired October 31, 1995. The license allowed the facility to accept waste containing mixed activation and mixed fission products with atomic numbers from 3 to 83, source material such as natural or depleted uranium, small quantities of special nuclear material and transuranics, and sealed sources. The recycle center has processed a total of 85,000 m^3 (3.0E+06 ft^3) of metallic materials, approximately 80 percent of which have either been sold as scrap on the metals market or returned to productive use. The processes employed by AEC for decontaminating metals were listed, but were not described. The methods listed are abrasive decontamination, chemical decontamination, electrochemical decontamination, and shear stress cleaning.

3.4.6. Applied Health Physics, Inc.

Applied Health Physics, Inc., (AHP) decontamination capabilities are limited to utilizing hydrolasing and chemical decontamination on small items at the clients' site. No other information was provided.

3.4.7 Babcock and Wilcox Nuclear Environmental Services, Inc.

B&W capabilities and facilities are currently reserved solely for the support of waste management needs of the B&W Naval Nuclear Fuel Division. B&W maintains a fully-equipped R&D center at its Lynchburg Technology Center in Lynchburg, Virginia. B&W has high-limit, source, by-product, and special nuclear material licenses and performs decontamination and recycling operations for LLW.

3.4.8 Bartlett Nuclear, Inc.

Bartlett has developed a cleaning agent called BY*PAS Decontamination Chemical, which is useful for many decontamination tasks and is approved for use at many reactor facilities. Bartlett's Sonatol process uses an inert organic solvent and a carefully-designed surfactant in an ultrasonic bath to remove loose and tightly adhered radioactive particles from surfaces. In laboratory tests, Sonatol has produced decontamination factors greater than 1,000 for specimens contaminated with iron oxide particulates. The Sonatol process also includes real-time monitoring of the decontamination activity to optimize the process time for each batch of contaminated objects.

3.4.9 British Nuclear Fuels Limited, Inc.

BNFL has a patented process for soil treatment called CACITOX that was originally developed for nuclear fuel reprocessing. BNFL is extending the patent to treat soil contaminated with heavy metals and TRU elements. CACITOX is a leaching process that uses a reagent to dissolve particulates and adsorb contaminants from the soil, while leaving the basic matrix intact. BNFL plans to build a transportable plant that uses this process in the near future. Also, BNFL and Raytheon Engineers and Constructors have formed a team which has an interest in providing turnkey radioactive mixed waste treatment services for the INEL.

3.4.10 Chem-Nuclear Systems, Inc.

Although CNSI claimed expertise in this area, no information on their capabilities has been provided.

3.4.11 COGNIS, Inc.

COGNIS has developed processes for lead remediation, metal remediation, and heavy metal recovery. Although these processes have been demonstrated and performed successfully in a nonradioactively-contaminated environment, COGNIS indicated that their capabilities will be extended to include radioactively-contaminated materials. COGNIS is the first company to successfully put a soil washing/soil leaching plant in the field, and, because the plant is transportable, the technology could have a large impact on mixed LLW volume reduction and remediation.

3.4.12 Environmental Alternatives, Inc.

Environmental Alternatives, Inc., (EAI) offers the equipment and experience to provide nuclear decontamination, decommissioning, volume reduction, site remediation, hazardous waste cleanup, as well as a broad range of industrial cleaning capabilities. EAI's scope of services includes design, engineering, fabrication, installation, start-up testing, and operation of advanced technology cleaning and decontamination systems. Decontamination technologies that are provided include CO_2 blast cleaning,

multimedia dry abrasive, liquid abrasive, absorbent impregnated media, high-pressure water, scabbling, and most other environmentally-acceptable technologies.

3.4.13 Framatome Technologies, Inc.

FT maintains mobile equipment that can provide decontamination by chemical methods, resin processing, and high-pressure water. No other information was provided by the company.

3.4.14 Frank W. Hake Associates

FHA provides decontamination of LLW by abrasive blast, chemical bath, hydrolase, tumbling, and ultrasonics. No other information was provided by the company.

3.4.15 Gencorp Aerojet

Gencorp Aerojet works in a large array of decontamination and restoration areas. Their processing capabilities consist of volume reduction, treatment, repackaging, and recycling through agglomeration, compaction, consolidation, incineration, leaching, mixing, sedimentation, flocculation, solidification, high-pressure water wash, and soft media blasting. The company has the ability to improve radioactive waste forms for the reduction or elimination of disposal requirements, via various decontamination methods, including its Advanced Recyclable Media System (ARMS™) technology. ARMS™ is a highly portable and containable air pressured system that utilizes a recyclable soft media capable of removing most contaminants on many brick, cinder block, metal, and wood geometries, with minimal waste.

3.4.16 IDM Environmental Corporation

IDM Environmental Corporation (IDM) services encompass each of the principal disciplines within the environmental remediation field, including plant dismantling and decommissioning, hazardous waste remediation, radiological remediation, and toxic substances abatement. IDM has completed thousands of remediation and decommissioning projects utilizing a project management approach that integrates all phases of the project as well as integrating all the diverse cleanup activities, including asbestos abatement, radiological decontamination, hazardous waste remediation, waste treatment, packaging, and disposal.

3.4.17 Interstate Nuclear Services Corporation

Interstate Nuclear Services Corporation (INS) provides onsite mobile metal decontamination units, which employ state-of-the art cleaning methods for metals recovery and waste reduction.

3.4.18 Manufacturing Sciences Corporation

MSC's process is centered around reclamation of metals for recycling into the commercial market place. MSC decontaminates equipment, and reuse of this equipment is provided either to the customer, external to the used equipment market, or in some cases, used internally by MSC for production capability. For metals that cannot be released to the public sector, MSC manufactures custom and standard products such as 55- and 85-gallon drums, B-25 boxes, and vitrification containers. These products are marked as being recycled from radioactively-contaminated steel and are destined for disposal in a disposal site as a container rather than scrap.

3.4.19 M.J.W. Corporation, Inc.

M.J.W. Corporation, Inc., specializes in high-volume, low specific-activity equipment decontamination to free release by using solutions and mechanical surface abrasives. In addition, the company is applying for a license amendment to operate a 6,000-ft^2 decontamination facility in June 1996. No other information was provided by the company.

3.4.20 Non-Destructive Cleaning, Inc.

Non-Destructive Cleaning, Inc., (NDC) supplies nondestructive cleaning systems and predesigned facilities. The systems and facilities that are sold are somewhat unique in that they use CO_2 to clean contaminated material, leaving behind no secondary contamination, such as contaminated water. NDC's decontamination facilities are all mobile units; the company does not supply any other decontamination services.

3.4.21 Nuclear Fuel Services, Inc.

Although NFS claimed expertise in this field in their response to this survey, no specific information was provided concerning the company's decontamination capabilities.

3.4.22 Nuclear Metals, Inc.

NMI currently operates under a Radioactive Material License and a RCRA permit. NMI plans to obtain a RCRA permit for their Depleted Uranium Recycle Facility located in Barnwell, South Carolina. NMI has developed the "Denver process" to extract uranium, lead, and other metals from LLW sludge and soils. This process involves a washing/leaching step that solutionizes radioactive constituents so they can be separated for possible recycling. The metals, as precipitates or leachate residues, are generally recovered free of radioactive contamination. The recovered nonradioactive metals can then be reintroduced into an unrestricted end use because the radioactive component of the waste stream has been removed. The company has demonstrated this technology with a pilot plant designed to handle 2,700 kg/day (6,000 lb/day). NMI reports that a full-scale plant could be online in 9 to 15 months if needed. NMI has also developed the Hydromet process to process uranium and uranium alloy scrap, such as machine turnings, grinding swarf and foundry scrap into high-quality metal. The Hydromet process allows alloying elements such as titanium, molybdenum, and niobium to be fully recovered. In addition, NMI uses a high-pressure water jet technique and other abrasive methods to decontaminate equipment and facilities.

3.4.23 Nuclear Sources & Services, Inc.

NSSI states that their permit LO-2991 authorizes decontamination and release of equipment for reuse or recycling. The permit does not limit the volume treated. As decontamination is not currently a large part of NSSI's business, an ultimate capacity cannot be given. The permit does not limit the facility capacity.

3.4.24 Radiation Service Organization, Inc.

RSO is licensed by the State of Maryland Department of the Environment to provide decay-in-storage for radionuclides with half-lives less than 88 days, with the waste being returned to the generators.

3.4.25 RUST Clemson Technical Center

RUST currently operates under a Radioactive Material License and a RCRA permit. RUST decontaminates metal-contaminated soil for reuse or recycling using acid extraction and selective dissolution methodologies. Decontamination operations are conducted at RUST's facility in Anderson, South Carolina. Capacity is determined by the radionuclide limits in RUST's NRC license. RUST has extensive capabilities to develop treatment and decontamination methods. For metals decontamination, RUST specifies acid extraction and selective dissolution as examples of methods it employs. RUST has also provided a pilot-plant demonstration to extract radionuclides and metals from INEL soils and sludges. RUST expressed a willingness to provide treatment and decontamination systems and services when DOE defines a need for its services.

3.4.26 Scientific Ecology Group, Inc.

SEG currently operates under a Radioactive Material License and an interim status RCRA permit. SEG expected to receive a RCRA Part B permit to treat, store, or dispose of mixed LLW in 1995. SEG decontaminates and recycles LLW metals. SEG states that is has the largest, most technologically-advanced metal decontamination facility with the only dedicated foundry for radioactive metals in the United States. Most metals are decontaminated via high-pressure water, steel shot, or glass bead blasting. Metals, including steel, stainless steel, copper, brass, and lead, are routinely released by SEG. SEG also melts LLW metal into blocks used for shielding at DOE facilities. Stainless steel, carbon steel, and aluminum are commonly processed in this fashion. In 1994, SEG processed and released over 280,000 kg (627,000 lb) of contaminated metals for unrestricted use.

For metals that cannot be decontaminated by surface decontamination techniques, SEG operates a furnace that has a capacity to melt approximately 12 million kg per year (13,000 tons per year). The molten metal is then molded into customized shielded waste containers or shielding blocks for reuse. SEG accepts a large number of radionuclides, including mixed fission products and TRU waste contaminated to levels below 10 nCi/g. The total limit for radionuclides is 800 Ci with additional limitations of 700 g for ^{235}U, 400 g for ^{238}U, and 400 g for all plutonium. All Oak Ridge area facilities operated by SEG hold current licenses from the State of Tennessee.

3.4.27 Thomas Gray and Associates, Inc.

TGA's facility in Salt Lake City, Utah, currently has a Solid Waste Management Facility Permit that allows them to decontaminate LLW via decay in storage. The capacity of this facility is 850 m^3 (30,000 ft^3).

3.4.28 Trycon Technologies, Inc.

Although known primarily as a supplier of both portable and fixed decontamination systems, TTI would like to expand their services to include the volume reduction and decontamination of LLW. TTI has developed a Liquid Abrasive Decon/Cleaning System (LADS) that is designed to perform decontamination economically and with a minimum of residual waste. The LADS process is a simple mechanical process that uses only water, air, and abrasive, thus eliminating some of the dangers associated with other decontamination methods. This process decontaminates metal, wood, plastic, lead, fiberglass, rubber, and other materials using a variety of abrasives to minimize surface removal or to increase productivity.

3.4.29 U.S. Ecology

U.S. Ecology currently operates under a Radioactive Material License issued by the State of California. U.S. Ecology expected to obtain a Radioactive Material License from the State of Nebraska in 1995. The company currently does not have a RCRA permit, but is planning to apply for a RCRA permit for thermal treatment of mixed LLW. U.S. Ecology decontaminates LLW for metals reuse, recycling, and/or free release, but only for institutional clients, hospitals, and universities.

3.5 Laundering of Radioactively-Contaminated Laundry and/or Respirators

3.5.1 Afftrex, Ltd.

Afftrex owns and operates a NRC-licensed facility in Clairton, Pennsylvania, which is capable of laundering radioactive and/or asbestos-contaminated protective clothing and other items, including respirators.

3.5.2 Bartlett Nuclear, Inc.

Bartlett manufactures a Mobile Respirator Decontamination system which includes a complete wash line with deep sink, washer, HEPA vacuum, drying oven, and survey area; complete water reprocessing system with a 5-micron particulate filter, activated charcoal, and mixed bed resin system; and a 48-foot trailer with air conditioning, nuclear-grade HEPA system, and HALON 1301 fire suppression system. The system provides automated controls for water temperature, water quality, drying cabinet temperature, water level, and flow rate.

3.5.3 Eastern Technologies, Inc.

Eastern Technologies, Inc., (ETI) presently operates a laundering facility for radioactively-contaminated clothing and respirators in Ashford, Alabama. Currently, this facility is operating at one-fourth of its maximum capacity of 43,092 pounds per day. The facility operates under a state Radioactive Materials License. An aqueous-borne ozone cleaning system is used for cleaning of protective clothing, modesty garments, and other launderable items (i.e., bath towels, mop heads, decontamination towels). ETI maintains separate equipment to process contaminated and noncontaminated items, to ensure that cross contamination does not occur.

In addition to the fixed-base Alabama facility, ETI provides mobile onsite water wash services. The mobile facility also utilizes the aqueous-borne ozone cleaning system. Two sizes of mobile units are available, rated at 1,400 and 2,400 sets per twenty-four hours. Services available with the mobile units include water wash processing of protective clothing, monitoring of processed clothing, repair of protective clothing, and cleaning and drying of respirators and related equipment (approximately 400 units per twenty-four hours). The mobile water wash laundry systems are designed to operate in two modes (i.e., full recycle or partial recycle) depending on discharging requirements. ETI's mobile system is comprised of three trailers.

All laundry is monitored by an Automated Radioactive Laundry Monitor (ARLM). The monitor utilizes upper and lower overlapping high efficiency (<7000 dpm for most isotopes) gas flow proportional detectors to survey protective clothing items on all sides simultaneously. Alarm set points utilized on the ARLM can be customer-specified.

3.5.4 Gencorp Aerojet

Gencorp Aerojet performs laundering services in conjunction with their manufacturing processes. Their current capacity for laundry and respirators is 5,000 ft^3/yr and 400 ft^3/yr, respectively.

3.5.5 Interstate Nuclear Services Corporation

INS has been a supplier of radiological laundry and protective clothing programs for 38 years. INS presently operates 14 different laundering facilities in support of the commercial nuclear industry, Naval shipyards, DOE, and private industry. The typical wash capacity at INS facilities is approximately 2,000 pounds per hour. The Hanford facility is the largest INS facility, cleaning up to 3,500 pounds per hour. The Hanford facility in Richland, Washington, operates under a state Radioactive Material License (Number WN-I0414-1). All INS facilities provide protective wear decontamination, respirator decontamination and recertification, and tool and metal decontamination. Five models of laundry monitors are used at INS facilities. Each one has been designed for a specific application (low-level contamination monitoring, alpha monitoring, large area monitoring, hot particle monitoring, etc.). INS also provides onsite mobile water wash units capable of processing 350 pounds per hour; respirator cleaning, inspection and recertification; and respirator filter cartridge testing and recertification. All respirator work is performed in compliance with NUREG 0041. Protective clothing and equipment sales and leasing is also available through INS.

3.5.6 Manufacturing Sciences Corporation

MSC regularly does laundry for their internal uses but has not considered laundry of customer-supplied materials. This capability exists at MSC and they would consider offering this service if the customer showed interest or has special needs that are not being addressed by standard processors.

3.5.7 Nuclear Fuel Services, Inc.

NFS stated that they have the resources to provide this service. However, the company did not provide any specific information that illustrated this capability.

3.5.8 Octagon/Power Systems Energy Services, Inc.

Octagon/Power Systems Energy Services, Inc., has developed a complete mobile wet laundry system. The system can be assembled at any location on a temporary or permanent foundation. The system occupies an area of approximately 30 feet by 48 feet and includes facilities for washing, drying, folding, and repair of protective clothing, as well as respirator servicing. The facility provides HEPA filtration and water treatment for all process effluents. An optional shipping and receiving shelter can be added to the system to provide a fully-covered laundry facility.

3.5.9 Trycon Technologies, Inc.

TTI specifies that they are capable of providing laundering services, but no information was available that provided any specific details.

3.6 Mixed LLW Treatability Studies and/or Treatment Technology Development

3.6.1 Advanced Recovery Systems, Inc.

ARS conducts mixed waste treatability studies for commercial and government clients. ARS has treatability and development laboratories in Erwin, Tennessee, that are licensed by the State of Tennessee and the NRC to accept hazardous and radioactive materials, respectively. The laboratories are capable of accepting up to 10,000 kg (22,000 lb) of mixed waste pursuant to the treatability exemption found at 40 CFR §264.4(e) and (f) as modified by 59 FR 8362. Treatment technologies routinely evaluated by ARS include soil washing, mercury treatment and reclamation, resource recovery, wastewater treatment, and immobilization. ARS has the necessary resources and is engaged in developing new treatment methods for mixed LLW, such as rare earths and heavy metal recovery and recycling, soil washing, extraction and purification, and chemical fixation.

3.6.2 ADTECHS Corporation

ADTECHS' parent company, JCL Corporation, is based in Japan, with additional offices in the United States. JCL's facility in Japan is licensed to perform bench- or pilot-scale treatability studies on mixed LLW. Current technologies under license include the following:

- Evaporation;
- Reverse Osmosis;
- UV oxidation;
- (Micro)filtration;
- Incineration;
- Drying;
- Stabilization with cement, bitumen, and plastic;
- Hollow fiber filtration;
- Shredding;
- Compacting; and
- Slagging.

In addition, ADTECHS has expressed a desire to develop new treatment technologies for mixed LLW.

3.6.3 Afftrex, Ltd.

Afftrex is willing to conduct bench- or pilot-scale treatability studies on mixed LLW and is interested in developing new methods for treating LLW and/or mixed LLW. Afftrex has performed some test applications for DOE facilities on the solidification of radioactively-contaminated oily waste. The company would like to utilize its new Blackfoot, Idaho, facility for LLW and mixed LLW treatability studies.

3.6.4 ALARON Corporation

ALARON currently operates an NRC-licensed facility located in Wampum, Pennsylvania. ALARON is not currently permitted by the EPA and has no plans to apply for an EPA permit within the next five years. ALARON is not currently capable of performing treatability studies for mixed LLW; however, ALARON is interested in obtaining more specific information concerning the development of new treatment methods for mixed LLW. ALARON indicated that they do have laboratory and application test facilities that could be modified to conduct treatability studies.

3.6.5 Allied Technology Group, Inc.

ATG operates facilities in California under a Radioactive Materials License. Although, ATG does not operate facilities permitted by the EPA, the company has recently submitted a RCRA Part B Permit application to the Washington Department of Ecology for a Mixed Waste Treatment/Storage Facility in Richland, Washington. Currently, ATG is permitted for conducting treatability studies involving the calcining of thorium nitrates. With license amendment, other studies would be possible. ATG also has expressed interest in the development of new treatment technologies for both LLW and mixed LLW.

3.6.6 American Ecology Corporation

AEC currently operates under a Radioactive Materials License issued by the State of Tennessee. AEC also has applied for a RCRA permit to treat bench-scale quantities of mixed LLW via thermal treatment. AEC can currently perform thermal treatment under a treatability exemption for R&D permit. The treatability exemption is promulgated at 40 CFR 264.4(e) and (f) (see 59 FR 8362 for final rule). AEC has the necessary resources and is interested in developing new treatment technologies for mixed LLW using thermal treatment and decontamination methods.

3.6.7 Applied Health Physics, Inc.

AHP states that they have the facilities and resources necessary to develop new treatment technologies for mixed LLW, but no information was provided by the company that illustrated this capability.

3.6.8 Babcock and Wilcox Nuclear Environmental Services, Inc.

B&W capabilities and facilities are currently reserved solely for the support of waste management needs of the B&W Naval Nuclear Fuel Division. B&W maintains a fully-equipped R&D center at its Lynchburg Technology Center in Lynchburg, Virginia. B&W has high-limit, source, by-product, and special nuclear material licenses allowing it to receive and possess virtually any mixed LLW sample for study.

3.6.9 Bartlett Nuclear, Inc.

The company has expressed interest in the developing of treatment technologies that utilize the Pyrolytic Gasification, Sonatol, or Pyrolytic Arc Melter processes. The Pyrolytic Gasification process is a proprietary, patented technology in which the resultant carbon residue is a stable waste form. The Sonatol process utilizes an inert, nontoxic, nonflammable, nonhazardous solvent substitute that provides higher decontamination factors than the original solvent. The Pyrolytic Arc Melter provides for

gasification of combustible materials in a pyrolytic environment, vitrification of combustible residue and noncombustible materials, and simultaneous melting of metal objects.

3.6.10 Brown & Root Environmental

Brown & Root Environmental, a Division of Halliburton NUS Corporation, has extensive experience conducting treatability studies, including studies involving mixed LLW. Many of the studies were performed in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements at National Priority List sites, DoD Installation Restoration Program sites, and state-led sites. As such, Brown & Root Environmental is familiar with the scoping requirements for, and the data required at the completion of, treatability studies completed under CERCLA, RCRA, and TSCA. Their laboratory is a full-service analytical laboratory with a self-contained mixed waste treatability study laboratory. The laboratory has a Type B broad scope NRC license and a Radioactive Material License from the Pennsylvania Department of Environmental Resources, as well as numerous certifications and approvals. To facilitate mixed LLW treatability studies, the company constructed a mixed LLW treatability laboratory where the key element in the design was containment. Brown & Root Environmental has performed numerous treatability studies on all media for a wide range of contaminants including organics, metals, and radionuclides. Over the past five years, the company has performed numerous bench-scale treatability studies for the Rocky Flats Environmental Technology Site and the Fernald Environmental Management Project. The work scope ranged from developing stabilization "recipes" for pond liquids, brines, and sludges, to determining the effectiveness of a soil washing treatment technology. Brown & Root Environmental has the personnel and facilities available to perform treatability studies on nonproprietary technologies including chemical oxidation, chemical reduction, soil washing, chemical precipitation, liquid/solid separation, distillation, dewatering, adsorption, and biological treatment.

3.6.11 Chem-Nuclear Systems, Inc.

CNSI is licensed by South Carolina to perform small-scale treatability studies, and through WMX Technologies, Inc., CNSI can develop treatment technologies involving vitrification, thermal desorption, molten salt oxidation, stabilization, and wastewater treatment.

3.6.12 COGNIS, Inc.

COGNIS, which is based in California, is interested in conducting mixed LLW treatability studies and in developing treatment technologies for mixed LLW. COGNIS is Henkel's research arm in metal separation technology. The primary interests of COGNIS are metals removal and recovery, removal of organic and mineral acids, resource management, wastewater treatment, mine detoxification, and analytical services. It has developed the only transportable soil treatment plant for heavy metals in the country, which has been treating 100% of the excavated soil, returning the soil onsite, and recycling the recovered metals. COGNIS has been successful in employing its soil washing/soil leaching technology to treat the soil at the Twin Cities Army Ammunition Plant in New Brighton, Minnesota, for eight heavy metals. The company is licensed by the state of California. The license pertains to the use of very small quantities of specific nuclides used for labeling and as tracers in chemical and biological studies.

3.6.13 Diversified Technologies Services, Inc.

DT has applied for an NRC license to perform treatability studies and store and maintain equipment. They expected approval of the NRC license by May 1995. DT plans to operate fixed-base

sites in Knoxville, Tennessee, and near the Hanford site in Washington. They have the necessary facilities and resources and are interested in conducting treatability studies and developing new treatment methods for LLW and mixed LLW. DT is currently pursuing thermosetting thermoplastic polymer solidification/stabilization for LLW and mixed LLW and reverse osmosis for volume reduction of aqueous waste streams. It has already done development work for the INEL under EG&G Idaho, Inc., (now under Lockheed Idaho Technologies Company), and the Naval Reactors Facility for limited applications. Currently DT's mixed LLW treatability studies are conducted at the IT Corporation's facilities in Knoxville, Tennessee.

3.6.14 Duke Engineering and Services, Inc.

Duke is only licensed/permitted to handle wastes generated at Duke Power company facilities. Duke operates under a Radioactive Material License and a RCRA permit. However, the company can provide expertise concerning treatability studies of mixed LLW and is interested in conducting treatability studies for outside customers in the future.

3.6.15 Ecology and Environment, Inc.

Ecology and Environment, Inc., (E&E) maintains a state-of-the art analytical laboratory, the Analytical Services Center, which is a fully accredited and equipped environmental laboratory capable of conducting all major empirical and diagnostic tests on air, water, soil, and product samples. E&E also offers the necessary staffing and technical expertise to apply appropriate and innovative technologies in providing solutions to a variety of environmental and waste management issues.

3.6.16 ElChroM Industries, Inc.

ElChroM Industries, Inc., develops specialized resins/extractants for the removal of radioactive and nonradioactive metals from waste streams and processing solutions. The company is interested in conducting treatability studies and developing treatment technologies. Currently, ElChroM is involved in developing the following:

- Extraction chromatographic resins for the selective separation of radium, cesium, and tritium
- Enhanced analysis and removal capabilities for actinides, strontium, and technetium
- Separation of ultrapure isotopes for radiopharmaceutical applications, and
- Advanced separations products for industrial and environmental applications including ultrapure reagents, hydrometallurgy, and radioactive waste.

3.6.17 Envirocare of Utah, Inc.

Envirocare owns and operates a treatment and disposal facility 120 km (75 mi) west of Salt Lake City, Utah. Envirocare operates under a Radioactive Materials License and a RCRA permit. Envirocare can currently accept LLW, mixed LLW, Natural Occurring Radioactive Material, and 11e.(2) waste material. Envirocare indicated that it is capable of conducting bench- and pilot-scale treatability studies. Specific information was not provided.

3.6.18 Environmental Alternatives, Inc.

EAI provides onsite self-contained decontamination systems to demonstrate the effectiveness of their technologies. EAI owns and operates a fleet of mobile-based decontamination facilities and systems. Through ongoing R&D, EAI strives to develop or improve their existing technologies, as well as new technologies, to aid in providing more efficient and cost-effective service. As part of an ongoing effort to eliminate hazards in the workplace and improve site remedial cleanup actions, EAI continues to develop advances to their existing technologies and investigate the applicability of new emerging treatment methods and techniques. As these new methods, techniques, and technologies are refined and proven, EAI continually adds them to their line of services.

3.6.19 Fluid Tech, Inc.

FTI operates a licensed laboratory that conducts treatability studies on the chemical stabilization of hazardous constituents of mixed LLW. FTI is actively involved in developing new and improved mixed LLW treatment methods and is interested in providing this service to the DOE.

3.6.20 Framatome Technologies, Inc.

FT states that they can conduct treatability studies and treatment technology development, but no supporting information was provided by the company that details these capabilities.

3.6.21 Frank W. Hake Associates

FHA states that they have the facilities and resources necessary to develop new treatment technologies for mixed LLW, but no information was provided by the company that illustrated this capability.

3.6.22 Gencorp Aerojet

Aerojet Ordnance Tennessee, a subsidiary of Gencorp Aerojet, is constantly looking at new technologies to reduce or minimize LLW due to the escalating costs associated with disposal. Their Chemical and Metallurgical Laboratories offers a wide variety of services from analytical chemistry to material and mechanical testing.

3.6.23 GTS Duratek.

GTS Duratek has permitted facilities. They currently can perform bench- or pilot-scale treatability studies of mixed LLW using vitrification and ion exchange. They also perform physical and chemical characterization of LLW and mixed LLW for vitrification and ion exchange and are willing to develop new technologies. GTS Duratek uses the Vitreous State Laboratory (VSL), located on the campus of the Catholic University of America, as a state-of-the-art analytical and research facility. GTS Duratek plays a key role in the scale-up, commercialization, and transfer of technology developed at the VSL. The VSL is fully licensed for radioactive and hazardous materials research.

The VSL research is managed by a core group of internationally-recognized faculty and staff from many disciplines including physics, chemistry, material science, biology, and chemical, mechanical, and electrical engineering. The VSL's R&D capabilities include:

- Characterization laboratory

- Leach test laboratory
- Ceramic processing facility
- Glass dissolution modeling
- Glass melting laboratories
- Ion exchange laboratories.

3.6.24 Hazen Research, Inc.

Hazen Research, Inc., is a consulting and research company providing R&D services to a wide range of customers in the mining, water, treatment, and waste management industries. Hazen is authorized by the Colorado Department of Health to conduct treatability studies on samples of listed and characteristic hazardous wastes. Hazen can perform treatability tests on radioactive materials, as they possess a license from the State of Colorado to transfer, receive, possess, and use certain radioactive materials. The conditions of the license are quite specific, but with adequate lead time, their license can be modified to accommodate most project-specific requirements. Hazen is also approved by the EPA to conduct R&D into polychlorinated biphenyl (PCB) disposal.

3.6.25 International Technology Corporation

IT operates under a Radioactive Materials License issued by the State of Tennessee. IT conducts treatability studies in its Knoxville, Tennessee, facility under the treatability exemption in the federal regulations that has been adopted by the Tennessee Department of Health and Environment. The treatability exemption is promulgated at 40 CFR 264.4(e) and (f) (see 59 FR 8362 for final rule). Testing on materials regulated under the TSCA is covered by technology-specific permits issued by Region IV of the EPA or by EPA-Headquarters depending on the quantity of materials used for testing. IT currently operates under TSCA permits for the bench-scale testing of thermal technologies, stabilization, dechlorination, and other technologies. Their Technology Development Laboratory can conduct regulatory-approved treatability study programs for the following technologies:

- Stabilization/Solidification
- Fixation
- Vitrification
- Carbon Adsorption
- Ion Exchange
- Chemical Extraction
- Air Stripping
- Chemical Treatment

- Incineration
- Thermal Desorption
- Soil Washing and Flushing
- Wastewater Treatment
- Photocatalytic Oxidation
- Precipitation
- Solid/Liquid Separation.

3.6.26 Maxim Technologies, Inc.

Maxim Technologies, Inc., has the capabilities to perform bench- and pilot-scale treatability studies on mixed LLW simulating a wide variety of treatment technologies. The in-house analytical laboratory supports treatability activities by conducting performance assessment analyses on simulated technologies. Maxim also has the capabilities to assist in the development and testing of new technologies to treat mixed LLW.

3.6.27 M.J.W. Corporation, Inc.

The M.J.W. Corporation, Inc., states that they have the necessary facilities and resources to develop new treatment methods for mixed LLW, but no information was provided by the company that illustrated this capability.

3.6.28 Nuclear Fuel Services, Inc.

NFS, located in Erwin, Tennessee, and its subsidiary, ARS, have the capability to conduct treatability studies to evaluate uranium recovery, establish sediment dewatering parameters, and develop treatment processes for RCRA components. The company maintains the onsite analytical capability to conduct laboratory and pilot-scale studies of radioactive, hazardous, and mixed LLW treatment processes. NFS has a permit for treatment of their own mercury-contaminated mixed wastes and K-25 sludge. They have submitted a permit modification that will allow them to commercially offer treatment of mixed wastes.

3.6.29 Nuclear Sources & Services, Inc.

NSSI states that they are authorized to utilize any of the permitted treatments. In addition, license L0-1811 authorizes NSSI to conduct R&D on new treatment processes, new wastes, etc. They also state that they are routinely developing new treatment processes and refining existing processes and equipment to better treat hazardous, radioactive, and mixed wastes.

3.6.30 RUST Clemson Technical Center

RUST is capable of performing bench- and pilot-scale technology demonstrations on LLW and mixed LLW. A partial list of these technologies include the following:

- VAC*TRAX℠/X*TRAX®-low temperature thermal separation
- Incineration
- CHEM-MATRIX®-numerous proprietary cementitious formulas for stabilization/solidification
- Vitrification
- Dechlorination reagent for PCBs and other chlorinated compounds
- Soils/debris washing
- Chemical extractions and reactions
- Electrolytic migration
- PO*WW*ER®-evaporative/catalytic oxidation
- Biological sequential batch reactors, insitu applications, and aqueous waste treatment.

The Clemson Technical Center, which is a 40,000-ft^2 facility comprised of analytical, bench-scale, and pilot-scale laboratories, is fully authorized by federal and state regulatory agencies to handle hazardous, radioactive, and mixed wastes. It has the complete infrastructure required for developing and demonstrating technologies that can be applied to remediating actual contaminated waste from any agency or industry site.

3.6.31 Scientific Ecology Group, Inc.

SEG currently operates under a Radioactive Material License and an interim status RCRA permit. SEG expects to receive a RCRA Part B permit to treat, store, or dispose of mixed LLW in 1995. SEG has a permit to conduct bench- and pilot-scale treatability studies on mixed LLW at its laboratories in Oak Ridge, Tennessee, and Pittsburgh, Pennsylvania. Stabilization and vitrification testing have been successfully performed on a variety of mixed LLW. SEG has the resources for and is interested in developing new treatment methods for mixed LLW. Recently, SEG has completed a bench-scale testing program to process radioactively-contaminated resin using a molten metal solvent system. The catalytic extraction processing technology uses a molten metal bath to convert waste into raw materials. The process breaks molecular bonds, converting compounds into elements, and destroys hazardous and toxic materials in mixed LLW. It captures radionuclides in a stable, nonleachable matrix for final form disposal. The process also decontaminates gases and metals for potential reuse/recycle. The process achieves a volume reduction of 30:1.

3.6.32 Sevenson Environmental Services, Inc.

SES has patented a MAECTITE® treatment process that has been successfully used for the treatment of RCRA contaminated materials. Recently, SES has been conducting treatability studies on Naturally-Occurring Radioactive Material. Results of the study were favorable and SES is looking to conduct additional studies that would eventually allow them to process LLW and mixed LLW on a full-scale basis. In addition, SES would like to further develop their MAECTITE® technology to identify its limitations.

3.6.33 Waste Control Specialists, Inc.

Although fully permitted for management of hazardous and toxic wastes, WCSI is focused on expanding its scope of operations to facilitate the development of new technologies by providing:

- Permitted feedstock storage;
- Permitted treatment and disposal of test residues;
- Ample acreage for controlled release facilities and other research infrastructure;
- Emissions monitoring and control allowing "test-to-fail" evaluations;
- An onsite EPA-approved laboratory;
- Broad and flexible research, development, and demonstration permitting; and
- An opportunity for development and application of standardized research protocols at a comprehensive, centralized research facility.

4.0 DEPARTMENT OF ENERGY TSD CAPABILITIES

Historically, the U.S. Department of Energy (DOE) sites operated semi-autonomously, even though all are driven by the same federal and often similar state requirements. To stimulate interaction between the various DOE sites, the Department of Energy Headquarters developed waste-type management programs for hazardous/sanitary, radioactive high-level, low-level, mixed low-level, and transuranic wastes. These programs were designed to develop and implement specific waste-type strategic plans. One goal of the strategic plan is to integrate the sites, i.e., merge the individual site management efforts into one system such that it becomes a nationally-integrated, cost-effective program based on acceptable risk and sound planning. Benefits of such a system include an increase in public confidence and support; reduction in duplication of cost and efforts; acceleration of site cleanup schedules; and widespread use of developed technologies, including treatment, storage, and disposal (TSD) units. Therefore, for low-level and mixed low-level wastes (LLW) that cannot be stored, treated, or disposed onsite, an offsite facility providing the most feasible alternative should be used. The offsite facility could be a private sector company or another DOE facility. Since DOE facilities may be considered a suitable alternative for managing radioactive wastes offsite, it was decided that this report should provide the current and projected capabilities of the DOE complex in addition to those of the private sector. The DOE complex has approximately 34 sites that generate the majority of both LLW and mixed LLW. Table 4-1 identifies these sites by Operations Office. Section 4.1 highlights, by DOE Operations Office, the LLW TSD units within the DOE complex, and Section 4.2 identifies the mixed LLW TSD units. Since liquid LLW has not historically been treated offsite, Section 4.1 will be limited to solid LLW TSD units.

4.1 Low-Level Waste

Tables 4-2 through 4-4 provide a listing of solid LLW TSD units. The tables are organized by DOE Operations Office and they identify both current and planned units. The information presented in the tables were taken from the draft *Low-Level Waste Current State System Description* (DOE/LLW-202), and, due to resource limitations, have not been updated for this report. With the exception of the Albuquerque Operations Office and the Fernald Environmental Management Project, the information provides the LLW TSD capabilities as of September 1995. The Albuquerque information was last updated on October 1994; the Fernald information was last updated on April 1994.

4.2 Mixed Low-Level Waste

Table 4-5 provides a listing of mixed LLW treatment units as identified by the Materials Inventory and Tracking Information (MITI) system. The MITI system is a database used for the storage of the Mixed Waste Inventory Report data and it represents the most current complex-wide data collection effort to date for mixed LLW. The data presented is as of November 1995, and it may presently be out-of-date.

Table 4-1. Department of Energy site organization.

Operations Office	Site
Albuquerque	Grand Junction Project Office (GJPO) Inhalation Toxicology Research Institute (ITRI) Kansas City Plant (KCP) Pantex Plant (PX) Pinellas Plant (PIN) Sandia National Laboratory-Albuquerque (SNLA) Sandia National Laboratory-Livermore (SNLL)
Chicago	Ames Laboratory (Ames) Argonne National Laboratory-East (ANLE) Argonne National Laboratory-West (ANLW) Brookhaven National Laboratory (BNL) Fermi National Accelerator Laboratory (FNAL) Princeton Plasma Physics Laboratory (PPPL)
Idaho	Idaho National Engineering Laboratory (INEL)
Nevada	Nevada Test Site (NTS)
Oakland	Energy Technology Engineering Center (ETEC) Laboratory for Energy-Related Health Research (LEHR) Lawrence Berkeley Laboratory (LBL) Lawrence Livermore National Laboratory (LLNL) Stanford Linear Accelerator Laboratory (SLAC)
Oak Ridge	Colonie Interim Storage Site (CI) K-25 Site (K-25) Oak Ridge National Laboratory (ORNL) Paducah Gaseous Diffusion Plant (PGDP) Portsmouth Gaseous Diffusion Plant (PORTS) Weldon Spring Site (WSS)
Ohio	Battelle Columbus Laboratories (BCL) Fernald Environmental Management Project (FEMP) Mound Plant (Mound) West Valley Demonstration Project (WVDP)
Richland	Hanford Site (HANF)
Rocky Flats	Rocky Flats Environmental Technology Site (RF)
Savannah River	Savannah River Site (SRS)

Table 4-2. Solid low-level waste treatment facilities.

Site	Facility	Treatment Process(es)	Capacity (m^3/yr)	Current Use (m^3/yr)	Status	Acceptable Feedstock and Limitations
			ALBUQUERQUE OPERATIONS			
ITRI	Radioactive Waste Compactor	Compaction		<100	Current	Contact-Handled (CH)* LLW: Solid compactible; contaminated with Class C levels of alpha and beta-gamma. 55-gal drums
	Pathological Waste Destructor	Incineration			Current	Radioactively-contaminated pathologic waste. 55-gal drums
LANL	Hazardous Waste Treatment Facility	Decontamination; Recycling; Solidification	139	0	Planned	CH LLW: Treatment residuals
	New LLW Compactor-Baler	Compaction		0	Planned	CH LLW: Dry solid.
	Solid LLW Compactor-Baler	Compaction Volume Reduction Ratio (VRR) = 5:1	800	0	Inactive	CH LLW: Solid compactible
	Controlled Air Incinerator	Incineration with liquid feed. VRR = 120:1	[1.5E6 BTU/hr]	0	Inactive	CH LLW/Mixed low-level waste (MLLW)/TRU/ Mixed transuranic (MTRU): Solids, slurries, liquids.
	Scintillation Vial Crusher	Crushing & Grinding, Liquid/Solid Separation, Repackaging	136	27	Current	LLW/MLLW: Solids with liquid packages. 30-gal drums.
	Characteristic Waste Immobilization	Solidification (Portland cement)	142	0	Planned	LLW/ MLLW: Solids, slurries, liquids.
PIN	LLW Compactor	Compaction VRR = 7:1	240	22	Current	CH LLW: Solid compactible; paper and protective clothing contaminated with tritium
SNLA	Radioactive & Mixed Waste Management Facility	Characterization & Sorting; Compaction; Neutralization; Repackaging; Screening; Solidification; Shredding; Stabilization	300	0	Under Const.	CH LLW: Solids, sludges, slurries, liquids. 55-gal drums and 7A steel boxes.
	Consolidated Waste Management Complex				Planned	
SNLL	LLW Compactor	Compaction			Current	CH LLW: Solid compactible lab trash
	Cement Solidification Facility	Solidification			Current	CH LLW

Table 4-2. (continued).

Site	Facility	Treatment Process(es)	Capacity (m^3/yr)	Current Use (m^3/yr)	Status	Acceptable Feedstock and Limitations
	Steam Cleaner	Decontamination			Current	CH LLW: Salvageable equipment contaminated with tritium, U-238, or hazardous chemicals
		CHICAGO OPERATIONS				
ANLE	Compactor	Compaction VRR = 7:1				
BNL	Hazardous Waste Management Facility (HWMF) Compactor	Compaction VRR = 4-5:1			Current	CH LLW: Solid compactible
	HWMF Incinerator	Incineration		Periodic	Current	CH LLW: Animal carcasses only.
	HWMF-I Compactor (replacement)	Compaction			Planned	CH LLW: Solid compactible
	HWMF-I Incinerator (replacement)	Incineration			Planned	CH LLW
FNAL	Site 67	Compaction; Solidification; Sorting; Repackaging		120	Current	CH LLW: Primarily solids containing mostly Mn-54, Co-60, and Na-22.
	Site 38 (replacement for Site 67)	Compaction; Solidification; Sorting; Repackaging		120	Planned	CH LLW: Solid and liquid miscellaneous
		IDAHO OPERATIONS				
INEL	Waste Experimental Reduction Facility (WERF) Compactor	Compaction; Repackaging VRR = 14:1	1,550		Current	CH LLW: Solid compactible; packaged in poly bag, B-25 bin, or cargo container; <10 nCi/g alpha; <50 ppm PCBs; no free liquids; <500 mR/h per package; <200 mR/h per piece
	WERF Grout Facility	Solidification	114		Current	CH LLW/MLLW: WERF incinerator ash
	WERF Incinerator	Controlled air incinerator with liquid injection. VRR = 70:1	Max: 8700 Nom: 2700		Current	CH LLW/MLLW: Solid and liquid; packaged in 55-gal drum or cardboard box; <20 mR/h contact radiation; <0.1 nCi/g alpha; limited H-3, C-14, I-129 content; <50 ppm PCBs; <1% soil; <15 g fissile material in facility

Table 4-2. (continued).

Site	Facility	Treatment Process(es)	Capacity (m^3/yr)	Current Use (m^3/yr)	Status	Acceptable Feedstock and Limitations
	WERF Metal Sizing	Size reduction (plasma arc, gas torches, arc gougers, saws); Repackaging. VRR = 5:1			Current	CH LLW: Dry solid. Bulk contaminated and activated metals; packaged in D&D bin or wooden box; <100 mR/h contact radiation; <0.5 nCi/g alpha
	Oxidation Ovens	Thermal Oxidation		1	Current	Dry solid LLW: U-238 and depleted uranium.
		OAK RIDGE OPERATIONS				
K-25	K-1420 Decontamination Facility	Decontamination; Neutralization; Distillation; Liquid/solid separation		As needed	Current	CH LLW: Valves contaminated with uranium
	LLW Compaction/Preparation Facility	Repackaging; Shredding; Compacting			Planned	
	TSCA Incinerator	Incineration (Rotary kiln); Offgas includes quench chamber, venturi scrubber, packed-bed scrubber, 2-stage ionizing wet scrubber. Liquid treatment includes carbon absorption, neutralization, and settling.	1818	Operates 10 months/yr with liquid feed. Solids accepted in 1994.	Current	CH LLW/MLLW/HAZ: Solids and liquids.
PGDP	C-400 Dry Honer Facility	Decontamination (Grit Blasting)		Varies	Current	Solid LLW: Contaminated objects.
	C-400 Cylinder Wash Facility	Washing			Current	CH LLW: Solid. Uranium transport cylinders.
	C-409 New Cylinder Wash Facility	Washing			Current	CH LLW: Solid. Higher assay transport cylinders.
ORNL	Waste Compaction Facility	Compaction; Repackaging	10,900	540	Current	CH LLW: Dry or damp solid compactible; no free liquids, fissile or TRU.
Y-12	Uranium Chip Oxidation Facility	Thermal oxidation			Current	CH LLW: Depleted and natural uranium (<0.71% U-235)
	Waste Feed Preparation Facility	Compaction; Repackaging; Shredding; Baling. VRR = 8:1	8,950	7,080	Current	CH LLW: Dry or damp solid compactible.
		OHIO OPERATIONS OFFICE				

Table 4-2. (continued).

Site	Facility	Treatment Process(es)	Capacity (m^3/yr)	Current Use (m^3/yr)	Status	Acceptable Feedstock and Limitations
Mound	Compactor (R/SW)	Compaction		0	Inactive	CH LLW: Low-specific activity (LSA) beta-contaminated; general office area trash, restroom trash, shoe covers
	Compactor (T)	Compaction		As needed	Current	CH LLW: LSA beta-contaminated
	Compactor (WD)	Compaction		As needed	Current	CH LLW: Solid compactible; general building trash
	Mound Glass Melter	Pyrolysis	182	[~23 kg/hr]	Current	Primarily MLLW: Liquid and solid combustibles, fuel cycle wastes, noncombustibles, plastic, rubber, and sludges; RCRA limited to onsite waste
WVDP	Contact Size Reduction Facility	Size reduction VRR = ~6:1		Inactive[b]		CH LLW, MLLW: Bulk contaminated metals
	Supercompactor	Compaction VRR = 3.85:1		As needed[c]	Current	CH LLW: Dry solid compactible
	Waste Reduction and Packaging Area	Compaction; Repackaging; VRR = 2.81:1		As needed[d]	Current	CH LLW: Solids.
			RICHLAND OPERATIONS			
HANF	Low-Level/Solid Waste Compactor	Compaction; Repackaging	9,710	6,800	Current	CH LLW: Solid compactible; LSA. B-25 boxes.
	LLW/Low Reading Compactor at Building 327	Compaction		Limited	Current	CH LLW: Solid compactible lab waste; no RCRA wastes. 55-gal drums only.
	T-Plant	Macroencapsulation; Decontamination			Current	CH LLW/High-level waste (HLW)/MLLW
	TRU Waste Compactor	Compaction; Repackaging		0	Inactive	CH/Remote-Handled (RH) LLW/TRU: Solid compactible lab waste. One-gallon cans.
	Waste Receiving and Processing Facility-I	Compaction; Repackaging; Sorting; Shredding	5,250	0	Planned	Solid CH LLW/TRU: 55- and 83-gal drums, waste boxes
			ROCKY FLATS OPERATIONS			
RF	Advanced Sizing Reduction Facility	Compaction; Crushing/Grinding; Decontamination; Repackaging; Washing; Size Reduction (Plasma Arc)	5,920 - 14,500[e]	Inactive	1996	CH LLW/MLLW/TRU: Bulk metal solids

Table 4-2. (continued).

Site	Facility	Treatment Process(es)	Capacity (m^3/yr)	Current Use (m^3/yr)	Status	Acceptable Feedstock and Limitations
	Building 776	Size Reduction			Inactive[f]	CH LLW: Primarily bulk metal solids in 55-gal drums, 2x4x7-ft and 4x4x7-ft plywood boxes. Examples include metal filter housings and ventilation ducting, and retired equipment such as platforms and metal lathes.
	Building 889	Compaction; Decontamination	1,819	0	Inactive[g]	CH LLW/MLLW: Uranium-contaminated equipment and compactible wastes
	Supercompactor	Compaction; Repackaging; VRR = 18-25:1	200		Current	CH LLW/MLLW/TRU: "Soft" compactible wastes such as Kimwipes, Texwipes, rags, cardboard, coveralls, PVC, poly bottles, air suits; "Hard" compactible wastes such as small metal objects, glass, and wood; packaged in 55-gal drums
	Portable Concrete Floor Grinder with high-efficiency particulate air filter	Decontamination	[2.8 m^2/hr]	As needed	Current	CH LLW: Contaminated concrete floors.
	Portable CO_2 Pellet Blaster	Decontamination	[45 kg/hr]	As needed	Current	CH LLW: Large contaminated equipment.
		SAN FRANCISCO OPERATIONS				
LBL	Hazardous Waste Handling Facility	Decontamination; Compaction			Current	LLW/MLLW/hazardous (HAZ)/TSCA
	Low-Level Waste Compactor	Compaction; VRR = 3.5:1	1200[h]	0	Inactive	CH LLW/MLLW: Solid compactible.
LLNL	Building 612 Drum/Container Crushing Unit	Compaction; Crushing/Grinding; Repackaging	11,300-11,400[i]		Current	CH LLW: Empty steel drums or containers. Drums may have plastic bags or liners.
	Building 513 Shredding Unit	Repackaging Shredding	1,590	1,470	Current	CH LLW/MLLW/HAZ: Dry solid: metal scrap, ceramics, absorbent material, piping, plastic items, and wood.
	Building 612 Size Reduction Unit	Decontamination; Draining/Drying; Repackaging; Size Reduction (Plasma Arc)	142[j]	0	Inactive	CH LLW/MLLW/HLW: Bulk metal solids
	Decontamination and Waste Treatment Facility			0	Planned	LLW/MLLW/HAZ:

Table 4-2. (continued).

Site	Facility	Treatment Process(es)	Capacity (m^3/yr)	Current Use (m^3/yr)	Status	Acceptable Feedstock and Limitations
	Solidification Unit	Repackaging; Solidification with Environstone	1,250	0	Inactive	CH LLW: Solids, sludges, liquids. 5-, 30-, or 55-gal drums. Adsorbed liquids, absorbent materials, concentrated salts, and organic concentrates.
		SAVANNAH RIVER OPERATIONS				
SRS	Consolidated Incinerator Facility	Incineration (rotary kiln)	948	0	Planned	LLW/MLLW: Currently specified to process hazardous waste only, pending completion of SRS Environmental Impact Statement
	H-Area Compactor	Compaction VRR = 6:1	27,000[k]	5950	Current	CH LLW: Solid Compactible; <200 mR/h at 3 inches; cardboard boxes; E-Area Disposal Area WAC applies; no absorbed liquids; no wet ion exchange resins; no waste that generates hydrogen, no asbestos, <500 dpm/0.1 m^2 alpha, no offgassing tritium
	M-Area Compactor	Compaction VRR = 5:1	27,000[k]		Current	Same as H-Area Compactor, except cannot have any detectable alpha or tritium

a. CH LLW requires container surface radiation level to be <200 mR/h, unless further restrictions are stated.
b. Undergoing start-up testing. Processed 515 m^3 in 1991.
c. Processed 18.2 m^3 in 1991.
d. Processed 279 m^3 in 1991.
e. For 55-gal drums, the annual capacity is 5,920 m^3/year; for boxes, the capacity is 14,500 m^3/year.
f. Being upgraded.
g. Must be upgraded.
h. Based on 0.6 m^3/hr x 2000 hr/yr.
I. For unpackaged materials, the annual capacity is 11,300 m^3/yr; for 55-gal drums., the capacity is 11,400 m^3/yr.
j. Assumes 250 days/year of operation with an average density of 8000 kg/m^3.
k. Based on a nominal 13.5 m^3/hr feedrate and maximum annual operation of 2,000 hours.

Table 4-3. Solid low-level waste storage facilities.

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
			ALBUQUERQUE OPERATIONS		
GJPO	Building 20/Analytical Chemistry Laboratory	5	2	Current	LLW/MLLW: Low-level counting filters, planchettes, copper foil, excess uranium oxide and salts, ion exchange resin, tritium cocktails, dodecane/trioctylphosine oxide, volatile extraction sample residue, Toxicity Characteristic Leaching Procedure (TCLP) sample residue, unused sample portions
	Building 33	42	42	Current	LLW: Contaminated 50-50 mixture of water/ethylene glycol
	Building 7		14	Current	LLW: Contaminated equipment
	Low-Level Radioactive Storage Area (Modular Facility)/Building 61-C	37.4		Current	LLW: Small quantities of liquid tritium
	Low-Level Radioactive Storage Area/Building 36	796	<1	Current	LLW: Solids and liquids. Contaminated calibration sources
	GJPO South Yard		34.4	Current	LLW: Contaminated soil, generated from the decommissioning of calibration boreholes at the Reno Test Pits
ITRI	Hazardous Waste Storage Building	446[a]		Current	RH[b] LLW/TRU
	Pathological Waste Freezer	11.3		Current	LLW: Pathological wastes such as animal carcasses, tissues, excreta, animal bedding, and aqueous wastes arising from decontaminating animal holding and exposure equipment
LANL	Container Storage Pads	511	110	Current	Dry or damp solid LLW/MLLW/TRU/MTRU
	Mixed Waste Dome	680	340	Current	LLW: Liquid with solid objects interspersed. MLLW: Dry or damp solid.
	Mixed Waste Pad 54-001(A)	625		Current	LLW/MLLW: Solids and liquids.
	Mixed Waste Receiving and Storage Facility		0	Planned	LLW/MLLW: Solids and liquids.
KCP	Recycling and Recovery Radioactive Waste Storage Area	<50[a]		Current	LLW: Primarily LSA resulting from disassembly of electric components and from cleanup of area contaminated with promethium
	WM Storage Facility			Planned	LLW/HAZ
PIN	Radioactive Waste Storage Facility	42		Current	LLW/TRU: Contaminated paper, shoe covers, plastic gloves, scrap equipment and products, destructively tested products, and laboratory wastes
PX	Building 11-9			Current	LLW

Table 4-3. (continued).

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
	Conex Containers (14)	212	3	Current	LLW
	Container Storage Magazine/Igloo 4-56	57	Varies	Current	LLW
	Warehouse 12-42	663		Current	LLW
SNLA	Building 6580 Rooms 108-109	42.5	0.28	Current	LLW/MLLW/TRU/MTRU: Could be used for high activity waste >10 mR/hr. Accepts dry solids, free liquids, and overpacked containers, but no biological waste.
	Building 6580 Rooms 105-106	42.5	0.28	Current	LLW/MLLW/TRU/MTRU: High activity waste >10 mR/hr. Accepts dry solids, free liquids, and overpacked containers, but no biological waste.
	Annular Core Research Reactor High Bay	14.2	0.0	Inactive	LLW/MLLW/TRU/MTRU/Category I Special Nuclear Material (SNM): Bulk waste from reactor high bay area of Building 6588
	Building 6580 Room 113-113A	141.6	0.0	Current	LLW/MLLW/TRU/MTRU: Experimental waste from Building 6580; accepts dry solids, free liquids, and overpacked containers
	Building 6580 Room 110, 111, 112	198.2	0.28	Current	LLW/MLLW/TRU/MTRU: Experiment waste; accepts dry solids, free liquids, and overpacked containers
	Building 6596 Storage Area	203.9		Current	LLW: Dry solids; no pyrophoric or asbestos materials
	Building 6596A Chapel	764.6	152.9	Current	LLW: Dry solids, damp solids, slurries, and free liquids
	Building 819	584.8	<0.1	Inactive	LLW/MLLW: Dry solids, slurries, and free liquids
	Consolidated Waste Management Complex			Planned	LLW/HAZ: To be used for the processing and storage of classified and nonclassified weapons-related wastes, waste oil handling, and storage of wastes containing explosives
	Hot Cell Facility	8.5		Current	LLW/MLLW/TRU/MTRU: Solids; all EPA waste codes. Anything considered on case-by-case basis.
	Manzano Bunkers			Planned	
	Radioactive and Mixed Waste Management Facility			Current	LLW/MLLW: Uranium, Tritium, and liquids.
	Sandia Pulse Reactor (SPR) 3X vault	42.48	0.0	Current	LLW/MLLW/Category I SNM: Dry solids
	SPR Dense Pack	31.15	0.0	Inactive	LLW/MLLW/Category III SNM: Reactor materials; dry solids
	SPR Nova vault	14.16	0.0	Inactive	LLW/MLLW/Category I SNM: Dry solids

Table 4-3. (continued).

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
	SPR Sandlot	594.7	169.9	Planned to retire in 1/1994	LLW: Dry solids. Most of current storage is not waste.
	SPR Storage Sheds and Bins	237.9	2.83	Current	LLW: Dry solids; will accept PCBs
	Technical Area (TA)-III Classified Storage Site	2,520	0.10	Current	CH[c] LLW/MLLW: Dry solids.
	TA-III Unclassified Storage Site	2,520	0.10	Current	CH LLW/MLLW: Dry solids.
SNLL	Classified Radioactive Waste Vault	617[a]		Current	LLW: Solids; primarily depleted uranium; small quantities of enriched lithium and deuterium
	Radioactive and Mixed Waste Handling Facility	52		Current	LLW
			CHICAGO OPERATIONS		
ANLE	Building 317		836	Current	LLW: Solids.
ANLW	Radioactive Scrap & Waste Facility	643.7	343	Current	RH LLW/MLLW/TRU/MTRU: Dry or damp solids.
BNL	HWMF		450	Current	LLW/MLLW/Non-Rad/Non-HAZ: Animal carcasses, compactible solids, and bulk solids
	HWMF Upgrade I (replacement)		0	Planned	LLW/HAZ: Solids and liquids.
FNAL	Site 67 Storage Area		14 plus Temp. Staging	Current	LLW: Activated solids containing Mn-54, Co-60, and Na-22.
	Site 38 Storage Area (replacement for Site 67)		0	Planned	LLW: Activated solids containing Mn-54, Co-60, and Na-22.
			OAK RIDGE OPERATIONS		
K-25	K-1065-C	28	28	Current	LLW
	K-1066-H	4722.1	3926.6	Current	CH LLW: Dry solid combustible and compactible items such as contaminated trash from rad boundary control stations, cleanup materials, and wood
	K-1313A	246.3	246.3	Current	LLW: Compactible and incinerable
	K-301-1	23	23	Current	LLW
	K-301-2	11	11	Current	LLW

Table 4-3. (continued).

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
	K-302-4	45	45	Current	LLW
	K-302-5	20	20	Current	LLW
	K-303-3	3	3	Current	LLW
	K-305-12	3	3	Current	LLW
	K-306-2	246.3	246.3	Current	CH LLW: (temporary accumulation) mercury and radioactive soil that passed RCRA TCLP tests
	K-306-7	314.2	294.4	Current	CH LLW: Mercury and radioactively-contaminated soil that has passed RCRA TCLP tests
	K-309-1	639	0	Planned	LLW: Sludge
	K-309-2	662.5	424.7	Current	LLW: Filters and other solid wastes
	K-310-1	3	3	Current	LLW
	K-310-2	654	654	Current	CH LLW: Dewatered sludge, compactible waste; <50 mR/h; contaminants include cesium, strontium, and cobalt
	K-311-1	11	11	Current	LLW
	K-33	3,111.3	2729.1	Current	CH LLW/TSCA: Solid waste such as metal scraps and piping
	K-770	29626.5	29626.5	Current	CH LLW: Bulk scrap metal, segregated by metal type and contamination level; contaminant is primarily uranium
	Vault 6	268.9	268.9	Current	CH LLW: Compactible
	Vault 7A	406	0	Planned	LLW
	Vault 8A	215	215	Current	LLW
	Vault 12A	768	0	Planned	LLW
	Vault 15A	564	0	Current	CH LLW: Compacted waste from Scientific Ecology Group; waste with contact radiation levels exceeding threshold for outside storage
	Vault 17A	1,520	0	Planned	LLW: Contaminated solid waste, dirt, and construction debris
	Vault 18A	299	0	Planned	See Vault 17A
	Vault 20A	299	0	Planned	LLW

Table 4-3. (continued).

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
	Vault 23A	23	23	Current	LLW
	Vault 27A	196	0	Planned	LLW: Resins and evaporator bottoms
ORNL	7823	2	2	Current	RH LLW: Special case high-level incidental waste containing nuclear fuel sample materials, generated at the High-Radiation-Level Examination Laboratory
	7823B	164.2	107.6	Current	CH LLW: Solid or sludge. Waste having capability of future volume reduction.
	7823C	113.2	110.4	Current	CH LLW
	7823D	99.1	99.1	Current	CH LLW
	7823E	113.2	110.4	Current	CH LLW
	7827	17	6	Current	RH LLW: Special case high-level incidental waste, generated primarily from the ORNL High Flux Isotope Reactor
	7831C	342.6	342.6	Current	LLW
	7841	1000	1000	Current	LLW
	7842A	110.4	110.4	Current	LLW: Solidified liquid LLW awaiting containment in concrete casks for placement on the tumulus pads
	7856	634.1	634.1	Current	LLW
	7878A	342.5	266.1	Current	LLW
	7886 Freezer	1.5	1.3	Current	LLW
	Bulk Contaminated Soil Storage Facility	8410	0	Funded	CH LLW/MLLW: Contaminated soil
	Class L-III and L-IV Above-ground Storage Facility	651	0	Planned	CH LLW: Class L-III and L-IV. Dry or damp solid.
	Class L-III and L-IV Below-Ground Storage Facility	51	0	Planned	RH LLW/MLLW: Class L-III and L-IV. Dry solid.
	Dry Cask Storage Facility		0	Planned	RH LLW: Very high activity LLW, such as reactor components
	Pad 7841	442	354	Current	CH LLW: Bulk scrap metal, contaminated with mostly uranium and thorium

Table 4-3. (continued).

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
	Scrap Metal Accumulation Area	4,348.4	1,956.2	Current	CH LLW: Bulk scrap metal, contaminated with mostly uranium and thorium
	Solid Waste Storage Area (SWSA) 6 RH LLW Retrievable Storage Area	5	0	Current	RH LLW
	Solid LLW Staging Facility			Planned	Solid LLW/MLLW.
PGDP	C-333	1,160	882	Current	LLW: Large bulk materials, liquids, uranium-contaminated solid wastes
	C-746-B East Warehouse	166	103	Current	LLW/TRU/HLW: Classified and other solid wastes.
	C-745-K	1,900	1,860	Current	LLW: Soil and debris
	C-746-H3	3,115	3,090	Current	LLW/TRU/HLW: Environmental restoration-generated aqueous and solid wastes
PORTS	X-744G Yard Area	~5,000	~5,000	Current	LLW/MLLW: Primarily scrap metal, with some compactible and combustible wastes
	X-744G(U) Hazardous Waste Storage Unit			Current	LLW/MLLW: Primarily spent ion exchange resins contaminated with high levels of Tc-99
	X-3346 Outdoor Pad	8,660	5,550	Current	LLW: Lime sludge and asbestos
	X-747H Metal Storage Yard			Current	LLW: Contaminated scrap metal
WSS	Material Staging Area				LLW
	Temporary Storage Area				LLW
	WSS Remedial Action Program RCRA/TSCA Storage Area				LLW
Y-12	9720-58 PCB Shed	18	18	Current	LLW/MLLW
	9720-9	1	1	Current	LLW/MLLW
	9720-31	16	16	Current	LLW
	9811-1 OD-8 and OD-7	31	31	Current	LLW
	9825-1 and 9825-2 Oxide Vaults	1022	532.2	Current	LLW: Depleted uranium oxide and uranium metal scrap

Table 4-3. (continued).

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
	Above Grade Storage Facility	7131.3	7054.9	Current	LLW: Uranium and thorium contaminated construction/demolition debris, ferrous and nonferrous metals, compactible and combustible rubbish, floor sweepings, sludges, soil, asbestos, and beryllium wastes
	Classified Waste Storage Facility (9720-25S)	170	139	Current	LLW/MLLW: Solid classified; may or may not be contaminated with uranium and/or PCBs
	Containerized Waste Storage Area	111	111	Current	LLW/MLLW/HAZ: Solid, liquid.
	Contaminated Scrap Metal Storage Area (Old Salvage Yard)	4741.9	4741.9	Current	LLW: Bulk scrap metal, contaminated with U-235 and Th-232
	Low-Level Waste Storage Areas, Building 9720-12	311	246	Current	LLW: Bulk contaminated scrap and classified materials
	Low-Level Waste Storage Pad, Building 9720-44	2,720	170	Current	LLW: Contaminated, dewatered sewer sludge
	Outside Low-Level Waste Storage	153	153	Current	LLW: Contaminated wipes, shoe covers, personnel protection clothing, suspect sanitary/industrial waste, and construction debris
	Production Waste Storage Facility		0	Planned	LLW/MLLW/HLW
	Sludge Basin	2717.7	28.3	Current	LLW
			OHIO OPERATIONS		
FEMP	KC-2 Warehouse Bays 1 - 8	760		Current	LLW/HAZ: Solids and liquids.[d]
	Pilot Plant Warehouse (Building 68)	50		Current	LLW/HAZ: Solids and liquids. Primarily solid thorium waste.
	Plant 1 Storage Pad	41,200[e]	10,271	Current	LLW/HAZ: Solids and liquids.
	Plant 1 Thorium Warehouse			Current	
	Plant 1 Warehouse			Current	
	Plant 2/3			Current	
	Plant 5 Warehouse			Current	
	Plant 6 Warehouse (Building 79)	874		Current	LLW/HAZ: Solids and liquids.

Table 4-3. (continued).

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
	Plant 8 Warehouse (Building 80)	527		Current	LLW/HAZ: Solids.
	Plant 9 Warehouse (Building 81)	326		Current	LLW/HAZ: Solids and liquids.
Mound	D&D Warehouse	800		Current	LLW: Soils
	Radioactive/Mixed Waste Storage Building	650.3[a,f]		Current	LLW/MLLW
	Rental Trailers			Current	LLW
	Staging Area (Building 31)	1133.4[a,f]		Current	Tritiated and alpha LLW; TRU waste
WVDP	Lag Storage Extension	4390		Current	CH LLW/MLLW: Solids. Surface exposure <100 mR/hr. Liquids must be immobilized. No gases or pyrophoric waste.
			ROCKY FLATS OPERATIONS		
RF	Centralized Waste Storage Facility	550	0	Planned 1995	LLW: Varied wastes
	Miscellaneous Non-RCRA-permitted locations		4,314	Current	LLW: Varied wastes
			SAN FRANCISCO OPERATIONS		
ETEC	Radioactive Materials Disposal Facility-T022	8153.7	1503.9	Current	LLW: Equipment, rad calibration sources
LBL	HWMF	50	30	Current	LLW/MLLW/TRU/HAZ/TSCA
	Replacement HWMF	37.9	0	Planned	LLW/MLLW/HAZ: Solids and liquids
LLNL	514-1 Container Storage Unit	53	32	Current	CH LLW/MLLW: Damp solids, slurries, and free liquids
	514-2 Container Storage Unit	39	30	Current	CH LLW/MLLW: Damp solids and liquids
	514-3 Container Storage Unit	83	35	Current	CH LLW/MLLW/HAZ: Liquids and solids
	Area 612 Container Storage Unit	45	20	Current	CH LLW/MLLW: Dry solids, damp solids, free liquids, and gases in pressurized containers
	612-1 Container Storage Unit	789	522	Current	CH LLW/MLLW: Dry or damp solids, sludges, slurries, and overpacked containers of early waste of unknown content.

Table 4-3. (continued).

Site	Facility	Total Capacity (m^3)	Current Storage Volume (m^3)	Status	Waste Characteristics
	612-2 Container Storage Unit	40.0		Current	CH LLW/MLLW/HAZ: Dry solids, solids with liquid packages interspersed, damp solids, and free liquids; will not accept compressed gas cylinders, concrete pieces, explosives, furnace brick, immobilized particulates, asbestos, machine/equipment, and leaded glovebox gloves
	612-5 Container Storage Unit	960	960	Current	LLW/MLLW: Dry solids and damp solids; accepts most materials except animal carcasses, explosives, and ion exchange media
	Bldg 513 Container Storage Unit	60		Current	CH LLW/MLLW: Sludges, slurries, free liquids with or without solid objects interspersed; accepts absorbed liquids, uranium machining chips/fines, organic concentrates, precipitated oxides, and mineral oil with depleted U-238 sludge
	Bldg 625 East Container Storage			Current	CH LLW/MLLW/TRU/MTRU: Dry solids; no animal carcasses, compressed gas cylinders, explosives, ion exchange media, or sewer sludge solids
	Container Storage Unit	56.6	14.2	Current	CH LLW/MLLW/TRU/MTRU/HAZ: Dry solids and overpacked containers of early waste of unknown content; accepts most materials except animal carcasses and explosives
	Area 612-4 Receiving, Segregation & Storage Unit	157	75	Current	CH LLW/MLLW/HAZ: Accepts all physical states of waste; accepts all wastes except explosives and fuming acids.
	Bldg 614 Container West Cells Storage Unit	6		Current	CH LLW/MLLW/HAZ: Accepts all physical states of waste; accepts all wastes excepts animal carcasses and explosives
SLAC	Radioactive and Mixed Waste Storage Facility	1680			LLW: Dry solids activated with lead shavings and metals/concrete
	Radioactive Storage Yard	520		Current	LLW: Corrosion products accumulated in resin beds; used resins
			SAVANNAH RIVER OPERATIONS		
SRS	Long-Lived Waste Storage Building	450		Current	LLW: Process water deionizers contaminated with C-14

a. Based on estimated usable storage area x 2 m storage height.
b. RH LLW has a container surface radiation level > 200 mR/hr.
c. CH LLW requires the container surface radiation level to be <200 mR/h, unless further restrictions are stated
d. Bay 2 will not accept free liquids due to the discovery of an abandoned groundwater monitoring well.
e. This capacity includes upgrades in progress.
f. Total area is utilized for the storage of other waste types. This facility is primarily used for staging LLW.

Table 4-4. Solid low-level waste disposal facilities.

Site	Facility	Remaining Capacity (m^3)	Status	Pertinent Waste Acceptance Criteria
			ALBUQUERQUE OPERATIONS	
LANL	TA-54 Material Disposal Area (MDA) G	175,000[a]	Current	LLW: Solid with no free liquids; >1 wt% of <10 micron particles and >15 wt% of <200 micron particles must be immobilized; no pressurized or evacuated containers unless vented; no RCRA wastes; restrictions on radionuclide content exclude TRU and Greater-Than-Class C (GTCC) waste and limit fissile materials and other radionuclides to ensure safe handling; packaging required in 0.6-m^3 plastic-lined cardboard boxes; pit disposal limits waste package to <200 mR/h contact radiation; shaft disposal required for waste package >200 mR/h contact radiation; restrictions on radionuclide only relate to exclusion of TRU and GTCC waste, criticality safety
	TA-67 Mixed Waste Disposal Facility	400,000	Planned	LLW/MLLW: Solid with no free liquids; >1 wt% of <10 micron particles and >15 wt% of <200 micron particles must be immobilized; no pressurized or evacuated containers unless vented; no etiologic agents; <50 ppm PCBs; restrictions on radionuclide only relate to exclusion of TRU and GTCC waste, criticality safety, and safe handling during disposal; LDR restrictions apply unless treated to remove characteristic wastes
			IDAHO OPERATIONS	
INEL	Radioactive Waste Management Complex	38,500	Current	Dry or damp LLW: No unpackaged wastes; no nonradioactive materials; no pressurized containers; no gaseous radioactive materials; no readily accessible classified materials; no chelating or complexing agents; no free liquids; no GTCC waste; <1% pyrophoric radionuclides; no phenolics; <50 ppm PCBs; <10 nCi/g TRU radionuclides; no pathogenic wastes, explosives, toxic gases, vapors, or fumes; pH between 2.0 and 12.5; <15% waste package void volume; acceptable packaging includes various U.S. Department of Transportation (DOT)-approved boxes and drums, INEL wooden boxes, and INEL-specific cask inserts and packages
			NEVADA OPERATIONS	
NTS	Area 3 Radioactive Waste Management Site (RWMS) (U3ahat)	382,000	Closed	CH LLW: <100 nCi/g TRU radionuclides; No RCRA wastes; <0.5% volume free liquid; <1% weight of <10 micrometer particulate; <15% weight of <200 micrometer particulate; no unvented pressurized containers; waste shall be volume reduced/stabilized as practical; no etiologic agents; <1% weight chelating agents; <50 ppm PCBs; no explosives or pyrophorics; <200 mR/h contact radiation; DOE/DOT and NTS-specific packaging requirements apply
	Area 5 RWMS	66,600	Current	Same as Area 3 RWMS
			OAK RIDGE OPERATIONS	
ORNL	SWSA-6	8,100[b]	Current	Class L-II LLW. No explosives or pyrophoric materials. No free liquids; no PCB-contaminated materials; no compressed gases; no RCRA wastes; no chelating agents; <100 nCi/g TRU radionuclides. The exterior must be free from removeable contamination. NRC Class C limits for 55-gal drums and B-25 boxes.
	Class L-II Disposal Facility		Proposed, not funded	Class L-II LLW. Tumulus disposal.

Table 4-4. (continued).

Site	Facility	Remaining Capacity (m^3)	Status	Pertinent Waste Acceptance Criteria
			RICHLAND OPERATIONS	
HANF	200 Area Solid Waste Burial Ground		Current	LLW/MLLW: No liquids; No etiologic agents or infectious wastes; no reactive metals, no chemically incompatible materials in any waste container; no explosives or pyrophorics; no unvented gas cylinders; no chelating agents; no identified, uncharacterized, or poorly characterized waste; <200 mR/h contact radiation for CH waste and <3,000 mR/h at 1 m for RH waste; <1 W/ft^3 thermal power; <15 g U-235 per container fissile limit; <10% package void volume
	Trench 31, 34	21,424[c]	Constructed[c]	MLLW: CH; similar to 218-W-5 but will accept RCRA-regulated wastes
			SAVANNAH RIVER OPERATIONS	
SRS	E-Area Solid Waste Disposal Facility: Engineered Low-Level Trenches; Intermediate-Level Waste Trenches; Greater Confinement Disposal	Near capacity	Current	LLW: No South Carolina-listed (R.61-79.261) or RCRA listed hazardous wastes; no rags or wipes with RCRA F-listed solvent (except F003); <1 vol% free liquid; no gaseous waste; no explosive or pyrophoric materials; no off-gassing tritium; <1 wt% unneutralizing chelating agents; no unneautralized acids or bases; no unreacted alkali metals; no biological, pathogenic, or infectious materials; <10 nCi/g TRU radionuclides; <50 ppm PCBs; no soil with >100 ppm petroleum hydrocarbons; no soil with >10 ppm benzene, toluene, ethyl benzene, or xylene; no waste capable of generating toxic gases, vapors, or fumes; no chemically incompatible materials in any waste package; radiation levels <50 R/h at 1 ft from package; no nitrated organic resins; no GTCC waste; <15% package void volume; <1% weight of <10 micrometer particulate; <15% weight of <200 micrometer particulate; <1 W/ft^3 thermal power; packaged in carbon steel boxes or 55-gal drums
	E-Area Solid Waste Disposal Facility: E-Area Vaults	1,030,000[d]	Current	Same as above.
	Z-Area Saltstone Vaults (Concrete Vaults)	1,190,000[e]	Current	No offsite waste accepted. Must be nonhazardous and meet LDR treatment standards. Waste placed in saltstone grout form, which gels in 30 to 60 minutes and solidifies in 12 to 18 hours.

a. The remaining capacity and retirement date assume expansion of the MDA G disposal facility. Without expansion, the remaining capacity is 13,000 m^3 and the expected retirement date is 1995.
b. Pad 1and 2 are full. Pad 3 at 50% capacity as of November 1995. Pad 4-6 are constructed, not in use. Planned expansion to 12 total pads. Remaining capacity assumes 12 pads.
c. Currently waiting until enough backlog of waste meeting LDR restrictions are accumulated and adequate funding is received.
d. This is for all 40 planned vaults. Only 3 are complete and in operation.
e. This is for all 15 planned vaults. Two exist and one is under construction.

Table 4-5. Mixed low-level waste treatment facilities.

Site	Facility	Type[a]	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
			ALBUQUERQUE OPERATIONS				
GJPO	Mobile Thermal Desorption Process	P	Activated carbon adsorption; Thermal desorption			Planned	CH MLLW/M11e(2): Solids. Organic contaminated soil and debris.
	Mobile Evaporative Oxidation Process	P	Evaporative oxidation; Chemical oxidation	[20 gal/hr]		Planned	CH MLLW: Liquids. Aqueous waste streams containing volatile and semivolatile RCRA contaminants.
	Mobile Treated Waste Evaporation	P	Evaporation/volume reduction	408		Planned	CH MLLW: Liquids. Secondary aqueous wastes from other treatment systems. As such, these wastes will already have been treated, and will only carry an "F" code.
LANL	Mobile Lead Decontamination Trailer	P	Filtration; Surface decontamination; Immobilization	[90,000 kg/yr]		Current	RH and CH MLLW: Solids. Lead bricks to allow recycle.
	Scintillation Vial Crusher	P	Compaction/consolidation; Liquid/solid separation; Repacking; Bulking/blending; Deactivation-Alkali metal treatment, Neutralization			Current	CH MLLW: Solids and liquids. Glass and plastic scintillation vials are mechanically crushed, and the liquids are separated from the solids.
	Hazardous Waste Treatment Facility (HWTF) Mobile Water-Reactive Metals Skid	P	Deactivation-Alkali metal treatment; Deactivation of Ignitables/Corrosives/ Reactives-Reaction with water, Neutralization	[7,000 kg/yr]		Funded	CH MLLW: Solids. Alkaline metals or their hydrides. This will be a portable scale unit.
	HWTF Mobile Chemical Plating Waste Skid	P	Metal removal-Precipitation; Immobilization-Pozzolonic reaction; Deactivation-Cyanide destruction, Neutralization, Acid/base additions; Liquid/solid separation; Bulking/blending	[100,000 kg/yr]		Funded	CH MLLW: Liquids. Heavy metal-contaminated aqueous wastes, and cyanide wastes.
	HWTF Mobile DETOX Skid	P	Destruction-Wet catalytic oxidation; Immobilization; Liquid/solid separation			Funded	CH MLLW: Liquids. Organics.
	Treatment Development Facility (TDF)-LANL Controlled Air Incinerator (CAI)-Solid Feed System	F	Incineration-Controlled Air; Encapsulation/ Macroencapsulation; Vitrification		2,480	Inactive	CH MLLW/LLW/MTRU/TRU: Combustible solids.

Table 4-5. (continued).

Site	Facility	Type*	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	TDF-LANL CAI-Liquid Feed System	F	Incineration-Controlled Air; Encapsulation/ Macroencapsulation; Vitrification; Bulking/blending	966	966	Inactive	CH MLLW/LLW/MTRU/TRU: Combustible liquids.
	HWTF Mobile Gas Scrubbing Skid	P	Removal-Precipitation, Neutralization; Immobilization			Funded	CH MLLW/HAZ: Gases.
	HWTF Mobile Lead Chelation Skid	P	Metal removal-Precipitation, Membrane processes-Ultrafiltration; Chelator extraction; Liquid/solid separation			Funded	CH MLLW: Solids. Lead-contaminated soils.
	HWTF Mobile Hydrothermal Processing Skid	P	Destruction-Supercritical waste oxidation; Immobilization; Liquid/solid separation			Funded	CH MLLW: Solids and liquids. Organic or nitrate-contaminated waste. This is a portable scale unit.
	HWTF Bench-top Mercury Distillation Unit	P	Decontamination-Distillation; Immobilization	0.5		Funded	CH MLLW: Solids. Bulk mercury.
PIN	Mobile Amalgamation Process	B	Amalgamation (of Hg)	0.3		Planned	CH MLLW: Contaminated mercury.
SNLA	Radioactive and Mixed Waste Management Facility	B	Stabilization/immobilization; Neutralization; Compaction/consolidation; Repacking; Screening			Under Construction	CH MLLW: Solids and liquids.
	Packed Bed Reactor/Silent Discharge Plasma	P	Thermal treatment-Packed bed; Organic destruction-Silent discharge plasma			Funded	RH and CH MLLW: Liquids. Organic waste.
	Radionuclide Separation	B	Manual disassembly			Planned	CH MLLW: Solids. Neutron generators.
	Treatability Study: Deactivation	B	Deactivation-Thermal degradation			Current	CH MLLW: Solids.
	Treatability Study: Solidification/Neutralization	B	Stabilization/immobilization; Neutralization			Current	CH MLLW: Liquids. Acids and bases.
			CHICAGO OPERATIONS				
ANLE	Alkali Metal Passivation Booth	F	Reaction with water	100		Inactive	CH MLLW: Alkali metal-contaminated items
	Precipitation/Filtration Unit	D	Filtration; Precipitation	10	2	Current	CH MLLW: Liquid contaminated with hazardous metals.

Table 4-5. (continued).

Site	Facility	Type[a]	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	Wet Oxidation System	D	Oxidation by UV/peroxide chemical process	0.5	0.5	Planned	CH MLLW: Liquid contaminated with organics. This will be a demonstration or pilot-plant scale unit.
	Vitrification	D	Vitrification	1	1	Planned	CH MLLW: Sludges from Precipitation/Filtration unit and retention tank sludges, soils with metals (small volumes only), and glass contaminated with metals and organics.
	Macroencapsulation	D	Macroencapsulation	5	5	Planned	CH MLLW: Combustible debris-type waste with metal contaminants.
	Surface Decontamination Unit	D	Decontamination by CO_2 pellet blasting	5	5	Planned	CH MLLW: Radioactively-contaminated lead.
ANLW	Remote Treatment Facility	F	Melting; Other alkali metals treatment	42.16		Planned	CH and RH MLLW/LLW/MTRU/TRU: Sodium-contaminated radioactive materials.
	Sodium Process Facility	F	Evaporation/drying; Reaction with water	697.7		Under Construction	CH MLLW/HAZ: Bulk metallic sodium, radioactive metallic sodium, and sodium-potassium eutectic waste.
BNL	Elementary Neutralization	B	Neutralization; Acid/base additions			Inactive	CH MLLW: Corrosive liquids.
	Cyanide Destruction Treatability Study	B	Cyanide destruction			Inactive	CH MLLW: Proposed treatability study to treat one small vial of a radioactive sodium cyanide solution.
	Polymeric Encapsulation Treatability Study	B					
			IDAHO OPERATIONS				
INEL	Idaho Chemical Processing Plant (ICPP) HEPA Filter Leaching System	F	Leaching; Solvent extraction	11.33		Construction Complete	CH and RH MLLW/MTRU: Solids. Used HEPA filters.
	ICPP Debris Treatment and Containment (DTC) Decontamination-Water Washing	F	Washing	113.5		Construction Complete	RH and CH MLLW: Solids. Debris.

Table 4-5. (continued).

Site	Facility	Type*	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	ICPP DTC Decontamination-CO_2 Blasting	F	Decontamination-CO_2 pellets	113.5		Planned	RH and CH MLLW: Solids. Debris.
	INEL Waste Treatment Under 40 CFR 262.34 Macroencapsulation	D	Encapsulation/Macroencapsulation			Planned	CH MLLW: Solids. Lead, silver, and cadmium items.
	INEL Waste Treatment Under 40 CFR 262.34 Stabilization-SMC	D	Immobilization-Pozzolonic reaction	4.8		Current	CH MLLW: Solids. Calcined uranyl nitrate hexahydrate. This will be a demonstration or pilot-plant scale unit.
	INEL Waste Treatment Under 40 CFR 262.34 Stabilization-ICPP	D	Immobilization			Inactive	RH MLLW: Solids and liquids. Flocculent solids from the bottom of the CPP-603 Fuel Storage Basin.
	Mixed Waste Storage Facility (MWSF) Open/Blend/Repack	F	Repacking; Sorting; Bulking/blending	1.4		Funded	CH MLLW: Liquids. Pretreatment prior to incineration at WERF.
	MWSF Open/Segregate/Repack	F	Repacking; Sorting; Bulking/blending	67.2		Funded	CH MLLW: Solids. Preparation for incineration at WERF. Segregation to meet waste acceptance criteria for other WROC treatment processes.
	New Waste Calcining Facility	F	Calcination	469.9		Inactive	RH MLLW/LLW/HLW/MTRU: Liquids. Solution containing dissolved metals and fission products.
	Portable Waste Treatment Unit	P	Metal removal-Ion exchange, Filtration; Organic removal-Activated carbon adsorption; Deactivation-Neutralization-Acid/base additions	126		Construction Complete	CH MLLW: Liquids. Treats groundwater and process wastewaters contaminated with low levels of radioisotopes, trichloroethylene, tetrachloroethylene, and heavy metals.
	Test Area North Cask Dismantlement	F	Mechanical removal	11.18		Current	RH and CH MLLW: Solids. Contaminated large metal objects such as storage and transportation casks.
	WERF Stabilization	F	Immobilization-Portland cement	71.4		Current	CH MLLW/LLW/HAZ: Solids and liquids. Primarily WERF incinerator ash and WERF emission control dust, but may also be used to treat other liquid or solid waste.

Table 4-5. (continued).

Site	Facility	Type[a]	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	Waste Reduction Operations Complex (WROC)	D	Encapsulation/Macroencapsulation-Organic polymers	16.8		Funded	CH MLLW/LLW/HAZ: Solids. Nondebris, such as lead.
	WERF Incinerator	F	Incineration-Controlled Air	4,000	1,843	Current	CH MLLW/LLW/HAZ: Solids and liquids. Solid wastes typically contain characteristic or listed hazardous constituents. Liquids are organic or aqueous and are defined as waste that is capable of sustaining a flame in the liquid waste burner chamber.
	WROC Amalgamation	D	Amalgamation (of Hg)	0.4		Funded	CH MLLW/HAZ: Liquids. Radioactively-contaminated mercury.
	WROC Deactivation-Neutralization	D	Deactivation-Neutralization-Acid/base additions	4.2		Funded	CH MLLW/HAZ: Liquids. Pretreatment for wastes destined for WROC stabilization and, in a few cases, for WERF incineration.
	WROC Sizing	F	Size reduction	22.68		Funded	CH MLLW/LLW/HAZ: Solids. Large items so that the materials can fit into other treatment units.
	WROC Hg Retort	D	Mercury separation-Roasting/retorting	14.7		Planned	CH MLLW/HAZ: Solids and liquids. Mercury-contaminated items.
			NEVADA OPERATIONS				
NTS	Liquid Waste Treatment System	F	Evaporation/drying; Adsorption of free liquids; Bulking/blending	8,516 (L) 12 (S)	8,516 (L) 12 (S)	Funded	CH MLLW/LLW: Solids (S), liquids (L), and sludge.
			OAK RIDGE OPERATIONS				
CI	Nitric Acid Oxidation	D	Oxidation; Organic removal; Steam stripping; Thermal desorption			Inactive	CH MLLW/HAZ: Solids and liquids.
	Stabilization	P	Stabilization; Macroencapsulation			Current	CH MLLW/HAZ: Solids and liquids. Portland cement is used for nonorganic aqueous and solid wastes. CORPEX is used for organic and nonaqueous liquid or sludge wastes.
	Low-Temperature Thermal Desorption	P	Thermal desorption			Current	CH MLLW/HAZ: Solids.

Table 4-5. (continued).

Site	Facility	Type[a]	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	Solvent Extraction	D	Solvent extraction			Under Construction	CH MLLW/HAZ: Solids and liquids. To be used for the treatment of one waste stream at Colonie and then dismantled.
	Fenton's Reagent Oxidation	D	Oxidation			Current	CH MLLW/HAZ: Solids and liquids. Used as needed to treat CI CERCLA waste.
DP	Central Neutralization Facility	F	Metal removal (other than Hg)-Filtration, Precipitation; Activated carbon adsorption; Air stripping; Neutralization; Liquid/solid separation	345,380	88,500	Current	CH MLLW/HAZ/LLW: Wastewater treatment facility. Used for treatment of effluent from K-1501 Steam Plant and the TSCA Incinerator.
	TSCA Incinerator	F	Rotary kiln incineration; Liquid/solid separation; size reduction; Bulking/blending	15,716	15,716	Current	CH MLLW/HAZ/TSCA/LLW: Liquids, sludges, and solid PCB and hazardous waste.
	Liquid Pretreatment Facility	F	Oxidation; Reduction; Precipitation; Neutralization; Liquid/solid separation; Bulking/ blending			Planned	CH MLLW/HAZ: Liquids. Will be used to pretreat various liquid aqueous and organic mixed wastes prior to acceptance at other wastewater facilities or the TSCA Incinerator.
ORNL	Melton Valley LLW Immobilization Facility	F	Stabilization/immobilization; pH adjustment	189		Current	RH and CH MLLW/LLW: Liquids. Supernate from storage tanks W-29 and W-30.
	Process Waste Treatment Plant	F	Distillation; Ion exchange; Filtration; Precipitation; Neutralization; Liquid/solid separation	390,000		Current	CH MLLW/LLW: Liquids. Wastewater.
	Liquid LLW Evaporation Facility	F	Evaporation/drying; Vapor filtration; Condensation	18		Current	RH and CH MLLW/LLW: Liquids.
	Nonradiological Wastewater Treatment Plant	F	Filtration; Activated carbon adsorption; Air stripping; Neutralization; Liquid/solid separation	1,509,944		Current	CH MLLW/LLW/HAZ: Liquids. Wastewaters contaminated with organics, particulates, and heavy metals.
PGDP	C-400-D Lime Precipitation Unit	F	Precipitation; Neutralization			Current	CH MLLW/LLW: Solids and liquids. Uranium and heavy metal contaminated.
	Vortec Vitrification Unit	D	Vitrification			Funded	CH MLLW/LLW: Solids.

Table 4-5. (continued).

Site	Facility	Type[a]	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
PORTS	X-624E Groundwater Treatment Facility	F	Filtration; Activated carbon adsorption; Stripping; Neutralization-Acid/base additions	100,000		Current	CH MLLW: Liquids. Contaminated groundwater.
	X-622 Groundwater Treatment Facility	F	Activated carbon adsorption; Mechanical removal; Neutralization	160,000	160,000	Current	CH MLLW: Liquids. Contaminated groundwater.
	X-705 Decontamination Facility: Uranium Recovery System	F	Metal removal-Ion exchange, Filtration, Precipitation; Neutralization-Acid/base additions; Liquid/solid separation	525		Current	CH MLLW: Solids and Liquids. Highly acidic uranium-bearing wastewaters that also contain toxic metals.
	X-705 Decontamination Facility: Microfiltration	F	Metal removal-Filtration, Membrane processes, Precipitation; Neutralization-Acid/base additions; Liquid/solid separation	3,000		Current	CH MLLW: Solids and liquids. Highly acidic uranium-bearing wastewaters that also contain toxic metals.
	X-622T Groundwater Treatment Facility	P	Filtration; Activated carbon adsorption; Neutralization-Acid/base additions	69,700		Current	CH MLLW: Solids and liquids. Contaminated groundwater containing halogenated organics.
	Mixed Waste Treatment Facility	P	Ion exchange; Thermal desorption; Decontamination; Soil washing; Stabilization/Immobilization; Alkali metal treatment-Neutralization			Planned	CH MLLW: Solids and liquids.
YP	Biodenitrification Unit, Building 9818	F	Biodenitrification; Neutralization	2,100		Current	CH MLLW: Nitrate waste.
	Central Pollution Control Facility	F	Metals removal (other than Hg); Filtration; Precipitation; Activated carbon adsorption; Liquid/solid separation	10,260		Current	CH MLLW/LLW/HAZ: Liquids. Oil, grease, metal, and organic contaminated aqueous waste.
	Cyanide Treatment Facility, Building 9201-5N	P	Oxidation; Cyanide destruction; Neutralization	15.14	15.14	Current	CH MLLW/LLW/HAZ: Liquids. Cyanide-bearing wastes.
	Plating Rinsewater Treatment Facility	F	Reduction; Metal removal (other than Hg)-Filtration, Precipitation; Activated carbon adsorption; Cyanide destruction; Neutralization; Liquid/solid separation	30,300		Current	CH MLLW/LLW/HAZ: Solids and liquids. Heavy metal contaminated wastes.

Table 4-5. (continued).

Site	Facility	Type*	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	West End Treatment Facility: Wastewater Treatment	F	Biological denitrification; Biological oxidation; Filtration; Precipitation; Organic removal-Activated carbon adsorption, Air; Deactivation of Ignitables/Corrosives/ Reactives-Neutralization; Liquid/solid separation; Bulking/blending	7,600	2,600	Current	CH MLLW/LLW/HAZ: Liquids. Nitrate-bearing wastes.
			OAKLAND OPERATIONS				
LBL	Bld. 85 Unit MW-6	B	Neutralization; Bulking/blending	39	71	Under Construction	CH MLLW/MTRU: Liquids. Corrosives, flammable combustible liquids, toxics, and highly toxics, and other health hazards as allowed by permit.
	Bld. 85 Unit MW-7	B	Stabilization/immobilization; Bulking/blending	541	541	Under Construction	CH MLLW/LLW/MTRU/TRU: Liquids. Lab packs and/or carboys (from small laboratory containers to a maximum of 5-gallon containers).
	Bld. 75 Unit 131E	B	Stabilization/immobilization-Organic polymers; Bulking/blending	541	541	Current	CH MLLW/LLW/MTRU/TRU: Liquids. Lab packs and/or carboys (from small laboratory containers to a maximum of 5-gallon containers).
	Bld. 75 Unit 131 AFH	B	Neutralization-Acid/base additions; Bulking/blending	49	49	Planned	CH MLLW/MTRU: Liquids. Acidic or caustic mixed liquid wastes.
LLNL	Area 514-1: Cold Vapor Evaporation Unit	P	Evaporation/drying; Neutralization; Bulking/blending	7,495	7,495	Under Construction	CH MLLW/LLW/HAZ: Liquids.
	Building 513 Solidification Unit	D	Stabilization/immobilization; Neutralization	1,347	1,347	Current	CH MLLW/LLW/HAZ: Solids.
	B612 Size Reduction Unit	F	Size reduction	[10^6 kg]	[10^6 kg]	Under Construction	CH MLLW/LLW/HAZ: Large pieces of contaminated equipment.
	Area 514 Waste Water Treatment Tank Farm	F	Reduction; Biological process; Ion exchange; Leaching; Precipitation; Activated carbon adsorption; Liquid/solid separation	7,495	7,495	Current	CH MLLW/LLW/HAZ: Liquids. Contaminated water prior to discharge to the City of Livermore Water Reclamation Plant via the sanitary sewer.

Table 4-5. (continued).

Site	Facility	Type[a]	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	Area 514 Waste Water Filtration Unit	F	Filtration	7,495	7,495	Current	CH MLLW/LLW/HAZ: Liquids. Contaminated water prior to discharge to the City of Livermore Water Reclamation Plant via the sanitary sewer.
	Building 513 Shredding Unit	F	Size reduction	[5,501,000 kg]	[5,501,000 kg]	Current	CH MLLW/LLW/HAZ: Solids. Items such as debris and empty containers.
	Area 514-1: Tank Blending Unit	P	Liquid/solid separation; Bulking/blending	7,495	7,495	Under Construction	CH MLLW/LLW/HAZ: Solids and liquids.
	Area 514-1: Portable Blending Unit	P	Liquid/solid separation; Bulking/blending	7,495	7,495	Under Construction	CH MLLW/LLW/HAZ: Solids and liquids.
	Area 514-1: Carbon Adsorption Unit	P	Activated carbon adsorption; Solvent extraction	7,495	7,495	Under Construction	CH MLLW/LLW/HAZ: Solids and liquids.
	Area 514-1: Centrifugation Unit	P	Liquid/solid separation	7,495	7,495	Under Construction	CH MLLW/LLW/HAZ: Solids and liquids.
	On Site Small-Scale Treatment	B	Alkali metals treatment-Reaction with water; Deactivation of ignitables/corrosives/reactives-Reaction with water	1	1	Planned	CH MLLW/LLW/HAZ: Solids and liquids.
	Treatability Study No. 2-Amalgamation of Mercury	B	Amalgamation (of Hg)	0.1	0.1	Planned	CH MLLW/HAZ: Liquids.
	Treatment Technology Demonstrated-Mixed Waste Mgmt Facility	D	Molten salt	32	16	Planned	CH MLLW/LLW: Solids and liquids.
			OHIO OPERATIONS				
FEMP	FEMP Waste Treatment System (Incineration Proj)		Plug flow activated sludge; Ion exchange; Filtration; Precipitation; Activated carbon adsorption; Deactivation; Clarification; Biodenitrification			Current	CH MLLW: Liquids. Residual uranium-contaminated aqueous characteristic waste originally generated in the uranium processing operations at FEMP.
WVDP	Integrated Radioactive Waste Treatment System	F	Stabilization/immobilization-Pozzolonic reaction	2,305	2,305	Current	RH and CH MLLW/LLW/HLW: Liquids.

Table 4-5. (continued).

Site	Facility	Type*	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
			RICHLAND OPERATIONS				
HANF	Grout Treatment Facility	F	Organic polymers; Pozzolonic reaction; Bulking/blending	15,000	15,000	Inactive	RH and CH MLLW/LLW: Liquids
	242-A Evaporator	F	Evaporation/drying; Ion exchange	50,000	318,000	Current	RH and CH MLLW/MTRU/HLW: Liquids.
	Hanford Waste Vitrification Plant	F	Evaporation/drying; Vitrification; Liquid/solid separation	2,190	2,190	Delayed	RH and CH MLLW/MTRU/HLW: Solids and liquids. High-activity fraction of mixed waste of the type currently stored in the Double-Shell Tank (DST) System.
	200 Area Effluent Treatment Facility	F	Oxidation; Photolysis; Evaporation/drying; Ion exchange; Filtration; Membrane processes-reverse osmosis; Acid/base additions; Liquid/solid separation; Blending/bulking	215,000	72,000	Under Construction	CH MLLW/LLW/HAZ: Liquids. Wastewater
	Waste Receiving and Processing Facility I	F	Stabilization/immobilization; Neutralization; Compaction/ consolidation; Liquid/solid separation; Repacking; Screening	1,870		Under Construction	CH MLLW/LLW/MTRU/TRU: Solids.
	300 Area Waste Acid Treatment System	F	Filtration; Neutralization	12,045	12,045	Inactive	CH MLLW: Solids and liquids: Fuel fabrication operations waste.
	Mixed Waste Treatment Facility (MWTF): Shielded Analytical Lab Waste Treatment Facility	B	Evaporation/drying; Ion exchange; Filtration; Precipitation; Portland cement; Neutralization-Acid/base additions; Liquid/solid separations			Current	RH and CH MLLW/LLW/MTRU/TRU: Solids and liquids. Analytical waste resulting from the analysis of DST and Single-shell Tank core samples.
	MWTF: Hazardous Waste Treatment Unit	B	Oxidation; Reduction; Evaporation/drying; Ion exchange; Filtration; Precipitation; Activated carbon adsorption; Stabilization/ immobilization-Portland cement; Sorption; Alkali metals treatment; Neutralization-Acid/base additions; Acid recycling; Compaction/consolidation; Liquid/solid separation; Screening		[12,000 kg]	Inactive	CH MLLW/LLW/MTRU/TRU: Liquids. Lab scale quantities generated within the Pacific Northwest Laboratory.

Table 4-5. (continued).

Site	Facility	Type[a]	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	Encapsulation at Plutonium/Uranium Extraction (PUREX) Plant	B	Encapsulation/Macroencapsulation			Planned	RH MLLW: Solids.
	Amalgamation at PUREX	B	Amalgamation (of Hg)			Planned	RH MLLW: Liquids.
			ROCKY FLATS OPERATIONS				
RF	Building 774-Aqueous Process Treatment	F	Precipitation; Neutralization-Acid/base additions; Liquid/solid separation	1,819	7,883	Current	CH MLLW/LLW/MTRU/TRU: Liquids. Acidic, caustic, or other radioactive wastes.
	Organic and Sludge Immobilization: Building 774	F	Stabilization/Immobilization-Pozzolonic Reaction	208	341	Current	CH MLLW/LLW/MTRU/TRU: Liquid.
	Fabric Filtration: Building 444, 447	F	Metal removal (other than Hg)-Filtration	15,747	15,747	Current	CH MLLW/LLW: Liquids
	Process Waste Treatment Facility: Building 374	F	Evaporation/drying; Filtration; Precipitation; Stabilization/immobilization; Neutralization; Liquid/solid separation	45,425	149,400	Current	CH MLLW/LLW/MTRU/TRU: Liquids.
	Unit 61 Size Reduction vault: Building 776	F	Decontamination-Washing, Steam cleaning; Immobilization; Repacking; Screening; Size reduction	320,000	320,000	Current	CH MLLW/LLW/MTRU/TRU: Large equipment, glovebox gloves, metals, insulation, filter media, contaminated drums, and HEPA filters.
	Unit 62 Advanced Size Reduction Facility: Building 776	F	Steam cleaning; Repacking; Screening; Size reduction	[10,330,000 kg]	[10,330,000 kg]	Current	CH MLLW/LLW/MTRU/TRU: Plutonium-contaminated gloveboxes and miscellaneous large equipment.
	Unit 74 Supercompaction and Repackaging Facility; Building 776	F	Compaction/consolidation; Screening	218	491.4	Inactive	CH MLLW/LLW/MTRU/TRU: Solids
	Misc. Aqueous Waste Handling and Solidification, Building 774	F		10.4	54	Current	CH MLLW/LLW/MTRU/TRU: Miscellaneous liquid and solid wastes that are incompatible with the process equipment or the liquid waste treatment processes.

Table 4-5. (continued).

Site	Facility	Type*	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	CTMP System 3-LLW Miscellaneous Waste Forms Immobilization	F	Evaporation/drying; Precipitation; Encapsulation/Macroencapsulation; Deactivation of ignitables/ corrosives/ reactives-Neutralization; Liquid/solid separation; Screening; Size reduction	9.5 (L) 457.4 (S)		Funded	CH MLLW: Solids (S), and liquids (L).
	CTMP System 2/4B-LLW Buildings 374/774 Sludge Immobilization	F	Stabilization/immobilization-Pozzolonic Reaction, Encapsulation/Macroencapsulation-Organic polymers, Vitrification; Screening; Size reduction; Bulking/blending	150		Funded	CH MLLW/MTRU: Bypass sludge that does not meet the NTS waste acceptance criteria or Department of Transportation regulations.
	CTMP System 5-LLW Surface Organic Contaminant Removal	F	Chemical oxidation; Mercury separation; Organic removal-Supercritical fluid, Thermal desorption; Washing; Size reduction	13.4 (L) 441.6 (S)		Funded	CH MLLW: Solids (S) and liquids (L). Contaminated with organics.
	Building 910 Evaporators	F	Evaporation/drying			Closed	CH MLLW/LLW: Liquids. Water from the 207 A & B Solar Ponds and/or Interceptor Trench System.
	CTMP System 4A-LLW Building 374/774 Salt Immobilization	F	Stabilization/immobilization-Organic polymers, Portland Cement; Screening	264,000		Closed	CH MLLW: Solids. Waste nitrate salts
	CTMP System 6-LLW Pondcrete Remix	F	Stabilization/immobilization-Pozzolonic Reaction-Lime-fly ash, Portland cement; Size reduction	6,450		Planned	CH MLLW: Solids and liquids. Pondcrete, Saltcrete, and Solar Pond Water.
			SAVANNAH RIVER OPERATIONS				
SRS	M-Area Liquid Effluent Treatment Facility (ETF)	F	Filtration	100,000	100,000	Current	CH MLLW/LLW/HAZ: Liquids. Dilute wastewater effluents form the M-Area nickel plating and aluminum forming operations, including laboratory effluents.

Table 4-5. (continued).

Site	Facility	Type[a]	Treatment Process(es)	Design Capacity (m^3/yr)	Permitted Capacity (m^3/yr)	Status	Acceptable Feedstock and Limitations
	F/H Area ETF	F	Chemical precipitation; Chemical oxidation; Evaporation/drying; Ion exchange; Filtration; Membrane processes-Reverse osmosis; Activated carbon adsorption; Neutralization-Acid/base additions.	328,000	597,000	Current	CH MLLW/LLW/HAZ: Liquids.
	SRL (SRTC) Ion Exchange Treatment Probe-High Activity	F	Reduction; Ion exchange; Neutralization	9,950 (L)	210 (L)	Current	RH MLLW: Liquids (L) and solids. Mercury and heavy metal contaminated wastes.
	SRL (SRTC) Ion Exchange Treatment Probe-Low Activity	F	Reduction; Ion exchange; Neutralization	9,950	1,500	Current	CH MLLW: Liquids. Metal or organic contaminated wastes.
	Consolidated Incineration Facility	F	Thermal treatment-Incineration-Rotary kiln; Aqueous liquid (wastewater) treatment; Stabilization/immobilization-Pozzolonic reaction; Deactivation of ignitables/corrosives/ reactives-Neutralization-Acid/base additions	1,192 (L) 17,850 (S)	1,192 (L) 17,850 (S)	Under Construction	CH MLLW/LLW/HAZ: Solids (S) and liquids (L).
	M-Area Liquid ETF: 313-M/321-M	F	Precipitation	1,800	1,800	Current	CH MLLW: Liquids.
	D-Area Technical Purification Facility	F	Mercury separation-Ion exchange	54		Current	CH MLLW: Liquids. Mercury contaminated waste.

a. Facility types are as follows: "B"=bench-scale; "D"=Demonstration or pilot-plant scale; "P"=Portable scale; "F"=Full-size plant scale

5.0 CONCLUSION

Of the 26 companies identified in revision 1 of document INEL-95/0020, 24 were contacted by telephone to provide updated information. Eleven companies provided responses that were incorporated into this revision. For the other thirteen that did not respond, it was assumed that they were satisfied with the information presented concerning their company. One company, IC Technologies, Inc., could not be reached by telephone or directory assistance and was removed from the report. Another company, Diversified Scientific Service, Inc., was identified as being operated by Chem-Nuclear System, Inc.

In addition to the original 26 companies, 274 companies were identified that could potentially provide one or more of the desired services. After initial contact with their representatives, 100 companies were sent questionnaires to assess their capabilities. Responses were received by 52 vendors, and based on the responses, an additional 24 companies were added to the report.

Based on the companies' responses and supporting literature, it appears as though adequate treatment, storage, disposal, and decontamination capabilities exist for low-level waste. In addition, many companies have the capability and desire to perform treatability studies and/or develop treatment technologies for mixed low-level waste. Although both laundering and alpha-contaminated mixed low-level waste treatment services are not strongly supported by the private sector, many companies stated that the services could be provided, with some license and permit modifications, if there was a large demand for the services.

6.0 REFERENCES

40 CFR §264.4, July 1, 1991, "Exclusions," *Code of Federal Regulations*, Washington, D.C., Office of the National Archives and Records Administration.

59 FR 8362, 1994, "Hazardous Waste Management System: Identification and Listing of Hazardous Waste Treatability Studies Sample Exclusion," *Federal Register* 59 (February 18): pp. 8362-8366.

American Nuclear Society, 1995, *Nuclear News: Buyers Guide for 1995*, Vol. 38/No. 4, pp. 233-274.

Garrison, T. W. and J. D. Mousseau, to K. E. Kooda, 1993, *Private Sector Participation Initiative (PSPI) Private Sector Status Report*, April.

Nuclear Plant Journal: Product & Service Directory-1996 Issue, Vol. 13/No. 6, November-December 1995.

NUREG/CR-5938, 1992, *National Profile on Commercially Generated Low-Level Radioactive Mixed Waste*, U. S. Nuclear Regulatory Commission, December.

Piper, R. B. and J. D. Mousseau, to R. R. Piscitella, 1993, *Private Sector Participation Initiative (PSPI) Letter Report for Private Sector Treatment of Idaho National Engineering Laboratory Flammable Low-level Mixed Waste*, September.

Smith, Miles, et. al., *Review of Private Sector Treatment, Storage, and Disposal Capacity for Radioactive Waste*, Lockheed Idaho Technologies Company, INEL-95/0020, revision 1, January 1995.

Taylor, D. D., *Private Sector Initiative Vendor Forum (1994)*, Lockheed Idaho Technologies Company, INEL Report No. INEL-94/002, October 1994.

APPENDIX A

Vendor Contact Telefax

COVER LETTER

Mr. John Doe
Company X

Dear Mr. Doe:

The U.S. Department of Energy (DOE) Idaho National Engineering Laboratory (INEL), under cooperation with other DOE facilities, seeks to identify private sector companies with the capability to treat, store, or dispose (TSD) of low-level waste (LLW) and/or mixed low-level waste (MLLW) generated at DOE facilities.

The Waste Technology Planning and Projects Department of the Environmental Operations at Lockheed Idaho Technologies Company (LITCO) is conducting a survey to assess the private sector's TSD capabilities and capacities. Qualified and interested companies identified during this survey may be considered and contacted for contractual agreements to handle waste streams generated by DOE sites.

The objective of the survey is to identify facilities in the United States that are licensed by the U.S. Nuclear Regulatory Commission (NRC) or an agreement state, and/or permitted by the U.S. Environmental Protection Agency (EPA) or an authorized state to treat, store, or dispose of LLW and/or MLLW. The survey seeks to define existing and near-term (within the next five years) waste handling capabilities and capacities in the private sector.

The attached questionnaire, which identifies the desired services, is included to assist in minimizing the effort necessary to provide the requested information. A sample vendor profile is also attached to provide additional assistance. LITCO requests that your response to this questionnaire by received via facsimile within two weeks after submittal, with a mail submittal of the questionnaire arriving at a later date. LITCO also requests two copies of company literature, operating history, company brochures, or any other applicable information that describes the company's qualifications. Please do not send any proprietary information. Response within two weeks will ensure inclusion in our report.

Faxes should be sent to Richard Willson at (208)526-2714. Questionnaires and other company literature should be mailed to the following address:

LITCO
c/o Richard Willson
2525 N. Fremont Ave
Idaho Falls, ID 83415-2414

If you have any questions or concerns, feel free to contact me at (208)526-9641. LITCO appreciates your assistance in this matter and hopes that this will lead to a mutually beneficial working relationship.

Sincerely,

Richard Willson
Principal Investigator

LOW-LEVEL WASTE AND MIXED LOW-LEVEL WASTE HANDLING CAPABILITY AND CAPACITY QUESTIONNAIRE

I. Regulatory Licenses and Permits

Please answer the following questions with a 'yes' or 'no.' Attach continuation pages as necessary. The sample vendor profile may provide some assistance.

1. _____ Is your company currently licensed by the Nuclear Regulatory Commission (NRC) or an agreement state to treat, store, or dispose of low-level waste (LLW)? If 'yes' please specify license number, authorizing party (NRC or state), duration of license, and scope or limitations of the license.

2. _____ Is your company currently applying for an NRC or agreement state license to treat, store, or dispose of LLW? If 'yes' please identify the authorizing party, planned date of license inception, duration of license, and scope of the license.

3. _____ Is your company planning to apply for an NRC or agreement state license for LLW within the next five (5) years? If 'yes' please identify the scope of the license, if known.

If the answer to questions 1, 2, and 3 are 'no' skip to Section V.

4. _____ Is your company currently permitted/licensed by the Environmental Protection Agency (EPA)/NRC or authorized state to treat, store, or dispose of mixed low-level waste (MLLW)? If 'yes' please specify license number, authorizing party (NRC or state), duration of license, and scope or limitations of the license.

5. _____ Does your company have an interim status Resource Conservation and Recovery Act (RCRA) permit to treat, store, or dispose of MLLW? If 'yes' please identify the scope of the permit.

6. _____ Is your company planning to apply for a RCRA permit to treat, store, or dispose of MLLW within the next five (5) years? If 'yes' please identify the scope of the permit, if known.

_____

_____

_____

II. Storage and Disposal Capabilities and Capacities

Please indicate with a 'yes' or 'no' if your company conducts the following operations. Attach continuation pages as necessary. For each 'yes' response, estimate the annual capacity (ft^3/yr) and available capacity (ft^3).

1. _____ Storage of LLW? _____

2. _____ Disposal of LLW? _____

3. _____ Storage of MLLW? _____

4. _____ Disposal of MLLW? _____

5. _____ Storage of alpha-contaminated (<100 nCi/g) MLLW? _____

6. _____ Disposal of alpha-contaminated (<100 nCi/g) MLLW? _____

III. Specific Waste Treatment Capabilities and Capacities

Please indicate with a 'yes' or 'no' if your company conducts the following operations. Please attach continuation pages as necessary. For each 'yes' response, estimate the annual capacity (ft^3/yr).

1. _____ Volume reduction of LLW (dry activated/mixed fission product-contaminated wastes including incinerable, compactible, or metal wastes)? If 'yes' please specify the method(s) and annual operating capacity (ft^3/yr). _____

_____

2. _____ Treatment of MLLW? If 'yes' please specify the method(s) and annual operating capacity (ft^3/yr). _____

_____

3. _____ Treatment of alpha-contaminated MLLW? If 'yes' please specify the method(s) and annual operating capacity (ft^3/yr). _____

_____

4. _____ Decontamination of LLW for recycling, reclamation, or reuse? If 'yes' please specify the method(s) and annual operating capacity (ft^3/yr). _____

_____

5. _____ Laundering of radioactively-contaminated laundry and/or respirators? If 'yes' please specify the annual operating capacity (ft^3/yr). _____

_____

IV. Treatability Studies

Please answer the following questions with a 'yes' or 'no'. Please attach continuation pages as necessary.

1. _____ Is your company capable of conducting bench- or pilot-scale treatability studies on MLLW? If 'yes' please describe the treatment technology your company employs.

2. _____ Does your company have the necessary facilities and resources, and is your company interested in developing new treatment methods for LLW and/or MLLW? If 'yes' please provide any pertinent information.

V. Request for Additional Information

1. _____ Do you know of any other companies or facilities that could provide some or all of the services identified? If 'yes' please provide the following information: company name, contact, and telephone number.

2. _____ Has your company ever provided any of the identified services for a U.S. Department of Energy (DOE) site? If 'yes' please provide the site name and site contact.

3. _____ Does your company have any interest in providing services to DOE sites?

4. _____ Would your company be interested in participating in future surveys for additional waste types such as hazardous waste? NOTE: The report generated from the surveys is distributed to all DOE sites for reference.

Please telefax the completed questionnaire as soon as possible to Richard Willson at (208)526-2714. Please mail the questionnaire and two (2) copies of all supporting materials to:

Lockheed Idaho Technologies Company
c/o Richard Willson
2525 N. Fremont Ave.
Idaho Falls, ID 83415-2414

Thank you for your participation.

CONTINUATION PAGE

SAMPLE VENDOR PROFILE

COMPANY X

Rep:	Doe, John	12345 Any Street
Phone:	(208)555-5555	Any City, USA 12345
FAX:	(208)555-5555	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
  Mixed Low-Level Waste Treatment, Storage, or Disposal
  Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- X Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
  Mixed Low-Level Waste Treatment Technology Development

Overview:

Company X, a subsidiary of Company Y, provides decontamination, volume reduction, waste minimization, and packaging services. Company X has permits or licenses in the States of California, Washington, and Nevada. Company X operates a licensed volume reduction and supercompaction facility.

Current Capabilities:

Company X has the resources to provide decontamination and decommissioning, volume reduction, supercompaction, site remediation, packaging, and container fabrication services. Decontamination techniques include grit blasting, plasma arc, mechanical descaling, electropolishing, and high pressure water blasting. Company X can provide both onsite and mobile decontamination unit services.

Future Capabilities:

Company X is interested in developing new decontamination and thermal treatment methods. Company X has also applied for an NRC Broad Scope Type A license to use by-product material.

Permits and Licenses:

California Radioactive Materials License No. XXXX-XX, expires October 1999.
U.S. EPA Transporter No. XXXXX-XX
NRC License No. XX-XXXXX, for receipt, possession, storage, and repackaging of dry low-specific activity waste materials.

APPENDIX B

Vendor Profiles

ADCO SERVICES, INC.

Rep.:	Lizzo, Tony	PO Box 1129
Phone:	(800) 282-2326	Tinley Park, IL 60477-1129
FAX:	(708) 429-9759	

Services Provided:

X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
Mixed Low-Level Waste Treatment, Storage, or Disposal
Alpha-Contaminated Mixed Low-Level Waste Treatment
Low-Level Waste Decontamination/Recycling
Laundering of Rad-Contaminated Laundry and/or Respirators
Mixed Low-Level Waste Treatability Studies
Mixed Low-Level Waste Treatment Technology Development

Overview:

ADCO can provide for storage and volume reduction of LLW. No other information was provided.

Current Capabilities:

ADCO currently has the capacity to store approximately 113 m^3 (4,000 ft^3) of LLW. In addition, ADCO can volume reduce LLW with ram flat compactor. No other information was provided.

Future Capabilities:

No information was provided concerning ADCO's future capabilities.

Permits and Licenses:

- State of Illinois No. IL-01347-01
- U.S. Nuclear Regulatory Commission (NRC) License No. 12-11286-01

ADTECHS CORPORATION

Rep.:	Day, Ed	2411 Dulles Corner Park
Phone:	(703) 713-9000	Suite 520
FAX:	(703) 713-9101	Herndon, VA 22071

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
X	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

ADTECHS Corporation is a multi-disciplined engineering and project organization specializing in technology application, proof-of-process, and process design for the parent company, JGC Corporation. ADTECHS designs, processes, constructs, and operates waste processing facilities. The company's current technologies and continued research and development (R&D) efforts in the United States and at the JGC Oarai R&D Center in Japan provides clients with the best demonstrated available technologies.

Current Capabilities:

ADTECHS current capabilities include the following:

- Volume reduction of wastes
- Solidification/stabilization
- Ground water treatment
- Heavy metal separation from aqueous solutions and soils
- Organic adsorption
- Dissolved solids separation
- Uranium separation.

Future Capabilities:

No information was provided concerning the future capabilities of the ADTECHS Corporation.

Permits and Licenses:

None.

ADVANCED RECOVERY SYSTEMS, INC.

Rep.:	Schutt, Steve	3945 Holcomb Bridge Rd.
Phone:	(770) 447-6956	Suite 202
FAX:	(770) 662-8415	Atlanta, GA 30092

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- X Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- Mixed Low-Level Waste Treatment Technology Development

Overview:

Advanced Recovery Systems, Inc., (ARS) formerly Ekotek and a subsidiary of Nuclear Fuel Services Technologies, Inc., has resources and staff to perform treatability studies, bench- and pilot-scale studies, design of systems, and onsite support for LLW and mixed LLW activities. ARS has a Radioactive Material License issued by the State of Tennessee. ARS has patented processes to treat a variety of hazardous and mixed wastes. These processes are as follows:

- DeCaF-Recovery of fluorine and metal from radioactive wastes
- DeHg-Mercury treatment process
- DeAct-Soil washing to extract actinide contamination
- DeCl-Recovery of rare earths and scandium from process residues
- TherMag-Recovery of fluorine, magnesium, and uranium from refractive waste

Current Capabilities:

ARS maintains a treatability laboratory in Erwin, TN and can conduct hazardous and mixed waste treatability studies to develop process flow diagrams and mass and energy balances. Pilot-scale studies can be conducted to test extraction process effectiveness and full-scale plants can be designed based on the derived data from pilot studies. ARS provides consulting services in recovery evaluation of radionuclides, precious metals, and rare earth metals from a variety of waste forms.

Future Capabilities:

ARS continues to develop and apply their current technologies while evaluating and developing complementary technologies for growth within the federal and commercial marketplace.

Permits and Licenses:

- Tennessee Radioactive Materials License No. R-86008-P97, expires April 30, 1997
- NRC mobile Radioactive Materials License No. 41-25193-01, expires April 30, 1997
- Under treatability exemption, can accept 1,000 kg (2,200 lb) of mixed/hazardous waste for treatability studies

AFFTREX, LTD.

Rep.:	Button, Douglas	395 West Highway 39
Phone:	(208) 785-7470	Blackfoot, ID 83221
FAX:	(208) 785-6308	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- X Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Since 1981 Afftrex has been providing scientific, engineering, environmental, and technical radioactive decontamination and mixed waste services to clients such as the Bettis Atomic Power Laboratory, Grand Junction Project Office, K-25, Naval Reactors Facility at the Idaho National Engineering Laboratory (INEL), Knolls Atomic Power Laboratory, Los Alamos National Laboratory, and Sandia National Laboratories, and the Uranium Mill Tailings Remedial Action Program.

Current Capabilities:

Volume Reduction: Afftrex applies the processes of segregation, sizing, destructive and nondestructive disassembly for improved survey accessibility, and decontamination by mechanical and nonhazardous chemicals.

LLW Decontamination/Recycling: Afftrex offers decontamination services for projects ranging from localized "hot spots" to an entire site. The primary methods the company uses are broadly classed as mechanical and chemical. Included is grinding, sanding, machining, chemical (alcohol and water) wiping, and strippable paints.

Treatability Studies: Afftrex is willing to conduct bench- or pilot-scale treatability studies of mixed LLW. The company is knowledgeable of analytical requirements and is familiar with testing procedures. Afftrex has the facilities and resources and is interested in developing new treatment methods for LLW and mixed LLW at its facilities in Clairton, Pennsylvania, and Blackfoot, Idaho. Afftrex is interested in establishing a fixed base for R&D processes or commercial activities at its facility in Blackfoot, Idaho.

Laundry Services: The company owns and operates a NRC-licensed laundry facility that is capable of laundering protective clothing and other items contaminated with radioactivity and/or asbestos. The company uses a water and detergent process to perform the decontamination. Afftrex designed the systems and modified commercial washing machines for ease in decontamination.

Future Capabilities:

Afftrex has applied for an NRC Broad Scope Type A License to use by-product material at its Blackfoot, Idaho, facility. Other radiological activities may be added to the above license by addendum or addition as the need arises. Afftrex is interested in establishing a fixed-base operation at its new Blackfoot, Idaho, facility to perform such activities as treatment/segregation of lead blankets, treatment of radioactive NAK, and supercompacting, segregation, sizing, and decontamination of LLW. Also, Afftrex has applied for an NRC license to perform leak testing of sealed sources and instrument calibration at its facility in Clairton, Pennsylvania.

Permits and Licenses:

- Materials License No. 37-28329-01, issued by the Nuclear Regulatory Commission, expires July 31, 1999, for the collection, laundering, and decontamination of contaminated clothing and other launderable nonapparel items

- Asbestos Abatement Contractor License No. ACAL-94-9045, issued by the Allegheny County Health Department Bureau of Air Pollution Control

ALARON CORPORATION

Rep.:	Taylor, James	Park Place, Suite 500
Phone:	(803) 791-9900	440 Knox Abbot Drive
FAX:	(803) 791-9911	Casey, SC 29033

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

ALARON Corporation is an environmental remediation service provider specializing in LLW processing. ALARON has an NRC-licensed facility offering metals decontamination and recycling, metal melt and beneficial reuse, and general metal consolidation services. ALARON's facility is located outside of Pittsburgh, Pennsylvania. In addition to facility operations, ALARON offers decontamination and decommissioning (D&D) services at remote sites through our field services division managed in Columbia, South Carolina.

Current Capabilities:

ALARON's facility offers the following state-of-the-art processes and services:

- Patented "DECOHA" chemical decontamination process (stainless steel, carbon steel, lead, aluminum, etc.)
- High throughput continuous flow steel descaler (structural steel components)
- Various abrasive and nonabrasive mechanical decontamination systems
- Metal melt and beneficial reuse services (teamed with Nuclear Metals, Inc.)
- Fabrication of RAM-LOC™ Shielding utilizing the generator's contaminated metals
- Decontamination and recycling services for contaminated pumps, motors, etc.

ALARON's facility offers standard volume reduction and consolidation services for LLW generated in the nuclear industry. ALARON's field services division has concentrated its efforts on the D&D of reactors and nuclear process facilities. ALARON provides segmentation and volume reduction services for highly irradiated reactor internals, decontamination and removal of process systems and equipment, and radiological "free-release" surveys. Additional services include tank desludging, tank cleaning, spent fuel pool consolidation services, waste volume reduction and packaging services, and waste brokering services.

Future Capabilities:

ALARON is interested in using its laboratory and application test facilities to develop new treatment methods for LLW and mixed LLW.

Permits and Licenses:

- Radioactive Material License No. 37-20826-01, issued by the Nuclear Regulatory Commission, for possession, storage, maintenance, repair, and decontamination of contaminated equipment and materials at ALARON's facility and other temporary job sites of the licensee where the NRC maintains jurisdiction. Has expired but an application for renewal has been deemed timely filed, thus the license will not expire until final action has been taken by the NRC

- Radioactive Material License No. 37-20826-02, issued by the Nuclear Regulatory Commission, for receipt, possession, storage, and repackaging dry low-specific activity waste materials as defined in 49 CFR Part 173.403(n) at ALARON's facility. Has expired but an application for renewal has been deemed timely filed, thus the license will not expire until final action has been taken by the NRC

- Department of Environmental Resources, Commonwealth of Pennsylvania License No. PA-0678, for possession, storage, repair, and decontamination of equipment and components that are contaminated with naturally-occurring, or accelerator-produced radioactive material with atomic numbers 1 through 96, inclusive

ALLIED TECHNOLOGY GROUP, INC.

Rep.:	Su, Eric	47375 Fremont Blvd.
Phone:	(510) 490-3008	Fremont, CA 94538
FAX:	(510) 651-3731	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal (Application submitted January 96)
- X Alpha-Contaminated Mixed Low-Level Waste Treatment (Application submitted January 96)
- X Low-Level Waste Decontamination/Recycling
  Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Allied Technology Group, Inc., (ATG) and subsidiary Allied Ecology Services, Inc. provide full service capability for waste management, environmental restoration (ER) and D&D programs. The company also specializes in technology development, nationwide waste transportation and brokerage, mercury lamp recycling, mixed waste treatment, asbestos abatement, underground storage tank management. ATG's 45-acre center in Richland, Washington, employs sorting, decontamination, shredding, supercompaction for volume reduction, waste minimization, storage for decay, green-bag free release, and packaging services to reduce the volume of waste received from the U.S. Department of Energy (DOE), U.S. Department of Defense (DoD), utilities, and industrial/commercial customers. ATG has permits or licenses in the States of California, Washington, and Nevada, and is in the process of applying for a license in the State of South Carolina. ATG has regional offices in Richland, Washington, and Oak Ridge, Tennessee, and project offices throughout the United States. ATG operates a licensed volume reduction and supercompaction facility in Richland, Washington.

Current Capabilities:

ATG has the resources to provide D&D, volume reduction, supercompaction, site remediation, packaging, and container fabrication services. Decontamination techniques include grit blasting, plasma arc, mechanical descaling, electropolishing, Freon cleaning, and high-pressure water blasting. ATG provides both onsite and mobile decontamination unit services.

Future Capabilities:

ATG is planning to expand its services to include mixed LLW waste. A Resource Conservation and Recovery Act (RCRA) Part B Permit application has been submitted to the Washington Department of Ecology in January 1996 to support the development of a Mixed Waste Facility at Richland, Washington, which will treat and stabilize mixed LLW for safe and permanent disposal. Once the State of South Carolina issues a license to ATG, the company will be able to offer coast-to-coast LLW and mixed LLW service.

Permits and Licenses:

- Radioactive Materials License No. 2873-60, issued by the State of California, expires May 1997, allows for storage
- License No. WN-I0393-I, issued by the State of Washington, expires September 30, 1999, allows for treatment and storage
- Transporter License No. CAD-98-248-2317, issued by the U.S. Environmental Protection Agency
- California Hazardous Waste Haulers Permit No. 1410
- Washington State Site Use Permit No. 2242
- Nevada State Site Use Permit No. Q-453
- Applying for State of South Carolina license for treatment and storage

AMERICAN ECOLOGY CORPORATION

Rep.:	Wry, David	109 Flint Road
Phone:	(615) 482-5532	Oak Ridge, TN 37830-7033
FAX:	(615) 482-5605	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
  Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
  Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

The American Ecology Recycle Center, operated by American Ecology Environmental Company, a wholly-owned subsidiary of American Ecology Corporation (AEC), is licensed by the State of Tennessee to sort and process radioactive materials for reuse or disposal. AEC surveys and unconditionally releases materials proven to be below stated limits of release or prepares them for disposal by burial.

Current Capabilities:

AEC sorts radioactive materials into material types to enhance nuclear decontamination and recycling processes. AEC uses abrasive, chemical, electrochemical, and shear stress cleaning decontamination processes to decontaminate radioactively-contaminated materials for recycling. Volume reduction is accomplished through compaction and supercompaction methods. Survey for release is used to determine those decontaminated materials that are below stated limits and can be recycled for reuse and those that must be processed and packaged for burial. AEC is capable of conducting bench-scale or pilot-scale treatability studies under treatability exemptions or specific R&D permits.

Future Capabilities:

AEC has applied for a RCRA permit that will allow the company to perform waste management services for mixed LLW in addition to the services already provided for LLW. AEC is also interested in developing new decontamination and thermal treatment methods.

Permits and Licenses:

- Radioactive Material License No. R-01037-J95, issued by the Tennessee Department of Health and Environment, Division of Radiological Health, expires October 31, 1995

APPLIED HEALTH PHYSICS, INC.

Rep.: Brown, Rich
Phone: (412) 831-9555
FAX: (412) 835-9559

2986 Industrial Boulevard
Bethel Park, PA 15102

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

Applied Health Physics, Inc. (AHP) is a radiation health physics consulting firm that employs 12 full time personnel and maintain, on call, about 50 "Rent-A-Techs™." Their specialized services include professional health physics consulting services, radioactive waste brokerage, specialized safety training, analytical services, and an instrumentation department.

Current Capabilities:

Applied Health Physics is licensed by the NRC for receipt, possession, and storage of pre-packaged wastes for a limit of 180 days. The license limits to 50 Ci/source and 500 Ci total radionuclides with atomic numbers between 3 and 83. As a brokerage firm, AHP can store approximately 60 m^3 (2,100 ft^2) of LLW and dispose of approximately 57 m^3 (2000 ft^3/year) of LLW. Their decontamination activity is limited to utilizing hydrolasing and chemical decontamination on small items at the clients site.

Future Capabilities:

Applied Health Physics states that they have the facilities and resources necessary to develop new treatment methods for mixed LLW, and that they are continually exploring new methods.

Permits and Licenses:

- Radioactive Material License No. 37-14600, issued by the Nuclear Regulatory Commission, expires January 30, 1997
- Radioactive Material License No. Pa-0228, issued by the State of Pennsylvania, expires April 30, 1999

BABCOCK AND WILCOX NUCLEAR ENVIRONMENTAL SERVICES, INC.

Rep.:	Finney, Jim	220 Langhorne Road
Phone:	(804) 948-4600 ext.4725	Lynchburg, VA 24506
FAX:	(804) 948-4801	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
  Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
  Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
  Mixed Low-Level Waste Treatment Technology Development

Overview:

The company services only the waste management needs of the Babcock and Wilcox (B&W) company's Naval Nuclear Fuel Division.

Current Capabilities:

The company provides storage for B&W-generated LLW and mixed LLW. Volume reduction is performed using supercompaction methods. It treats mixed LLW using neutralization, microfiltration, microwave separation, compaction, stabilization/solidification, distillation, and delisting techniques. Recovery of uranium product and scrap materials uses solvent extraction methods. Complete R&D and test laboratories are used to develop new technologies as required by B&W.

B&W does not provide these services to other waste generators. However, B&W is willing to make its experience and knowledge available in support of DOE and DOE contractors in their waste management programs.

Future Capabilities:

B&W has no specific plans to provide services to waste generators outside of the company.

Permits and Licenses:

No information was provided by the company concerning licensing and permitting.

BARTLETT NUCLEAR INC.

Rep.:	DiMascio, Nick	60 Industrial Park Road
Phone:	(800) 225-0385 ext. 267	Plymouth Industrial Park
FAX:	(508) 830-0997	Plymouth, MA 02360

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
  Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- X Laundering of Rad-Contaminated Laundry and/or Respirators
  Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Bartlett Nuclear, Inc., and its sister company Bartlett Services, Inc., provide health physics, decontamination, and decommissioning consultation and services to the commercial nuclear power industry and DOE and DoD facilities. Past health physics and decontamination experience includes providing personnel to 65 pressurized water reactors, 35 boiling water reactor power plants, and over ten DOE facilities and numerous other radioactive material users.

Current Capabilities:

Bartlett can supply any of the services and equipment listed below. In addition, Bartlett is capable of designing and manufacturing specialized equipment for customers' needs.

Volume Reduction:

Mobile Waste Monitor: Bartlett has a Mobile Waste Monitor/Volume Reduction System, which is a self-contained trailer designed to monitor all dry waste leaving a site. The waste monitor will detect 5000 disintegrations per minute (dpm) above background levels assuming uniform distribution per 50-pound bag of waste. This measurement is at the 95 percent probability of detection.

Plasma Arc Metal Cutters: Bartlett provides Thermo Electron Plasma Arc units that will cut stainless steel 4 inches thick to the thickness of light gauge sheet metal.

Decontamination Services:

PlasmaBlast Decontamination System: The Bartlett PlasmaBlast System utilizes a high velocity stream of plastic particles (PlasTek) to decontaminate any surface. The primary benefits of the "PlasTek" particles are that they do not remove or abrade the surface being cleaned and PlasTek is incinerable. Using this system, plant components with critical dimensions and surfaces are easily decontaminated without impacting the integrity of the base material. Bartlett Services can provide mobile tool and equipment decontamination trailers for outage support. Either glass bead or plastic systems, high-pressure water booths, or Ultrasonic tanks can be provided.

BY*PAS Decontamination Chemical: Bartlett has developed a cleaning agent called BY*PAS Decontamination Chemical, which is approved for use at many reactor facilities.

Sonatol Process: Bartlett's Sonatol Process uses an inert organic solvent and a carefully designed surfactant in an ultrasonic bath to remove loose and tightly adhered radioactive particles from surfaces. The Sonatol process also includes real time monitoring of the decontamination activity to optimize the process time for each batch of contaminated objects.

Laundry Services:

Mobile Respirator Decontamination System: Bartlett manufactures a Mobile Respirator Decontamination system, which includes a complete wash line with deep sink, washer, HEPA vacuum, drying oven, and survey area; complete water reprocessing system with a 5-micron particulate filter, activated charcoal, and mixed bed resin system; and a 48-foot trailer with air conditioning, nuclear-grade HEPA system, and HALON 1301 fire suppression system. The system provides automated controls for water temperature, water quality, drying cabinet temperature, water level, and flow rate. In addition Bartlett is a supplier of radiation protection and decontamination personnel. These personnel are experienced with DOE facilities and operations. All personnel qualifications are evaluated under the direction of a Certified Reactor Health Physicist with NRC experience.

Future Capabilities:

Bartlett has the capability to provide a facility for the thermal processing of dry active waste, metal melting, and vitrification of other waste forms including low activity spent resins. The company has expressed interest in the developing of treatment technologies that utilize the Pyrolytic Gasification, Sonatol, or Pyrolytic Arc Melter processes. The Pyrolytic Gasification process is a proprietary, patented technology in which the resultant carbon residue is a stable waste form. The Sonatol process utilizes an inert, nontoxic, nonflammable, nonhazardous solvent substitute that provides higher decontamination factors than the original solvent. The Pyrolytic Arc Melter provides for gasification of combustible materials in a pyrolytic environment, vitrification of combustible residue and noncombustible materials, and simultaneous melting of metal objects.

Permits and Licenses:

Bartlett provides radiological equipment and supplies for use under facility licenses and permits. Bartlett has an NRC license that allows the company to receive, store, and possess their equipment after use at client locations containing low levels of contamination. In addition, Bartlett plans to obtain an Environmental Protection Agency (EPA) permit and another NRC license that will allow them to reduce (gasify), vitrify, and melt various wastes.

BRITISH NUCLEAR FUELS LIMITED, INC.

Rep.:	Dam, A. Scott, P.E.	9302 Lee Highway
Phone:	(703) 385-7100	Suite 950
FAX:	(703) 385-7128	Fairfax, VA 22031-1207

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- Mixed Low-Level Waste Treatability Studies
- Mixed Low-Level Waste Treatment Technology Development

Overview:

British Nuclear Fuels Limited, Inc., (BNFL) implements design, engineering, and operation of facilities that process, treat, and dispose of radioactive and mixed wastes. BNFL and Raytheon Engineers and Constructors, Inc., (Raytheon) are involved in the design, process configuration, and mockup of a radioactive/hazardous waste treatment facility at DOE's Hanford site at Richland, Washington.

Current Capabilities:

BNFL has the resources to provide expertise in the design and engineering of radioactive waste facilities. Specific areas of expertise include waste treatment facility design and engineering for processing, treating, and disposing of radioactive wastes. New waste treatment and disposal technology development for radioactive wastes is ongoing.

Future Capabilities:

BNFL is currently designing, constructing, and operating radioactive and hazardous waste treatment, storage, and disposal operations in England. BNFL manufactures nuclear fuel, reprocesses spent fuel, transports fuel and wastes, decommissions facilities, and provides waste management at five facilities in the United Kingdom. These operations have been in use for several years and meet all government requirements. BNFL has developed the CACITOX soil treatment process for removing heavy metals and radionuclides from soils in-situ. This technology is applicable to U.S. facilities. The teaming with Raytheon includes an expression of interest to transport and treat mixed radioactive/hazardous solid waste at the INEL.

Permits and Licenses:

Licensing and permitting information was not provided in the information from the vendor.

BROWN & ROOT ENVIRONMENTAL
A Division of Halliburton NUS Corporation

Rep.:	Holder, Richard	PO Box 50736
Phone:	(208) 529-1000	Idaho Falls, ID 83401
FAX:	(208) 524-9282	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Low-Level Alpha-Contaminated Mixed Waste
	Low-Level Radioactive Waste Decontamination/Recycling
	Laundering of Radioactively-Contaminated Laundry and/or Respirators
X	Low-Level Mixed Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

Brown & Root Environmental, a Division of Halliburton NUS Corporation, has extensive experience conducting treatability studies, including studies involving mixed LLW, for the DOE. Many of the studies were performed in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements at National Priority List sites, DoD Installation Restoration Program sites, and state-led sites. As such, Brown & Root Environmental is familiar with the scoping requirements for, and the data required at the completion of, treatability studies completed under CERCLA, RCRA, and Toxic Substance Control Act (TSCA). Their laboratory is a full-service analytical laboratory with a self-contained mixed waste treatability study laboratory. The laboratory has a Type B broad scope NRC license and a Radioactive Material License from the Pennsylvania Department of Environmental Resources, as well as numerous certifications and approvals.

Current Capabilities:

Recently, a mixed LLW laboratory has been constructed to support mixed LLW treatment technology development and to facilitate bench-scale efforts. Brown & Root Environmental has the personnel and facilities available to perform treatability studies on nonproprietary technologies including chemical oxidation, chemical reduction, soil washing, chemical precipitation, liquid/solid separation, distillation, dewatering, adsorption, and biological treatment. Recent efforts of Brown & Root Environmental include conducting bench-scale soil washing treatability studies and the development of stabilization "recipes" for solar pond liquids, brines, and sludges.

Future Capabilities:

Brown & Root Environmental is interested in providing additional assistance to DOE by using their own laboratory facilities to conduct bench-scale treatability studies and to develop new treatment technologies for mixed LLW.

Permits and Licenses:

- Class B Broad Scope Materials License No. 37-17937-03, issued by the Nuclear Regulatory Commission, expires August 31, 2000

- Radioactive Material License No. PA-0523, issued by the Pennsylvania Department of Environmental Resources, expires November 30, 2000

CHEM-NUCLEAR SYSTEMS, INC.

Rep.:	Redd, Katie	140 Stoneridge Drive
Phone:	(803)758-1852	Columbia, South Carolina 29210
FAX:	(803)252-9770	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- X Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
  Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Chem-Nuclear Systems, Inc., (CNSI) which includes Diversified Scientific Services, Inc., (DSSI) is dedicated to providing safe and professional management of radioactive waste to the nuclear industry. CNSI operates a disposal facility in Barnwell, South Carolina, and DSSI operates a processing facility in Kingston, Tennessee.

Current Capabilities:

CNSI currently has the capability to perform all desired functions except laundering services. Their South Carolina disposal facility is the only such facility to operate without interruption since commencing in 1971. Their Tennessee facility employs an industrial boiler to thermally treat liquid mixed LLW and radioactive used oil. The facility's RCRA permit allows the Tennessee facility to accept D001, F001-F005 plus numerous "D", "U", "F", and "P" listed and characteristic hazardous wastes. Their Radioactive Materials License allows for the receipt of radioactive material with Atomic Numbers 1-83, radium, thorium, uranium, plutonium, and americium-241. CNSI is licensed by South Carolina to perform small-scale treatability studies, and through WMX Technologies, Inc., CNSI can develop treatment technologies involving vitrification, thermal desorption, molten salt oxidation, stabilization, and wastewater treatment.

Future Capabilities:

In addition to continuing their existing services, CNSI plans to increase the burning capacity of the Tennessee facility to meet future demands; however, there are no plans to increase the level of radionuclides in solvents accepted at this facility.

Permits and Licenses:

<u>DSSI Permits</u>

- Permits issued by the Tennessee Department of Environment & Conservation's Division of Radiological Health
  - Radioactive Material License No. R-73014-K98, expires November 30, 1998

- Radioactive Material License No. R-73014-C98, expires November 30, 1997
- RCRA Part B-Hazardous Waste Permit No. TNHW-024, expires August 14, 1999
- Air Pollution Permit No. 937185F, expired January 1, 1994, in review with State
- EPA Generator No. TW098-210-9142

- National Pollutant Discharge Elimination System Storm Water Runoff Permit No. TNR00321 issued by the Tennessee Department of Conservation, expires September 26, 1997

- Permits issued by the U.S. EPA, Region IV
  - National Emission Standards for Hazardous Air Pollutants Permit, no expiration
  - Boiler and Industrial Furnace Part B Permit, Part A, in interim status

- Small Power Production Facility Permit Docket No. QF-89-280-000, issued by the Federal Energy Regulatory Commission, no expiration date

CNSI Permits

- Radioactive Material License No. 097, issued by the South Carolina Department of Health and Environmental Control (SCDHEC), expires July 31, 2000

- Special Nuclear Material License No. 12-13536-01, issued by the Nuclear Regulatory Commission, expires December 31, 1996

- Radioactive Material License No. 287-02, issued by the SCDHEC, expires April 30, 2000

COGNIS, INC.

Rep.:	Dr. Fristad, William	2331 Circadian Way
Phone:	(707) 575-7155	Santa Rosa, CA 95407
FAX:	(707) 575-7833	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
X	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

COGNIS is a subsidiary of the Henkel Corporation. It is the parent company's research arm in metal separation technology. It is the first company to successfully put a soil washing/soil leaching mobile plant in the field. The company specializes in metals removal and recovery, removal of organic and mineral acids, resource management, wastewater treatment, mine detoxification, and analytical services.

Current Capabilities:

The company has developed and successfully employed a transportable soil treatment plant for heavy metals. It has the capability to treat excavated soil, return it onsite, and recycle the recovered metals. The company is currently applying its expertise in heavy metal recovery to LLW and/or mixed LLW treatment.

Future Capabilities:

COGNIS' future capabilities are unknown at this time.

Permits and Licenses:

The company is fully permitted to handle RCRA and other heavy metal wastes. The company also has a Radioactive Material License from the State of California Department of Health Services to receive, use, possess, transfer, or dispose of thorium and uranium-contaminated soil and small quantities of specific radionuclides used for labeling and as tracers in chemical and biological studies. License has expired but an application for renewal has been deemed timely filed, thus the license will not expire until final action has been taken by the State of California.

DIVERSIFIED TECHNOLOGIES SERVICES, INC.

Rep.:	Brunsell, Dennis	Westbridge Business Park
Phone:	(423) 539-9000	2860 Westcott Blvd.
FAX:	(423) 539-9001	Knoxville, TN 37931

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- X Alpha-Contaminated Mixed Low-Level Waste Treatment
- Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- Mixed Low-Level Waste Treatment Technology Development

Overview:

Diversified Technologies (DT) is involved in filtration, demineralization, reverse osmosis, volume reduction, dewatering and drying, and polymer and vitrification solidification activities. DT provides onsite support to customers for waste cleanup activities.

Current Capabilities:

DT can currently conduct treatability studies and solidify wastes using thermosetting polymers. DT has commercialized the use of reverse osmosis processes for volume reduction applications.

Future Capabilities:

DT has a Mobile Treatment Unit for sludge dewatering, drying, volume reduction and polymer solidification for treating 1,000 lbs/hr of solids. DT offers the use of thermosetting polymers for in-situ solidification of wastes and reverse osmosis processes for volume reduction of liquid wastes. DT will offer onsite waste treatment using self-contained, skid-mounted equipment.

Permits and Licenses:

DT has applied for NRC and RCRA licenses to perform treatability studies on LLW and mixed LLW. All D- and F- listed wastes are accepted upon prior approval.

DUKE ENGINEERING AND SERVICES, INC.

Rep.:	Trew, Lucinda	230 South Tryon Street
Phone:	(704) 382-3430	P.O. Box 1004
FAX:	(704) 382-8389	Charlotte, NC 28201-1004

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
	Mixed Low-Level Waste Treatment Technology Development

Overview:

Duke Engineering and Services, Inc., did not provide any information describing an overview of the company.

Current Capabilities:

All current LLW and mixed LLW activities are in support of Duke Power company-generated wastes. License restrictions allow only Duke Power company-generated wastes to be processed or studied.

Future Capabilities:

The company is interested in performing treatability studies for outside customers in the future when licensing becomes available.

Permits and Licenses:

Licenses are for Duke Power company-generated materials only.

EASTERN TECHNOLOGIES, INC.

Rep.:	Fellows, Mark	P.O. Box 409
Phone:	(334) 899-4351	Ashford, AL 36312
FAX:	(334) 899-2310	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
X	Laundering of Rad-Contaminated Laundry and/or Respirators
	Mixed Low-Level Waste Treatability Studies
	Mixed Low-Level Waste Treatment Technology Development

Overview:

Eastern Technologies, Inc., (ETI) has been providing radiological laundry services to the nuclear industry since 1987. ETI operates a licensed offsite facility and provides mobile water wash laundry systems.

Current Capabilities:

ETI presently operates a laundering facility for radioactively-contaminated clothing and respirators in Ashford, Alabama. An aqueous-borne ozone cleaning system is used for cleaning protective clothing, modesty garments, and other launderable items (i.e., bath towels, mop heads, decontamination towels). ETI maintains separate equipment to process contaminated and noncontaminated items to ensure that cross contamination does not occur. In addition to the Alabama facility, ETI provides mobile onsite water wash services. The mobile facility also utilizes the aqueous-borne ozone cleaning system. Two sizes of mobile units are available, rated at 1,400 and 2,400 sets per twenty-four hours. Services available with the mobile units include water wash processing of protective clothing, monitoring of processed clothing, repair of protective clothing, and cleaning and drying of respirators and related equipment (approximately 400 units per twenty-four hours). ETI's mobile system is comprised of three trailers. All laundry is monitored by an Automated Radioactive Laundry Monitor. The monitor utilizes upper and lower overlapping high efficiency (<7000 dpm for most isotopes) gas flow proportional detectors to survey protective clothing items on all sides simultaneously.

Future Capabilities:

No information was provided concerning Eastern Technologies future capabilities.

Permits and Licenses:

- Radioactive Material License No. 947, issued by the State of Alabama

ECOLOGY AND ENVIRONMENT, INC.

Rep.:	Peel, Robert C.	950 Energy Dr.
Phone:	(208)522-8133	Idaho Falls, ID 83401
FAX:	(208)522-8473	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

Ecology and Environment, Inc., (E&E) is an internationally recognized leader in environmental management specializing in services to industry and the government. E&E's professional skill base covers a large spectrum of over 75 scientific and engineering disciplines.

Current Capabilities:

E&E maintains a state-of-the-art analytical laboratory, the Analytical Services Center (ASC), near Buffalo, New York, which is a fully accredited and equipped environmental laboratory capable of conducting all major empirical and diagnostic tests on air, water, soil, and product samples. E&E also offers the necessary staffing and technical expertise to apply appropriate and innovative technologies in providing solutions to a variety of environmental and waste management issues.

Future Capabilities:

E&E intends to use its experience in the environmental and hazardous waste management industry to pursue additional opportunities for treating, storing, and disposing of hazardous waste. To reach these objectives, E&E will apply for all required licenses or permits to assure that all future waste management activities are properly recognized and sanctioned by the appropriate federal and state agencies.

Permits and Licenses:

E&E's ASC maintains accreditation, registration, certification, or participates in proficiency testing with various agencies of the federal government; national organizations such as the American Industrial Hygiene Association, and the National Institute of Occupational Safety and Health; and with several state government agencies. Authorization to possess radioactive source materials for operation and calibration of instrumentation is issued to E&E by the Texas Department of Health, Bureau of Radiation Control.

ELCHROM INDUSTRIES, INC.

Rep.:	Harvey, Jim	8205 S Cass Ave
Phone:	(800)422-6693	Suite 107
FAX:	(708)963-0381	Darien, IL 60561

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

As an R&D 100 Award recipient, ElChroM Industries, Inc., is renown as a manufacturer/developer of specialized resins/extractants and metals separations technologies.

Current Capabilities:

ElChroM Industries develops specialized resins/extractants for the removal of radioactive and nonradioactive metals from waste streams and processing solutions. The company is currently involved in developing the following:

- Extraction chromatographic resins for the selective separation of radium, cesium, and tritium
- Enhanced analysis and removal capabilities for actinides, strontium, and technetium
- Separation of ultrapure isotopes for radiopharmaceutical applications, and
- Advanced separations products for industrial and environmental applications including ultrapure reagents, hydrometallurgy, and radioactive waste.

Future Capabilities:

ElChroM will continue developing resins/extractrants to serve specialized needs.

Permits and Licenses:

None.

ENVIROCARE OF UTAH, INC.

Rep.:	Rice, Sue	46 West Broadway
Phone:	(801) 532-1330	Suite 240
FAX:	(801) 537-7345	Salt Lake City, UT 84101

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
X	Mixed Low-Level Waste Treatment, Storage, or Disposal
X	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
	Mixed Low-Level Waste Treatment Technology Development

Overview:

Envirocare operates a waste treatment and disposal facility at Clive, Utah. The facility accepts and disposes of LLW, mixed LLW, Naturally-Occurring Radioactive Material (NORM), and 11e.(2) waste material.

Current Capabilities:

Envirocare of Utah, Inc., is licensed to treat and dispose of radioactive and mixed wastes. Envirocare is currently licensed and permitted to disposal of LLW, NORM, 11e.(2) byproduct material, and mixed LLW.

The treatment capabilities of Envirocare include nonthermal stabilization and macroencapsulation. The stabilization process will employ chemical treatments to include waste extract concentrations of hazardous constituents to meet Land Disposal Restrictions (LDR) prior to land disposal. Elemental lead and debris can be macroencapsulated using a polymer extrusion process to meet RCRA treatment method prior to disposal. Envirocare is now fully permitted to perform these treatment processes.

Treatability studies will be done by Envirocare for candidate treatment waste streams. Waste streams with pure liquids are not acceptable for stabilization or disposal; however, mixed LLW requiring treatment that is predominantly solid but does contain some free liquids (<50% free liquids per container) can be treated and disposed at the facility.

Future Capabilities:

Envirocare plans to complement its macroencapsulation process by adding microencapsulation to its treatment capabilities in 1996.

Permits and Licenses:

- Radioactive Material License, UT 2300249, issued by the Utah Division of Radiation Control, expired February 28, 1996, but a renewal application has been submitted

- RCRA Part B Permit, issued by the Utah Division of Solid and Hazardous Waste, expires November 30, 2000

- Hazardous and Solid Waste Amendments Permit, issued by the Environmental Protection Agency Region 8, expires February 14, 1996. After expiration, the scope of this permit will be added to the RCRA Part B Permit

- 11e.(2) License, issued by the Nuclear Regulatory Commission, expires November 30, 2003

ENVIRONMENTAL ALTERNATIVES, INC.

Rep.:	Martin, Randy	564 B Route 9
Phone:	(603)256-6440	P.O. Box 160
FAX:	(603)256-6741	West Chesterfield, NH 03466-0160

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

Environmental Alternatives, Inc., (EAI) is an advanced surface cleaning, decontamination, and waste minimization services company dedicated to providing safe, environmentally acceptable technologies and methods to its customers.

Current Capabilities:

EAI has the equipment and experience to provide nuclear decontamination, decommissioning, volume reduction, site remediation, hazardous waste cleanup, as well as a broad range of industrial cleaning capabilities to offer. EAI's scope of services include design, engineering, fabrication, installation, start-up testing, and operation of advanced technology cleaning and decontamination systems. Decontamination technologies that are provided include CO_2 blast cleaning, multimedia dry abrasive, liquid abrasive, absorbent impregnated media, high-pressure water, scabbling, and most other environmentally acceptable technologies.

Future Capabilities:

As part of an ongoing effort to eliminate hazards in the workplace and improve site remedial cleanup actions, EAI continues to develop advances to their existing technologies and investigate the applicability of new emerging treatment methods and techniques. As these new methods, techniques, and technologies are refined and proven, EAI adds them to their line of services. One of the new methods currently undergoing evaluation is a chemical technology for the extraction of radionuclides, heavy metals, PCBs, and hazardous organics from materials such as metals and concrete.

Permits and Licenses:

EAI currently does not possess a Radioactive Material License or any specific EPA or state permit to store or dispose of LLW or mixed LLW. Since their primary business service is to provide mobile systems at the clients' sites, EAI adopts and complies with the requirements of the customer's license and permit.

FLUID TECH, INC.

Rep.:	Hodin, Larry	4335 W. Tropicana
Phone:	(702) 871-1884	Suite 3
FAX:	(702) 871-3629	Las Vegas, NV 89103

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- X Alpha-Contaminated Mixed Low-Level Waste Treatment
  Low-Level Waste Decontamination/Recycling
  Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Fluid Tech performs treatability studies on LLW and mixed LLW, and solidification/volume reduction of LLW.

Current Capabilities:

Fluid Tech performs treatability studies for solidification of LLW and chemical stabilization of hazardous constituents of mixed LLW. Fluid Tech has a licensed laboratory capable of accepting radioactive and/or hazardous waste. They provide service in determining the most effective recipe for solidification/stabilization of either LLW, hazardous waste, or mixed LLW. Fluid Tech also has drum mixers and larger batch mixers available to solidify/stabilize liquids, sludges, and soils.

Future Capabilities:

Fluid Tech will continue to develop new formulations for solidification/stabilization of LLW and mixed LLW as an ongoing part of the company business.

Permits and Licenses:

- Radioactive Material License No. 03-11-0339-01, issued by the Nevada State Health Division, expires February 28, 1998, for laboratory
- Radioactive Material License No. 03-11-0369-01, issued by the Nevada State Health Division, expires September 30, 2000, for volume reduction facility
- All hazardous constituents/EPA Waste Codes are accepted for treatability studies only

FRAMATOME TECHNOLOGIES, INC.

Rep.:	Meyers, Paul	155 Mill Ridge Rd.
Phone:	(804) 832-2826	Lynchburg, VA 24502
FAX:	(804) 832-0622	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
X	Mixed Low-Level Waste Treatment, Storage, or Disposal
X	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

Framatome Technologies Incorporated (FT), a subsidiary of Framatome SA, was formerly the B&W Nuclear Technologies Company. The company has a licensed facility to store, and maintain the company's mobile equipment used to provide the services listed above. The facility has a broad license to accept contaminated equipment for storage and maintenance.

Current Capabilities:

FT currently provides mobile services related to chemical cleaning, decontamination, liquid volume reduction, and general liquid waste processing capabilities in the treatment of LLW and mixed LLW. The company provides onsite services utilizing numerous tanks ranging from 250 to 40,000 gallons, (4) one Megawatt heaters, (2) 2.5 M BTU/HR Cooling Towers and Heat Exchangers, Mobile Chemistry Laboratories, pumps, hoses, valves, solidification equipment, blending equipment, evaporators, and HEPA filtration.

In addition to waste processing capabilities, the company has broad range capabilities from engineering analyses, robotics, cutting, welding, video, nondestructive examination, electroplating, electrosleeving, explosive welding, valve services, and parts distribution.

Future Capabilities:

FT is working with Framatome SA to develop a new system for mobile destruction of organic liquids which will take the liquid to a dry powder with no organic residual. The company is considering using portions of its current fixed facility, which is used for equipment maintenance and storage, for the treatment of LLW or mixed LLW.

Permits and Licenses:

- License No. SNM-1168, issued by the Nuclear Regulatory Commission, covers the facility used for decontamination, maintenance, testing and storage of equipment associated with FT's servicing of nuclear power primary system components.

FRANK W. HAKE ASSOCIATES

Rep.:	Applebaum, Robert B.	1790 Dock St.
Phone:	(901)774-2850	Memphis, TN 38113
FAX:	(901)942-2207	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

No information was provided that presented an overview of Frank W. Hake Associates (FHA).

Current Capabilities:

FHA is NRC-licensed to volume reduce LLW using compaction, and to decontaminate contaminated metals using abrasive blast, chemical bath, hydrolase, tumbling, and ultrasonics. In addition, FHA provides soil processing and survey for release.

Future Capabilities:

No information was provided concerning the future capabilities of FHA.

Permits and Licenses:

FHA is currently licensed by the Nuclear Regulatory Commission. No other information was provided.

GENCORP AEROJET

Rep.:	Pocock, Steven M.	Old Highway 11-East
Phone:	(423) 753-1252	PO Box 399
FAX:	(423) 753-8645	Jonesborough, TN 37659

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- X Laundering of Rad-Contaminated Laundry and/or Respirators
- Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Gencorp Aerojet, and its subsidiaries, has the capacity to perform a wide variety of ER and waste management services including the following:

- Risk assessment/site characterization;
- Licensing;
- Health physics/assessment;
- Decontamination and decommissioning of equipment and buildings;
- Soil, water, and air analysis;
- Waste water treatment;
- Transportation and brokering; and
- Processing and disposal.

Current Capabilities:

Gencorp Aerojet works in a large array of decontamination and restoration areas. Their processing capabilities consist of volume reduction, treatment, repackaging, and recycling through agglomeration, compaction, consolidation, incineration, leaching, mixing, sedimentation, flocculation, solidification, high-pressure water wash, and soft media blasting. The company has the ability to improve radioactive waste forms for the reduction or elimination of disposal requirements via various decontamination methods, including its Advanced Recyclable Media System (ARMS™) technology.

Aerojet Ordnance Tennessee (AOT), a subsidiary of Gencorp Aerojet, operates a fully integrated, depleted uranium research, development, and production facility in Jonesborough, Tennessee. AOT has expertise in chemical and metallurgical testing and analysis; processing, transportation, and disposal of

hazardous waste; environmental risk assessment and remediation; management of wastewater treatment; and health physics in support of all manufacturing and production processes and operations.

Future Capabilities:

Gencorp Aerojet is constantly looking at new technologies to reduce and minimize LLW due to the escalating costs associated with disposal.

Permits and Licenses:

- License No. S-9009-F7, issued by the Tennessee Department of Health & Environment, Division of Radiological Health, expires June 30, 1996, for natural and depleted uranium processing and manufacturing, including waste processing and storage.

- License No. LA-7378-S01, issued by the Louisiana Department of Environmental Quality, Division of Radiation Protection, expires December 31, 1996, for radium-226/228 and daughters products decontamination of tanks/vessels, tubulars/pipes, and land in and offshore of Louisiana.

- License No. T-Tn009-695, issued by the Tennessee Department of Health & Environment, Division of Radiological Health, expires December 31, 1996, allows Aerojet to ship radioactive material (except special nuclear material sufficient to form a critical mass) to a licensed disposal/processing facility within Tennessee.

- License No. 0011-41-96, issued by the South Carolina Department of Health and Environmental Control, Division of Radioactive Waste Management, expires December 31, 1996, allows for the transport of solid uranium in magnesium fluoride and uranium oxide in trash within the state of South Carolina.

GTS DURATEK

Rep.:	Greenman, Bill	8955 Guilford Road
Phone:	(410) 312-5100	Suite 200
FAX:	(301) 621-8211	Columbia, Maryland 21046

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
  Alpha-Contaminated Mixed Low-Level Waste Treatment
  Low-Level Waste Decontamination/Recycling
  Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

GTS Duratek converts waste to a glass form using vitrification. They use the DuraMelter™ technology in two basic vitrification chemistry modes: minimum-additive and additive.

Current Capabilities:

GTS Duratek offers six different DuraMelter™ systems varying in size and capacity. The DuraMelter™ can be used for the vitrification of both LLW and mixed LLW. Currently, the DuraMelter™ system is being used as part of the Minimum Additive Waste Stabilization project at the Fernald Environmental Management Project. GTS is also designing a DuraMelter™ system to process Savannah River Site's M-Area wastes. This system would be the first commercial-scale LLW melter. GTS has successfully demonstrated bench- and pilot-scale studies for groundwater contaminated with mixed LLW using ion exchange technology. GTS also performs environmental consulting and training services.

Future Capabilities:

GTS Duratek has entered into a joint venture called DuraChem™ with CSNI to build and operate a LLW vitrification plant at CNSI's Barnwell, South Carolina, waste management facility. The business is targeted on processing commercial nuclear power plant "wet" wastes such as filter media, ion exchange resins, and wastewater evaporator concentrates in addition to waste from industrial facilities, hospitals, and laboratories. GTS Duratek has expressed interest in developing new technologies for mixed LLW. GTS Duratek is planning to apply for an NRC or agreement state license for LLW within the next five (5) years, but scope of the license was not identified. GTS is also planning to apply for a RCRA permit within the next five (5) years, but again, the scope of the license was not identified.

Permits and Licenses:

GTS Duratek has permitted facilities at the Vitreous State Laboratory (VSL), located on the campus of The Catholic University of America, to perform physical and chemical characterization of LLW and mixed LLW for vitrification and ion exchange. The VSL is fully licensed for radioactive and hazardous materials research.

HAZEN RESEARCH, INC.

Rep.:	Downey, Jerry	4601 Indiana Street
Phone:	(303) 279-4501	Golden, CO 80403
FAX:	(303) 278-1528	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

Hazen is a consulting and research company providing R&D services to a wide range of customers in the mining, water treatment, and waste management industries.

Current Capabilities:

Hazen is authorized by the Colorado Department of Health to conduct treatability studies on samples of listed and characteristic hazardous wastes. Hazen can perform treatability tests on radioactive materials, as they possess a license from the State of Colorado to transfer, receive, possess, and use certain radioactive materials. The conditions of the license are quite specific, but with adequate lead time, their license can be modified to accommodate most project-specific requirements. Hazen is also approved by the EPA to conduct R&D into polychlorinated biphenyl (PCB) disposal.

Future Capabilities:

No information was provided concerning Hazen's future capabilities.

Permits and Licenses:

- Colorado Department of Public Health and Environment (CDPHE), Radioactive Materials License No. 77-02, expired September 30, 1999
  - Radionuclides accepted and associated license limits: Any radionuclide with atomic number 1 through 96. The maximum quantity that Hazen may posses at one time for treatability studies is limited to 10 microcuries. The license can be amended on a project-specific basis.
- EPA letter of approval dated June 14, 1995, to perform research on various TSCA materials, including PCB-contaminated materials, expires June 23, 1996
- Hazen is authorized by the CDPHE to conduct treatability studies on samples of RCRA wastes that are listed and/or characteristic hazardous wastes at their site of origin. Such studies are permitted under the condition of Colorado regulations 1007-3 CCR (e) and (f)

governing treatability studies. Under certain restrictions, Hazen can accept all EPA waste codes. P-listed wastes are subject to a one-kilogram lifetime restriction. For other waste codes, Hazen can accept and study up to 10,000 kg of contaminated soil or up to 1,000 kg of pure waste. For projects requiring quantities of waste in excess of the treatability study exclusion, Hazen can obtain a Research, Development, and Demonstration permit from CDPHE.

IDM ENVIRONMENTAL CORPORATION

Rep.:	Capote, Jose	PO Box 388
Phone:	(908)390-9550	396 Whitehead Ave.
FAX:	(908)390-9545	South River, NJ 08882

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
	Mixed Low-Level Waste Treatability Studies
	Mixed Low-Level Waste Treatment Technology Development

Overview:

IDM Environmental Corporation (IDM) is a full-service contractor specializing in the performance of "hands-on" environmental remediation, plant decommissioning, and relocation/re-erection of process plants.

Current Capabilities:

IDM's services encompass each of the principal disciplines within the environmental remediation field, including plant dismantling and decommissioning, hazardous waste remediation, radiological remediation, and toxic substances abatement. IDM has completed thousands of remediation and decommissioning projects utilizing a project management approach that integrates all phases of the project as well as integrating all the diverse clean-up activities, including asbestos abatement, radiological decontamination, hazardous waste remediation, waste treatment, packaging, and disposal.

Future Capabilities:

No information was provided concerning IDM's future capabilities.

Permits and Licenses:

No information was provided concerning IDM's permits and/or licenses.

INET CORPORATION

Rep.:	Miller, Herman	8450 Central Avenue
Phone:	(510) 797-9600	Newark, CA 94560
FAX:	(510) 794-7066	

Services Provided:

X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
Mixed Low-Level Waste Treatment, Storage, or Disposal
Alpha-Contaminated Mixed Low-Level Waste Treatment
Low-Level Waste Decontamination/Recycling
Laundering of Rad-Contaminated Laundry and/or Respirators
Mixed Low-Level Waste Treatability Studies
Mixed Low-Level Waste Treatment Technology Development

Overview:

INET Corporation has been in business since 1985 and provides radioactive waste management and volume reduction equipment for LLW. To date, INET has contracted for seven Superpack® systems. Their most recent Superpack® was set in place at the Department of Energy Hanford Site Waste Receiving and Processing Facility. INET Corporation also provides condition monitor and control equipment.

Current Capabilities:

INET Corporation has the resources to provide volume reduction services and equipment. INET can provide both onsite and mobile reduction unit services. INET's supercompactor, the Superpack®, is a fourth generation, hydraulically-operated supercompactor, with the highest commercially available ram force of 2,200 tons. The Superpack® is available in both fixed-base and trailer-mounted models.

INET's control and drum handling experience includes the Programmable Logic Control for Superpack®, plus ten years of experience with the IMS® Intelligent Monitor and Control System.

Future Capabilities:

INET's experience extends through design, fabrication, operation, maintenance and service.

Permits and Licenses:

None.

INTERNATIONAL TECHNOLOGY CORPORATION

Rep.:	Alperin, Ed	312 Directors Drive
Phone:	(423) 690-3211	Knoxville, TN 37923
FAX:	(423) 694-9573	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

The International Technology Corporation (IT) is an environmental management company providing technologically-driven solutions to industrial and government clients. IT's Technology Development Laboratory (TDL) can provide for bench- and pilot-scale evaluation, and technology development of most unit operations used in the treatment of toxic, hazardous, and radiological wastes.

Current Capabilities:

IT's TDL can conduct regulatory-approved treatability study programs for the following technologies:

- Stabilization/Solidification
- Fixation
- Vitrification
- Carbon Adsorption
- Ion Exchange
- Chemical Extraction
- Air Stripping
- Chemical Treatment
- Incineration
- Thermal Desorption
- Soil Washing and Flushing

- Wastewater Treatment
- Photocatalytic Oxidation
- Precipitation
- Solid/Liquid Separation.

TDL's capabilities and experience include the preparation of treatability study work plans, preparation and performance of treatability studies, and preparation of treatability study reports, all in compliance with EPA guidelines. TDL is authorized to perform treatability studies on RCRA wastes under the treatability exemptions of the Tennessee Department of Environment and Conservation, Division of Solid Waste Management. These regulations grant exemptions for treatability studies provided that certain treatment and storage quantities are not exceeded.

Future Capabilities:

The IT Corporation currently does not have the capability to treat or store mixed LLW. However, the company has formed teaming agreements with a number of other companies and will apply for a permit to store and treat LLW and mixed LLW.

Permits and Licenses:

- Radioactive Material License No. R-01060-J95, issued by the Tennessee Department of Health and Environment Division of Radiological Health, expired October 31, 1995, authorized for use in instrument calibration
- Radioactive Material License No. R-47055-D98, issued by the Tennessee Department of Health and Environment Division of Radiological Health, expires April 30, 1998, authorized treatability studies, analytical procedures, calibration, and archive sample storage

INTERSTATE NUCLEAR SERVICES CORPORATION

Rep.:	Crusselle, Vick	295 Parker Street
Phone:	(413) 543-6911	P.O. Box 51957
FAX:	(413) 543-2975	Springfield, MA 01151

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
X	Laundering of Rad-Contaminated Laundry and/or Respirators
	Mixed Low-Level Waste Treatability Studies
	Mixed Low-Level Waste Treatment Technology Development

Overview:

Interstate Nuclear Services Corporation (INS) has been a supplier of radiological laundry and protective clothing programs since 1957. INS services 80 % of the commercial nuclear industry, 100% of the Naval Shipyards and many DOE and private facilities from a network of 14 strategically-located facilities. Protective clothing and equipment sales and leasing is also available through INS. INS currently provides laundry service to the INEL.

Current Capabilities:

Laundry Services: INS presently operates 14 different laundering facilities. The typical wash capacity at INS facilities is approximately 2,000 pounds per hour. The Hanford facility is the largest INS facility, cleaning up to 3,500 pounds per hour. INS facilities provide protective wear decontamination, respirator decontamination, and recertification. Five models of laundry monitors are in use at INS facilities. Each one has been designed for a specific application (low-level contamination monitoring, alpha monitoring, large area monitoring, hot particle monitoring, etc.). INS also provides onsite mobile water wash units capable of processing 350 pounds per hour; respirator cleaning, inspection and recertification; and respirator filter cartridge testing and recertification. All respirator work is performed in compliance with NUREG 0041.

Decontamination of LLW Metals: INS provides onsite mobile metal decontamination units which employ state-of-the-art cleaning methods for metals recovery and waste reduction.

Future Capabilities:

INS has been awarded a long-term contract to provide protective wear laundry and respirator decontamination services to the DOE Savannah River Site (SRS). Services will be provided from a new laundry facility to be built by INS near the SRS, with operation to begin in 1996.

Permits and Licenses:

The Hanford facility in Richland Washington operates under a state Radioactive Material License (Number WN-I0414-1).

MANUFACTURING SCIENCES CORPORATION

Rep.:	Nichols, Frank	8917 NE Etna Road
Phone:	(360)225-6013	Woodland, WA 98674
FAX:	(360)225-6224	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- X Laundering of Rad-Contaminated Laundry and/or Respirators
- Mixed Low-Level Waste Treatability Studies
- Mixed Low-Level Waste Treatment Technology Development

Overview:

Manufacturing Sciences Corporation (MSC) was founded as a technology-based manufacturing company in 1982. In 1984, MSC constructed a manufacturing plant in Oak Ridge, Tennessee, that specializes in the decontamination and recycling of radioactive scrap metal.

Current Capabilities:

MSC capabilities are centered around the reclamation of metals for recycling into the commercial market place. MSC decontaminates equipment and reuse of this equipment is provided either to the customer, external to the used equipment market, or in some cases, used internally by MSC for production capability. MSC manufactures custom products and standard products, like 55- and 85-gallon drums, B-25 boxes and vitrification containers. These products are marked as being recycled from radioactive contaminated steel and are destined for disposal in a disposal site as a container rather than scrap. MSC's facility is equipped with three vacuum induction melting furnaces, a complete radiological laboratory, a complete metallurgical laboratory, and the necessary pre-treatment equipment to safely develop the necessary process steps and/or equipment to develop new technology for metal processing.

Future Capabilities:

MSC is part of a team consisting of BNFL and MK submitting a bid to develop the Advance Mixed Waste Treatment Facility at the INEL. If selected, MSC will be obtaining an EPA permit such that they can expand their services and technologies to include mixed LLW.

Permits and Licenses:

- Radioactive Materials License No. R-01078-L00, issued by the Tennessee Department of Environment and Conservation Division of Radiological Health, expires December 31, 2000, consists of a general license to treat, store, or dispose of LLW.

MAXIM TECHNOLOGIES, INC.

Rep.:	Sumariwalla, Amy	1908 Innerbelt Business Center Dr.
Phone:	(314)426-0888	St. Louis, MO 63114
FAX:	(314)426-4212	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

Maxim Technologies, Inc., (Maxim) is an environmental engineering, science, and chemistry firm that provides a full array of environmental services to both government and commercial clients. The St. Louis office of Maxim has been providing environmental services to DOE facilities for over ten years, primarily in the areas of mixed LLW treatability studies, conceptual designs of remediation systems, and analytical services. In addition, Maxim has performed some geotechnical testing services to their DOE clients.

In addition to holding an NRC Materials license, Maxim completes an annual waste treatability study report to the EPA. This submittal allows Maxim to receive small quantities of hazardous waste for treatability study purposes without having to comply with RCRA permit requirements (conditional exemption).

Current Capabilities:

Maxim has the capabilities to perform bench- and pilot-scale treatability studies on mixed LLW simulating a wide variety of treatment technologies. The in-house analytical laboratory supports treatability activities by conducting performance assessment analyses on simulated technologies. Maxim also has the capabilities to assist in the development and testing of new technologies to treat mixed LLW. Additional capabilities include site characterization studies, feasibility studies, and site remediation designs.

Future Capabilities:

Maxim is interested in assisting in the development of new treatment technologies/methodologies as required in the future. As Maxim acquires new capabilities that may be of interest to the DOE, the information regarding these capabilities will be transmitted to DOE sites for review and consideration.

Permits and Licenses:

- Materials License No. 24-17152-02, issued by the Nuclear Regulatory Commission, expires April 30, 1999, allows for receipt, acquisition, and possession of specific levels of radioactive materials as specified in the license

- Waste Treatability Study Annual Report-1995, submitted to the Environmental Protection Agency, allows Maxim to conditionally perform treatability studies on hazardous waste samples

- Hazardous Waste Generator No. MOD98768191, issued by the Environmental Protection Agency

- Hazardous Waste Generator No. 011869, issued by the State of Missouri

M. J. W. CORPORATION, INC.

Rep.:	Griffen, Jim	338 Harris Hill Road
Phone:	(716) 372-2866	Suite 200
FAX:	(716) 372-1603	Williamsville, NY 14221

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

M.J.W. Corporation, Inc., is capable of providing LLW decontamination. In addition, the company has the necessary facilities and resources to develop new treatment methods for mixed LLW. However, no information was provided by the company that illustrated these capabilities.

Current Capabilities:

M.J.W. Corporation, Inc., specializes in high-volume, low-specific activity equipment decontamination to free release by using solutions and mechanical surface abrasives.

Future Capabilities:

The company is applying for a license amendment to operate a 6,000-ft^2 decontamination facility in June 1996. No other information was provided by the company.

Permits and Licenses:

- Radioactive Material License, issued by the New York State Department of Labor

NON-DESTRUCTIVE CLEANING, INC.

Rep.:	Dufalt, Keith	4944 Cahuenga Blvd.
Phone:	(818) 761-0264	North Hollywood, CA 91601
FAX:	(818) 761-5930	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
	Mixed Low-Level Waste Treatability Studies
	Mixed Low-Level Waste Treatment Technology Development

Overview:

Non-Destructive Cleaning, Inc., (NDC) designs and builds dry ice (CO_2) decontamination systems for sale or lease according to the customers' needs.

Current Capabilities:

NDC's dry ice systems leave no residue and no secondary contamination requiring disposal, such as water or spent grit. The systems are mobile units allowing the user onsite decontamination.

Future Capabilities:

The information provided did not identify future plans of the company.

Permits and Licenses:

No permits or licenses are necessary. The vendor operates under its clients' facility permits and licenses.

NUCLEAR FUEL SERVICES, INC.

Rep: Clark, R.D.
Phone: (423) 743-1706
FAX: (423) 743-0140

1205 Banner Hill Road
Erwin, TN 37650

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
  Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- X Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
  Mixed Low-Level Waste Treatment Technology Development

Overview:

Nuclear Fuel Services, Inc., (NFS) a subsidiary of NFS Services, Ltd., provides advanced technical services and systems to both government and commercial clients. NFS's primary categories of expertise include D&D, environmental remediation, waste treatment and disposition, and processing of special nuclear materials. Radioactive materials expertise includes uranium, plutonium and thorium. D&D services include site decommissioning; decontamination and volume reduction; and waste packaging and disposition of uranium-, plutonium-, or thorium-contaminated systems. Environmental remediation services include sampling, analysis, packaging and transport of waste, and bench- and pilot-scale treatability studies. Waste treatment and disposition capabilities encompass the treatment of nuclear, hazardous and mixed waste, and the treatment of soil, sludge and wastewater. The company also has the capability to process several types of special nuclear materials such as high- and low-enriched uranium and to perform resource and scrap recovery.

Current Capabilities:

The company has a recovery and purification throughput capacity of 2,500 to 5,000 kg U/yr of highly-enriched uranium and up to 50,000 kg U/yr of purified uranyl nitrate. NFS is permitted by the State of Tennessee to accept up to 10,000 kg of mixed waste for treatability testing. The company has development and engineering facilities for researching and evaluating remediation processes for treating LLW and mixed LLW (including uranium, thorium, and plutonium), minimizing waste, and resource recovery. NFS also maintains a 25,000-ft^2 laboratory in Atlanta, Georgia, which has the capability of analyzing hazardous and inorganic materials and performing radiochemical analyses.

Future Capabilities:

NFS is planning to apply for a RCRA permit for a proprietary process to treat mixed LLW within the next five years.

Permits and Licenses:

- Special Nuclear Materials License No. SNM-124, issued by the Nuclear Regulatory Commission
- Radioactive Material License No. S-860001, issued by the State of Tennessee
- Radioactive By-product Material License No. R-860002-S93, issued by the State of Tennessee
- EPA RCRA Permit No. TNHW-066, issued by the State of Tennessee
- Authorized possession and processing of up to 7,000 kg of ^{235}U (fully enriched)
- NRC licensed process for enrichment blend-down of weapons-grade uranium to commercial enrichment

NUCLEAR METALS, INC.

Rep.:	Lehan, Dennis J.	2229 Main Street
Phone:	(508) 369-5410	Concord, MA 01742
FAX:	(508) 369-4045	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- Mixed Low-Level Waste Treatability Studies
- Mixed Low-Level Waste Treatment Technology Development

Overview:

Nuclear Metals, Inc. (NMI) is a treatment company for LLW. NMI uses various LLW volume reduction processes and decontaminates metals for recycle and reuse.

Current Capabilities:

NMI is capable of treating and decontaminating LLW using a variety of processes. NMI developed the Hydromet process, Denver process, ring mill pulverizer chip compaction process, and HEPA filter process to treat LLW. NMI uses a high-pressure water jet technique, as well as other abrasive methods, to decontaminate metals for reuse, recycling, or release. NMI uses processes developed in-house to process and recover LLW.

Future Capabilities:

NMI has installed a metal melting facility at Carolina Metals to melt, cast, and process various metals exhibiting radioactive contamination.

Permits and Licenses:

NMI stated that they were licensed by the NRC or an agreement state to treat or store LLW. No details on the licenses were supplied. NMI is planning to apply for a RCRA permit for their Depleted Uranium Recycle Facility, located at Barnwell, South Carolina.

NUCLEAR SOURCES & SERVICES, INC.

Rep.:	Gallagher, Robert D.	P.O. Box 34042
Phone:	(713) 641-0391	Houston, Texas 77234
FAX:	(713) 641-6153	

Services Provided:

X Low-Level Radioactive Waste Volume Reduction.
X Mixed Low-Level Waste Treatment, and Storage.
X Alpha-Contaminated Mixed Low-Level Waste Treatment
X Low-Level Waste Decontamination/Recycling
Laundering of Rad-Contaminated Laundry and/or Respirators
X Mixed Low-Level Waste Treatability Studies
X Mixed Low-Level Waste Treatment Technology Development

Overview:

Nuclear Sources and Services, Inc., (NSSI) is a hazardous, mixed, and radioactive storage and treatment facility in Houston, Texas. In addition to treatment and storage, NSSI provides decontamination services, radiation safety surveys, sealed source leak testing, instruments and accessories, consulting services, sealed sources, waste disposal, tracer applications, and radionuclides and labeled compounds.

Current Capabilities:

NSSI's authorized treatments are as follows:

- Mercury retort;
- Neutralization, oxidation, reduction, and other chemical reactions or physical processing to render the waste less hazardous or more suitable for offsite disposal or onsite processing;
- Cleaning of cullet or particulate solids, empty drums, and equipment;
- Solidification or stabilization (including amalgamation) in portable equipment;
- Centrifugation, filtration, and ion exchange in portable equipment;
- Chemical and/or mechanical treatment to accomplish separation, settling, or clarification in portable equipment;
- Removal of hazardous constituents by absorption on solid media in portable equipment;
- Consolidation of miscellaneous compatible hazardous waste;
- Shredding of containers for recovery of contents;
- Recovery of waste chemicals and other material for reuse or resale;

- Blending of wastes to form a fuel for use offsite;
- Recycling of solvents; and
- Compactor operation.

Future Capabilities:

NSSI continues to develop new processes for the treatment of hazardous and mixed wastes. NSSI is currently installing equipment to:

- Allow hydrolysis of organometallic compounds and gases and thermally treat released organic vapors,
- Allow treatment of H-3 and C-14 organic wastes and capture H-3 and C-14 for land disposal or reuse, and
- Thermally treat small quantity EPA F code mixed wastes to allow land disposal.

NSSI is interested in providing services to DOE facilities IF NSSI can do so through DOE contractors who can isolate NSSI from the expense and documentation required by the Federal Acquisition Regulations. If such isolation cannot be provided, NSSI is NOT interested in providing such services.

Permits and Licenses:

- Radioactive Material License No. LO-1811, issued by the Texas Department of Health Bureau of Radiation Control, expired April 1995, renewal application has been deemed timely renewed.
- Radioactive Material License No. LO-2991, issued by the Texas Department of Health Bureau of Radiation Control, expires June 1996
- Hazardous Material Permit No. HW-50269, issued by the Texas Natural Resource Conservation Commission, expires October 2000

OCTAGON/POWER SYSTEMS ENERGY SERVICES, INC.

Rep.:	Byrd, Butch	317 S. North Lake Boulevard,
Phone:	(800) 393-0222	Suite I024
FAX:	(407) 834-4559	Altomonte Springs, FL 32701

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
	Low-Level Waste Decontamination/Recycling
X	Laundering of Rad-Contaminated Laundry and/or Respirators
	Mixed Low-Level Waste Treatability Studies
	Mixed Low-Level Waste Treatment Technology Development

Overview:

Octagon/Power Systems Energy Services, Inc., (PSESI) provides mobile wet laundering services for the commercial nuclear industry.

Current Capabilities:

PSESI has developed a complete mobile wet laundry system. The system can be assembled at any location on a temporary or permanent foundation. The system occupies an area of approximately 30 feet by 48 feet and includes facilities for washing, drying, folding, and repair of protective clothing as well as respirator servicing. The facility provides HEPA filtration and water treatment for all process effluents. An optional shipping and receiving shelter can be added to the system to provide a fully-covered laundry facility.

Future Capabilities:

No information was provided concerning PSESI's future capabilities.

Permits and Licenses:

PSESI services are provided under the authority of facility licenses and permits. PSESI does not currently maintain any licensed laundering facilities.

RADIAC RESEARCH CORPORATION

Rep.:	Tekin Jr., John V.	261 Kent Ave.
Phone:	(718) 963-2233	Brooklyn, NY 11211
FAX:	(718) 388-5107	

Services Provided:

X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
Mixed Low-Level Waste Treatment, Storage, or Disposal
Alpha-Contaminated Mixed Low-Level Waste Treatment
Low-Level Waste Decontamination/Recycling
Laundering of Rad-Contaminated Laundry and/or Respirators
Mixed Low-Level Waste Treatability Studies
Mixed Low-Level Waste Treatment Technology Development

Overview:

The Radiac Research Corporation (RRC) can provide storage for LLW. No other information was provided.

Current Capabilities:

RRC is currently licensed to store a maximum of 119 m^3 (4,200 ft^3) of LLW for a duration of one year. No other information was provided.

Future Capabilities:

No information was provided concerning RRC's future capabilities.

Permits and Licenses:

- NRC License No. 31-17528-01
- New York State Department of Labor License No. 1944-1879

RADIATION SERVICE ORGANIZATION, INC.

Rep.:	Smith, Greg	P. O. Box 1526
Phone:	(410) 792-7444	Laurel, Maryland 20725-1526
FAX:	(301) 498-3017	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- Mixed Low-Level Waste Treatability Studies
- Mixed Low-Level Waste Treatment Technology Development

Overview:

Radiation Services Organization, Inc., (RSO) is licensed by the State of Maryland Department of the Environment to provide radioactive waste services including brokerage, short-term storage, and decay-in-storage for radionuclides with half-lives less than 88 days.

Current Capabilities:

RSO currently stores approximately 140 m^3 (5,000 ft^3) annually and has 280 m^3 (10,000 ft^3) available. RSO also provides a brokerage service for disposal of LLW and mixed LLW and is licensed for decay-in-storage, with the waste being returned to the generator.

Future Capabilities:

RSO plans to apply for an NRC license to perform waste packaging at license facilities.

Permits and Licenses:

- Radioactive Material License No. MD-33-021-01, issued by the State of Maryland Department of the Environment, expires April 30, 1998
- Radioactive Material License No. MD-33-021-02, issued by the State of Maryland Department of the Environment, expires April 30, 1998

RUST CLEMSON TECHNICAL CENTER

A Division of RUST International

Rep.:	Wannemacher, Edward E.	100 Technology Drive
Phone:	(803) 646-2413	Anderson, SC 29625-6540
FAX:	(803) 646-5311	

Services Provided:

	Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
X	Mixed Low-Level Waste Treatment, Storage, or Disposal
	Alpha-Contaminated Mixed Low-Level Waste Treatment
X	Low-Level Waste Decontamination/Recycling
	Laundering of Rad-Contaminated Laundry and/or Respirators
X	Mixed Low-Level Waste Treatability Studies
X	Mixed Low-Level Waste Treatment Technology Development

Overview:

RUST Clemson Technical Center is a well-staffed technology center supporting a wide range of R&D activities. Bench-scale studies for waste stabilization and pilot plant demonstration and development are supported using RUST-developed methods as well as industry techniques.

Current Capabilities:

RUST is capable of performing bench- and pilot-scale technology demonstrations on LLW and mixed LLW. A partial list of these technologies include the following:

- VAC*TRAX℠/X*TRAX®-low temperature thermal separation
- Incineration
- CHEM-MATRIX®-numerous proprietary cementitious formulas for stabilization/solidification
- Vitrification
- Dechlorination reagent for PCBs and other chlorinated compounds
- Soils/debris washing
- Chemical extractions and reactions
- Electrolytic migration
- PO*WW*ER®-evaporative/catalytic oxidation
- Biological sequential batch reactors, in situ applications, and aqueous waste treatment.

In addition, RUST operates, with CNSI, the DSSI mixed LLW treatment facility in Oak Ridge, Tennessee, and has an EPA license allowing for liquid mixed LLW thermal destruction at a rate of 700,000 gallons per year. The Clemson Technical Center, which is a 40,000 square foot facility comprised of analytical, bench-scale, and pilot-scale laboratories, is fully authorized by federal and state regulatory agencies to handle hazardous, radioactive, and mixed wastes. It has the complete infrastructure required for developing and demonstrating technologies that can be applied to remediating actual contaminated waste from any agency or industry site.

Future Capabilities:

The information provided did not include information on future plans of the company.

Permits and Licenses:

- NRC licenses for research activities
- RCRA treatability exclusion; South Carolina has adopted new, very generous federal limits
- Several TSCA permits for treatment of PCBs
- Hazardous constituents/EPA Waste Codes accepted: No regulatory limits on which waste codes are accepted. Prior approval by RUST required before shipping. RUST operates under the quantity restraints of the EPA and SCDHEC treatability exclusion regulations and TSCA regulations.
- Radioactive Material License No. 482, issued by the SCDHEC, expires April 30, 1997

SCIENTIFIC ECOLOGY GROUP, INC.

Rep.:	Owens, Colleen	1470 N. Skyline
Phone:	(208) 528-6658	Idaho Falls, ID 83402
FAX:	(208) 528-7819	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- X Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Scientific Ecology Group, Inc., (SEG), a wholly-owned subsidiary of Westinghouse, provides radioactive waste processing and management services. These services include metal processing, volume reduction of various waste forms, liquid disposal, and packaging,

Current Capabilities:

SEG achieves volume reduction of solid and liquid (oil) wastes by incineration. SEG provides supercompaction services to reduce the volume of drums and boxes. Liquid wastes are dewatered using vacuum compression dewatering of powdered and ion-exchange media. Liquids, sludges, resins and concentrates are processed by techniques designed for each waste type. LLW-contaminated metals are decontaminated using high-pressure water, steel shot, or glass bead blasting. Contaminated metals are melted down and poured into molds to form shielding blocks. Mixed LLW will be treated by vitrification, molten metal solvent system, Synthetica, or solidification processes when RCRA permitting has been obtained. The process selected will depend on the waste constituents and the permits. SEG can perform mixed LLW treatability studies in its laboratories. It has performed stabilization and vitrification testing on a variety of mixed wastes.

Future Capabilities:

SEG has applied for a RCRA Part B Permit to allow processing of mixed wastes on a large scale. Several new mixed waste treatment technologies are being tested for use after permitting. SEG is currently purchasing land and planning to build a waste processing facility in Hanford, Washington.

Permits and Licenses:

- Four radioactive facility licenses for four operating facilities in Oak Ridge, Tennessee
- NRC license for their shipping casks
- A RCRA Part B permit applied for and pending for the Oak Ridge, Tennessee, facilities; SEG expected approval of the Part B permit by the third quarter of 1995

SEVENSON ENVIRONMENTAL SERVICES, INC.

Rep.:	Yost, Karl W.	9245 Calument Ave.
Phone:	(219) 836-0016	Suite 101
FAX:	(219) 836-2838	Munster, IN 46321

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- X Alpha-Contaminated Mixed Low-Level Waste Treatment
  Low-Level Waste Decontamination/Recycling
  Laundering of Rad-Contaminated Laundry and/or Respirators
- X Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Sevenson Environmental Services, Inc., (SES) primarily provides waste site remediation services, including material handling and treatment. A wholly-owned subsidiary, Waste Stream Technology, Inc., provides treatability and analytical services to Sevenson for hazardous waste and provides bioremediation capabilities.

Current Capabilities:

SES has patented a MAECTITE® treatment process that has been successfully used at RCRA, National Priority List, emergency response, and other lead-contaminated sites. The process has recently been modified for radioactive materials. The process has been applied successfully to over 200,000 yd^3 of lead and RCRA metal-contaminated soils at 24 sites in 14 states. This includes exsitu and insitu treatment.

Future Capabilities:

SES would like to expand their services for radioactive and mixed waste site cleanup using their construction and material handling expertise, coupled with the MAECTITE® treatment technology.

Permits and Licenses:

SES services are provided under the authority of facility licenses and permits. SES does not currently maintain any licensed facilities.

THOMAS GRAY AND ASSOCIATES, INC

Rep.:	Gallego, Richard	1205 W. Barkley Ave.
Phone:	(714) 997-8090	Orange, CA 92668
FAX:	(714) 997-3561	

Services Provided:

X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
Mixed Low-Level Waste Treatment, Storage, or Disposal
Alpha-Contaminated Mixed Low-Level Waste Treatment
X Low-Level Waste Decontamination/Recycling
Laundering of Rad-Contaminated Laundry and/or Respirators
Mixed Low-Level Waste Treatability Studies
Mixed Low-Level Waste Treatment Technology Development

Overview:

Thomas Gray and Associates, Inc., (TGA) operates facilities in California and Utah that provide storage, volume reduction via compaction, and decontamination via decay for LLW.

Current Capabilities:

TGA currently operates under Radioactive Materials Licenses issued by the State of California and the State of Utah. Their main facility, located in Orange, California, is licensed for storage of LLW. Their recently-acquired facility located in Turlock, California, also provides for storage of LLW, and has a box compactor with an exertion force of 400,000 pounds of pressure that compacts dry waste into reinforced 4 x 4 x 6-ft metal boxes containing a usable 90 ft^3. A third facility, located in Salt Lake City, provides decontamination of LLW by decay in storage.

Future Capabilities:

TGA is currently applying for a license from the Washington Department of Social and Health Services. Upon acceptance, TGA would be licensed to provide storage of LLW for an indefinite period of time.

Permits and Licenses:

- Radioactive Materials License No. 2105-30, issued by the State of California Department of Health Services, expired November 18,1995. Renewal application has been deemed timely filed. Allows for storage of LLW.

- Radioactive Materials License No. 3546-50, issued by the State of California Department of Health Services, expires August 10, 1996. Allows for storage and treatment of LLW.

- Radioactive Materials License No. UT 1800308, issued by the Utah Department of Environmental Quality Division of Radiation Control, has expired. Renewal application has been deemed timely filed.

- Solid Waste Management Facility Permit, issued by the Salt Lake City County Health Department, expires March 10, 1996. Allows for processing of decayed radioactive waste as infectious waste.

- Broker Site Use Permit No. B400, issued by the State of Washington Department of Ecology, expires February 29, 1996.

TRYCON TECHNOLOGIES, INC.

Rep.:	Robb, Randy	919 Easley
Phone:	(806)492-3542	PO Box 520
FAX:	(806)492-3250	Paducah, TX 79248-0520

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- X Low-Level Waste Decontamination/Recycling
- X Laundering of Rad-Contaminated Laundry and/or Respirators
- Mixed Low-Level Waste Treatability Studies
- Mixed Low-Level Waste Treatment Technology Development

Overview:

Trycon Technologies, Inc., (TTI) is a company that specializes in decontamination of LLW.

Current Capabilities:

TTI has developed a Liquid Abrasive Decontamination/Cleaning System (LADS) that is designed to perform decontamination economically and with a minimum of residual waste. The LADS process is a simple mechanical process that uses only water, air, and abrasive, thus eliminating some of the dangers associated with other decontamination methods. This process decontaminates metal, wood, plastic, lead, fiberglass, rubber, and other materials using a variety of abrasives to minimize surface removal or to increase productivity.

Future Capabilities:

Although known primarily as a supplier of both portable and fixed decontamination systems, TTI would like to expand their services to include the actual processing and decontamination of LLW.

Permits and Licenses:

Trycon is planning to apply for both an NRC and EPA license to allow expansion of their services to include processing and decontamination of LLW, in addition to being a supplier of decontamination systems.

U.S. ECOLOGY

Rep.:	Gardner, Fredrick	5333 Westheimer
Phone:	(800)567-2372	Suite 1000
FAX:	(423)482-5605	Houston, TX 77056-5407

Services Provided:

X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
X Mixed Low-Level Waste Treatment, Storage, or Disposal
Alpha-Contaminated Mixed Low-Level Waste Treatment
X Low-Level Waste Decontamination/Recycling
Laundering of Rad-Contaminated Laundry and/or Respirators
Mixed Low-Level Waste Treatability Studies
Mixed Low-Level Waste Treatment Technology Development

Overview:

U.S. Ecology, a subsidiary of American Ecology, operates a LLW disposal facility for institutional clients at Richland, Washington. No other information was provided.

Current Capabilities:

U.S. Ecology provides volume reduction services for LLW and decontaminates LLW for metals reuse, recycling and/or free release. These services are limited to institutional clients, hospitals, and universities.

Future Capabilities:

U.S. Ecology is planning to apply for a RCRA permit for the thermal treatment of mixed LLW.

Permits and Licenses:

- Radioactive Materials License, issued by the State of California
- Radioactive Materials License was expected to be obtained from the State of Nebraska in 1995

WASTE CONTROL SPECIALISTS, INC

Rep.:	Jackson, Ken	P.O. Box 1937
Phone:	(713) 944-4900	Pasadena, TX 77501
FAX:	(713) 944-5252	

Services Provided:

- X Low-Level Radioactive Waste Volume Reduction, Storage, or Disposal
- X Mixed Low-Level Waste Treatment, Storage, or Disposal
- Alpha-Contaminated Mixed Low-Level Waste Treatment
- Low-Level Waste Decontamination/Recycling
- Laundering of Rad-Contaminated Laundry and/or Respirators
- Mixed Low-Level Waste Treatability Studies
- X Mixed Low-Level Waste Treatment Technology Development

Overview:

Waste Control Specialists, Inc., (WCSI) is a Texas corporation operating a 16,073-acre tract near the southern and eastern extreme of the New Mexico-Texas border.

Current Capabilities:

Current capabilities of WCSI are dependent upon issued permits. Current permits include the following:

- One 7,645,500-m^3 (10,000,000-yd^3) common hole landfill permitted for all RCRA and TSCA waste codes;
- Two discrete 487,000-m^3 (637,000-yd^3) condominium cells also permitted for all hazardous and toxic wastes;
- An onsite waste treatment/stabilitization facility equipped with thermal oxidizer for air emissions control;
- Warehouse storage facility for 5,000 drums and 150 bins of hazardous, toxic, and dioxin wastes;
- Drum-to-bulk and bulk-to-drum materials handling and repackaging capabilities; and
- An onsite railcar unloading facility.

Future Capabilities:

WCSI is focused on expanding its scope of operations through acquisition of the following:

- Permitting for treatment, storage, and disposal of by-product materials including §11e.(2) mine tailings; and
- Licensing for treatment and storage of federal facility LLW and mixed LLW.

In addition, WCSI will facilitate the development of new technologies by providing:

- Permitted feedstock storage;
- Permitted treatment and disposal of test residues;
- Ample acreage for controlled-release facilities and other research infrastructure;
- Emissions monitoring and control allowing "test-to-fail" evaluations;
- An onsite EPA-approved laboratory;
- Broad and flexible research, development, and demonstration permitting; and
- An opportunity for development and application of standardized research protocols at a comprehensive, centralized research facility.

Permits and Licenses:

WCSI operates under EPA permits but is currently applying for NRC permits that would allow them to manage LLW and mixed LLW.

APPENDIX C

Tables C-1 Through C-5: Vendors' Radioactive Material License Limit Profile

Table C-1. Vendor Radioactive Material License limit profile: Isotopes Ag-110m through Cm-244.

Company Name	License No.	Expiration Date	Isotope											
			Ag-110m	Am-241	Am-242	Am-243	Ba	Be-7	C-14	Ca-45	Cd-109	Cm-242	Cm-243	Cm-244
ARS	R-86008-P97	4/30/97												
Afftrex	37-28329-01	7/31/99												
ALARON	37-20826-01	8/31/90 extended												
	37-20826-02	9/30/94 extended												
ATG	WN-I0171-1	9/30/99												
AEC	R-01037-J95	10/31/95		1Ci	1Ci				50Ci			1Ci	1Ci	1Ci
CNSI	12-13536-01	12/31/96												
	287-02	4/30/2000												
	097	7/31/2000												
COGNIS	4880-49	1/9/94 extended							2mCi	15mCi				
Envirocare[a]	UT 2300239	2/28/96 renewal submitted	560pCi/g	560pCi/g		1,700pCi/g		38nCi/g	400nCi/g	0.4mCi/g	460nCi/g	1,400nCi/g	1.5nCi/g	10nCi/g
FTI	03-11-0339-01	2/28/99												
Hazen	77-02	9/30/99												
IT Corp.	R-47055-D98	4/30/98												
	R-01060-J95	10/31/95		0.2μCi[b]			See note (c)							
MSC	R-01078-L00	12/31/2000							10Ci					
Maxim	24-17152-02	4/30/99												

Table C-1. (continued).

Company Name	License No.	Expiration Date	Isotope											
			Ag-110m	Am-241	Am-242	Am-243	Ba	Be-7	C-14	Ca-45	Cd-109	Cm-242	Cm-243	Cm-244
NSSI	L01811	4/30/95 extended												
RSO	MD-33-021-01	4/30/98		500mCi										
RUST	482	4/30/97												
SEG		Renewals Submitted		250Ci					110Ci					
TGA	UT 1800308	extended												
	2105-30	11/18/95 extended												
	3546-50	8/10/96		12μCi[d]										

a. Maximum average concentration in waste for disposal
b. Limit of 2 sources not to exceed 0.1 μCi/each
c. No single source to exceed 30 μCi
d. Limit of 1 source

Table C-2. Vendor Radioactive Material License limit profile: Isotopes Co-56 through I-129.

Company Name	License No.	Isotope													
		Co-56	Co-57	Co-58	Co-60	Cr-51	Cs-134	Cs-137	D-38 Th-232[a]	Eu-152, -154, -155	Fe-55	Fm-257	H-3	Hg-203	I-129
ARS	R-86008-P97			100mCi	100mCi		100mCi	100mCi	1000kg	100mCi			2Ci		100mCi
Afftrex	37-28329-01														
ALARON	37-20826-01														
	37-20826-02														
ATG	WN-I0171-1				10Ci								10Ci		See note (b)
AEC	R-01037-J95							1.2Ci[c]				1Ci	100Ci		
CNSI	12-13536-01														
	287-02														
	097														
COGNIS	4880-49												2mCi		
Envirocare[d]	UT 2300239	360pCi/g	19nCi/g	1.6nCi	360pCi/g	68nCi/g	1/2nCi/g	560pCi/g		1.7nCi/g	.018mCi/g		0.02mCi/g	10nCi/g	3.1nCi/g
FTI	03-11-0339-01							1.85mCi							
Hazen	77-02														
IT Corp	R-47055-D98												10Ci[e] 200mCi[c]		
	R-01060-J95				100mCi[c]			3.75Ci[c] 2.2mCi[c]					10Ci[f]		
MSC	R-01078-L00												100Ci		
Maxim	24-17152-02												100mCi[g]		

Table C-2. (continued).

Company Name	License No.	Isotope												
		Co-56	Co-57	Co-58	Co-60	Cr-51	Cs-134	Cs-137	D-38 Th-232[a]	Eu-152, -154, -155	Fe-55	Fm-257	H-3	Hg-203	I-129
NSSI	L01811														
RSO	MD-33-021-01				100Ci			100Ci							
RUST													10Ci		
SEG													330Ci		
TGA	UT 1800308														
	2105-30												4,000Ci		
	3546-50												4,000Ci		

a. Natural thorium with daughters
b. Limit is 1 Ci for I-125; 250 mCi for I-129; 1 Ci for I-131
c. Limit of 1 source
d. Maximum average concentration in waste for disposal
e. No single source and/or sample to exceed 10 mCi
f. No single source and/or sample to exceed 100 mCi
g. No single source and/or sample to exceed 5 mCi

Table C-3. Vendor Radioactive Material License limit profile: Isotopes Ir-192 through Po-210.

Company Name	License No.	Isotope													
		Ir-192	K-40	MAFP[a]	Mn-54	Na-22	Nb-94	Ni-59	Ni-63	Np-237	P-32	P-33	Pa-231	Pb-210	Po-210
ARS	R-86008-P97			100mCi[b,c] 5mCi[d,e]					100mCi				100mCi		
Afftrex	37-28329-01			100mCi[f] 10mCi[g] 10g[h] 1.0mCi[i]											
ALARON	37-20826-01			100Ci[j]											
	37-20826-02			100Ci[j]											
ATG	WN-I0171-1			50Ci[k] 10mCi[l] 1,000kg[m]							1Ci				
AEC	R-01037-J95			100Ci[n] 10Ci[o,p] 1mCi[q]						1Ci					
CNSI	12-13536-01														
	287-02			10Ci[r] 10mCi[s] 1,000Ci[r] 1,000lb[t] 100g[s,u]											
	097			50,000Ci[v] 60,000lb[t]											
COGNIS	4880-49										16mCi	5mCi			
Envirocare[w]	UT 2300239	2.5nCi	10nCi/g		6.5nCi/g	780pCi/g	160pci/g	700pCi/g	.002mCi/g	2nCi/g				230nCi/g	20nCi/g
FTI	03-11-0339-01			100µCi											
Hazen	77-02			10mCi[x]											
IT Corp	R-47055-D98			1Ci[y] 100mCi[z]					15mCi[aa] 8mCi[ab]						
	R-01060-J95			1Ci[y,bb] 100mCi[z]											

Table C-3. (continued).

Company Name	License No.	Isotope													
		Ir-192	K-40	MAFP[a]	Mn-54	Na-22	Nb-94	Ni-59	Ni-63	Np-237	P-32	P-33	Pa-231	Pb-210	Po-210
MSC	R-01078-L00			100Ci[n] 10Ci[ee] 1Ci[dd]											
Maxim	24-17152-02			200 mCi[c,ee]					20mCi[ff] 180mCi[gg] 90mCi[hh]						
NSSI	L01811			2,000Ci[ii]											
RSO	MD-33-021-01	150Ci		500Ci[jj] 999kg[t] 200g[u] 10mCi[kk]											100mCi
RUST	482			2Ci[ll] 100mCi[e] 1000lb[t]					15mCi						
SEG				400Ci[n] 1.1Ci[mm,nn] 10Ci[oo]											11Ci
TGA	UT 1800308			2Ci[pp]											
	2105-30			150Ci[qq] 500mCi[kk] 15g[u] 2,500lb[t] 10μCi[rr] 1mCi[bb,ss]											
	3546-50			150Ci[qq] 500mCi[kk] 15g[u] 2,500lb[t] 10μCi[rr] 1mCi[bb,ss]											

a. Mixed activation and fission products
b. Atomic numbers 93-96, excluding special nuclear material (SNM)
c. No single source and/or sample to exceed 10 mCi
d. Atomic numbers 1-91, excluding natural thorium
e. No single source and/or sample to exceed 5 mCi
f. Contaminated material and associated decontamination waste with atomic numbers 1-96, except source and SNM: 100mCi limit with 50 mCi maximum/radionuclide
g. Any contaminated source material and associated decontamination waste.
h. Any contaminated SNM and associated decontamination waste
i. Any byproduct material with atomics numbers 1-103: for use as calibration standards
j. Atomic numbers 1-96, inclusive: For fixed or removable contamination, limit of 100Ci total, except 250g for SNM and 10g for plutonium; for sealed sources, limit of 100 μCi/source
k. Atomic numbers 1-83: limit of 2Ci/radionuclide except as specified otherwise

Table C-3. (continued).

l. Atomic number 84-103, except SNM
m. Source material, except Th-228, which has a limit of 4 µg
n. Atomic numbers 3-83, excluding C-14
o. Atomic numbers 82-91, excluding source material
p. Source material (natural or depleted uranium, or thorium)
q. Calibration and standardization sources: limit of 1mCi/source
r. Atomic numbers 1-92, inclusive. Dependant upon Authorized Use terms of the license
s. Atomic numbers 93 and above
t. Source material limit
u. SNM limit
v. Any radioactive material excluding source material and SNM
w. Maximum average concentration in waste for disposal
x. Atomic numbers 1-96
y. No single source and/or sample to exceed 1 mCi
z. No single source and/or sample to exceed 100 µCi
aa. Limit of 1 source
bb. Atomic numbers 3-83, inclusive
cc. Atomic numbers 84-91, excluding radium
dd. Transuranics, excluding SNM
ee. Any licensed material, excluding H-3
ff. Limit of 2 single cells not to exceed 10 mCi/each
gg. Limit of 9 single cells not to exceed 20 mCi/each
hh. Limit of 9 single cells not to exceed 10 mCi/each
ii. Limit is for sealed sources received as radioactive waste. For SNM, the maximum activity is as specified in the Texas Regulations for Control of Radiation (TRCR) 11.2. For any radioactive waste as defined in TRCR 44.2, the maximum activities are specified under TRCR 44.5(a) for a Class B Storage Facility and are not to exceed the following: Group I, 2 Ci; Group II, 20 Ci; Group III, 200 Ci; Group IV, 2,000 Ci
jj. Atomic numbers 1-83
kk. Atomic numbers 89-98, excluding source material and SNM
ll. Atomic numbers 2-92
mm. Radioactive materials with atomic numbers 84-91, excluding Po-210, Ra-226, or Th-232
nn. Transuranics, excluding Pu and Am-241
oo. Total limit for radioactive material, excluding SNM, in sealed source form. No single source to exceed 5 mCi. Single sources > 5mCi are licensed individually
pp. Alpha emitters, excluding source material and SNM
qq. Any radioactive material, excluding source material, SNM, and alpha emitters
rr. Atomic numbers 3-104, total limit for contaminated wipe samples
ss. Total limit for calibration sources

Table C-4. Vendor Radioactive Material License limit profile: Isotopes Pr-147 through Sn-113.

Company Name	License No.	Isotope													
		Pr-147	Pu	Pu-238	Pu-239	Pu-240	Pu-241	Pu-242	Ra-226	Ra-228	Ru-106	S-35	Sb-124	Sb-125	Sn-113
ARS	R-86008-P97	100mCi							100mCi	100mCi					
Afftrex	37-28329-01														
ALARON	37-20826-01														
	37-20826-02														
ATG	WN-I0171-1			0.00005g	0.015g		0.0015g								
AEC	R-01037-J95		200g												
CNSI	12-13536-01		see note (a)												
	287-02														
	097		see note (b)												
COGNIS	4880-49											1mCi			
Envirocare[e]	UT 2300239			10nCi/g	9.9nCi/g	10nCi/g	350nCi/g	10nCi/g	2nCi/g	1.8nCi/g	19nCi/g		790pCi/g	5300pCi/g	730nCi/g
FTI	03-11-0339-01				20µCi[d]				10µCi[e]						
Hazen	77-02														
IT Corp	R-47055-D98		10g[f]												
	R-01060-J95		10g[g]		7.8µCi[h]										
MSC	R-01078-L00								10Ci[i]	10Ci[i]					
Maxim	24-17152-02														
NSSI	L01811														

Table C-4. (continued).

Company Name	License No.	Isotope													
		Pr-147	Pu	Pu-238	Pu-239	Pu-240	Pu-241	Pu-242	Ra-226	Ra-228	Ru-106	S-35	Sb-124	Sb-125	Sn-113
RSO	MD-33-021-01								1000mg						
RUST	482		200g[j]												
SEG			200g							11Ci					
TGA	UT 1800308														
	2105-30								300μCi[k]						
	3546-50								100μCi[l]						

a. License limits for Pu isotopes are as specified in Condition 31 of South Carolina Radioactive Material License No. 097, Amendment No. 45, and as limited by Condition 40 of that license
b. Concentration limit of 350 nCi/m³ for Class A and 3,500 nCi/m³ for Class C
c. Maximum average concentration in waste for disposal
d. Limit of 4 sources not to exceed 5 μCi/each
e. Includes decay products
f. No single source and/or sample to exceed the lesser of 10 μCi or 0.002g
g. No single source and/or sample to exceed 100 μCi or 0.002 g
h. Limit of 6 sources not to exceed 1.3 μCi/each
i. Limit is for combined quantity of Ra-224, Ra-226, and Ra-228
j. For packages containing a combination, the sum of the ratios of the individual quantity of each radionuclide to the limit specified for that radionuclide shall not exceed unity
k. Limit of 3 sources not to exceed 100 μCi/each
l. Limit of 1 source

Table C-5. Vendor Radioactive Material License limit profile: Isotopes Sr-90 through Zn-65.

Company Name	License No.	Isotope													
		Sr-90	Tc-99	Th_{nat}	Th-230	Th-232	U	U-233	U-234	U-235	U-236	U-238	U_{nat}	U_{dep}	Zn-65
ARS	R-86008-P97			200mCi[a]			200mCi[a]						1,000kg[b]	1,000kg[b]	
Afftrex	37-28329-01														
ALARON	37-20826-01									1,000kg					
	37-20826-02									1,000kg					
ATG	WN-I0171-1							1g		347g					
AEC	R-01037-J95							200g		350g					
CNSI	12-13536-01							200g[c]		4,500g[c]					
	287-02														
	097														
COGNIS	4880-49														
Envirocare[d]	UT 2300239	20nci/g	100nCi/g		15nCi/g	68pCi/g			37nCi/g	770pCi/g	36nCi/g	28nCi/g	18nCi/g	110nCi/g	11nCi/g
FTI	03-11-0339-01		30μCi[e]	1.85mCi	100μCi[f]								1.85mCi	1.85mCi	
Hazen	77-02														
IT Corp	R-47055-D98							10g[g]		200g[h]					
	R-01060-J95			200mCi[a]				10g[g]		200g[h]			200mCi[a,b]	200mCi[a,b]	
MSC	R-01078-L00			15.9kg						350g[i,j]			216,818kg	409,091kg[k]	
Maxim	24-17152-02														
NSSI	L01811														

Table C-5. (continued).

Company Name	License No.	Isotope													
		Sr-90	Tc-99	Th_{nat}	Th-230	Th-232	U	U-233	U-234	U-235	U-236	U-238	U_{nat}	U_{dep}	Zn-65
RSO	MD-33-021-01														
RUST	482							200g[i]		350g[i]					
SEG						11Ci	1.1Ci[j]	200g		350g			110Ci[k]	110Ci[k]	
TGA	UT 1800308														
	2105-30														
	3546-50														

a. No single source and/or sample to exceed 20 mCi
b. The total quantity of both natural and depleted uranium must not exceed this limit
c. No single package shall contain more than 200 g of U-233 or 330 g of U-235. For packages containing a combination, the sum of the ratios of the individual quantity of each radionuclide to the limit specified for that radionuclide shall not exceed unity
d. Maximum average concentration in waste for disposal
e. Limit of 3 sources not to exceed 10 μCi/each
f. Limit of 10 sources not to exceed 10 μCi/each
g. No single source and/or sample to exceed 0.01 g
h. No single source and/or sample to exceed 50 g
i. For packages containing a combination, the sum of the ratios of the individual quantity of each radionuclide to the limit specified for that radionuclide shall not exceed unity
j. Uranium is enriched to 3% U-235. Limit is specified for the total amount of U-235 that may be present, not the total amount of uranium.
k. Uranium depleted in the U-235 isotope
l. Limit for total uranium, excluding U-233, U-235, and U-238