ANNUAL REPORT - FY 1998

Shipments to and from the Nevada Test Site (NTS)

February 1999

**United States Department of Energy
Nevada Operations Office
Las Vegas, Nevada**

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1.0 INTRODUCTION

In February 1997, the U.S. Department of Energy Nevada Operations Office (DOE/NV) issued the Mitigation Action Plan which addressed potential impacts described in the "Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada" (DOE/EIS 0243). DOE/NV committed to several actions, including the preparation of an annual report, which summarizes waste shipments to the Nevada Test Site (NTS) Radioactive Waste Management Sites (RWMSs) at Area 3 and Area 5. This document satisfies requirements with regard to low-level radioactive waste (LLW) and mixed low-level radioactive waste (MLLW) transported to or from the NTS during fiscal year (FY) 1998.

This report has been prepared in accordance with the specifications contained in Section 4.1.1 (Commitments) of the "NTS Environmental Impact Statement, Mitigation Action Plan" (February 1997). Tabular summaries are provided which include the following data:

- Sources of and carriers for LLW and MLLW shipments to or from the NTS;
- Number and volume of LLW and MLLW shipments;
- Identification of highway routes used by carriers; and
- Incident/accident data applicable to LLW and MLLW shipments.

In addition, this report provides a summary evaluation of each shipping campaign by source (waste generator) which identifies observable incidents, if any, associated with the actual waste shipments.

2.0 SUMMARY OF WASTE SHIPMENTS (FY 1998)

During FY 1998, disposal at the NTS RWMSs included 390,528 cubic feet (cu. ft.) of LLW from 13 generator sites and 9,306 cu. ft. of MLLW from an on-site generator. The waste was received at the two RWMSs in a total of 348 shipments. Of these 348 shipments, none were involved in any vehicular accidents and 344 shipments arrived at the NTS incident free. In addition, there was a single shipment of MLLW sent **from** the NTS to a treatment site in Texas. This single shipment from the NTS arrived at the intended destination incident free. During FY 1998 there were a total of five incidents; four involving shipments that arrived at the NTS and one with a shipment that was returned to the generator site before arriving at the NTS. Of these incidents, all five involved breached containers. In each instance, regardless of whether or not contamination was detected, the transporter's trailer floor was carefully cleaned to ensure that there was no chance for a subsequent spread of contamination. The following sections present waste shipment information for FY 1998, including all LLW and MLLW shipments to and from the NTS.

2.1 Waste Transporters (Carriers)

Each generator often uses more than one carrier. The following table (Table 1) indicates each generator and corresponding carrier(s) used for transport of LLW (and MLLW for Bechtel Nevada (BN)). Carriers are chosen by generators operating under 49 CFR., Transportation.

Table 1. Waste Transporters

Generator	Carrier(s) Used
Aberdeen Proving Ground Aberdeen (APG), MD	T.F. Boyle Transportation
Bechtel Nevada (BN) (from NTS and Tonopah Test Range) - Las Vegas, NV	Pan Western Corporation Bechtel Nevada
Bechtel Nevada (BN) - MLLW	Fluid Transport Inc.
Fernald Environmental Management Project (FEMP) Cincinnati, OH	Appalachian Environmental Transportation Incorporated Autumn Industries, Inc. Fluid Transport Inc. Hittman Transportation Landstar Ranger Trucking Triad Transport Tri-State Motor Transport
General Atomics (GA) San Diego, CA	Tri-State Motor Transport
Lawrence Livermore National Laboratory (LLNL) Livermore, CA	Bechtel Nevada Ligon Transportation R&R Trucking Incorporated (RRIS International) Triad Transport Tri-State Motor Transport
Lovelace Respiratory Research Institute (LRRI) Albuquerque, NM	Tri-State Motor Transport
Mound Plant (MEMP) Miamisburg, OH	Landstar Ranger Trucking
Pantex Plant (PP) Amarillo, TX	Fluid Transport Inc. Gibson Truckline Inc Triad Transport
Boeing North American- Rocketdyne (ETEC) Canoga Park, CA	Lutrel Trucking Inc. Bakersfield, CA Tri-State Motor Transport
Reactive Metals Incorporated (RMI) Environmental Service Extrusion Plant Ashtabula, OH	Landstar Ranger Trucking
Rocky Flats Environmental Technology Site (RFETS) Golden, CO	Colorado Allstate Transportation, Inc. Fiore Brothers Incorporated Hittman Transportation R&R Trucking, Inc. Tri-State Motor Transport
Sandia National Laboratories (SNL/CA) Livermore, CA	Tri-State Motor Transport
Sandia National Laboratories (SNL/NM) Albuquerque, NM	Arkansas Best Freight System Bechtel Nevada MCT Industries, Inc. Tri-State Motor Transport

2.2 Shipments and Volume

The following table (Table 2) presents a summary of all LLW and MLLW shipments received at the NTS during FY 1998. Since MLLW is accepted only from in-state (DOE/NV) sources, these shipments are included under BN, the operating contractor for the NTS.

Table 2. Shipments and Volume Received at the NTS (FY 1998)

Generator	Shipments by Quarter				Total Shipments	Total Volume (cu. ft.)
	1st	2nd	3rd	4th		
APG, Aberdeen, MD	1	0	0	0	1	448
Allied Signal (KCP), Kansas City, KS	0	0	0	0	0	0
BN - NTS & TTR, NV	0	1	8	16	25	34,345
* BN - MLLW	0	0	0	10	10	9,306
ETEC - Canoga Park, CA	2	7	10	33	52	30,697
FEMP Cincinnati, OH	45	0	0	0	45	62,885
GA - San Diego, CA	5	5	1	4	15	17,723
International Technology (IT)	0	0	0	0	0	0
LLNL Livermore, CA	10	4	2	10	26	24,083
LRRI Albuquerque, NM	0	2	0	0	2	1,919
MEMP - Miamisburg, OH	11	2	16	6	35	73,800
PP - Amarillo, TX	0	1	5	22	28	18,946
RMI, - Ashtabula, OH	0	0	0	3	3	1,560
RFETS Golden, CO	13	12	20	22	67	98,698
SNL - Livermore, CA	0	0	1	0	1	243
SNL- Albuquerque, NM	2	1	8	27	38	25,181
TOTAL (all generators)	89	35	71	153	348**	399,834

* This table indicates the number of shipments and the volume of MLLW accepted for disposal at the NTS. There was a single shipment of MLLW shipped from the NTS to Waste Control Specialists in Andrews County, Texas, for treatment, which is described in Section 2.3 below.

** This table does not reflect the one shipment from Fernald that did not arrive at the NTS.

2.3 Transportation Routes

There were 12 out-of-state generators who shipped waste to the NTS for disposal in FY 1998. The transportation routes used by the out-of-state generators to the NTS are identified in Figure 1. Transportation routes were selected by the carrier (49 CFR 397.101). Most of the BN LLW and MLLW shipments were generated on the NTS and transported to the RWMSs on highways that are not accessible to the general public. Shipments from the TTR, identified in Figure 2, travel on U.S. Highway 95, a public highway. As a result of geographical considerations, the routes used by selected sources may overlap to a substantial degree (e.g., the routes used by the FEMP, RMI, and MEMP; all three located in Ohio, are essentially the same). Generators that use the same route as another generator with a point of origin farther from the NTS are identified as using the same Route ID as indicated in Table 3.

BN had one shipment of MLLW during FY 1998 from the NTS to Waste Control Specialists in Andrews County, TX. The route used for this shipment is identified in Figure 1 (route H). The total volume of the MLLW shipment was 470 cu. ft. MLLW contains both hazardous and radioactive components. The hazardous components must be below specific concentrations (mandated by the U.S. Environmental Protection Agency (EPA)) before it can be disposed. Figures 1 and 2 provide regional and national views of transportation routes used. Table 3 route IDs correspond to Figures 1 and 2.

Table 3. Transportation route identification and corridor states

Generator	Route ID	Corridor States
APG - Aberdeen, MD	A	MD, VA, TN, AK, OK, TX, NM, AZ, NV
BN - (from TTR)	B	NV
ETEC - Canoga Park, CA	E	CA, NV
FEMP - Cincinnati, OH	C	OH, IN, IL, MO, OK, TX, NM, AZ, NV
GA - San Diego, CA	D	CA, NV
LLNL - Livermore, CA	E	CA, NV
LRRI - Albuquerque, NM	F	NM, AZ, NV
Mound - Miamisburg, OH	C	OH, IN, IL, MO, OK, TX, NM, AZ, NV
Pantex - Amarillo, TX	F	TX, NM, AZ, NV
RMI - Ashtabula, OH	C	OH, IN, IL, MO, OK, TX, NM, AZ, NV
RFETS - Golden, CO	G	CO, UT, NV
SNL/CA - Livermore, CA	E	CA, NV
SNL/NM - Albuquerque, NM	F	NM, AZ, NV
BN MLLW from the NTS	H	NV, AZ, NM, TX

Figure 1. Intercontinental Transportation Routes for LLW and MLLW Carriers

Refer to Table 3 for Transportation Route Identification

3.0 INCIDENT/ACCIDENT DATA

LLW and MLLW shipments are made in accordance with all applicable DOE, Nuclear Regulatory Commission (NRC), United States Department of Transportation (DOT), EPA, and state and local regulations and requirements. Generators are responsible for evaluating motor carriers used for transportation of radioactive waste. Generators are also responsible for notifying the DOE/NV Assistant Manager of Environmental Management whenever a discrepancy, non-compliance, or inadequate performance is identified; or if a transportation incident or emergency situation occurs. BN personnel control waste receipt and disposal activities at the NTS and are responsible for notifying appropriate DOE personnel regarding any non-compliant or refused radioactive waste shipments.

During FY 1998, there were no carrier vehicular accidents and a total of five shipping incidents, all from the same generator. Below is a brief description of the incidents, response action, and corrective action(s) taken to prevent recurrence.

- October 6, 1997 - A shipment of low-level waste from FEMP arrived at the NTS Area 5 RWMS with a breached package. A dry, grey granular material was seen on the trailer floor. Upon inspection of the box, cracks in the steel bottom were observed, and swipe samples were collected. Analysis of the swipes indicated the granular material contained no significant detectable contamination. The swipe analysis indicated radioactivity levels of 10 disintegrations per minute (dpm) alpha and 10 dpm beta which are basically normal background levels and are well below release limits. The grey, granular material was removed for the simple purpose of cleaning the floor and the trailer was released. Even though there was not a release of a significant amount of radioactive material, this is still considered an incident because waste packagings are required to retain their integrity during normal transport, and this container was breached.
- December 15, 1997 - The driver of a truck containing seven packages of low level radioactive waste destined for disposal at the NTS from FEMP, noticed that the trailer was leaking as he exited from Interstate Highway 40 near Kingman, Arizona. The driver notified local authorities, the Assistant Emergency Duty Officer at FEMP, and his company of the leak. Local authorities responded to the scene, as did representatives of the State of Arizona. The DOE dispatched a Radiological Assistance Program Team from the Albuquerque Operations Office and a support team from FEMP to support the Incident Command. The responders detected no radioactive contamination and determined that the leaking liquid was not hazardous to the health and safety of the public or damaging to the environment. The FEMP Support Team took custody of the shipment, controlled the leak, and returned the low level radioactive waste to Fernald on December 21, 1997. This shipment is not reflected in Table 2, on page 3, because it did not arrive at the NTS.

- December 15, 1997 - One shipment arrived at the Area 5 RWMS from FEMP with water and a fine grey material observed on the trailer floor as a result of a leaking package. Swipe samples were collected and the analysis indicated contamination levels of 31 dpm alpha and 576 dpm beta from the box swipes and 17 dpm alpha and 471 dpm beta from the trailer floor. Even though these swipe analysis results were much higher than those from the October 6 FEMP incident, the trailer floor swipes indicated that the contamination levels were still below the DOT allowed release limits. The only way that this amount of contamination could be considered hazardous is if it were to be directly ingested (eaten or inhaled). Public access to these waste packages and the inside of the trailer (and therefore the contamination) is prevented by locked and sealed trailer doors. The seals and locks are periodically checked by the truck driver and by specialists at the NTS when the shipment arrives. The leaking box was placed directly into the waste stack in Pit P05U after the leak was stabilized as the remainder of the trailer was unloaded. Even though not required, according to the DOT release limits, the trailer was decontaminated prior to release.
- December 16, 1997 - A shipment arrived at the Area 5 RWMS from FEMP. A small puddle of liquid containing fine greyish brown particulate matter which was observed on the trailer floor during unloading. It was determined that one of the boxes had a crack measuring 2 3/8 inches long. Radiation surveys of the packages and the trailer floor were conducted.
- December 16, 1997 - A second shipment on that same day with a similar problem. During unloading, the floor of the trailer was observed to be wet with a white and reddish substance leaking from the bottom of three different packages. Radiation surveys of the packages and the trailer floor were conducted. During inspection of the breached packages, it was noted that they were leaking from cracks in the bottom of the boxes at the ends of the middle skids. DOE/NV, BN, and FEMP management were notified. As a result, it was recommended that FEMP halt all shipments of white metal boxes, Model No. C-95-IP2, until further review of procedures and completion of a root cause analysis of the use of substandard containers. As a result of these incidents FEMP voluntarily suspended all shipments of LLW to the NTS and did not resume during FY 1998.

DOE/NV Waste Management Division (WMD) established a local notification protocol in May 1998. This protocol provides an incident notification process for the DOE/NV WMD to use to receive, document, and notify other federal, tribal, state and local agencies of incidents related to the transport of radioactive waste to the NTS. The purpose of the protocol is to provide timely notification to relevant agencies in order to mitigate consequences, activate emergency response organizations, and/or to notify off-site agencies responsible for protecting the health and safety of workers and the public. The process describes actions DOE/NV WMD will take when notification is received of;

1) emergency, off-normal, or unusual occurrences; 2) non-emergency significant events; and 3) all other non-emergency incidents. DOE/NV may issue a Corrective Action Request to the generator if the incident was a violation of waste acceptance requirements. The generator must evaluate and perform applicable analyses to determine the factors that led up to the incident. Generators are then responsible for determining a corrective action to ensure that the incident is not repeated. After DOE/NV WMD receives the proposed corrective action, representatives from the DOE/NV Radioactive Waste Acceptance Program evaluate the corrective action for adequacy.

4.0 EVALUATION OF SHIPPING CAMPAIGNS

This section contains a brief summary of each generator's shipping campaign, describing the overall success of the effort in terms of shipments, discrepant incidents, and overall success. Success is subjectively based on the number of shipments and the number of incidents that occurred during the fiscal year while shipping waste to the NTS for disposal. The cut-off between what is considered to be a minor and major shipper is subjectively placed at 5 shipments. Success is rated as follows:

1 or less incidents for major shippers (0 for minor shippers)	=	Successful
2 incidents for major shippers (1 for minor shippers)	=	Marginally Successful
3 incidents for major shippers (2 for minor shippers)	=	Unsuccessful

- APG had only one shipment in FY 1998 with a total volume of 448 cu. ft. The only transporter used was T.F. Boyle Transportation. There were no accidents or incidents during the shipment. APG sent all the waste they planned to send and had a successful shipping campaign for FY 1998.
- BN had 25 shipments of LLW with a total of 34,345 cu. ft. BN also sent 11 shipments of MLLW. Of these 11 shipments, BN sent 10 MLLW shipments totaling 9,306 cu. ft. to the Area 5 RWMS for disposal, and one MLLW shipment totaling 470 cu. ft. to Waste Control Specialists for treatment. BN used their own transportation vehicles and Pan Western Corporation for the 10 MLLW shipments that went to disposal, and Fluid Transport for the one shipment that went to treatment. There were no incidents nor accidents during shipments. BN had a successful shipping campaign for FY 1998.
- ETEC had 52 shipments for a total of 30,697 cu. ft. They used two carriers for transportation. There were no accidents and there were no shipping incidents reported for FY 1998. ETEC had a successful shipping campaign in FY 1998.
- FEMP had 46 shipments, 45 of which arrived at the NTS for a total volume of 62,885 cu. ft. disposed at the NTS. Seven different carriers were used for their

transportation. There were no vehicular accidents, but there were five incidents which involved breached packages. The incidents led to a shutdown (voluntary) of the FEMP LLW shipments to the NTS. Based on the number of incidents, the FEMP shipping campaign was unsuccessful in FY 1998.

- GA had 15 shipments, using only Tri-State Motor Transport for a total of 17,723 cu. ft. There were no accidents or incidents. GA had a successful shipping campaign during FY 1998.
- LLNL used five transport carriers for 26 shipments during FY 1998. A total of 24,083 cu. ft. reached the NTS with no incidents. LLNL had a successful shipping campaign for FY 1998.
- LRRI had a total of two shipments using only Tri-State Motor Transport, for a total of 1,919 cu. ft. of LLW. There were no accidents, and no violations during the transport of waste to the NTS. LRRI had a successful shipping campaign for the fiscal year.
- MEMP had a total of 35 shipments for 73,800 cu. ft. of waste. MEMP used only Landstar Ranger Trucking. There were no accidents and no shipping incidents during MEMP's successful shipping campaign in FY 1998.
- PP, using three carriers, delivered 28 shipments for a total of 18,946 cu. ft. with no incidents. PP had a successful shipping campaign in FY 1998.
- RMI, had 3 shipments using only Landstar Ranger Trucking for a total of 1,560 cu. ft. There were no accidents or incidents. RMI had a successful shipping campaign during FY 1998.
- RFETS shipped a total of 98,698 cu. ft. in 67 shipments. They used five different carriers during FY 1998. RFETS had no accidents and no shipping incidents. RFETS had a successful shipping campaign in FY 1998.
- SNL/CA had one shipment of 243 cu. ft. of LLW. The waste was transported by Tri-State Motor Transport without accident or incident. SNL/CA had a successful shipping campaign for FY 1998.
- SNL/NM shipped a total of 38 shipments for a total of 25,181 cu. ft., using four carriers. There were no accidents nor incidents during their shipments. SNL/NM also had a successful shipping campaign in FY 1998.

5.0 REFERENCES

The primary sources of shipment information were records kept by the BN Waste Management Program, which manages the NTS RWMSs at Area 3 and Area 5. These records provided detailed information on each shipment of LLW and MLLW (dates received, sources, number and type of waste packages, volumes, weight, carrier and route used, and final disposition of the shipments). In addition, incident and accident information was gathered by reviewing other BN and DOE/NV correspondence and through personal communication with DOE/NV managers, BN management and program personnel, representatives from the waste generator (source) facilities, and carrier personnel.

The following source documents are incorporated by reference:

1. U.S. Department of Energy, Nevada Operations Office, "Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada," DOE/EIS 0243, Las Vegas, Nevada, August 1996.
2. U.S. Department of Energy, Nevada Operations Office, "Mitigation Action Plan - Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada," DOE/EIS 0243, Las Vegas, Nevada, February 1997.
3. U.S. Department of Transportation (DOT) Regulations, 49 CFR, "Transportation," *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, DC, 1998

6.0 POINTS OF CONTACT

The following are points of contact for questions concerning the transportation of radioactive waste at the NTS or for requests for information relating to waste management and DOE/NV operations.

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7.0 ACRONYM LIST

APG	Aberdeen Proving Ground
BN	Bechtel Nevada
cu. ft.	Cubic feet
DOE/NV	United States Department of Energy Nevada Operations Office
DOT	United States Department of Transportation
dpm	Disintegrations per minute
ETEC	Boeing North American-Rocketdyne
EPA	Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FY	Fiscal year
GA	General Atomics
KCP	Allied Signal, Kansas City Plant
LLNL	Lawrence Livermore National Laboratory
LLW	Low-level radioactive waste
LRRI	Lovelace Respiratory Research Institute
MEMP	Mound Plant
MLLW	Mixed low-level radioactive waste
NRC	Nuclear Regulatory Commission
NTS	Nevada Test Site
PP	Pantex Plant
RFETS	Rocky Flats Environmental Technology Site
RMI	Reactive Metals Inc., Environmental Service Extrusion Plant
RWMSs	Radioactive Waste Management Sites
SNL/CA	Sandia National Laboratories of California
SNL/NM	Sandia National Laboratories of New Mexico
TTR	Tonopah Test Range
WMD	Waste Management Division

8.0 DISTRIBUTION LIST

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