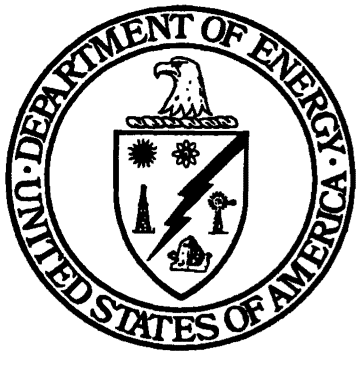
UC-721

MMSC-ESH-95115 - Rev.1

# U.S. DOE Pinellas Plant Exemption Package for Disposal at Envirocare of Utah








Revision 1

June 1996

LOCKHEED MARTIN

*Lockheed Martin Specialty Components, Inc., is the Management and Operating Contractor for the Pinellas Plant Under U.S. Department of Energy Contract No. DE-AC04-92AL73000.*

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## EXECUTIVE SUMMARY

The issue facing the Pinellas Plant and the Department of Energy (DOE) is to determine the disposition of any mixed waste that may be generated during shutdown. Currently the Pinellas Plant has one Resource Conservation and Recovery Act (RCRA) restricted waste that is also considered to be low-level waste. Any mixed waste must be treated to the applicable Land Disposal Requirements (LDR) standards in order to be in compliance with the Environmental Protection Agency (EPA) regulations. Further, DOE 5820.2A states that "DOE low-level waste shall be disposed of on the site at which it is generated, if practical, or if on-site disposal capability is not available, at another DOE disposal facility." The purpose of this document is to request and provide support documentation for an exemption to DOE 5820.2A requirements so that potential mixed waste streams can be treated and disposed of at a commercial facility.

Management of mixed waste is regulated under the RCRA regulations, Atomic Energy Act, and DOE orders. The RCRA LDR prohibits long-term storage and bans land disposal of these wastes without prior treatment to meet regulatory standards. As a result, the Pinellas Plant must determine the most feasible method of treatment and disposal for any mixed waste generated during shutdown at the site. As a means to determine the most appropriate mixed waste disposition, an analysis of alternatives was conducted, including the option of sending the waste to a commercial facility. A National Environmental Policy Act (NEPA) analysis (see Appendix A) must be completed prior to final evaluation of the commercial facility option. At this time, Envirocare of Utah has a RCRA Part B permit for land disposal of mixed waste. This facility is located in Clive, Utah, approximately 80 miles west of Salt Lake City.

Based on this alternative analysis, the exemption required is to allow approximately 191 cubic meters of mixed waste that is listed or characteristic and contaminated with tritium, to be land disposed at the Envirocare facility. This alternative offers the combination of lowest cost coupled with the highest assurance of success. Detailed supplemental information is provided in this report. Table 1 is a summary of the options analysis for F006 sludge, Table 2 is compactable solid waste, and Table 3 is an options analysis for construction debris.

**Table 1. Summary of Alternatives for Sludge Disposal**

| Option | Cost* | Feasibility | Comments |
|---|---|---|---|
| 1. On-site storage | N/A | Not feasible | The Pinellas Plant is in shutdown and transition. No permit for disposal in Florida can be obtained. |
| 2. Shipment and storage at Hanford | $1,075.3 | Feasible with headquarter authorization | This postpones the problem. Costs are for shipping, treatment and storage only. Disposal would be required at a later time. The option has unknown expenses that will increase the ultimate cost. |
| 3. Shipment and disposal at the Nevada Test Site or Savannah River Site | N/A | Feasible | Authority to dispose of mixed waste is pending EPA and state agreement. This is not an option at this time. |
| 4. Disposal at Envirocare | $493.3 | Feasible | Requires an exemption to use non-DOE disposal facility. Following shipment and disposal, no additional costs would be incurred. This would be a "final" solution |
| * Costs are in thousands of dollars. | | | |

**Table 2. Summary of Alternatives for Compactable Solid Waste**

| Option | Cost* | Feasibility | Comments |
|---|---|---|---|
| 1. On-site storage | N/A | Not feasible | The Pinellas Plant is in shutdown and transition. No permit for disposal in Florida can be obtained. |
| 2. Shipment and storage at Hanford | $8.3 | Feasible with headquarter authorization | This postpones the problem. Costs are for shipping, treatment and storage only. Disposal would be required at a later time. The option has unknown expenses that will increase the ultimate cost. |
| 3. Shipment and disposal at the Nevada Test Site or the Savannah River Site | N/A | Feasible | Authority to dispose of mixed waste is pending EPA and state agreement. This is not an option at this time. |
| 4. Treatment and Disposal at Envirocare | $6.8[1] | Feasible | Requires an exemption to use non-DOE disposal facility. Following shipment and disposal, no additional costs would be incurred. This would be a "final" solution |

* Costs are in thousands of dollars.

[1] Cost of treatment and disposal will be provided by the Idaho National Engineering Laboratory Demonstration Project for Macroencapsulation (OPE/MWFA-95-110)

**Table 3. Summary of Alternatives for Construction Debris Treatment and Disposal**

| Option | Cost* | Feasibility | Comments |
|---|---|---|---|
| 1. On-site storage | N/A | Not feasible | The Pinellas Plant is in shutdown and transition. No permit for disposal in Florida can be obtained. |
| 2. Shipment and storage at Hanford | $8.3 (same volume as Table 2) | Feasible with headquarter authorization | This postpones the problem. Costs are for shipping, treatment and storage only. Disposal would be required at a later time. The option has unknown expenses that will increase the ultimate cost. |
| 3. Shipment and disposal at the Nevada Test Site or the Savannah River Site | N/A | Feasible | Authority to dispose of mixed waste is pending EPA and state agreement. This is not an option at this time. |
| 4. Treatment and Disposal at Envirocare | $5.3[(1)] | Feasible | Requires an exemption to use non-DOE disposal facility. Following shipment and disposal, no additional costs would be incurred. This would be a "final" solution |

* Costs are in thousands of dollars.

[(1)] Cost of treatment and disposal will be provided by the Idaho National Engineering Laboratory Demonstration Project for Macroencapsulation (OPE/MWFA-95-110)

# 1.0 SITE WASTE MANAGEMENT PROGRAM

## 1.1 Introduction

The Pinellas Plant is owned by Pinellas County and is operated by Lockheed Martin Specialty Components, Inc., (Specialty Components) under contract with the U.S. Department of Energy (DOE). The DOE's Albuquerque Operations Office administers the contract through the Pinellas Area Office (PAO) and is the Programmatic Office of the plant.

In operation since 1956, the Pinellas Plant currently employs about 650 people on a site occupying 100 acres in Pinellas County, Florida (just north of St. Petersburg). Neutron generators, thermal batteries, lightning arrestor connectors, capacitors and other non-nuclear products that are the principal components of nuclear weapons were built at the plant until production was terminated in September 1994. The by-products of the manufacture and cleaning of these parts and components included hazardous and radioactive wastes.

Waste management activities at the plant are controlled by Federal, State and local requirements and regulations, including the Florida Department of Environmental Protection (FDEP) Operating Permit No. HO52-159339. The Waste Management/Minimization Department has primary responsibility for identifying, storing and shipping hazardous, radioactive and mixed waste. Waste Management/Minimization is part of the Environmental, Safety and Health (ES&H) Division. Authority for Waste Management flows from the plant's General Manager to the ES&H Division Director to the Manager, Waste Management/Minimization.

The Pinellas Plant generated a variety of hazardous and radioactive wastes as by-products of its production processes and continues to generate a smaller quantity in support of Reconfiguration and Technology Transfer initiatives. The predominant hazardous waste streams include halogenated solvents, flammable solvents, flammable solids, contaminated oils (halogens), plating bath streams, and miscellaneous lab pack wastes. Flammable solids are disposed of at the BDT facility in Clarence, New York. Halogenated solvents, flammable solvents, and oils are recycled by Laidlaw Environmental Services. Laidlaw also disposes of plating bath wastes and lab packs.

The primary radionuclide of concern is tritium. Tritiated waste may be produced during the tritium loading of neutron generator components, laboratory operations, and contamination control efforts. Tritium may also be found in scrapped equipment and effluent control waste. Low-level tritiated waste is disposed of at the Savannah River burial site in Aiken, South Carolina in compliance with the Savannah River Waste Acceptance Criteria.

Radioactive Materials Management Areas (RMMAs) have been designated in plant locations that have the potential to produce radioactive hazardous (that is, mixed) waste. This potential is indicated by the presence of unencapsulated or

unconfined radioactive material, or the use of subatomic particles or beams that may cause activation. The RMMAs are identified on the basis of the processes performed in the area; particularly the hazardous chemicals and radioactive materials used. The designation is made by the Manager, Health Physics and the Specialist, Radioactive Waste, in consultation with the Manager, Waste Management/Minimization. The plant has an ongoing program to assess potential to produce mixed waste in areas throughout the facility.

In keeping with the performance objective for the certification of nonradioactive hazardous waste, all hazardous wastes generated in an RMMA are considered suspect.

The DOE moratorium was lifted (see MMSC-ESH-0016, Moratorium Documentation Manual for the Pinellas Plant). Hazardous waste from an RMMA can be shipped to a licensed commercial facility only if Waste Management determines, on the basis of radioassay and/or radiological survey, that:

1) No radioactivity has been added as a result of DOE operations, and

2) The waste does not exceed the surface contamination criteria set in DOE 5400.5, Radiation Protection of the Public and the Environment.

The Pinellas Plant Radiological Control Manual, "Unconditional release of nonradioactive materials or items," uses the DOE 5400.5 removable contamination limit. Waste Management requires every effort to be made to meet the Pinellas Plant As Low As Reasonably Achievable (ALARA) objective of <220 dpm/100cm$^2$. To release any item over the ALARA limit requires clearance from the Health Physicist. Any mixed waste will be stored in the generating area pending the development of proper disposal procedures and the identification of commercial facilities that are licensed to handle mixed waste containing tritium.

## 1.2 Waste Characterization and Certification

Background - The radiation in our natural environment, including cosmic rays and radiation from the naturally radioactive elements, both outside and inside the human body. Radioassay techniques are useful for measuring added radioactivity only if they can detect the background radiation in a virgin sample of the material being assayed.

Mixed Waste - Radioactive waste that is also regulated under Subtitle C of the Resource Conservation and Recovery Act (RCRA); in other words, waste that is both radioactive and hazardous. Radioactive Toxic Substances Control Act waste, although technically not mixed waste, is also subject to the performance objective for certification of nonradioactive hazardous waste.

Nonradioactive Waste - Material which: 1) was not radioactive when it was received by the Pinellas Plant, 2) has had no radioactivity added to it during storage or use, and 3) does not exceed the surface contamination criteria in DOE 5400.5.

Potentially Contaminated Material - Any item or substance which, in the opinion of Health Physics, could be reasonably expected to have become contaminated as a result of direct or indirect contact with controlled radioactive material.

Radioactive Materials Management Area (RMMA) - An area in which the potential exists for contamination because of the presence of unencapsulated or unconfined radioactive material or of beams or other sources of particles (neutrons, protons, etc.) capable of causing activation. The following areas (Figures 1-1 and 1-2) of the Pinellas Plant are now or have been designated as RMMAs:

- 107, Tube Assembly
- 108, Tube Exhaust
- 109, Product Analysis
- 157/158, Gas Analysis Laboratory
- 182C, Tube Assembly
- 182G, Tube Exhaust
- Building 200, Environmental Test
- Building 800, Accelerator
- Neutralization Facility
- Radioanalytical Laboratory

Note: For non-routine projects or processes, temporary RMMAs may be delineated with the concurrence of Health Physics and Waste Management.

Radioactive Waste - Any waste managed because of its radioactive content, which is not otherwise regulated for that radioactive content i.e., Clean Air Act, Clean Water Act, etc.

Restricted Release - The release of material for use, treatment, or disposal under the control of the DOE or according to the provisions of a Nuclear Regulatory Commission (NRC) or State Radioactive Materials License.

Unrestricted Release - The release of property (that is, waste) to any party for use, treatment, or disposal without concern for radioactive content, following a decision that is documented and based on risk-based standards and associated procedures.

Without access to a commercial mixed waste disposal facility, there are three possible scenarios for handling potentially contaminated material:

Case 1 The waste is found to be mixed waste and is stored, treated, or disposed of at another DOE facility according to applicable orders and regulations.

Case 2 No radioactive component is detected; the waste is simply hazardous. Hazardous waste is shipped off site for treatment and disposal.

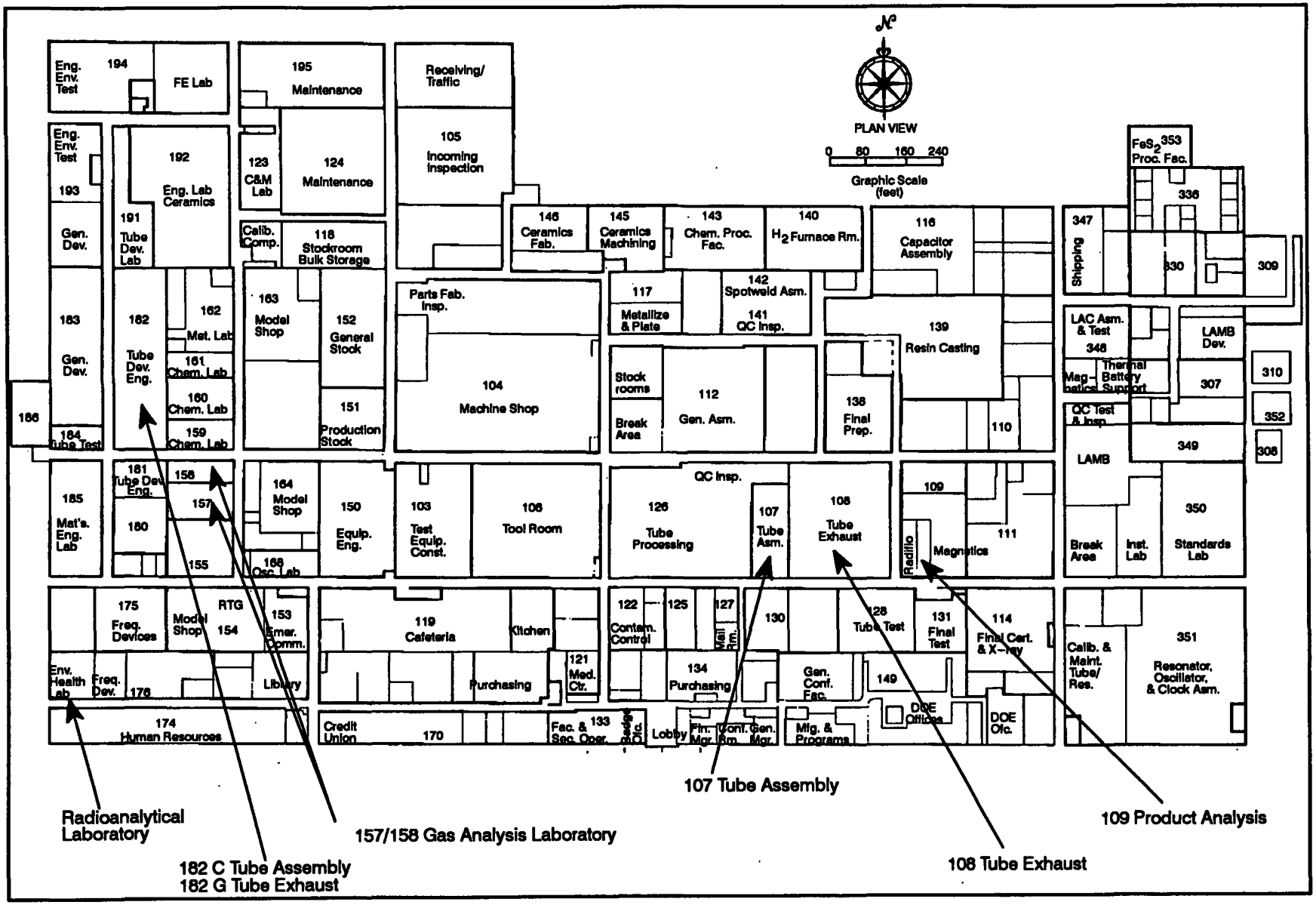


Figure 1-1. Pinellas Plant RMMAs in Existing First Floor Layout

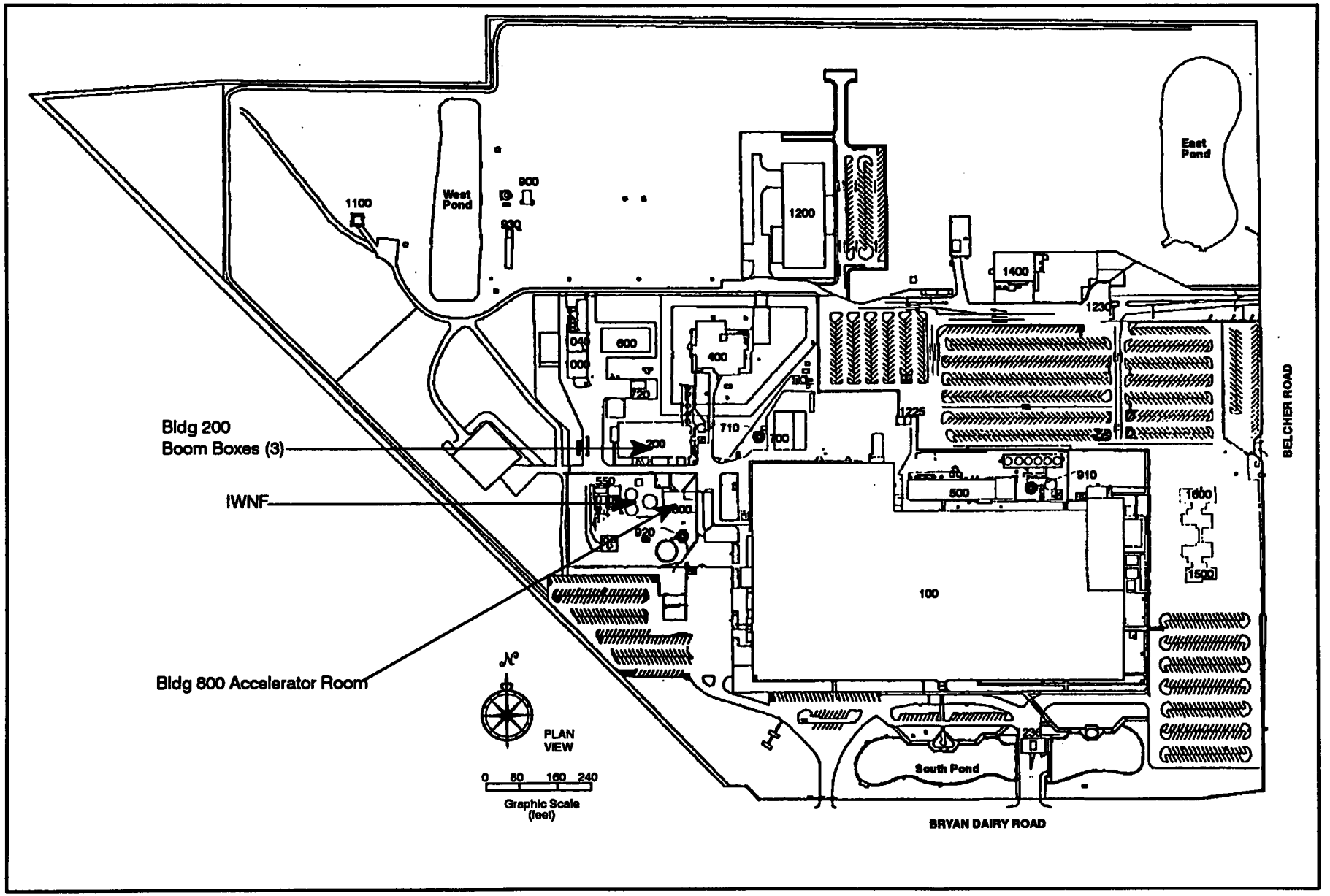


Figure 1-2. Pinellas Plant RMMAs - Site As-Built

No hazardous waste produced in RMMAs is being shipped to off-site commercial treatment, storage, and disposal facilities. Hazardous wastes from other areas of the plant are being shipped to pre-approved off-site commercial TSD facilities in accordance with Title 40 Code of Federal Regulations (CFR), Protection of Environment.

MMSC-QPP-0017, The Hazardous Waste Management Quality Program Plan, outlines quality assurance requirements for hazardous waste handling. These requirements are implemented by means of step-by-step instructions in operating procedures. Waste Management uses the procedures in MMSC-OSP-0027, Waste Management Operating Procedures Manual, to collect and prepare hazardous waste for disposal.

ES&H Standards 4.08, Storage, Handling and Use of Hazardous Material, and ES&H Standard 8.01, Chemical Waste Disposal, also provide guidance for the handling and disposal of hazardous waste.

Case 3 The waste is found to be mixed waste and is shipped off site to a licensed, RCRA-permitted commercial facility for treatment of the hazardous component, then returned to a DOE facility for treatment and/or disposal of the radioactive component.

The classification of an RMMA is based on materials (radioactive/chemical) used in the area, surface contamination, and the possibility of unencapsulated or unconfined radioactive material creating a potential for mixed waste production.

### 1.2.1 Determining the Radioactivity Status of Waste

Waste is considered mixed waste if either of the following conditions exists:

- Radioanalysis of the waste reflects a greater activity level than the established minimum detection limit and detection limit for that specific waste matrix. Waste Management must assume that the greater activity level has been caused by a process or by exposure to activating beams or particles at the Pinellas Plant.
- The waste is found to exceed the surface contamination criteria stated in DOE 5400.5.

Process Knowledge

The designation of an RMMA is the starting point for identifying mixed waste. A waste may be determined not to be a mixed waste based on the Pinellas Plants' knowledge of the origin, storage, use, and potential exposures of the waste material (see Figure 1-3, Waste Flow Diagram). After the establishment of an RMMA as defined in the performance objective, waste originating outside of the defined RMMA is considered nonradioactive. If a waste originates from within an established RMMA, process knowledge can still be used to determine that the waste is nonradioactive (i.e., sealed container that has never been opened). The

surface of the container would still have to meet requirements set forth in DOE 5400.5.

Specific plant locations are delineated as RMMAs on the basis of the processes and radioactive materials used in those locations. An RMMA is indicated if a potential for contamination exists because of the presence of unencapsulated or unconfined radioactive material (principally tritium), or because chemicals or other supplies used in the area are exposed to subatomic particles or beams capable of causing activation. The classification of an RMMA must be based on the potential for contamination during routine operations. Paragraph 1.2.8 of this document describes the RMMAs identified at the Pinellas Plant.

An FC-294, Chemical Certification Disposal Log, was developed for hazardous waste generators to enhance existing tracking procedures and to comply with DOE initiatives to maintain traceable records of hazardous waste movement from the point of generation through disposal.

Waste Management Operators have been instructed to only accept hazardous waste from generators that provide a properly completed FC-294 certifying that hazardous waste requiring disposal was not generated in an RMMA and is not a mixed waste. If the waste was generated in an RMMA, it requires the generator to call Waste Management for further guidance.

In addition, Waste Management developed the FC-2766, Certification of Conformance of the DOE Performance Objective, for the purpose of certifying that any waste that is generated in an RMMA has been analyzed in accordance with approved procedures, and meet all release criteria established by the DOE for certifying the waste as containing no DOE-added radioactivity.

The operator will maintain a drum record on each bulk hazardous waste drum, using the FC-294 provided by generators, listing the source of waste stream contained in the drum. In some instances, comparable waste streams from various areas are consolidated into one drum. The operators have been trained to list the source of each waste stream on the drum record.

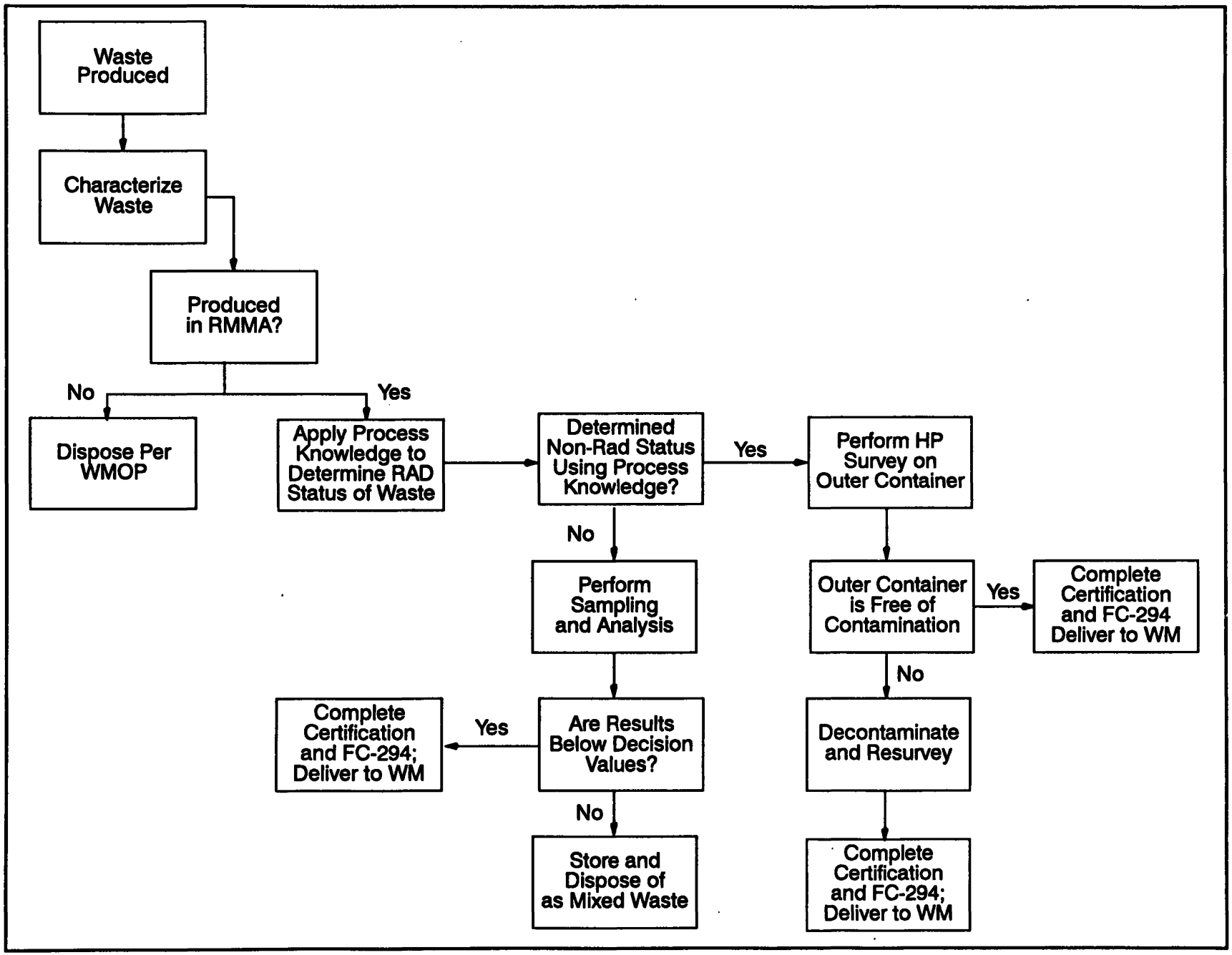


Figure 1-3. Waste Flow Diagram

The Specialist, Waste Management, will ensure that miscellaneous chemicals packaged using secondary packaging (lab packs) have certifications for each waste container packaged in the drum. In some instances, one certification may apply to several containers in a drum. A packing slip will also be completed listing each container packaged in the drum. The Specialist will maintain the certification record and packing slip as part of the shipping manifest file currently maintained for all hazardous waste shipments.

In some areas of the Pinellas Plant, special processes are performed on products or equipment. These processes may entail cutting or special cleaning operations. A description of the products is listed below:

Neutron Tube - Neutron tubes contain a small amount of tritium. The tritium is hydrided to occluder films in the tube under vacuum. Tritium hydrides used in neutron tubes are in a stable physical form. The tritium is contained within the tube envelope. This has been confirmed historically through smear survey data and product life.

The neutron tube envelope is used in nondestructive operations. It is very durable and is considered a sealed source at the Pinellas Plant. Incidents of tritium leakage or permeation with current neutron tubes are not common. Aqueous and nonaqueous liquids are used in nondestructive operations (cleaning and degreasing) at the Pinellas Plant. The liquids are sampled for tritium prior to disposal to determine if radioactivity has been added.

Destructive testing of neutron tubes is conducted dry. Areas where neutron tubes are dry destructive tested are controlled as RMMAs per ES&H Standard 8.05, Control of Potentially Contaminated Hazardous Waste (PCHW).

Neutron Generator - Neutron generators contain a neutron tube and associated electronics depending on the requirements. Neutron generators are coated and sealed to increase their strength and further prevent damage in handling. Neutron generators are considered a sealed source of tritium and leakage or permeation are not expected.

Destructive testing of neutron generators is conducted dry. Areas where neutron generators are dry destructive tested are controlled as RMMAs per ES&H Standard 8.05.

The Radioanalytical Laboratory - A counting laboratory who's primary function is to provide analytical as well as technical support to ES&H and Health Physics. Environmental sample analysis includes surface and subsurface waters, air filters, columns, as well as soil samples collected from various locations on and off site. Health Physics performs radiological surveys in a number of areas throughout the plant. Surveys are performed in radiological controlled areas, as well as uncontrolled areas. The Radioanalytical Laboratory also performs bioassay analysis on a daily basis.

Analysis is performed for tritium, uranium, and plutonium. Environmental and Health Physics analysis for tritium is performed by liquid scintillation counting using a nonhazardous, biodegradable cocktail. Plutonium and uranium analysis is performed in a fume hood reserved for plutonium and uranium analysis only. This area of the Radioanalytical Laboratory has been designated as an RMMA. All glassware and laboratory equipment dedicated to plutonium and uranium analysis is kept separate from other lab ware. The plutonium and uranium analysis process involves the use of acids, plutonium, and uranium tracers. The tracer materials are of a low activity (5-10 dpm). Acids ($HNO_3$ HCl, HF, HI, and $BO_3$) are also used. A waste beaker is set aside for solutions which may contain traces of plutonium and/or uranium activity. Prior to disposal, these solutions are heated to dryness.

The Radioanalytical Laboratory has completed a study and developed a procedure for the analysis of solvents (alcohol and acetone). Minimum detection activities for sample matrices consisting of 100 percent alcohol and 100 percent acetone have been determined. A detection limit has been established for these matrices in order to determine whether a waste contains radioactivity above background levels. The Radioanalytical Laboratory will design studies and develop analysis procedures based on their initial study for all waste matrices suspected of containing any added radioactivity.

The RMMAs are designated by the Manager, Radiological Control and the Specialist, Radioactive Waste in consultation with the Manager, Waste Management/Minimization. These professionals have the following qualifications:

- **Manager, Waste Management/Minimization** - This individual has nine years of experience in the hazardous waste field. She has attended RCRA courses and seminars, as well as Department of Transportation (DOT) classes for hazardous and radioactive waste transport. She is a certified Environmental Protection Agency (EPA) Trainer and has been instructed in NQA-1.
- **Specialist, Radioactive Waste** - This member of the Waste Management staff has eight years of experience in the Health Physics and radioactive waste fields. He worked as an Health Physics Technician with responsibility for radioactive waste before becoming a Specialist, Radioactive Waste. He has attended a DOT hazardous waste transportation class and numerous radiation training courses, including the Advanced Radioactive Training course offered by the DOT. In addition, he has completed RCRA training and has been instructed in NQA-1.
- **Manager, Radiological Control** - Certified Health Physicist, has over 11 years of experience in the field of radiation protection. He has attended

various DOT courses covering hazardous and radioactive waste transport and has been instructed in NQA-1.

Radiological Survey and Radioassay

The Pinellas Plant has an ongoing program to assess areas throughout the plant for their potential to produce mixed waste.

Waste would be considered contaminated on the basis of process knowledge alone if the waste originated in a contaminated area. However, Health Physics might still perform a radiological survey for informational purposes.

A radiological survey is performed by Health Physics to determine if waste contamination exceeds the site's surface contamination criteria. The site's limits are below those set in DOE 5400.5.

The Pinellas Plant relies primarily on radioassays to identify mixed waste [ES&H Standard 8.05].

The plant established a plan for sampling and analyzing hazardous wastes generated in RMMAs. This plan consists of the following steps:

1. All RMMAs are assessed for their potential to produce mixed wastes. Waste Management makes this assessment on the basis of the processes and chemicals used in each area. This information is obtained from the area manager or supervisor.

2. The manager of each RMMA area supplies Waste Management with a list of the hazardous chemicals used in the RMMA. In addition, the Specialist, Radioactive Waste compiles his own list based on an area assessment and observation of the processes that the chemicals are used in.

3. Virgin chemicals and waste materials from an RMMA are analyzed by the Radioanalytical Laboratory. Waste is stored in the generating area while the analysis is being performed.

   The Radioanalytical Laboratory analyzes the samples using a Beckman Liquid Scintillation Counter. The calibration of this device is routinely verified to meet the manufacturer's specifications. The analysis uses quench curves to determine efficiency of the instrument on the sample. This is based on U.S. National Institute of Science and Technology tritiated water standards and water blanks.

   Quality assurance samples are also analyzed to verify the results. The laboratory reports the results to Health Physics and to Waste Management.

   Sampling and analysis follow accepted practices that employ valid statistical methods to define confidence levels. The laboratory develops procedures as required to analyze each new chemical or material it receives. These procedures are prepared on the basis of current,

published chemical literature, as well as practices accepted by government regulators, including the following guidelines:

- NTIS Accession No. PB88-239223/XAB (EPA/SW-846), Test Methods for Evaluating Solid Waste. Field Manual, Physical/Chemical Methods (3rd Edition), Volume 2. Office of Solid Waste and Emergency Response, Environmental Protection Agency: Washington, DC.
- NTIS Accession No. DE88000215/XAB (DOE/EH-0053-V.4), Environmental Survey Manual, Volume 4. Office of Environmental Audit, Department of Energy: Washington, DC.
- NTIS Accession No. EMSL-LV-0539-17, Radiochemical Analytical Procedures for Analysis of Environmental Samples, F.B. Johns et. al. (authors). Environmental Monitoring and Support Laboratory: Las Vegas, NV.
- NTIS Accession No. DE91010178/XAB (HASL-300-ED.27-VOL.1), Environmental Measurements Laboratory (EML) Procedures Manual, N.A. Chieco et. al. (authors). Environmental Measurements Laboratory, Department of Energy: New York, NY.
- NTIS Accession No. PB84-215581 (EPA-520/5-84-006), Eastern Environmental Radiation Facility Radiochemistry Procedures Manual, R. Lieberman, Ed. Eastern Environmental Radiation Facility: Montgomery, AL.
- Section 6, Radioanalytical Laboratory procedures.

To determine if any radioactivity has been added to a material, a detection limit for the sample matrix will be used. The detection limit is based on blanks prepared from virgin chemicals.

The results of the waste radioassay are kept by Health Physics and the Specialist, Radioactive Waste. The Specialist retains copies of the virgin chemical analysis.

4. If any radioactivity has been added during DOE operations, the waste is considered mixed waste and is not released to a commercial TSD facility; it is stored on site pending the development of proper disposal procedures and the identification of a commercial TSD facility that is licensed to handle the waste.

5. If no radioactivity has been added during DOE operations, the waste is considered hazardous waste. A tag on a container of waste released from an RMMA and signed by Waste Management attests that the waste is free from added radioactivity. Once the moratorium is lifted, this waste will be shipped to a licensed commercial facility for recycling or disposal [WM.2.07, Bulk Chemical and Drum Waste Shipments, and WM.2.08, Hazardous Waste Transportation and Loading for Off-Site Shipment, and ES&H Standards. 8.01 and 8.05 Paragraph 6.4]. The certification of

nonradioactivity for RMMA hazardous waste can be traced to the waste shipment. Hazardous waste in drum shipments can be traced by comparing the analytical results to the drum log description and sampling records. For bulk shipments of hazardous waste, such as flammable liquids, Waste Management can compare dated inspection forms that indicate the amount of waste stored in each tank with the date the waste was certified as nonradioactive. Shipment papers identify the date the bulk waste was shipped.

### 1.2.2 Shipment of Mixed Waste to a Licensee

In accordance with DOE 5820.2A, Radioactive Waste Management, radioactive waste is disposed of at a DOE site.

If any waste produced at the plant is determined to be mixed waste, it will be stored in the generating area until proper storage and disposal procedures can be written and mixed waste disposal facilities can be identified.

### 1.2.3 Department of Transportation (DOT) Shipping Requirements

The Pinellas Plant does not ship mixed waste for disposal at present.

Radioactive waste shipping procedures are part of the ES&H Manual, ES&H Standard 8.04, Radioactive Waste Handling and Packaging, and WM 7.04, Radioactive Waste Shipments. These procedures conform to the requirements in Title 49 CFR, Transportation.

The Nuclear Materials Representative from the Facilities Division coordinates radioactive waste disposal facilities for shipments of radioactive waste between the Pinellas Plant and DOE.

### 1.2.4 Quality Assurance

Quality Program Plans (QPPs) are quality assurance documents that identify the Federal, State and local requirements and regulations that DOE facilities must follow in their daily operations. NQA-1, Quality Assurance Program Requirements for Nuclear Facilities, and DOE 5700.6C, Quality Assurance, outline the proper format and content of a QPP.

At the Pinellas Plant, QPPs are written and maintained by personnel who are well acquainted with the functions of a division or department, and the QPP must be approved by the Division Director or Department Manager. In addition, all QPPs are reviewed and approved by a representative from PAO to ensure the QPPs satisfy the requirements in NQA-1 and DOE 5700.6C.

The QPPs cited in this document pertain to waste management and characterization, including requirements for designating RMMAs and for determining whether DOE operations have added any radioactivity to a

material. A PAO representative has determined that the QPPs comply with the performance objective.

Operating procedures and standards apply the quality assurance requirements in the QPPs to day-to-day operations. A PAO representative has determined that the procedures that Waste Management employs to process hazardous waste conform to the performance objective. The PAO periodically audits Waste Management activities to ensure that personnel are following the operating procedures and standards.

Environmental Oversight and Quality Assurance (EO&QA), an independent group in the ES&H Division, conducts compliance audits and reviews and quality audits of environmental management activities to ensure compliance with environmental laws, regulations, requirements, permits, DOE orders, Lockheed Martin Command Media, Corporate Environmental Management, and Specialty Components policy and procedures.

Any future changes to the operating procedures, standards, or QPPs which may affect the plant's compliance with the performance objective will be reviewed and approved by line management and a PAO representative, as described in this section.

The Publications Section coordinates the review and approval of new and modified QPPs, standards, and operating procedures. Records Retention maintains a Master copy of each document, oversees the distribution of current manuals and plans, and keeps a record of past revisions.

### 1.2.5 Training

A performance-based RMMA training program has been developed based on the requirements in the performance objective. The RMMA training consists of a computer-based portion along with area-specific classroom training. Personnel required to complete this training include radiation workers, maintenance workers, calibration personnel, members of the ES&H Department, and the Waste Management Operation employees. Certain Directors, Managers, and DOE employees are also included in the training program.

Waste Management staff are retrained annually. The Manager, Waste Management/Minimization assesses each person's training needs at the start of employment and on the basis of periodic self-audits. Waste Management personnel who designate work areas as RMMAs must complete radiological training and hazardous waste training.

Health Physics personnel attend off-site radiological training, as well as on-site training by a Health Physicist. Only a Health Physicist may certify hazardous waste as nonradioactive.

All personnel who handle radioactive material receive annual radiological training every two years. A training procedure for handling radiological waste is being developed.

Training records are maintained by the Group Leader in the plant's Procurement and Distribution Department. Training effectiveness is evaluated by comparing performance on the job with operating procedures and standards.

### 1.2.6 Records

All records associated with procedures incorporated in this document and covered by the performance objective are quality records and are maintained as permanent records, pending the incorporation of retention guidelines into DOE 1324.2A, Records Disposition.

Records related to radioactive and mixed waste disposal are retained by the Specialist, Radioactive Waste and by Security.

Records related to nonradioactive hazardous waste disposal are retained by the Manager, Waste Management/Minimization and the Specialist, Hazardous Waste.

Revision records for the procedures and plans themselves are maintained by Records Retention.

### 1.2.7 Review and Approval of Criteria and Procedures

The following manuals contain operating procedures and standards covered by the performance objective:

Waste Management Operating Procedures Manual

Waste Management Operating Procedures are developed and maintained by Waste Management Specialists and approved by the Manager, Waste Management/Minimization. Procedures for nonroutine operations are also reviewed by the Director, ES&H and by Health Physics.

The Manager, Waste Management/Minimization ensures that the operating procedures include performance criteria for subcontractors, as outlined in the Hazardous Waste Management QPP. The Manager also checks to make sure that the operating procedures satisfy government regulations and requirements including, but not limited to, the following:

- Florida Department of Environmental Protection Operating Permit Number HO52-159339
- Title 40 CFR, Protection of Environment, Parts 260-266, U.S. Environmental Protection Agency
- Title 49 CFR, Transportation, Parts 100-177, U.S. Department of Transportation

- SW-846, Test Methods for Evaluating Solid Waste, U.S. Environmental Protection Agency
- ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities
- DOE 5400.5, Radiation Protection of the Public and the Environment
- DOE 5480.3, Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes
- DOE 5700.6C, Quality Assurance
- DOE 5820.2A, Radioactive Waste Management

Environmental, Safety and Health Manual

The ES&H Standards related to Waste Management are prepared by Waste Management Specialists, reviewed by the Manager, Waste Management/Minimization, and approved by the Director, ES&H.

Radiological Control Manual

The Radiological Control Manual is reviewed and approved by the Radiological Control Manager. The Manager, Radiological Control reports to the Director, Radiological Operations.

Laboratory Procedures

Radioanalytical Laboratory procedures have been developed by a Senior Developmental Chemist and approved by the Manager, Laboratory Operations.

### 1.2.8 Descriptions of Pinellas Plant Radioactive Materials Management Areas

107 Tube Assembly and 182C Tube Assembly

The processes performed in the Tube Assembly areas include vacuum firing, evaporation, welding, brazing and particle blow-off.

The primary contamination concern in these areas is the brazing operation. Tritium-loaded domes are brazed; although the domes are sealed there is always a possibility of leakage. In addition, the Tube Exhaust areas are located next to, and work with, the assembly areas, so there is a possibility of contamination's spreading to those areas.

108 Tube Exhaust and 182G Tube Exhaust

The Tube Exhaust areas are the locations in which tritium is actually loaded into the tubes or domes. The areas contain several tritium beds. Tubes are loaded, exhausted and baked in these areas.

Contaminated molecular sieves and contaminated oils are stored in Area 108.

157/158 Gas Analysis Laboratory

Thin-film hydrides that contained tritium were analyzed in the Gas Analysis Laboratory using mass spectrometers. Tritium standards were used to calibrate the sensitivity in these instruments.

Tritium targets from the Engineering areas were also analyzed here. Tubes were disassembled and the targets, sources and getters were analyzed.

Building 200 Environmental Test

In Building 200 Environmental Test, tubes and generators were destructively tested. This effort included exploding some units in "boom boxes."

Area 109 Product Analysis

The Area 109 Product Analysis Laboratory analyzes defects in ferroelectric neutron generators. Also, debris from the destructive testing process in Building 200 is sent to the Product Analysis Laboratory, where it is analyzed for defects in the manufacturing process.

Building 800 Accelerator

The accelerator in Building 800 is used to irradiate battery compound samples (such as lithium and silicon) with high-flux neutrons. The accelerator beams on tritium-loaded targets.

Neutralization Facility

The Pinellas Plant operates a neutralization facility for the purpose of maintaining a pH balanced effluent prior to discharge to the Publicly Owned Treatment Works (POTW). Wastewater is piped through a system of drains and separated into three types of streams. Sanitary wastewater effluents are pumped into a series of lift stations and then discharged to the POTW. Industrial wastewater consisting of deionized water, air handler condensate, acid and caustic discharges, and plating bath rinse waters are pumped into lift stations and then conveyed to the Industrial Wastewater Neutralization Facility (IWNF). Wastewater effluents from radiological areas are piped to three above ground holding tanks prior to tritium analysis, then discharged to the IWNF. The combined wastewater streams are then discharged. Occasionally, the IWNF tanks require cleaning to remove accumulate solids and precipitants (sludge). It is this sludge that is a potential concern related to this document.

Radioanalytical Laboratory

The Radioanalytical Laboratory is a counting laboratory. It's primary function is to provide analytical as well as technical support to ES&H and Health Physics. Analysis is performed for tritium, uranium, and plutonium. Plutonium and uranium analysis is performed in a fume hood

reserved for plutonium and uranium analysis only. All glassware and laboratory equipment dedicated to this process is kept separate from other lab ware. The plutonium and uranium analysis process involves the use of acids, plutonium, and uranium tracers. A waste beaker is set aside for solutions which may contain traces of plutonium and/or uranium activity. Prior to disposal, these solutions are heated to dryness.

### 1.2.9 Referenced Documents


DOE 1324.2A, Record Disposition

DOE 5400.5, Radiation Protection of the Public and the Environment.

DOE 5700.6C, Quality Assurance

DOE 5480.3, Safety Requirements for the Packaging and Transportation of Hazardous Materials, Hazardous Substances, and Hazardous Wastes.

DOE 5820.2A, Radioactive Waste Management

Vermont State Nuclear Advisory Panel, 1979, A Primer on Radiation, p. 14.

MMSC-ESH-92010, Radiological Control Manual, December 1, 1992

MMSC-QPP-0017, Hazardous Waste Management Quality Program Plan, February 3, 1993

MMSC-OSP-0027, Waste Management Operating Procedures Manual, June 14, 1993

CHM 2201-4, Environmental Chemistry Laboratory Procedure, General Liquid Scintillation Analysis for Tritium, January 21, 1992.

MMSC-QPP-0019, Quality Program Plan for Radioactive and Mixed Waste Management, December 21, 1992.

Waste Management Procedures:

| | |
|---|---|
| WM 2.01 | Hazardous Waste Drum Preparation, Removal and Storage |
| WM 2.02 | Daily Chemical Waste Pickup |
| WM 2.04 | Bulk Chemical Waste Storage |
| WM.2.07 | Bulk Chemical and Drum Waste Shipments |
| WM.2.08 | Hazardous Waste Transportation and Loading for Off-Site Shipment |
| WM 3.01 | Sampling Methods for Nonradioactive Waste and Environmental Sites |
| WM 3.02 | Shipping Samples for Analysis |

MMSC-ESH-0006, Environmental, Safety and Health Manual, July 30, 1993

ES&H Standards:

| | |
|---|---|
| Std. 4.08 | Storage, Handling, and Use of Hazardous Materials |
| Std. 8.01 | Chemical Waste Disposal |
| Std. 8.04 | Radioactive Waste Handling and Packaging |
| Std. 8.05 | Control of Potentially Contaminated Hazardous Wastes (PCHW) Tritium Removable Contamination Standards |

### 1.3 Shipment Forecasts

Historically, tank sludge build up has been removed every two years. The last shipment occurred in April 1992. However, with lower production activity at the plant, it is estimated that three years will produce approximately the same quantity. In 1995, it was estimated that 189 cubic meters (liquid volume) of sludge required disposal. This will constitute the final shipment of contaminated sludge.

Two additional waste streams are described including compactable solid waste and construction debris that are estimated to be one cubic meter each. Also, in March 1966, a waste volume study which included an evaluation of Mixed Low-Level Waste (LLW) was published. Section 2 of the study contains Table 2-2 which lists a number of potential mixed waste streams and one declared mixed waste. This latter stream (Mix-1) is addressed in the construction debris stream described in this Exemption Request. Of the remaining streams in Table 2-2, other options such as decontamination or recycling appear more promising than disposal at Envirocare.

## 2.0 SHIPMENT CAMPAIGN AND TREATMENT, STORAGE, AND DISPOSAL FACILITY

### 2.1 Industrial Wastewater Neutralization Facility (IWNF)

A potential source of mixed waste generation is the IWNF. Wastewater from plant operations is generated as three separate types of effluents:

1) Sanitary wastewater effluents are pumped into a series of lift stations and then discharged directly to the POTW without receiving treatment.

2) Industrial wastewater, which consists of deionized water, air handler condensate, acid and caustic discharges, nickle plating bath rinse waters, and water from various cleaning operations, enters the northwest lift station and then on to the IWNF.

3) Wastewater effluents from radiological areas (rad drain) are piped to three above-ground Health Physics holding tanks and are held there until the tritium analysis is complete. Once released by the Radiological Laboratory, the wastewater is then discharged to the IWNF.

The combined wastewater now enters the equalization tank where it is agitated to thoroughly mix the components and obtained a stable pH. The pH is adjusted at this time, if necessary, with either sodium hydroxide or sulfuric acid. The wastewater is then transferred to the neutralization tanks.

The wastewater now enters Neutralization Tank No. 1 and/or Tank No. 2, depending on operating conditions and capacity needed at the time. The pH can be adjusted in the neutralization tanks, if necessary. Much of the particulates and suspended solids settle out at this time and result in a sludge accumulation at the bottom of the neutralization tanks. Because the system receives rinse water from plating operations, the sludges are classified as a hazardous waste. They are assigned the EPA Hazardous Waste Code No. F006.

The neutralization tanks are approximately 25 feet in diameter and 20 feet high with a cat-walk around the outside and across the center. The neutralization tanks typically contain about 10 feet of water overlying the sludge. This water continuously overflows an inner wall in the neutralization tank and flows down a drain between the inner and outer wall of the tank and is discharged to the Pinellas County POTW.

All wastewater discharges are based on compliance with the Pinellas Plant's Industrial Wastewater Discharge Permit (No. 018-IE) issued by the Pinellas County Sewer System. This permit establishes limits for metal concentrations, biochemical oxygen demand, pH, and total suspended solids. Tritium limits for effluent discharges are based on compliance with 49 CFR and DOE orders. The plant has never had an excursion of tritium since the IWNF began operation.

When the sludge accumulates to a depth of approximately 2 to 3 feet, the decision is made to have the sludge removed. The sludge must be sampled and analyzed for tritium activity and RCRA constituents before removal to recognize any safety precautions that need to be taken during the removal process and to choose the appropriate disposal methods and disposal site.

The sludge has been removed in the past by means of an industrial sized pump and is accumulated into tanker trucks. After removal, the sludge was transported to a commercial hazardous waste disposal facility.

## 2.2 Waste Characterization for the F006 Sludge

### 2.2.1 Project Description

In accordance with DOE requirements, a sampling and analysis plan must be submitted for approval prior to any sampling activity or sludge shipments to a hazardous waste disposal facility. This plan provides the procedures utilized for the sampling and analysis of the accumulated sludge in Neutralization Tank No. 2. This information is essential to the accurate identification of any tritium activity or RCRA constituents and for choosing the proper disposal method.

### 2.2.2 Sampling and Analysis Schedule

The initial sampling and analysis will encompass the sludge at the bottom of Neutralization Tank No. 2. In the future, this sampling and analysis plan may be used to sample Neutralization Tank No. 1. After the initial sampling and analysis, periodic samples will be analyzed

based on the amount of accumulated sludge at the bottom of the neutralization tanks.

### 2.2.3 Waste Identification

This sampling plan specifically addresses the sampling and analysis of the accumulated sludge on the bottom of Neutralization Tank No. 2. The waste is a sticky material with a foul odor. Tritium could have contaminated the sludge through the rad drain as a result of small liberations during routine plant operations. The RCRA constituents could possibly contaminate the sludge during routine plant operations such as electroplating, chemical etching, and cleaning processes.

### 2.2.4 Objectives of Sampling and Analysis

The objectives of the sampling and analysis plan are to:

1) Provide enough information to make the analysis results representative of the waste sludge that has accumulated in the past, as well as improve generator knowledge of the waste.

2) Determine that the waste meets DOE and 10 CFR tritium limits for effluent discharges.

3) Identify the present and concentrations of all parameters listed in the following Laboratory Analysis Section.

### 2.2.5 Analysis Plan

Laboratory Analysis

The sludge samples will be submitted for analysis to the Radiological Laboratory to determine tritium activity. They will also be submitted for analysis to a State of Utah certified laboratory for full characterization including the follow parameters:

A) Identify the presence and concentrations of the Toxicity Characteristic Leaching Procedure (TCLP) metals:

| Analyte | SW846 Test Method |
|---|---|
| As | 7061 |
| Ba | 7080 |
| Cd | 7131 |
| Cr | 7191 |
| Pb | 7421 |
| Hg | 7471 |
| Se | 7740 |
| Ag | 7760 |

B) Identify the present and concentration of the following organic compounds:

| Analyte | SW-846 Test Method |
|---|---|
| TCLP volatiles | 8010, 8020, 8040, 8080, 8240 |

C) Identify the presence and concentrations of the following organic compounds:

| Analyte | SW-846 Test Method |
|---|---|
| TCLP Semivolatiles | 8250, 8270, 8280 |

D) Identify the presence and concentrations of the following parameters:

| Analyte | SW-846 Test Method |
|---|---|
| Total Cyanides | 9010 |
| Amenable Cyanides | 9010 |

E) Quantify the following parameters:

| Parameter | SW-846 Test Method |
|---|---|
| pH | 9040 |

| Parameter | EPA Test method |
|---|---|
| Percent Solids | 160.3 |
| Percent Water | 160.3 |

Quality Objectives

Quality objectives are designed to meet the requirements of SW-846, Test Methods for Evaluating Solid Waste, EPA. The procedures for sampling and analyzing the waste sludge are included in this document.

Use of Process Knowledge and Existing Analytical Data

Based on process knowledge and past analytical data, it is known that the waste sludge is near background levels for tritium. However, process knowledge cannot be provided for other possible hazardous constituents. It is through the use of sampling and analysis that any other hazardous constituents will be identified.

Use of Results

Result of the sampling and analysis will be used to demonstrate compliance with 10 CFR and DOE orders. They will also be used to ensure compliance with RCRA hazardous waste regulations. In the event that the analysis reveals hazardous constituents, the results will be used to develop a treatment plan to facilitate land disposal.

### 2.2.6 Personnel and Responsibilities

In order to implement a quality sampling and analysis plan, a number of personnel and disciplines are involved. Below is a list of the personnel and their responsibilities within the sampling and analysis plan:

**Health Physics** - Issue a Special Work Permit (SWP) allowing for the sampling of the waste sludge.

**Waste Facility Operator** - Sample the waste sludge under the supervision of a Specialist, Waste Management.

**Environmental Technician** - Assist in the sampling and supervises the completion of the related documents such as NFC-156, Certification of Representative Sample.

**Advanced Specialist, Waste Management** - Direct, coordinate, and supervise the waste sludge sampling.; write the sampling and analysis plan; arrange for the transportation of the samples to a qualified laboratory for analysis; complete the shipping paperwork; approve the Chain of Custody Record.

**Packaging Engineer** - Supervise the packaging of the waste sludge samples in accordance with DOT regulations.

**Receiving and General Stock** - Ship samples that are transported by a designated carrier. Inputs information from the Shipper/Purchase Order into the Shipment Mobility/Accountability Collection System.

**Purchasing** - Provide the shipper POs used to ship samples of waste sludge for analysis; issues a Purchase Order number in response to a General Purchase Requisition (GPR)

**Specialist, Quality Assurance** - Evaluate vendor qualifications and monitors the performance of outside laboratories on the basis of supplier surveys and scope of work submitted with the GPR.

### 2.2.7 Supplies Needed

Safety Equipment

- Safety glasses
- Rubber gloves
- Tyvex suit
- Plastic apron

Materials Checklist

- Sample log book
- Sampling Plan
- FC-2604, Sample Information Form
- FC-209, Chain of Custody Record
- Sampling device, such as a stainless steel corer
- Precleaned glass sample jars
- Precleaned one-gallon glass jar
- Precleaned glass stirring rod
- Precleaned glass coliwasa
- Identification labels
- Safety equipment

### 2.2.8 Sample Documentation

A sample is tracked from its collection point through analysis by using several types of documentation.

Log Entry

The Advanced Specialist, Waste Management maintains a sample log book. The sample log book is used to record and number all waste samples as they are collected.

Sample Labeling

Every sample is required to have a label that indicates the name of the material sampled, sampling date and time, area in which the sample was collected, and the sampler's signature.

FC-2604, Sample Information Form

Sample information is used to communicate sampling and analysis instructions and to certify that the samples collected are representative of their source. The sample information form is filled out by the personnel requesting sampling and by the personnel who collect the samples. Multiple samples can be recorded on one form providing they

originate from the same source. Split samples share the same ID number and are distinguished by a letter suffix (-A, -B, etc.). Before giving the sample information form to the Advanced Specialist, Waste Management, the sampler photocopies the analysis parameters on page two and attaches them to the Chain Of Custody Record.

NFC-209, Chain of Custody Record

The Chain of Custody Record is used to track samples from their source, through analysis, and back to Waste Management. The Chain of Custody Record is filled out by the sampler, approved by the Advanced Specialist, Waste Management and is signed over to the person who is delivering the samples to the laboratory. This delivery person signs the Chain of Custody Record indicating possession of the samples. The delivery person then signs the Chain of Custody Record over to the person taking possession of the samples at the laboratory. The person receiving the samples at the laboratory signs the Chain of Custody Record indicating he has possession of the samples. The samples are kept in a locked cabinet until they are analyzed and the results are reviewed. The laboratory returns the Chain of Custody Record with the analysis results attached, as well as any remaining sample, to Waste Management.

### 2.2.9 Sampling Discussion

Sampling Purpose

The purpose of this procedure is to direct the collection of waste sludge samples for analysis. The waste sludge will be sampled and analyzed for tritium activity and RCRA hazardous constituents prior to shipment to a disposal facility.

Definitions

**Representative Sample** - A sample that reflects the entire contents of the sampled vessel. This procedure requires the collection of representative samples of the accumulated waste sludge.

**Sample Custodian** - The person who has physical possession of the sample, or the person who last possessed it if it has not been formally transferred to another person or facility, such as a laboratory. The transfer of a sample from one custodian to another must be recorded on a Chain of Custody Record.

Number of Samples

The neutralization tank will be sampled in ten random locations. A core will be taken from the top to the bottom of the sludge at each of the ten locations. Each core will be placed into a precleaned one-gallon glass jar and thoroughly stirred with a precleaned glass stirring rod or coliwasa. The stirred sample will then be split by pouring sample into four precleaned, 8 oz glass sample jars and one 30 ml Volatile Organic

Compound (VOC) vial. The samples will be allocated according to the following chart:

| Sample Description | Test Parameter |
|---|---|
| No. 1 8-oz. jar | Library sample |
| No. 2 8-oz. jar | TCLP metal, solid, moisture |
| No. 3 8-oz. jar | Tritium analysis, pH |
| No. 4 8-oz. jar | TCLP semivolatiles |
| 30 ml VOC vial | TCLP volatiles |

In order to avoid confusion during the sampling process, the allocation of the samples cannot be changed without a rewrite of the Sampling and Analysis Plan by the Advanced Specialist, Waste Management. The samples will be shipped to the appropriate laboratories for analysis.

Sampling Rationale

The rationale in sampling is to collect a representative sample of the accumulated waste sludge which contains all of the substances that are present in the Neutralization Tank No. 2. This sample will then be analyzed for tritium activity, as well as RCRA constituents, to determine the appropriate disposal method.

Sampling Strategy

The strategy in sampling the Neutralization Tank No. 2 will be to core down through the sludge until the bottom of the concrete tank is reached in 10 randomly chosen locations with a stainless steel coring device. Coring from top to bottom will negate any affect of stratification or layering of the sludge in the neutralization tank. This core of material will be thoroughly stirred with a precleaned glass stirring rod or coliwasa. The stirred sample will be used to fill four 8 oz. glass sample jars and one 30 ml VOC vial.

### 2.2.10 Sampling Procedure

The Advanced Specialist, Waste Management will obtain a SWP from Health Physics allowing for the sampling of the accumulated waste sludge.

The water is drawn down in the neutralization tank(s) within a few inches of the sludge to allow Waste Management personnel to retrieve composite samples.

The Advanced Specialist assigns personnel to perform the sampling. All sampling must be done by two members of Waste Management: One collects the samples while the other directs according to this procedure.

The Waste Facility Operator will put on safety glasses, rubber gloves, a tyvex suit, and a plastic apron. Under the supervision of the Advanced Specialist, the Waste Facility Operator will determine the sampling locations in the Neutralization Tank No. 2 as designated by the sampling plan.

Using a stainless steel coring device, the Operator will core down through the sludge at each of the designated locations until the bottom of the concrete tank is reached (approximately 2-to-3 feet). The material removed from the tank with the coring device will be placed into a precleaned 1-gallon glass jar.

The material in the 1-gallon glass jar will be thoroughly mixed by stirring with a precleaned glass stirring rod or coliwasa. The mixed sample will be placed into 4 precleaned, 8-ounce glass sample jars, and one 30 ml VOC vial. The lids will be placed on the sample jars and the sample labels will be attached to the sample jars.

One 8-ounce sample jar will be held by Waste Management as a back-up (library sample) and the 3 other 8-ounce sample jars, along with the 30 ml VOC vial, will be shipped to the appropriate laboratories for analysis.

### 2.2.11 Initial Sampling Results

On July 25, 1995, the sampling and analysis plan as detailed above was utilized to characterize the F006 sludge. From an average of 10 samples, the tritium level was measured at 28.998 pCi/gm. No TCLP metals, volatiles or semivolatiles exceeded regulatory limits. The data complies with the Envirocare WAC.

### 2.2.12 Reference Documents

Title 40 CFR, Parts 260 through 266.

Title 49 CFR, Parts 100 through 177.

SW-846, Test Methods for Evaluating Sold Waste, Environmental Protection Agency (EPA)

NVO-325 (Rev. 1) Nevada Test Site (NTS) Defense Waste Acceptance Criteria, Certification, and Transfer Requirements.

## 2.3 Waste Characterization for Cleanup and Debris

The remaining two proposed waste streams are separated by compactability and treatment requirements. The compactable waste stream is comprised of soft materials such as wipes or clothing and apparel which may be contaminated with materials that can be treated by macroencapsulation. The

debris from the dismantlement waste stream cannot be compacted and is contaminated with lead.

Characterization of the compactable stream is done using process knowledge and from analytical testing of equipment or facilities that require cleaning. If solvents are required to remove organic contaminants in all areas or on equipment, it may be preferable to create a small quantity of mixed waste to avoid a larger problem.

The material is so heterogeneous that it cannot be sampled by a quantitative technique. The characterization of the waste must be inferred from analytical results of samples taken from the equipment or facilities.

Characterization of construction debris is carried out by direct sampling of the material such as HEPA filters and plumbing which contains lead-tin solder joints. From previous experiments with radiologically clean plumbing containing the same type of solder joint, it is known the material will fail TCLP for lead. The radiologically-contaminated debris will be sampled and sent to a Utah certified laboratory that can perform both radiological and TCLP metals analysis. In cases where experimentation is not useful, the debris is sampled and sent to a certified laboratory such as Rust Geotech in Grand Junction, CO.

All samples are handled following the procedures described in Section 2.2 of this document.

## 2.4 Assessment of Envirocare Facility

Envirocare of Utah, Inc., is a disposal facility for low specific activity radioactive and mixed waste located in Tooele County, Utah. The facility is located on the eastern edge of the Great Salt Lake Desert, 80 miles west of Salt Lake City and approximately three miles south of Interstate 80. The disposal site is in an area set aside by the county and zoned for radioactive and hazardous waste disposal.

The Envirocare facility adjoins the DOE Vitro Uranium Mill Tailings disposal facility. The DOE facility contains several million cubic yards of low-level radioactive mill tailings generated by the Vitro Company at their former uranium mill near Salt Lake City. An Environmental Impact Statement (EIS) was completed by DOE on the suitability for using the site for the disposal of radioactive material at the time the mill tailings were placed there.

The climate is typically desert arid conditions, with average annual rainfall of less than 5 inches and evaporation rate of greater than 70 inches. The groundwater levels under the site vary from 20-to-30 feet below ground surface. The groundwater at the site is classified as "briny." The EIS conclusion on the site was, "Given existing technologies, however, development of the area for any purpose appears unlikely because of it unproductive soil, and its remoteness from population centers." There are no residential and agricultural activities within a 30-mile radius of the facility.

In early 1995, the DOE/Oak Ridge Operations (ORO) conducted an audit of the Envirocare facility in Clive, Utah. The Environmental, Safety, and Quality

Report was issued by ORO on November 17, 1995. See Appendix B for additional explanation.

Envirocare has a Radioactive Material License, No. UT 2300249, Amendment No. 14, issued on September 10, 1993 (see Appendix C). The license was issued by the Utah Bureau of Radiation Control, which is an agreement with the NRC for certain types of radioactive material. The license permits Envirocare to accept Naturally Occurring Radioactive Material (NORM) waste such as Radium-226, source material, special nuclear material, and depleted uranium. Although depleted uranium is technically source material, it is specifically called out to prevent confusion. Additionally, Envirocare is pursuing a license from the NRC to permit them to dispose of by-product materials.

Envirocare also has a Part B permit, EPA Identification No. UTD982598898, to dispose of radioactive mixed waste at their facility (see Appendix C). This permit was issued November 30, 1990, by the Utah Bureau of Solid and Hazardous Waste.

Each NRC licensee must meet financial responsibility requirements as a license condition, and the financial responsibility requirements for commercial radioactive waste burial facilities provide assurance that funds are available for closure and monitoring of the site prior to the termination of the license. There are similar financial responsibility requirements under RCRA; these would be applicable to commercial disposal sites for mixed wastes. Envirocare has met these financial requirements.

Waste can be received by the Envirocare facility in a number of ways. It can be shipped via trucks using Interstate 80, or by rail using Union Pacific's main rail line that runs east and west about one mile north of the site. Envirocare owns a rail spur that extends from the Union Pacific rail to the facility. The site is equipped with a rail car rollover system that can quickly unload large volumes. Waste can be received by the site in a number of forms ranging from barrels, boxes, and bags, to bulk rail cars.

The material is placed in the cell in one-foot lifts. Each lift is compacted and its compaction checked prior to the next placement of waste. The compaction criteria required does preclude the placement of soil while the material is frozen so the soil received in the winter is typically stored on site until spring. Accurate records are maintained on the location of the waste in the cell. The waste placed in the cell are segregated by waste generators to build a waste specific cell for the exclusive use of that client.

Envirocare has an established relationship with the Utah Bureau of Radiation Control, which maintains an on-site field office to monitor activities at the site. There is currently no State opposition to bringing out-of-state waste to the site.

## 2.5 Comparison of DOE and NRC Requirements

This section is a comparison of the requirements of DOE 5820.2A with the NRC requirements at 10 CFR 61.

| COMPARISON OF REQUIREMENTS<br>DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| Charter III: Policy Statements | |
| 1.0 DOE low-level waste operations shall be managed to protect the health and safety of the public, preserve the environment, and ensure that no legacy requiring remedial action remains after operation | 61.23 A license for the receipt, possession, and disposal of waste containing or contaminated with source, special nuclear, or by-product material will be issued by the Commission upon finding that the issuance of the license will not be inimical to the common defense and security and will not constitute an unreasonable risk to the health and safety of the public and . . |
| 2.b DOE-low-level waste operations shall be managed on a systematic basis using the most appropriate combination of waste generation reduction, segregation, treatment, and disposal practices so that the radioactive components are contained and the overall system cost effectiveness is maximized. | No directly comparable requirement. |
| 2.c DOE-low-level waste shall be disposed of on the site at which it is generated if practical, or if on-site disposal capability is not available, at another DOE disposal facility. | No directly comparable requirement. |
| 2.d DOE-low-level waste shall conform to the requirements of DOE 5820.2A, applicable EH Orders and shall also be regulated by the appropriate regional authorities under RCRA. | 61.23 See previous description. |
| Requirements | 61.23 See Previous description. |
| 3.a.1 Protect public health and safety in accordance with standards specified in applicable EH Orders and DOE Orders. | |
| 3.a.2 Assure that external exposure to the waste results in an effective dose equivalent (EDE) that does not exceed 25 mrem/yr to any member of the public. | 61.41 Concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public.<br><br>Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environmental as low as is reasonably achievable. |

| COMPARISON OF REQUIREMENTS DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.a.2 Releases to the atmosphere shall meet the requirements of 40 CFR 61. | 61.41 See previous description. |
| 3.a.3 Assure that committed effective dose equivalents received by intruders after loss of institutional control (100 years) will not exceed 100 mrem/yr for continuous exposure or 500 mrem for a single acute exposure. | 61.42 Design, operation, and closure of the land disposal facility must assure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after institutional controls over the disposal site are removed. |
| 3.a.4 Protect ground water resources consistent with Federal, State and local requirements. | No directly comparable requirement. |
| 3.b.1 Field organizations with disposal sites shall prepare and maintain a site specific radiological performance assessment for the disposal of waste to demonstrate compliance with the performance objectives stated in paragraph. 3a. | 61.40 Land disposal facilities must be sited designed operated, closed, and controlled after closure so that reasonable assurance exists that exposures to humans are within the limits established in the performance objective in 61.41 through 61.44. |
| 3.b.2 Each field organization shall, for each DOE reservation within it cognizance, prepare and maintain an overall waste management systems performance assessment supporting the combination of waste management practices being used. | No directly comparable requirement. |
| 3.b.3 Where practical, monitoring measurements to evaluate actual and prospective performance should be made at locations as required within and outside each facility and disposal site. | 61.53(c) During the land disposal facility site construction and operation the licensee shall maintain a monitoring program. Measurements and observation must be made and recorded to provide data to evaluate the potential health and environmental impacts during both the construction and the operation by the facility and to enable the evaluation of long-term effects and the need for mitigative measures. The monitoring system must be capable of providing early warning or radionuclides from the disposal site before they leave the site boundary. |
| 3.c.1 Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring dose. | No directly comparable requirement. |
| 3.c.2 All DOE-low-Level waste generators shall establish auditable programs to ensure that the amount of low-level waste generated and/or shipped for disposal is minimized. | 61.52a(11) Only wastes containing or contaminated with radioactive materials shall be disposed of at the disposal site. |

| COMPARISON OF REQUIREMENTS DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.c.3 Each DOE-low-level waste generator shall separate uncontaminated waste from low-level waste to facilitate cost effective treatment and disposal. | 61.52a(11) See previous description. |
| 3.c.4 Each DOE-low-level waste generator preparing a design for a new process or process change shall incorporate principles into the design to minimize generation of low-level waste. | This appears to be a generator requirement. |
| 3.d.1 Low-level waste shall be characterized with sufficient accuracy to permit proper segregation, treatment, storage, and disposal. | This appears to be a generator requirement. |
| 3.d.2 Waste characterization data shall be recorded on a waste manifest, and include: a) physical and chemical characterization of the waste, b) volume of waste, c) weight of waste, d) major radionuclides and concentrations, e) packaging date, package weight, and external volume. | This appears to be a generator requirement. |
| 3.d.3 The concentration of a radionuclide may be determined by direct methods or by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured. | 61.55a(8) The concentration of a radionuclide may be determined by indirect methods. |
| 3.e.1 Waste shipped from one field organization to another for treatment, storage or disposal shall be done in accordance with the requirements established by the operations office having responsibility for operations of the receiving facility. | No directly comparable requirements. |
| 3.e.2 Waste acceptance criteria shall be established for each low-level waste treatment, storage, and disposal facility, and submitted to the cognizant field organization. | No directly comparable requirements. |
| 3.e.3 Generators of waste shall implement a low-level waste certification program to provide assurance that the waste acceptance criteria for any low-level waste treatment, storage, or disposal facility used by the generator are met. Generators and facilities receiving the waste are jointly responsible for assuring compliance with waste acceptance criteria. | This appears to be a generator requirement. |
| 3.e.4 Generator low-level waste certification programs shall be subject to a periodic audit by operators of facilities to which the waste is sent by the generator. | This appears to be a generator requirement |

| COMPARISON OF REQUIREMENTS<br>DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.e.5 Waste acceptance criteria for storage, treatment, or disposal facilities shall address the following issues: a) allowable quantities/concentrations of specific radioisotopes to be handled, processed, stored or disposed of; b) criticality safety requirements; c) restrictions regarding low-level waste classified for security reasons; d) external radiation and internal heat generation; e) restrictions on the generation of harmful gases, vapors, or liquids in waste; f) chemical and structural stability of waste packages, radiation effects, microbial activity, chemical reactions, and moisture; g) restrictions for relating and complexing agents having the potential for mobilizing radionuclides; and h) quantity of free liquids. | 61.56 The following requirements are minimum requirements for all classes of waste and are intended to facilitate handling at the disposal site and provide protection of safety and health of personnel at the site . . . |
| 3.f.1 Waste shall be treated by appropriate methods so that the disposal site can meet the performance objectives. | 61.40 Land disposal facilities must be sited, designed, operated, closed and controlled after closure so that reasonable assurance exits that exposures to humans are within the limits established in the performance objectives 61.41 through 61.44. |
| 3.f.2 Waste techniques shall be implemented as necessary to meet performance requirements. | No directly comparable requirement. |
| 3.f.3 The development of large scale waste treatment facilities shall be supported by NEPA documentation in addition to the following: a) a document that analyzes waste streams needing treatment, b) a construction design report, c) a safety analysis report. | 61.10 An environmental report prepared in accordance with Subpart A of Part 51 of this chapter must accompany the application. Please note Part 51 Subpart A is NEPA regulations implementing section. |
| 3.f.4 Operation of waste treatment facilities shall be supported by adequate documentation including: a) operation and maintenance procedures, b) personnel training and qualification procedures, c) monitoring and emergency response plans, d) records shall be maintained for each package of low-level waste that enters and leaves the treatment facility. | 61.80(a) Each licensee shall maintain any records and make any reports in connection with the licensed activities as may be required by the conditions of the licensee of the rules, regulations, and orders of the NRC. |
| 3.g.1 Off-site shipment of low-level waste shall be in compliance with DOE 1540.1. | 10 CFR 71 Packaging and transportation of Radioactive Material. |
| 3.g.2 Generators shall provide an annual forecast in the third quarter of the fiscal year to the field organization managing the off-site disposal facility to which the waste is to be shipped. | No directly comparable requirement. |

| COMPARISON OF REQUIREMENTS<br>DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.g.3 Generators must receive advance approval from the receiving facility and shall certify prior to shipment that waste meets the receiving facility waste acceptance criteria. | No directly comparable requirement. |
| 3.g.4 Each package of waste must comply with the labeling requirements of DOE 1540.1. | 61.57 Each package of waste must be clearly labeled to identify whether it is Class A waste, Class B waste, or Class C waste in accordance with 61.55. |
| 3.h.1 Low-level waste shall be stored such that the performance objectives stated in paragraph are met. | No directly comparable requirement. |
| 3.h.2 Records shall be maintained for all low-level waste that enters and leaves the storage facility. | 61.80(e) Licensees shall record the location and quantity of radioactive wastes contained in the disposal site . . . . |
| 3.h.3 The development and operation of a waste storage facility shall be supported by the following documentation; a) an analysis which identifies the need for the storage facility, b) a Construction Design Report, including projected waste planned for storage, construction and operating cost estimates, c) a safety analysis report and appropriate NEPA documentation, and d) operational procedures and plans. | 61.3 No person may receive, possess, and dispose of radioactive waste containing source, special nuclear, or by-product material at a land disposal facility unless authorized by a license issued by the NRC pursuant to Part 61, or unless exemption has been granted by the NRC under 61.6. |
| 3.i.2 Engineered modifications for specific waste types and for specific waste compositions for each disposal site shall be developed through the performance assessment model. | 61.54 NRC may upon request or on its own initiative authorize provisions other than those set forth in 61.51 through 61.53 for the segregation and disposal of waste and for the design and operation of a land disposal facility on a specific basis, if it finds reasonable assurance of compliance with the performance objectives of Subpart C of this part. |
| 3.i.4 Disposition of waste designated as greater-than-class C as defined in 10 CFR 61.55 must be justified by a specific performance assessment through the NEPA process. | No directly comparable requirement. |
| 3.i.5a Waste must not be packaged for disposal in cardboard or fiberboard boxes, unless such boxes meet DOT requirements and contain stabilized waste with a minimum of void space. | 61.56(a)(1) Waste must not be packaged for disposal in cardboard or fiberboard boxes. |
| 3.i.5b No freestanding liquids shall exceed 1% of the volume of the waste when the waste is in a disposal container, or 0.5% of the volume of the waste processed to a stable form. | 61.56(a)(3) Solid waste containing liquid shall contain as little freestanding and noncorrosive liquid as is reasonably achievable but in no case shall the liquid exceed 1% of the volume. |

| COMPARISON OF REQUIREMENTS<br>DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.i.5c Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water. | 61.56(a)(4) Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and |
| 3.i.5d Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. | 61.56(a)(5) Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons, transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with paragraph (a)(7) of this section. |
| 3.i.5e Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C. | 61.56(a)(7) Waste in a gaseous form must not be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C. Total activity must not exceed 100 curies per container. |
| 3.i.5f Waste must not be pyrophoric. | 61.56(a)(6) Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable. |
| 3.i.6 Waste containing amounts of radionuclides below regulatory concern, as defined by Federal regulations, may be disposed without regard to radioactivity content. | No directly comparable requirement. |
| 3.i.7a Disposal site selection criteria shall be developed for establishing new low-level waste sites. | 61.7(c) The licensing process (1) during the preoperational phase, the potential applicant goes through a process of disposal site selection by selecting a region of interest, examining a number of possible disposal sites within the area of interest and narrowing the choice to the disposal site. |
| 3.i.7b Disposal site selection shall be based on an evaluation of the prospective site in conjunction with planned waste confinement technology and NEPA. | 61.7(c)(1) See previous description. |
| 3.i.7c The disposal shall have hydrogeologic characteristics which will protect the groundwater resources. | 61.50(a)(7) The disposal site must provide sufficient depth to the water table that ground water intrusion, perennial or otherwise, into the waste will not occur. The commission will consider exception if certain conditions are met 6150(a)(8). The hydrogeologic unit used for disposal shall not discharge ground water to the surface within the disposal site. |

| COMPARISON OF REQUIREMENTS<br>DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.i.7d The potential for natural hazards such as floods, erosion, tornadoes, earthquakes, and volcanoes shall be considered in site selection. | 61.50(a)(5) The disposal site must be generally well drained and free of areas of flooding or frequent ponding. Waste disposal shall not take place in a 100-year flood plain coastal high-hazard area or wetland, as defined in Executive Order 11988, "Floodplain Management Guidelines." |
| | 61.50(a)(6) Upstream drainage areas must be minimized to decrease the amount of runoff which could erode or inundate waste disposal units. |
| | 61.50(a)(9) Areas must be avoided where tectonic processes such as faulting, folding, seismic activity, or volcanism may occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives (a)(10) - Areas must be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives. |
| 3.i.7e Site section criteria shall address the impact on current and projected populations, land use resource development plans and nearby public facilities, accessibility to transportation routes and utilities, and the location of waste generation. | 61.50(a)(3) Within the region of state where the facility is to be located, a disposal site should be selected so that project population growth and future developments are not likely to affect the ability of the disposal facility to meet the performance objectives. (a)(4) - Areas must be avoided having known natural resources which, if exploited, would result in failure to meet the performance objectives. |
| 3.i.8a Design criteria shall be established prior to selection of new disposal facilities, new disposal sites, or both. | The licensing process (1) During the operational phase, the potential applicant goes through a process of disposal site select by selecting a region of interest, examining a number of possible disposal sites and narrowing the choice to the proposed site. Through a detailed investigation of the disposal site characteristics, the applicant obtains data on which to base an analysis of the site's suitability. |
| 3.i.8b Disposal shall be designed consistent with disposal site hydrology, geology, and waste characteristics and in accordance with NEPA. | No directly comparable requirement. |
| 3.i.9a Field organizations shall develop and implement operating procedures for low-level waste disposal facilities. | 61.23(b) The applicant is qualified by reason of training and experience to carry out the disposal operations. |

| COMPARISON OF REQUIREMENTS<br>DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.i.9b Permanent identification markers for disposal excavations and monitoring wells shall be emplaced. | No directly comparable requirements. |
| 3.i.9c Operating procedures shall include training for disposal facility operating personnel, emergency response plans and a system of reporting unusual occurrences. | 61.23(b) See previous description.<br>61.11(b0(3) A description of the applicant's personnel training program |
| 3.i.9d Waste placement into disposal units should minimize void spaces. | 61.52(a)(4) Wastes must be emplaced in a manner that maintains the package integrity during emplacement, minimizes the void spaces between packages, and permits the void spaces to be filled. |
| 3.i.9e Operations are to be conducted so that active waste disposal operations will not have an adverse effect on filled disposal units. | No directly comparable requirement. |
| 3.j.1 Field organizations shall develop site-specific stabilization measures comprehensive closure plans for new and existing operating low-level waste disposal sites. The plan shall address closure of disposal sites within a 5 year period after each is filled and meet EPA requirements. Performance objectives for disposal sites shall be developed on a case-by-case basis as part of the NEPA process. | 61.52(a)(9)Closure and as set forth in the approved site closure plan must be carried out as each disposal unit (e.g., each trench) if filled and covered. (7) - The boundaries and locations of each disposal unit (e.g., trenches) must be accurately located and mapped by means of a land survey. Near-surface disposal units must be marked in such a way that the boundaries of each unit can be easily defined. Three permanent survey marker control points, referenced to the United States Geological Survey (USGS) or National Geodetic Survey (NGS) control stations, must be established on the site to facilitate surveys. The USGS or NGS control stations must provide horizontal and vertical controls as checked against USGS or NGS record files. 61.52(8) - A buffer zone of land must be maintained between any buried waste and the disposal site boundary and beneath the disposed waste. The buffer zone shall be of adequate dimensions to carry out environmental monitoring activities specified in 61.53(d) of this part and take mitigative measures if needed. (1) - Active waste disposal operations must not have an adverse effect on completed closure and stabilization measures. |
| 3.j.2 During closure and post closure, residual radioactivity levels for surface soils shall comply with existing DOE decommissioning guidelines. | No directly comparable requirement. |

| COMPARISON OF REQUIREMENTS<br>DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.j.4 Inactive disposal facilities, disposal sites, and disposal units shall be managed in conformance with RCRA, CERCLA, and the Superfund Amendments and Reauthorization Act, or, if mixed waste is involved, may be included in permit applications for operation of contiguous disposal facilities. | No directly comparable requirement. |
| 3.j.5 Closure plans for new and existing operating low-level information must waste disposal facilities shall be reviewed and approved by the appropriate field organization. | 61.12 Specific Technical include (9) a description of the disposal site, closure plan, including those design features which are intended to facilitate disposal site closure and to eliminate the need for ongoing active maintenance. |
| 3.j.6 Termination of monitoring and maintenance activity at closed facilities or sites shall be based on an analysis of site performance at the end of the institutional control period. | No directly comparable requirement. |
| 3.k.1 Each operational or non-operational low-level waste disposal facility site treatment, storage, and disposal facility should be monitored by an environmental monitoring that conforms with DOE 5484.1 and, at a minimum, meet the requirements of paragraph 3.k.2 through 3.k.4. | 61.53(c) During the land construction and operation, the licensee shall maintain a monitoring program. |
| 3.k.2 The environmental monitoring shall be designed to measure: a) operational effluent releases, b) migration of radionuclides, c) disposal unit subsidence, d) changes in disposal facility and disposal site parameters which may effect long-term site performance. | 61.53(c) Measurements and observations must be made and recorded to provide data to evaluate the potential health and environmental impacts during both the construction and the operation of the facility and to enable the evaluation of long-term effects and the need for mitigative measures. The monitoring system must be capable of providing early warning of radionuclides from the disposal site before they leave the site boundary. |
| 3.k.3 The environmental monitoring program may include, but not necessarily be limited to, monitoring surface soil, air, surface water, and in the subsurface, soil and water, both in the saturated and the unsaturated zones. | No directly comparable requirement. |
| 3.k.4 The monitoring program shall be capable of detecting changing plans for taking trends sufficiently in advance to allow application of any necessary corrective action prior to exceeding performance objectives and ascertain whether or not the requirements of applicable EH orders are being met. | 61.53(b) Licensee must have corrective measures if migration of radionuclides would indicate that the performance objectives may not be met. |

| COMPARISON OF REQUIREMENTS<br>DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.1 Consistent with DOE 5700.6B, the low-level waste operational and disposal practices shall be conducted in accordance with applicable requirements of ANSI/ASME NQA-1 and other appropriate national consensus standards. | 61.53(c) See previous summary. |
| 3.m.1 Each field organization shall develop and maintain a record system that records the following: historical record of waste generated, treated, stored, shipped, and/or disposed of. | 61.89 Following receipt and acceptance of a shipment of radioactive waste the licensee shall record the date of disposal of the waste, the location in the disposal site, the condition of the waste. |
| 3.m.2 A waste manifest shall be kept and accompany each waste package from generator through final disposal. At a minimum the following data should be included: a) waste physical and chemical characteristics, b) quantity of each major radionuclide present, c) weight of the waste, d0 volume of the waste. | See 10 CFR 20.311(b). |
| Chapter IV: Policy Statement<br>DOE waste containing NARM material or 11e(2) by-product material is defined in the Atomic Energy Act, as amended, or similarly contaminated material derived from DOE remedial actions, shall be stored, stabilized in place, and/or disposal of consistent with the requirements in 40 CFR 192. Small volumes of such DOE waste may be managed as low-level waste in accordance with the requirements of Chapter III of this Order. If the waste is classified as mixed waste RCRA requirements must also be met. | See 10 CFR 40 - Appendix A. |
| Requirements<br>3.a.1 Wastes covered under this chapter in quantities too large for acceptance at DOE low-level waste disposal site shall be managed according to the requirement of 40 CFR 192 and disposed of at specially designated DOE sites or tailing disposal sites established under UMTRCA of 1978 (Public Law 95-604). These sites will normally be located in the State in which the wastes are generated. | See 10 CFR 40 - Appendix A. |
| 3.a.2 With the approval of the appropriate field organization, small volumes of 11e(2) and NARM material may be disposed of at DOE low-level waste sites in accordance with the requirements of Chapter III DOE 5820.2A. | 61.1(b) The regulations in this part do not apply to (1) disposal of high-level waste as provided for in part 60 of this chapter, (1) disposal of uranium or thorium tailings or wastes (by-product material as defined in 40.4(a-1). . . in quantities greater 10,000 kg and containing more than mCi or Ra-226. |
| 3.a.3a NARM material mixed with RCRA hazardous chemicals shall be managed as hazardous waste under RCRA. | No directly comparable requirement. |

| COMPARISON OF REQUIREMENTS DOE 5820.2A AND NRC REQUIREMENTS AT 10 CFR 61 | |
|---|---|
| **DOE 5820.2A Requirements (Paragraph/Content Summary)** | **10 CFR 61 Requirements (Part Number/Content Summary)** |
| 3.a.3b 11e(2) material or a combination of 11e(2) and NARM materials mixed with RCRA hazardous chemicals, shall be managed consistent with both RCRA and 40 CFR 192. | No directly comparable requirement. |
| 3.b Consistent with DOE 5700.6B, waste management practices shall be conducted in accordance with applicable requirements of ANSI/ASME NQA-1 and other appropriate national consensus standards. | No directly comparable requirement. |

## 2.6 Quality Assurance and Waste Certification

As far as treatment, packaging and shipping of the mixed waste, Pinellas personnel will adhere to the Pinellas Plant Quality Plan for Radioactive Waste Shipment. The plan describes the certification program for radioactive mixed wastes generated at the Pinellas Plant and defines the plant's Quality Assurance Program as it applies to waste certification and characterization. The relevant elements of the American National Standards Institutes/American Society of Mechanical Engineers (ANSI/ASME) NQA-1, Quality Assurance Program and Supplements (NQA-1), are addressed, and implementation of plant standards and procedures are identified.

Further, the project plan establishes a management plan that will demonstrate compliance of mixed waste streams generated at the Pinellas Plant with the RCRA LDR. Mixed waste streams generated at the plant are analyzed to ensure restricted wastes meet the applicable treatment standards. Characterization involves a combination of process knowledge, existing analytical data, and additional sampling and analysis. The sampling and analysis process was developed to acquire information necessary for proper characterization of mixed waste streams while maintaining data quality objectives.

Records that furnish documentary evidence of quality shall be specified, prepared, and maintained. Records shall be legible, identifiable, and retrievable. Records shall be protected against damage, deterioration, and loss. Requirements, responsibilities for record transmittal, distribution, retention, maintenance and disposition shall be established and documented.

Envirocare maintains quality assurance procedures and control, as well as, procedures for performance and systems audit. The procedures are contained in the Envirocare Waste Analysis Plan that is attached in Appendix D. The operational quality assurance for the Envirocare facility is attached in Appendix E.

## 2.7 Mixed Waste Transportation

Interstate and intrastate transportation of mixed waste is simultaneously controlled at the Federal and State levels by several government agencies. At the Federal level, the DOT regulates mixed waste transportation through regulations under the Hazardous Materials Transportation Act and the Hazardous Material Transportation Uniform Safety Act. The regulations applicable to mixed waste transportation are contained in 49 CFR 171-180.

The EPA regulates mixed waste transportation under the RCRA regulations. Transporters of mixed waste are regulated under 40 CFR 263. Mixed waste generators must identify their wastes, obtain EPA identification numbers, comply with the hazardous waste manifest system, and properly package, label, mark, and placard mixed wastes slated for transport. Under 40 CFR 263, mixed waste transporters must also obtain EPA identification numbers. Storage of containerized waste at unpermitted transfer facilities is limited to 10 days or less. Mixed waste transporters must comply with the hazardous waste manifest system, and they are required to report and clean up transportation-related discharges. The Pinellas Plant will adhere to all applicable DOT, EPA, and State regulations concerning the shipment of mixed waste to an off-site commercial disposal or storage facility.

## 2.8 Options and Cost Analysis

The purpose of this section is to discuss the alternatives available for the disposal of mixed waste by the Pinellas Plant. Each alternative has its advantages and disadvantages. Costs are derived by analysis of various management alternatives. Table 3 provides a breakdown of cost estimates and associated assumptions.

**Table 4. Summary of Analysis**

| Waste Classification (Total Quantity) | Evaluation Factors | Permanent Disposal at Envirocare | Interim Storage at Hanford | Treatment and Storage On Site |
|---|---|---|---|---|
| 1. Tritium contaminated F006 sludge (treated before land disposed) | ALARA<br>Likelihood of Success | $493,333<br>High | $1,075,300<br>See Note | Not Feasible |
| 2. RCRA metal-contaminated solid waste (treated before land disposal | Cost<br>Likelihood of Success | $6,800<br>High | $8,325<br>See Note | Not Feasible |
| 3. Debris (treated before land disposal) | Cost<br>Likelihood of success | $5,290<br>High | $8,325<br>See Note | Not Feasible |
| Note: Probability of success is high, provided permission can be obtained to store Pinellas mixed waste at Hanford. It is very important to note, however, that this alternative only postpones the permanent disposition of the waste to a later date. Hanford has no capability for disposal of this type of waste. Final disposal costs are not included in this alternative. | | | | |

### 2.8.1 IWNF Sludge

An approximate quantity of 189 meters of F006 sludge at the Pinellas Plant is classified as potential mixed waste. The physical and chemical matrix of the waste may include heterogeneous debris and water contaminated with heavy metals. Low-level radiological contaminants are limited to tritium.

The actual process may involve dewatering the waste sludge and then packaging and shipping the waste to Envirocare for final disposal. Presently, the Pinellas Plant is reviewing dewatering plans. The costs associated with the additional risk are uncertain.

The following assumptions were made in the preparation of this estimate:

1. Solid waste consists of liquid or dewatered sludge. The liquid volume of 189 cubic meters was used in the calculations.
2. Adequate utilities exist at Envirocare to treat and solidify the sludge at their site and will be furnished.
3. Solidification or treatment will be performed by Envirocare.
4. Shipping will be done via truck, with no more than ten tanker trucks (liquid). Shipping costs are $2.30/mile for Envirocare and $2.00/mile for Hanford. These are base costs only and do not include any additional shipment costs.
5. Disposal costs for mixed waste at Envirocare are $57/per cubic foot.

6. Storage costs for mixed waste at Hanford are $350/per cubic foot.

Calculations:

| | | |
|---|---|---|
| **Envirocare Option A** | | |
| Pump sludge to tanker (ten tankers) | X10 | $31,500 |
| Confined space entry | | 3,500 |
| Transport to Clive, Utah | | |
| (2,300 miles at $2.30/mile) | X10 | $52,900 |
| Solidify at Envirocare | | $25,000 |
| (Specialty Components estimate) | | |
| Disposal at Envirocare | | $380,433 |
| ($1,538.88 X 247.2 CY) | | |
| TOTAL | | $493,333 |
| **Envirocare Option B** | | |
| Pump Sludge to Dewater Equipment | | $21,000 |
| Dewatering Operations (high risk operation) | | $67,000 |
| Miscellaneous Cost | | $2,500 |
| Confined Space Entry | | $3,500 |
| Load in Roll-Off ($500/vent) | | $8,000 |
| Transport to Clive, Utah (four trucks) | | $21,160 |
| Solidify at Envirocare (Specialty Components estimate) | | $25,000 |
| Disposal at Envirocare ($1,538.88/CY X 131.0 CY) | | $201,593 |
| TOTAL | | $349,753 |
| **Hanford Option** | | |
| Dewatered sludge (from above) | | $96,000 |
| Load into 55-gallon drums (360 drums) | | $5,000 |
| Transport to Richland, WA (3,200 miles @ $2.00/mile in six trucks) | | $38,400 |
| Store at Hanford ($350/cu ft X 2674/cu ft) | | $935,900 |
| TOTAL | | $1,075,300 |

### 2.8.2 Contaminated Compactable Solid Waste

This waste stream consists of solid wipes or personal protective equipment used in the cleaning of equipment. The wipes are contaminated with heavy metals, solvents, and radionuclides. The waste is RCRA coded as D-listed and F-listed. There is an approximate quantity of one cubic meter. The same management alternatives identified in paragraph 2.8 apply to these wastes. The approximate costs are listed below:

- Envirocare $ 6,800
- Hanford $ 8,325

### 2.8.3 Debris from Dismantlement

This one cubic meter volume waste stream may be generated during the disassembly of buildings or equipment. The debris is contaminated with lead and/or other heavy metals and requires macroencapsulation before disposal. The alternatives identified in paragraph 2.8 are applicable for these wastes. The approximate costs are listed below:

- Envirocare $5,290 (Includes shipment only)
- Hanford $8,325 (volume same as 2.8.2)

## 2.9 Procurement Method

Sufficient funds for the calculated annual disposal fee will be transferred to ORO before shipment. If disposal fees are less than calculated, the excess will be retained at ORO for future disposal fees.

Specialty Components will provide project funds for low-level waste disposal at Envirocare through contract DE-AC04-92AL73000. Specialty Components will prepay for the estimated waste volume by at least one fiscal quarter. Specialty Components will prepare a purchase order based on a minimum of four quarters of estimated low-level waste volume, consistent with the Three-Year Waste Shipment Forecast, at the prevalent charge per cubic foot.

Specialty Components will contact the DOE/ORO to coordinate financial arrangements. Purchase orders will be sent to ORO addressed as follows:

FUNDS Transfer - ORO
Bruce Fitch
U. S. Department of Energy
Oak Ridge Field Office
P. Office Box 2001
Oak Ridge, Tennessee 37831
Telephone: (615) 576-0657, FAX: (615) 576-5401

## 2.10 National Environmental Protection Agency (NEPA) Analysis

When the determination is made that the F006 sludge contains above background radioactive material (tritium) a NEPA evaluation will be conducted. An example of the NEPA checklist is in Appendix A.

# 3.0 AUDITS

Surveillances at the Pinellas Plant are performed by EO&QA throughout the waste management process. Surveillance is performed at the point of segregation on a random basis determined by an accepted method. Points have been established for surveillance activity, including pre-use of containers and contents before closure and after closure before final shipment.

Internal audits are also conducted minimally on an annual basis by a team of auditors, including at least one lead auditor who is qualified to NQA-1. The formal program includes establishing long-term plans of functions, systems, and activities to be audited, detailed plans regarding personnel, procedures, and scope for individual audits. All audits are conducted using written checklists. Results of all audits are documented in an audit report addressed to responsible management for written corrective audits responses to identified observations and findings. All nonconformances are documented in a report format. Verification of completion on all accepted corrective responses are documented prior to closeout of the audit.

Procedures governing quality audits are as follows:

- Planning and scheduling of audits
- Administration of audits
- Conducting audits

The ES&H Audit/Appraisal Program establishes policy and procedures for appraisal operations at the Pinellas Plant to ensure management that ES&H program objectives are met, specifically that:

- Desired results are being achieved
- Contractual ES&H requirements and approved policies and procedures are being effectively maintained
- Internal ES&H controls by management are effectively maintained
- Applicable laws and regulations pertaining to safety are significant to both U. S. DOE and Pinellas

Internal audits and surveillance will be performed, if required, at the Envirocare facility according to procedures outlined in the Waste Analysis Plan (Appendix D). This is also described in the operational quality assurance for the Envirocare facility (Appendix E).

## 4.0 DISTRIBUTION

DOE

| | |
|---|---|
| G. Schmidtke (3) | MS 015 |
| DOE/AL (3) | |

Pinellas Plant

| | |
|---|---|
| G. Chivington | MS 040 |
| D. DeLaneuville | MS 001 |
| E. Mayer | MS 001 |
| F. Ohlweiler | MS 001 |
| R. Rossmeisl | MS 001 |
| A. Weaver | MS 040 |
| Records Retention (MASTER) | MS002 |

# APPENDIX A

# NATIONAL ENVIRONMENTAL PROTECTION AGENCY DOCUMENTATION FOR PINELLAS PLANT MIXED WASTE DISPOSAL PROJECT

An example of the NEPA checklist that will be followed is given in the following pages. In accordance with DOE/ORO requirements, this evaluation will be carried out prior to making arrangements for shipping material.

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DOE F 1325.8
(5-83)

United States Government | Department of Energy

Pinellas Area Office

# memorandum

DATE: SEP - 1 1995

REPLY TO
ATTN OF: PAO:SEH:ESH126

SUBJECT: National Environmental Policy Act Determination

TO: C. A. Biedermann, Manager, Environmental Restoration & Permitting, LMSC-001

As NEPA Compliance Officer, I have reviewed the attached Environmental Checklist, PIP 95-0001, "Off-Site Transportation of Hazardous, Low-level Radioactive, and Low-Level Radioactive Mixed Waste from the Pinellas Plant".

The proposed activities are categorically excluded, and no further NEPA documentation is required, under 10 CFR 1021, Appendix B to Subpart D, Section B6, "Removal actions under CERCLA...and removal-type actions similar in scope under RCRA and other authorities...including treatment...recovery, storage, or disposal of wastes at existing facilities currently handling the type of waste involved in the removal action..." and supported by 10 CFR 1021, Preamble, Pg. 15142, Proposed 6.1, "...DOE did not include transportation in the lead statement of the categorical exclusion because the Department considers it an activity necessary to and included in the categorical exclusions..."

If the scope of the above project changes, the applicability of the NEPA determination must be re-evaluated. If you have any questions, please call me at Ext. 6139.

Sarah E. Hartson
NEPA Compliance Officer

Attachment

cc w/o attachment:
N. Schermerhorn, LMSC-001
D. Delaneuville, LMSC-001
G. Schmidtke, PAO

**U.S. DEPARTMENT OF ENERGY**
**Albuquerque Operations Office**
**ENVIRONMENTAL CHECKLIST/ACTION DESCRIPTION MEMORANDUM**

| Project/Activity Title: Off-site Transportation of Hazardous, Low-Level Radioactive, and Low-level Radioactive Mixed Waste from the Pinellas Plant | NEPA ID Number: PIP 95-0001 Rev.#: Date: |
|---|---|
| Contractor Project Manager: | Phone: |
| Contractor NEPA Coordinator: | Phone: |
| NEPA Compliance Officer: | Phone: |

A. BRIEF PROJECT/ACTIVITY DESCRIPTION: Include category (experiment, test, modification, maintenance, etc.), location, schedule, cost, etc.

The proposed action is off-site transportation of hazardous, low-level radioactive, and low-level radioactive mixed wastes generated at the Pinellas Plant. The wastes are generated primarily as the result of cleanup activities at the plant. These wastes would be transported to a permitted receiving facility approved by DOE or its Management and Operating Contractor. Depending on the contract arrangement, the receiving facility will be an appropriate facility in the contiguous United States. Hazardous wastes would be collected and packaged at the Pinellas Plant, primarily in 55-gallon drums, lab-pack drums, and roll-off boxes. Low-level radioactive and low-level radioactive mixed wastes would be collected at plant storage facilities and contained in drums or B-25 boxes. All waste management, handling, packaging, and preparation for transportation will be conducted consistent with all applicable Pinellas Plant procedures, DOE Orders, and Federal, state, and local regulations. Wastes will then be placed on approved waste transportation trucks provided by the waste contractor. Packaging and transportation of the wastes will be consistent with all applicable DOT and RCRA waste transporter requirements relating to these activities. Approximately 40 shipments per year of hazardous waste are expected during 1996 and 1997. Approximately 5 or 6 shipments per year of low-level radioactive waste are expected during this same time period. This action is consistent with documentation requirements as published in 10 CFR 1021 - National Environmental Policy Act Implementing Procedures, Appendix B to Subpart D, subsection B6, April 24, 1992.

B. ENVIRONMENTAL CONCERNS: Will the project/activity, either during construction or operation, affect or involve any of the following considerations? If the proposed project/activity represents a commitment to a course of actions that would ultimately require a positive response to one or more of the considerations below, identify consideration numbers and provide explanation.

| | YES | NO | | YES | NO |
|---|---|---|---|---|---|
| 1. Air emissions | | ✓ | 11. Clearing or excavation | | ✓ |
| 1b. Non-attainment/Maintenance Areas | | ✓ | 12. Activity outside area fence/wildlife | | ✓ |
| 2. Liquid effluents | | ✓ | 13. Archaeological/cultural resources | | ✓ |
| 3. Solid waste | ✓ | | 14. Noise levels | | ✓ |
| 4. Radioactive materials/soils | ✓ | | 15. Radiation/toxic chemical exposures | ✓ | |
| 5. Hazardous constituents | ✓ | | 16. Pesticide/herbicide use | | ✓ |
| 6. Mixed waste (rad & haz) | ✓ | | 17. High Energy source/explosives | ✓ | |
| 7. Chemical storage/use | | ✓ | 18. Transportation issues | ✓ | |
| 8. Petroleum storage/use | | ✓ | 19. Special status species/environment | | ✓ |
| 9. Asbestos materials | ✓ | | 20. Environmental restoration site | | ✓ |
| 10. Utilities | | ✓ | 21. Workforce adjustment | | ✓ |
| | | | 22. Other | | ✓ |

Explanation and qualification of specific "yes" responses.
Explanation - See Attachment 1

C. PERMITS: Does the proposed project/activity require any local, state, or Federal permits/notifications or potential violation of laws, regulations, or DOE Orders?

___Yes _✓_ No

Explain:

The intent of the Pinellas Plant is to perform this proposed action in accordance with all applicable statutory and regulatory requirements, permits, and DOE Orders. This project/activity has been reviewed with respect to regulatory compliance requirement at the Pinellas Plant. No additional permits or notifications are required at this time. Future activities performed at the site in fulfillment of this action will be reviewed for regulatory compliance prior to their initiation.

Permit Modifications, notifications, reviews, and/or registrations may be required in the following areas before beginning operations:

1. Solid Waste Regulations review
2. Resource conservation and Recovery Act (RCRA) permit review
3. Hazardous Solid Waste Amendments permit review
4. Department of Transportation requirements review
5. Toxic Substances Control Act Compliance review

D. CATEGORY EVALUATION CRITERIA:

| Would the proposed action: | Yes | No |
|---|---|---|
| 1. Be related to a proposed action with potentially significant impacts? | ___ | _✓_ |
| 2. Take place in an area of previously or ongoing disturbance? | ___ | _✓_ |
| 3. Create uncertain, unique or unknown risks? | ___ | _✓_ |
| 4. Require any federal, state or local permits, approvals, etc.? | ___ | _✓_ |
| 5. Create hazardous, radioactive or mixed waste for which no disposal is available? | ___ | _✓_ |
| 6. Impact a RCRA-regulated unit or facility? | ___ | _✓_ |
| 7. Threaten or violate any statute, regulation or DOE Order? | ___ | _✓_ |
| 8. Disturb hazardous substances, pollutants or contaminants that pre-exist in the environment? | ___ | _✓_ |
| 9. Require siting, construction, or expansion of a waste treatment, storage or disposal facility? | ___ | _✓_ |
| 10. Adversely affect any environmentally sensitive resources including, but not limited to, structures of archaeological, historic or architectural significance; threatened or endangered species or their habitat; floodplains or wetlands; wildlife refuges, agricultural lands or vital water sources (e.g., sole-source aquifer)? | ___ | _✓_ |
| 11. Force a low-income or ethnic minority population to shoulder a disproportionate share of the negative environmental impacts of pollution or environmental hazards because of a lack of political or economic strength (i.e., an issue of "Environmental Justice")? | ___ | _✓_ |
| 12. [if the proposed action will involve air emissions, will the action] be located within an air pollutant *non-attainment* or *maintenance area* for any of the criteria pollutants? (if YES, then additional analysis may be required to determine if emissions would be above *de minimus* thresholds and/or if emissions would be regionally significant. Pending completion of this analysis, requirements stated in 40 CFR 93.158 may be imposed before the proposed action could proceed). | ___ | _✓_ |

**Explanation and Qualification of specific responses of "YES."**

| Number | Explanation |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

E. RECOMMENDATION AND APPROVAL:

Contractor NEPA Coordinator and DOE Area Office: The potential environmental impacts of the proposed action are adequately addressed in:

[ ] Existing NEPA Documentation (approval to proceed with the proposed action documented in a NEPA Applicability Determination)

Signature: _____ Date: _____
Contractor NEPA Coordinator

DOE NCO Recommendation: I find and recommend that this proposed action meets the criteria specified by 10 CFR 1021, Subpart D, and/or DOE Policy and Guidance for:

[ ] Categorical Exclusion (Subpart D, Appendix B, Class of Action _____)
[ ] Environmental Assessment (Subpart D, Appendix C, Class of Action _____)
[ ] Environmental Impact Statement (Subpart D, Appendix D, Class of Action _____)
[ ] Action Description Memorandum (action not listed in Subpart D.)
[ ] Integrated Documentation for a CERCLA or RCRA action.
[ ] Variance (Emergency Action per 40 CFR 1506.11 and 10 CFR 1021.343)

NOTE: Appendix A Categorical Exclusions (CX) and actions addressed by an existing CX or NEPA document do not require completion of the ECL/ADM.

DOE-PAO NEPA Compliance Officer's Concurrence: I concur with the above recommendation and recommend that the proposed action be allowed to proceed.

Signature: _____ Date: _____

NOTES:

**U.S. DEPARTMENT OF ENERGY**
**Pinellas Area Office**

**APPLICABILITY DETERMINATION**
**BRIEF PROJECT/ACTIVITY DESCRIPTION:**

FINDING AND DETERMINATION:

The proposed action is related to a DOE action that has been assessed in an existing:

[ ] Categorical Exclusion (NEPA ID Number _____)

The proposed action meets the eligibility criteria for a categorical exclusion as set forth in DOE's NEPA Regulations at 10 CFR 1021.410 and 10 CFR 1021 Subpart D, Appendix B.

[ ] Environmental Assessment (NEPA ID Number _____)

The proposed action will not affect a change in the Environmental Consequences section of the EA or the Finding of No Significant Impact (FONSI).

[ ] Environmental Impact Statement (NEPA ID Number _____)

The proposed action will not affect a change in the Environmental Consequences section of the EIS or the Record of Decision (NOTE: Use for administrative actions only; impact analysis must be done under a Supplement Analysis).

Document Title: _____ Date: _____

Section/Page/Citation: _____

**OR**

[ ] The proposed action does not require any change to existing operations or facilities in order to be accomplished, nor does it require a new contract, procurement or budget request to accomplish, therefore, it is considered an *ONGOING OPERATION* and no further NEPA documentation is required.

Signature: _____ Date: _____
DOE-PAO NEPA Compliance Officer

---

Signature: _____ Date: _____
Contractor NEPA Coordinator

ATTACHMENT 1

Block B: Environmental Concerns
Off-site Transportation of Hazardous, Low-level Radioactive, and Low-level Radioactive Mixed Waste
from the Pinellas Plant

| Environmental Concern: | | Response: |
|---|---|---|
| 3. | Solid waste: | This action may result in the generation of very small quantities of solid waste, primarily excess packaging materials. These wastes will be disposed of in an off-site landfill and will be managed in accordance with established DOE and Pinellas Plant waste management procedures. |
| 4. | Radioactive waste/soil: | One of the purposes of this action is off-site disposal of low-level radioactive waste. Most of this waste is generated from cleanup of the Pinellas Plant. Radioactively contaminated wastes will be handled in accordance with Pinellas Plant procedures for identification, segregation, labelling, packaging, transport, and disposal. Radioactively contaminated waste will be disposed off-site in accordance with established DOE and Pinellas Plant procedures. |
| 5. | Hazardous constituents: | One of the purposes of this action is off-site disposal of hazardous waste. Such wastes include materials generated from cleanup and from environmental restoration activities. Hazardous waste will be transferred to the on-site hazardous waste handling facility, where it will be segregated, packaged, and transported off-site for disposal in accordance with established DOE and Pinellas Plant procedures. |
| 6. | Mixed waste (rad & haz): | Low-level radioactive mixed waste may be generated during cleanup activities. The possibility exists for wastes classified as hazardous to become contaminated in radiological areas. Such wastes would be transported off site, as appropriate. If mixed waste is generated, it will be stored and handled in accordance with appropriate regulations and established DOE and Pinellas Plant procedures. |
| 9. | Asbestos materials: | Some of the low-level radioactive wastes designated for off-site disposal may contain asbestos. In addition, uncontaminated asbestos may also be generated during cleanup activities. All handling of asbestos will be conducted by trained personnel using appropriate monitoring and personal protective and containment measures. Waste materials will be disposed of in accordance with regulatory requirements and DOE and Pinellas Plant procedures. |
| 15. | Radiation/toxic chemical exposures: | Activities in which hazardous, low-level radioactive, and low-level radioactive mixed waste are handled and packaged may include the potential for personnel exposure to toxic and radioactive materials. These activities will be conducted in accordance with appropriate monitoring and personnel protective measures to protect worker health and safety, and prevent environmental releases. |
| 17. | High Energy source/ explosives: | Some of the wastes identified for off-site transport may include explosive materials such as heat powder and heat paper. Precautions will be taken to ensure worker safety during handling and packaging these materials. These wastes are classified as hazardous and will be transferred to the on-site hazardous waste handling facility where they will be segregated, packaged, and shipped off site for disposal in accordance with established DOE and Pinellas Plant procedures. |
| 18. | Transportation issues: | This action will result in a nominal volume of truck traffic leaving the Pinellas Plant for waste disposal facilities in Florida and other states. However, this traffic is inconsequential with respect to overall traffic patterns in the area of the Pinellas Plant and in Pinellas County. All shipments of waste to disposal facilities will be conducted in compliance with DOE, DOT, and Pinellas Plant requirements for waste transport. |

# APPENDIX B

# SAFETY ANALYSIS FOR ENVIROCARE

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Note: An Environment, Safety, and Quality Audit was completed in early 1995 by a team organized by DOE/ORO. This report was formally released on November 17, 1995 and a copy may be obtained through DOE/ORO. (Contact David Carden at 423-576-9262 and request Environment, Safety, and Quality Assessment of Envirocare of Utah.)

A teleconference was held with Jane Powell of DOE/ORO on May 23, 1996, to obtain the latest status on this subject. Specialty Components was told that a reassessment was done in october of 1995 and no significant issues were found. DOE/ORO will perform another full scale audit in July 1996. At present, shipments are continuing at a high rate with no problems.

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# APPENDIX C

# ENVIROCARE LICENSES AND PERMITS

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STATE OF UTAH PLAN APPROVAL
Permittee:
Envirocare of Utah, Inc.
Tooele County, Utah
EPA Identification Number UTD982598898

Pursuant to the Utah Solid and Hazardous Waste Act, (the Act), 26-14-1, et. seq., Utah Code Annotated 1953, as amended and the Utah Administrative Code (UAC) (R450-1 through R450-13 and R450-50) as adopted by the Utah Solid and Hazardous Waste Committee, (the Committee), a plan approval (herein after called "permit") is issued to Envirocare of Utah, Inc. (hereafter called the "Permittee"), to operate a hazardous waste treatment and storage facility in Tooele County, Utah, at latitude 40o 41' 000" North and longitude 113o 06' 030" West. The U.S. Environmental Protection Agency (U.S. EPA) has authorized the Executive Secretary to issue such a permit under Section 3006(b) of the Resource Conservation and Recovery Act (RCRA).

The Permittee must comply with all the terms and conditions of this permit. The permit consists of the conditions contained herein (including the portions of the application attached and incorporated by reference), and the applicable portions of R450-1 through R450-13, R450-50, and R450-101 contained in the permit. Applicable rules are those which are in effect on the date of issuance of this permit.

This permit is based on the premise that the information submitted in the application dated July 22, 1987 as modified by subsequent amendments dated April 25, 1988 and July 25, 1989 (hereafter referred to as the application), is accurate and that the facility will be operated as specified in the referenced portions of the application, except as modified by the conditions herein. Portions of the application are attached and incorporated herein by reference, wherever noted, as part of this permit. Any inaccuracies or misrepresentations found in the application may be grounds for the termination or modification of this permit (see R450-3-9.). The Permittee must inform the Executive Secretary of any deviation from, or changes in the information in the application which would affect the Permittee's ability to comply with the applicable regulations or permit conditions.


This permit is effective as of November 30, 1990 and shall remain in effect until November 30, 2000, unless revoked and reissued (R450-3-9.1(a)(b)(c)) or terminated (R450-3-9.2.), or continued in accordance with R450-3-5(d).

Signature: Dennis R. Downs Date: 11/30/90

Dennis R. Downs
Executive Secretary
Utah Solid and Hazardous Wastes Committee


NOTE TO ENVIROCARE'S PART B PERMIT CERTIFICATE:

The Envirocare site is licensed by the Utah Bureau of Radiation Control for disposal of radioactive waste. The site is also licensed by the Utah Bureau of Radiation Control and permitted by the Utah Bureau of Solid and Hazardous Waste for disposal of "mixed" (hazardous/radioactive) waste.

Any one wishing to visit the site should contact the Permittee to make arrangements for a site tour and to determine that all safety requirements are met prior to entering the site.

Inspectors who will have extensive contact with the site should contact both the Utah Bureau of Radiation Control and the Utah Bureau of Solid and Hazardous Waste to determine that all safety requirements i.e. safety equipment, safety training, and/or physical, are met prior to entering the site.

## APPROVED HAZARDOUS WASTE NUMBERS

Revised March 1993

## ENVIROCARE OF UTAH, INC.
## HAZARDOUS WASTE LIST

RCRA Wastes

| EPA Waste No. | | Hazard Code |
|---|---|---|
| D001 | Ignitability | (I) |
| D002 | Corrosivity | (C) |
| D003 | Reactivity | (R) |
| D004 | Arsenic | (E) |
| D005 | Barium | (E) |
| D006 | Cadmium | (E) |
| D007 | Chromium | (E) |
| D008 | Lead | (E) |
| D009 | Mercury | (E) |
| D010 | Selenium | (E) |
| D011 | Silver | (E) |
| D012 | Endrin (1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethano naphthalene) | (E) |
| D013 | Lindane (1,2,3,4,5,6, hexa-chloro-cyclohexane, gamma isomer) | (E) |
| D014 | Methoxychlor (1,1,1-Trichloro-2,2-bis[p-methoxyphenyl]ethane) | (E) |
| D015 | Toxaphene ($C_{10}H_{10}Cl_8$, technical chlorinated camphene, 67-69 percent chlorine) | (E) |
| D016 | 2,4-D (2,4-dichlorophenoxyacetic acid) | (E) |
| D017 | 2,4,5-TP (Silvex) (2,4,5-trichloro-phenoxypropionic acid) | (E) |
| D018 | Benzene | (E) |
| D019 | Carbon Tetrachloride | (E) |
| D020 | Chlordane | (E) |
| D021 | Chlorobenzene | (E) |
| D022 | Chloroform | (E) |
| D023 | o-Cresol | (E) |

**ENVIROCARE OF UTAH, INC.**
**HAZARDOUS WASTE LIST**
(continued)

| | | |
|---|---|---|
| D024 | m-Cresol | (E) |
| D025 | p-Cresol | (E) |
| D026 | Cresol | (E) |
| D027 | 1,4-Dichlorobenzene | (E) |
| D028 | 1,2-Dichloroethane | (E) |
| D029 | 1,1-Dichloroethylene | (E) |
| D030 | 2,4-Dinitrotoluene | (E) |
| D031 | Heptachlor (and its hydroxide) | (E) |
| D032 | Hexachlorobenzene | (E) |
| D033 | Hexachlorobutadiene | (E) |
| D034 | Hexachloroethane | (E) |
| D035 | Methyl Ethyl Ketone | (E) |
| D036 | Nitrobenzene | (E) |
| D037 | Pentachlorophenol | (E) |
| D038 | Pyridine | (E) |
| D039 | Tetrachloroethylene | (E) |
| D040 | Trichloroethylene | (E) |
| D041 | 2,4,5-Trichlorophenol | (E) |
| D042 | 2,4,6-Trichlorophenol | (E) |
| D043 | Vinyl Chloride | (E) |

HAZARDOUS WASTE FROM NON-SPECIFIC SOURCES:

F001 The following spent halogenated solvents used in degreasing:

Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F002 The following spent halogenated solvents:

Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1.1.2-trichloro-1,2,2-triflouroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; and all spent solvent mixtures/ blends containing, before use, a total of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

**ENVIROCARE OF UTAH, INC.**
**HAZARDOUS WASTE LIST**
(continued)

F003 The following spent non-halogenated solvents:

Xylene, acetone, ethyl acetate,ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F004 The following spent non-halogenated solvents:

Cresols and cresylic acid, nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent of more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F005 The following spent non-halogenated solvents:

Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, and pyridine; benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

F006 Waste-water treatment sludges form electroplating operations except from the following processed: (1) Sulfuric acid anodizing for aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum.

F007 Spent cyanide plating bath solutions from electroplating operations.

**ENVIROCARE OF UTAH, INC.**
**HAZARDOUS WASTE LIST**
(continued)

F008 Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.

F009 Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.

F010 Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.

F011 Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.

F012 Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process.

F019 Waste-water treatment sludges from the chemical conversion coating of aluminum.

F024 Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of cerrtain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to an including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in 261.31 or 261.32.)

F028 Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026 and F027.

F039 Multi-Source Leachate

HAZARDOUS WASTE FROM SPECIFIC SOURCES:

K011 Bottom stream from the wastewater stripper in the production of acrylonitrile.

K013 Bottom stream from the acetonitrile column in the production of acrylonitrile.

K050 Heat Exchanger Bundle Cleaning Sludge from the petroleum refining industry.

K051 API separator sludge from the petroleum refining industry.

K052 Tank bottoms (leaded) from the petroleum refining industry.

K061 Emission control dust/sludge from the primary production of steel in electric furnaces.

K069 Emission control dust/sludge from the secondary lead smelting.

**ENVIROCARE OF UTAH, INC.**
**HAZARDOUS WASTE LIST**
(continued)

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES:

| | | |
|---|---|---|
| P002 | 1-Acetyl-2-Thiourea | H |
| P003 | Acrolein | H |
| P004 | Aldrin | H |
| P005 | Allyl Alcohol | H |
| P010 | Arsenic Acid | H |
| P011 | Arsenic Pentoxide | H |
| P012 | Arsenic Trioxide | H |
| P013 | Barium Cyanide | H |
| P014 | Benzenethiol | H |
| P015 | Beryllium Dust | H |
| P017 | Bromoacetone | H |
| P020 | Dinoseb | H |
| P021 | Calcium Cyanide | H |
| P022 | Carbon Disulfide | H |
| P024 | p-Chloroaniline | H |
| P027 | 3-Chloropropionitrile | H |
| P028 | Benzyl Chloride | H |
| P029 | Copper Cyanide | H |
| P030 | Cyanides (soluble cyanide salts), n.o.s. | H |
| P034 | 2-Cyclohexyl-4,6-Dinitrophenol | H |
| P037 | Dieldrin | H |
| P039 | Disulfoton | H |
| P046 | alpha, alpha-Dimethylphenethylamine | H |
| P047 | 4,6-Dinitro-2-Methylphenol | H |
| P048 | 2,4-Dinitrophenol | H |
| P050 | Endosulfan | H |
| P051 | Endrin | H |
| P056 | Fluorene | H |
| P059 | Heptachlor | H |
| P060 | Isodrin | H |
| P071 | Methyl Parathion | H |
| P074 | Nickel Cyanide | H |
| P075 | Nicotine & Salts | H |
| P077 | p-Nitroaniline | H |
| P082 | N-Nitrosodimethylamine | H |
| P085 | Octamethylpyrophosphoramide | H |
| P089 | Parathion | H |
| P094 | Phorate | H |
| P097 | Famphur | H |
| P098 | Potassium Cyanide | H |
| P099 | Potassium Silver Cyanide | H |
| P101 | Propanenitrile | H |
| P102 | Propargyl Alcohol | H |
| P104 | Silver Cyanide | H |
| P105 | Sodium Azide | H |

**ENVIROCARE OF UTAH, INC.**
**HAZARDOUS WASTE LIST**
(continued)

DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES, AND SPILL RESIDUES (continued):

| | | |
|---|---|---|
| P106 | Sodium Cyanide | H |
| P107 | Strontium Sulfide | H |
| P108 | Strychnine & Salts | H |
| P111 | Tetraethyl Pyrophosphate | H |
| P113 | Thallium (III) Oxide | H |
| P114 | Thallium Selenite | H |
| P115 | Thallium (I) Sulphate | H |
| P119 | Ammonium Vanadate | H |
| P120 | Vanadium (V) Oxide | H |
| P121 | Zinc Cyanide | H |
| P122 | Zinc Phosphide (>10%) | H |
| P123 | Toxaphene | H |

COMMERCIAL CHEMICAL PRODUCTS, MANUFACTURING CHEMICAL INTERMEDIATES, OR OFF-SPECIFICATION COMMERCIAL CHEMICAL PRODUCTS:

| | | |
|---|---|---|
| U002 | Acetone | I |
| U003 | Acetonitrile | I,T |
| U004 | Acetophenone | T |
| U005 | 2-Acetylaminoflourene | T |
| U007 | Acrylamide | T |
| U009 | Acrylonitrile | T |
| U012 | Aniline | I,T |
| U018 | Benzo(a)anthracene | T |
| U019 | Benzene | T |
| U021 | Benzidine | T |
| U022 | Benzo(a)pyrene | T |
| U027 | Bis(2-chloroisopropyl)ether | T |
| U028 | Bis(2-Ethylhexyl) Phthalate | T |
| U029 | Bromomethane | T |
| U030 | 4-Bromophenyl Phenyl Ether | T |
| U031 | n-Butyl Alcohol | I |
| U032 | Calcium Chromate | T |
| U036 | Chlordane | T |
| U037 | Chlorobenzene | T |
| U038 | Chlorobenzilate | T |
| U039 | 4-Chloro-3-methyl Phenol | T |
| U041 | Epichlorohydrin | T |
| U042 | 2-Chloroethylvinyl Ether | T |
| U043 | Vinyl Chloride | T |
| U044 | Chloroform | T |
| U045 | Chloromethane | T |
| U047 | 2-Chloronaphthalene | T |

**ENVIROCARE OF UTAH, INC.**
**HAZARDOUS WASTE LIST**
(continued)

| | | |
|---|---|---|
| U048 | 2-Chlorophenol | T |
| U050 | Chrysene | T |
| U052 | Cresols/Cresylic Acid | T |
| U056 | Cyclohexane | I |
| U057 | Cyclohexanone | I |
| U060 | DDD | T |
| U061 | DDT | T |
| U062 | Diallate | T |
| U063 | Dibenz(a,h)anthracene | T |
| U064 | Dibenzo(a,i)pyrene | T |
| U066 | 1,2-Dibromo-3-Chloropropane | T |
| U067 | 1,2-Dibromoethane | T |
| U068 | Dibromomethane | T |
| U069 | Di-n-Butylphthalate | T |
| U070 | o-Dichlorobenzene | T |
| U071 | m-Dichlorobenzene | T |
| U072 | P-Dichlorobenzene | T |
| U073 | 3-3'-Dichlorobenzidine | T |
| U074 | 1,4-Dichloro-2-Butene | I,T |
| U075 | Dichlorodifluoroethane | T |
| U076 | 1,1-Dichloroethane | T |
| U077 | 1,2-Dichloroethane | T |
| U078 | 1,1-Dichloroethylene | T |
| U079 | 1,2-Dichloroethylene | T |
| U080 | Methylene Chloride | T |
| U081 | 2,4-Dichlorophenol | T |
| U082 | 2,6-Dichlorophenol | T |
| U083 | 1,2-Dichloropropane | T |
| U084 | 1,3-Dichloropropene | T |
| U085 | 1,2:3,4-Diepoxybutane | I,T |
| U088 | Diethylphthalate | T |
| U089 | Diethylstilbesterol | T |
| U091 | 3,3'-dimethoxybenzidine | T |
| U093 | Dimethylaminoazobenzene | T |
| U094 | 7,12-Dimethylbenz(a)anthracene | T |
| U095 | 3,3'-Dimethylbenzidine | T |
| U101 | 2,4-Dimethylphenol | T |
| U102 | Dimethylphthalate | T |
| U105 | 2,4-Dinitrotoluene | T |
| U106 | 2,6-Dinitrotoluene | T |
| U107 | Di-n-Octyl Phthalate | T |
| U108 | 1,4-Dioxane | T |
| U109 | 1,2-Diphenylhydrazine | T |
| U112 | Ethyl Acetate | I |
| U115 | Ethylene Oxide | I,T |
| U117 | Ethyl Ether | I |
| U118 | Ethyl Methacrylate | T |
| U119 | Ethylmethane Sulfonate | T |

**ENVIROCARE OF UTAH, INC.**
**HAZARDOUS WASTE LIST**
(continued)

| | | |
|---|---|---|
| U120 | Fluoranthene | T |
| U121 | Trichlorofluoromethane | T |
| U122 | Formaldehyde | T |
| U123 | Formic Acid | C,T |
| U127 | Hexachlorobenzene | T |
| U128 | Hexachlorobutadiene | T |
| U129 | Lindane (Hexachlorocyclohexane) | T |
| U130 | Hexachlorocyclopentadiene | T |
| U131 | Hexachloroethane | T |
| U132 | Hexachlorophene | T |
| U133 | Hydrazine | R,T |
| U134 | Hydrofluoric Acid | C,T |
| U135 | Hydrogen Sulfide | T |
| U137 | Indeno(1,2,3-cd)pyrene | T |
| U138 | Iodomethane | T |
| U140 | Isobutyl Alcohol | I,T |
| U141 | Isosafrole | T |
| U142 | Kepone | T |
| U144 | Lead Acetate | T |
| U145 | Lead Phosphate | T |
| U146 | Lead Subacetate | T |
| U147 | Maleic Anhydride | T |
| U149 | Malononitrile | T |
| U151 | Mercury | T |
| U152 | Methacrylonitrile | I,T |
| U154 | Methanol | I |
| U155 | Methapyrilene | T |
| U157 | 3-Methylcholanthrene | T |
| U158 | 4,4'-Methylene Bis(2-Chloroaniline) | T |
| U159 | Methyl Ethyl Ketone | I,T |
| U161 | Methyl Isobutyl Ketone | I |
| U162 | Methyl Methacrylate | I,T |
| U165 | Naphthalene | T |
| U166 | 1,4-Naphthalenedione | T |
| U167 | 1-Naphthylenamine | T |
| U168 | 2-Naphthylenamine | T |
| U169 | Nitrobenzene | I,T |
| U170 | 4-Nitrophenol | T |
| U171 | 2-Nitropropane | I,T |
| U172 | N-Nitroso-di-n-butylamine | T |
| U174 | N-Nitrosodiethylamine | T |
| U179 | N-Nitrosopiperidine | T |
| U180 | N-Nitrosopyrrolidine | T |
| U181 | 5-Nitro-o-Toluidine | T |
| U182 | Paraldehyde | T |
| U183 | Pentachlorobenzene | T |
| U184 | Pentachloroethane | T |
| U185 | Pentachloronitrobenzene | T |

**ENVIROCARE OF UTAH, INC.**
**HAZARDOUS WASTE LIST**
(continued)

| | | |
|---|---|---|
| U187 | Phenacetin | T |
| U188 | Phenol | T |
| U190 | Phthalic Anhydride | T |
| U191 | 2-Picoline | T |
| U192 | Pronamide | T |
| U194 | 1-Propanamine | I,T |
| U196 | Pyridine | T |
| U197 | p-Benzoquinone | T |
| U201 | Resorcinol | T |
| U203 | Safrole | T |
| U204 | Selenium Dioxide | T |
| U205 | Selenium Sulfide | T |
| U207 | 1,2,4,5-Tetrachlorobenzene | T |
| U208 | 1,1,1,2-Tetrachloroethane | T |
| U209 | 1,1,2,2-Tetrachloroethane | T |
| U210 | Tetrachloroethylene | T |
| U211 | Carbon Tetrachloride | T |
| U212 | 2,3,4,6-Tetrachlorophenol | T |
| U214 | Thallium (I) Acetate | T |
| U215 | Thallium (II) Carbonate | T |
| U216 | Thallium (I) Chloride | T |
| U217 | Thallium (I) Nitrate | T |
| U219 | Thiourea | T |
| U220 | Toluene | T |
| U221 | Toluenediamine | T |
| U223 | Toluene Diisocyanate | R,T |
| U225 | Bromoform | T |
| U226 | 1,1,1-Trichloroethane | T |
| U227 | 2-Ethoxyethanol | T |
| U228 | Trichloroethylene | T |
| U230 | 2,4,5-Trichlorophenol | T |
| U231 | 2,4,6-Trichlorophenol | T |
| U232 | 2,4,5-T | T |
| U233 | 2,4,5-TP Silvex | T |
| U234 | 1,3,5-Trinitrobenzene | R,T |
| U235 | Tris(2,3-Dibromopropyl) Phosphate | T |
| U237 | Uracil mustard | T |
| U238 | Ethyl Carbamate (Urethane) | T |
| U239 | Xylene | I |
| U240 | 2,4-Dichlorophenoxyacetic acid | T |
| U242 | Pentachlorophenol | T |
| U243 | Hexachloropropene | T |
| U247 | Methoxychlor | T |
| U328 | 2-Methyl Benzenamine | T |
| U359 | 1,1,2-Trichloroethane | T |

(Note: Non-radioactive hazardous wastes must not be mixed with radioactive wastes to avoid or circumvent the land disposal restrictions.)

# UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY
# DIVISION OF RADIATION CONTROL
# RADIOACTIVE MATERIAL LICENSE

Pursuant to Section 19-3-104 of the Utah Code Annotated 1953, and the Utah Department of Environmental Quality Rules for the Control of Ionizing Radiation, and in reliance of statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material designated below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, and orders now or hereafter in effect and to any conditions specified below.

| LICENSEE | | 3. License Number<br>UT 2300249<br>Amendment #14, in its entirety |
|---|---|---|
| 1. Name | Envirocare of Utah, Inc. | |
| 2. Address | 46 West Broadway<br>Suite 240<br>Salt Lake City, Utah 84101 | 4. Expiration Date<br>February 28, 1996<br>See P c-33 for status |
| | | 5. License Category 4-a |

| 6. Radioactive Material (Element and Mass Number) | | 7. Chemical and/or Physical Form | | 8. Maximum Average Concentration In Waste for Disposal | |
|---|---|---|---|---|---|
| A. | Silver-110m | A. | Volumetric bulky materials or debris | A. | 5.6E+02 pCi/g |
| B. | Americium-241 | B. | Volumetric bulky materials or debris | B. | 2.3E+02 pCi/g |
| C. | Americium-243 | C. | Volumetric bulky materials or debris | C. | 1.7E+03 pCi/g |
| D. | Beryllium-7 | D. | Volumetric bulky materials or debris | D. | 3.8E+04 pCi/g |
| E. | Calcium-45 | E. | Volumetric bulky materials or debris | E. | 4.0E+08 pCi/g |
| F. | Cadmium-109 | F. | Volumetric bulky materials or debris | F. | 4.6E+04 pCi/g |
| G. | Cobalt-56 | G. | Volumetric bulky materials or debris | G. | 3.6E+02 pCi/g |
| H. | Cobalt-57 | H. | Volumetric bulky materials or debris | H. | 1.9E+04 pCi/g |

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| 6. Radioactive Material (Element and Mass Number) | | 7. Chemical and/or Physical Form | | 8. Maximum Average Concentration In Waste for Disposal | |
|---|---|---|---|---|---|
| I. | Cobalt-58 | I. | Volumetric bulky materials or debris | I. | 1.6E+03 pCi/g |
| J. | Cobalt-60 | J. | Volumetric bulky materials or debris | J. | 3.6E+02 pCi/g |
| K. | Chromium-51 | K. | Volumetric bulky materials or debris | K. | 6.8E+04 pCi/g |
| L. | Cesium-134 | L. | Volumetric bulky materials or debris | L. | 1.2E+03 pCi/g |
| M. | Cesium-137 | M. | Volumetric bulky materials or debris | M. | 5.6E+02 pCi/g |
| N. | Europium-152 | N. | Volumetric bulky materials or debris | N. | 1.7E+03 pCi/g |
| O. | Europium-154 | O. | Volumetric bulky materials or debris | O. | 1.4E+03 pCi/g |
| P. | Iron-55 | P. | Volumetric bulky materials or debris | P. | 1.8E+06 pCi/g |
| Q. | Mercury-203 | Q. | Volumetric bulky materials or debris | Q. | 1.0E+04 pCi/g |
| R. | Potassium-40 | R. | Volumetric bulky materials or debris | R. | 1.0E+04 pCi/g |
| S. | Iridium-192 | S. | Volumetric bulky materials or debris | S. | 2.5E+03 pCi/g |

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| 6. Radioactive Material (Element and Mass Number) | | 7. Chemical and/or Physical Form | | 8. Maximum Average Concentration In Waste for Disposal | |
|---|---|---|---|---|---|
| T. | Manganese-54 | T. | Volumetric bulky materials or debris | T. | 5.6E+03 pCi/g |
| U. | Niobium-94 | U. | Volumetric bulky materials or debris | U. | 1.6E+02 pCi/g |
| V. | Nickel-59 | V. | Volumetric bulky materials or debris | V. | 7.0E+02 pCi/g |
| W. | Nickel-63 | W. | Volumetric bulky materials or debris | W. | 2.0E+06 pCi/g |
| X. | Lead-210 | X. | Volumetric bulky materials or debris | X. | 2.3E+05 pCi/g* |
| Y. | Polonium-210 | Y. | Volumetric bulky materials or debris | Y. | 2.0E+04 pCi/g |
| Z. | Radium-226 | Z. | Volumetric bulky materials or debris | Z. | 2.0E+03 pCi/g* |
| AA. | Radium-228 | AA. | Volumetric bulky materials or debris | AA. | 1.8E+03 pCi/g |
| BB. | Radium-228 1 year | BB. | Volumetric bulky materials or debris | BB. | 1.2E+03 pCi/g* |
| CC. | Radium-228 5 years | CC. | Volumetric bulky materials or debris | CC. | 6.7E+02 pCi/g* |
| DD. | Radium-228 10 years | DD. | Volumetric bulky materials or debris | DD. | 5.6E+02 pCi/g* |

* Daughters are assumed to be present at same concentration in equilibrium.

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| 6. Radioactive Material (Element and Mass Number) | | 7. Chemical and/or Physical Form | | 8. Maximum Average Concentration In Waste for Disposal | |
|---|---|---|---|---|---|
| EE. | Ruthenium-106 | EE. | Volumetric bulky materials or debris | EE. | 1.9E+04 pCi/g* |
| FF. | Antimony-124 | FF. | Volumetric bulky materials or debris | FF. | 7.9E+02 pCi/g |
| GG. | Antimony-125 | GG. | Volumetric bulky materials or debris | GG. | 5.3E+03 pCi/g |
| HH. | Tin-113 | HH. | Volumetric bulky materials or debris | HH. | 7.3E+05 pCi/g |
| II. | Strontium-90 | II. | Volumetric bulky materials or debris | II. | 2.0E+04 pCi/g |
| JJ. | Thorium-230 | JJ. | Volumetric bulky materials or debris | JJ. | 1.5E+04 pCi/g |
| KK. | Thorium-232 | KK. | Volumetric bulky materials or debris | KK. | 6.8E+02 pCi/g* |
| LL. | Uranium-234 | LL. | Volumetric bulky materials or debris | LL. | 3.7E+04 pCi/g |
| MM. | Uranium-235 | MM. | Volumetric bulky materials or debris | MM. | 7.7E+02 pCi/g |
| NN. | Uranium-236 | NN. | Volumetric bulky materials or debris | NN. | 3.6E+04 pCi/g |
| OO. | Uranium-238 | OO. | Volumetric bulky materials or debris | OO. | 2.8E+04 pCi/g |

* Daughters are asumed to be present at same concentrations in equilibruim.

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| 6. Radioactive Material (Element and Mass Number) | | 7. Chemical and/or Physical Form | | 8. Maximum Average Concentration In Waste for Disposal | |
|---|---|---|---|---|---|
| PP. | Uraniuum-natural | PP. | Volumetric bulky materials or debris | PP. | 1.8E+04 pCi/g |
| QQ. | Uranium-depleted | QQ. | Volumetric bulky materials or debris | QQ | 1.1E+05 pCi/g |
| RR. | Zinc-65 | RR. | Volumetric bulky materials or debris | RR. | 1.1E+04 pCi/g |
| SS. | Carbon-14 | SS. | Volumetric bulky materials or debris | SS. | 4.0E+05 pCi/g |
| TT. | Hydrogen-3 | TT. | Volumetric bulky materials or debris | TT. | 2.0E+07 pCi/g |
| UU. | Iodine-129 | UU. | Volumetric bulky materials or debris | UU. | 3.1E+03 pCi/g |
| VV. | Sodium-22 | VV. | Volumetric bulky materials or debris | VV. | 7.8E+02 pCi/g |
| WW. | Technetium-99 | WW. | Volumetric bulky materials or debris | WW. | 1.0E+05 pCi/g |
| XX. | Curium-242 | XX. | Volumetric bulky materials or debris | XX. | 1.4E+06 pCi/g |
| YY. | Curium-242 | YY. | Volumetric bulky materials or debris | YY. | 8.1E+03 pCi/g* |
| ZZ. | Curium-243 | ZZ. | Volumetric bulky materials or debris | ZZ. | 1.5E+03 pCi/g |

* Daughters are assumed to be present at same concentrations in equilibrium.

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| 6. Radioactive Material (Element and Mass Number) | 7. Chemical and/or Physical Form | 8. Maximum Average Concentration In Waste for Disposal |
|---|---|---|
| AAA. Curium-243 | AAA. Volumetric bulky materials or debris | AAA. 1.3E+03 pCi/g* |
| BBB. Curium-244 | BBB. Volumetric bulky materials or debris | BBB. 1.0E+04 pCi/g |
| CCC. Curium-244 | CCC. Volumetric bulky materials or debris | CCC. 7.4E+03 pCi/g* |
| DDD. Neptunium-237 | DDD. Volumetric bulky materials or debris | DDD. 2.0E+03 pCi/g |
| EEE. Plutonium-238 | EEE. Volumetric bulky materials or debris | EEE. 1.0E+04 pCi/g |
| FFF. Plutonium-238 | FFF. Volumetric bulky materials or debris | FFF. 8.2E+03 pCi/g* |
| GGG. Plutonium-239 | GGG. Volumetric bulky materials or debris | GGG. 9.9E+03 pCi/g |
| HHH. Plutonium-240 | HHH. Volumetric bulky materials or debris | HHH. 1.0E+04 pCi/g |
| III. Plutonium-241 | III. Volumetric bulky materials or debris | III. 3.5E+05 pCi/g |
| JJJ. Plutonium-241 | JJJ. Volumetric bulky materials or debris | JJJ. 1.1E+03 pCi/g* |
| KKK. Plutonium-242 | KKK. Volumetric bulky materials or debris | KKK. 1.0E+04 pCi/g |

* Daughters are assumed to be present at same concentrations in equilibrium.

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9. AUTHORIZED USE

Radioactive material as bulk radioactive waste may be received, stored and disposed of by land burial. The licensee shall not accept low-level radioactive waste generated outside the region comprised of the party states to the Northwest Interstate Compact on Low-Level Radioactive Waste Management ("Compact") namely Alaska, Hawaii, Idaho, Montana, Oregon, Utah and Washington, unless the provisions of Articles IV and V of the Compact are met. Prior to receiving any such shipments, the licensee shall submit to the Utah Division of Radiation Control documentation evidencing compliance with these Compact provisions.

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CONDITIONS

10. Licensed material shall be used at the licensee's facility located in Section 32 of Township 1 South and Range 11 West, Tooele County, Utah.

11. The licensee shall not possess at any time, more than 300,000 cubic yards of radioactive waste material which is not disposed of in accordance with the finished design requirements. This includes all wastes in storage or active processing.

12. Pursuant to R313-12-54(1), the licensee is granted an exemption to R313-25-9, as it relates to land ownership and assumption of ownership.

13. The maximum quantity of special nuclear material which the licensee may possess, undisposed of, at any one time shall not exceed; 350 grams of U-235, 200 grams of U-233, and 200 grams Pu, or any combination of them in accordance with the following formula.

$$\frac{\text{(Grams U-235)}}{350} + \frac{\text{(Grams U-233)}}{200} + \frac{\text{(Grams Pu)}}{200} \leq 1$$

14. Licensed material specified in Item 6.A through 6.KKK shall not be placed in a disposal cell unless it has been determined that the concentration of radionuclides is approximately homogeneous within the physical form of the waste. This does not pertain to debris superficially contaminated with licensed materials.

15. A. The licensee may receive for treatment, storage, and disposal any radioactive waste as authorized by this license that is also determined to be hazardous as permitted by the "Hazardous Waste Plan Approvals" issued and modified by the Executive Secretary, Utah Solid and Hazardous Waste Control Board and "HWSA Permit" issued by the U.S. Environmental Protection Agency.

B. The licensee shall dispose of these wastes in the "mixed waste" disposal embankment only.

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16. A. If a mixture of radionuclides a, b, and c are present in the waste in the concentrations $C_a$, $C_b$, and $C_c$ and if the applicable maximum average waste concentrations from Item 8 of this license are $MWC_a$, $MWC_b$, and $MWC_c$ respectively, then the concentration in the waste shall be limited so that the following relationship exists.

$$\frac{C_a}{MWC_a} + \frac{C_b}{MWC_b} + \frac{C_c}{MWC_c} \leq 1$$

B. If a single radionuclide is present in the waste, the maximum average concentration shall not exceed the applicable value found in Item 8 of this license.

17. Sealed sources as defined in R313-12-3(64) shall not be accepted for disposal.

18. Radioactive waste containing free liquid shall not be accepted for disposal. Such waste shall be managed in accordance with the LARW Waste Management Plan currently approved by the Executive Secretary of the Utah Radiation Control Board.

19. The licensee shall comply with the provisions of Chapter R313-18, "Notices, Instructions and Reports to Workers by Licensees or Registrants, Inspections" and Chapter R313-15, "Standards for Protection Against Radiation".

20. The licensee may transport licensed material or deliver licensed material to a carrier for transport in accordance with the provisions of R313-19-100 "Transportation".

21. Written procedures shall be maintained and available at the disposal facility for operations involving radioactive materials. The procedures shall incorporate operating instructions and appropriate safety precautions for the work. The employee training program shall include detailed review of the operating procedures applicable to the employee's assignments. The requirement for written procedures shall include establishment of procedures for conduct of the radiation safety and environmental monitoring programs, including analytical procedures and instrument calibration requirements. Written procedures and subsequent changes to the procedure shall be reviewed and approved by the Corporate Radiation Safety Officer and the Project Manager. At least annually, all procedures shall be reviewed to assure continued applicability.

22. The Corporation Radiation Safety Officer or other qualified individual designated by the Corporate Radiation Safety Officer shall perform and document weekly inspections of the facility and report any findings of non-compliance, affecting radiological safety, to the Project Manager. Items for inspection include: operating procedures, license requirements and safety practices.

UTAH DIVISION OF RADIATION CONTROL
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23. The licensee shall conduct contamination surveys in accordance with the following table.

## ROUTINE MONITORING AND CONTAMINATION SURVEYS

| Type | Location | Frequency |
|---|---|---|
| A. Gamma Radiation Levels | 1. Perimeter of Controlled Area(s) | 1. Weekly |
| | 2. Office Area | 2. Weekly |
| | 3. Lunch/Change Area | 3. Weekly |
| | 4. Transport Vehicles | 4. Upon Arrival at Site and before departure. |
| B. Contamination Wipes | 1. Eating Area | 1. Weekly |
| | 2. Change Area | 2. Weekly |
| | 3. Office Areas | 3. Weekly |
| | 4. Railcar rollover and control shack | 4. Weekly |
| | 5. Equipment/Vehicles | 5. Once before release |
| C. Employee/ Personnel | 1. Skin & Personal clothing | 1. Prior to exiting controlled area |
| D. Gamma Exposure | 1. Administration Bldg. | 1. Quarterly |
| | 2. Security Trailer | 2. Quarterly |
| E. Radon Concentration | 1. Administration Bldg. | 1. Quarterly |
| | 2. Security Trailer | 2. Quarterly |

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24. The licensee shall conduct a bioassay program in accordance with letter dated July 16, 1993.

25. The use of respirators shall be controlled by a respiratory protection program in accordance with letter dated July 16, 1993, and as stipulated in R313-15-103.

26. The licensee shall calibrate air sampling equipment at intervals not to exceed six months.

27. The operational environmental monitoring program shall be conducted in accordance with revised Section 4.5.4, table 4.7, and figure 4.5 submitted in letter dated July 20, 1993.

28. A. Vehicles, containers, facilities, materials, equipment or other items for unrestricted use, except conveyances as defined in R313-19-4, used for commercial transport of radioactive waste material, shall not be released from the licensee's control if contamination exceeds the limits found in Table 28-A:

TABLE 28 - A

| Nuclide[a] | Column I Average [b,c,j] | Column II Maximum [b,d,j] | Column III Removable [b,e,j] |
|---|---|---|---|
| U-nat, U-235, U-238, and associated decay products | 5,000 dpm alpha/ 100 $cm^2$ | 15,000 dpm alpha/ 100 $cm^2$ | 1,000 dpm alpha/ 100 $cm^2$ |
| Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129 | 100 dpm/100 $cm^2$ | 300 dpm/100 $cm^2$ | 20 dpm/100 $cm^2$ |
| Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133 | 1,000 dpm/100 $cm^2$ | 3,000 dpm/100 $cm^2$ | 200 dpm/100 $cm^2$ |
| Beta-gamma emitters (nuclides with decay modes other than alpha emissions or spontaneous fission) except Sr-90 and other noted above. | 5,000 dpm beta, gamma/100 $cm^2$ | 15,000 dpm beta-gamma/100 $cm^2$ | 1,000 dpm beta-gamma/100 $cm^2$ |

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28. (con't)

a. Where surface contamination by both alpha- and beta-gamma emitting nuclides exists, the limits established for alpha- and beta-gamma emitting nuclides should apply independently.
b. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
c. Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.
d. The maximum contamination level applies to an area of not more than 100 $cm^2$.
e. The amount of removable radioactive material per 100 $cm^2$ of surface area should be determined by wiping the area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of know efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.
f. The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters shall not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

28. B. All conveyances as defined in R313-19-14 used for commercial transport of radioactive material to Envirocare will be decontaminated to the release limits set forth in the following:

TABLE 28 - B
REMOVABLE EXTERNAL RADIOACTIVE CONTAMINATION - WIPE LIMITS

| Contaminant | Maximum permissible limits | Maximum permissible limits |
|---|---|---|
| | micro $Ci/cm^2$ | $dpm/cm^2$ |
| Beta-gamma emitting radionuclides; all radionuclides with half-lives less than ten days; natural uranium; natural thorium; uranium-235; uranium 238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical concentrates..... | $10^{-5}$ | 22 |
| All other alpha emitting radionuclides..... | $10^{-6}$ | 2.2 |

Each transport vehicle used for transporting radioactive materials as an exclusive use shipment... shall be surveyed with appropriate radiation detection instruments after each use. A vehicle shall not be returned to service until the average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters shall not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber, and there is no significant removable (non-fixed) radioactive surface contamination as specified in the above Table 28-B.

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29. A quarterly report shall be prepared by the Corporate Radiation Safety Officer for the Project Manager and Company President evaluating employee exposures, effluent releases and environmental data to determine:

    A. If there are any upward trends in personnel exposures for identifiable categories of workers or types of operations or in effluent releases;

    B. If exposures and effluent might be lowered under the concept of maintaining exposures and effluent as low as reasonably achievable; and

    C. If equipment for exposure and effluent control is being properly used and maintained.

30. In accordance with R313-25-33, the licensee shall submit annual reports to the Division of Radiation Control by the end of the first calendar quarter of each year for the preceding year. The reports shall include:

    A. Specification of the quantity of each of the principal contaminants released to unrestricted areas in liquid and in airborne effluent during the preceding year.

    B. The results of the environmental monitoring program;

    C. A summary of licensee disposal unit survey and maintenance activities; and

    D. A summary of the volume, radioisotopes and their activities for materials disposed of.

31. Except as provided by this condition, the licensee shall maintain the results of sampling, analyses, surveys, and instrument calibration, reports on inspections and audits, employee training records as well as any related reviews, investigations and corrective actions, for five (5) years. The licensee shall maintain personnel exposure records in accordance with R313-15-401.

32. Operations shall be conducted by or under the supervision of Vernon E. Andrews, Corporate Radiation Safety Officer, or other individuals designated by the Corporate Radiation Safety Officer upon successful completion of the licensee's training program.

33. The licensee shall staff the operations of the facility in accordance with the revised organization chart submitted in letter dated July 16, 1993. In addition the licensee shall provide an updated organization chart within 10 days from any change.

34. The licensee staff shall meet the qualifications as described in Section 8.2 and shall have the responsibilities as described in Section 8.1.2 of the license amendment application dated September 20, 1990.

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35. The licensee shall not initiate disposal operations in newly excavated areas until the Division of Radiation Control has inspected and approved the cell/embankment liner.

36. The licensee shall provide "as built drawings" of the facility, at intervals not to exceed six (6) months. Drawings shall be submitted by February 1 and August 1 of each year. The drawings shall show conditions on the site as they existed no earlier than thirty (30) days prior to the submittal of the drawings to the Division of Radiation Control. The drawings shall be certified by a Utah Licensed Land Surveyor or Professional Engineer. Drawings submitted as, "as built drawings" will be marked as such, and will be marked in the same place on each drawing. Record drawings showing approved future designs, final or finished conditions at the site may be included in the "as built drawings", but shall be marked as "record drawings".

37. Reserved.

38. For the purpose of this license, debris is defined as any radioactive waste for disposal other than soils. Compactible debris is defined as: (A) having a gradation that will pass through a four inch (4") grizzly and; (B) as having a density greater than seventy pounds per cubic foot dry weight in accordance with ASTM D-698. Contaminated materials, other than soil, not meeting either of these criteria are defined as noncompactible debris.

39. The licensee shall place bulk radioactive materials in lifts with an uncompacted thickness not exceeding twelve inches (12").

40. In-place bulk radioactive waste shall be compacted at a moisture content up to three percent (3%) above optimum as determined by the Standard Proctor Method ASTM D-698.

41. The licensee shall compact each lift to not less than ninety percent (90%) of optimum density as determined by Standard Proctor Method ASTM D-698. Sampling points for compaction testing shall include locations immediately adjacent to debris when debris is included in the lift.

42. All debris shall be less than ten inches (10") in at least one (1) dimension, and no longer than eight feet (8') in any dimension.

43. The final twenty-four inches (24") of the radioactive waste material embankment, within the side slopes and the top surface, shall be free of debris. In addition, no debris (compactable or non-compactable) shall be placed within twenty-four inches (24") of the clay liner.

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44. A lift or any portion of a lift shall be limited to less than ten percent (10%) by volume of debris and the debris shall be uniformly distributed throughout the lift. However, noncompactible debris in the form of concrete, stone or metal may be placed in the lift up to twenty-five percent (25%) by volume, of the total lift, uniformly distributed throughout, and the debris is placed to minimize void space in the lift.

45. The licensee shall excavate the disposal cell liner, consisting of native materials, to a depth of twenty-four inches (24") and replace it with clay in uncompacted lifts not to exceed nine inches (9"). Each lift shall be compacted to not less than ninety-five percent (95%) optimum density as determined by ASTM D-698 and field permeability as specified in the currently approved Engineering Drawings.

46. The licensee shall fulfill and maintain compliance with all conditions and shall meet all requirements in the currently approved Construction QA/QC Plan and currently approved Engineering Drawings.

47. The disposal cell liner and radon barrier shall be constructed with a moisture content of zero percent (0%) to plus five percent (+5%) of optimum moisture as determined by Standard Proctor Method ASTM D-698.

48. The licensee shall compact the radon barrier to not less than 95 percent of optimum density as determined by Standard Proctor Method ASTM D-698 and a field permeability as specified in the currently approved Engineering Drawings.

49. The licensee shall record, at the time of acceptance, the date and time of day that any lift or portion of a lift has been accepted by the licensee as finished in accordance with all specifications and license conditions.

50. The licensee shall fulfill and maintain compliance with all conditions and requirements in the Waste Characterization Plan currently approved by the Division of Radiation Control.

51. The licensee shall fulfill and maintain compliance with all conditions and requirements in the LARW Waste Management Plan currently approved by the Division of Radiation Control.

52. The licensee shall utilize a manifest ("Radioactive Waste Shipment and Disposal Record," Envirocare Form E-100) containing the information required in R313-15-311(2) and (3) including:

    A. Specification of any solidification agents utilized;

    B. Waste containing more than 0.1% chelating agents by weight must be identified and the weight percentage of the chelating agent estimated. Chelating agents means amine polycarboxylic acids, hydroxyl-carboxylic acids, gluconic acids and polycarboxylic acids;

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53. The licensee shall not accept radioactive waste for storage and disposal unless the licensee has received a complete "Radioactive Waste Shipment and Disposal Record" (Form #E-100) from the shipper.

54. The licensee shall maintain copies of complete manifests or equivalent documentation until the Division of Radiation Control authorizes their disposition.

55. The licensee shall immediately notify the Division of Radiation Control or the Division's on-site representative of any waste shipment where a possible violation of applicable regulations or license conditions has been found.

56. The licensee shall require anyone who transfers radioactive waste to the facility comply with the requirements in R313-15-311(4)(a) through (h).

57. The licensee shall acknowledge receipt of the waste within one (1) week of receipt by returning a signed copy of the manifest or equivalent documentation to the shipper. The shipper to be notified is the licensee who last possessed the waste and transferred the waste to the licensee. The returned copy of the manifest or equivalent documentation shall indicate any discrepancies between materials listed on the manifest and materials received.

58. The licensee shall notify the shipper (i.e., the generator, the collector, or processor) and the Division of Radiation Control when any shipment or part of a shipment has not arrived within 60 days after the advance manifest was received.

59. The licensee shall maintain a record for each shipment of waste disposed of at the site. As a minimum, the record shall include:

    A. The date of disposal of the waste;

    B. The location of waste in the disposal site;

    C. The condition of the waste packages received;

    D. Any discrepancy between the waste listed on the shipment manifest or shipping papers and the waste received in the shipment.

    E. A description of any evidence of leaking or damaged packages or radiation or contamination in excess of applicable regulatory limits; and

    F. A description of any repackaging of wastes in any shipment.

# UTAH DIVISION OF RADIATION CONTROL
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60. In accordance with R313-25-31 the licensee shall maintain a Utah Division of Radiation Control Surety (Trust) Agreement adequate to fund the decommissioning and reclamation of the grounds, equipment and facilities. The surety shall be reviewed and updated annually and a report submitted to the Utah Division of Radiation Control within 60 days after June 1st of each year. The surety arrangement shall be updated as necessary to reflect decommissioning and reclamation costs.

61. Truck, railcar, and other equipment washdown (decontamination) facilities, including evaporation ponds, shall be controlled with fences or other approved barriers to prevent intrusion.

62. All burial embankments and waste storage areas, including immediately adjacent drainage structures, shall be controlled areas, surrounded by a six foot (6') high, chain link fence. All permanent fence shall be chain link, six feet (6') high, topped with three strand barbed wire, top tension wire and twisted selvedge.

63. The licensee shall fulfill and maintain compliance with all conditions and shall meet all compliance schedules stipulated in the Ground Water Discharge Permit, number UGW 450005, issued by the Executive Secretary of the Utah Water Quality Board.

64. One (1) year prior to the anticipated closure of the site, the licensee shall submit for approval a site decontamination and decommissioning plan. As part of this plan, the licensee shall demonstrate by measurements and/or modeling that concentrations of radioactive materials which may be released to the general environment, after site closure, will not result in an annual dose exceeding 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public.

65. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Item 6, 7, and 8 of this license and conduct site operations in accordance with statements, representations, operating procedures, and disposal criteria, heretofore made by the licensee or his authorized representative in application for and subsequent to issuance of Utah Radioactive Material License No. UT 2300249 and amendments thereto.

9/10/93
Date

William J. Sinclair, Executive Secretary, Utah Radiation Control Board

NOTE: Amendment #19 has been superceded by Amendment #20 which changed a number of small details and some of the nuclide limits. Only the change in the tritium limit affects this Exemption Request. The new limits are given as follows:

| Material | Amendment 19 | Amendment 20 |
|---|---|---|
| Calcium-45 | 4.0E08 pCi/g | 4.0E04 pCi/g |
| Carbon-14 | 4.0E05 pCi/g | 2.0E05 pCi/g |
| Curium-242 | 1.4E06 pCi/g | 1.0E03 pCi/g |
| Curium-243 | 1.0E04 pCi/g | 1.0E03 pCi/g |
| Hydrogen-3 | 2.0E07 pCi/g | 2.0E05 pCi/g |
| Iodine-129 | 3.1E03 pCi/g | 3.1E02 Ci/g |
| Iron-55 | 1.8E06 pCi/g | 2.0E04 pCi/g |
| Lead-210 | 2.3E05 pCi/g | 2.0E04 pCi/g |
| Nickel-63 | 2.0E06 pCi/g | 1.0E04 pCi/g |
| Plutonium-238 | 1.0E04 pCi/g | 1.0E03 pCi/g |
| Plutonium-239 | 9.9E03 pCi/g | 1.0E03 pCi/g |
| Plutonium-240 | 1.0E04 pCi/g | 1.0E03 pCi/g |
| Potassium-40 | 1.0E04 pCi/g | 1.0E03 pCi/g |
| Technetium-99 | 1.0E05 pCi/g | 1.0E04 pCi/g |
| Tin-113 | 7.3E05 pCi/g | 1.0E04 pCi/g |

State of Utah

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# APPENDIX D

# ENVIROCARE WASTE ANALYSIS PLAN

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## Table of Contents

# ATTACHMENT II-1

# WASTE ANALYSIS PLAN

## I. BACKGROUND

Most waste streams to be managed at Envirocare are expected to be large-volume wastes whose chemical and physical characteristics do not vary significantly from shipment to shipment.

In this plan, some references are made to HSWA requirements. For HSWA provisions, refer to Envirocare's HSWA Waste Analysis Plan, approved by the EPA.

## II. OVERVIEW

The following steps are detailed in this plan:

1. A generator, treatment facility, or other entity (generally referred to as "generators" in this plan), that is contemplating disposal of waste(s) at Envirocare, must complete the Waste Profile Record (WPR), form EC-0175, for each waste stream. The WPR records the generator's knowledge of the waste and the results of analyses of the waste.

2. A completed WPR is to be provided to Envirocare.

3. At least 5 representative samples of the waste are to be sent to Envirocare during the pre-shipment characterization period. These pre-shipment samples are analyzed for pre-shipment screening parameters and to establish acceptance tolerances for incoming-shipment parameters. The pre-shipment characterization period is the time prior to a generator's shipment of waste.

4. When the waste shipment arrives at Envirocare, the shipment and the associated manifest are inspected.

   For purposes of this plan, a "shipment" refers to a single rail car, flatbed truck, or dump truck, loaded with incoming waste for possible management at Envirocare. When a shipment includes a trailer or "pup", the trailer or "pup" is considered to be a separate shipment from the primary load.

5. Each waste stream of the shipment is sampled and analyzed for incoming-shipment acceptance parameters.

6. During Steps 4 and 5, Envirocare identifies any discrepancies associated with the shipment. All discrepancies are addressed or resolved prior to accepting the shipment. The types of possible discrepancies are described below:

Manifest Discrepancies
- Manifest Incompleteness
- Count, Weight Discrepancies
- Absence of HSWA Notices, Certifications
- Other Manifest Accuracy Discrepancies (Phone #, address, EPA ID No., Names, etc.)

Inspection Discrepancies
- Free Liquids Present
- Damaged, Leaking, Open Containers
- Containers with Holes or Openings
- Waste Outside of the Container

Appearance Discrepancies
- Different Appearance than is Described in the WPR

Analytical Discrepancies
- Incoming-shipment Analytical Results for the Waste are Beyond the Established Tolerances

7. After the incoming-shipment inspection, and completion of the sampling and analyses, if there are no discrepancies or if the discrepancies have been addressed or resolved, the manifest may be signed, the shipment may be accepted and the shipment may proceed as directed to the appropriate waste management area of the facility.

Shipments with the following discrepancies may be accepted for management only if the discrepancy has been resolved:

Manifest Discrepancies
- The manifest is incomplete or inaccurate

- Required HSWA Notices and/or Certifications Are Absent or Unaddressed (See HSWA plan.)

Inspection Discrepancies

- The waste contains free liquids
- The containers are extensively damaged, leaking and/or open
- The waste is in a container with holes or openings
- Waste is outside of containment

Appearance Discrepancies

- The waste has a description different from the description in the WPR

Analytical Discrepancies

- A sample of the waste is not within the tolerances for <u>one</u> of the non-prohibitive incoming-shipment sample analyses

Shipments with the following discrepancies may not be accepted for management at Envirocare:

Analytical Discrepancies

- <u>More than one</u> of the incoming-shipment analysis results are beyond the established tolerances
- A sample of the waste contains free liquids

The details of these items and other aspects of waste acceptance are outlined in this plan.

## III. <u>PRE-SHIPMENT EVALUATION PROCEDURES</u>

The pre-shipment evaluation will take place before a waste shipment arrives at the South Clive site. Envirocare will only dispose of waste from generators for those wastes which are considered by Envirocare to be acceptable for management. This determination will be based on the information which a generator provides in the WPR. A WPR must be completed for each waste stream.

Completion of the WPR will provide Envirocare with several details relating to waste analysis. These items are outlined below:

1. The WPR provides a description of a waste's chemical, physical, and general characteristics and properties relating to hazardous waste management regulations and prohibitions.

2. The WPR provides information as to the chemical composition of the waste.

3. The WPR incorporates checks and balances and provides "red flags" to Envirocare during the review.

4. The WPR requires the generator to certify as to the possible presence of other types of hazardous and toxic properties such as the presence of herbicides, pesticides, infectious wastes, PCBs, etc.

5. The WPR requires generators to analyze each waste stream using approved methods for several parameters which characterize the waste as to the overall toxicity and hazardous composition.

6. The WPR provides information as to whether the waste is subject to or in compliance with the EPA Land Disposal Restrictions.

7. Analytical data used by the generator to complete form EC-0175 shall meet the requirements of the Plan for Evaluating Generator's Laboratory Data outlined in Appendix II-1-5.

8. The WPR requires the generator to fully and completely describe the waste.

9. The WPR requires the generator to provide Envirocare with representative samples of the waste to establish the incoming-shipment acceptance tolerances.

10. The required completion of the WPR will provide Envirocare with a written record of analytical results.

Any profile that is not completed by the generator of the waste will be completed by Envirocare prior to acceptance of the waste at the Facility. The missing information will be documented in the operating record.

Envirocare will not accept waste from a generator when one or more of the following conditions apply:

1. Wastes are prohibited from land disposal as per 40 CFR 268 unless the waste is to be treated at Envirocare.

2. The generator's waste has an EPA Hazardous Waste Number which is not listed as acceptable in Envirocare's permit.

3. The information provided in the WPR is inconsistent and the inconsistency cannot be resolved with the generator.

4. A decision is made by Envirocare to refuse the waste.

5. When the pre-shipment characterization sample of the waste fails one or more of the following incoming-shipment parameters: pyrophoricity, water reactivity, air-reactivity, shock sensitivity, or the paint filter liquids test. Should the waste fail any of these analyses, Envirocare will not accept the waste.

During the pre-shipment characterization period, Envirocare will analyze the samples of the waste for the incoming-shipment acceptance parameters and will establish the incoming-shipment tolerances for the parameters.

When it has been determined that a waste is acceptable at Envirocare, based on the information from the WPR, and the results of the incoming shipment parameters, documentation of this pre-shipment acceptance is completed using the Pre-Shipment Waste Profile Record (EC-0550). The form also documents the results of and established tolerances for the incoming-shipment parameters from the samples provided from the generator. The completed form also provides the waste codes for identification of incompatibilities of waste.

## IV. ANALYSIS OF THE PRE-SHIPMENT ACCEPTANCE SAMPLE AND ESTABLISHMENT OF INCOMING-SHIPMENT TOLERANCES

The acceptable tolerances for the waste are outlined in Table II-1-1 on page 6. The tolerances are based on the results of at least five (5) pre-shipment sample analyses.

TABLE II-1-1
ACCEPTABLE PARAMETER TOLERANCES

| INCOMING-SHIPMENT | |
|---|---|
| ACCEPTANCE PARAMETER | ACCEPTABLE TOLERANCES |
| Solid/Soil pH | Range of the mean +/- 2 std. deviations of the pre-shipment sample results |
| Paint Filter Liquids Test | Pass paint filter or visually assured of no liquids |
| Oxidizer/Reducer Test | Must match initial sample result or must be neither oxidizer or reducer |
| Cyanide/Sulfide Test | Must match initial sample result or be not detectable |
| Photoionizer "sniffer" Test | Range from not detectable up to mean + 2 std. dev. or within range of 5 samples |
| **PRE-SHIPMENT** | |
| ACCEPTANCE PARAMETERS | ACCEPTABLE TOLERANCES |
| Pyrophoricity | Pass pyrophoricity |
| Shock Sensitivity | Pass shock sensitivity |
| Air Reactive | Pass air reactivity |
| Water Reactive | Pass water reactivity |

## V. INCOMING-SHIPMENT ACCEPTANCE PROCEDURES

An incoming shipment of hazardous waste will not be allowed to be unloaded for subsequent management until (1) a determination has been made and documented that the waste is accepted and (2) the manifest has been signed.

Envirocare will use the Incoming-Shipment Acceptance Procedure and Checklist (Appendix II-1-3) (EC-0525) to document the acceptance or rejection of the waste. Any discrepancies found during these procedures will be noted on the Incoming-Shipment Acceptance Procedure and Checklist.

The following types of evaluations are included in the checklist and procedure:

File Review
Manifest and Shipping Papers Review
Manifest Accuracy Check
Waste Inspection
Sample Analysis
Accepting the Shipment
Waste Tracking

These items are outlined below.

### A. File Review

The file review procedure helps Envirocare to prepare for the acceptance procedure. The file review consists of ensuring that:

- There is a current WPR in the operating record,
- Results of pre-shipment samples for on-site analyses parameters have been completed,
- Acceptance tolerances for incoming-shipment analysis parameters have been established, and
- Inspectors are aware of any previous problems with the waste by reviewing previously-completed manifests and Incoming-Shipment Acceptance Procedure and Checklist forms.

B. Manifesting and Shipping Papers Review

1. Manifests and shipping papers will be obtained from the incoming shipment or, in the case of rail shipments, through mail deliveries or telefax transmissions.

2. A review of the manifest is made to ensure that it has been completed.

3. A review of other shipping papers includes any notices required by HSWA -- notices and certifications.

4. Information for any incomplete portions of the manifest will be obtained, completed, and initialed by Envirocare personnel to note that the manifest had been incomplete.

5. The manifest will be reviewed to ensure that any required certifications are provided with the manifest and shipping papers.

C. Manifest Accuracy Check

1. A review of the manifest is made to ensure that the information on the manifest matches the waste being transported. The items which must match are:

   - Generator Information
   - Transporter Information
   - Number/Amount of Containers/Material Involved
   - Type of Waste Listed and Shipped

   Envirocare will compare the manifest to the bulk shipment weight and/or to the number of containers in the shipment. Any discrepancies discovered will be reconciled with the generator. Any corrections or information added to the manifest will be initialed by Envirocare.

Envirocare will use the following criteria to determine whether a count/weight discrepancy exists between the manifest and the shipment:

a. For bulk wastes, variations greater than ten (10) percent in volume or weight.

b. For containerized wastes, any variation in piece count, such as a discrepancy of one (1) drum in a truckload.

If Envirocare accepts a waste with a count/weight manifest discrepancy and the discrepancy is not resolved with the generator within fifteen (15) days after receiving the waste, Envirocare will submit to the Executive Secretary a copy of the manifest or shipping paper at issue and a letter describing the discrepancy and attempts to reconcile it, as required in 40 CFR 264.72(b).

D. Waste Inspection

Envirocare will prepare for the waste inspection by reviewing the WPR, by donning appropriate safety equipment and by taking the sniffer along to monitor volatile emissions, as needed. Often, only the required minimum equipment -- safety glasses or goggles, gloves, protective clothing, footwear, and respirator will be worn.

The inspectors must monitor each container with the sniffer after it is opened. The monitoring must be done at the plane of opening of the container (i.e. where the lid sits or where the bag opens). If an equivalent value of 10 ppm benzene is encountered, organic cartridges must be worn with the respirators. If organic cartridges are already worn, the sniffer check will not be required.

Each container and each bulk shipment will be visually inspected for the presence of free liquids, for damaged, leaking or open containers, and to see that the waste's appearance matches the description of the waste provided in the WPR. Any such discrepancies will be documented.

Envirocare may not accept waste shipments with any of the following discrepancies unless or until the discrepancy has been resolved:

1. Free liquids.

2. Extensively damaged, leaking or open containers.

3. Waste with appearance discrepancies.

**Free Liquids.** Should a shipment contain free liquids, Envirocare may either

reject the shipment or may solidify the shipment so that the waste no longer contains free liquids, as allowed by 40 CFR 264.1(f)(10) and 264.173(a).

**Damaged Containers.** Each shipment of waste will be inspected for acceptable waste containment. The inspector will look for leaks, holes, dents, corrosion, and evidence of leaks.

Should a shipment involve containers which are open, leaking, or extensively damaged, Envirocare may either reject the shipment or may re-containerize the affected waste so that the shipment no longer has open, leaking, or extensively damaged containers.

**Appearance Discrepancies.** When a waste with an appearance discrepancy is encountered, the waste either must be rejected or the following must occur:

1. The generator must be contacted to research the reason for the discrepancy.

2. If there is a satisfactory explanation for the discrepancy, the explanation must be noted and the inspection may continue.

In most cases, appearance discrepancies should result in rejection of the waste since, at the time of the incoming-shipment inspection, pre-shipment samples of the waste have already been observed by Envirocare and since complete descriptions of the waste should be provided in the WPR.

In most cases, appearance discrepancies should be resolved by completing a WPR for the waste and repeating the pre-shipment and incoming shipment procedures. In some cases, a change or addition to the description in the WPR to make the description more complete may address the discrepancy. However, such a change may not be done when there is an analytical discrepancy with more than one parameter beyond the established tolerances.

A waste rejected for an appearance discrepancy may remain as a rejected waste in the shipment vehicle (rail car, highway flatbed) at Envirocare in order to allow for time to obtain a profile of the waste, provided that:

1. The Executive Secretary is informed of and agrees to the situation.

2. From all indications, the waste may eventually be acceptable for management at Envirocare.

E. Sample Analysis

Envirocare will prepare for incoming-shipment sample analysis by reviewing the WPR and manifest and by donning appropriate safety equipment. Often, only the required minimum equipment -- safety glasses or goggles, gloves, protective clothing, and footwear will be worn.

Each waste from each incoming shipment will be sampled. The sampling will be performed according to the procedures outlined in the Quality Assurance Project Plan (page 19). Each sample will be analyzed at Envirocare's on-site laboratory for the following parameters:

Solid/Soil pH
Paint Filter Liquids Test or visual assurance
Oxidizer/Reducer Test
Cyanide/Sulfide Test
Photoionizer "sniffer" Test

These results will be compared with the established tolerances.

**Analytical Discrepancies.** Shipments within the tolerances may be managed at the site. Shipments with one or more incoming-shipment parameters not within the tolerances will be considered to have an analytical discrepancy. Discrepancies may be rectified using the procedures outlined below. If the analytical discrepancy cannot be satisfactorily resolved, the shipment will be rejected. Rejected waste shipments remain the responsibility of the generator and transporter.

**Analytical Discrepancy Rectification Where More Than One Parameter is Outside of Tolerance.**

1. Shipments with more than one parameter outside of tolerance are considered to be a "new" waste stream from the generator. New wastes need to be profiled and tolerances for the new waste need to be established as outlined in this plan. If all of the new waste from the generator is contained in the shipment(s) sent to the Envirocare site, the five samples for establishment of the parameters may come from the shipment itself. Otherwise the pre-shipment samples must come from the generator.

2. If it is determined that the waste with more than one parameter beyond the acceptance tolerances had been misplaced, mislabelled, or otherwise

mismanaged and if the "new" waste is actually another waste which had already been profiled for acceptance at Envirocare, the waste must be properly labelled and accepted through the established tolerances for the correct waste.

**Analytical Discrepancy Rectification Where <u>One</u> Parameter is Outside of the Tolerances.** When a shipment has an analytical discrepancy for only one parameter, Envirocare may use the following procedure to rectify the analytical discrepancy, otherwise, the shipment must be rejected or re-profiled as outlined above:

1. Where the result for the parameter that is beyond the tolerances is close to the acceptable range, a shipment may be accepted. However, justification for the acceptance must be documented.

2. If it is determined through consultation with the generator that tolerances for the parameter were not adequately established, the generator may send five new samples to re-establish the acceptance tolerances for that parameter.

3. Re-establishment of tolerances for the parameter will be required in the event that two or more shipments of the waste are accepted with justification for a parameter being beyond the acceptable tolerance range. The new tolerances must be in place prior to accepting more than two shipments of a waste with a parameter beyond the established tolerances.

4. If it is determined, after consultation with the generator, that the waste has been misplaced, mislabelled, or otherwise mismanaged and the "new" waste is actually a waste which already has been profiled for acceptance at Envirocare, as stated above, such waste must be properly labelled and accepted through the established tolerances for the correct waste.

In most cases other than those described above, analytical discrepancies should result in rejection of the waste since the acceptance tolerances should have been based on representative samples of the waste.

A shipment that has been rejected for analytical discrepancies may remain for

more than 10 days[1] in the shipment vehicle at Envirocare in order to allow for a profile of the waste or to complete the discrepancy rectification described in the previous paragraphs, provided that:

1. The Executive Secretary is informed of and agrees to the situation.

2. From all indications, the waste may eventually be acceptable for management at Envirocare.

## F. Accepting the Shipment

All discrepancies must be resolved or addressed as described in this plan prior to accepting the waste for management at Envirocare.

When the waste has been evaluated as outlined above and when the Incoming-Shipment Acceptance Procedure and Checklist form (Appendix II-1-3) has been completed and signed to document that the waste is acceptable and that any discrepancies have been resolved or addressed, the following procedures must be followed for acceptance of the shipment:

1. The manifest must be signed and dated.

2. The manifest number and Envirocare's tracking number must be recorded on the Incoming-Shipment Acceptance Procedure and Checklist.

3. The tracking number must also be recorded on line 15 of the manifest.

4. A label with the tracking number must be placed on each container of the waste.

5. The shipment must then be made ready for management (i.e. closing the containers, shutting the van-body doors, connecting to a locomotive, etc.).

6. The shipment may proceed as directed to the waste management areas

[1] Where a waste is accepted by this waste analysis plan, yet the waste is awaiting the analysis and acceptance required by the HSWA WAP, the waste may stored in the Envirocare container storage facility according to the requirements outlined in the Envirocare permit.

of Envirocare's facility. Signed manifests (or copies of same) must be kept on file at the Envirocare site and sent to the generator within 30 days of the acceptance date.

G. **Waste Tracking**

Upon approval for acceptance, the waste is assigned a unique number by which it is tracked throughout its management and final disposition. This number is written on line 15 of the manifest and placed on a label of each container. Envirocare must follow the tracking plan found in Section III-3 of the permit.

## VI. SAMPLING PROCEDURES

A. Pre-shipment sampling methods

1. The generator, when completing the WPR must certify that the sample is representative of the waste.

2. The WPR also requires that the generator ensure that specific methods' sampling instructions are followed.

B. Incoming-shipment sampling methods

On-site samples may be obtained by following the procedures outlined in the Quality Assurance Project Plan in Section IX (page 19) of this plan.

## VII. CONTINUING WASTE STREAM EVALUATION PROCEDURES

There are two types of updates to the WPR -- (1) a letter of update and (2) a renewed profiling of the waste.

**Letter of Update.** A letter of update means that the generator will provide a written statement to Envirocare to the effect that the previously-submitted WPR is still representative of the waste, that the process generating the waste has not changed, and that the WPR is still representative of the generator's waste.

**Renewed Profiling of the Waste.** A renewed profiling of the waste means that a new WPR is completed for the waste, new analytical results are

provided with the WPR, five new pre-shipment samples are sent to the facility for analysis, and new incoming-shipment tolerances are established.

Envirocare will update the WPR or will require that the generator update the WPR when the following occurs:

1. When Envirocare is notified by the generator that the process generating the waste has changed, Envirocare will obtain a renewed profiling of the waste.

2. When one calendar year (no more than 365 days) has passed since the arrival of the initial shipment of the waste at Envirocare. Envirocare will obtain a letter of update from the generator.

3. When Envirocare has reason to suspect that the process generating the waste has changed, Envirocare will obtain a renewed profiling of the waste.

The required updates will be documented in the Envirocare operating record.

## VIII. ANALYTICAL METHODS AND RATIONALE

### A. Waste Profile Record Analyses and Rationale

1. Analysis 10A.
Soil pH 9045 and Paint Filter Liquids Test (PFLT) 9095.

Rationale.
These parameters were selected to generally characterize the waste's corrosivity, to aid in establishing on-site compatibility strategies, and, in the case of a waste failing the PFLT, to let Envirocare know that the waste is unacceptable for management at the facility.

During completion of the WPR, if the generator determines, as a result of visual observation and knowledge of the waste, that free liquids are not present in the waste, then the test for free liquids need not be completed as a required test. However, the waste will also be inspected later by Envirocare as part of the incoming-shipment procedures.

2. Analysis 10B.
Test Method (from SW-846 Chapter 7) to Determine Hydrogen Cyanide Released from Wastes.

Rationale.
This parameter was selected to characterize the waste's cyanide reactivity and to aid in establishing on-site compatibility strategies.

3. Analysis 10C.
Test Method (from SW-846 Chapter 7) to Determine Hydrogen Sulfide Released from Wastes.

Rationale.
This parameter was selected to characterize the waste's reactivity and to aid in establishing on-site compatibility strategies.

4. Analysis 10D.
Heavy Metals Analysis. SW-846 and EPA Standard Methods.

Rationale.
Since there are several ways a waste may be hazardous as a result of heavy metal concentration, the generator is required to address the characteristics and treatment standards associated with heavy metal content.

5. Analysis 10E.
Volatile and Semi-Volatile Organic Chemical Analysis. SW-846 and EPA Standard Methods.

Rationale.
Since there are several ways a waste may be hazardous as a result of organic chemical concentration, the generator is required to address the characteristics and treatment standards associated with organic chemical content.

6. Analysis 12.
Other test methods may be required based on the responses in Item 9 of the WPR or based on the analytical results in Item 10 of the required analyses. The applicability of these other methods is described below:

12A. Should a generator indicate the possible presence of listed, derived, or toxic hazardous wastes or solvents, organics, phenolics, alcohols, or other applicable known or possible materials or chemicals in item 9 of the WPR, and the presence of that chemical is not otherwise addressed by analysis, then the generator will be required to provide more detailed information regarding the indication. This information may include test results using appropriate and applicable methods of the following list:

| | |
|---|---|
| Method 8000 | Gas Chromatography |
| Method 8010 | Halogenated Volatile Organics |
| Method 8015 | Nonhalogenated Volatile Organics |
| Method 8020 | Aromatic Volatile Organics |
| Method 8030 | Acrolein, Acrylonitrile, Acetonitrile |
| Method 8040 | Phenols |
| Method 8060 | Phthalate Esters |
| Method 8080 | Organochlorine Pesticides and PCBs |
| Method 8090 | Nitroaromatics and Cyclic Ketones |
| Method 8100 | Polynuclear Aromatic Hydrocarbons |
| Method 8120 | Chlorinated Hydrocarbons |
| Method 8150 | Chlorinated Herbicides |

12B. Should a generator indicate that the waste has the possibility of containing dioxins in Item 9 of the WPR, the generator will be required to provide the results of SW-846 Method 8280 -- The Analysis of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans to show that there are no detectable dioxins in the waste.

12C. Should a generator indicate that the waste has the possibility of containing herbicides and pesticides in Item 9 of the WPR, the generator will be required to provide the results of the Toxicity Characteristic Leaching Procedure (TCLP) in 40 CFR 268 Appendix I for the characteristic herbicides and pesticides.

12D. Should a generator indicate that the waste has the possibility of containing pesticides or PCBs in Item 9 of the WPR, the generator will be required to provide the results of SW-846 Method 8080 -- Organochlorine Pesticides and PCBs.

12E. Should a generator provide results in Item 10 of the WPR with reactive cyanide at greater than 20 mg/kg, the generator will be

required to run SW-846 Method 9010 or 9012 (adapted for solids as applicable) Total and Amenable Cyanide.

In addition to the requirements in the WPR, should a TOX analysis from the HSWA requirements result in greater than or equal to 200 mg/kg or ppm, the generator will be required to run SW-846 Methods to provide results for the Halogenated Organic Compounds (HOCs) listed in Item 16 or otherwise show that the halogenated organic compounds are not those listed as HOC's.

B. **Incoming Shipment Analyses Rationale**

The **Solid/Soil pH Test** was selected and designed to provide data for landfill cell compatibility management and as a basic incoming-shipment screening parameter.

The **Paint Filter Liquids Test (PFLT)** was selected to determine whether a shipment contains free liquids. During the incoming-shipment inspection, if it is determined by Envirocare, as a result of visual observation, that free liquids are not present in a waste, then the test for free liquids may be waived, and the waste may be accepted for management at the facility. The waste must also be otherwise acceptable to be managed at the facility.

The **Oxidizer/Reducer Tests** were selected and designed to determine the presence of oxidizing and reducing agents, for landfill cell compatibility management strategies, and as a basic incoming-shipment screening parameter.

The **Cyanide and Sulfide Tests** were selected and designed to be used to determine the presence of reactive constituents in the waste, for landfill cell compatibility management strategies, and as a basic incoming-shipment screening parameter.

The **Photoionizer "Sniffer" Test** will be used to determine whether the expected magnitude of volatile organic chemicals are present in the waste.

C. **Pre-Shipment Screening Parameters and Rationale**

The **Pyrophoricity Test** was selected and designed to determine whether a waste exhibits pyrophoricity, a prohibited characteristic for the Envirocare facility.

The **Shock Sensitivity Test** was selected and designed to determine whether a

waste exhibits shock sensitivity, a prohibited characteristic for the Envirocare facility.

The **Air Reactivity Test** was selected and designed to determine whether a waste exhibits air reactivity, a prohibited characteristic for the Envirocare facility.

The **Water Reactivity Test** was selected and designed to determine whether a waste exhibits water reactivity, a prohibited characteristic for the Envirocare facility.

## IX. QUALITY ASSURANCE PROJECT PLAN (QAPP) -- FOR INCOMING SHIPMENT SAMPLING AND ANALYSES

### A. PROJECT DESCRIPTION

Upon arrival, each incoming shipment of waste destined for the Mixed Waste Facility will be sampled and analyzed for incoming-shipment acceptance or "fingerprint" parameters. These parameters are: Solid/Soil pH, Paint Filter Liquids Test, Oxidizer/Reducer Test, Cyanide/Sulfide Test, and Photoionizer "sniffer" Test. These analytical methods are designed to be used as a final fingerprint screen.

The results of the analyses for incoming wastes for these parameters will be compared to the results of the analyses of pre-shipment samples. Waste is accepted based upon the results of both pre-shipment analysis by the generators, which includes Pyrophoricity, Shock Sensitivity, Air Reactivity, Water Reactivity, completion of the Mixed Waste Profile Record (Appendix II-1-1), results of on-site analysis and completion of the Pre-Shipment WPR (Appendix II-1-2).

### B. ORGANIZATIONAL RESPONSIBILITIES

The following Envirocare positions relate to quality assurance:

**President of Envirocare**

The President of Envirocare is ultimately responsible for overall operations and quality at the Envirocare facility. The President delegates authority to subordinate personnel. The President receives the quality assurance report

described in this plan. The President may provide written authorization to allow an audit to remain open beyond the calendar quarter when requested by the Technical Manager.

### Site Manager

The Site Manager is responsible for implementing operations at the South Clive site. The Site Manager directs the duties of the operators and laboratory personnel at the site. The Site Manager may act as the Laboratory Supervisor in his absence.

### Technical Manager/Quality Assurance Officer (QAO)

The Technical Manager and Quality Assurance Officer (QAO) provide technical direction of laboratory operations and oversees the quality performance of the laboratory through quarterly audits and a report(s) to the President. The Technical Manager may direct that samples be subject to chain-of-custody control. The Technical Manager may direct inspections of the on-site laboratory system and performance. The Technical Manager may request that an audit remain open beyond the calendar quarter. The Technical Manager is to be informed of the necessity of corrective actions. Upon determining that corrective actions must take place, the Technical Manager outlines the corrective action, completes the investigation, and determines when the corrective action has been effective and is complete.

### Laboratory Supervisor

The Laboratory Supervisor is responsible for daily operations of the on-site laboratory. The Laboratory Supervisor reports to the Site Manager for operational concerns and to the Technical Manager for technical and quality assurance concerns. The Laboratory Supervisor may direct that a sample be subject to chain-of-custody control. The Laboratory Supervisor directs the incoming-shipment inspections and approves shipments for management at the site. The Laboratory Supervisor may act as the Environmental Laboratory Technician in his absence.

### Environmental Laboratory Technician

The Environmental Laboratory Technician samples and inspects incoming shipments of waste and analyzes the samples. The Environmental Laboratory Technician performs analyses on the samples sent from generators to establish the tolerances for accepting the waste shipments. The Environmental

Laboratory Technician directs the efforts of other personnel involved in environmental sampling and shipment acceptance. The Environmental Laboratory Technician may be a custodian for chain-of-custody controlled samples.

## C. DATA QA OBJECTIVES FOR PRECISION, ACCURACY, COMPLETENESS, REPRESENTATIVENESS, AND COMPARABILITY

The following parameters will be measured during the incoming-shipment procedures: solid/soil pH, PFLT, cyanide and sulfide, oxidizer/reducer, and photoionizer "sniffer" test. Table II-1-2 (page 22) lists the objectives for accuracy, completeness, precision, representativeness, and comparability.

## D. SAMPLING PROCEDURES

Samples of waste shipments to be managed by Envirocare come from the following sources:

1. The first sample source is the generator's waste stream. Five representative samples from the generator are sent to Envirocare for analysis of the incoming-shipment parameters. Results of on-site analyses of these samples are used to establish the acceptance tolerances for the waste when it arrives at the site.

2. After the waste shipment has arrived at the Envirocare site, incoming-shipment samples are taken. These samples are obtained using the methods outlined below in Table II-1-2.

The samples are analyzed for the incoming-shipment parameters. Results of analyses of these samples are compared to the established tolerances for the waste stream to determine whether the waste may be accepted for waste management at the facility.

### Sample Handling and Preservation

Sample aliquots for composite samples must be a minimum mass of 100 g each. For the incoming-shipment parameters, a minimum sample mass of 150 g is needed to perform the incoming shipment parameters for either composite or discrete samples depending on the order in which the parameters are run and whether the sample material is used for more than one parameter. However, more sample may be obtained during the collection phase. The minimum mass (150 g) may be viable when the parameters are run in the following order:

# TABLE II-1-2
# QUALITY ASSURANCE OBJECTIVES

| MEASUREMENT PARAMETER | Reference (Method) | Experimental Conditions | Precision | Accuracy | Completeness |
|---|---|---|---|---|---|
| Soil pH | EC-0700 | Soil(solid)/Water Slurry of waste sample | (+/-) 0.3 pH units | (+/-) 0.3 pH units | 100% |
| Liquids | EC-0725 | Waste sample | Pass/Fail | N/A | 100% |
| Cyanide | EC-0750 | Vapors from Acidified Waste Sample | Detected/ Not Detected | N/A | 100% |
| Sulfide | EC-0750 | Vapors from Acidified Waste Sample | Detected/ Not Detected | N/A | 100% |
| Red/Ox | EC-0775 | Solid/Aqueous Solution Mixtures | Red/Ox/ Neither | Red/Ox/ Neither | 100% |
| "Sniffer" | EC-0800 | Vapors Above or Liberated from Waste | 20% (+/-) | 25% (+/-) | 100% |
| Pyrophoricity | EC-1350 | Waste Sample | Pass/Fail | N/A | 100% |
| Shock Sensitivity | EC-1375 | Waste Sample | Pass/Fail | N/A | 100% |
| Air Reactivity | EC-1400 | Waste Sample | Pass/Fail | N/A | 100% |
| Water Reactivity | EC-1425 | Waste Sample in Water | Pass/Fail | N/A | 100% |

1. Photoionizer "Sniffer" Test

2. In any order: Air Reactivity
   Shock Sensitivity
   Pyrophoricity
   Paint Filter Liquids Test

3. Water Reactivity

4. Solid/Soil pH

5. Oxidizer/Reducer Test

6. Cyanide/Sulfide Test

However, if all of the parameters are run concurrently, as much as 3,000 g could be used.

Samples for analyses at Envirocare's on-site laboratory routinely do not require special handling, preservation, or storage procedures. Samples will be labeled and will remain in closed containers until they are ready to be analyzed. The samples will be kept out of environments of extreme heat, moisture, or solar radiation, etc. Since the second sampling will be performed at the time of arrival of a waste shipment to determine its final acceptance/rejection, samples are analyzed for the incoming shipment parameters within 48 hours of sample collection.

**Sampling Methods**

After a visual inspection of the waste shipment has been completed, a sample from an incoming shipment will be obtained by using one or more of the following devices: a thief, a truer, an auger, a sampling tube (Shelby or split tube), a shovel, a spade, or a scoop. Personnel obtaining samples from incoming shipments may use guidance from the methods outlined in 40 CFR 261 Appendix I in selecting which device to use.

**Alternative Sampling Methods and Waiver of Incoming Analysis**

Some wastes do not lend themselves to sampling or to the incoming-shipment analyses. Examples of these wastes are (incomplete list):

| | |
|---|---|
| Lead Bricks | Tree Stumps |
| Wood | Lead Shielding |

| | |
|---|---|
| Concrete | Construction Debris |
| Building Debris | Other Debris |
| Bricks | Sheet Metal |
| Lead/Acid Batteries | Discarded Containers |
| Metal | Dry Wall (Sheet Rock) |
| Wire | Plastic Waste |
| Wood Pallets | Glass |

Soft Waste (Gloves, Suits, Boots, Paper Towels)

When a shipment arrives with such waste, alternative sampling methods may be used to obtain, where possible, samples for analysis. Where analytical methods do not lend themselves to the form of the waste in a shipment, the analyses may be waived by the Site Manager (or the acting Site Manager in the absence of the Site Manager). When alternative sampling is used or when analysis is waived, the methods employed must be recorded, and the reasons for selection of the alternative or waiver must be documented. Some samples may be analyzed for some parameters and waived for other parameters. Where reasonably possible, analyzable samples will be obtained and run. However, when the analysis is waived or the sampling method altered, the action must be documented and justified in the laboratory notebook.

Additionally, pre-shipment samples of such material may be similarly waived and documented at the discretion of the Technical Manager.

**Sample Collection Procedures**

Samples will be collected from random locations in bulk shipments (bulk rail, seavans or dump truck) or from randomly selected containers (i.e. drums, bags, boxes) as determined by a random number generator (or table) and a grid. The minimum number of samples per shipment is outlined on the following page, in Table II-1-3.

**Sample Site-Selection Procedure**

The location of sites within the waste shipment from which the incoming-shipment samples are to be taken are determined by implementing several procedures. These procedures are detailed in subsequent pages of this plan. The overall procedure is outlined below:

1. From the Sampling Frequency Determination Procedure (page 26), the minimum number of samples to be obtained for the waste stream is determined.

2. As many random numbers as the number of samples to be analyzed for the waste

## TABLE II-1-3
## MINIMUM NUMBER OF SAMPLES FOR INCOMING SHIPMENTS

| | |
|---|---|
| Railcar Gondola Shipments: (Bulk or Bags) | Six (6) samples at random locations composited into one sample |
| Flatbed Railcar Shipments: (Bags, Boxes, Drums, etc.) | Same as corresponding highway shipment frequency |
| Highway Bulk Shipments: (Including Dump Trucks) | Four (4) samples at random locations composited into one sample |
| Highway Bulk Shipments: (Seavans) | Four (4) samples at random locations composited into one sample |
| Highway Container Shipments: | Discrete Samples Only |
| Drums: | 10 percent of the number of drums of each waste in the shipment |
| Bags: | 10 percent of the number of bags of each waste in the shipment |
| B-12 | Boxes: 10 percent of the number of boxes of each waste in the shipment |
| B-25 Boxes: | 10 percent of the number of boxes of each waste in the shipment |

stream are obtained using the Random Numbers Selection Procedure (page 30).

3. The waste stream is divided into subsets using the Waste Stream Subset Procedure (page 28).

4. Subsets to be sampled are identified using the random numbers selected.

**Sampling Frequency Determination Procedure**

The frequencies for incoming shipments are outlined in Table II-1-3 (page 28).

For purposes of sampling and analysis, a shipment with a truck and a pup is considered to be two shipments. Waste streams on each must be sampled and accepted separately.

**Random Numbers Selection Procedure**

Each day for which sampling takes place, random numbers are selected from Table XV, Random Numbers, page 628 of "Probability and Statistics in Engineering and Management Science," William W. Hines and Douglas C. Montgomery, Second Edition, John Wiley & Sons. Random numbers also may be selected by this method in advance of the day of sampling. The numbers selected must be documented in the laboratory notebook. The random number table has 90 sets of five (5)-digit numbers in nine columns and ten rows arranged as follows:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 |
| 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 |
| 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
| 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 |
| 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |

To obtain a random number from the table, a digit from the page is randomly selected. The Waste Stream Subset Procedure, described below, obtains two-digit numbers from this digit chosen from the random numbers table. As numbers are used or discarded, the numbers on the page are crossed out. The page may be used for more than one day. For example, if all of the numbers on a sheet were not used from a previous day or shipment, the next set of numbers may be obtained by

TABLE II-1-4
PROCEDURE FOR DIVIDING A SHIPMENT INTO SUBSETS

Note: Samples must be taken from a depth of at least 12 inches.

**Railcar Gondola Shipments:** A rail car measures (Bulk or bags) approximately 50 ft. long by 10 ft. wide.

Divisions are to include possible sampling locations at varying depths in the bulk shipment. Therefore, rail-car divisions are made by dividing the depth of the bulk waste in the car by two and using the number as the depth dimension, d. The length and width dimension for rail car divisions are 5 ft. by 5 ft. Therefore, there will be 20 subsets or divisions in a bulk rail car shipment.

A rail car is divided as follows:

Top Half

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

Bottom Half

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |

Each square measures about 5 ft on each side. The depth would not be more than 5 ft since the tallest cars are 13 feet from the top of the rail.

**Highway Bulk Shipments:** (Including Dump Trucks and Seavans) Divisions are made so that there are at least 10 subsets which include the entire shipment with varying depths in the shipment.

**Highway Container Shipments:** Each bag, drum or (Bags, Drums, or B-12 Boxes) B-12 box is assigned a number and becomes a subset.

**B-25 Boxes:** After the B-25 box to be sampled has been selected, the sample from the B-25 box must come from one of four subset of the box -- two upper and two lower. The subset to be sampled will be decided based on the results of two coin tosses or a similar random method of selection.

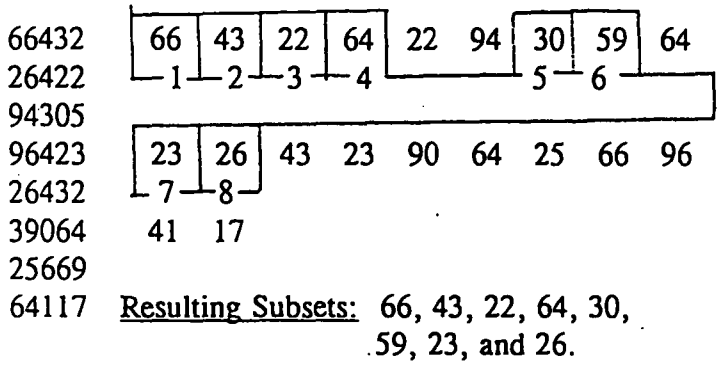
selecting two-digit numbers remaining on the random number sheet from the previous time that numbers were obtained. The sheet may be used until all of the numbers have been selected or discarded.

## Waste Stream Subset Procedure

This procedure establishes the total number of possible sampling sites from which locations may be randomly sampled for incoming-shipment analyses. The number of possible sites are referred to as "divisions". Divisions are established by dividing the waste in a shipment into subsets and assigning a number to each subset or division. The waste will be made into subsets according to the instructions in Table II-1-4 (page 30).

Sampling sites are identified by grouping the random numbers into two-digit numbers and selecting those non-repeating numbers which correspond to numbers equal to or less than the total number of subsets. For example:

A shipment with 72 drums arrives. The drums are numbered 1 to 72. The first eight random numbers are selected as follows:




Note that since numbers 22 and 64 are repeated, the second time the numbers are encountered they are not used. Numbers are selected until 8 numbers are found.

The selected subset numbers for the day's rail cars and container shipments must be documented in the laboratory notebook.

## Containment of a Sample

Once a sample or array of aliquots is collected it will be placed in an approved sample container and labeled accordingly. A container approved for sample collection must have the following characteristics:

1. The container must be free from contaminants that would interfere with the analytical procedures.

2. The container must be constructed of either plastic or glass and able to withstand routine sampling procedures without being destroyed in the process.

3. The container must be of a volume comparable to the volume of the sample to be taken.

4. The container must be able to be closed in such a manner that material may not enter or escape the closed container.

5. The container must be labeled.

6. Examples of acceptable containers are plastic or glass jars with screw-top lids or freezer-quality polyethylene sealable bags.

All incoming-shipment samples will be analyzed the same day that the sample is taken. No sample preservation is necessary.

## Sampling Safety

Safe sampling practices will be employed for the gathering of all samples. Safe work practices will be followed during all waste shipment sampling activities including but not limited to the wearing of protective clothing, shoes, respirators and protective eye wear. Sampling will be performed after personnel have checked the manifest and are familiar with the WPR.

## Contamination

After each sampling event, the sampling equipment will be decontaminated by cleaning with water and soap or detergent. The equipment will then be rinsed with water. This rinse will be followed with a final rinse of distilled or deionized water. The equipment will then be air dried or dried with paper towels.

## Standard Sample Custody

All samples under standard sample custody control are identified by a sample tag or label. This label or tag is used to record the client's name, the waste stream name, the sample collector's name, the shipment manifest number (for incoming shipments), and the time and date of collection.

## Chain-of-Custody

Sample seals are to be placed in such a manner as to secure the opening of the sample container. A chain-of-custody record is completed and accompanies the sample at all times.

A sample is considered to be under a person's custody if the sample is managed using one or more of the following situations:

The sample is in the custodian's physical possession.

The sample is in view of the custodian after possession has taken place.

The sample is secured by the custodian so that no one can tamper with the sample.

The sample is secured by the custodian in an area which is restricted to authorized personnel.

Once a sample has been taken to the on-site laboratory, its receipt is recorded into the laboratory's sample receipt logbook. All chain-of-custody samples are examined for proper integrity of their seals and so noted in the logbook. If custodianship changes upon arrival in the laboratory, the chain-of-custody record is noted and signed by the new custodian.

## Sample Labels

Sample labels are necessary to prevent misidentification and misuse of samples. The labels are affixed to the sample container at the time of sampling. The labels are filled out at the time of collection and contain the following information:

The client's name.

The location of sample collection.

The date and time of collection.

The person performing the sampling.

The shipment manifest number.

Occasionally, it may be necessary for sample labels to be covered with clear plastic tape for protection. This is to be determined by the person collecting the sample or as may be directed by the Laboratory Supervisor.

### Sample Seals

Sample seals are used in chain-of-custody control, to detect any tampering activity of a sample following collection up to the time of analysis. The following information is recorded on a seal:

The client's name.

The sampler's initials.

The date of sample collection.

The seal(s) are affixed to the sample container to secure the container opening and before the sample leaves the custody of the sample collector.

### Chain-of-Custody Record

For a sample under chain-of-custody control, a Chain-of-Custody form is completed. The time, date, and person in possession of the sample is recorded. This record accompanies the sample until the time of final sample disposition. At this time the record is completed and maintained in the proper file. The record contains the following information:

Client's name.

Signature of the sample collector.

The date and time of sample collection.

Signatures of custodians involved as well as the dates and times of possession.

The shipment manifest number.

A copy of the Chain-of-Custody form is in the Envirocare Procedures Manual.

### Sample Compositing Procedures

When a sample is to be composited, collected aliquots will be placed together at the time of sampling. After the composite sample is brought into the laboratory, the sample will be placed into a stainless steel bowl and mixed with a stainless steel spoon or scoop until it is thoroughly mixed. Once this is completed, the sample will be used for analysis.

### Calibration Procedures and Frequency

All instruments are calibrated in accordance with the appropriate analytical method and at the appropriate frequency. Specific methods for calibration are contained in laboratory operating procedures. It is Envirocare's policy to check all new standards against existing standards prior to their adoption. Table II-1-5 (page 33), which lists requirements for calibration, will be posted in the laboratory. Calibrations will be recorded in the laboratory notebook.

## E. ANALYTICAL PROCEDURES

Pre-shipment and incoming-shipment methods for analysis are given in this section for:

* Solid/Soil pH
* Paint Filter Liquids Test
* Oxidizer/Reducer Test
* Cyanide/Sulfide Test
* Photoionizer "sniffer" Test
* Pyrophoricity Test
* Shock Sensitivity
* Air Reactivity
* Water Reactivity

For all analytical procedures, the temperature of the sample must exceed 10°C (50°F) prior to analysis. When the temperature of the sample is below the minimum temperature, the sample may be warmed by exposure to room temperature and by exposure to an incandescent warming lamp provided that the lamp remains at least 8" from the sample when illuminated. The sample may not be heated in a microwave or a convection oven. Samples not immediately analyzed may be held in an air-tight container in a locked controlled refrigerator for a maximum of one week prior to analysis.

TABLE II-1-5
CALIBRATION AND QUALITY CONTROL SCHEDULE

| PARAMETER | REQUIRED FREQUENCY | PROCEDURE | DOCUMENTATION |
|---|---|---|---|
| pH Meter Calibration | Within 3 hours or 10 analyses | Check/Recheck Calibration | Record in the Laboratory Notebook |
| pH Meter Duplicate | Within 3 hours or 10 analyses | Run a duplicate sample | Record in the Notebook |
| pH Meter Rinse and Inspection | Between each sample | Rinse/inspect; wipe electrode if necessary | None required |
| Paint Filter Duplicate | Once each operating day | Run a duplicate sample | Record in the Lab Notebook |
| Oxidizer/ Reducer Test Control Check | Once each day that the test is run. | Run potasssium nitrate and sodium sulfite or sodium thiosulfate | Record in the Laboratory Notebook |
| Ox/Red Test Duplicate | Once each operating day. | Run a duplicate sample. | Record in the Notebook |
| Cyanide/ Sulfide Test Quality Control | Once per week ensure that the tubes are out of direct sunlight. Use tubes within two years of purchase. Check the bellows for leaks by suction and pressure. | | None Required |
| Cyanide/ Sulfide Dupl. | Once each operating day | Run a duplicate sample | Record in the Lab Notebook |

TABLE II-1-5
CALIBRATION AND QUALITY CONTROL SCHEDULE

| PARAMETER | REQUIRED FREQUENCY | PROCEDURE | DOCUMENTATION |
|---|---|---|---|
| Photoionizer "Sniffer" Test Quality Control | Once each operating day | Run a duplicate sample | Record in the Laboratory Notebook |
| Photoionizer "Sniffer" Test Quality Control | Once each operating day | Standardize sniffer with calibration gas | Record in the Laboratory Notebook |
| Photoionizer "Sniffer" Test Quality Control | Run a blank on non-glass containers prior to use | Run a blank on non-glass container | Record in the Laboratory Notebook |
| Pyrophoricity | Once each operating day | Run a duplicate sample | Record in the Laboratory Notebook |
| Shock Sensitivity | Once each operating day | Run a duplicate sample | Record in the Laboratory Notebook |
| Air Reactivity | Once each operating day | Run a duplicate sample | Record in the Laboratory Notebook |
| Water Reactivity | Once each operating day | Run a duplicate sample | Record in the Laboratory Notebook |

## F. INTERNAL QUALITY CONTROL CHECKS

Envirocare maintains procedures for internal quality checks. These procedures are associated with each of the specific analytical procedures being followed in performing the waste sample's on-site analyses. To aid in accomplishing the internal quality control function, the following sections generalize the actions that are routinely taken.

**Field Quality Control.** The following guidelines are used to ensure high quality field data:

1. Employing the accepted sampling techniques and plans as outlined in this Quality Assurance Project Plan.

2. The justification and documentation of any field action taken that is not in adherence to specified techniques and procedures as provided in the Incoming-Shipment Acceptance Procedure and Checklist.

3. Documentation of pre-field activities when these activities are not routine as provided in the Incoming-Shipment Acceptance Procedure and Checklist.

4. Documentation of field activates designed to ensure quality as provided in the Incoming-Shipment Acceptance Procedure and Checklist.

**On-site Analysis Quality Control.** Items such as calibration, check samples, instrument adjustment, and duplicate sample analysis are used to provide additional information about analytical quality control. Specific analytical quality control requirements are specified for each analyte in its respective analysis procedure.

## G. PERFORMANCE AND SYSTEMS AUDITS

The activities associated with the on-site analyses of waste samples are subject to both internal and external inspections and audits. These inspections and audits provide objective information about the capability and performance of the waste analysis system.

System inspections and audits consist of evaluation of all components associated with the on-site analysis activities to assess their proper selection and application.

**Inspections.** Inspections are used randomly to spot changes from expected procedures. Inspections occur as informal actions. The results are discussed informally with those involved and may be documented as deemed necessary by the Technical Manager who performs the inspection.

**Audits.** Audits are performed on a scheduled basis, once each quarter of the calendar year. The objective of the audit is to examine the information (data) generated from several waste samples and verify that proper procedures were used from sample collection, analysis, data reduction, to data reporting as they apply to acceptance/rejection of waste shipments. All

audit findings and actions are documented in an audit report.

**Audit Reports.** Audit reports will provide the reader with an analysis and summary of the present quarter's audit findings as they pertain to the capability and performance of the on-site analysis system. The present quarter will also be compared to the preceding two quarters to identify any trends that may be developing and that may negatively impact the quality of the data and acceptance of decisions.

An audit with findings of work practices or activities that do not conform to expected procedures (standard Envirocare procedures or approved and documented variances of the standard Envirocare procedures) will result in corrective action. The auditor will formally discuss the required corrective actions resulting from the audit findings with the employees involved. The audit remains open until the corrective action is completed and verified by the auditors as corrected. If a corrective action had been required, it will be documented in the quarterly audit report as to the cause, the corrective action and its verified final disposition. A quarterly audit may not remain open for more than four weeks.

## H. PREVENTIVE MAINTENANCE

A maintenance logbook record will be used to keep maintenance records for each analytical instrument (the pH meter, the HNU photoionizer, and the Drager tube equipment) in accordance with the manufacturer's recommended maintenance procedures and frequency.

## I. SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

The precision, accuracy, and completeness of data is to be assessed and documented routinely. The following guidelines are used to make and document these assessments.

**Precision.** Precision is the historically-based measurement of agreement between a sufficient number or set of replicate results among themselves, without the assumption of any prior information as to the results. Duplicate/replicate sample analyses are used to assess precision.

Relative percent difference between duplicate analyses is calculated using the following equation:

$$RPD = \{ (D_1 - D_2) / [ (D_1 + D_2) / N ] \} * 100$$

where

RPD: Relative Percent Difference
$D_1$: First Sample Value
$D_2$: Second Sample Value
N: Number of Sample Values Used
(The number here is 2.)

Alternatively the root-means-square deviation (standard deviation) can be used to assess the central tendency of the data as a percent of the relative standard deviation (PRSD)

$$s = \{ [ \text{sum}(x_i - x_{avg})^2 ] / (N - 1) \}^{1/2}$$

where

s: Standard Deviation
N: Number of Observations
$x_{avg}$: Mean of the Observations
$x_i$: Value of the Determination and

sum means the summation over all of the observations
i = 1 to N.

Expressed as a relative percentage it becomes

$$PRSD = (s/x_{avg}) * 100$$

**Accuracy.** The measurement of accuracy assumes that a true value exists. In this case, accuracy is measured by the nearness of a result to the true value.
Accuracy = [ (MKSV) / (KSV) ] * 100

where

KSV: Known Sample Value
MKSV: Measurement of Known Sample Value

NOTE: Envirocare will measure accuracy quantitatively for the pH and "Sniffer" methods. The "Sniffer" will be quantified as to concentration and the pH will be converted to g-mole/liter for the computation and reverted to a change in equivalent pH units after the value is calculated.

**Completeness.** Completeness is an objective assessment based on a review of actions taken. A completeness check is not easily expressed in terms of quantities in the same manner as for precision or accuracy. However, completeness is an achievable goal that is accomplished

through a review of the actions taken that demonstrate that the precision and the accuracy requirements were met. Completeness is documented by each reviewer of the on-site analysis results when the laboratory analysis notebook is reviewed for errors of omission and commission and the data is initialed in the notebook as valid and correct.

## J. CORRECTIVE ACTION

Most corrective actions are performed in association with the on-site analysis procedure being used. Each analysis procedure requires that quality control checks be made before proceeding with the assigned work. If, however, a control check does not pass, work is stopped and the Technical Manager is informed. The reason for the failure is investigated, the cause is corrected, and the results are documented in the laboratory analysis notebook. All analytical data associated with questionable procedures -- from the previous acceptable control check to the failed control check -- are examined for validity and corrective action taken as necessary.

Corrective action(s) may also be initiated for other quality related activities, such as:

1. Performance inspections and audits.

2. System inspections and audits.

3. Regulatory agency audits.

4. Incidental observations made during report reviews.

All corrective action activities are based on constructive reinforcement of the data quality objectives listed in the QAPP. The following standard actions are taken as the basis for the corrective action procedure:

1. Define the problem in clear terms.

2. Determine the root cause(s) of the problem.

3. Determine possible solutions to the present problem.

4. Determine possible ways to stop the problem from reoccurring.

5. Implement the corrective action necessary (as determined from items 3 and 4 above).

6. Verify that the corrective action is effective.

7. Document all actions taken, results received and conclusions made.

It is the responsibility and duty of all Envirocare employees to bring to their supervisor's attention any problem or work practice which they believe may negatively impact the quality of Envirocare's waste management services.

## K. QUALITY ASSURANCE REPORTS TO MANAGEMENT

Each quarter, the QAO is responsible for preparing a written report, to the President of Envirocare, on the quality of the data and performance of the on-site waste analysis system. The report will include an assessment of data accuracy, precision, and completeness.

Additionally, the report will address the results of performance and system audits. The report will also make management aware of significant quality assurance problems and their possible and recommended solutions. The quarterly quality assurance report will be due to management by the first day of the second month following the quarter that is reported. The due dates for reporting and the four quarters that will be used for quality assurance reporting purposes are outlined below:

| Ending Dates for Each Audit Quarter | Report Due Date |
|---|---|
| March 31 | May 1 |
| June 30 | August 1 |
| September 30 | November 1 |
| December 31 | February 1 |

# APPENDIX E

# ENVIROCARE QUALITY ASSURANCE

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ENVIROCARE OF UTAH, INC.

# QUALITY ASSURANCE MANUAL

**CONTROLLED DOCUMENT**

**SET ID #** 7

**ENVIROCARE OF UTAH, INC.** **QUALITY ASSURANCE MANUAL**

Manual: QUALITY ASSURANCE MANUAL

Revision Number: 3 Affected Pages: i to iv, 1 to 42, 41 FI-F1

Purpose: Revise Manual and incorporate Corrective Action Items

Submitted by: _____ _____ 1/2/96
Signature Printed Name Date

Forwarded: _____ 1/2/96 _____ 1/3/96 _____ 1-3-96
Site MGR Date Site QAO Date Site RSO Date

Concurrence: _____ 4/9/96
Compliance Engineer Date

Review: _____ 4/10/96
Corporate RSO Date

Approval: _____ 4/11/96
Project Manager/Operations Director Date

Note: Only Section 9 of this manual has been included for reference.

# TABLE OF CONTENTS

# INTRODUCTION

All activities of Envirocare of Utah, Inc. (Envirocare) will conform to good engineering practices and be in accordance with applicable state and federal regulatory requirements. The professional work and good judgment of each employee, supplemented by strong management commitment and resources, is essential to maintaining the expected high quality. This quality expectation is inspired and implemented at every level within Envirocare.

This Quality Assurance Manual defines and describes the basic quality assurance attributes, policies, and procedures (the Quality Assurance Plan) used by Envirocare to provide confidence that the construction and functioning of its South Clive Disposal Site follows the clearly defined applicable requirements. The Quality Assurance Plan for Envirocare has the full support and involvement of all levels of management. All employees shall adhere to its provisions and are encouraged to report all issues of non-conformance or of unsafe conditions affecting quality. This policy of "no-fault" applies unless the issue of non-conformance or of an unsafe condition is the direct result of purposeful negligence or intentionally deliberate action or lack thereof on the part of the individual making the report.

The process of Continuous Quality Improvement leads to the development of a better and more responsive Quality System. Lessons learned from assessments and audits and from operating experiences should be used to augment or enhance Envirocare's quality systems and technical operations. Employees are empowered to perform to the best of their abilities and encouraged to identify process improvement opportunities, identify problems, and to offer solutions to those problems. Poor job performance or ignorance of existing known problems affects the work environment, safety, and performance of other employees; affects customer satisfaction and perception; and affects overall costs. Envirocare management seeks Continuous Quality Improvement at every level and encourages and supports the overall Envirocare quality improvement goal of exceeding the expectations of our customers whenever possible.

While not directly applicable, the policies described in this Quality Assurance Manual are intended to be consistent with the guidance provided in NQA-1, 10 CFR 50 - Appendix B, and Department of Energy (DOE) Order 5600.6c. Suggestions for revisions or additions to this Quality Assurance Manual are invited and will be made as necessary to conform to the current needs of Envirocare. Revisions will be controlled in accordance with procedure ADMIN-1 of the Envirocare Operating Procedures Manual.

**Khosrow B. Semnani, President**
**Envirocare of Utah, Inc.**

## 9. QUALITY ASSURANCE

The quality assurance requirements outlined in this section are applicable to both the design and construction phase as well as the operational phase of the project. The majority of the construction for this project has already been completed.

Section 4 discusses the operation of the waste disposal facility. As described in that section, the operation is a continuous cut and cover construction project, with the construction phase also being the operational phase:

1. Topsoil (overburden is removed to a depth of 8 feet, and stockpiled for future use to provide the radon barrier on the final stage of the embankment.

2. Disposal material is placed in the excavation, in 1 foot lifts, and compacted in place, until a maximum height of 30 feet above pre-existing grade is reached.

3. The overburden from the next stage of the embankment is placed on top of the disposal material and compacted to form the radon barrier which will be 7 feet thick.

4. Specification-sized rock, two-foot thick, will be placed on the radon barrier to provide an erosion barrier.

The following information addresses the Quality Assurance program to be followed during the construction/waste disposal activities.

### 9.0 Quality Assurance Program

During the design phase of this project, the major objective has been to design a disposal embankment that will afford environmental protection, safety, and stability to at least the same degree as the Vitro disposal embankment at South Clive. The design criteria as presented in Section 3 (including corrections and correspondence) has been approved by the Utah Bureau of Radiation Control (UBRC) prior to submission of this amended Section 9. Any design changes must be submitted for review and approval by the UBRC before implementation by Envirocare.

It is not the intent of this Section to specify the number, model, weights, etc., of construction equipment to be used by the construction contractor during the project. The construction contractor is to be given the design/construction specifications, and required to meet them.

This section itemizes the specific tests and frequencies that must be performed on each type of construction material, calibration and control of measuring equipment, and records to be maintained.

Section 9.6 discusses corrective actions to be taken when non-conformance items are encountered.

During the operation of the waste disposal facility, Envirocare will assure that all activities affecting structures, systems, or components important to safety will be subject to the applicable controls of the QA program, and that specific equipment, environmental conditions, skills or processes will be provided as necessary.

## 9.1 Organization

### 9.1.1 Project Engineer

The Project Engineer is in charge of all quality assurance on the project. He is in continual contact with the Project Manager and receives help from him when needed. The Project Manager is in charge of making sure that all corrective action is completed satisfactory. He is responsible to sign off Certificates of Compliance/Conformance when required. The Project Engineer will periodically check all field procedures and record keeping procedures to assure proper quality assurance. He also will make periodic checks of the site with the inspector(s) and make appropriate comments and suggestions.

### 9.1.2 Engineer's Assistant

The Engineer's Assistant is in charge of all inspectors in the field, and coordinates all quality assurance and quality control activities. He will supervise the running of tests whenever it is necessary. He monitors all activities at the site. The Engineer's Assistant assures that proper record keeping is being done and makes sure that all necessary information is documented. He is also responsible to provide certified and approved survey personnel to complete field measurements and to locate certain points.

The survey crew will see that materials are placed in the proper position. All excavation and backfill quantities will be calculated using the area method. Surveying will be done by the cross-

section method with before, excavated and final elevations.

The survey crew will also measure in test locations for Envirocare's Materials personnel and the Materials Testing Contractor (MTC).

### 9.1.3 Field Testing Inspector

A Materials Testing Contractor (MTC) will be contracted to perform quality assurance testing on the embankment construction,however a majority of the testing will be performed by Envirocare personnel. Envirocare is responsible to assure that all materials are placed in accordance with the schedule and approved testing methods detailed in this section. Any MTC activities will report directly to the Project Engineer.

Both Envirocare and the MTC will provide qualified personnel who are certified to perform all tests that they are required to perform. Envirocare's field personnel will keep records on a daily basis, and provide this data to the Project Engineer routinely and as needed.

### 9.1.4 Quality Assurance Auditor (Outside)

A quality Assurance Auditor will be contracted to audit all quality assurance activities performed in conjunction with the construction/disposal project. The individual/group that is to perform this audit will be from outside of the Envirocare organization. This should provide the Auditor with insulation/isolation from production quotas, schedules, deadlines, etc., in order to adequately assure compliance with required testing and certification of materials and procedures. A construction/disposal audit will be performed by an outside auditor on at least a quarterly basis.

## 9.2 Material Testing to be Conducted

Table 9.1 summarizes the tests that are to be run during the construction of the Envirocare embankment. The table also shows the frequency of the tests that must be performed. The following sections also describe the tests to be run.

### 9.2.1 Field Density Control

Soil density and moisture testing will be done with licensed Nuclear Moisture/Density gauges or by the sand cone method. The tests will be run in accordance with ASTM D-2922 (AASHTO T-238), and ASTM D-3017 (AASHTO T-239) respectively. If density gauges are used it will be necessary to use sand cone tests to confirm the results of the nuclear gauges. Sand cone test will be run in accordance with ASTM D-1556 (AASHTO T-191). At least two sand cone tests will be run for every 20,000 cubic yards (CY) of disposal material.

There will be a minimum of one density test per 1000 CY of disposal material placed. At least one test will be taken on each lift in each area that of construction; i.e., the Envirocare embankment will be constructed in phases (areas) and each lift must be tested in every area as it is constructed. A compaction test will be performed for every full shift of compaction operation.

The radon barrier will be tested by sand cone method only, at a minimum of one test for every 500 CY of radon barrier material placed. At least one test will be taken on each lift in each area of construction; i.e., the Envirocare radon barrier will be placed in phases (areas) and each lift must be tested in every area as it is constructed. A compaction test will be performed for every full shift of compaction operation. It should be noted that this is a minimum number of tests and that in most situations more tests will be taken. A test may be taken whenever the inspector or Project Engineer feels it would be beneficial.

Due to the higher radiation background anticipated in the disposal areas, calibration procedures for the nuclear density gauges will vary as follows whenever they are used on the contaminated material:

1. A background count is taken in a "normal" low background area. This normal area would be in an area over 500 feet from the disposal cell. The background count will be taken on a concrete pad.

2. A background count is also taken in the proximity of the location where the density measurement is to be taken.

3. The background difference (BD) between the two measurements is obtained by subtraction of #1 from #2.

4. The density measurement is then performed in the normal manner, except that the difference in the backgrounds (BD) is subtracted from the obtained count prior to calculating density.

Moisture determinations may be taken on the contaminated material in the usual manner with the nuclear moisture gauge or by the sand cone method. If nuclear density gauges are used, cross checks will be performed using sand-cone tests or other approved moisture test methods.

The original ground at the site will be tested by sand cone method only, at a minimum of one test for every 1500 square yards. These tests will also include an inspection of the original ground to insure that the ground has been scarified to a depth of one foot before compaction. Record of the scarification will be kept with the density tests.

To assure that the correct maximum dry density is being used to determine the relative compaction, proctor tests shall be run according to ASTM D-698 (AASHTO T-99). A complete proctor test will be run for a minimum of every 7,500 CY of radon barrier placed. A complete proctor will also be performed for every 15,000 CY of disposal material placed. One point Proctor tests will be taken more frequently depending on the variability of the soil. Whenever different material types are encountered, a complete Proctor test will be performed for each material type. Prior to the start of field compaction operations, appropriate laboratory compaction curves will be obtained for the range of placed material. Supplemental laboratory compaction curves will be obtained, approximately one for every 15 field tests, depending on the variability of materials.

Density tests and Proctor tests shall be recorded and logged on appropriate forms, which shall be kept for permanent record and also supplied to the Project Engineer.

### 9.2.2 Gradation Testing

Gradation tests for the specified materials will be run according to ASTM C-136 (AASHTO T-27) as applicable. Testing for gradation will be taken for a minimum of every 20,000 CY. At least one gradation test will be performed for each day of significant material placement (in excess of 150 CY) for all materials other than disposal material and radon barrier material. Tests may be taken more frequently if desired by the engineer or the inspector.

Gradation tests will be run by Envirocare. A series of gradation tests will be performed in stock piles before the material is placed. Final gradation tests will be done on material that is "in place" on the site.

### 9.2.3 Soil Classification

Testing for soil classification will be taken for a minimum of every 15,000 CY of disposal material and a minimum of one test for every 20,000 CY of radon barrier. Whenever there is a change in the material, soil classification tests will be performed. Laboratory tests will be run in accordance with ASTM D-2487 (AASHTO M-145). Soil classification tests will be performed by Envirocare.

### 9.2.4 Other Testing

#### 9.2.4.1 Liquid limit determination

Liquid limit determination of soils will be performed in accordance with ASTM D-423 (AASHTO T-89) by Envirocare. Records of liquid limits will be kept on the form shown in this section, or equivalent forms provided by the MTC. One liquid limit test will be performed for every 20,000 CY of disposal material placed. At least one liquid limit test will be performed for each day that over 1000 CY of radon barrier is placed. One test will be run for every 7,500 CY of radon barrier placed.

9.2.4.2 Plastic limit and plasticity index

Plastic limit and plasticity index determination of soils will be performed in accordance with ASTM D-424 (AASHTO T-90). Plastic limit and plastic index tests will be performed by Envirocare and will be recorded on a log such as the one shown in this chapter. One plastic limit and one plastic index test will be performed for every 20,000 CY of disposal material placed and at least one series of tests will be performed for each day that over 1000 CY of radon barrier is placed. ONe test will be run for every 7,500 CY of radon barrier placed.

9.2.4.3 Specific Gravity and Absorption

Specific gravity and absorption tests will be run in accordance with ASTM C-128 (AASHTO T-84) and ASTM C-127 (AASHTO T-85) respectively. One of these tests will be performed by Envirocare or the MTC for every 10,000 CY of erosion barrier material placed. During construction activities, additional tests will be performed for each phase of placement of the rock erosion barrier. At least one test will be taken for every 140,000 SY of rock material placed. A set of these tests will be performed for each type of barrier material prior to delivery to the site. Other samples will be taken randomly from material that is already "in place".

9.2.4.4 Abrasion of coarse aggregate

Abrasion of coarse aggregate by use of the Los Angeles machine will be run in accordance with ASTM C-131 (AASHTO T-96). These tests will be performed by the MTC. One L.A. abrasion test will be run for every 10,000 CY of rock erosion barrier placed. During construction activities, additional tests will be performed for each phase of placement of the rock erosion barrier. At least one test will be taken for every 140,000 SY of rock material placed. A set of these tests will be performed for each type of barrier material prior to delivery to the site.

A set of tests will be performed for each type of barrier material prior to delivery to the site. Other samples will be taken randomly from material that is already "in place".

9.2.4.5 Laboratory determination of pH

Laboratory determination of pH for soils will be run in accordance with UDOHMOI 8-934, or other approved method. These tests will be performed by Envirocare of by the MTC at the same frequency as the L.A. abrasion tests.

9.2.4.6 Sodium Soundness

Sodium Soundness tests will be run in accordance with ASTM C-88 (AASHTO T-104) by Envirocare or by the MTC. The tests will be recorded on forms similar to the one shown as Attachment 9.2. One Sodium Soundness test will be run for every 10,000 CY of rock erosion barrier placed.

During construction activities, additional tests will be performed for each type of erosion barrier placement and for at least every 140,000 square yards of rock erosion placement. A set of tests will be performed for each type of barrier material prior to delivery to the site. Other samples will be taken randomly from material that is already "in place".

9.2.5 Specifications for Rock Erosion Barrier Materials

The Erosion Barrier shall consist of hard, durable stone meeting the following requirements:

| TEST | Standard Designation | Specification |
|---|---|---|
| Sodium Soundness | AASHTO T-104 (ASTM C-88) | Loss 8% |
| L.A. Abrasion | ASTM C-131 & C-535) | Loss 25% |
| Absorption | AASHTO T-85 (ASTM C-127) | 2% Max. |
| Specific Gravity | AASHTO T-84 (ASTM C-128) | 2.6 Min |

Gradation AASHTO T-27 (ASTM C-136)

8" Diameter Zone

| Sieve Size | % Passing |
|---|---|
| 20 inch | 100 |
| 12 inch | 40-70 |
| 4 1/42 inch | 10-40 |
| 2 inch | 0-10 |

1 1/2" Diameter Zone

| Sieve Size | % Passing |
|---|---|
| 4 1/4 inch | 100 |
| 1 1/2 inch | 0-40 |
| 3/4 inch | 0-10 |

Filter Zone

| Sieve Size | % Passing |
|---|---|
| 3 inch | 100 |
| 1 inch | 70-85 |
| No. 60 | 15-30 |

9.2.6 Procedures

Written procedures will be maintained for each test to be conducted. A separate file category will be created for each test, with procedures and frequency specifications (see Attachment 9.3), which must be approved by the Project Engineer.

9.3 Inspections

Construction inspections will be performed by the Project Engineer or his designee, to assure that all tests are being performed in accordance to the approved plans and specifications.

9.3.1 Excavation

Inspection shall be performed to assure that all excavation at the site is done according to the approved plans and specifications. Proper grade

and line will be recorded to assure that the embankment is constructed to the design limits.

9.3.2 Embankment fill and backfill

The embankment fill and backfill will be continuously monitored to insure that it is handled as stated in the approved plans and specifications. The lift depth will be monitored to insure that the 1 foot maximum lift is not exceeded. This will be done by having each lift surveyed when the density test is being taken. When organic or structural debris is placed in the embankment, no fragments having a horizontal displacement of more than 8 feet in any two dimensions will be permitted. If the debris is 8 feet in any two dimensions it shall be no more than 12" in the third dimension. The debris shall be distributed and manipulated so that adequate space is provided for the proper placing and compacting of embankment material between the debris and the horizontal 12" layers. Density and moisture requirements will be checked in accordance with sections 9.2.1 through 9.2.4.

9.3.3 Radon Barrier

Inspection of the radon barrier material will be performed to assure that the material is placed in accordance with the specifications. Tests will be done on a random basis as the material is being placed. The radon barrier will be checked for 1 foot lift thickness, moisture content, gradation, plasticity index, classification, and density, in accordance with sections 9.2.1 through 9.2.4.

9.3.4 Erosion Barrier

The placement of rock erosion barrier material will be inspected continuously to assure that there has been no degradation of the material and that the voids are kept to a minimum. The lifts will be inspected to insure that they do not exceed the maximum depth described in the approved plans and specifications. The erosion barrier will also be visually inspected to insure that it is nonsegregated (free of pockets of small stones or of clusters of large stones).

A description of all tests performed on the erosion barrier and their frequency can be found

in Sections 9.2 (as applicable). The erosion barrier will be tested for durability by using tests such as specific gravity, soundness, abrasion ph and absorption.

Envirocare will also require that the rock erosion barrier material be subjected to on-site gradation testing as described in Section 9.2.2.

9.3.5 Receiving

All instruments received that are to be used during the operations at the site will be inspected by the person who will be using that instrument. The instrument will be checked and calibrated to assure that it is working properly.

Equipment which is damaged or that does not work properly will be returned to the supplier and thus not used on the site. Damaged equipment will be reported by completing the form included as Attachment 9.4.

Materials which are to be used on the site will be inspected before they are used in accordance with sections 9.1.4.1 through 9.1.4.4. If they do not meet the required the materials when they arrive on the site, the inspector (or MTC employee) will document the incident and inform the project engineer as soon as possible. These materials will not be used on the project.

9.3.6 Control of Measuring and Test Equipment for Engineering Aspects

9.3.6.1 General

1. All equipment used in measurement, inspection and testing is checked at least once a year. All pieces of equipment that need to be calibrated are calibrated on a yearly basis.

2. If more than one calibration a year is desired, it can be requested by the Project Engineer.

3. All equipment must be calibrated against equipment that is known to have a valid relationship (traceability) to the National Bureau of Standards.

9.3.6.2 Equipment Identification

1. All equipment must be labeled with an identification label(s) showing certain information, including serial number, initial of person performing calibration, date of previous calibration and date for next calibration.

2. Labels that are lost or that become unreadable will be replaced. New labels are used with each calibration.

3. Any equipment that is damaged beyond repair, will be removed from service. A record of the damage will be maintained, showing the disposition of this equipment.

9.3.6.3 Equipment Calibration Record

1. A Calibration and Certification Data sheet (Attachment 9.5) is prepared for all equipment where it is applicable.

2. The data sheet will indicate the following information:

   a. The person or persons performing the calibration.

   b. The results of the calibration performed.

   c. Identification of the procedure used to calibrate the equipment.

   d. The results of the calibration, which includes a statement of whether or not the equipment is acceptable, along with the required accuracy for the equipment that is being calibrated.

3. If a new piece of equipment is received that has been calibrated by the manufacturer and that calibration is traceable to the NBS, then that calibration is used for the initial time

period. This record must be kept on file in the project records.

9.3.6.4 Functional Checks

1. All equipment which are used in measurement and testing are checked on at least a yearly basis.

2. A functional check will be required for all equipment prior to each use.

3. Because some of the moisture/density tests are performed on the radioactive disposal material, it is necessary to develop an adjustment factor for the Nuclear M/D gauges.

This will be done by correlating the machine with a series of sand cone tests. At least 10 sand cone tests will be performed on the first day that disposal material is placed, and then two sand cone tests will be run for every 20,000 CY of material placed.

9.3.6.5 Discrepancies

1. When a functional check or a calibration finds that a piece of equipment is not functioning correctly, the following steps will be taken:

   a. Remove the piece of equipment from operation.

   b. The equipment is labeled as non-functioning.

   c. Items or work activities which were monitored or measured with that piece of equipment will rechecked is possible.

   d. If it is possible to recheck the items or work activities that were measured by that piece of equipment, then all interested parties will be notified so that a solution may be reached. (Procedures for remedy are outlined in Section 9.5). The inspector

will document the above procedures in his daily report.

9.3.6.6 Calibration Records

Calibration records for all equipment are kept in both the Working File the Permanent File.

9.4 Records

9.4.1 Records to be maintained

Inspection records will be kept on a daily basis. Inspectors will be on site whenever the contractor is working on the project. They will turn their daily reports into the project file at the end of every week. Tests will be recorded on the same day that the tests are performed and turned in to the permanent file. The inspectors will be required to identify the status of the inspection and testing of the project in charts, record drawings, or periodic status reports.

All test and inspection records will contain the following information:

1. Items tested or inspected and the location of the test in three dimension.

2. Date of test or inspection.

3. Tester, inspector or data recorder.

4. Type of test or inspection.

5. Instrument number used in performing the test or inspection.

6. The results of the test or inspection and the acceptability of the results.

7. Any actions taken in connection with any deviations.

8. Any persons evaluating test results.

9.4.2 Quality Assurance Records Control

The project engineer is ultimately responsible for the items described in this section. He will be assisted by his office manager, secretary, or others in the organization, and will be responsible for the following:

1. Control of the Quality Assurance Records in accordance with this section.

2. Establishment of filing and indexing system that is orderly and convenient.

3. Assure that records that are entered into the Working File and the Permanent File are prepared properly. They will check to insure that all records are legible and complete.

4. Assure that access to both files is controlled properly.

5. Check both the Working and Permanent Files on a regular basis to confirm that all portions of the filing system are operating properly.

9.4.3 Operations of the Quality Assurance Files

1. Two separate files will be established for the disposal site. The Working File will be kept in the office area utilized by Envirocare on site, while the Permanent File will be kept in the Project Engineers office. All daily inspection logs will be turned in on a weekly basis. Test records will be turned in on a daily basis. The original document will be kept in the Permanent File, and a copy of the documents will be kept in the Working File.

2. Both of the Files will be divided into categories. A master index will identify which of the categories, and will be kept at the front of each of the files. (See Attachment 9.6)

3. Each category will contain a "category index". When a quality assurance record is placed in the file it will be recorded on the category index. (See attachment 9.7)

4. Records will only be removed from either of the files by the Project Engineer or by those to whom he designates that responsibility.

   a. Whenever a document is removed from the Working File, that removal will be recorded on the Project File In/Out Record. (See Attachment 9.8)

   b. Records will only be allowed out of the file for a 2-hour period unless special permission is granted by the Project Engineer.

   c. Each original document will be stamped with a red stamp designated that it is the original.

5. Authorized Admittance

   a. The Working File will be kept in a locked cabinet. Keys will only be given to authorized personnel.

   b. The Project Engineer will have unlimited access to the file. He may also designate others to have unlimited access. Unauthorized personnel will not have access to the file.

### 9.4.4 Field Orders

In order to keep the State of Utah informed on upcoming changes in the operations at the site Envirocare will use Field Orders such as the one shown in Figure 9.1. These Field Orders will be filled out and discussed with the State site representative whenever a significant change is to occur at the site; changes such as new cell excavation, access control changes, road construction and new radon placement should be recorded on these Field Orders and discussed with the State. These Field Orders are to be used specifically to increase communication between Envirocare and the State's representative at the site.

Field Orders should be initially written by Envirocare's staff. The Field Order should then be taken to the State's site representative and discussed. Changes can be made to the Field Order

by either party. After both parties have agreed to the scope of the Order, it should be signed by the State's representative and by Envirocare.

The Field Orders are triplicates so that a copy can be kept by the State's representative, one at the Envirocare site office and one in the Envirocare Salt Lake office.

9.4.5 Records Disposition

At the conclusion of the project the entire Permanent File will be copied and included into the Construction File, which will be kept by the Project Manager.

9.5 Failed Tests, Nonconformance and Corrective Action

A "Failed Test" is when one of the tests described in this section does not meet the required specifications. Examples of a failed test would include such situations as a density test on the contaminated material which only showed 85% of the standard proctor, a moisture test on the radon barrier that was outside of the required plus or minus three percent of optimum moisture or other such incidents.

"Nonconformance" is defined as a deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable.

9.5.1 Failed Tests

9.5.1.1 Procedure

1. All reports of failed tests will be recorded by the inspector who is on duty at the time of the failed test.

2. When a failed test is recorded, no further work will be allowed on that area of the job until the failed test is corrected. Of course, work will be allowed to correct the failed test.

3. The engineers assistant/inspector will contact the contractors supervisor and inform him that no further work can be done until the failed test area has been corrected.

4. The inspector will document the failed test on the page on which the test is recorded. The inspector will insure that the following information is also recorded:

   a: The date and time of the failed test.

   b. The nature of the failed test as well as the extent of the failed test.

   c. The exact location of the failed test. The site grid system will be used to assist in locating the nonconformance. Both the horizontal and vertical location of the failed test must be recorded.

5. If necessary, Envirocare's Vice President of Operations will be informed of the situation.

9.5.1.2 Corrective Action

1. Before further work will be allowed in the area of the failed test, the area must be reworked to achieve the required specifications.

2. When corrective action is taken, the inspector on duty will retest the area and assure that the area is within the specifications required. The new test will be referred to the respective failed test.

3. Special attention will be given to the portion of the work that had the failed test. It may be necessary to run extra tests on that portion of the work.

9.5.1.3 Subcontractor and Nonconformance

1. Subcontractors are subject to the failed test and corrective action rules in the same manner as the contractor.

2. If excessive failed tests are noticed on the part of a subcontractor, it may be

necessary to schedule a meeting with the subcontractor, the contractor, and the Project Engineer to solve the relevant problems.

9.5.2 Nonconformance and Corrective Action

9.5.2.1 Procedure

1. In order to further clarify the definition given above, the following examples are given of nonconformance:

   a. Failing density or gradation tests which were not corrected.

   b. Placing material which is outside the specification limits and not correcting the situation.

   c. Placing material in lifts which are thicker than stated in the approved plans and specifications and not reworking the area.

   d. Use of equipment which is out of calibration.

   e. Any other deviations from the approved plans and specifications which are not corrected.

2. All reports of nonconformance will be handled through the inspector who is on duty at the time of nonconformance.

3. When nonconformance is encountered, no further work will be allowed on that area of the job until the Vice President of Operations is contacted.

4. The engineers assistant will contact the contractors supervisor and inform him that no further work can be done until approval is given by the Vice President of Operations.

5. The inspector will document the nonconformance in the Daily Inspectors Record. The documentation will include the following information:

a. The date and time of nonconformance.

b. The nature of the nonconformance as well as the extent of the nonconformance.

c. The exact location of the nonconformance. The site grid system will be used to assist in locating the nonconformance. Both the vertical and horizontal location must be recorded.

d. The name of the contractors representative(s) that was informed of the nonconformance.

6. The Vice President of Operations will immediately contact the UBRC and inform them of the nonconformance. A written report is required to be submitted to the UBRC within one week of the identification of the nonconformance.

7. If necessary, an emergency meeting may need to be held to discuss the problem. The Project Engineer will conduct this meeting.

9.5.2 Corrective Action

1. Corrective action is required on the nonconformance before further work is allowed.

2. When corrective action is taken, the inspector on duty will document in the Daily Inspectors Record all corrective action and the results of the corrective action.

3. Special attention will be given to the portion of the work that was in nonconformance. It may be necessary to run extra tests on that portion of the work.

9.5.3 Subcontractor and Nonconformance

1. Subcontractors are subject to the nonconformance and corrective action rules in the same manner as the contractor.

9.5.4 Records

All records required in this section will be kept in the Working File and the Permanent File.

9.6 Health Physics and Environmental Safety Inspections

The site will be inspected each day of operation by the Field Radiation Safety Officer, the Site Manager or a Radiation Technician to assure that all health physics activities are being conducted in a safe manner. This inspection will include all Envirocare employees AND all contractor employees, including the MTC. This inspection will insure that all activities are in accordance with Section 7 of this application, and the applicable regulations of the Utah Bureau of Radiation Control. Exhibit 9.1 shows the daily inspection form that will be filled out each day the site is in operation and filed in the Clive file.

The site is also be inspected on a routine basis (at least quarterly and more frequent, if deemed necessary) by the Industrial Hygiene Consultant (see Sec. 7.4.8) or his designee to assure compliance with applicable UOSHA standards, and other issues of industrial hygiene concern. Envirocare will keep a record of all Industrial Hygiene Inspections so that the inspections can be verified.

The IHC inspections will be "drop-in", unannounced visits, and will cover all operations of Envirocare employees AND all contractors.

9.7 Radiological Quality Assurance Audits

Routine radiological audits will be performed of all records, tests, measurements, etc. required by this application and pursuant to regulations of the Utah Bureau of Radiation Control. Quality assurance audits are performed by a contracted QA Auditor, who is independent of the construction operations of the company.

The QA Auditor will be insulated from pressures of construction, cost and/or schedule restraints. He will be responsible only to Envirocare's President, and will have the responsibility, delineated in writing, to stop unsatisfactory work and initiate, recommend, or provide solutions through designated channels.

9.7.1 Frequency of audit

These radiation and safety audits will be performed on at least quarterly intervals. Additional audits or partial audits may be undertaken as needed. Such things as the results of a previous audit or an unusual occurrence during waste disposal operations may precipitate additional review.

9.7.2 Radiation Audit contents

Radiation Quality assurance audits will review and evaluate for adequacy the data and information found in the following procedures and records:

1. Monitoring procedures for personnel and equipment.

2. Environmental sampling procedures.

3. Personnel training.

4. Instrument calibration and maintenance records.

5. Dosimetry records.

6. Other personnel monitoring records.

7. Environmental monitoring records.

8. Decontamination certification procedures and records.

9. Review of vendor provided services for any of the above.

10. Other records and procedures as they are identified.

11. Records control.

9.7.3 Record of findings

Results of quality assurance audits and unannounced Industrial Hygiene audits will be discussed with the Project Manager, Project Engineer, and/or the Radiation Safety Officer, as appropriate. A written summary of the QA and IH

audit findings will also be provided to the Project Manager in addition to the President of Envirocare. Evidence of the audits or the actual audit record or findings should be included in the project and working files. Copies will be provided to the Utah Bureau of Radiation Control.

9.7.4 Control of Measuring and Test Equipment for Radiation Aspects.

9.7.4.1 General

1. All equipment used in measurement, inspection and testing is checked at least once a year. Calibrations will be performed at the frequency listed below:

| | |
|---|---|
| Multi Channel | Daily |
| GM survey meters | 6-month |
| MicroR meters | 6-month |
| Alpha survey meter | 6-month |
| Analytical Balance | monthly |
| Dosimeters | Yearly |

2. Calibrations will be performed by persons who are qualified for the specific calibration.

9.7.4.2 Equipment Identification

1. All equipment must be labeled with an identification label(s) showing certain information, including serial number, initials of person performing calibration, date of previous calibration and date for next calibration.

2. Labels that are lost or that become unreadable will be replaced. New labels are used with each calibration.

3. Any equipment that is damaged beyond repair, will be removed from service. A record of the damage will be maintained, showing the disposition of this equipment.

9.7.4.3 Functional Checks

1. Each piece of equipment listed above is checked on at least a yearly basis.

2. A functional check will be required for the above listed equipment each day that it is used.

9.7.4.4 Discrepancies

1. When a functional check or a calibration finds that a piece of equipment is not functioning correctly, the following steps will be taken:

   a. Remove the piece of equipment from operation.

   b. The equipment is labeled as non-functioning.

   c. Items or work activities which were monitored or measured with that piece of equipment will be rechecked if possible.

   d. If it is not possible to recheck the items or work activities that were measured by that piece of equipment, then all interested parties will be notified immediately so that a solution may be reached. The inspector will document the above procedures in his daily report.

9.7.4.5 Calibration Records

Calibration records for all equipment are kept at both the Clive and Salt Lake offices.