

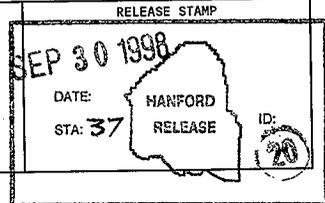
ENGINEERING CHANGE NOTICE

1. ECN **646729**

Page 1 of 2

Proj.
ECN

2. ECN Category (mark one) Supplemental <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Change ECN <input type="checkbox"/> Temporary <input type="checkbox"/> Standby <input type="checkbox"/> Supersedeure <input type="checkbox"/> Cancel/Void <input type="checkbox"/>	3. Originator's Name, Organization, MSIN, and Telephone No. WA McCormick/03E00/HI-15/376-0422	4. USQ Required? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. Date 09/28/98
6. Project Title/No./Work Order No. LLCE/772028/40007001	7. Bldg./Sys./Fac. No. NA	8. Approval Designator NA SQ	
9. Document Numbers Changed by this ECN (includes sheet no. and rev.) HNF-SD-WM-ER-730, Rev. 0	10. Related ECN No(s). NA	11. Related PO No. NA	
12a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 12b) <input checked="" type="checkbox"/> No (NA Blks. 12b, 12c, 12d)	12b. Work Package No. NA	12c. Modification Work Complete NA Design Authority/Cog. Engineer Signature & Date	12d. Restored to Original Condition (Temp. or Standby ECN only) NA Design Authority/Cog. Engineer Signature & Date
13a. Description of Change This engineering change notice incorporates updates to the Long-Length Contaminated Equipment Process Path Document, which reflect modifications and document updates for the system in fiscal year 1998.			
13b. Design Baseline Document? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
14a. Justification (mark one) Criteria Change <input type="checkbox"/> Design Improvement <input type="checkbox"/> Environmental <input type="checkbox"/> Facility Deactivation <input type="checkbox"/> As-Found <input checked="" type="checkbox"/> Facilitate Const <input type="checkbox"/> Const. Error/Omission <input type="checkbox"/> Design Error/Omission <input type="checkbox"/>			
14b. Justification Details Changes to this document are made on an annual basis to incorporate system updates and documentation changes.			
15. Distribution (include name, MSIN, and no. of copies) See distribution list.			



ENGINEERING CHANGE NOTICE

Page 2 of 2

1. ECN (use no. from pg. 1)

646729

16. Design Verification Required <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	17. Cost Impact <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: center;">ENGINEERING</th> <th style="text-align: center;">CONSTRUCTION</th> </tr> <tr> <td style="text-align: center;">Additional [NA] \$ Savings [NA] \$</td> <td style="text-align: center;">Additional [NA] \$ Savings [NA] \$</td> </tr> </table>	ENGINEERING	CONSTRUCTION	Additional [NA] \$ Savings [NA] \$	Additional [NA] \$ Savings [NA] \$	18. Schedule Impact (days) Improvement [NA] Delay [NA]
ENGINEERING	CONSTRUCTION					
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19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
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OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>	Tickler File	<input type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>	NA	<input checked="" type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>		<input type="checkbox"/>

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision
NA		

21. Approvals

Signature	Date	Signature	Date	
Design Authority:		Design Agent:	DW Crass	2/30/98
Cog. Eng.: WA McCormick	2/30/98	PE		
Cog. Mgr.: JG Field	2-30-98	QA		
QA:		Safety		
Safety:		Design		
Environ.		Environ.		
Other Independent Reviewer:		Other		
D. E. Legare	2/30/98			

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

Long-Length Contaminated Equipment Disposal Process Path Document

W. A. McCormick

Waste Management Federal Services, Inc.,
Northwest Operations, Richland, WA 99352
for Fluor Daniel Hanford, Inc.

U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: ECN 646729

UC: 513

Org Code: 03E00

Charge Code: D6309 Task Order: GS080003

Project: 772028 Crosswalk 40-007-001

B&R Code: EW3130010

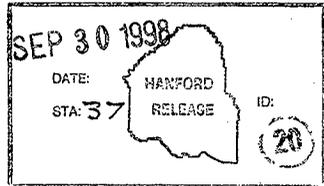
Total Pages: 86

Key Words: LLCE, Disposal Process, Process Path Document

Abstract: The first objective of the LLCE Process Path Document is to guide future users of this system on how to accomplish the cradle-to-grave process for the disposal of long-length equipment. Information will be provided describing the function and approach to each step in the process. Pertinent documentation, prerequisites, drawings, procedures, hardware, software, and key interfacing organizations will be identified. The second objective is related to the decision to lay up the program until funding is made available to complete it or until a need arises due to failure of an important component in a waste tank. To this end, the document will identify work remaining to be completed for each step of the process and open items or issues that remain to be resolved.

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Janis Aardal 9-30-98
Release Approval Date

Release Stamp

Approved for Public Release

**LONG-LENGTH CONTAMINATED EQUIPMENT DISPOSAL
PROCESS PATH DOCUMENT**

Engineering Task Number ETN-94-0054A

Prepared for

**WASTE MANAGEMENT FEDERAL SERVICES, INC.
Agreement No. A52770, Task Order 001
Report No. 987201-001, Rev. 1**

(Previous revision prepared for Fluor Daniel Northwest under
Purchase Order MAA-SLB-336070, Task A96-147
Report No. 961147-001, Revision 0)

September 1998

Prepared by

ARES CORPORATION
636 Jadwin Avenue Suite B
Richland, Washington 99352

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September 1998

Prepared by: Stephen D. Riesenweber
Steven Weaver

Approved by: *R. L. Fritz*
Robert L. Fritz

Date: 9-29-98

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TRADEMARKS

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ACRONYMS

CCTV	Closed-Circuit Television
CWC	Central Waste Complex
DCRT	Double-Contained Receiver Tanks
DST	Double-Shell Tank
EPA	Environmental Protection Agency
FRA	Flexible Receiver Apparatus
HEPA	High-Efficiency Particulate Air
LLCE	Long-Length Contaminated Equipment
NOC	Notice of Construction
QT	Qualification Testing
RCRA	Resource Conservation Recovery Act
RMW	Radioactive Mixed Waste
SARP	Safety Analysis Report for Packaging
SEP	Safety Evaluation for Packaging
SST	Single-Shell Tank
TRUM	Transuranic Mixed Waste
TWRS	Tank Waste Remediation System
USQ	Unreviewed Safety Question
VDTT	Viscosity Density Temperature Tree

1.0 INTRODUCTION

Within the 200 Area Tank Farms at the Hanford Nuclear Reservation, there are more than 177 underground tanks used for the storage of high-level and low-level radioactive mixed waste (RMW). The majority of this waste was generated during World War II and the Cold War period as a part of the nuclear weapons production effort. The majority of these tanks range in capacity from 530,000 to 1,160,000 gallons. Of these, the earliest built are 149 single-walled tanks called single-shell tanks (SSTs), which are no longer actively used; most of these tanks have been stabilized by pumping the free liquids from the tanks and isolating all sources of liquid input. Twenty-eight double-shell tanks (DSTs) containing liquid waste provide the bulk of the current active storage capacity. The current mission of the Tank Waste Remediation System (TWRS) is to safely store, retrieve, and transport the waste in preparation for vitrification, and finally, decommission the tanks and miscellaneous equipment and facilities.

Since the tanks are underground, equipment such as pumps, air lances, and monitoring equipment is installed from above through risers in the top of the tank. DSTs generally range in height from 45 to 50 feet and are buried a minimum of 10 feet below grade. This results in the majority of such equipment being greater than 12 feet in length (called "long-length equipment"). There are approximately 1,300 long-length pieces of equipment currently installed in DSTs and SSTs; many more will be installed during the remaining life of Tank Farms to support the mission described above.

At some point during the operation, remediation, and/or decommissioning of Tank Farms, many of these items will need to be removed from the tanks either to provide access to the tank through one of the limited number of existing risers or to replace failed or obsolete equipment. In either case, once removed, this equipment will require disposal. With the advent of the 1992 Environmental Protection Agency (EPA) Debris Rule, the past practice of rinsing, plastic wrapping, and land disposal of mixed waste contaminated equipment as non-mixed low-level waste is no longer possible. Under the EPA Debris Rule, contaminated equipment must be disposed of as RMW. This involves treatment using one of the treatment technologies listed in 40 CFR 268.45 prior to land disposal or treatment to exit Resource Conservation Recovery Act (RCRA) requirements.

Costs to comply with these new requirements have been extremely high since no infrastructure exists to accomplish the task. Actual costs resulting from the removal, packaging, and storage of three air lances from Tank 101-SY in late 1992, were in excess of \$1,000,000 per lance; additional costs for the treatment and disposal of this equipment will increase this total to an estimated \$1,700,000. Several subsequent projects developing limited-use engineered approaches to retrieval and disposal have experienced similar expensive hurdles to cost-effective retrieval, treatment, and disposal. As a result, several facilitated WesTIP® workshops were held

to formulate the basis for a standardized cradle-to-grave process for the disposal of Long-Length Contaminated Equipment (termed LLCE). The LLCE Program is utilizing lessons learned and much of the equipment from preceding disposal initiatives to produce the equipment and infrastructure needed for a cost-effective and standardized removal and disposal process.

The LLCE process has been defined and agreed to by both the generator and disposal entities with the encouragement and support of the U.S. Department of Energy and the Washington State Department of Ecology. The design for all primary components of the LLCE system has been completed and the major reusable hardware items have been procured or fabricated.

2.0 PURPOSE

The LLCE Program approach to long-length equipment disposal has evolved over time as a result of such things as clarification of regulatory requirements, cost/benefit trade studies, lessons learned from other efforts, organizational changes, and changes in the treatment/disposal approach by the disposal agent. Furthermore, a considerable amount of equipment has been developed and hundreds of drawings generated for the various programs and projects working on case specific LLCE disposal efforts. Some of this information is being incorporated into the generic LLCE system and some is not. This continual evolution has resulted in a confusing array of requirements, drawings, procedures, and equipment. The purpose of this document is twofold:

- 1) The first objective of the LLCE Process Path Document is to guide future users of this system on how to accomplish the cradle-to-grave process for the disposal of long-length equipment. Information is provided describing the function and approach to each step in the process. Pertinent documentation, prerequisites, drawings, procedures, hardware, software, and key interfacing organizations are identified.
- 2) The second objective is related to the decision to lay up the program until the first field application of this system. This document will identify work remaining to be completed for each step of the process and open items or issues which remain to be resolved.

3.0 SCOPE

The LLCE disposal system is intended to establish the entire process from the point that a need for removal of equipment arises to the time when a long-length item is ready for final disposal. This document encompasses this entire span (cradle-to-grave). Since plans and requirements often change with time, a certain amount of verification as to the current applicability of the information contained herein will be required on the part of the user.

Specific procedures and work activities performed by the Solid Waste Disposal organization of Waste Management Hanford will not be contained in this document since they remain to be defined and are beyond the control of Tank Farms management.

4.0 OVERALL PROCESS DESCRIPTION

The LLCE process can be broken into the five high-level steps depicted in Figure 1. These steps include Characterize Waste, Retrieve Waste, Package/Treat Waste, Transport Waste, and Dispose/Store Waste. A brief overall description of the LLCE process is provided below. Detailed descriptions of the process steps, equipment, reference information, issues, and remaining work may be found in Section 5.0.

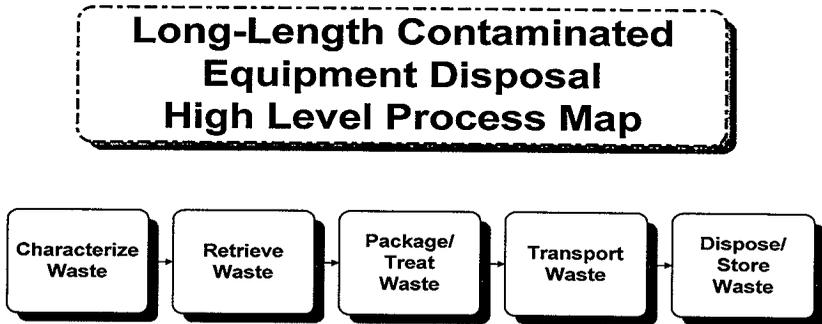


Figure 1. LLCE High Level Process Map

The original WesTIP® workshop resulted in the process map contained in Appendix A. It represents the first systematic look at the steps required to accomplish a limited-use engineered retrieval and disposal effort. The resulting estimated costs were \$1.2 million per item for retrieval to storage with an elapsed time of 92.7 weeks. Treatment and disposal costs were not included at this time because a clear approach to disposal was not yet apparent. Appendix B contains the final WesTIP® revision of the process map resulting from the last workshop which took place on January 11-12, 1995. Figure 2, contained in Section 5.0, depicts the final detailed

process map that has resulted from the development of hardware and software in the ensuing months. This map forms the basis of this document and the LLCE process as it currently stands.

Prior to mobilization of any equipment, preliminary characterization of the waste likely to be found within the LLCE will be performed. The most recent tank waste characterization information along with the physical attributes of the equipment to be removed will be input and processed in the PC-based LLCEDATA Program. This program will identify the proper burial container and Flexible Receiver Apparatus (FRA). The program will also prepare a data file which will be used in conjunction with radiological assay data gathered during equipment retrieval to confirm that the waste falls within the bounds established in the LLCE Waste Certification Summary.

Retrieval of LLCE is accomplished using a mobile crane and the FRA, originally designed for specific locations and equipment in Tank 101-AZ in support of Project W-151, "Tank 101-AZ Waste Retrieval System". This system provides a means of remotely retrieving equipment from a riser into a flexible Herculite bag which is sealed and "double bagged" on the bottom end. The FRA also washes the equipment externally with a 3,000 psi hot water spray and performs a gamma assay along the length of the equipment as it is being removed. Information gathered from the assay is used during the Packaging/Treatment step to verify the waste classification of the equipment.

Two sizes of FRAs have been built. The 4/6-inch device is for use on small risers containing such equipment as thermocouple trees and instrumentation trees. The other 42-inch unit is for use on larger risers contained in pits that hold such equipment as transfer and mixer pumps.

The LLCE Program has made the FRA system generically useful by designing platforms and adapters which conform to the varying physical configurations found at the different tank farms and Double-Contained Receiver Tanks (DCRTs). An additional enhancement is the addition of provisions in the flexible bags to support internal flush of waste equipment, such as transfer pumps during retrieval, in order to reduce contamination levels.

A receiver trailer has been designed and built for the LLCE Program. This trailer will be positioned in the Tank Farm adjacent to the crane and FRA. Its function is to receive the bagged equipment in a half-shell skid assembly while it is still in a vertical position, transition it safely and stably to a horizontal position, and act as the vehicle to move the equipment to a location nearby for packaging.

Once waste equipment is transitioned to horizontal, the receiver trailer is moved to a nearby packaging/staging area where the LLCE Transport Trailer is located with a burial container secured in place. Nine container sizes have been identified to contain at least 98 percent of all

LLCE. Eight of the nine sizes of containers have been designed and tested. The two trailers are remotely aligned and a remote tug assembly moves the equipment and skid into the polyethylene container. The container lid is then positioned and welded in place using electrical heating elements incorporated into the container lid.

The data file output from the FRA gamma assay equipment during retrieval is input with the LLCEDATA computer program output data into the LLCECALC Program. This program analyzes the information to verify and ensure compliance with transportation and disposal requirements specified in the Safety Analysis Report for Packaging (SARP), and the Waste Certification Summary.

As long as the LLCECALC Program verifies that the waste is not suspect transuranic mixed waste (TRUM) and that excess hydrogen gas will not be generated, the waste item can be treated per RCRA requirements for disposal in the mixed waste landfill trenches located in the 200 West Area. "Macro-encapsulation" has been determined to be the most cost effective treatment approach. This process involves filling the polyethylene container with low-density perlite grout to completely encase the LLCE. Then the grout and vent ports are sealed and tested and the package is ready for shipment to the mixed-waste trench.

The transport trailer holding the disposal container has been specially designed to accommodate the heavy load associated with a grout filled container and to maneuver through the Hanford Site roads. This is accomplished through the use of multiple axles with steerable bogey's on the rear-end.

A SARP has been released for the family of containers that provides a single safety analysis for the transport of LLCE waste containers. The SARP bounds the waste that may be transported for routine operations. If contamination levels or constituents are found to exceed the bounding limits of the SARP, an Engineering Change Notice will be written against this document or a single use Safety Evaluation for Packaging (SEP) can be generated prior to shipment. These documents place vehicle speed, environmental, and administrative controls on the transport process.

The destination for transport is dependant upon the results of the LLCECALC Program. If the waste turns out to be suspect TRUM, or calculated hydrogen generation rates are too high, it cannot be disposed of in the mixed-waste trench. In this case, it will be taken to T-Plant for storage and eventual alternative treatment. Less than five percent of the equipment removed is expected to have this classification. Equipment that is determined to not be TRUM will be transported directly to the mixed-waste trench.

The majority of the waste will be off-loaded into one of the two existing mixed-waste trenches. The trenches, though complete, have not yet been activated for a disposal function. The current approach is to store waste in the trenches until the disposal function is authorized. This approach will require chocking, fire protection, and monitoring arrangements for the equipment containers similar to what will be needed in the Central Waste Complex (CWC). In some cases, temporary shielding may be required. Once the trenches are transitioned to a disposal role, the equipment can be simply off-loaded and covered with backfill.

Figure 2 in Section 5.0 provides an overall perspective of the LLCE process. This figure may be used to guide the approximate order that events should take place during LLCE retrieval and disposal. It should be noted that all sub-elements of the high-level steps, Figure 1, do not occur sequentially. This diagram is intended to clarify the overall relation of activities.

4.1 Program Level Activities

Integration and cooperation has taken place between the various groups and projects that have had and will have a need to remove and dispose of long-length equipment. Examples of those having input include: Tank Farms Operations, Waste Management Hanford, Project W-151, Project W-320, "241-C-106 Sluicing", Project W-211, "Initial Tank Retrieval System", Safety Programs (101-SY), and the CWC. In order for the process to work effectively, early and close communication must be maintained between the engineer(s) associated with the above groups.

A complex series of drawings exists to support the various FRA pit and riser configurations found in the Tank Farms. Drawing H-2-79190 provides the most complete assembly drawings available for the retrieval system. Drawing H-2-827806 is the drawing index for the burial container assemblies. Drawing H-2-827806 provides the LLCE drawing index.

A test case to remove a transfer pump from Tank 104-AW was performed in order to assure that the drawings provide sufficient traceability to support proper component selection and assembly. This test showed that it was possible to identify all necessary components. The results of this test are contained in Appendix C.

4.1.1 Existing Documentation

- *LLCE Work Plan*, WHC-SD-WM-WP-215, Rev. 1.
- *LLCE Program Level Functions and Requirements*, WHC-SD-WM-022, Rev. 0.
- *Comparison Report on Method for Disposal of Long-Length Contaminated Equipment*, ARES Report No. 951122-001.

- WesTIP® Workshop Results (multiple sessions)
 - *WesTIP® Workshop Charts for Tank Farm Disposal of Long-Length Contaminated Equipment*, EDT 141849
 - *WesTIP® Workshop, Tank Farm Disposal of Long-Length Contaminated Equipment*, WHC-SD-WM-ER-303, Rev 0
 - *WesTIP® Workshop, Tank Farm Disposal of Long-Length Contaminated Equipment*, WHC-SD-WM-ER-353, Rev. 0
 - *WesTIP® Workshop, Tank Farm Disposal of Long-Length Contaminated Equipment*, WHC-SD-WM-ER-433, Rev. 0
- *Safety Analysis Report for Packaging (Onsite) Long-Length Contaminated Equipment Transport System*, HNF-SD-TP-SARP-013, Rev. 0.
- *Authorization Basis Assessment of Removal, Packaging, and Transportation of Long-Length Contaminated Equipment*, HNF-2311, Rev. 0.
- Unreviewed Safety Question Screening, *Long-Length Contaminated Equipment Transport System*, USQ Tracking No. TF-98-0550, Rev.0.

4.1.2 Issues

- A system for tracking and controlling which equipment has been fabricated/procured and where it is stored does not exist. Most equipment is currently distributed between the Cold Test Facility, located on Route 3, and the fenced equipment lay down yard adjacent to Building 2704-HV.

4.1.3 Remaining Work

At this point, several tasks remain to be completed to finalize the LLCE Program. These tasks fall in the realm of limited design, fabrication, testing, configuration management, and the procurement of spare "consumable" equipment. A brief description of remaining work is found in each of the following sections and is summarized in Appendix D.

Following are the remaining tasks that best fit into a program level description:

- Overall system Qualification Testing (QT) must be completed to assure proper operation of equipment in conjunction with interfacing elements prior to use in a contaminated environment. This task also includes preparation of the Cold Test Facility to support QT.

- Overall system operator training must be performed prior to the first tank farm use. Due to the movement of personnel and the likely span of time between retrieval activities, some training will be required prior to each equipment removal.
- Completion of TWRS Maintenance and Operating Procedures is needed to assure that the equipment can be safely operated and adequately maintained. Higher level "operating instructions" have been prepared which will aid in procedure preparation. Appendix E contains the LLCE Disposal System Procedure Matrix which identifies the specific procedures needed and the current status of their development.
- A limited number of consumable spares should be identified and procured for use in unanticipated situations.
- A standardized system for LLCE Program equipment tracking and storage must be established.

5.0 DETAILED LLCE PROCESS

The following sections provide a detailed description of the primary elements of the disposal process. Figure 2 depicts this process.

5.1 Characterize Waste

Figure 3 depicts the activities that take place during the "Characterize Waste" process step.

Characterization of the waste is needed for three reasons: 1) physical parameters, including weight and dimensions are needed to select the FRA, flexible receiver bag, and the burial container; 2) radiation levels and concentrations of the various radionuclides are needed to assure that the equipment falls within the bounding classifications identified in the *Safety Analysis Report for Packaging (Onsite) Long-Length Contaminated Equipment Transport System* (HNF-SD-TP-SARP-013, Rev. 0); and 3) waste classification is needed to assure that the waste package falls within the solid waste disposal acceptance requirements contained in *Hanford Solid Waste Acceptance Criteria Document* (WHC-EP-0063-4).

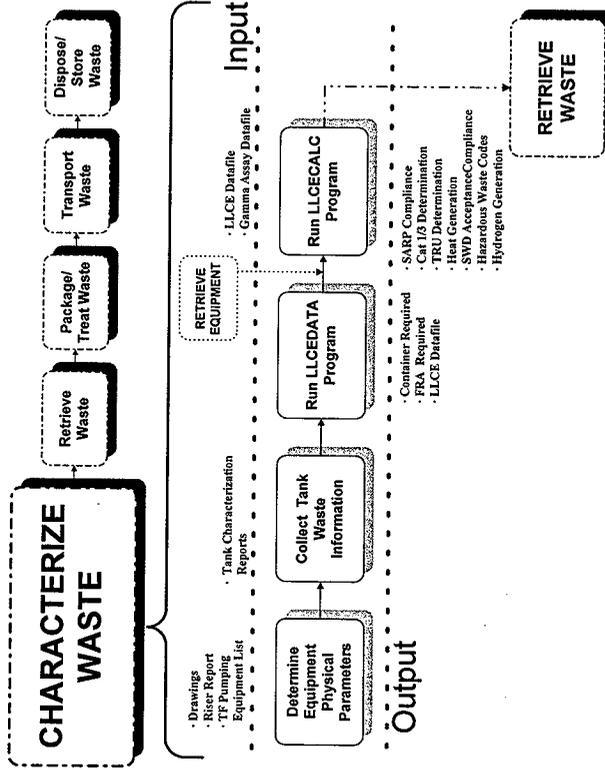


Figure 3. Characterize Waste

Computer programs LLCEDATA and LLCECALC have been developed to perform the calculations necessary to provide the information and verifications listed above. Appendix F contains the results of a test run of both programs for Tank 104-AW. This test uses gamma assay data gathered during a 101-AZ thermocouple tree retrieval operation. NOTE: The information in this appendix is for illustrative purposes only and it should not be used for an actual retrieval.

5.1.1 Existing Documentation

- *Disposal of Long-Length Contaminated Equipment: LLCE Characterization Software Functional Criteria and Management Plan*, WHC-SD-WM-TCP-007 Rev. 0.
- *Disposal of Long-Length Contaminated Equipment: Radiological and Chemical Characterization Plan*, WHC-SD-WM-CSWD-080, Rev. 0.
- *Waste Certification Summary*, 601-01a.
- *Tank Farms Pumping Equipment List*, WHC-SD-WM-RPT-025.
- *Double Shell Underground Waste Storage Tanks Riser Survey*, WHC-SD-RE-TI-093.
- *LLCEDATA and LLCECALC for Windows Version 1.0, Volume I: User's Manual*, HNF-3169, Rev. 0.
- *LLCEDATA and LLCECALC for Windows Version 1.0, Volume II: Technical Manual*, HNF-3169, Rev. 0.
- *LLCEDATA and LLCECALC for Windows Version 1.0, Volume III: Software Verification and Validation*, HNF-3169, Rev. 0.

5.1.2 Existing Hardware

- FRA Gamma Energy Analysis system

5.1.3 Existing Software

- LLCE Characterization Database Program (validated and benchmarked).
- LLCE Characterization Program (validated and benchmarked).

- FRA Gamma Energy Analysis system and computer program.

5.1.4 User Information Needed to Accomplish Task

- Prerequisite information needed for the *LLCEDATA* Program:
 - Physical data is required on equipment to be removed (drawing number for equipment is sufficient in most cases since the program contains a pick list and database of 581 types of items that are or have been installed in tanks):
 - specific length and weight information, and
 - confirmation that equipment was fabricated to drawing number indicated on *LLCEDATA* to assure that the proper size of container is used; if not, edit and correct the information.
 - Tank-specific information required:
 - Identify Tank Farm, tank, and riser,
 - Number of stratified layers of waste in tank for which characterization information exists (this will be selected automatically if characterization information currently exists in the database or can be overridden if new information is available), and
 - Best available characterization information for the tank in question. (This information is best obtained from the Generator Services group of Waste Management Hanford.)
 - Geometry Correction Factors required for specific equipment:
 - Factors are equipment-specific; they are needed to characterize equipment using gamma assay information acquired during retrieval. Once determined for a particular equipment configuration, the correction factor is good for similar equipment.
 - Equipment must be analyzed and factors obtained. The current group performing such work is Criticality and Shielding.
- Prerequisite information needed for the *LLCECALC* Program:
 - Data file produced on *LLCEDATA* Program prior to retrieval, and
 - After *LLCE* retrieval, assay data files must be downloaded in DOS format from the Microvax computer tied to the FRA gamma assay equipment.

5.1.5 Issues

- Some contents of *Disposal of Long-Length Contaminate Equipment: LLCE Characterization Software Functional Criteria and Management Plan*, WHC-SD-WM-TCP-007 Rev. 0, conflict with the *LLCE* Program information.
- Software has not been reviewed and approved by the TWRS Solid Waste group.

5.1.6 Remaining Work

- Release Rev. 1 of *Disposal of Long-Length Contaminated Equipment: LLCE Characterization Software Functional Criteria and Management Plan*, WHC-SD-WM-TCP-007 Rev. 0. Certain changes were made in the characterization process that are not reflected in this document. (The computer programs, however, are based on these changes.)
- Obtain final concurrence from Waste Management Hanford and the Tank Farms Solid Waste organization on the characterization programs.
- Update the characterization database program (LLCEDATA) with the most current information. This task should be done periodically as new characterization information is compiled.
- Improve the gamma assay software to be more realistic and less conservative. The gamma assay software is currently benchmarked and validated. However, the software is considered overly conservative with respect to transuranic waste. As storage of TRUM is significantly more expensive than storage of mixed waste, significant cost savings may be realized by improving the gamma assay software.

5.2 Retrieve Waste

Figure 4 depicts the activities that take place during the "Retrieve Waste" process step. As can be seen, considerable preparation is required prior to actual retrieval activities. Much of the primary retrieval equipment exists (see Section 5.2.2), however, many adapters, spool pieces, and platforms will not be fabricated until they are needed for a particular retrieval effort. Also, consumable items will need to be procured for each retrieval (see Section 5.2.4).

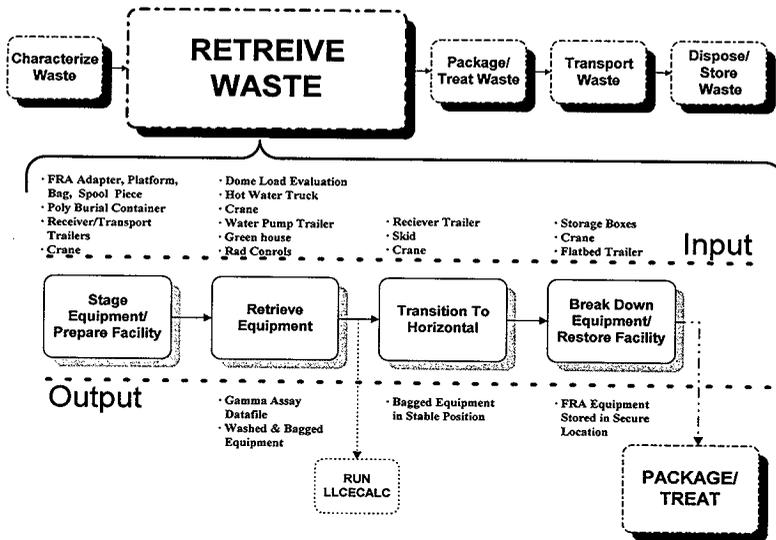


Figure 4. Schematic of the Retrieval Process

5.2.1 Existing Documentation

- *LLCE Drawing Index, H-2-827806,*
- *Drawing Index 4-6 Inch Tank 101AZ Waste Retrieval System, H-2-79335*
- *Drawing Index 42 Inch Tank 101AZ Waste Retrieval System, H-2-79341*
- Drawing H-2-79190 provides arrangement drawings for FRA equipment. It references detailed drawings for individual components, and provides farm/tank/pit/riser references to the specific elements needed.

- Work Package No. 2E-95-00858 contains the instructions/procedures that were used to retrieve seven thermocouples from Tank 101-AZ. This information could be beneficial in the development of standardized procedures for operating the FRA equipment. In addition, a Post ALARA Review was performed which may provide further insights (see Section 5.2.5).
- *Long-Length Contaminated Equipment (LLCE) Tank Farm Field Verification Report 12/94*, WHC-SD-WM-ES-332, Rev 0. This document provides interface and interference details on Tank Farm tanks and DCRT pits.
- *Operating Instructions for the 42-Inch Flexible Receiver*, HNF-2748, Rev 0.
- *Operating Instructions for the 4-Inch and 6-Inch Flexible Receivers*, HNF-2749, Rev 0.
- *Preparation and General Operating Instructions for LLCE Receiver Trailer*, HNF-3071, Rev. 0.
- *General Maintenance Instructions for the Flexible Receiver System*, HNF-3336, Rev 0.
- *General Maintenance Instructions for LLCE Transportation System*, HNF-3252, Rev. 0.

5.2.2 Existing Hardware

Receiver Trailer HO-64-4283 is located in the lay down yard north of Building 2704-HV.

The existing equipment for the FRA is listed below. This equipment is stored primarily in the lay down yard north of Building 2704-HV and in the Cold Test Facility.

- Basic 4/6-inch and 42-inch FRAs (see H-2-79190).
- Several adapters, platforms, and spool pieces have been fabricated for FRA in conjunction with Projects W-151 and W-320. Others have been designed but will be fabricated on an as needed basis. Until a complete tracking system is developed, it will be necessary to physically check the storage locations for the existence of needed equipment. Part of this task includes determining where the existing Project W-320 adapters and platforms can be used in other Tank Farm locations.

- Spool piece adapter with capability to pierce equipment for free liquid draining [ultra high pressure (approx 60,000 psi)] currently designed as part of the SY-101 Viscosity Density Temperature Tree (VDTT) removal task.
- Equipment storage boxes have been built to store existing equipment that may be affected by long-term storage in an outdoor environment. In addition, these boxes provide ALARA protection for personnel from low levels of residual contamination that may be present after LLCE retrieval. Additional boxes will be needed as FRA equipment is fabrication.
- Modified Crane HO-17T5691. This Hanford crane has been modified with load cells and other equipment to specifically support this program. Use of a different crane will require similar modifications.
- Water Pump Trailer HO-64-3538 or HO-64-5257.
- Two Control Trailers.

5.2.3 Existing Software

- FRA Gamma Energy Analysis system.

5.2.4 Consumables

Several items will either be used up or disposed during retrieval operations. These items will be procured for each retrieval. A limited number of spares should be kept onsite, available for high priority emergent activities. Consumables include flexible receiver bags, inner lifting bail, inner water connection hose, burial containers, skids, and strippable ALARA coatings for adapters. In some cases, adapters and/or spool pieces may be disposed of due to residual contamination levels.

5.2.5 Lessons Learned

A Post ALARA Review was performed after the retrieval of seven thermocouple trees from Tank 101-AZ (part of the Project W-151 efforts). This review is archived in Work Package No. 2E-95-00858. Several difficulties were encountered during the initial retrieval efforts; this review documents the resolution of these problems and observations of ways to reduce personnel exposure and increase the efficiency of the activities. Several key elements of this review are listed below.

- A 20 foot exclusion zone around the FRA was established to control access to the equipment and reduce exposure. Controls were set up for time allowed in prespecified radiation fields.
- Remote tools and crane boom movements were used to manipulate the LLCE. This was needed because waste buildup on equipment being retrieved caused them to become lodged in the riser on several occasions.
- A whirling water spray was used to wash down the inside of the FRA immediately after an equipment pull. This, along with the application of a strippable coating applied to the inside of the FRA, enhanced decontamination efforts.
- The secondary bag (installed on the bottom of the bagged equipment) should be located as close to the FRA as possible to reduce the potential for contamination spread.
- A HEPA filtered vacuum was identified as a means of simplifying decontamination of the lower glove bag. This vacuum and a shielded drum prefilter were procured and fabricated to support future retrieval efforts.
- It was suggested that the use of a disposable plastic liner, to be inserted in the FRA and disposed after each retrieval, be explored to further reduce the decontamination efforts.
- "Lollipops" of crystallized/solidified waste on the lower end of the thermocouple trees were sheared off as they entered the risers forming a plug that caused the high pressure wash water to back up in the FRA. No fix has been identified or design change implemented to correct this problem in future retrieval efforts. NOTE: Risers should not be allowed to become plugged. An in-tank Closed-Circuit Television (CCTV) camera should be installed in an adjacent riser to monitor for this condition.

5.2.6 Issues

- Vendor information files have not been established. Don Legare has a good collection of vendor cut sheets, drawings, etc., for the FRA. Bill McCormick has a collection of vendor information for the Receiver Trailer.

- Equipment is currently stored both north of Building 2704-HV and at the Cold Test Facility. There does not appear to be any documentation to indicate which elements have been fabricated and where they are stored.
- “Lollipops” have plugged risers causing water to backup in the FRA and actually jamming the LLCE in the riser. The design and/or operating methods should be modified to preclude this condition. An in-tank CCTV system should always be used during the removal process.

5.2.7 Remaining Work

- Establish vendor information files.
- Fabricate platforms, adapters, spool pieces, and storage boxes on an as-needed basis.
- Procure and stage flexible bags for emergency use. Bags for pre-planned use should be purchased on an as-needed basis prior to retrieval activities.
- Develop maintenance and storage procedures. General maintenance instructions for the Flexible Receiver System and the Receiver Trailer are provided in HNF-3336 and HNF-3252.
- Perform Receiver Trailer long-term storage and pre-use maintenance. The trailer has been stored in an outdoor environment for an extended time period. There are maintenance items, recommended by the equipment vendors, that should be performed prior to extended periods without operating the equipment. No maintenance has been performed on the trailer. Long-term storage, pre-use, and periodic maintenance items are identified in HNF-3252.
- Prepare TWRS Operating Procedures for the Flexible Receiver System and assay equipment. Procedures are needed also for preparation and staging of the Receiver Trailer. General operating instructions are provided in HNF-2748, HNF-2749, and HNF-3071.
- Make design and equipment modifications to enhance ease of decontamination (Project W-211 may fund a portion of this).
- Improve the LLCE wash system (high pressure to ultra high pressure and/or nozzle arrangement). This is prompted by the difficulty encountered in cleaning

off equipment during the Tank 101-AZ retrieval work.

- Perform an Unreviewed Safety Question (USQ) screening and possible safety analysis on retrieval efforts with respect to the flammable gas issues.
- Provide in-tank CCTV system.

5.3 Package/Treat Waste

Figure 5 depicts the activities that take place during the "Package/Treat Waste" process step. The packaging and treatment step takes place after equipment is retrieved from the tank and bagged. It begins when the waste item is captured by the receiver trailer tilt assembly and involves transitioning the waste to a horizontal position, pushing the LLCE (contained in a skid assembly) into the burial container, sealing of the container lid, and void fill of the container (macro-encapsulation) once it is confirmed by the LLCECALC Program that the waste is not suspect TRUM and that hydrogen generation will not be excessive. If it is determined that the waste is suspect TRUM, void fill will not take place and the LLCE will be prepared for transport to a storage facility as described in Sections 5.5 and 5.6.

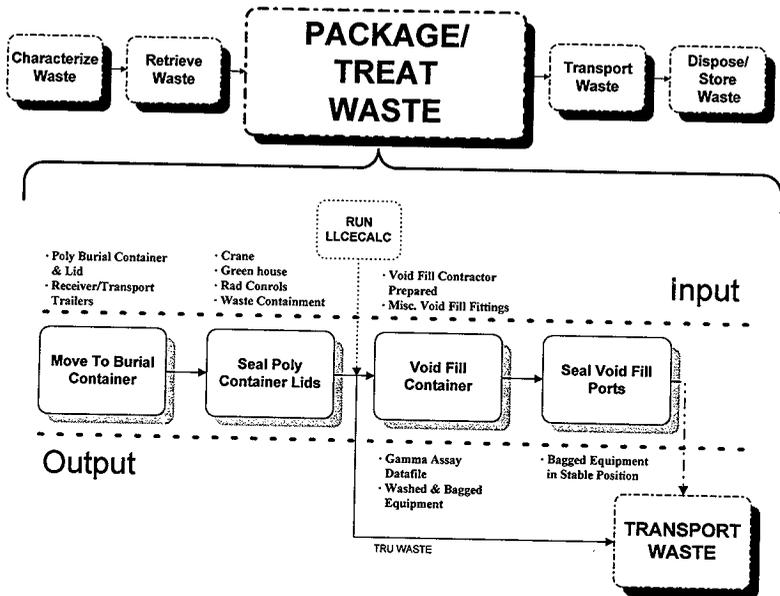


Figure 5. Package/Treat Waste

5.3.1 Existing Documentation

- *Packaging Design Criteria, Transfer and Disposal of Long-Length Equipment, Hanford Tank Farm Complex, WHC-SD-TP-PDC-020.*
- *Specification for Trailers for the Handling and Transport of Tank Farms Long-Length Contaminated Equipment, WHC-S-0321, Rev. 1A.*
- *Specification for Contaminated Equipment Burial Container, WHC-S-0402 Rev. 0.*

- *Specification for Void Fill of the Long-Length Contaminated Equipment Burial Container*, HNF-0568, Rev. 0.
- *Long-Length Contaminated Equipment Burial Containers Fabrication Process Procedures*, HNF-SD-WM-SPP-002, Rev. 0.
- *General Operating Instructions for LLCE Transportation System*, HNF-3069, Rev. 0.
- *Preparation and General Operating Instructions for LLCE Transport Trailer*, HNF-3070, Rev. 0.
- *Preparation and General Operating Instructions for LLCE Receiver Trailer*, HNF-3071, Rev. 0.
- *General Maintenance Instructions for LLCE Transportation System*, HNF-3252, Rev. 0.
- *LLCE Drawing Index*, H-2-827806.

5.3.2 Existing Hardware

- Receiver Trailer HO-64-4283 and Transport Trailer HO-64-4280 are located in the lay down yard north of Building 2704-HV.
- Burial containers: one, 54-inch diameter container, and three, 26-inch diameter (for SY Farm VDTTs). Containers are complete with skids.

5.3.3 Issues

- Vendor information files have not been established for the burial containers or the trailers. Bill McCormick has vendor information for the trailers.
- The SARP hydrogen gas generation analysis indicates that with the worst case waste, the Lower Flammable Limit is reached in approximately six hours. A gas generation evaluation should be performed during the "characterization" phase to assure that a safe situation is maintained (this evaluation can be added to the LLCE Characterization Database Program).

5.3.4 Remaining Work

- Develop maintenance and storage procedures. General maintenance instructions for the Receiver and Transport Trailers are provided in HNF-3252.
- Perform Receiver and Transport Trailer long-term storage and pre-use maintenance. The trailers have been stored in an outdoor environment for an extended time period. There are maintenance items, recommended by the equipment vendors, that should be performed prior to extended periods without operating the equipment. No maintenance activities have been performed on the trailers. Long-term storage, pre-use, and periodic maintenance items are identified in HNF-3252.
- Prepare TWRS Operating Procedures for trailer staging, equipment capture (on tilt trailer in vertical position), lay down, trailer positioning, and transfer to the disposal container, container sealing, void fill operations, and container handling and storage (both empty and filled). General operating instructions for the trailers are provided in HNF-3069, HNF-3070, and HNF-3071.
- Provide specialized training for the sealing process. Due to the critical nature of this process, work should be performed by technicians.
- Assure that adequate Notice of Construction (NOC) permitting is in place for the void fill operation (may be able to use Project W-151 documentation).

5.4 Transport Waste

Figure 6 depicts the activities that will take place in the "Transport Waste" process step.

Transportation of the containerized LLCE should not take place until the LLCECALC computer program has verified that the waste falls within the constraints identified in the SARP and the *Hanford Solid Waste Acceptance Criteria document*, WHC-EP-0063-4, since this determination controls the destination of the LLCE.

The LLCE transport trailer has been designed to carry the heavy (void filled) equipment from the tank farms to the storage or final disposal location. Steerable rear axles on the trailer make it possible to negotiate corners en route to the LLCE destination without establishing new roads or making major modifications to existing roads. Still, prior to equipment transport, the route must be checked for interferences such as stop signs, utility poles, overhead wires, etc. Controls will

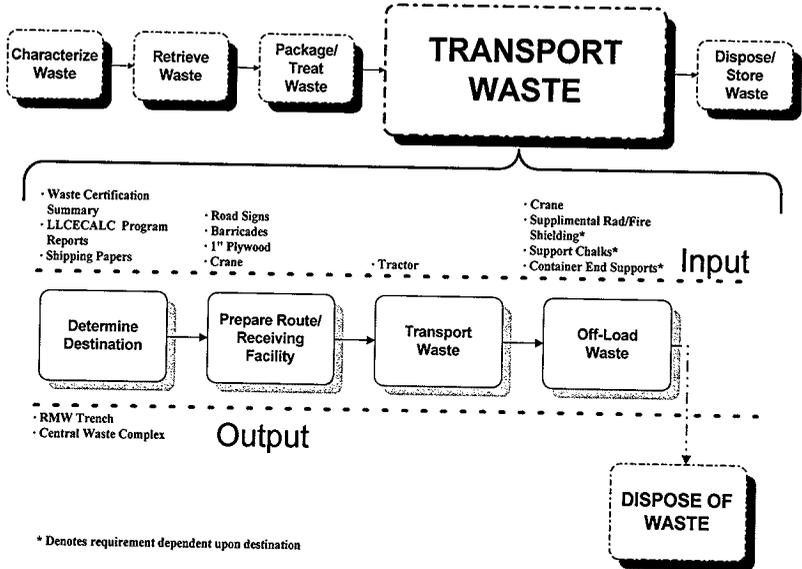


Figure 6. Transport Waste

be placed on the transport by the SARP and possibly the work package. Examples of the controls include:

- Establishment and dry run of the transport route.
- Use of an escort vehicle.
- Closing of certain "higher risk" sections of the transport route.

- Establishment of a "rolling zone" around the transport trailer for ALARA concerns.
- Weather limitation controls associated with wind, temperature, and slick roads.
- Maximum transport speed limitations (i.e., 15 mph on straight stretches).

In most cases, LLCE will be driven straight to the mixed-waste landfill. The ramp leading into the landfill is made of compacted backfill. Due to the high weight of the transport trailer and void filled container, it may be necessary to condition the ramp surface prior to the first entrance. In addition, the bottom of the landfill where the truck will drive should be lined with one-inch plywood (or other suitable material) to distribute the load.

5.4.1 Existing Documentation

- *Specification for Trailers for the Handling and Transport of Tank Farms Long-Length Contaminated Equipment*, WHC-S-0321 Rev. 1A.
- *Safety Analysis Report for Packaging (On Site) Long-Length Contaminated Equipment Transport System*, HNF-SD-TF-SARP-013, Rev. 0.
- *General Operating Instructions for LLCE Transportation System*, HNF-3069, Rev. 0.
- *Preparation and General Operating Instructions for LLCE Transport Trailer*, HNF-3070, Rev. 0.

5.4.2 Existing Hardware

- Transport Trailer HO-64-4280 is located in the lay down yard north of Building 2704-HV.
- Tractors for pulling trailers are standard units available onsite.
 - Receiver Trailer: Ford LTS 9000.
 - Transport Trailer: Mack DM897SX.

5.4.3 Issues

- Current trench design may not support positioning trailer for off-loading.
 - Grade may be too steep with current gravel base, causing truck tires to spin

- going up the ramp.
- Bottom of grade may need a corner widened to support turning radius of the trailer.

5.4.4 Remaining Work

- Prepare TWRS Operating Procedures for transport trailer (include loading and securing of containers, handling containers that come out remote-handled, roadway constraints, mixed-waste trench/storage facility interfaces, and off-loading). General operating instructions for the transport trailer are provided in HNF-3069 and HNF-3070.
- Perform a dry run of the trailer entering the mixed-waste trench. This dry run should be performed with a weighted trailer for the purpose of identifying any necessary modifications and/or conditioning of the trench entrance ramps.
- Modify and/or condition landfill entrance ramps if necessary.

5.5 Dispose/Store Waste

Figure 7 depicts the activities that will take place in the "Dispose/Store Waste" process step. Depending on the characterization determination of LLCE by the LLCECALC Program after retrieval, two primary alternatives currently exist as a destination. Waste Management Hanford is still in the process of finalizing what approach will be taken and establishing appropriate permitting requirements. The following descriptions are therefore subject to change based on the results of these efforts.

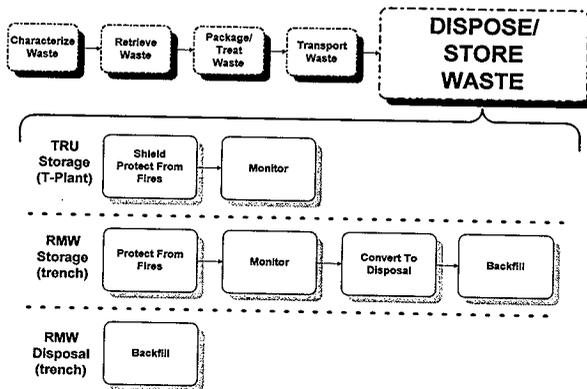


Figure 7. Dispose/Store Waste

1) RMW Trench

Two RCRA compliant RMW trenches were constructed under Project W-025, "Radioactive Mixed-Waste Landfill," in the 200 West Area. The trenches have not yet been put into service for disposal due to the difference in cost associated with operation compared with the limited quantity of RMW that is staged for disposal at this point. Current funding plans are for the trench(es) to be opened for disposal in Fiscal Year (FY) 2000. In the meantime, the trenches have been permitted to allow storage of such items as LLCE. Equipment will not be buried until the trench is opened for disposal. The storage approach will require regular inspection of burial containers for damage or leakage. Accordingly, chocks will be needed to hold the LLCE off the ground for visual access to the bottom of the containers. Personnel shielding may be required depending on the radiation levels at the surface of the container.

Once the trench is transitioned to a disposal mode, containers will simply be off-loaded, concrete support blocks placed on each end, and the LLCE covered with backfill.

Only LLCE that has been confirmed to not exceed the threshold for TRUM and hydrogen generation will be stored or disposed in the RMW trenches.

2) Central Waste Complex

LLCE that is characterized as suspect TRUM or has a hydrogen generation rate greater than limits established in the SARP will be stored at T-Plant until a final method of disposal is determined. This storage location will require chocks to facilitate inspection and may require an overpack container or some other form of barrier to provide shielding and fire protection for the poly containers.

5.5.1 Existing Documentation

- *Treatment Options for Long-Length Contaminated Equipment, WHC-SD-WM-ES-324.*
- *Hanford Solid Waste Acceptance Criteria, WHC-EP-0063, Rev. 5.*
- *Chemical Compatibility Study of Cooley L18KU, Herculite, and Elephant Mat With Hanford Tank Waste, HNF-2893, Rev. 0.*
- *TRU Storage Options Letter Report*

5.5.2 Existing Hardware/Facilities

- RMW Landfill, Trenches No. 31 and 34
- CWC.

5.5.3 Issues

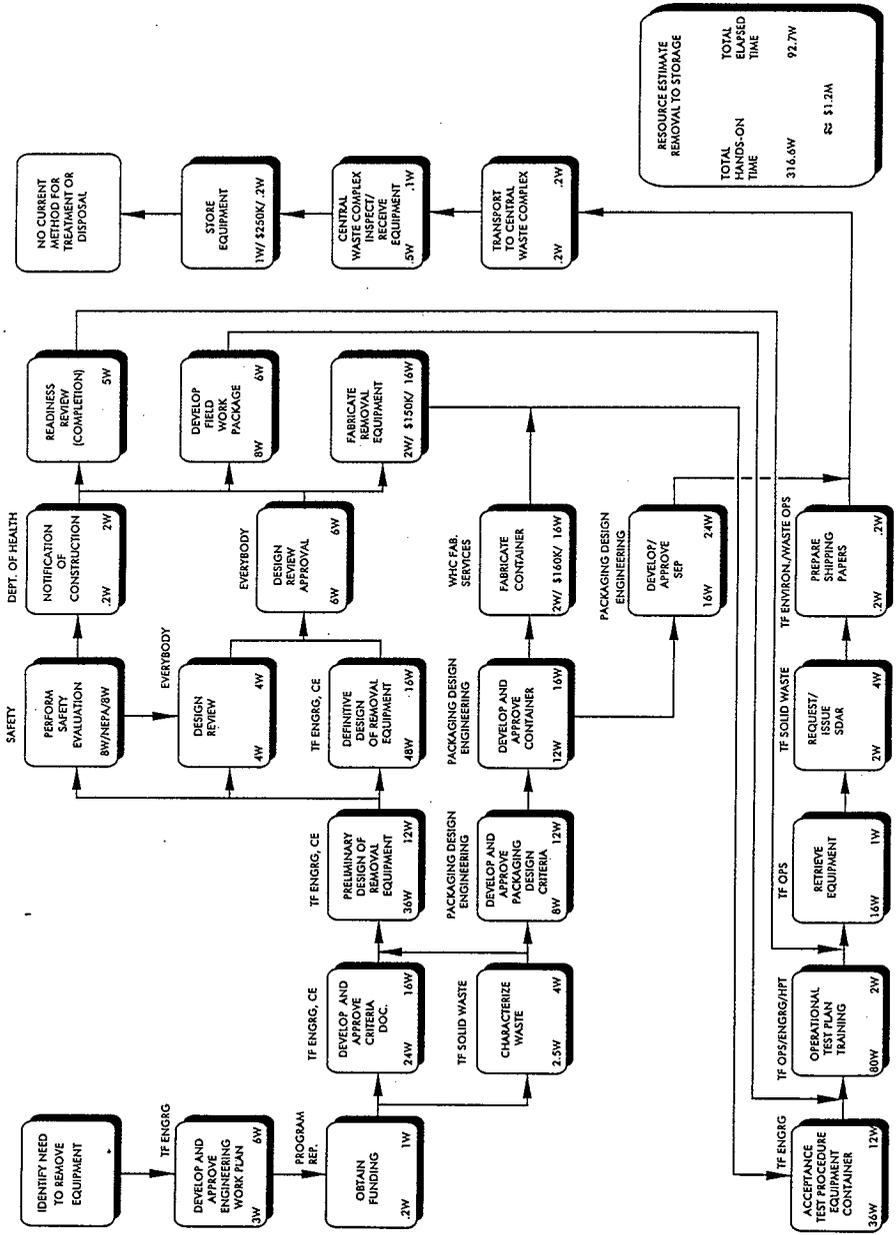
- Current trench design may not support positioning trailer for off-loading.
 - The grade may be too steep with current gravel base, causing truck tires to spin going up the ramp.
 - The bottom of grade may need a corner to be widened to support turning radius of trailer.

5.5.4 Remaining Work

- Modify and/or condition the landfill entrance ramps if necessary. A dry run with a weighted transport trailer should be performed to identify any required changes to the ramps.
- Storage in Mixed-Waste Trench:
 - Develop Solid Waste Disposal Procedures for locating equipment in and monitoring LLCE in the mixed-waste trenches in the storage mode.
 - Design and fabrication of support chocks to support containers off the ground for inspection during storage must be completed. It may be possible to use the support chocks used for shipping the burial containers.
- Disposal in Mixed-Waste Trench:
 - Design and fabricate "bookends" to place in trench at ends of containers. These devices will carry excessive loads generated by backfill weight on top of containers.
- Solid Waste Disposal must establish a pricing structure for storage and/or disposal of LLCE.

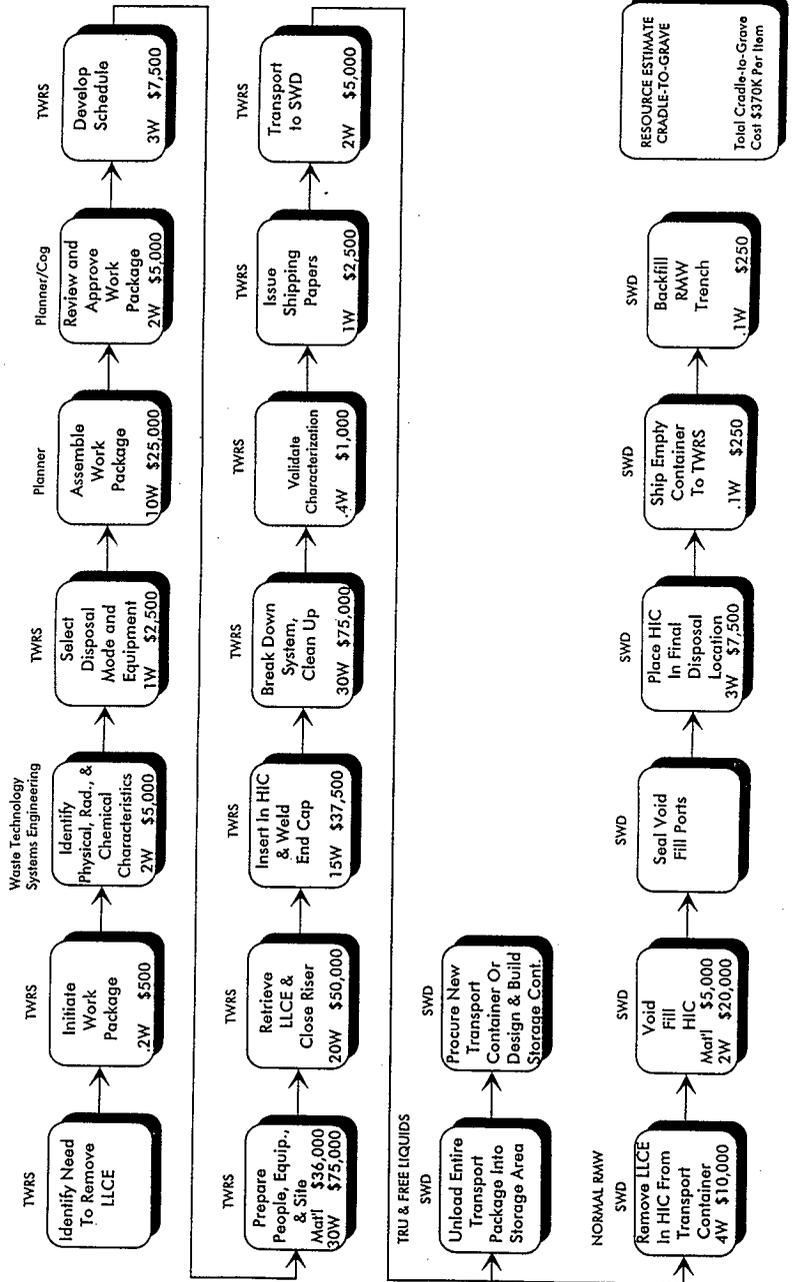
Appendix A
Original WesTIP® Process Map

DISPOSAL OF LONG-LENGTH CONTAMINATED EQUIPMENT CURRENT PROCESS



Appendix B
Final WestTIP® Process Map

DISPOSAL OF LONG-LENGTH CONTAMINATED EQUIPMENT PROCESS



Appendix C
Drawing Traceability Example

TANK 104-AW TRANSFER PUMP REMOVAL TEST RUN

TOP LEVEL DRAWING INDEX

- ▶ H-2-79190 - LLCE EQUIPMENT DRAWING ARRANGEMENTS
 - Indicates Arrangement 3
 - Provides drawing references to FRA equipment
 - Provides information on crane needed, and water pump trailer
 - Does not include Burial Containers and Retrieval and Transport Trailers

CONTROL TRAILER

- ▶ H-2-79204 - INDEX (not referenced on H-2-79190)
- ▶ H-2-78935 - Assembly Drawing (referenced on H-2-79190)
 - This is the preferred of the two existing control trailers; however either will work
 - Procedures exist, Don will provide the number

FLEXIBLE RECEIVER TOP ARRANGEMENT

- ▶ H-2-79138 - 42 INCH FLEXIBLE RECEIVER TOP ARRANGEMENT

ADAPTER/PLATFORM

- ▶ H-2-842755 - 104-AW TANK 4A PIT/RISER #3A
 - Contains pit/riser drawing and, FRA installation drawing
 - References adapter [H-2-824818], platform [H-2-824709], and restraint drawings [H-2-824702]
 - No instructions provided for installation

FLEXIBLE RECEIVER BAG

- ▶ H-2-79143 - LLCE FLEXIBLE RECEIVER ASSEMBLIES (Referenced on H-2-79190)
 - References H-2-79147 LLCE FLEXIBLE RECEIVER FOR 42-INCH RISER, which contains fabrication details for the bag
- ▶ H-2-79362 or H-2-79297 TWRS FLEXIBLE RECEIVER LEAK CONTAINMENT BAG/STAND ASSY (Referenced on H-2-79190)
 - Drawings appear to be similar, it is not clear if one is more appropriate than the other
- ▶ H-2-79125 - LLCE FLEXIBLE RECEIVER CONTAINER LENGTH CALCULATION, (Not referenced on H-2-79190)

WASH EQUIPMENT

- ▶ H-2-79129 - LLCE INNER WATER CONNECTION TOOL ASSY, (referenced on H-2-79190) used for internal flushing of waste equipment
- ▶ H-2-79142 - LLCE FLEXIBLE RECEIVER INNER WATER HOSE ASSEMBLIES, (referenced on H-2-79190) provides connections for flush water inside the receiver bag
- ▶ H-2-79131 - PRIMER PUMP AND HOSE DETAILS, (referenced on H-2-79190), provides details for pump needed between water truck and pumping trailer

LIFTING BAIL

- ▶ H-2-79181 - LLCE BAIL ASSEMBLY II, (referenced on H-2-79190) provides details for bail assembly to be used inside the flexible receiver bag

BURIAL CONTAINER

- ▶ LLCEDATA - Computer program indicates which container to use (C-5)
- ▶ H-2-827806 - LLCE DRAWING INDEX, (not referenced on H-2-79190) provides references to container and miscellaneous related equipment drawings, does not indicate which container to use in a given application

Appendix D
LLCE Program Summary of Remaining Work

No.	Work Item	Responsible Person	Status
1.	LLCE Program (See Section 4.1.3) <ul style="list-style-type: none"> <li data-bbox="189 326 593 374">A • Overall System Qualification Testing, including Cold Test Facility preparation <li data-bbox="189 401 593 426">B • Overall System Operator Training <li data-bbox="189 454 593 502">C • Completion of TWRS Maintenance and Operating Procedures <li data-bbox="189 529 593 577">D • Consumable Spares Identified and Procured <li data-bbox="189 605 593 653">E • LLCE Program Equipment Tracking and Storage 	McCormick Lagare/ McCormick Lagare/ McCormick Lagare/ McCormick McCormick	FY 1999 FY 1999 FY 1999 FY 1999 FY 1999
2.	Characterize Waste (see Section 5.1.6) <ul style="list-style-type: none"> <li data-bbox="189 717 593 834">A • Release Rev. 1 of <i>Disposal of Long-Length Contaminate Equipment: LLCE Characterization Software Functional Criteria and Management Plan</i>, WHC-SD-WM-TCP-007 Rev. 0 <li data-bbox="189 861 593 909">B • Obtain concurrence on the characterization programs <li data-bbox="189 937 593 985">C • Update Waste Characterization database programs <li data-bbox="189 1012 593 1037">D • Improve gamma assay software 	Roach TBD Roach Roach	FY 1999 TBD As needed FY 1999

No.	Work Item	Responsible Person	Status
3.	Retrieve Waste (see Section 5.2.7)		
A	<ul style="list-style-type: none"> • Establish vendor information files 	Lagare	FY 1999
B	<ul style="list-style-type: none"> • Fabricate platforms, adapters, spool pieces, and storage boxes on an as-needed basis 	Lagare	As needed
C	<ul style="list-style-type: none"> • Procure and stage flexible bags for emergency use 	Lagare	FY 1999
D	<ul style="list-style-type: none"> • Develop TWRS Maintenance and Storage Procedures 	Lagare	FY 1999
E	<ul style="list-style-type: none"> • Perform long term storage maintenance on trailers 	TBD	As needed
F	<ul style="list-style-type: none"> • Develop TWRS Operating Procedures for the FRA and receiver trailer (preparation and staging) 	Lagare	FY 1999
G	<ul style="list-style-type: none"> • Develop TWRS procedures for assay equipment 	Lagare/Roach	FY 1999
H	<ul style="list-style-type: none"> • Make design and equipment modifications to enhance decontamination 	Lagare	Project W-211 or FY 1999
I	<ul style="list-style-type: none"> • Improve the LLCE wash system 	Lagare	Project W-211 or FY 1999
J	<ul style="list-style-type: none"> • Provide in-tank CCTV system 	McCormick	FY 1999

No.	Work Item	Responsible Person	Status
4. A	Package/Treat Waste (see Section 5.3.4) <ul style="list-style-type: none"> • Develop TWRS Maintenance and Storage Procedures 	Lagare	FY 1999
B	<ul style="list-style-type: none"> • Perform long term storage maintenance on trailers 	TBD	As needed
C	<ul style="list-style-type: none"> • Develop TWRS Operating Procedures 	McCormick	FY 1999
D	<ul style="list-style-type: none"> • Establish specialized training for the sealing process 	McCormick	FY 1999
E	<ul style="list-style-type: none"> • Finalize NOC permitting 	McCormick	FY 1999
5. A	Transport Waste (see Section 5.4.4) <ul style="list-style-type: none"> • Develop TWRS Operating Procedures for transport trailer 	McCormick	FY 1999
B	<ul style="list-style-type: none"> • Develop TWRS Maintenance and Storage Procedures for transport trailer 	McCormick	FY 1999
C	<ul style="list-style-type: none"> • Dry run transport trailer entrance into trench 	TBD	Prior to use
D	<ul style="list-style-type: none"> • Modify landfill entrance ramps if necessary 	McCormick	FY 1999

No.	Work Item	Responsible Person	Status
6.	Dispose/Store Waste (see Section 5.5.4)		
A	<ul style="list-style-type: none"> • Develop Solid Waste Procedures for storage in mixed-waste trench 	Connolly	FY 1999
B	<ul style="list-style-type: none"> • Dry run transport trailer entrance into trench 	TBD	Prior to use
C	<ul style="list-style-type: none"> • Modify landfill entrance ramps if necessary 	McCormick	FY 1999
D	<ul style="list-style-type: none"> • Design and fabricate container support chocks 	McCormick	FY 1999
E	<ul style="list-style-type: none"> • Design and fabricate disposal container end supports 	McCormick	FY 1999
F	<ul style="list-style-type: none"> • Establish LLCE disposal pricing structure 	Connolly	FY 1999

Appendix E
Procedure Matrix

LONG-LENGTH CONTAMINATED EQUIPMENT DISPOSAL SYSTEM TWRS PROCEDURE MATRIX					
TASK	VENDOR SUPPLIED		HANFORD GENERATED		
	Completion Status	Vendor Information File Number	Completion Status	Title/Location/Document Number	Notes
SYSTEM					
Overall System Qualification Test Procedure	N/A	N/A	No		Not Started
LLCE Training Procedure	N/A	N/A	No		Not Started. Some training materials generated for project W-151 may be applicable
CHARACTERIZE					
LLCEDATA Computer Program	N/A	N/A	Yes		
LLCECALC Computer Program	N/A	N/A	Yes		
FRA Gamma Assay Equipment Operating Procedures	N/A		No		LLCE Procedures not written

LONG-LENGTH CONTAMINATED EQUIPMENT DISPOSAL SYSTEM
TWRS PROCEDURE MATRIX

TASK	VENDOR SUPPLIED		HANFORD GENERATED		Notes
	Completion Status	Vendor Information File Number	Completion Status	Title/Location/ Document Number	
RETRIEVE					
4/6 inch FRA System Operating Procedure	N/A		Partial		General operating instructions(HNF-2749) for the 4/6 inch FRA system have been prepared. Also, one-time use procedures (included in JCS Work Package 2E-95-00858) have been written for Project W-151 retrievals. A TWRS Operating Procedure needs to be prepared.
42 inch FRA System Operating Procedure	N/A		Partial		General operating instructions(HNF-2748) for the 42 inch FRA system have been prepared. Also, one-time use procedures (included in JCS Work Package 2E-95-00858) have been written for Project W-151 retrievals. A TWRS Operating Procedure needs to be prepared.
FRA Maintenance Procedures	N/A		Partial		General maintenance instructions(HNF-3336) have been prepared for the FRA System.

**LONG-LENGTH CONTAMINATED EQUIPMENT DISPOSAL SYSTEM
TWRS PROCEDURE MATRIX**

TASK	VENDOR SUPPLIED		HANFORD GENERATED		
	Completion Status	Vendor Information File Number	Completion Status	Title/Location/Document Number	Notes
FRA Gamma Assay Equipment Operating Procedures	N/A		No		
Site Setup/Tear-down Procedure	N/A		Partial		Some information may be available from Project W-151. General operating instructions (HNF-3070 and HNF-3071) have been prepared which provide trailer setup and preparation information.

LONG-LENGTH CONTAMINATED EQUIPMENT DISPOSAL SYSTEM
TWRS PROCEDURE MATRIX

TASK	VENDOR SUPPLIED		HANFORD GENERATED		Notes
	Completion Status	Vendor Information File Number	Completion Status	Title/Location/ Document Number	
PACKAGE/TREAT					
Receiver Trailer Operating Procedures	Partial		Partial		General operating instructions(HNF-3069 & HNF-3071) have been prepared for the Receiver Trailer. A TWRS Operating Procedure needs to be prepared.
Receiver Trailer Maintenance and Storage Procedure	Partial		Partial		General maintenance instructions(HNF-3252) have been prepared for the LLCE Transportation System, including Receiver Trailer.
Burial Container Operating Procedure (storage, handling, loading, sealing)	Partial		Yes		
Burial Container Void Fill Procedure	TBD		Yes		

LONG-LENGTH CONTAMINATED EQUIPMENT DISPOSAL SYSTEM
 TWRS PROCEDURE MATRIX

TASK	VENDOR SUPPLIED			HANFORD GENERATED		Notes
	Completion Status	Vendor Information File Number	Completion Status	Title/Location/ Document Number		
TRANSPORT						
Transport Trailer Operating Procedures	Partial		Partial			General operating instructions(HNF-3069 & HNF-3070) have been prepared for the Transport Trailer. A TWRS Operating Procedure needs to be prepared.
Transport Trailer Maintenance and Storage Procedure	Partial		Partial			General maintenance instructions(HNF-3252) have been prepared for the LLCE Transportation System, including Transport Trailer.
DISPOSE/STORE						
TRUM Waste Storage	N/A		No			This procedure should be written by Solid Waste Disposal by the CWC if and when equipment is removed that is suspect TRUM

**LONG-LENGTH CONTAMINATED EQUIPMENT DISPOSAL SYSTEM
TWRS PROCEDURE MATRIX**

TASK	VENDOR SUPPLIED		HANFORD GENERATED		
	Completion Status	Vendor Information File Number	Completion Status	Title/Location/Document Number	Notes
RMW Waste Storage Procedure (mixed-waste trench)	N/A		No		This procedure should be written by Solid Waste Disposal to facilitate storage of LLCE in the trench until the trench is designated for disposal.
RMW Waste Disposal Procedure (mixed-waste trench)	N/A		No		This procedure should be written by Solid Waste Disposal to govern container off-loading, and burial operations.

Appendix F
Characterization Computer Program Example

LLCE PHYSICAL DATA

ID	LLCE Description	Max Diameter	Max Tip to Tip Length	LLCE Weight	Elange to Tip Length	Drawing Number	Part Number	Drawing List	Exams	Waste Container Size	Comment	Time	Date
353	Pump, turbine	1.04	16.30	14.93	0.00	91943	5	H-291943 AN, H-9-1105	AW101,103-10	5		10:28:23 AM	5/21/96

**LLCEDATA PROGRAM
TEST RUN**

Note: Test run was performed for tank 241-A-W-104

Weight in kg

TANK CHARACTERIZATION DATABASE

Tank	Constituent	CAS	Unit Mass	Unit Volume	Layer Content	Layer Number	Layer Thickness	SpG	Data Source	Time	Date	Type
241-AW-104	Aluminum	7429-90-5	ug	L	142000.00	1	0.00	1.00		11:34:51 AM	10/24/96	CHEMICAL
241-AW-104	Chloride	12595-89-0	ug	L	6500000.00	1	0.00	1.00		11:35:10 AM	10/24/96	CHEMICAL
241-AW-104	Fluoride	16984-48-8	ug	L	2940000.00	1	0.00	1.00		11:35:59 AM	10/24/96	CHEMICAL
241-AW-104	Hydroxide		ug	L	6850000.00	1	0.00	1.00		11:36:34 AM	10/24/96	CHEMICAL
241-AW-104	Iron	7439-89-6	ug	L	1050.00	1	0.00	1.00		11:37:09 AM	10/24/96	CHEMICAL
241-AW-104	Nitrate	14797-55-8	ug	L	3900000.00	1	0.00	1.00		11:37:41 AM	10/24/96	CHEMICAL
241-AW-104	Nitrite	14797-65-0	ug	L	1900000.00	1	0.00	1.00		11:38:11 AM	10/24/96	CHEMICAL
241-AW-104	Sodium	7440-23-5	ug	L	0000000.00	1	0.00	1.00		11:39:01 AM	10/24/96	CHEMICAL
241-AW-104	Sulfate	14808-79-8	ug	L	1810000.00	1	0.00	1.00		11:39:37 AM	10/24/96	CHEMICAL
241-AW-104	Total inorganic carbon	TIC	ug	L	5020000.00	1	0.00	1.00		11:40:27 AM	10/24/96	CHEMICAL
241-AW-104	Total organic carbon	TOC	ug	L	5010000.00	1	0.00	1.00		11:40:53 AM	10/24/96	CHEMICAL
241-AW-104	Americium-241	241AM	uCi	L	0.50	1	0.00	1.00		11:41:15 AM	10/24/96	RADIOCHEMICAL
241-AW-104	Cesium-134	134CS	uCi	L	6780.00	1	0.00	1.00		11:41:32 AM	10/24/96	RADIOCHEMICAL
241-AW-104	Cesium-137	137CS	uCi	L	2300.00	1	0.00	1.00		11:42:36 AM	10/24/96	RADIOCHEMICAL
241-AW-104	Plutonium-239	239PU	uCi	L	0.02	1	0.00	1.00		11:42:52 AM	10/24/96	RADIOCHEMICAL
241-AW-104	Plutonium-239/240	239PU/240PU	uCi	L	0.02	1	0.00	1.00		11:43:21 AM	10/24/96	RADIOCHEMICAL
241-AW-104	Strontium-90	90SR	uCi	L	7.80	1	0.00	1.00		11:43:39 AM	10/24/96	RADIOCHEMICAL

LLCF SUBMERGED FACIONS

Weight in kg

ID	LLCF Description	Max Diameter	Flange to Tip	Drawing Number	Part Number	Start Location	End Location	Isotone	Correction Factor #1	Correction Factor #2	Correction Factor #3	Time	Date
353	Pump, turbine	1.04	14.93	91943	5	0.00	14.93	137CS	1.00	1.00	1.00	7:17:48 AM	1/28/97

LLGL RADIONUCLIDE DATA

Isotope	Specific Activity C/g	Half Life years	Heat Generation Rate Watts/g	Daughter 1	Branching Ratio 1	Daughter 2	Branching Ratio 2	Alpha Emitt	Beta Emitt	Gamma Emitt	Handford TRU Isotope	NRC TRU Isotope	Time	Date	Element
225AC	58040.00	0.03	0.03	221FR	1.00	N/A	0.00	1	0	1	0	0	3:21:13 PM	5/21/96	AC
227AC	72.34	21.77	0.00	223FR	0.01	227TH	0.99	1	0	0	0	0	3:21:14 PM	5/21/96	AC
228AC	2242000.00	0.00	0.01	228TH	1.00	N/A	0.00	1	0	0	0	0	3:21:14 PM	5/21/96	AC
241AM	3.43	432.52	0.03	237NP	1.00	N/A	0.00	1	0	1	0	0	1:00:26 PM	11/20/96	AM
242AM	808500.00	0.00	0.00	242PU	0.17	242CM	0.83	1	0	0	0	0	2:03:10 PM	8/23/96	AM
243AM	9.72	152.11	0.00	238NP	0.00	242AM	1.00	1	0	0	0	0	1:08:07 PM	11/20/96	AM
243AM	243AM	0.20	7385.21	239NP	1.00	N/A	0.00	1	0	0	0	0	1:09:03 PM	11/20/96	AM
217AT	10000000.00	0.00	0.04	213BI	1.00	N/A	0.00	1	0	0	0	0	3:21:10 PM	5/21/96	AT
133BA	250.30	10.50	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:58 PM	5/21/96	BA
137mBA	538000000.00	0.00	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:59 PM	5/21/96	BA
108B	0.02	1600000.00	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:48 PM	5/21/96	BE
210BI	124100.00	0.01	0.00	210PO	1.00	N/A	0.00	1	0	0	0	0	3:21:03 PM	5/21/96	BI
211BI	418400000.00	0.00	0.04	207TL	1.00	211PO	0.00	1	0	0	0	0	3:21:06 PM	5/21/96	BI
212BI	14650000.00	0.00	0.02	208TL	0.36	212PO	0.64	1	0	0	0	0	3:21:07 PM	5/21/96	BI
213BI	193430000.00	0.00	0.00	209TL	0.02	213PO	0.98	1	0	0	0	0	3:21:08 PM	5/21/96	BI
214BI	44160000.00	0.00	0.01	214PO	1.00	N/A	0.00	1	0	0	0	0	3:21:09 PM	5/21/96	BI
14C	4.46	5730.00	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:49 PM	5/21/96	C
115mCD	216.90	13.70	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:56 PM	5/21/96	CD
144CE	3190.00	0.78	0.00	143PR	0.99	144mPR	0.01	1	0	0	0	0	3:21:00 PM	5/21/96	CE
36Cl	0.03	301000.00	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:49 PM	5/21/96	CE
242CM	3307.00	0.45	0.04	238PU	1.00	N/A	0.00	1	0	0	0	0	2:01:23 PM	8/23/96	CM
243CM	51.63	28.52	0.04	239PU	1.00	N/A	0.00	1	0	0	0	0	1:09:32 PM	5/21/96	CM
244CM	80.91	18.12	0.03	240PU	1.00	N/A	0.00	1	0	0	0	0	1:10:01 PM	11/20/96	CM
245CM	0.17	8504.57	0.00	242PU	1.00	N/A	0.00	1	0	0	0	0	1:30:03 PM	8/23/96	CM
246CM	0.31	4734.27	0.03	243PU	1.00	N/A	0.00	1	0	0	0	0	1:13:44 AM	8/23/96	CM
247CM	0.00	560000.00	0.00	243PU	1.00	N/A	0.00	1	0	0	0	0	11:28:20 AM	8/23/96	CM
248CM	0.00	339000.00	0.00	244PU	0.92	N/A	0.00	1	0	0	0	0	3:20:50 PM	5/21/96	CM
60CO	1131.00	5.27	0.02	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:58 PM	5/21/96	CO
134CS	1300.00	2.06	0.01	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:59 PM	5/21/96	CS
135CS	0.00	2300000.00	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:59 PM	5/21/96	CS
137CS	86.60	30.17	0.00	137mBA	0.95	N/A	0.00	0	0	0	0	0	3:07:05 PM	5/21/96	CS
150EU	66.21	36.00	0.01	N/A	0.00	N/A	0.00	0	0	0	0	0	3:21:02 PM	5/21/96	EU
152EU	173.00	13.60	0.00	152GD	0.28	N/A	0.00	0	0	0	0	0	3:21:03 PM	5/21/96	EU
154EU	264.00	8.80	0.01	N/A	0.00	N/A	0.00	0	0	0	0	0	3:21:03 PM	5/21/96	EU
155EU	465.00	4.96	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:21:11 PM	5/21/96	EU
221FR	17730000.00	0.00	0.04	217AT	1.00	N/A	0.00	1	0	0	0	0	3:21:12 PM	5/21/96	FR
223FR	3686000.00	0.00	0.00	223RA	1.00	N/A	0.00	1	0	0	0	0	3:21:02 PM	5/21/96	FR
152GD	0.00	0000000.00	0.01	N/A	0.00	N/A	0.00	0	0	0	0	0	3:21:02 PM	5/21/96	GD
153GD	357.00	0.66	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:48 PM	5/21/96	GD
3H	9651.00	12.23	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:58 PM	5/21/96	H
129I	0.00	570000.00	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:58 PM	5/21/96	I
113mIn	16730000.00	0.00	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:59 PM	5/21/96	IN
40K	0.00	770000.00	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:49 PM	5/21/96	K
56Mn	7739.00	0.86	0.01	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:52 PM	5/21/96	MN
93mMo	1.10	3500.00	0.00	93mNB	1.00	N/A	0.00	0	0	0	0	0	3:20:53 PM	5/21/96	MO
94mNB	282.70	14.60	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:53 PM	5/21/96	NB
94NB	0.19	20300.00	0.01	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:53 PM	5/21/96	NB
95mNB	39200.00	0.10	0.00	95NB	0.95	N/A	0.00	0	0	0	0	0	3:20:54 PM	5/21/96	NB
95NB	39110.00	0.10	0.00	N/A	0.00	N/A	0.00	0	0	0	0	0	3:20:53 PM	5/21/96	NB

Isotope	Specific Activity C/kg	Half Life years	Heat Generation Rate wats/kgUe	Daughter Ratio 1	Daughter Ratio 2	Branching Ratio 2	Alpha Emitt	Beta Emitt	Gamma Emitt	Fissile Material	Handford TRU Isotope	NRC TRU Isotope	Time	Date	Element
59NI	0.08	75000.00	0.00	N/A	0.00	0.00	0	0	1	0	0	0	3:20:50 PM	5/21/96	NI
63NI	61.69	100.10	0.00	N/A	0.00	0.00	0	0	1	0	0	0	3:20:51 PM	5/21/96	NI
237NP	0.00	2141362.2	0.03	238PU	1.00	N/A	0	1	0	0	0	1	1:04:32 PM	11/20/96	NP
238NP	259200.00	0.01	0.00	238PU	1.00	N/A	0	1	0	0	0	0	2:19:12 PM	8/23/96	NP
239NP	232000.00	0.01	0.00	238PU	1.00	N/A	0	1	0	0	0	0	2:12:32 PM	8/23/96	NP
240mNP	105900000.0	0.00	0.01	240NP	0.00	240PU	1.00	0	1	0	0	0	10:43:02 AM	8/23/96	NP
231PA	0.05	32760.00	0.03	227AC	1.00	N/A	0	0	0	0	0	0	3:21:16 PM	5/21/96	PA
232PA	20760.00	0.07	0.00	235U	1.00	N/A	0	1	0	0	0	0	3:21:17 PM	5/21/96	PA
234mPA	68690000.0	0.00	0.00	234PA	0.00	234U	1.00	0	1	0	0	0	3:21:19 PM	5/21/96	PA
234PA	1999000.0	0.40	0.01	N/A	0.00	N/A	0	0	1	0	0	0	3:21:18 PM	5/21/96	PA
208PB	4544000.00	0.00	0.00	N/A	0.00	N/A	0	0	1	0	0	0	3:21:03 PM	5/21/96	PB
210PB	76.35	22.26	0.00	210BI	1.00	N/A	0	0	1	0	0	0	3:21:04 PM	5/21/96	PB
211PB	24690000.0	0.00	0.00	211BI	1.00	N/A	0	0	1	0	0	0	3:21:06 PM	5/21/96	PB
212PB	13900000.0	0.00	0.00	212BI	1.00	N/A	0	0	1	0	0	0	3:21:07 PM	5/21/96	PB
214PB	32790000.0	0.00	0.00	214BI	1.00	N/A	0	0	1	0	0	0	3:21:09 PM	5/21/96	PB
107PD	0.00	6500000.0	0.00	N/A	0.00	N/A	0	0	0	0	0	0	3:20:55 PM	5/21/96	PD
143PM	139.30	17.70	0.00	147SM	1.00	N/A	0	0	1	0	0	0	3:21:01 PM	5/21/96	PM
147PM	928.00	2.62	0.00	N/A	0.00	N/A	0	0	1	0	0	0	3:21:01 PM	5/21/96	PM
209PO	0.00	102.00	0.00	205PB	1.00	N/A	0	0	1	0	0	0	3:21:05 PM	5/21/96	PO
210PO	4490.00	0.38	0.03	N/A	0.00	N/A	0	0	1	0	0	0	3:21:06 PM	5/21/96	PO
211PO	54900000.0	0.00	0.05	N/A	0.00	N/A	0	0	1	0	0	0	3:21:07 PM	5/21/96	PO
212PO	000000000.0	0.00	0.05	N/A	0.00	N/A	0	0	1	0	0	0	3:21:08 PM	5/21/96	PO
213PO	000000000.0	0.00	0.05	209PB	1.00	N/A	0	0	1	0	0	0	3:21:08 PM	5/21/96	PO
214PO	90000000.0	0.00	0.05	210PB	1.00	N/A	0	0	1	0	0	0	3:21:09 PM	5/21/96	PO
215PO	80000000.0	0.00	0.04	211PB	1.00	N/A	0	0	1	0	0	0	3:21:09 PM	5/21/96	PO
216PO	82000000.0	0.00	0.04	212PB	1.00	N/A	0	0	1	0	0	0	3:21:10 PM	5/21/96	PO
218PO	28280000.0	0.00	0.04	214PB	1.00	N/A	0	0	1	0	0	0	3:21:10 PM	5/21/96	PO
144mPr	18140000.0	0.00	0.00	144PR	1.00	N/A	0	0	1	0	0	0	3:21:00 PM	5/21/96	PR
144Pr	76000000.0	0.00	0.01	N/A	0.00	N/A	0	0	1	0	0	0	3:21:00 PM	5/21/96	PR
238Pu	17.12	87.80	0.03	234U	1.00	N/A	0	0	1	0	0	0	3:21:00 PM	5/21/96	PR
239Pu	0.06	24080.42	0.06	235U	1.00	N/A	0	0	1	0	0	0	1:05:31 PM	11/20/96	PU
240Pu	0.23	6541.73	0.03	236U	1.00	N/A	0	0	1	0	0	0	1:06:30 PM	11/20/96	PU
241Pu	103.00	14.41	0.00	241AM	1.00	N/A	0	0	1	0	0	0	1:07:01 PM	11/20/96	PU
243Pu	0.00	387176.5	0.03	238PU	1.00	N/A	0	0	1	0	0	0	2:05:36 PM	8/23/96	PU
243Pu	26030000.0	0.00	0.00	243AM	1.00	N/A	0	0	1	0	0	0	1:08:33 PM	8/23/96	PU
244Pu	0.00	260000.0	0.03	240U	1.00	N/A	0	0	1	0	0	0	1:49:41 PM	8/23/96	PU
223Rn	51220.00	0.03	0.04	219RN	1.00	N/A	0	0	1	0	0	0	10:12:17 AM	8/23/96	RU
224Rn	1593000.0	0.01	0.03	220RN	1.00	N/A	0	0	1	0	0	0	3:21:12 PM	5/21/96	RU
225Rn	39210.00	0.04	0.00	225AC	1.00	N/A	0	0	1	0	0	0	3:21:13 PM	5/21/96	RU
226Rn	0.99	1600.00	0.03	223RN	1.00	N/A	0	0	1	0	0	0	3:21:13 PM	5/21/96	RU
228Rn	234.10	5.75	0.00	228AC	1.00	N/A	0	0	1	0	0	0	3:21:15 PM	5/21/96	RU
103mRh	187KE	0.00	0.00	N/A	0.00	N/A	0	0	1	0	0	0	3:21:03 PM	5/21/96	RE
106Rh	56000000.0	0.00	0.01	N/A	0.00	N/A	0	0	1	0	0	0	2:42:11 PM	8/23/96	RH
219Rn	30100000.0	0.00	0.04	N/A	0.00	N/A	0	0	1	0	0	0	3:20:55 PM	5/21/96	RH
220Rn	92240000.0	0.00	0.04	215PO	1.00	N/A	0	0	1	0	0	0	3:21:11 PM	5/21/96	RN
222Rn	1153800.00	0.00	0.03	216PO	1.00	N/A	0	0	1	0	0	0	3:21:11 PM	5/21/96	RN
103Ru	322460.00	0.11	0.00	103mRH	1.00	N/A	0	0	1	0	0	0	3:21:12 PM	5/21/96	RN
													2:40:23 PM	8/23/96	RU

Isotope	Specific Activity C/g	Half Life years	Heat Generation Rate wats/grams	Daughter 1	Branching Ratio 1	Daughter 2	Branching Ratio 2	Alpha Emitt	Beta Emitt	Gamma Emitt	Fissile Material	Hamford TRU Isotopes	NRC TRU Isotopes	Time	Date	Element
106RU	3346.00	1.01	0.00	106RH	1.00	N/A	0.00	0	0	1	0	0	0	3:20:55 PM	5/21/96	RU
125SB	1030.00	2.77	0.00	125BH	0.23	N/A	0.00	0	0	1	0	0	0	3:20:56 PM	5/21/96	SB
126mSB	78550000.00	0.00	0.01	126SB	0.14	N/A	0.00	0	0	1	0	0	0	3:20:57 PM	5/21/96	SB
126SB	83610.00	0.03	0.02	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:20:57 PM	5/21/96	SB
79Se	0.07	650000.00	0.00	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:20:57 PM	5/21/96	Se
147Sm	0.00	60000000.00	0.01	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:21:01 PM	5/21/96	Sm
151Sm	26.31	90.00	0.00	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:21:01 PM	5/21/96	Sm
151mSm	10640.00	0.32	0.00	113mIn	1.00	N/A	0.00	0	0	1	0	0	0	3:20:55 PM	5/21/96	Sm
126Sn	59.13	50.01	0.00	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:01:14 PM	8/23/96	Sn
90Sr	139.00	28.60	0.00	90Y	1.00	N/A	0.00	0	1	0	0	0	0	3:20:57 PM	5/21/96	Sr
99TC	0.02	2130000.00	0.00	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:20:54 PM	5/21/96	Tc
125mTe	18010.00	0.16	0.00	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:20:57 PM	5/21/96	Te
227Th	30740.00	0.05	0.04	223Ra	1.00	N/A	0.00	1	0	1	0	0	0	3:21:14 PM	5/21/96	Th
228Th	821.00	1.91	0.03	228Ra	1.00	N/A	0.00	2	0	1	0	0	0	3:21:15 PM	5/21/96	Th
229Th	0.21	7340.00	0.03	225Ra	1.00	N/A	0.00	1	0	1	0	0	0	3:21:15 PM	5/21/96	Th
230Th	0.02	77000.00	0.03	226Ra	1.00	N/A	0.00	1	0	1	0	0	0	3:21:16 PM	5/21/96	Th
231Th	531700.00	0.00	0.00	231Pa	1.00	N/A	0.00	0	0	1	0	0	0	3:21:04 PM	5/21/96	Th
232Th	0.00	72.00	0.02	232Ra	1.00	N/A	0.00	2	0	1	0	0	0	3:21:05 PM	5/21/96	Th
234Th	232000.00	0.07	0.00	234mPa	1.00	N/A	0.00	2	0	1	0	0	0	3:21:18 PM	5/21/96	Th
208Tl	190500000.00	0.00	0.00	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:21:04 PM	5/21/96	Tl
208Pb	294500000.00	0.00	0.02	N/A	0.00	N/A	0.00	0	0	1	0	0	0	3:21:05 PM	5/21/96	Pb
209Tl	409000000.00	0.00	0.02	209Pb	1.00	N/A	0.00	0	0	1	0	0	0	3:21:05 PM	5/21/96	Tl
232U	21.40	77.00	0.03	232Th	1.00	N/A	0.00	1	0	1	0	0	0	3:21:18 PM	5/21/96	U
233U	0.01	1592000.00	0.03	229Th	1.00	N/A	0.00	2	0	1	0	0	0	3:21:18 PM	5/21/96	U
234U	0.01	2445000.00	0.03	230Th	1.00	N/A	0.00	2	0	1	0	0	0	2:28:28 PM	8/23/96	U
235U	0.00	04274479.00	0.03	231Th	1.00	N/A	0.00	1	0	1	0	0	0	2:14:21 PM	8/23/96	U
236U	0.00	3430365.00	0.03	232Th	1.00	N/A	0.00	1	0	1	0	0	0	10:42:06 AM	8/23/96	U
238U	0.00	71080669.00	0.03	234Th	1.00	N/A	0.00	0	0	1	0	0	0	3:20:52 PM	5/21/96	U
240U	9262000.00	0.00	0.00	240mNp	1.00	N/A	0.00	0	0	1	0	0	0	3:20:54 PM	5/21/96	U
90Y	5430000.00	0.01	0.01	N/A	0.00	N/A	0.00	0	1	0	0	0	0	3:20:54 PM	5/21/96	Y
93Zr	0.00	1530000.00	0.01	93mNb	1.00	N/A	0.00	0	0	1	0	0	0	3:20:54 PM	5/21/96	Zr
95Zr	21480.00	0.18	0.01	95Nb	0.99	95mNb	0.01	0	0	1	0	0	0	3:20:54 PM	5/21/96	Zr

ANNUAL INDIANAPOLIS LIMITS

Isotopes	Category 1 LLW Limit	Category 3 LLW Limit	NRC Class C Limit	Cat 3 Noncomb Limit	PE-CI Correction Factor	Enc-222 EGE Factor	DOT A2 Limit	EP-0063 A2 Limit	CMC Limit per DE-CI Package	DE-CI Factor	Current SARP Limit	Z41 Reporting Unit	Element/Time	Date
TOTAL Cn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	TO	2:52:21 5/21/96
TOTAL Pu	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	TO	2:52:21 5/21/96
3H	99000.00	0.00	0.00	4000000.00	0.00	0.00	1080.00	1000.00	210.00	0.00	0.00	0.01	H	2:52:21 5/21/96
108BE	1.10	240.00	0.00	10000.00	0.00	0.00	13.50	0.00	210.00	0.00	0.00	0.00	BE	2:52:22 5/21/96
14C	0.09	21.00	8.00	1800000.00	0.00	0.00	54.10	60.00	0.00	0.00	0.06	0.00	C	2:52:22 5/21/96
36CL	0.00	0.14	0.00	1700000.00	0.00	0.00	13.50	10.00	0.00	0.00	0.00	0.00	CL	2:52:22 5/21/96
40K	0.00	0.38	0.00	3000000.00	0.00	0.00	16.20	0.00	1200.00	0.00	0.00	0.00	K	2:52:22 5/21/96
54Mn	0.00	0.00	0.00	0.00	0.00	0.00	27.00	20.00	0.00	0.00	0.00	0.00	MN	2:52:22 5/21/96
59Ni	3.90	850.00	0.00	2900000.00	0.00	0.00	1080.00	900.00	0.00	0.00	0.00	0.00	NI	2:52:22 5/21/96
60Co	75.00	0.00	0.00	18000.00	0.00	0.00	10.80	7.00	0.00	0.00	0.00	0.00	CO	2:52:23 5/21/96
63Ni	5.90	20000.00	700.00	1200000.00	0.00	0.00	811.00	100.00	0.00	0.00	33.20	0.00	NI	2:52:23 5/21/96
79Se	0.51	110.00	0.00	390000.00	0.00	0.00	54.10	0.00	260.00	0.00	0.98	0.00	SE	2:52:23 5/21/96
90Sr	0.02	54000.00	7000.00	15000.00	0.00	0.00	2.70	0.40	0.00	0.00	208.00	0.00	SR	2:52:23 5/21/96
90Y	0.00	0.00	0.00	0.00	0.00	0.00	5.41	10.00	0.00	0.00	208.00	0.00	Y	2:52:23 5/21/96
93mNb	0.00	0.00	0.00	0.00	0.00	0.00	162.00	200.00	0.00	0.00	0.01	0.00	NB	2:52:23 5/21/96
93Mo	0.87	200.00	0.00	1300000.00	0.00	0.00	189.00	0.00	2600.00	0.00	0.00	0.00	MO	2:52:24 5/21/96
93Zr	2.50	540.00	0.00	4600.00	0.00	0.00	5.41	200.00	94.00	0.00	0.01	0.00	ZR	2:52:24 5/21/96
94Nb	0.00	0.05	0.00	9200.00	0.00	0.00	16.20	0.00	200.00	0.00	0.00	0.00	NB	2:52:24 5/21/96
95mNb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30000.00	0.00	0.00	0.00	NB	2:52:24 5/21/96
95Nb	0.00	0.00	0.00	0.00	0.00	0.00	27.00	20.00	0.00	0.00	0.00	0.00	NB	2:52:25 5/21/96
95Zr	0.00	0.00	0.00	0.00	0.00	0.00	24.30	20.00	0.00	0.00	7.57	0.00	ZR	2:52:25 5/21/96
99Tc	0.02	5.00	3.00	400000.00	0.00	0.00	24.30	25.00	0.00	0.00	1.37	0.00	TC	2:52:25 5/21/96
103mRh	0.00	0.00	0.00	0.00	0.00	0.00	1080.00	1000.00	0.00	0.00	0.00	0.00	RH	2:52:25 5/21/96
103Ru	0.00	0.00	0.00	0.00	0.00	0.00	24.30	25.00	0.00	0.00	0.00	0.00	RU	2:52:25 5/21/96
106Rh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	0.00	8.70	0.00	RH	2:52:26 5/21/96

Isotopes	Category 1 LLW Limit	Category 2 LLW Limit	NRC Class C Limit	Cat 3 Noncomb Limit	PE-Ci Corrosion Factor	Pu-239 EGE Factor	DOT A2 Limit	EP-0063 A2 Limit	CWC Limit per DE-Ci Package	Factor	Curie	Current SARP Limit	741 Reporting Limit	Element/Time	Date
106KU	0.00	0.00	0.00	0.00	0.00	0.00	5.41	7.00	0.00	0.00	0.00	8.70	0.00	RU	2:52:26 5/21/96
107PD	15.00	3300.00	0.00	2900000.00	0.00	0.00	0.00	0.00	590000.00	0.00	0.00	0.00	0.00	PD	2:52:26 5/21/96
113mCD	0.76	0.00	0.00	18000.00	0.00	0.00	2.43	0.00	37.00	0.01	0.00	0.00	0.00	CD	2:52:26 5/21/96
113mIN	0.00	0.00	0.00	0.00	0.00	0.00	108.00	60.00	0.00	0.00	0.00	0.00	0.00	IN	2:52:26 5/21/96
113SN	0.00	0.00	0.00	0.00	0.00	0.00	108.00	60.00	0.00	0.00	0.00	0.00	0.00	SN	2:52:27 5/21/96
121mSN	0.67	22000.00	0.00	3100000.00	0.00	0.00	24.30	0.00	660000.00	0.00	0.00	0.00	0.00	SN	2:52:27 5/21/96
125mTE	0.00	0.00	0.00	0.00	0.00	0.00	243.00	100.00	0.00	0.00	0.00	0.00	0.00	TE	2:52:27 5/21/96
125SB	0.00	0.00	0.00	0.00	0.00	0.00	24.30	25.00	0.00	0.00	5.27	0.00	0.00	SB	2:52:27 5/21/96
126mSB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	690000.00	0.00	0.00	0.00	0.00	SB	2:52:27 5/21/96
126SB	0.00	0.00	0.00	0.00	0.00	0.00	10.80	0.00	550000.00	0.00	0.00	0.00	0.00	SB	2:52:28 5/21/96
126SN	0.00	0.03	0.00	360000.00	0.00	0.00	8.11	0.00	760.00	0.00	0.00	0.00	0.00	SN	2:52:28 5/21/96
129I	0.01	1.80	0.08	71000.00	0.00	0.00	0.00	2.00	0.02	10.00	0.00	0.00	0.00	I	2:52:28 5/21/96
133BA	0.71	0.00	0.00	4600000.00	0.00	0.00	81.10	10.00	0.00	0.00	0.00	0.00	0.00	BA	2:52:28 5/21/96
134CS	0.00	0.00	0.00	0.00	0.00	0.00	13.50	10.00	0.00	0.00	1.39	0.00	0.00	CS	2:52:28 5/21/96
135CS	0.16	35.00	0.00	8000000.00	0.00	0.00	24.30	25.00	0.00	0.00	0.00	0.00	0.00	CS	2:52:29 5/21/96
137CS	0.01	12000.00	4600.00	1200000.00	0.00	0.00	13.50	10.00	0.00	0.00	0.00	912.00	0.00	CS	2:52:29 5/21/96
137mBA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	10.00	0.00	0.00	861.00	0.00	BA	2:52:29 5/21/96
144CE	0.00	0.00	0.00	0.00	0.00	0.00	5.41	7.00	0.00	0.00	0.00	424.00	0.00	CE	2:52:29 5/21/96
144mPR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PR	2:52:29 5/21/96
144PR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PR	2:52:30 5/21/96
145PM	0.00	0.00	0.00	0.00	0.00	0.00	189.00	0.00	8700000.00	0.00	0.00	0.00	0.00	PM	2:52:30 5/21/96
147PM	0.00	0.00	0.00	0.00	0.00	0.00	24.30	25.00	0.00	0.00	0.00	0.00	0.00	PM	2:52:30 5/21/96
147SM	0.02	3.70	0.00	29.00	0.00	0.00	0.00	0.00	0.59	0.40	0.00	0.00	0.00	SM	2:52:30 5/21/96
150EU	0.00	670.00	0.00	140000.00	0.00	0.00	18.90	0.00	0.00	0.00	0.00	0.00	0.00	EU	2:52:30 5/21/96

REGULATORY RADIONUCLIDE LIMITS

Isotope	Category 1 LLW Limit	Category 2 LLW Limit	NRC Class C Limit	Cat 3 Noncomb Limit	PE-CI Correction Factor	Pa-229 EGE Factor	DOT A2 Limit	EP-0063 A2 Limit	CMC Limit per DE-CI Curie Package	Current SARP Limit	741 Reporting Limit	ElementTime	Date
151SM	46.00	210000.0	0.00	710000.0	0.00	0.00	108.00	90.00	0.00	1.68	0.00	SM	2:52:30 5/21/96
152EU	0.05	0.00	0.00	17000.00	0.00	0.00	24.30	10.00	0.00	0.00	0.00	EU	2:52:31 5/21/96
152GD	0.01	1.40	0.00	3.60	0.00	0.00	0.00	0.00	0.02	16.00	0.00	GD	2:52:31 5/21/96
153GD	0.00	0.00	0.00	0.00	0.00	0.00	135.00	100.00	0.00	0.00	0.00	GD	2:52:31 5/21/96
154EU	0.75	0.00	0.00	130000.00	0.00	0.00	13.50	5.00	0.00	0.00	0.00	EU	2:52:31 5/21/96
155EU	0.00	0.00	0.00	0.00	0.00	0.00	54.10	60.00	0.00	1.13	0.00	EU	2:52:31 5/21/96
187RE	36.00	7800.00	0.00	63000000.00	0.00	0.00	0.00	0.00	1300000.0	0.00	0.00	RE	2:52:32 5/21/96
209PB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PB	2:52:32 5/21/96
208TI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TI	2:52:32 5/21/96
209PB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PB	2:52:32 5/21/96
209PO	0.01	32.00	0.00	300.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00	PO	2:52:32 5/21/96
209TL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TL	2:52:32 5/21/96
210BI	0.00	0.00	0.00	0.00	0.00	0.00	13.50	0.00	0.00	0.00	0.00	BI	2:52:33 5/21/96
210PB	0.04	2100000.0	0.00	1800.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	PB	2:52:33 5/21/96
210PO	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.20	0.00	0.00	0.00	PO	2:52:33 5/21/96
212BI	0.00	0.00	0.00	0.00	0.00	0.00	8.11	0.00	0.00	0.00	0.00	BI	2:52:33 5/21/96
212PB	0.00	0.00	0.00	0.00	0.00	0.00	8.11	5.00	0.00	0.00	0.00	PB	2:52:33 5/21/96
212PO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PO	2:52:34 5/21/96
213BI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	BI	2:52:34 5/21/96
213PO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PO	2:52:34 5/21/96
214BI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	BI	2:52:34 5/21/96
214PB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	11000.00	0.00	0.00	PB	2:52:35 5/21/96
214PO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	94000.00	0.00	0.00	PO	2:52:35 5/21/96
216PO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PO	2:52:35 5/21/96
217AT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	AT	2:52:35 5/21/96

ASBESTOS AND RADON/THORON DATA TABLE

Isotope	Category 1 LLW Limit	Category 3 LLW Limit	NRC Class C Limit	Category 3 Noncomb Limit	PE-CI Correction Factor	PE-CI Factor	Pu-239 FCF Factor	DOT A2 Limit	EP-0043 A2 Limit	CWC Limit per DE-CI Package	Factor	Current SARP Limit	741 Reporting Unit	Element	Time	Date
234mPA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PA	2:52:40	5/21/96
234PA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PA	PM	2:52:40 5/21/96
234TH	0.00	0.00	0.00	0.00	0.00	0.00	5.41	10.00	0.00	0.00	0.00	0.00	0.00	TH	PM	2:52:40 5/21/96
234U	0.01	1.90	0.00	27.00	0.00	0.00	0.03	0.10	0.00	0.43	0.00	0.00	0.00	U	PM	2:52:40 5/21/96
235U	0.00	0.50	0.00	29.00	0.00	1.00	0.00	0.20	0.00	0.38	0.00	0.00	0.00	U	PM	2:52:40 5/21/96
236U	0.01	2.00	0.00	29.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	U	PM	2:52:40 5/21/96
237NP	0.00	0.15	0.00	2.60	1.00	0.00	0.01	0.01	0.00	4.50	0.00	0.00	0.50	NP	PM	2:52:41 5/21/96
238NP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NP	PM	2:52:41 5/21/96
238PU	0.00	24.00	0.00	5.20	0.91	0.11	0.01	0.00	0.00	0.00	0.00	0.01	0.05	PU	PM	2:52:41 5/21/96
238U	0.01	1.20	0.00	31.00	0.00	0.00	0.00	0.00	0.00	0.62	0.38	0.00	0.00	U	PM	2:52:41 5/21/96
239NP	0.00	0.00	0.00	0.00	0.00	0.00	13.50	0.00	0.00	0.00	0.00	0.00	0.00	NP	PM	2:52:42 5/21/96
239PU	0.00	0.42	0.00	4.60	1.00	1.00	0.01	0.00	0.00	0.00	1.00	0.40	0.00	PU	PM	2:52:42 5/21/96
240PU	0.00	0.43	0.00	4.60	1.00	1.00	0.02	0.01	0.00	0.00	1.00	0.02	0.00	PU	PM	2:52:42 5/21/96
241AM	0.00	0.85	0.00	4.40	1.00	0.02	0.01	0.01	0.00	0.00	1.00	0.37	0.50	AM	PM	2:52:42 5/21/96
241PU	0.06	25.00	3500.00	240.00	0.02	2.25	0.27	0.10	0.00	0.00	0.02	0.18	0.00	PU	PM	2:52:42 5/21/96
242AM	0.00	0.00	0.00	0.00	0.00	34.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	AM	PM	2:52:42 5/21/96
242CM	0.00	0.00	2000.00	200.00	0.03	0.00	0.27	0.20	0.00	0.00	0.06	0.00	0.00	CM	PM	2:52:43 5/21/96
242mAM	0.00	1.60	0.00	4.60	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	AM	PM	2:52:43 5/21/96
242PU	0.00	0.43	0.00	5.00	0.91	0.01	0.01	0.00	0.00	0.00	0.91	0.00	0.00	PU	PM	2:52:43 5/21/96
243AM	0.00	0.23	0.00	4.40	1.00	0.01	0.01	0.01	0.00	0.00	2.50	0.01	0.50	AM	PM	2:52:43 5/21/96
243CM	0.02	340.00	0.00	6.70	0.00	5.00	0.01	0.01	0.00	0.00	1.70	0.00	0.00	CM	PM	2:52:43 5/21/96
243PU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PU	PM	2:52:44 5/21/96
244CM	0.14	160.00	0.00	8.60	0.53	0.09	0.01	0.01	0.00	0.00	1.30	0.00	0.00	CM	PM	2:52:44 5/21/96
244PU	0.00	0.13	0.00	5.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	PU	PM	2:52:44 5/21/96
245CM	0.00	0.22	0.00	4.40	0.00	15.00	0.01	0.01	0.00	0.00	2.50	0.00	0.00	CM	PM	2:52:44 5/21/96

Isotope	Category 1 LLW Limit	Category 3 LLW Limit	NRC Class C Limit	Cat 3 Noncomb Limit	PE-CI Correction Factor	En-239 EGE Factor	DOT Δ2 Limit	FE-0663 Δ2 Limit	CWC Limit per Package	DE-CI Factor	Current SARP Limit	741 Reporting Unit	ElementTime	Date
246CM	0.00	0.42	0.00	4.30	0.00	0.00	0.01	0.00	0.00	0.00	0.00		PM CM 2:52:44	5/21/96
247CM	0.00	0.12	0.00	4.80	0.00	0.50	0.01	0.00	0.00	0.00	0.00		PM CM 2:52:45	5/21/96
248CM	0.00	0.11	0.00	1.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00		PM CM 2:52:45	5/21/96

CHEMICAL REGULATORY DATA

Reference: WAC-303-090(8)(C)

HNF-SD-SWM-ER-730, Rev.

Constituent Name	CAS	D Code	D Code Limit (mg/L)	Time	Date
Arsenic	7440-38-2	D004	33.75	1:51:00 PM	5/21/96
Barium	7440-39-3	D005	100.00	1:51:00 PM	5/21/96
Cadmium	7440-43-9	D006	1.00	1:51:00 PM	5/21/96
Chromium	7440-47-3	D007	1.00	1:51:00 PM	5/21/96
Lead	7439-92-1	D008	7.00	1:51:00 PM	5/21/96
Mercury	7439-97-6	D009	0.20	1:51:00 PM	5/21/96
Selenium	7782-49-2	D010	1.00	1:51:00 PM	5/21/96
Silver	7440-22-4	D011	5.00	12:23:07 PM	8/22/96

LLCE WASTE CHARACTERIZATION SUMMARY REPORT

UserName: sdr
 LLCE Description: Pump, turbine
 Drawing Number (H-2): 91943
 Part Number: 5
 Waste Tank: 241-AW-104
 Tank Riser: 1
 Waste Container: 5

CHECK TO SEE IF SARP LIMITS HAVE BEEN EXCEEDED

No SARP Limits have been exceeded.
 SEP is not required for this waste package

CALCULATE FOR CAT 1 AND CAT 3 LLW

Volume for LLCE waste container: 5 is 2.7028e+1 m³
 Cat 1 Sum of fractions is : 3.5736e-1
 Cat 3 Sum of fractions is : 7.3316e-7
 NRC Class C Sum of fractions is : 4.2747e-7
 Cat 3 Noncombustible Limit Sum of fractions is : 1.2015e-7
 LLCE waste is Category 1, LLMW
 LLCE is suitable for near surface disposal (NRC C Fraction < 1)
 Additional safety analysis is not required for near surface disposal. (NonComb Fraction <1)

TRU WASTE CALCULATION

LLCE Weight is 1.e+3 kg.
 LLCE waste is Low Level Mixed Waste (LLMW) since TRU fraction <1 (1.2323e-4)
 LLCE waste is not Greater than NRC Class C since NRC fraction <1 (1.2323e-4)

CALCULATE PE-CI FOR TRU WASTE

Since LLCE waste is not TRU this calculation is not required.

CALCULATE Pu-239 FGE FOR TRU WASTE

Since LLCE waste is not TRU this calculation is not required.

CALCULATE ALPHA CURIE CONTENT FOR TRU WASTE

Since LLCE waste is not TRU this calculation is not required.

CALCULATE FOR ACCOUNTABLE NUCLEAR MATERIAL

LLCE waste does not contain accountable nuclear material.

HEAT GENERATION FROM THE LLCE WASTE PACKAGE

Total heat generated by LLCE waste is: 1.6481e-3 watts.
 Internal Volume of selected Container LLCE-5 = 9.5449e+2 ft³
 Heat Generation rate for this LLCE waste is 1.7267e-6 watts/ft³
 Heat Generation rate doesn't exceed 0.1 watts/ft³

CALCULATE TRANSPORTATION CATEGORY

A2 Fraction Sum = 1.7856e-2
 EF-0063 Appendix L A2 Limit Fraction = 2.3206e-2
 LLCE Waste Package is Type A Quantity.
 DE-CI Calculation is not required.

CALCULATE DE-CI

DE-CI Calculation is not required according to transportation category.

CALCULATE HAZARDOUS WASTE CODES

Hazardous waste codes F001-F005 apply to all LLCE.
 No other Waste codes Apply.

LLCECALC PROGRAM TEST RUN

Note: Test run was performed for tank 104-AW using gamma assay data gathered by Project W-151 retrieval efforts on Tank 241-AZ-101

ESTIMATED RADIONUCLIDE/CHEMICAL CONTENT OF LLCE WASTE

content estimated to be: 1.3564e-7 Ci
 Aluminum content estimated to be: 3.2739e+0 g
 Chloride content estimated to be: 1.4986e+1 g
 Fluoride content estimated to be: 6.7785e+0 g
 Hydroxide content estimated to be: 1.5793e+2 g
 Iron content estimated to be: 2.4209e-2 g
 Nitrate content estimated to be: 5.5104e+2 g
 Nitrite content estimated to be: 2.7437e+2 g
 Sodium content estimated to be: 2.3056e+2 g
 Sulfate content estimated to be: 4.1731e+1 g
 Total inorganic carbon content estimated to be: 1.1574e+1 g
 Total organic carbon content estimated to be: 1.1551e+1 g
 Americium-241 content estimated to be: 1.1574e-5 Ci
 Cesium-134 content estimated to be: 1.5632e-1 Ci
 Cesium-137 content estimated to be: 5.3029e-2 Ci
 Plutonium-239 content estimated to be: 6.1368e-7 Ci
 Strontium-90 content estimated to be: 1.7984e-4 Ci

CALCULATED WASTE CONTENT VS SARP LIMIT

LLCE Waste Content: 1.1574e-5 for Americium-241 SARP Limit is: 3.67e-1 Ci
 LLCE Waste Content: 1.5632e-1 for Cesium-134 SARP Limit is: 1.39e+0 Ci
 LLCE Waste Content: 5.3029e-2 for Cesium-137 SARP Limit is: 9.12e+2 Ci
 LLCE Waste Content: 6.1368e-7 for Plutonium-239 SARP Limit is: 4.e-1 Ci
 LLCE Waste Content: 1.7984e-4 for Strontium-90 SARP Limit is: 2.08e+2 Ci
 LLCE Waste Content: 1.3564e-7 for SARP Limit is: 1.86e-2 Ci

CALCULATE FOR CAT 1 AND CAT 3 LLW

Isotope, CAT 1 Fraction, CAT 3 Fraction, NRC Class C fraction, NonComb Limit Fraction
 241AM, 2.0392e-4, 5.038e-7, 0.e+0, 9.7325e-8
 134CS, 0.e+0, 0.e+0, 0.e+0, 0.e+0
 137CS, 3.5673e-1, 1.635e-7, 4.2652e-7, 1.635e-8
 239PU, 1.195e-5, 5.4061e-8, 0.e+0, 4.935e-9
 90SR, 4.1586e-4, 1.2322e-10, 9.5054e-10, 4.4358e-10
 240PU, 2.6413e-6, 1.1671e-8, 0.e+0, 1.091e-9
 Cat 1 Sum of fractions is : 3.5736e-1
 Cat 3 Sum of fractions is : 7.3316e-7
 NRC Class C Sum of fractions is : 4.2747e-7
 Cat 3 Noncombustible Limit Sum of fractions is : 1.2015e-7
 LLCE waste is Category 1, LLMW
 LLCE is suitable for near surface disposal (NRC C Fraction < 1)
 Additional safety analysis is not required for near surface disposal. (NonComb Fraction < 1)

TRU WASTE CALCULATION

LLCE Weight is 1.e+3 kg.
 241AM is a NRC TRU isotope
 Content = 1.1574e-2 nCi/gram
 Fraction = 1.1574e-4
 241AM is a Hanford TRU isotope
 Content = 1.1574e-4 nCi/gram
 Fraction = 1.1574e-4
 239PU is a NRC TRU isotope
 Content = 6.1368e-4 nCi/gram
 Fraction = 6.1368e-6
 239PU is a Hanford TRU isotope
 Content = 6.1368e-6 nCi/gram
 Fraction = 6.1368e-6
 240PU is a NRC TRU isotope
 Content = 1.3564e-4 nCi/gram
 Fraction = 1.3564e-6
 240PU is a Hanford TRU isotope
 Content = 1.3564e-6 nCi/gram
 Fraction = 1.3564e-6
 LLCE waste is Low Level Mixed Waste (LLMW) since TRU fraction < 1 (1.2323e-4)
 LLCE waste is not Greater than NRC Class C since NRC fraction < 1 (1.2323e-4)

CALCULATE PE-CI FOR TRU WASTE

Since LLCE waste is not TRU this calculation is not required.

CALCULATE Pu-239 FGE FOR TRU WASTE

Since LLCE waste is not TRU this calculation is not required.

CALCULATE ALPHA CURIE CONTENT FOR TRU WASTE

Since LLCE waste is not TRU this calculation is not required.

CALCULATE FOR ACCOUNTABLE NUCLEAR MATERIAL

LLCE waste does not contain accountable nuclear material.

HEAT GENERATION FROM THE LLCE WASTE PACKAGE

Isotope, Curies, Watts/Ci, Watts

241AM , 1.1574e-5, 3.322e-2, 3.8449e-7

134CS, 1.5632e-1, 1.02e-2, 1.5945e-3

137CS, 5.3029e-2, 1.e-3, 5.3029e-5

239PU , 6.1368e-7, 3.082e-2, 1.8914e-8

90SR, 1.7984e-4, 1.2e-3, 2.158e-7

240PU , 1.3564e-7, 3.114e-2, 4.2238e-9

Total heat generated by LLCE waste is: 1.6481e-3 watts.

Internal Volume of selected Container LLCE-5 = 9.5449e+2 ft³Heat Generation rate for this LLCE waste is 1.7267e-6 watts/ft³Heat Generation rate doesn't exceed 0.1 watts/ft³

CALCULATE TRANSPORTATION CATEGORY

Isotope, A2 Limit , EP-0063 A2 Limit, A2 Fraction, EP-0063 A2 fraction

241AM, 5.4e-3, , 8.e-3, 2.1434e-3, 1.4468e-3

134CS, 1.35e+1, , 1.e+1, 1.1579e-2, 1.5632e-2

137CS, 1.35e+1, , 1.e+1, 3.9281e-3, 5.3029e-3

239PU, 5.4e-3, , 2.e-3, 1.1364e-4, 3.0684e-4

90SR, 2.7e+0, , 4.e-1, 6.6606e-5, 4.4959e-4

240PU, 5.4e-3, , 2.e-3, 2.5118e-3, 6.7819e-5

A2 Fraction Sum = 1.7856e-2

EP-0063 Appendix L A2 Limit Fraction = 2.3206e-2

LLCE Waste Package is Type A Quantity.

DE-Ci Calculation is not required.

CALCULATE DE-Ci

DE-Ci Calculation is not required according to transportation category.

CALCULATE HAZARDOUS WASTE CODES

Hazardous waste codes F001-F005 apply to all LLCE.

No other Waste codes Apply.

1/27/97 - 4:51:25 PM: -----
 1/27/97 - 4:51:25 PM: START OF LLCEDATA
 1/27/97 - 4:51:25 PM: -----
 1/27/97 - 4:51:26 PM: New Program Run Initiated
 1/27/97 - 4:51:26 PM: Program User is: sdr
 1/27/97 - 4:51:26 PM: Main database file LLCEINFO.MDB open
 1/27/97 - 4:51:27 PM: All changes made to database will be recorded (logged) in DBCHANGE.MDB
 1/27/97 - 4:51:27 PM: New LLCE Data File c:\llcedata\test.edf has been created and opened
 1/27/97 - 4:51:28 PM: -----
 1/27/97 - 4:52:04 PM: START - CHANGES to LLCE Physical Database Follow:
 1/27/97 - 4:52:22 PM: END - LLCE Physical Database Changes
 1/27/97 - 4:52:22 PM: -----
 1/27/97 - 4:52:51 PM: START - CHANGES to LLCE Physical Database Follow:
 1/27/97 - 4:53:05 PM: Pump, turbine, H-2-91943, H-9-1105, Part No: 5, has been selected for retrieval.
 1/27/97 - 4:53:05 PM: Note that all units are in meters and kg.
 1/27/97 - 4:53:07 PM: END - LLCE Physical Database Changes
 1/27/97 - 4:53:07 PM: -----
 1/27/97 - 4:55:17 PM: START - Editing of Tank Waste Data
 1/27/97 - 4:55:17 PM: Tank 241-AW-104 was selected for Pump, turbine retrieval.
 1/27/97 - 4:55:18 PM: LLCE will be retrieved from riser #2
 1/27/97 - 4:55:20 PM: Type changed to: CHEMICAL
 1/27/97 - 4:55:20 PM: Layer changed to: 1
 1/27/97 - 4:57:14 PM: Specific Gravity was: 0.996 Now: 0.996
 1/27/97 - 4:58:31 PM: Type changed to: RADIOCHEMICAL
 1/27/97 - 4:59:47 PM: END - Editing of tank Waste Data
 1/27/97 - 4:59:48 PM: -----
 1/27/97 - 5:02:24 PM: START - Editing of Tank Waste Data
 1/27/97 - 5:02:25 PM: Tank 241-AW-104 was selected for Pump, turbine retrieval.
 1/27/97 - 5:02:25 PM: LLCE will be retrieved from riser #5
 1/27/97 - 5:02:26 PM: Current tank waste data accepted without editing
 1/27/97 - 5:02:26 PM: END - Tank Waste Data Editing
 1/27/97 - 5:02:27 PM: -----
 1/27/97 - 5:02:39 PM: START - Changes to Geometry correction factors for Pump, turbine
 1/27/97 - 5:03:53 PM: New Record added for Isotope: 137CS At End Point: 10.
 1/27/97 - 5:04:45 PM: New Record added for Isotope: 137CS At End Point: 11.
 1/27/97 - 5:05:05 PM: New Record added for Isotope: 137CS At End Point: 14.9289
 1/28/97 - 7:03:38 AM: -----
 1/28/97 - 7:03:39 AM: START OF LLCEDATA
 1/28/97 - 7:03:39 AM: -----
 1/28/97 - 7:03:40 AM: New Program Run Initiated
 1/28/97 - 7:03:41 AM: Program User is: sdr
 1/28/97 - 7:03:41 AM: Main database file LLCEINFO.MDB open
 1/28/97 - 7:03:42 AM: All changes made to database will be recorded (logged) in DBCHANGE.MDB
 1/28/97 - 7:03:42 AM: Existing LLCE Data File c:\llcedata\test.edf has been Opened - Last Edited: 1/27/97
 1/28/97 - 7:03:43 AM: Last Program User Was: sdr
 1/28/97 - 7:03:43 AM: -----
 1/28/97 - 7:04:25 AM: START - CHANGES to LLCE Physical Database Follow:
 1/28/97 - 7:07:39 AM: Cancel executed: Changes identified above have not been made
 1/28/97 - 7:07:40 AM: END - LLCE Physical Database Changes
 1/28/97 - 7:07:41 AM: -----
 1/28/97 - 7:07:54 AM: START - Editing of Tank Waste Data
 1/28/97 - 7:07:54 AM: Tank: 241-AW-104 Tank Waste Data Being Edited.
 1/28/97 - 7:07:56 AM: Type changed to: CHEMICAL
 1/28/97 - 7:07:56 AM: Layer changed to: 1
 1/28/97 - 7:08:14 AM: Restoring Data for Tank 241-AW-104 in the LLCE Data File.
 1/28/97 - 7:08:14 AM: END - Editing of tank Waste Data
 1/28/97 - 7:08:15 AM: -----
 1/28/97 - 7:16:11 AM: START - Editing of Tank Waste Data
 1/28/97 - 7:16:12 AM: Tank 241-AW-104 was selected for Pump, turbine retrieval.
 1/28/97 - 7:16:12 AM: LLCE will be retrieved from riser #2
 1/28/97 - 7:16:13 AM: Layer changed to: 1
 1/28/97 - 7:17:06 AM: END - Editing of tank Waste Data
 1/28/97 - 7:17:07 AM: -----
 1/28/97 - 7:17:39 AM: START - Editing of Tank Waste Data
 1/28/97 - 7:17:39 AM: Tank 241-AW-104 was selected for Pump, turbine retrieval.
 1/28/97 - 7:17:40 AM: LLCE will be retrieved from riser #1
 1/28/97 - 7:17:40 AM: Current tank waste data accepted without editing
 1/28/97 - 7:17:41 AM: END - Tank Waste Data Editing
 1/28/97 - 7:17:42 AM: -----
 1/28/97 - 7:17:48 AM: START - Changes to Geometry correction factors for Pump, turbine
 1/28/97 - 7:20:24 AM: New Record added for Isotope: 137CS At End Point: 14.9289

1/28/97 - 7:20:50 AM: END - Completed Geometry Correction factors
 1/28/97 - 7:20:50 AM: _____
 1/28/97 - 7:26:45 AM: Start - Completion of LLCE Data File
 1/28/97 - 7:26:46 AM: Data for Container #5 Saved to LLCE Data File
 1/28/97 - 7:26:47 AM: D-Code Chemical Limits Saved to LLCE Data File
 1/28/97 - 7:26:48 AM: Verified - Valid Gamma Isotope List is in LLCE Data File
 1/28/97 - 7:26:52 AM: Radionuclide Limits Saved to LLCE Data File
 1/28/97 - 7:26:56 AM: LLCE Data File Successfully Completed
 1/28/97 - 7:26:57 AM: _____
 1/28/97 - 7:28:52 AM: BEGIN - Start of edit of Radionuclide Physical Constants
 1/28/97 - 7:44:27 AM: END - end of edit of Radionuclide Physical Constants
 1/28/97 - 7:44:27 AM: _____
 1/28/97 - 7:44:36 AM: START - Begin edit of Radionuclide Regulatory Limits
 1/28/97 - 7:50:10 AM: END - End edit of Radionuclide Regulatory Limits
 1/28/97 - 7:50:11 AM: _____
 1/28/97 - 7:51:13 AM: START - CHANGES to D-Code Regulatory Limits
 1/28/97 - 7:52:17 AM: END - CHANGES to D-Code Regulatory Limits
 1/28/97 - 7:52:18 AM: _____
 1/28/97 - 7:52:23 AM: START - CHANGES to List of Valid Measured Gamma Radionuclides Follow:
 1/28/97 - 7:52:54 AM: END - CHANGES to List of Valid Measured Gamma Radionuclides Complete
 1/28/97 - 7:52:55 AM: _____
 1/31/97 - 7:48:07 AM: _____
 1/31/97 - 7:48:07 AM: START OF LLCECALC
 1/31/97 - 7:48:08 AM: _____
 1/31/97 - 7:48:08 AM: LLCE Data File Selected: c:\llcedata\test.edf
 1/31/97 - 7:48:09 AM: Gamma Assay File Selected: c:\llcecal\az13a.av2
 1/31/97 - 7:48:09 AM: _____
 1/31/97 - 8:07:25 AM: _____
 1/31/97 - 8:07:25 AM: START OF LLCECALC
 1/31/97 - 8:07:26 AM: _____
 1/31/97 - 8:07:27 AM: LLCE Data File Selected: c:\llcedata\test.edf
 1/31/97 - 8:07:27 AM: Gamma Assay File Selected: c:\llcecal\az13a.av2
 1/31/97 - 8:07:27 AM: _____
 1/31/97 - 8:07:38 AM: START - Analysis of Gamma Assay File
 1/31/97 - 8:07:39 AM: _____
 1/31/97 - 8:07:39 AM: Reading Gamma Assay Data File: az13a.av2
 1/31/97 - 8:07:55 AM: Gamma File: az13a.av2 was successfully read
 1/31/97 - 8:07:56 AM: 664 data records were read into Table 'RAWDATA'.
 1/31/97 - 8:07:56 AM: _____
 1/31/97 - 8:08:07 AM: Copying RAWDATA to Table GAMMADATA
 1/31/97 - 8:08:08 AM: _____
 1/31/97 - 8:08:08 AM: Converting Activity from Microcuries to Curies.
 1/31/97 - 8:08:09 AM: Make Sure That Position Measurements are Positive.
 1/31/97 - 8:08:09 AM: Max Position = 5.9004e+4 feet
 1/31/97 - 8:08:10 AM: Since this position > 1000 ft is assumed that measurements are in thousands of a feet
 1/31/97 - 8:08:10 AM: Correcting Database to position in feet.
 1/31/97 - 8:08:11 AM: Max Position (now): 5.9004e+1 feet
 1/31/97 - 8:08:11 AM: _____
 1/31/97 - 8:08:19 AM: START - Checking for Zero and Inconsistent Position Records.
 1/31/97 - 8:08:29 AM: Record: 1712560 Positions Not Uniform. Max: 4.9428e+1 Min: 4.8489e+1 Avg: 4.9139e+1 Set all to Min value: 4.8489e+1
 1/31/97 - 8:08:30 AM: Record: 1712580 Positions Not Uniform. Max: 5.0908e+1 Min: 5.0579e+1 Avg: 5.0661e+1 Set all to Min value: 5.0579e+1
 1/31/97 - 8:08:31 AM: Record: 1713000 Positions Not Uniform. Max: 5.0714e+1 Min: 5.0287e+1 Avg: 5.0588e+1 Set all to Min value: 5.0287e+1
 1/31/97 - 8:08:33 AM: Record: 1713030 Positions Not Uniform. Max: 5.1583e+1 Min: 5.1024e+1 Avg: 5.121e+1 Set all to Min value: 5.1024e+1
 1/31/97 - 8:08:34 AM: Record: 1713040 Positions Not Uniform. Max: 5.2802e+1 Min: 5.2195e+1 Avg: 5.2395e+1 Set all to Min value: 5.2195e+1
 1/31/97 - 8:08:34 AM: Record: 1713050 Positions Not Uniform. Max: 5.4021e+1 Min: 5.3351e+1 Avg: 5.3495e+1 Set all to Min value: 5.3351e+1
 1/31/97 - 8:08:35 AM: Record: 1713070 Positions Not Uniform. Max: 5.3428e+1 Min: 5.2995e+1 Avg: 5.3109e+1 Set all to Min value: 5.2995e+1
 1/31/97 - 8:08:36 AM: Record: 1713080 Positions Not Uniform. Max: 5.225e+1 Min: 5.187e+1 Avg: 5.1933e+1 Set all to Min value: 5.187e+1
 1/31/97 - 8:08:37 AM: Record: 1713090 Positions Not Uniform. Max: 5.2411e+1 Min: 5.2078e+1 Avg: 5.2363e+1 Set all to Min value: 5.2078e+1
 1/31/97 - 8:08:38 AM: Record: 1713100 Positions Not Uniform. Max: 5.3579e+1 Min: 5.3246e+1 Avg: 5.3528e+1 Set all to Min value: 5.3246e+1
 1/31/97 - 8:08:39 AM: Record: 1713110 Positions Not Uniform. Max: 5.4473e+1 Min: 5.4473e+1 Avg: 5.4473e+1 Set all to Min value: 5.4473e+1
 1/31/97 - 8:08:39 AM: Record: 1713120 Positions Not Uniform. Max: 5.5909e+1 Min: 5.5688e+1 Avg: 5.5771e+1 Set all to Min value: 5.5688e+1
 1/31/97 - 8:08:40 AM: Record: 1713150 Positions Not Uniform. Max: 5.6652e+1 Min: 5.66e+1 Avg: 5.6609e+1 Set all to Min value: 5.66e+1
 1/31/97 - 8:08:41 AM: Record: 1713160 Positions Not Uniform. Max: 5.5458e+1 Min: 5.5407e+1 Avg: 5.541e+1 Set all to Min value: 5.5407e+1
 1/31/97 - 8:08:42 AM: Record: 1713180 Positions Not Uniform. Max: 5.6516e+1 Min: 5.6459e+1 Avg: 5.6508e+1 Set all to Min value: 5.6459e+1
 1/31/97 - 8:08:43 AM: Record: 1713190 Positions Not Uniform. Max: 5.7739e+1 Min: 5.7684e+1 Avg: 5.7728e+1 Set all to Min value: 5.7684e+1
 1/31/97 - 8:08:44 AM: Record: 1713210 Positions Not Uniform. Max: 5.78e+1 Min: 5.7745e+1 Avg: 5.7749e+1 Set all to Min value: 5.7745e+1
 1/31/97 - 8:08:45 AM: Record: 1713220 Positions Not Uniform. Max: 5.6613e+1 Min: 5.656e+1 Avg: 5.6572e+1 Set all to Min value: 5.656e+1
 1/31/97 - 8:08:46 AM: Record: 1713230 Positions Not Uniform. Max: 5.6821e+1 Min: 5.6765e+1 Avg: 5.6805e+1 Set all to Min value: 5.6765e+1
 1/31/97 - 8:08:47 AM: Record ID 1711230 reads Zero Position. Prev: 1.4046e+1 Next: 1.4046e+1 Position Corrected to : 1.4046e+1
 1/31/97 - 8:08:48 AM: END - Position Check Complete.
 1/31/97 - 8:08:48 AM: _____

1/31/97 - 8:08:49 AM: START - Get Gamma Assay Record Start Points
 1/31/97 - 8:08:53 AM: Min Travel for this LLCE is 9.21e-1 ft, Max: 1.27e+0 ft, Avg: 1.2001e+0 ft
 1/31/97 - 8:08:54 AM: Deleting Record 1711200 since LLCE is not moving
 1/31/97 - 8:08:55 AM: Deleted Record 1711200 from table GammaData
 1/31/97 - 8:08:55 AM: Deleted Record 1711200 from table Positions
 1/31/97 - 8:08:56 AM: Deleting Record 1711210 since LLCE is not moving
 1/31/97 - 8:08:56 AM: Deleted Record 1711210 from table GammaData
 1/31/97 - 8:08:57 AM: Deleted Record 1711210 from table Positions
 1/31/97 - 8:08:58 AM: Deleting Record 1711220 since LLCE is not moving
 1/31/97 - 8:08:58 AM: Deleted Record 1711220 from table GammaData
 1/31/97 - 8:08:59 AM: Deleted Record 1711220 from table Positions
 1/31/97 - 8:08:59 AM: Deleting Record 1711230 since LLCE is not moving
 1/31/97 - 8:09:00 AM: Deleted Record 1711230 from table GammaData
 1/31/97 - 8:09:01 AM: Deleted Record 1711230 from table Positions
 1/31/97 - 8:09:01 AM: Deleting Record 1711240 since LLCE is not moving
 1/31/97 - 8:09:02 AM: Deleted Record 1711240 from table GammaData
 1/31/97 - 8:09:03 AM: Deleted Record 1711240 from table Positions
 1/31/97 - 8:09:03 AM: Deleting Record 1711250 since LLCE is not moving
 1/31/97 - 8:09:04 AM: Deleted Record 1711250 from table GammaData
 1/31/97 - 8:09:04 AM: Deleted Record 1711250 from table Positions
 1/31/97 - 8:09:05 AM: Deleting Record 1711280 since LLCE is not moving
 1/31/97 - 8:09:06 AM: Deleted Record 1711280 from table GammaData
 1/31/97 - 8:09:06 AM: Deleted Record 1711280 from table Positions
 1/31/97 - 8:09:07 AM: Deleting Record 1711290 since LLCE is not moving
 1/31/97 - 8:09:07 AM: Deleted Record 1711290 from table GammaData
 1/31/97 - 8:09:08 AM: Deleted Record 1711290 from table Positions
 1/31/97 - 8:09:09 AM: Deleting Record 1711300 since LLCE is not moving
 1/31/97 - 8:09:09 AM: Deleted Record 1711300 from table GammaData
 1/31/97 - 8:09:10 AM: Deleted Record 1711300 from table Positions
 1/31/97 - 8:09:10 AM: Deleting Record 1711310 since LLCE is not moving
 1/31/97 - 8:09:11 AM: Deleted Record 1711310 from table GammaData
 1/31/97 - 8:09:12 AM: Deleted Record 1711310 from table Positions
 1/31/97 - 8:09:12 AM: Deleting Record 1711320 since LLCE is not moving
 1/31/97 - 8:09:13 AM: Deleted Record 1711320 from table GammaData
 1/31/97 - 8:09:13 AM: Deleted Record 1711320 from table Positions
 1/31/97 - 8:09:14 AM: Deleting Record 1711340 since LLCE is not moving
 1/31/97 - 8:09:15 AM: Deleted Record 1711340 from table GammaData
 1/31/97 - 8:09:15 AM: Deleted Record 1711340 from table Positions
 1/31/97 - 8:09:16 AM: Deleting Record 1711350 since LLCE is not moving
 1/31/97 - 8:09:16 AM: Deleted Record 1711350 from table GammaData
 1/31/97 - 8:09:17 AM: Deleted Record 1711350 from table Positions
 1/31/97 - 8:09:18 AM: Deleting Record 1711370 since LLCE is not moving
 1/31/97 - 8:09:18 AM: Deleted Record 1711370 from table GammaData
 1/31/97 - 8:09:19 AM: Deleted Record 1711370 from table Positions
 1/31/97 - 8:09:19 AM: Deleting Record 1711380 since LLCE is not moving
 1/31/97 - 8:09:20 AM: Deleted Record 1711380 from table GammaData
 1/31/97 - 8:09:21 AM: Deleted Record 1711380 from table Positions
 1/31/97 - 8:09:21 AM: END - Find Detector Start Points
 1/31/97 - 8:09:22 AM: _____
 1/31/97 - 8:09:22 AM: START - Checking for Supereceded Records (Backward motion of LLCE)
 1/31/97 - 8:09:23 AM: Deleting Supereceded Record 1713220
 1/31/97 - 8:09:24 AM: Deleted Record 1713220 from table GammaData
 1/31/97 - 8:09:24 AM: Deleted Record 1713220 from table Positions
 1/31/97 - 8:09:25 AM: Deleting Supereceded Record 1713210
 1/31/97 - 8:09:26 AM: Deleted Record 1713210 from table GammaData
 1/31/97 - 8:09:26 AM: Deleted Record 1713210 from table Positions
 1/31/97 - 8:09:27 AM: Deleting Supereceded Record 1713200
 1/31/97 - 8:09:28 AM: Deleted Record 1713200 from table GammaData
 1/31/97 - 8:09:28 AM: Deleted Record 1713200 from table Positions
 1/31/97 - 8:09:29 AM: Record 1713220 is inserted :
 1/31/97 - 8:09:29 AM: In middle of Record 1713190
 1/31/97 - 8:09:30 AM: Record 1713190 new end position is now 5.656e+1 Activities have been reduced by 91.7559%
 1/31/97 - 8:09:31 AM: Deleting Supereceded Record 1713160
 1/31/97 - 8:09:31 AM: Deleted Record 1713160 from table GammaData
 1/31/97 - 8:09:32 AM: Deleted Record 1713160 from table Positions
 1/31/97 - 8:09:33 AM: Deleting Supereceded Record 1713150
 1/31/97 - 8:09:33 AM: Deleted Record 1713150 from table GammaData
 1/31/97 - 8:09:34 AM: Deleted Record 1713150 from table Positions
 1/31/97 - 8:09:34 AM: Deleting Supereceded Record 1713140
 1/31/97 - 8:09:35 AM: Deleted Record 1713140 from table GammaData
 1/31/97 - 8:09:36 AM: Deleted Record 1713140 from table Positions

1/31/97 - 8:09:36 AM: Deleting Supersceded Record 1713130
 1/31/97 - 8:09:37 AM: Deleted Record 1713130 from table GammaData
 1/31/97 - 8:09:38 AM: Deleted Record 1713130 from table Positions
 1/31/97 - 8:09:38 AM: Record 1713160 is inserted :
 1/31/97 - 8:09:39 AM: In middle of Record 1713120
 1/31/97 - 8:09:39 AM: Record 1713120 new end position is now 5.5407e+1 Activities have been reduced by 23.128%
 1/31/97 - 8:09:40 AM: Deleting Supersceded Record 1713080
 1/31/97 - 8:09:41 AM: Deleted Record 1713080 from table GammaData
 1/31/97 - 8:09:41 AM: Deleted Record 1713080 from table Positions
 1/31/97 - 8:09:42 AM: Deleting Supersceded Record 1713070
 1/31/97 - 8:09:43 AM: Deleted Record 1713070 from table GammaData
 1/31/97 - 8:09:44 AM: Deleted Record 1713070 from table Positions
 1/31/97 - 8:09:44 AM: Deleting Supersceded Record 1713060
 1/31/97 - 8:09:45 AM: Deleted Record 1713060 from table GammaData
 1/31/97 - 8:09:45 AM: Deleted Record 1713060 from table Positions
 1/31/97 - 8:09:46 AM: Deleting Supersceded Record 1713050
 1/31/97 - 8:09:47 AM: Deleted Record 1713050 from table GammaData
 1/31/97 - 8:09:47 AM: Deleted Record 1713050 from table Positions
 1/31/97 - 8:09:48 AM: Record 1713080 is inserted :
 1/31/97 - 8:09:49 AM: In middle of Record 1713040
 1/31/97 - 8:09:49 AM: Record 1713040 new end position is now 5.187e+1 Activities have been reduced by 27.754%
 1/31/97 - 8:09:50 AM: Deleting Supersceded Record 1713010
 1/31/97 - 8:09:50 AM: Deleted Record 1713010 from table GammaData
 1/31/97 - 8:09:51 AM: Deleted Record 1713010 from table Positions
 1/31/97 - 8:09:52 AM: Deleting Supersceded Record 1713000
 1/31/97 - 8:09:52 AM: Deleted Record 1713000 from table GammaData
 1/31/97 - 8:09:53 AM: Deleted Record 1713000 from table Positions
 1/31/97 - 8:09:54 AM: Deleting Supersceded Record 1712590
 1/31/97 - 8:09:54 AM: Deleted Record 1712590 from table GammaData
 1/31/97 - 8:09:55 AM: Deleted Record 1712590 from table Positions
 1/31/97 - 8:09:55 AM: Deleting Supersceded Record 1712580
 1/31/97 - 8:09:56 AM: Deleted Record 1712580 from table GammaData
 1/31/97 - 8:09:57 AM: Deleted Record 1712580 from table Positions
 1/31/97 - 8:09:57 AM: Record 1713010 is inserted :
 1/31/97 - 8:09:58 AM: In middle of Record 1712570
 1/31/97 - 8:09:59 AM: Record 1712570 new end position is now 4.9244e+1 Activities have been reduced by 38.013%
 1/31/97 - 8:09:59 AM: Deleting Supersceded Record 1712470
 1/31/97 - 8:10:00 AM: Deleted Record 1712470 from table GammaData
 1/31/97 - 8:10:01 AM: Deleted Record 1712470 from table Positions
 1/31/97 - 8:10:01 AM: Record 1712470 is inserted :
 1/31/97 - 8:10:02 AM: In middle of Record 1712360
 1/31/97 - 8:10:02 AM: Record 1712360 new end position is now 4.3981e+1 Activities have been reduced by 4.083%
 1/31/97 - 8:10:03 AM: Deleting Supersceded Record 1712330
 1/31/97 - 8:10:04 AM: Deleted Record 1712330 from table GammaData
 1/31/97 - 8:10:04 AM: Deleted Record 1712330 from table Positions
 1/31/97 - 8:10:05 AM: Deleting Supersceded Record 1712310
 1/31/97 - 8:10:06 AM: Deleted Record 1712310 from table GammaData
 1/31/97 - 8:10:06 AM: Deleted Record 1712310 from table Positions
 1/31/97 - 8:10:07 AM: Deleting Supersceded Record 1712300
 1/31/97 - 8:10:08 AM: Deleted Record 1712300 from table GammaData
 1/31/97 - 8:10:08 AM: Deleted Record 1712300 from table Positions
 1/31/97 - 8:10:09 AM: Deleting Supersceded Record 1712290
 1/31/97 - 8:10:10 AM: Deleted Record 1712290 from table GammaData
 1/31/97 - 8:10:10 AM: Deleted Record 1712290 from table Positions
 1/31/97 - 8:10:11 AM: Deleting Supersceded Record 1712260
 1/31/97 - 8:10:12 AM: Deleted Record 1712260 from table GammaData
 1/31/97 - 8:10:12 AM: Deleted Record 1712260 from table Positions
 1/31/97 - 8:10:13 AM: Deleting Supersceded Record 1712230
 1/31/97 - 8:10:13 AM: Deleted Record 1712230 from table GammaData
 1/31/97 - 8:10:14 AM: Deleted Record 1712230 from table Positions
 1/31/97 - 8:10:15 AM: Deleting Supersceded Record 1712220
 1/31/97 - 8:10:15 AM: Deleted Record 1712220 from table GammaData
 1/31/97 - 8:10:16 AM: Deleted Record 1712220 from table Positions
 1/31/97 - 8:10:17 AM: Deleting Supersceded Record 1712200
 1/31/97 - 8:10:17 AM: Deleted Record 1712200 from table GammaData
 1/31/97 - 8:10:18 AM: Deleted Record 1712200 from table Positions
 1/31/97 - 8:10:19 AM: Deleting Supersceded Record 1712120
 1/31/97 - 8:10:19 AM: Deleted Record 1712120 from table GammaData
 1/31/97 - 8:10:20 AM: Deleted Record 1712120 from table Positions
 1/31/97 - 8:10:21 AM: Record 1712120 is inserted :
 1/31/97 - 8:10:21 AM: In middle of Record 1712100

1/31/97 - 8:10:22 AM: Record 1712100 new end position is now 3.9791e+1 Activities have been reduced by 8.666%
 1/31/97 - 8:10:23 AM: Deleting Superseded Record 1711580
 1/31/97 - 8:10:23 AM: Deleted Record 1711580 from table GammaData
 1/31/97 - 8:10:24 AM: Deleted Record 1711580 from table Positions
 1/31/97 - 8:10:25 AM: Deleting Superseded Record 1711560
 1/31/97 - 8:10:25 AM: Deleted Record 1711560 from table GammaData
 1/31/97 - 8:10:26 AM: Deleted Record 1711560 from table Positions
 1/31/97 - 8:10:26 AM: Record 1711580 is inserted :
 1/31/97 - 8:10:27 AM: In middle of Record 1711520
 1/31/97 - 8:10:28 AM: Record 1711520 new end position is now 2.9095e+1 Activities have been reduced by 85.658%
 1/31/97 - 8:10:28 AM: END - Check for Superseded Records is Complete.

 1/31/97 - 8:10:29 AM:
 1/31/97 - 8:10:30 AM: START - Applying Geometry Correction Factors
 1/31/97 - 8:10:31 AM: Found Min Position: 6.2409e+0 ft, Max Dimension: 5.9004e+1 ft, Distance Measured: 5.2763e+1 ft
 1/31/97 - 8:11:07 AM: The Bottom Tip of the LLCE Corresponds to the End Crane Reading
 1/31/97 - 8:11:08 AM: Changing Postion Measurements so Zero (0) position represents tip of LLCE
 1/31/97 - 8:11:10 AM: Removing Record ID 1711120 because it's position is above mounting flange of LLCE
 1/31/97 - 8:11:10 AM: Removing Record ID 1711150 because it's position is above mounting flange of LLCE
 1/31/97 - 8:11:11 AM: Removing Record ID 1711160 because it's position is above mounting flange of LLCE
 1/31/97 - 8:11:12 AM: Geometry Correction Factors at end location 1.4929e+1 meters: Geom Cor1: 1, Geom Cor2: 1, Geom Cor3: 1
 1/31/97 - 8:11:12 AM: Correcting 137CS, Record 1711160, for Detector #1 Was: 2.121e-4 Now: 2.121e-4 curies
 1/31/97 - 8:11:13 AM: Correcting 137CS, Record 1711170, for Detector #1 Was: 5.794e-5 Now: 5.794e-5 curies
 1/31/97 - 8:11:13 AM: Correcting 137CS, Record 1711180, for Detector #1 Was: 1.376e-4 Now: 1.376e-4 curies
 1/31/97 - 8:11:14 AM: Correcting 137CS, Record 1711190, for Detector #1 Was: 1.476e-4 Now: 1.476e-4 curies
 1/31/97 - 8:11:15 AM: Correcting 137CS, Record 1711190, for Detector #1 Was: 2.186e-4 Now: 2.186e-4 curies
 1/31/97 - 8:11:15 AM: Correcting 137CS, Record 1711400, for Detector #1 Was: 1.873e-4 Now: 1.873e-4 curies
 1/31/97 - 8:11:16 AM: Correcting 137CS, Record 1711410, for Detector #1 Was: 2.181e-4 Now: 2.181e-4 curies
 1/31/97 - 8:11:16 AM: Correcting 137CS, Record 1711420, for Detector #1 Was: 9.601e-5 Now: 9.601e-5 curies
 1/31/97 - 8:11:17 AM: Correcting 137CS, Record 1711430, for Detector #1 Was: 8.66e-5 Now: 8.66e-5 curies
 1/31/97 - 8:11:18 AM: Correcting 137CS, Record 1711440, for Detector #1 Was: 2.037e-4 Now: 2.037e-4 curies
 1/31/97 - 8:11:18 AM: Correcting 137CS, Record 1711450, for Detector #1 Was: 7.78e-4 Now: 7.78e-4 curies
 1/31/97 - 8:11:19 AM: Correcting 137CS, Record 1711460, for Detector #1 Was: 1.368e-3 Now: 1.368e-3 curies
 1/31/97 - 8:11:19 AM: Correcting 137CS, Record 1711480, for Detector #1 Was: 3.164e-3 Now: 3.164e-3 curies
 1/31/97 - 8:11:20 AM: Correcting 137CS, Record 1711520, for Detector #1 Was: 3.8781e-4 Now: 3.8781e-4 curies
 1/31/97 - 8:11:20 AM: Correcting 137CS, Record 1712040, for Detector #1 Was: 8.545e-4 Now: 8.545e-4 curies
 1/31/97 - 8:11:21 AM: Correcting 137CS, Record 1712100, for Detector #1 Was: 1.454e-3 Now: 1.454e-3 curies
 1/31/97 - 8:11:22 AM: Correcting 137CS, Record 1712160, for Detector #1 Was: 1.908e-3 Now: 1.908e-3 curies
 1/31/97 - 8:11:22 AM: Correcting 137CS, Record 1712360, for Detector #1 Was: 1.0484e-3 Now: 1.0484e-3 curies
 1/31/97 - 8:11:23 AM: Correcting 137CS, Record 1712490, for Detector #1 Was: 1.225e-3 Now: 1.225e-3 curies
 1/31/97 - 8:11:23 AM: Correcting 137CS, Record 1712540, for Detector #1 Was: 1.169e-3 Now: 1.169e-3 curies
 1/31/97 - 8:11:24 AM: Correcting 137CS, Record 1712560, for Detector #1 Was: 1.043e-3 Now: 1.043e-3 curies
 1/31/97 - 8:11:25 AM: Correcting 137CS, Record 1713020, for Detector #1 Was: 7.373e-4 Now: 7.373e-4 curies
 1/31/97 - 8:11:25 AM: Correcting 137CS, Record 1713030, for Detector #1 Was: 1.966e-4 Now: 1.966e-4 curies
 1/31/97 - 8:11:26 AM: Correcting 137CS, Record 1713040, for Detector #1 Was: 5.5998e-4 Now: 5.5998e-4 curies
 1/31/97 - 8:11:26 AM: Correcting 137CS, Record 1713090, for Detector #1 Was: 7.351e-4 Now: 7.351e-4 curies
 1/31/97 - 8:11:27 AM: Correcting 137CS, Record 1713100, for Detector #1 Was: 8.393e-4 Now: 8.393e-4 curies
 1/31/97 - 8:11:28 AM: Correcting 137CS, Record 1713110, for Detector #1 Was: 8.241e-4 Now: 8.241e-4 curies
 1/31/97 - 8:11:28 AM: Correcting 137CS, Record 1713120, for Detector #1 Was: 7.2744e-4 Now: 7.2744e-4 curies
 1/31/97 - 8:11:29 AM: Correcting 137CS, Record 1713180, for Detector #1 Was: 9.313e-4 Now: 9.313e-4 curies
 1/31/97 - 8:11:29 AM: Correcting 137CS, Record 1713190, for Detector #1 Was: 1.6679e-4 Now: 1.6679e-4 curies
 1/31/97 - 8:11:30 AM: Correcting 137CS, Record 1713230, for Detector #1 Was: 1.03e-3 Now: 1.03e-3 curies
 1/31/97 - 8:11:31 AM: Correcting 137CS, Record 1713250, for Detector #1 Was: 9.324e-4 Now: 9.324e-4 curies
 1/31/97 - 8:11:31 AM: Correcting 137CS, Record 1713030, for Detector #3 Was: 4.543e-11 Now: 4.543e-11 curies
 1/31/97 - 8:11:32 AM: Correcting 137CS, Record 1713090, for Detector #3 Was: 2.419e-11 Now: 2.419e-11 curies
 1/31/97 - 8:11:32 AM: Correcting 137CS, Record 1713120, for Detector #3 Was: 1.5682e-11 Now: 1.5682e-11 curies
 1/31/97 - 8:11:33 AM: Correcting 137CS, Record 1713190, for Detector #3 Was: 4.8958e-12 Now: 4.8958e-12 curies
 1/31/97 - 8:11:34 AM: Correcting 137CS, Record 1713230, for Detector #3 Was: 3.165e-11 Now: 3.165e-11 curies
 1/31/97 - 8:11:34 AM: Correcting 137CS, Record 1713250, for Detector #3 Was: 5.908e-11 Now: 5.908e-11 curies
 1/31/97 - 8:11:35 AM: Correcting 137CS, Record 1713250, for Detector #3 Was: 4.94e-11 Now: 4.94e-11 curies
 1/31/97 - 8:11:35 AM: END - Applying Geometry Correction Factors

 1/31/97 - 8:11:36 AM:
 1/31/97 - 8:11:37 AM: START - Check for detector correction factors for 137Cs
 1/31/97 - 8:11:37 AM: Read from file C:\LLCE\CAL\Nlcecalc.ini Cor1 = 1 Cor2 = 1.165 Cor3 = 24790000
 1/31/97 - 8:11:38 AM: START - Estimate Detector Correction Factors
 1/31/97 - 8:11:39 AM: Detector 1 readings Found
 1/31/97 - 8:11:39 AM: Detector 2 readings Not Found
 1/31/97 - 8:11:40 AM: Detector 3 readings Found
 1/31/97 - 8:11:40 AM: Detector 3 Shielding Correction Factor estimated to be 2.7765e+7
 1/31/97 - 8:11:41 AM: END - Estimate Detector Correction Factors
 1/31/97 - 8:11:41 AM: Shielding Calibration Correction Factor will be 1 For Detector #1
 1/31/97 - 8:11:42 AM: Shielding Calibration Correction Factor will be 1.165 For Detector #2

1/31/97 - 8:11:43 AM: Shielding Calibration Correction Factor will be 27765004.9911328 For Detector #3
 1/31/97 - 8:11:44 AM: Correcting 137Cs for Detector #3, Record ID: 1713030, Was: 4.543e-11 Now: 1.2614e-3
 1/31/97 - 8:11:44 AM: Correcting 137Cs for Detector #3, Record ID: 1713090, Was: 2.419e-11 Now: 6.7164e-4
 1/31/97 - 8:11:45 AM: Correcting 137Cs for Detector #3, Record ID: 1713120, Was: 1.5682e-11 Now: 4.3541e-4
 1/31/97 - 8:11:45 AM: Correcting 137Cs for Detector #3, Record ID: 1713190, Was: 4.8958e-12 Now: 1.3593e-4
 1/31/97 - 8:11:46 AM: Correcting 137Cs for Detector #3, Record ID: 1713230, Was: 3.165e-11 Now: 8.7876e-4
 1/31/97 - 8:11:47 AM: Correcting 137Cs for Detector #3, Record ID: 1713240, Was: 5.908e-11 Now: 1.6404e-3
 1/31/97 - 8:11:47 AM: Correcting 137Cs for Detector #3, Record ID: 1713250, Was: 4.94e-11 Now: 1.3716e-3
 1/31/97 - 8:11:48 AM: END - Detector Correction factors Complete
 1/31/97 - 8:11:48 AM: -----
 1/31/97 - 8:11:49 AM: START - Looking For Missing Cs-137 Gamma Data (Gaps in Gamma Measurements)
 1/31/97 - 8:11:58 AM: Gap Found, Creating new Record: 1712493 Start: 1.201e+1 End: 1.3766e+1
 1/31/97 - 8:11:58 AM: Gap Found, Creating new Record: 1712163 Start: 1.6174e+1 End: 1.8226e+1
 1/31/97 - 8:11:59 AM: Gap Found, Creating new Record: 1712043 Start: 2.0309e+1 End: 2.2215e+1
 1/31/97 - 8:11:59 AM: Gap Found, Creating new Record: 1711523 Start: 2.3415e+1 End: 2.9909e+1
 1/31/97 - 8:12:00 AM: Gap Found, Creating new Record: 1711483 Start: 3.0081e+1 End: 3.2717e+1
 1/31/97 - 8:12:01 AM: Gap Found, Creating new Record: 1711463 Start: 3.3917e+1 End: 3.5237e+1
 1/31/97 - 8:12:01 AM: Gap found at Record 1712570 Start: 9.76e+0 End: 1.0515e+1
 1/31/97 - 8:12:02 AM: Gap found at Record 1712493 Start: 1.201e+1 End: 1.3766e+1
 1/31/97 - 8:12:03 AM: Gap found at Record 1712163 Start: 1.6174e+1 End: 1.826e+1
 1/31/97 - 8:12:03 AM: Gap found at Record 1712043 Start: 2.0309e+1 End: 2.2215e+1
 1/31/97 - 8:12:04 AM: Gap found at Record 1711523 Start: 2.3415e+1 End: 2.9909e+1
 1/31/97 - 8:12:04 AM: Gap found at Record 1711483 Start: 3.0081e+1 End: 3.2717e+1
 1/31/97 - 8:12:05 AM: Gap found at Record 1711463 Start: 3.3917e+1 End: 3.5237e+1
 1/31/97 - 8:12:05 AM: Gap found at Record 1711169 Start: 4.8658e+1 End: 4.8979e+1
 1/31/97 - 8:12:35 AM: User Chose to have the program estimate the content of Record: 1712570
 1/31/97 - 8:12:35 AM: Deleted Record 1712570 from table GammaData
 1/31/97 - 8:12:36 AM: Deleted Record 1712570 from table Positions
 1/31/97 - 8:12:37 AM: New Record 1715019 Created by program for Gap 1712570 Start: 9.76e+0 End: 1.0515e+1 Activity (ci/f): 2.5164e-3
 1/31/97 - 8:12:38 AM: User Chose to have the program estimate the content of Record: 1712493
 1/31/97 - 8:12:39 AM: Warning - Record ID: 1712493 Was Not Found in Table GammaData. Delete Record Failed
 1/31/97 - 8:12:40 AM: Deleted Record 1712493 from table Positions
 1/31/97 - 8:12:40 AM: New Record 1712539 Created by program for Gap 1712493 Start: 1.201e+1 End: 1.2888e+1 Activity (ci/f): 9.7423e-4
 1/31/97 - 8:12:41 AM: New Record 1712538 Created by program for Gap 1712493 Start: 1.2888e+1 End: 1.3766e+1 Activity (ci/f): 9.7437e-4
 1/31/97 - 8:12:44 AM: User Chose to have the program estimate the content of Record: 1712163
 1/31/97 - 8:12:45 AM: Warning - Record ID: 1712163 Was Not Found in Table GammaData. Delete Record Failed
 1/31/97 - 8:12:46 AM: Deleted Record 1712163 from table Positions
 1/31/97 - 8:12:46 AM: New Record 1712359 Created by program for Gap 1712163 Start: 1.6174e+1 End: 1.7217e+1 Activity (ci/f): 1.2923e-3
 1/31/97 - 8:12:47 AM: New Record 1712358 Created by program for Gap 1712163 Start: 1.7217e+1 End: 1.826e+1 Activity (ci/f): 1.655e-3
 1/31/97 - 8:12:56 AM: User Chose to have the program estimate the content of Record: 1712043
 1/31/97 - 8:12:56 AM: Warning - Record ID: 1712043 Was Not Found in Table GammaData. Delete Record Failed
 1/31/97 - 8:12:57 AM: Deleted Record 1712043 from table Positions
 1/31/97 - 8:12:58 AM: New Record 1712099 Created by program for Gap 1712043 Start: 2.0309e+1 End: 2.1262e+1 Activity (ci/f): 1.1204e-3
 1/31/97 - 8:12:58 AM: New Record 1712098 Created by program for Gap 1712043 Start: 2.1262e+1 End: 2.2215e+1 Activity (ci/f): 9.2863e-4
 1/31/97 - 8:13:00 AM: User Chose to have the program estimate the content of Record: 1711523
 1/31/97 - 8:13:01 AM: Warning - Record ID: 1711523 Was Not Found in Table GammaData. Delete Record Failed
 1/31/97 - 8:13:01 AM: Deleted Record 1711523 from table Positions
 1/31/97 - 8:13:02 AM: New Record 1712039 Created by program for Gap 1711523 Start: 2.3415e+1 End: 2.4497e+1 Activity (ci/f): 9.5696e-4
 1/31/97 - 8:13:03 AM: New Record 1712038 Created by program for Gap 1711523 Start: 2.4497e+1 End: 2.558e+1 Activity (ci/f): 1.1893e-3
 1/31/97 - 8:13:03 AM: New Record 1712037 Created by program for Gap 1711523 Start: 2.558e+1 End: 2.6662e+1 Activity (ci/f): 1.4216e-3
 1/31/97 - 8:13:04 AM: New Record 1712036 Created by program for Gap 1711523 Start: 2.6662e+1 End: 2.7744e+1 Activity (ci/f): 1.6539e-3
 1/31/97 - 8:13:05 AM: New Record 1712035 Created by program for Gap 1711523 Start: 2.7744e+1 End: 2.8827e+1 Activity (ci/f): 1.8862e-3
 1/31/97 - 8:13:05 AM: New Record 1712034 Created by program for Gap 1711523 Start: 2.8827e+1 End: 2.9909e+1 Activity (ci/f): 2.1185e-3
 1/31/97 - 8:13:07 AM: User Chose to have the program estimate the content of Record: 1711483
 1/31/97 - 8:13:08 AM: Warning - Record ID: 1711483 Was Not Found in Table GammaData. Delete Record Failed
 1/31/97 - 8:13:08 AM: Deleted Record 1711483 from table Positions
 1/31/97 - 8:13:09 AM: New Record 1711519 Created by program for Gap 1711483 Start: 3.0081e+1 End: 3.096e+1 Activity (ci/f): 2.3137e-3
 1/31/97 - 8:13:10 AM: New Record 1711518 Created by program for Gap 1711483 Start: 3.096e+1 End: 3.1838e+1 Activity (ci/f): 2.4151e-3
 1/31/97 - 8:13:10 AM: New Record 1711517 Created by program for Gap 1711483 Start: 3.1838e+1 End: 3.2717e+1 Activity (ci/f): 2.5165e-3
 1/31/97 - 8:13:16 AM: User Chose to have the program estimate the content of Record: 1711463
 1/31/97 - 8:13:17 AM: Warning - Record ID: 1711463 Was Not Found in Table GammaData. Delete Record Failed
 1/31/97 - 8:13:18 AM: Deleted Record 1711463 from table Positions
 1/31/97 - 8:13:18 AM: New Record 1711479 Created by program for Gap 1711463 Start: 3.3917e+1 End: 3.5237e+1 Activity (ci/f): 1.8702e-3
 1/31/97 - 8:13:20 AM: User Chose to have the program estimate the content of Record: 1711169
 1/31/97 - 8:13:21 AM: Warning - Record ID: 1711169 Was Not Found in Table GammaData. Delete Record Failed
 1/31/97 - 8:13:22 AM: Deleted Record 1711169 from table Positions
 1/31/97 - 8:13:22 AM: New Record 1711169 Created by program for Gap 1711169 Start: 4.8658e+1 End: 4.8979e+1 Activity (ci/f): 4.5694e-5
 1/31/97 - 8:13:23 AM: END - Looking For Missing Gamma Data Complete
 1/31/97 - 8:13:24 AM: -----
 1/31/97 - 8:13:25 AM: START - Calculate Cs-137 Curie Content for Tank Waste Layers
 1/31/97 - 8:13:26 AM: Layer #1 Cs-137 Content = 5.3029e-2 Ci.

1/31/97 - 8:13:27 AM: Cs-137 Content for all tank waste layers = 5.3029e-2 Ci.
 1/31/97 - 8:13:28 AM: END - Calculate Cs-137 Curie Content for Tank Waste Layers
 1/31/97 - 8:13:28 AM: -----
 1/31/97 - 8:14:28 AM: START - Analysis of LLCE Waste Characterization
 1/31/97 - 8:14:29 AM: -----
 1/31/97 - 8:14:29 AM: START - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 8:14:29 AM: -----
 1/31/97 - 8:14:30 AM: Converting mass units to grams and curies
 1/31/97 - 8:14:31 AM: New record generated in Tankchar table for 240PU. Layer Content is 5.883e-9 Ci.
 1/31/97 - 8:14:32 AM: Changed Content of 239PU Was: 0.000000166 Now: 0.00000026617 Ci.
 1/31/97 - 8:14:33 AM: Cleared out old calcs (if any)
 1/31/97 - 8:14:33 AM: Estimating the Content of each Radiochemical/Chemical in LLCE waste
 1/31/97 - 8:14:36 AM: END - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 8:14:37 AM: -----
 1/31/97 - 8:14:37 AM: START - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 8:14:39 AM: No SARP Limits have been exceeded.
 1/31/97 - 8:14:40 AM: SEP is not required for this waste package
 1/31/97 - 8:14:41 AM: END - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 8:14:41 AM: -----
 1/31/97 - 8:14:42 AM: START - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 8:14:43 AM: Volume for LLCE waste container: 5 is 2.7028e+1 m³
 1/31/97 - 8:14:45 AM: Cat 1 Sum of fractions is : 3.5736e-1
 1/31/97 - 8:14:46 AM: Cat 3 Sum of fractions is : 7.3316e-7
 1/31/97 - 8:14:46 AM: NRC Class C Sum of fractions is : 4.2747e-7
 1/31/97 - 8:14:47 AM: Cat 3 Noncombustable Limit Sum of fractions is : 1.2015e-7
 1/31/97 - 8:14:48 AM: LLCE waste is Category 1, LLMW
 1/31/97 - 8:14:49 AM: LLCE is suitable for near surface disposal (NRC C Fraction < 1)
 1/31/97 - 8:14:50 AM: Additional safety analysis is not required for near surface disposal. (NonComb Fraction <1)
 1/31/97 - 8:14:50 AM: END - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 8:14:51 AM: -----
 1/31/97 - 8:14:52 AM: START - Calculate for TRU
 1/31/97 - 8:15:12 AM: LLCE Weight is 2.e+3 kg.
 1/31/97 - 8:15:14 AM: LLCE waste is Low Level Mixed Waste (LLMW) since TRU fraction <1 (6.1617e-5)
 1/31/97 - 8:15:15 AM: LLCE waste is not Greater than NRC Class C since NRC fraction <1 (6.1617e-5)
 1/31/97 - 8:15:16 AM: END - Calculate for TRU
 1/31/97 - 8:15:17 AM: -----
 1/31/97 - 8:15:17 AM: START - Calculate PE-Ci for TRU waste
 1/31/97 - 8:15:18 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:15:19 AM: END - Calculate PE-Ci for TRU waste
 1/31/97 - 8:15:20 AM: -----
 1/31/97 - 8:15:21 AM: START - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 8:15:22 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:15:23 AM: END - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 8:15:23 AM: -----
 1/31/97 - 8:15:24 AM: START - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 8:15:25 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:15:26 AM: END - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 8:15:26 AM: -----
 1/31/97 - 8:15:27 AM: START - Calculate for Accountable Nuclear Material
 1/31/97 - 8:15:29 AM: LLCE waste does not contain accountable nuclear material.
 1/31/97 - 8:15:29 AM: END - Calculate for Accountable Nuclear Material
 1/31/97 - 8:15:30 AM: -----
 1/31/97 - 8:15:31 AM: START - Calculate heat generation rate of LLCE waste package
 1/31/97 - 8:15:33 AM: Total heat generated by LLCE waste is: 1.6481e-3 wats.
 1/31/97 - 8:15:34 AM: Internal Volume of selected Container LLCE-5 = 9.5449e+2 ft³
 1/31/97 - 8:15:35 AM: Heat Generation rate for this LLCE waste is 1.7267e-6 wats/R³
 1/31/97 - 8:15:36 AM: Heat Generation rate doesn't exceed 0.1 wats/R³
 1/31/97 - 8:15:36 AM: END - Calculate heat generation rate of LLCE waste package
 1/31/97 - 8:15:37 AM: -----
 1/31/97 - 8:15:38 AM: START - Calculate Transportation Category
 1/31/97 - 8:15:40 AM: A2 Fraction Sum = 1.7856e-2
 1/31/97 - 8:15:41 AM: EP-0063 Appendix L A2 Limit Fraction = 2.3206e-2
 1/31/97 - 8:15:41 AM: LLCE Waste Package is Type A Quantity.
 1/31/97 - 8:15:42 AM: DE-Ci Calculation is not required.
 1/31/97 - 8:15:43 AM: END- Calculate Transportation Category
 1/31/97 - 8:15:44 AM: -----
 1/31/97 - 8:15:44 AM: START - Calculate DE-Ci
 1/31/97 - 8:15:45 AM: DE-Ci Calculation is not required according to transportation category.
 1/31/97 - 8:15:46 AM: START - Calculate Hazardous Waste Codes
 1/31/97 - 8:15:48 AM: Hazardous waste codes F001-F005 apply to all LLCE.
 1/31/97 - 8:15:48 AM: No other Waste codes Apply.
 1/31/97 - 8:15:49 AM: END - Calculate Hazardous Waste Codes

1/31/97 - 8:15:50 AM: _____
 1/31/97 - 8:23:34 AM: _____
 1/31/97 - 8:23:34 AM: START OF LLCECALC
 1/31/97 - 8:23:35 AM: _____
 1/31/97 - 8:23:35 AM: LLCE Data File Selected: c:\llcedata\test.edf
 1/31/97 - 8:23:36 AM: Gamma File Data Present in LLCE Data File
 1/31/97 - 8:23:36 AM: _____
 1/31/97 - 8:24:57 AM: _____
 1/31/97 - 8:25:58 AM: START OF LLCECALC
 1/31/97 - 8:25:58 AM: _____
 1/31/97 - 8:25:59 AM: LLCE Data File Selected: c:\llcedata\test.edf
 1/31/97 - 8:25:59 AM: Gamma File Data Present in LLCE Data File
 1/31/97 - 8:26:00 AM: _____
 1/31/97 - 8:26:37 AM: START - Analysis of LLCE Waste Characterization
 1/31/97 - 8:26:38 AM: _____
 1/31/97 - 8:26:39 AM: START - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 8:26:39 AM: Converting mass units to grams and curies
 1/31/97 - 8:26:40 AM: Cleared out old calcs (if any)
 1/31/97 - 8:26:41 AM: Estimating the Content of each Radiochemical/Chemical In LLCE waste
 1/31/97 - 8:26:44 AM: END - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 8:26:44 AM: _____
 1/31/97 - 8:26:45 AM: START - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 8:26:47 AM: No SARP Limits have been exceeded.
 1/31/97 - 8:26:47 AM: SEP is not required for this waste package
 1/31/97 - 8:26:48 AM: END - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 8:26:48 AM: _____
 1/31/97 - 8:26:49 AM: START - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 8:26:50 AM: Volume for LLCE waste container: 5 is 2.7028e+1 m³
 1/31/97 - 8:26:52 AM: Cat 1 Sum of fractions is : 3.5736e-1
 1/31/97 - 8:26:52 AM: Cat 3 Sum of fractions is : 7.3316e-7
 1/31/97 - 8:26:53 AM: NRC Class C Sum of fractions is : 4.2747e-7
 1/31/97 - 8:26:54 AM: Cat 3 Noncombustible Limit Sum of fractions is : 1.2015e-7
 1/31/97 - 8:26:55 AM: LLCE waste is Category 1, LLMW
 1/31/97 - 8:26:55 AM: LLCE is suitable for near surface disposal (NRC C Fraction < 1)
 1/31/97 - 8:26:56 AM: Additional safety analysis is not required for near surface disposal. (NonComb Fraction < 1)
 1/31/97 - 8:26:57 AM: END - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 8:26:57 AM: _____
 1/31/97 - 8:26:58 AM: START - Calculate for TRU
 1/31/97 - 8:27:10 AM: LLCE Weight is 2.e+3 kg.
 1/31/97 - 8:27:13 AM: LLCE waste is Low Level Mixed Waste (LLMW) since TRU fraction <1 (6.1617e-5)
 1/31/97 - 8:27:14 AM: LLCE waste is not Greater than NRC Class C since NRC fraction <1 (6.1617e-5)
 1/31/97 - 8:27:14 AM: END - Calculate for TRU
 1/31/97 - 8:27:15 AM: _____
 1/31/97 - 8:27:16 AM: START - Calculate PE-Ci for TRU waste
 1/31/97 - 8:27:17 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:27:17 AM: END - Calculate PE-Ci for TRU waste
 1/31/97 - 8:27:18 AM: _____
 1/31/97 - 8:27:19 AM: START - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 8:27:20 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:27:20 AM: END - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 8:27:21 AM: _____
 1/31/97 - 8:27:22 AM: START - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 8:27:23 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:27:23 AM: END - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 8:27:24 AM: _____
 1/31/97 - 8:27:25 AM: START - Calculate for Accountable Nuclear Material
 1/31/97 - 8:27:26 AM: LLCE waste does not contain accountable nuclear material.
 1/31/97 - 8:27:27 AM: END - Calculate for Accountable Nuclear Material
 1/31/97 - 8:27:27 AM: _____
 1/31/97 - 8:27:28 AM: START - Calculate heat generation rate of LLCE waste package
 1/31/97 - 8:27:30 AM: Total heat generated by LLCE waste is: 1.6481e-3 watts.
 1/31/97 - 8:27:31 AM: Internal Volume of selected Container LLCE-5 = 9.5449e+2 ft³
 1/31/97 - 8:27:31 AM: Heat Generation rate for this LLCE waste is 1.7267e-6 watts/ft³
 1/31/97 - 8:27:32 AM: Heat Generation rate doesn't exceed 0.1 watts/ft³
 1/31/97 - 8:27:33 AM: END - Calculate heat generation rate of LLCE waste package
 1/31/97 - 8:27:34 AM: _____
 1/31/97 - 8:27:34 AM: START - Calculate Transportation Category
 1/31/97 - 8:27:36 AM: A2 Fraction Sum = 1.7856e-2
 1/31/97 - 8:27:37 AM: EP-0063 Appendix L A2 Limit Fraction = 2.3206e-2
 1/31/97 - 8:27:38 AM: LLCE Waste Package is Type A Quantity.
 1/31/97 - 8:27:38 AM: DE-Ci Calculation is not required.

1/31/97 - 8:27:39 AM: END - Calculate Transportation Category
 1/31/97 - 8:27:40 AM: _____
 1/31/97 - 8:27:41 AM: START - Calculate DE-CI
 1/31/97 - 8:27:43 AM: DE-CI Calculation is not required according to transportation category.
 1/31/97 - 8:27:43 AM: START - Calculate Hazardous Waste Codes
 1/31/97 - 8:27:43 AM: Hazardous waste codes F001-F005 apply to all LLCE.
 1/31/97 - 8:27:44 AM: No other Waste codes Apply.
 1/31/97 - 8:27:45 AM: END - Calculate Hazardous Waste Codes
 1/31/97 - 8:27:46 AM: _____
 1/31/97 - 8:32:01 AM: _____
 1/31/97 - 8:32:01 AM: START OF LLCECALC
 1/31/97 - 8:32:02 AM: _____
 1/31/97 - 8:32:03 AM: LLCE Data File Selected: c:\llce\data/test.edf
 1/31/97 - 8:32:03 AM: Gamma File Data Present in LLCE Data File
 1/31/97 - 8:32:04 AM: _____
 1/31/97 - 8:32:08 AM: START - Analysis of LLCE Waste Characterization
 1/31/97 - 8:32:08 AM: _____
 1/31/97 - 8:32:09 AM: START - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 8:32:09 AM: Converting mass units to grams and curies
 1/31/97 - 8:32:10 AM: Cleared out old calcs (if any)
 1/31/97 - 8:32:11 AM: Estimating the Content of each Radiochemical/Chemical in LLCE waste
 1/31/97 - 8:32:14 AM: END - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 8:32:14 AM: _____
 1/31/97 - 8:32:15 AM: START - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 8:32:17 AM: No SARP Limits have been exceeded.
 1/31/97 - 8:32:17 AM: SEP is not required for this waste package
 1/31/97 - 8:32:18 AM: END - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 8:32:18 AM: _____
 1/31/97 - 8:32:19 AM: START - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 8:32:20 AM: Volume for LLCE waste container: 5 is 2.7028e+1 m³
 1/31/97 - 8:32:22 AM: Cat 1 Sum of fractions is : 3.5736e-1
 1/31/97 - 8:32:22 AM: Cat 3 Sum of fractions is : 7.3316e-7
 1/31/97 - 8:32:23 AM: NRC Class C Sum of fractions is : 4.2747e-7
 1/31/97 - 8:32:24 AM: Cat 3 Noncombustible Limit Sum of fractions is : 1.2015e-7
 1/31/97 - 8:32:25 AM: LLCE waste is Category 1, LLMW
 1/31/97 - 8:32:25 AM: LLCE is suitable for near surface disposal (NRC C Fraction < 1)
 1/31/97 - 8:32:26 AM: Additional safety analysis is not required for near surface disposal. (NonComb Fraction < 1)
 1/31/97 - 8:32:27 AM: END - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 8:32:27 AM: _____
 1/31/97 - 8:32:28 AM: START - Calculate for TRU
 1/31/97 - 8:32:49 AM: LLCE Weight is 2.e+3 kg.
 1/31/97 - 8:32:52 AM: LLCE waste is Low Level Mixed Waste (LLMW) since TRU fraction <1 (6.1617e-5).
 1/31/97 - 8:32:53 AM: LLCE waste is not Greater than NRC Class C since NRC fraction <1 (6.1617e-5)
 1/31/97 - 8:32:53 AM: END - Calculate for TRU
 1/31/97 - 8:32:54 AM: _____
 1/31/97 - 8:32:55 AM: START - Calculate PE-CI for TRU waste
 1/31/97 - 8:32:56 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:32:56 AM: END - Calculate PE-CI for TRU waste
 1/31/97 - 8:32:57 AM: _____
 1/31/97 - 8:32:58 AM: START - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 8:32:59 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:32:59 AM: END - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 8:33:00 AM: _____
 1/31/97 - 8:33:01 AM: START - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 8:33:02 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:33:02 AM: END - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 8:33:03 AM: _____
 1/31/97 - 8:33:04 AM: START - Calculate for Accountable Nuclear Material
 1/31/97 - 8:33:05 AM: LLCE waste does not contain accountable nuclear material.
 1/31/97 - 8:33:06 AM: END - Calculate for Accountable Nuclear Material
 1/31/97 - 8:33:06 AM: _____
 1/31/97 - 8:33:07 AM: START - Calculate heat generation rate of LLCE waste package
 1/31/97 - 8:33:09 AM: Total heat generated by LLCE waste is: 1.6481e-3 watts.
 1/31/97 - 8:33:10 AM: Internal Volume of selected Container LLCE-5 = 9.5449e-2 ft³
 1/31/97 - 8:33:10 AM: Heat Generation rate for this LLCE waste is 1.7267e-6 watts/ft³
 1/31/97 - 8:33:11 AM: Heat Generation rate doesn't exceed 0.1 watts/ft³
 1/31/97 - 8:33:12 AM: END - Calculate heat generation rate of LLCE waste package
 1/31/97 - 8:33:12 AM: _____
 1/31/97 - 8:33:13 AM: START - Calculate Transportation Category
 1/31/97 - 8:33:15 AM: A2 Fraction Sum = 1.7856e-2
 1/31/97 - 8:33:16 AM: EP-0063 Appendix L A2 Limit Fraction = 2.3206e-2

1/31/97 - 8:33:16 AM: LLCE Waste Package is Type A Quantity.
 1/31/97 - 8:33:17 AM: DE-CI Calculation is not required.
 1/31/97 - 8:33:18 AM: END - Calculate Transportation Category

 1/31/97 - 8:33:18 AM:
 1/31/97 - 8:33:19 AM: START - Calculate DE-CI
 1/31/97 - 8:33:20 AM: DE-CI Calculation is not required according to transportation category.
 1/31/97 - 8:33:21 AM: START - Calculate Hazardous Waste Codes
 1/31/97 - 8:33:22 AM: Hazardous waste codes F001-F005 apply to all LLCE.
 1/31/97 - 8:33:23 AM: No other Waste codes Apply.
 1/31/97 - 8:33:24 AM: END - Calculate Hazardous Waste Codes

 1/31/97 - 8:33:24 AM:
 1/31/97 - 8:37:00 AM: START OF LLCECALC

 1/31/97 - 8:37:00 AM: START OF LLCECALC

 1/31/97 - 8:37:01 AM:
 1/31/97 - 8:37:01 AM: LLCE Data File Selected: c:\llce\data\test.edf
 1/31/97 - 8:37:02 AM: Gamma File Data Present in LLCE Data File

 1/31/97 - 8:37:03 AM:
 1/31/97 - 8:37:06 AM: START - Analysis of LLCE Waste Characterization

 1/31/97 - 8:37:07 AM:
 1/31/97 - 8:37:07 AM: START - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 8:37:08 AM: Converting mass units to grams and curies
 1/31/97 - 8:37:09 AM: Cleared out old calcs (if any)
 1/31/97 - 8:37:10 AM: Estimating the Content of each Radiochemical/Chemical in LLCE waste
 1/31/97 - 8:37:13 AM: END - Calculate Radiochemical/Chemical Content of LLCE Waste

 1/31/97 - 8:37:13 AM:
 1/31/97 - 8:37:14 AM: START - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 8:37:16 AM: No SARP Limits have been exceeded.
 1/31/97 - 8:37:16 AM: SEP is not required for this waste package
 1/31/97 - 8:37:17 AM: END - Calculate to see if SARP Limits are exceeded.

 1/31/97 - 8:37:18 AM:
 1/31/97 - 8:37:18 AM: START - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 8:37:19 AM: Volume for LLCE waste container: 5 is 2.7028e+1 m³
 1/31/97 - 8:37:21 AM: Cat 1 Sum of fractions is : 3.5735e-1
 1/31/97 - 8:37:22 AM: Cat 3 Sum of fractions is : 7.3316e-7
 1/31/97 - 8:37:23 AM: NRC Class C Sum of fractions is : 4.2747e-7
 1/31/97 - 8:37:23 AM: Cat 3 Noncombustible Limit Sum of fractions is : 1.2015e-7
 1/31/97 - 8:37:24 AM: LLCE waste is Category 1, LLMW
 1/31/97 - 8:37:25 AM: LLCE is suitable for near surface disposal (NRC C Fraction < 1)
 1/31/97 - 8:37:26 AM: Additional safety analysis is not required for near surface disposal. (NonComb Fraction < 1)
 1/31/97 - 8:37:27 AM: END - Calculate for Cat 1 and Cat 3 LLW

 1/31/97 - 8:37:27 AM:
 1/31/97 - 8:37:28 AM: START - Calculate for TRU
 1/31/97 - 8:37:33 AM: LLCE Weight is 2.e+3 kg.
 1/31/97 - 8:37:35 AM: LLCE waste is Low Level Mixed Waste (LLMW) since TRU fraction <1 (6.1617e-5)
 1/31/97 - 8:37:36 AM: LLCE waste is not Greater than NRC Class C since NRC fraction <1 (6.1617e-5)
 1/31/97 - 8:37:37 AM: END - Calculate for TRU

 1/31/97 - 8:37:38 AM:
 1/31/97 - 8:37:38 AM: START - Calculate PE-CI for TRU waste
 1/31/97 - 8:37:39 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:37:40 AM: END - Calculate PE-CI for TRU waste

 1/31/97 - 8:37:41 AM:
 1/31/97 - 8:37:41 AM: START - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 8:37:42 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:37:43 AM: END - Calculate Pu-239 FGE for TRU waste

 1/31/97 - 8:37:44 AM:
 1/31/97 - 8:37:45 AM: START - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 8:37:46 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 8:37:46 AM: END - Calculate Alpha Curie Content for TRU waste

 1/31/97 - 8:37:47 AM:
 1/31/97 - 8:37:48 AM: START - Calculate for Accountable Nuclear Material
 1/31/97 - 8:37:49 AM: LLCE waste does not contain accountable nuclear material.
 1/31/97 - 8:37:50 AM: END - Calculate for Accountable Nuclear Material

 1/31/97 - 8:37:51 AM:
 1/31/97 - 8:37:51 AM: START - Calculate heat generation rate of LLCE waste package
 1/31/97 - 8:37:53 AM: Total heat generated by LLCE waste is: 1.6481e-3 watts.
 1/31/97 - 8:37:54 AM: Internal Volume of selected Container LLCE-5 = 9.5449e+2 ft³
 1/31/97 - 8:37:55 AM: Heat Generation rate for this LLCE waste is 1.7267e-6 watts/ft³
 1/31/97 - 8:37:56 AM: Heat Generation rate doesn't exceed 0.1 watts/ft³
 1/31/97 - 8:37:57 AM: END - Calculate heat generation rate of LLCE waste package

 1/31/97 - 8:37:57 AM:
 1/31/97 - 8:37:58 AM: START - Calculate Transportation Category

1/31/97 - 8:38:00 AM: A2 Fraction Sum = 1.7856e-2
 1/31/97 - 8:38:01 AM: EP-0063 Appendix L A2 Limit Fraction = 2.3206e-2
 1/31/97 - 8:38:01 AM: LLCE Waste Package is Type A Quantity.
 1/31/97 - 8:38:02 AM: DE-CI Calculation is not required.
 1/31/97 - 8:38:03 AM: END - Calculate Transportation Category
 1/31/97 - 8:38:03 AM: -----
 1/31/97 - 8:38:04 AM: START - Calculate DE-CI
 1/31/97 - 8:38:05 AM: DE-CI Calculation is not required according to transportation category.
 1/31/97 - 8:38:06 AM: START - Calculate Hazardous Waste Codes
 1/31/97 - 8:38:07 AM: Hazardous waste codes F001-F005 apply to all LLCE.
 1/31/97 - 8:38:08 AM: No other Waste codes Apply.
 1/31/97 - 8:38:09 AM: END - Calculate Hazardous Waste Codes
 1/31/97 - 8:38:10 AM: -----
 1/31/97 - 9:11:26 AM: -----
 1/31/97 - 9:11:26 AM: START OF LLCECALC
 1/31/97 - 9:11:26 AM: -----
 1/31/97 - 9:11:27 AM: LLCE Data File Selected: c:\drive\llcecalc\steve.edf
 1/31/97 - 9:11:27 AM: Gamma File Data Present in LLCE Data File
 1/31/97 - 9:11:27 AM: -----
 1/31/97 - 9:11:29 AM: START - Analysis of LLCE Waste Characterization
 1/31/97 - 9:11:29 AM: -----
 1/31/97 - 9:11:29 AM: START - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 9:11:29 AM: Converting mass units to grams and curies
 1/31/97 - 9:11:29 AM: Cleared out old calcs (if any)
 1/31/97 - 9:11:29 AM: Estimating the Content of each Radiochemical/Chemical in LLCE waste
 1/31/97 - 9:11:30 AM: END - Calculate Radiochemical/Chemical Content of LLCE Waste
 1/31/97 - 9:11:30 AM: -----
 1/31/97 - 9:11:30 AM: START - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 9:11:31 AM: No SARP Limits have been exceeded.
 1/31/97 - 9:11:31 AM: SEP is not required for this waste package
 1/31/97 - 9:11:31 AM: END - Calculate to see if SARP Limits are exceeded.
 1/31/97 - 9:11:31 AM: -----
 1/31/97 - 9:11:32 AM: START - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 9:11:32 AM: Volume for LLCE waste container: 5 is 2.7028e+1 m³
 1/31/97 - 9:11:32 AM: Cat 1 Sum of fractions is : 3.5736e-1
 1/31/97 - 9:11:32 AM: Cat 3 Sum of fractions is : 7.3316e-7
 1/31/97 - 9:11:33 AM: NRC Class C Sum of fractions is : 4.2747e-7
 1/31/97 - 9:11:33 AM: Cat 3 Noncombustible Limit Sum of fractions is : 1.2015e-7
 1/31/97 - 9:11:33 AM: LLCE waste is Category 1, LLMW
 1/31/97 - 9:11:33 AM: LLCE is suitable for near surface disposal (NRC C Fraction < 1)
 1/31/97 - 9:11:33 AM: Additional safety analysis is not required for near surface disposal. (NonComb Fraction < 1)
 1/31/97 - 9:11:34 AM: END - Calculate for Cat 1 and Cat 3 LLW
 1/31/97 - 9:11:34 AM: -----
 1/31/97 - 9:11:34 AM: START - Calculate for TRU
 1/31/97 - 9:11:44 AM: LLCE Weight is 1.e+3 kg.
 1/31/97 - 9:11:45 AM: LLCE waste is Low Level Mixed Waste (LLMW) since TRU fraction < 1 (1.2323e-4)
 1/31/97 - 9:11:45 AM: LLCE waste is not Greater than NRC Class C since NRC fraction < 1 (1.2323e-4)
 1/31/97 - 9:11:45 AM: END - Calculate for TRU
 1/31/97 - 9:11:46 AM: -----
 1/31/97 - 9:11:46 AM: START - Calculate PE-CI for TRU waste
 1/31/97 - 9:11:46 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 9:11:46 AM: END - Calculate PE-CI for TRU waste
 1/31/97 - 9:11:46 AM: -----
 1/31/97 - 9:11:47 AM: START - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 9:11:47 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 9:11:47 AM: END - Calculate Pu-239 FGE for TRU waste
 1/31/97 - 9:11:47 AM: -----
 1/31/97 - 9:11:47 AM: START - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 9:11:48 AM: Since LLCE waste is not TRU this calculation is not required.
 1/31/97 - 9:11:48 AM: END - Calculate Alpha Curie Content for TRU waste
 1/31/97 - 9:11:48 AM: -----
 1/31/97 - 9:11:48 AM: START - Calculate for Accountable Nuclear Material
 1/31/97 - 9:11:49 AM: LLCE waste does not contain accountable nuclear material.
 1/31/97 - 9:11:49 AM: END - Calculate for Accountable Nuclear Material
 1/31/97 - 9:11:49 AM: -----
 1/31/97 - 9:11:49 AM: START - Calculate heat generation rate of LLCE waste package
 1/31/97 - 9:11:50 AM: Total heat generated by LLCE waste is: 1.6481e-3 watts.
 1/31/97 - 9:11:50 AM: Internal Volume of selected Container LLCE-5 = 9.5449e+2 ft³
 1/31/97 - 9:11:50 AM: Heat Generation rate for this LLCE waste is 1.7267e-6 watts/ft³
 1/31/97 - 9:11:50 AM: Heat Generation rate doesn't exceed 0.1 watts/ft³
 1/31/97 - 9:11:50 AM: END - Calculate heat generation rate of LLCE waste package

1/31/97 - 9:11:51 AM: -----
1/31/97 - 9:11:51 AM: START - Calculate Transportation Category
1/31/97 - 9:11:51 AM: A2 Fraction Sum = 1.7856e-2
1/31/97 - 9:11:51 AM: EP-0063 Appendix L A2 Limit Fraction = 2.3206e-2
1/31/97 - 9:11:52 AM: LLCE Waste Package is Type A Quantity.
1/31/97 - 9:11:52 AM: DE-CI Calculation is not required.
1/31/97 - 9:11:52 AM: END- Calculate Transportation Category

1/31/97 - 9:11:52 AM: START - Calculate DE-CI
1/31/97 - 9:11:53 AM: DE-CI Calculation is not required according to transportation category.
1/31/97 - 9:11:53 AM: START - Calculate Hazardous Waste Codes
1/31/97 - 9:11:53 AM: Hazardous waste codes F001-F005 apply to all LLCE.
1/31/97 - 9:11:53 AM: No other Waste codes Apply.
1/31/97 - 9:11:53 AM: END - Calculate Hazardous Waste Codes

1/31/97 - 9:11:54 AM: -----

DISTRIBUTION SHEET

To Distribution	From Packaging Engineering	Page 1 of 1
Project Title/Work Order Long-Length Contaminated Equipment Disposal Process Path Document (HNF-SD-WM-ER-730, Rev. 1)		Date Sept. 28, 1998
		EDT No. N/A ECN No. 646729

Name	MSIN	Text With All Attach.	Text Only	Attach./Appendix Only	EDT/ECN Only
R. M. Boger	S7-12	X			
D. W. Crass	R3-47	X			
C. DeFigh-Price	S7-21	X			
J. G. Field	H1-15	X			
W. H. Grams	R1-49	X			
G. P. Janicek	S7-12	X			
D. E. Legare	R3-47	X			
W. A. McCormick	H1-15	X			
R. J. Smith	H1-15	X			
HNF-SD-WM-ER-730 File	H1-15	X			
Central Files	B1-07	X			
DOE/RL Reading Room	H2-53	X			
Hanford Technical Library	P8-55	X			