Department of Energy
Albuquerque Operations Office
Waste Isolation Pilot Plant Project Office
P. O. Box 3090
Carlsbad, New Mexico 88221

AUG 27 1991

Ms. Judith M. Espinosa, Secretary
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Dear Ms. Espinosa:

Enclosed is the Program Plan for Certification of Idaho National Engineering Laboratory Contact-Handled Stored Transuranic Waste, WM-PD-88-011-4, dated May 1991, which received conditional approval in the Waste Acceptance Criteria Certification Committee (WACCC) meeting of July 24, 1991.

Please review this document and submit your comments within 30 days of this letter.

If you have any questions regarding this document, please contact Jerry Carr of my staff.

Sincerely,

Arlen Hunt
Project Manager

Enclosure

cc w/enclosure:
G. Gonzales, NMED (4)
P. McCasland, NMED/WIPP
C&C File

cc w/o enclosure:
B. Garcia, NMED
K. Sisneros, NMED
J. Lytle, DOE-HQ
M. Frei, DOE-HQ
R. Wise, DOE-WPO
J. Mewhinney, DOE-WPO
J. Carr, DOE-WPO
R. Farrell, WID
WACCC File

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Report No. WM-PD-88-011-4
Revised May 1991
Date:

INTERNAL TECHNICAL REPORT

Title: PROGRAM PLAN FOR CERTIFICATION OF INEL CONTACT-HANDLED STORED TRANSURANIC WASTE

Organization: Waste Management Operations Technical Support

Author: T. L. Clements, Jr.

Checked By: J. R. Bishoff
RWMC/SWEPP Operations Manager

Approved By: D. L. French
RWMC Manager

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SWEPP-CERT PLAN-1
Revised May 1991

PROGRAM PLAN FOR CERTIFICATION OF INEL CONTACT-HANDLED STORED TRANSURANIC WASTE

T. L. Clements, Jr.

May 1991

EG&G Idaho, Inc.
Idaho National Engineering Laboratory
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Idaho Operations Office
Under DOE Contract No. DE-AC07-76ID01570

PROGRAM PLAN

FOR

CERTIFICATION OF INEL CONTACT–HANDLED STORED TRU WASTE

APPROVALS

Revised by:	D. G. Pound Waste Management Operations Technical Support	5/21/91 Date
Reviewed by:	T. L. Clements, Jr., Manager Waste Management Operations Technical Support	5/22/91 Date
	J. R. Bishoff, Manager RWMC Operations	5/23/91 Date
Approved by:	D. L. French, Manager Radioactive Waste Management Complex Facility	5/23/91 Date

DOE/ID Approval Letter – S. T. Hinschberger to T. L. Clements, Jr. 6/04/91.

NOTE: Original signatures and changes appears on DRR WM–4005, WM–RS–020 and WM–RS–142

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PROGRAM PLAN FOR CERTIFICATION OF INEL CONTACT–HANDLED STORED TRU WASTE

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the methods that will be used by the Idaho National Engineering Laboratory (INEL) to certify contact–handled stored transuranic (TRU) waste for shipment to the Waste Isolation Pilot Plant (WIPP). Transuranic waste packages will be retrieved from interim storage pads and nondestructively examined in the Stored Waste Examination Pilot Plant (SWEPP). Waste packages that meet the WIPP–Waste Acceptance Criteria (WIPP–WAC) will be placed in certified storage for future shipment to WIPP. Waste packages that do not meet the WIPP–WAC will be returned to storage until the waste can be processed or otherwise certified.

1.2 Certification Requirements

This certification program plan has been prepared in accordance with the latest approved issues of the following documents:

- TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant, WIPP–DOE–069.
- TRU Waste Certification Compliance Requirements for Contact–Handled Wastes Retrieved from Storage for Shipment to the WIPP, WIPP–DOE–137.
- Quality Assurance Requirements for Certification of TRU Waste for Shipment to the Waste Isolation Pilot Plant, WIPP–DOE–120.
- Data Package Format for Certified Transuranic Waste for the Waste Isolation Pilot Plant, WIPP–DOE–157.
- INEL Transuranic Waste Acceptance Criteria, IDO–10074, Current Revision.

1.3 Certification Plan Scope and Organization

This certification plan delineates the methods that will be used to certify INEL stored TRU waste. The plan includes a descriptive history of the INEL Transuranic Storage Area (TSA) and facilities, administrative controls for TRU waste, waste certification, and a description of the nondestructive examination techniques used in SWEPP to certify waste. This certification plan also includes an attachment that identifies the methods used for certification, a description of each certifiable waste form, and identifies the operating documents and procedures that control each certification step.

2. BACKGROUND

2.1 Site History

The Idaho National Engineering Laboratory (INEL) covers 894 square miles of semiarid land in southeast Idaho near the center of the eastern Snake River Plain. The Radioactive Waste Management Complex (RWMC) encompasses approximately 144 acres in the southwestern corner of the INEL. The RWMC was established in 1952 as a controlled area for burial of solid radioactive wastes generated by INEL operations. In 1954, the burial ground was also designated as a solid transuranic (TRU) waste disposal site for offsite generated waste. Until 1970, all TRU waste was buried below grade at the RWMC. In November 1970, the Transuranic Storage Area (TSA) was established for retrievable storage of waste contaminated with greater than 10 nCi of transuranic activity per gram of waste. The waste is stored above ground on asphalt pads within the TSA. The definition of transuranic waste was recently changed to be waste contaminated with greater than 100 nCi of transuranic activity per gram of waste.[1]

2.2 Sources of TRU Waste

Transuranic wastes stored at TSA are generated by operations conducted for the U.S. Atomic Energy Commission and its successor agencies, now the U.S. Department of Energy (DOE). The following facilities have generated the majority of TRU wastes placed in storage at TSA: Mound Laboratory, Miamisburg, Ohio; Battelle Columbus Laboratories, Columbus, Ohio; Bettis Atomic Power Laboratory, West Mifflin, Pennsylvania; Argonne National Laboratory–East, Argonne, Illinois; and the Rocky Flats Plant, Golden, Colorado. Small volumes of TRU wastes have also been generated by INEL operations. In addition, the INEL Initial Drum Retrieval (IDR) and Early Waste Retrieval (EWR) projects have contributed to wastes placed in storage at TSA.

3. SITE DESCRIPTION

The RWMC, Figure 1, consists of two main areas, the Subsurface Disposal Area (SDA) and the Transuranic Storage Area (TSA). SWEPP is located within the TSA. Solid waste generated by INEL operations and wastes received from offsite generators are routed to smaller specialized locations within these areas depending on content and packaging. In addition, support facilities are provided for the administrative, operational, and utility requirements of the RWMC.

3.1 Subsurface Disposal Area (SDA)

The SDA is a fenced 88–acre area surrounded by a flood control dike and drainage channel. Although the SDA contains some TRU waste previously authorized for burial, the SDA is currently devoted to pit and soil–vault disposal of nontransuranic solid waste. The SDA has been the site for two waste retrieval study programs, one within the original 10–acre burial ground for pre–1964 wastes (EWR) and another for drum–packaged wastes buried between 1968 and 1969 (IDR). Recovered TRU waste from these studies is stored on the Transuranic Storage Area Retrieval (TSA–R) pad in the TSA. Surface disposal of waste with less than 10 nCi/gram waste of transuranic radionuclides began in 1972 with the establishment of the Transuranic Disposal Area (TDA) pad, now known as Pad A, within the SDA. The TDA was operational until 1979.

3.2 Transuranic Storage Area (TSA)

The TSA is a 55–acre area located adjacent to the SDA along its east boundary. Enclosed by a 7–ft security fence, it was originally used for retrievable storage of waste contaminated with greater than 10 nCi of transuranic activity/gram of waste. This limit has been changed to greater than 100 nCi of transuranic activity/gram of waste, as defined in DOE Order 5820.2.[1] This area has the following specialized storage locations:

- TSA–1 and TSA–2 asphalt surface storage pads
- TSA–3 storage pad for examined wastes
- TSA–R asphalt storage pad
- An Intermediate–Level Transuranic Storage Facility (ILTSF).

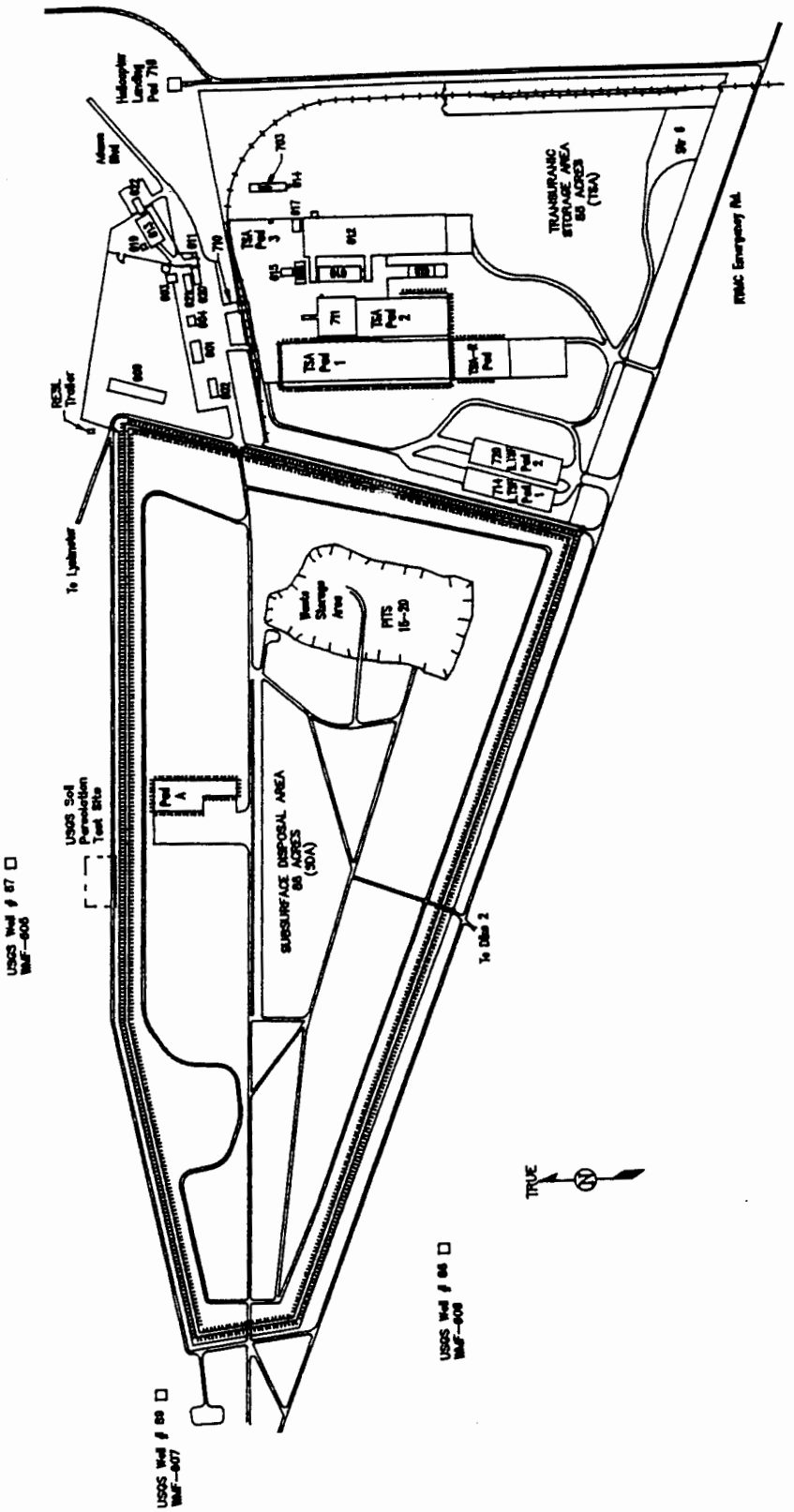

Figure 1. Radioative Waste Managment Complex.

3.2.1 TSA-1 and TSA-2. These two surface storage pads provided retrievable storage for contact-handled TRU waste. TSA-1 was filled and closed in 1975. A portion of TSA-2 was filled, closed, and also provided with internal environmental monitoring. The remainder of TSA-2 is currently being used for TRU waste stored under the protective environmental cover provided by an Air Support Weather Shield (ASWS).

Waste was packaged in DOT 7A fiberglass-reinforced polyester-coated (FRP) plywood boxes, DOT 7A steel bins (M-III bins), and DOT 6M and 17C 55-gal steel drums. The bins were placed around the perimeter of an area called a "cell," which served as a boundary, retaining wall, and load-bearing surface. The cell is typically 100 x 128 ft. Each cell on the pad is isolated from the adjacent cell by a 2- to 4-ft-thick earth firewall. The steel drums occupy the space within the cell boundary and were stacked 5 high (approximately 15 ft high). After a cell was filled with waste containers, it was covered with 5/8-in.-thick plywood, 20-mil nylon-reinforced polyvinyl sheeting, and 2 to 3 feet of soil seeded with sod-building grass to provide drainage and erosion protection.

3.2.2 TSA-3. The asphalt pad is used to support SWEPP operations. A Certified and Segregated (C&S) Waste Storage Building (WMF-612) is located on TSA-3 to temporarily store all waste containers examined in SWEPP. This building is also used for storage of certified waste received from offsite waste generators.

3.2.3 TSA-R. The TSA-R is a 150- x 430-ft asphalt pad used to store TRU waste retrieved during the Initial Drum Retrieval (IDR) and Early Waste Retrieval (EWR) projects. The TRU waste from the EWR project is contained in DOT 7A steel bins stacked two high to form the Cell-1 perimeter boundary. The TRU waste from the IDR project is contained in 55- and 83-gal drums, which were placed in metal cargo carriers stacked two high within this boundary. The containers are covered with 4- x 12-in. by 16-ft-long planks, 1/4-in. plywood, polyethylene sheeting, and 2 to 3 ft of soil seeded with a sod-building grass. A second cell has been used to store FRP boxes, SAND boxes, and M-III bins. The containers have been covered with a waterproof fabric for weather protection.

3.2.4 ILTSF. The ILTSF, constructed in 1976, provides earth-shielded storage for intermediate-level (200 mR/hr to 4500 R/hr) remote-handled (RH) TRU waste. The vaults are embedded in a compacted earth berm 88 ft wide by 352 ft long. The berm is elevated approximately 5 ft above grade, asphalt surfaced on top, and sloped to preclude flooding around the vault covers. The pipe vaults, which are up to 30 ft long, are watertight. An asphalt road permits heavy equipment to be used during waste unloading and retrieval operations. Waste stored at ILTSF will not be addressed further in this document.

3.3 Support Facilities

3.3.1 Buildings. Nine buildings are clustered adjacent to the SDA and TSA in the northeast corner of the RWMC. Building WMF-601 houses the Health Physics offices and material storage areas. Building WMF-602 is an operations support facility. Building WMF-603 houses the domestic and firewater supply systems and the standby generator. The personnel change areas and lunchroom are located in building WMF-604. The Heavy Equipment Storage Shed (HESS), building WMF-609, provides weather protection for most of the mobile equipment. Building WMF-611 is the guard house at the entrance to the RWMC. Building WMF-613 provides additional office space for RWMC/SWEPP support personnel. Building WMF-620/621 provides the access control to the area and office space for the RWMC operations staff.

3.3.2 Railroad Spur. A single track railroad spur from the Union Pacific Railroad Mackay line permits direct rail shipments from offsite generators to the TSA. The dual track siding at the TSA provides some limited switching capability.

3.3.3 Stored Waste Examination Pilot Plant (SWEPP). The main purpose of the SWEPP facility is to certify contact-handled TRU waste stored in TSA-1, TSA-2, and TSA-R. It was constructed within the existing TSA, along with a covered asphalt pad for storage of certified waste until WIPP is operational. The SWEPP building, WMF-610, houses the SWEPP examination equipment, Data Management System (DMS) equipment and offices for SWEPP operations personnel. Waste drums are vented in building WMF-615 prior to being examined in the SWEPP building. The Maintenance Support building, WMF-617, provides maintenance facilities for SWEPP equipment. The SWEPP auxiliary building, WMF-616 provides storage space for miscellaneous equipment. The TRUPACT-II loading station, WMF-618, is used to load waste containers into the TRUPACT for shipment from the RWMC to WIPP.

4. ADMINISTRATIVE CONTROLS FOR TRU WASTE

4.1 RWMC Documentation System

The RWMC documentation system is an extension of the requirements, general policies, and procedures established in the EG&G Idaho Resource Manual. Other EG&G manuals and lower–tier documentation describe the policies and procedures in more detail for specific functions. Based upon complexity and other factors where the policy information must be expanded or documented further, additional written procedures or plans are developed. The RWMC documentation flow chart is shown in Figure 2.

Of specific interest to the SWEPP program are the EG&G Safety, Quality, and Radiological Controls Manuals.

The EG&G Safety Manual stipulates the company safety policies by presenting or providing reference to those safety codes, standards, regulations, procedures, and guidelines necessary to implement the safety policies. Each operating group prepares a Safety Assessment Document and/or Safety Analysis Report to document the safety aspects of the operation. The group also prepares a set of Operational Safety Requirements, stipulating controls and limits associated with safe operation, and Emergency Action Manuals describing the organization, training, and responsibilities for emergency procedures and guidelines. The requirements in these documents provide the basic safety requirements that must be addressed when preparing Standard Practices, Project Directives, and Operating Procedures.

The EG&G Quality Manual stipulates the requirements and organizational responsibility for each major element of EG&G's Quality Assurance Program. RWMC prepares a Quality Program Plan (QPP) that invokes the applicable requirements of the EG&G Quality Manual. The QPP is implemented by subtier documents such as the EG&G Idaho, Inc. Company Procedures Manual, RWMC/SWEPP Project Directives (PDs) and Operating Procedures (OPs).

The specific responsibilities and procedures for RWMC are defined in the Project Directives and the Waste Packaging Criteria. A Project Directive (PD) is a formal written procedure or directive documenting a requirement or operational function within the RWMC. The PDs are used to establish responsibilities and implement specific Operating and Maintenance Manuals, Engineering Drawings and Specifications, Operating Procedures, Equipment Specifications, and Manuals, Reports, and Logs.

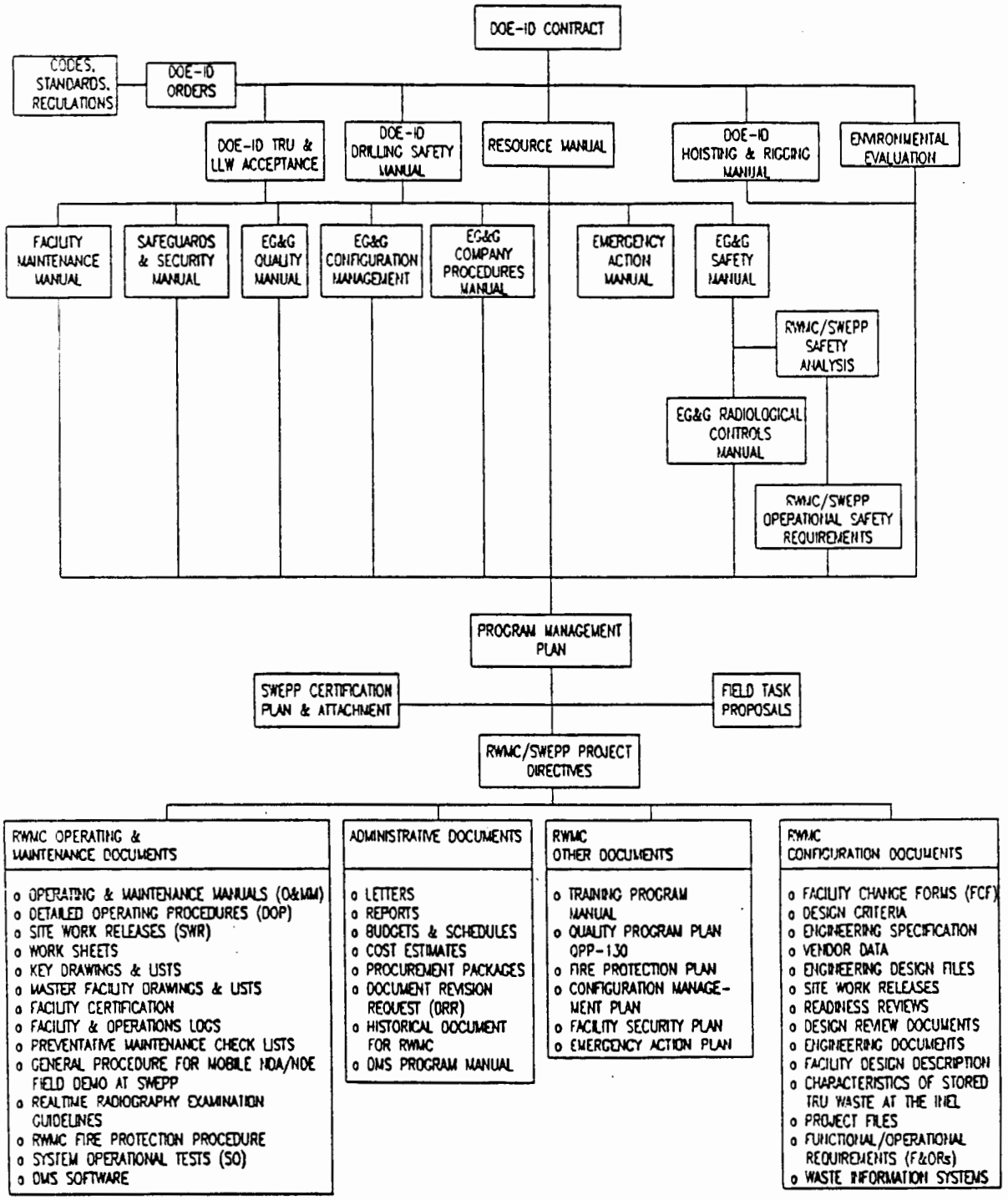

Figure 2. RWMC Documentation.

4.2 INEL Waste Packaging Criteria

The criteria defining the packaging of TRU waste were initially based on the requirements imposed by the Department of Transportation (DOT) for the transport of waste materials. The INEL Waste Acceptance Criteria were initially defined in meetings with each waste generator. At a later date, these agreements were verified and formalized with letters of agreement. In 1978 these letters were the basis for a formal packaging criteria document. This document[2] has since been revised to include the WIPP–WAC requirements plus those requirements necessary for interim storage at the INEL.

4.3 Waste Management Information System

Since January 1971, the computerized Waste Management Information System (WMIS) has been used for input, storage, compilation, and presentation of data on INEL radioactive airborne, liquid, and solid waste. This system serves as the official record of all types of radioactive wastes stored or buried at the RWMC. The WMIS is an interactive system and is updated monthly. These reports present the waste data for each generating site for the radioactive airborne, liquid, and solid waste categories. Included in these data are the quantity of radioactivity, each nuclide present, the percentage of total activity contributed by that nuclide, and the concentration of that nuclide in liquid and airborne effluents. Two reports are issued monthly:

- "INEL Summary Reports"—the volume and total radioactivity for airborne, liquid, and solid waste in both disposed and stored categories

- "Radionuclide Waste Containers Disposed/ Stored at INEL"—the number of each type of container used for solid waste by area and building number.

In addition to these routine reports, a special data run giving a listing of solid waste received at RWMC during a specified time period by disposal or storage location is available. This run provides an inventory listing for each disposal pit, trench, or storage area. Solid waste data since January 1971 are available in the WMIS. In addition, waste shipment documents from 1960–1970 have been reviewed, and a secondary WMIS data file has been generated for that period. Pre–1960 data, when available, have also been entered in the data file.

4.4 Transuranic Waste Management Information System (TWMIS)

Prior to March 1984, the Transuranic Contaminated Waste Container Information System (TCWCIS) was in use. It contained stored waste data which extended to the latter portion of 1971. In March 1984, the Certified Waste Data Base (CWDB) was developed to maintain container data required by the Waste Isolation Pilot Plant (WIPP). All TCWCIS data was transferred to the CWDB.

In February 1987 the Transuranic Waste Management Information System (TWMIS) was established. At this time the CWDB was renamed Transuranic Waste Data Base (TWDB) to better represent the data residing in the data base and a new Certified Waste Data Base (CWDB) was established to store data only on WIPP Certified Waste. The TWMIS consists of the TWDB, the CWDB, and the SWEPP Data Management System (DMS), the Load Management System (LMS), the SWEPP Tracking System, and the archive (RKIVE) Data Base.

Information on all TRU waste sent to the INEL for storage and/or certification is placed in the TWDB. Data from certified waste containers received from offsite generators are transferred directly from the TWDB to the CWDB.

As each container is either retrieved or received from offsite generators, a facility bar code is installed for tracking the container location within the facility and the information is stored on the SWEPP tracking system.

Information stored in the TWDB is transferred to the SWEPP–DMS prior to the certification examination. Data obtained during the certification examination are entered into the SWEPP–DMS. The data from the containers certified by SWEPP for shipment to WIPP are transferred to the CWDB.

The Load Management System (LMS) accesses the data on the CWDB and evaluates a group of containers with respect to the TRUPACT–II shipping requirements or limits. Based on the container data, the LMS determines the loading configuration for a given waste shipment.

Data required for preparation of the WIPP Data Package are available from the CWDB. The WIPP facility is able to access the CWDB.

Information on all containers examined by SWEPP is stored in the SWEPP RKIVE Data Base and provides information for containers which are designated for Low-Level Waste (LLW), PREPP, and special case.

5. STORED WASTE EXAMINATION PILOT PLANT (SWEPP) DESCRIPTION

The SWEPP process description presented in this section is for familiarization and general information only.

5.1 Purpose and General Description of SWEPP

The purpose of SWEPP is to provide capabilities for the nondestructive examination and certification of INEL stored transuranic wastes. Waste packages containing less than 100 nCi of transuranic activity per gram of waste will be disposed of as low–level waste. These capabilities include overpacking of breached or damaged waste containers, container integrity examination, weighing, radiographic examination(s), fissile inventory examination, radiological surveys, labeling, and loading of waste containers. If a waste package meets all the WIPP–WAC, the package will be stored until it can be shipped to the WIPP for disposal. Waste packages not meeting the WIPP–WAC will be processed or placed in storage until the waste can be examined or otherwise certified.

Other SWEPP activities include retrieval of stored waste packages from the TSA, venting of waste containers, storage of certified and noncertifiable waste, and preparation and shipment of certified waste to WIPP.

5.2 SWEPP Operations

The following sections describe the various SWEPP operations. Figure 3 is a flow diagram depicting these operations.

5.2.1 Waste Retrieval.

5.2.1.1 Drum Venting. The overburden soil, plastic, and wood will be removed during retrieval operations to expose the stored waste containers. During retrieval of the waste containers, drums will be transported to the drum venting station for venting. Drums are vented with a device that does not invalidate the waste container type A certification.[7]

As the containers are removed from the stack, any containers determined visually to be damaged and whose ability to withstand the rigors of the examination process in question will be "overpacked." The term damaged container generally includes excessive corrosion, breached containers, or any other evidence of potential leakage. Boxes, other than Standard Waste Boxes (SWB), will be processed to repackage the waste in a TRUPACT–II compatible container.

5.2.1.2 Container Survey. Each waste container is surveyed by Health Physics (HP) technicians. The survey consists of legal smears of the container surface, as well as a measurement of the radiation level.

Containers that exceed 50 picocuries (110 dpm) per 100 cm^2 for alpha–emitting isotopes and 450 picocuries (1000 dpm) per 100 cm^2 for beta–gamma emitting isotopes will be overpacked in the retrieval area and thereafter will be handled like any other container. Those that exceed 200 mRem/hr will be immediately moved to an interim storage area to await special handling.

5.2.1.3 Head–End Storage. The vented drums; the boxes, bins, and drums not requiring venting; and the overpacked containers will be transported from the retrieval area to head–end storage. Typically the drums, boxes, and bins will be moved by forktruck or trailer to the storage area.

5.2.2 SWEPP Building.

5.2.2.1 Data Management System. Upon receipt at the weigh station, an electronically–read "bar code" label on each drum is scanned. The bar code label only has a number on it and is used to preclude container identification mistakes during examination in SWEPP. The bar code and the container serial number are entered into the Data Management System (DMS) via a remote terminal. Thereafter, the electronically–read label is used to ensure correct identification of the container throughout the examination process.

The computer–based DMS provides record–keeping support for the waste containers being processed. The DMS acquires and stores data from the inspection stations, communicates with remote terminals and a remote data base, and generates the appropriate documentation. The DMS interfaces via CWDB with the WIPP data system to permit transferring data package information.

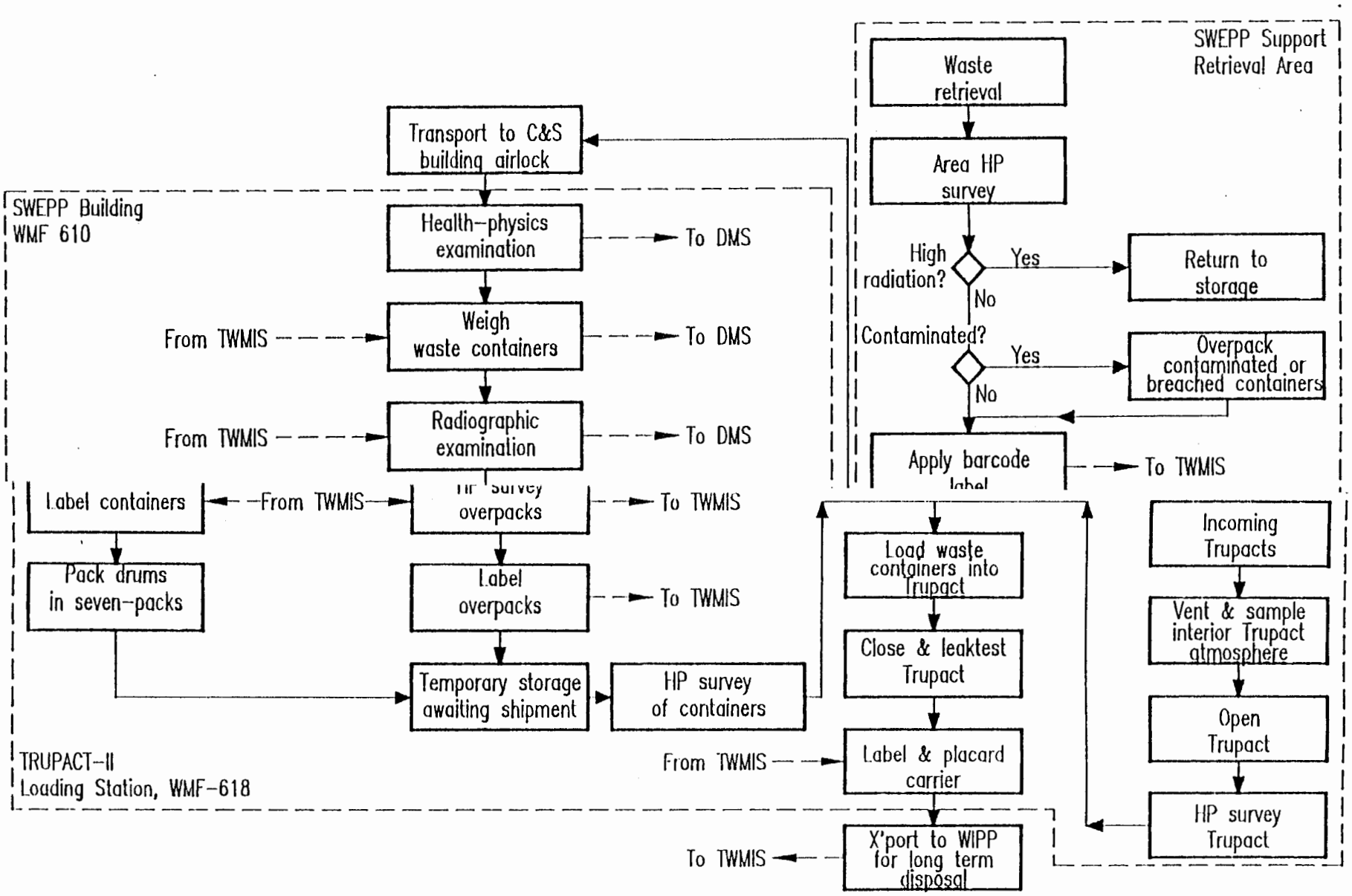

Figure 3. SWEPP Process Flow Diagram.

5.2.2.2 Health Physics Survey Station. A contamination and radiation check is performed at this station. The examination consists of a smear of the surface as well as a measurement of the gamma and neutron dose rate. The smears are counted for beta-gamma and alpha contamination. Containers that exceed 50 picocuries (110 dpm) per 100 cm^2 for alpha-emitting isotopes or 450 picocuries (1000 dpm) per 100 cm^2 for beta-gamma emitting isotopes are decontaminated, if possible, or overpacked and thereafter are handled like any other container. Containers that have a maximum surface gamma-neutron dose rate that exceeds 200 mR/h will be treated as remote-handled (RH) waste and will not be certified for shipment to WIPP by this Certification Program Plan. Contamination readings and the maximum surface gamma and neutron dose rate, including neutron contributions greater than 20 mR/h, are entered into the DMS via a keyboard terminal in the immediate vicinity.

5.2.2.3 Container Weight. Waste containers are moved from the head-end storage area into SWEPP and directly to the weigh station. At the weight station the bar code labels are scanned. Containers returned from processing and treatment facilities will also be bar-coded and weighed. The weight of the container is displayed locally on a digital read-out and, on operator command, is entered into the DMS.

5.2.2.4 Radiographic Examination Station. The real-time x-ray radiography (RTR) system is used to examine the contents of waste drums, boxes, and bins to determine if the waste meets certain WIPP-WAC, as identified in Section 6.3.2 and Table 2. The RTR is also used to determine if uncertifiable waste packages can be processed.

The RTR system consists of a 420-kVp constant-potential x-ray head and imaging system, a recorder, a video processor, and monitors. The x-ray source and imaging system is housed in a lead-shielded enclosure. Radiation shielding is provided by the enclosure. A cart and turntable assembly is used to transport waste containers in and out of the enclosure.

The imaging system consists of a fluoroscopic screen and a low-light-level Isocon closed-circuit television (CCTV) camera. The camera is mounted inside a shielded light-tight enclosure to protect the lens and electronic components from radiation damage. The camera has five lenses in a turret arrangement, which permits remote selection of image sizes from 0.50X to 2X magnification.

The output from the imaging system is supplied to two CCTV monitors at the operator's station. One monitor always presents the images directly from the camera. The operator can use the second monitor to view a processed image. The processing can consist of videotaping and adding printed data on the videotape via a character generator. The video recorder makes a file copy record of all waste container radiographic examinations.

The waste package weight, information obtained from the content code assessments and sampling program, and RTR examination are used to estimate the organic content of each waste package. The 90-mil rigid polyethylene liner is not included in determining the organic content. The proper content code for each waste package, which will identify the waste matrix, is verified during RTR examination. The total alpha activity of the waste package is determined at the fissile inventory examination station.

5.2.2.5 Fissile Inventory Examination. The containers are moved from the radiographic examination station to the fissile inventory examination station. The fissile inventory examination system measures the fissile material content and total TRU content (including the system errors) from which the thermal power density and the Pu-239 equivalent TRU activity is calculated. The system includes a drum counter for 55-gal drums and a box/bin counter to assay boxes, M-III bins, and 83-gal drums. Both counting systems for SWEPP were designed and constructed by the Los Alamos National Laboratory. Both counters use the differential die-away technique (DDT), which is an active neutron interrogation technique, and passive neutron counting. This system is known as the Passive Active Neutron (PAN) Assay system. In DDT, a pulse of fast (14-MeV) neutrons is introduced into the assay chamber. The chamber is made of polyethylene and lined with graphite to thermalize the neutrons. These neutrons have a characteristic lifetime, called the system die-away time. If fissile material is present in the chamber, some of the neutrons will cause fissions. Prompt neutrons from these fissions are detected in specially designed neutron detectors, which are sensitive only to fast neutrons.

After operator verification of the results, the data is automatically entered into the DMS computer. Waste containers determined to contain less than 100 nCi of TRU activity per gram of waste will be segregated for processing. The weight of containers (including any rigid liners and external shielding) will be subtracted prior to performing the 100 nCi per gram calculation.[3]

5.2.2.6 Container Integrity (CI) Examination. After examination at the Fissile Inventory Examination station, WIPP acceptable metal waste containers are transported to the container integrity station. The purpose of the CI examination is to ensure that stored metal waste containers meet applicable requirements for Department of Transportation (DOT) Type A packages. These requirements are met by using a combination of visual examination of the container, results from the RTR inspection, statistical sampling, and measurement of metal wall thickness using ultrasonic techniques. Waste containers not meeting the other elements of the WIPP acceptance criteria are not examined.

The drum integrity ultrasonic system consists of a tilt/rotation stand in which the drum rotates, an eight–channel multiplexed ultrasonic digital thickness gauge, water–coupled search unit holders, analog and digital recording, and digital data processing. Measurements are obtained in 0.040–in. increments of drum travel for each of the eight search units. Each search unit, which is mounted on a tilt stand to measure preselected drum locations, includes an ultrasonic transducer to measure the drum wall thickness. A microcomputer calculates the average thickness, standard deviation, and the minimum thickness measured for each inch of drum travel for each search unit. These data are used to determine if the drum meets DOT Type A wall thickness specifications. The wall thickness of metal bins and boxes will be measured using standard hand–held ultrasonic measuring instruments.

After the examinations are complete, the containers are moved to storage in the C&S Building.

5.2.2.7 Container Sampling and Processing. After the CI exam is complete, the Certification Specialist evaluates the information gathered from all examination stations. This information is stored in the RKIVE Data Base. Some of the certified waste containers are selected for the SWEPP sampling program. They will be physically examined at an opening and verification facility.

The purpose of the SWEPP certified waste sampling program is to provide quality control of the certification process. Quality control of the SWEPP certification process is provided by measurement of metal wall thickness by ultrasonic techniques and opening and visually examining the contents of selected transuranic waste containers, certified for shipment to WIPP, to ensure their compliance with the WIPP–WAC. The size of the sample is determined by using statistical sampling techniques such as those described by W. G. Cochran[4] or in ANSI E122[5].

The data obtained from the SWEPP–certified waste sampling program is used to determine the true proportion of miscertified waste containers. Future sampling requirements and frequencies will be based on the sampling program results. The sampling rate is specified in the SWEPP O&MM Section 3.9.4.B.8.c. Any anomalies shown by sampling will be evaluated and necessary improvements or changes will be made in the examination process to ensure accurate examination of this waste.

Waste that does not meet the WIPP–WAC is moved to the Certified and Segregated Waste Storage Building where it is segregated for future processing. The processed waste will be returned to the SWEPP head–end storage area, where it will be held pending final certification. Waste unacceptable for WIPP or processing is stored in the Certified and Segregated Storage Building until it can be processed, examined, or otherwise certified.

5.2.2.8 Overpack Station. The "overpack" station, located in the north end of the TRUPACT building, has hoisting equipment available to lift drums and wooden boxes into approved Type A containers.

Drums to be overpacked include damaged or breached drums, drums that failed the container integrity examination, and 30– and 83–gal drums. The drums will be overpacked into approved Type A metal standard waste boxes. Fiberglass–reinforced polyester plywood and plywood boxes will also be overpacked into approved Type A metal boxes.

5.2.2.9 Container Labels. When the waste container is retrieved or brought into the SWEPP area for processing, an INEL unique 6–digit bar code label is attached to the container for ease of identification during SWEPP examination. The container is then examined by SWEPP. Prior to shipment to WIPP, a 13–digit, WIPP approved, alphanumeric bar code label is permanently attached to the top and at 120° intervals on the side of the waste drum. All boxes will have the label placed on the top and all four sides. The required DOT and EPA labels will also be placed on the containers prior to shipping to WIPP. Materials used for labeling are selected to meet the 10–year storage requirement.

5.2.3 Certified and Segregated Storage Building. The Certified and Segregated (C&S) Waste Storage Building is provided to temporarily store all the waste containers processed through SWEPP, including

certified waste received from offsite waste generators, until the waste can be shipped or otherwise processed/treated. Space for sorting 55–gallon drums into payload assemblies has also been provided.

Containers scheduled for shipment to WIPP will be maintained separately from uncertified waste and wastes to be processed.

The certified waste received from offsite generators will be unloaded and put into the Certified and Segregated Storage Building until the WIPP opens. This offsite waste will only be received until WIPP opens. Then all generators will ship waste directly to WIPP under their own approved certification plans.

5.2.4 Packing and Shipping. All containers sent to WIPP will meet the Type A packaging requirements. All containers will be surveyed for surface contamination and radiation level and then loaded into the TRUPACT shipping container.

6. WASTE CERTIFICATION

The approach and methods that will be used to certify INEL contact-handled stored TRU waste are described below.

6.1 Waste Certification Approach

Stored TRU waste containers will be retrieved from interim storage and processed through SWEPP for certification. During the certification process, if the information obtained from the nondestructive examinations and other information sources, as described below, is sufficient to certify that the waste package meets all WIPP-WAC, the package will be certified and placed in certified storage. After WIPP becomes operational, the stored certified waste packages will be retrieved, visually inspected to ensure container integrity has been maintained, surveyed for surface contamination and radiation level, and prepared for shipment to WIPP.

Waste packages containing less than 100 nCi of transuranic activity per gram of waste will be disposed of as low-level waste.

If the information obtained during the SWEPP certification process is insufficient to certify that the waste package meets the WIPP-WAC, the waste will be either processed or placed in storage until the waste can be processed, examined, or otherwise certified.

Stored INEL TRU waste will be certified using a combination of information obtained from sources described below.

6.1.1 Nondestructive Examination. The primary nondestructive examination (NDE) techniques that are used in SWEPP to certify waste packages include real-time X-ray radiography (RTR), ultrasonic container integrity examination, and fissile inventory examination. Information obtained from the examinations is entered into the DMS and is used in determining if the waste complies with the WIPP-WAC. These examination techniques were described in Section 5.

The capabilities of the INEL RTR and drum integrity ultrasonic systems were demonstrated to the WIPP-Waste Acceptance Criteria Certification Committee (WACCC) in April 1984. Approval to use these systems as inspection devices to support the certification program was received from the WIPP-WACCC in June 1984.

6.1.2 Waste Records. Waste records available from the TWDB, as described in Section 4.4, are used to initially screen waste packages for identification of container contents prior to examination in SWEPP.

For waste packages with little or no record information, a proper content code, which describes the container contents, is assigned only if the RTR examination can clearly determine the container contents. The waste package then continues through the certification process. In addition, if a waste package has been assigned an improper content code and the RTR can clearly identify the proper code, the proper code is assigned to the waste package in SWEPP following a review by the Certification Specialist. The waste package then continues through the certification process. If the proper content code cannot be assigned, the waste package is not certified.

Records important to certification, such as the container procurement records, certification process records, calibration records, training records etc. are readily retrievable and protected against damage, loss and deterioration. The records are identified and responsibilities and specific record retention requirements are established in a RWMC/SWEPP Project Directive[10].

Certification records relating to current operations, such as equipment calibrations and personnel qualifications, are retained until at least the next WIPP-WACCC audit. Certification records that provide detailed information on the processing of the waste, such as internal audit reports and nonconformance reports, are retained until waste is permanently emplaced in WIPP. Certification records that are basic to the certification process, such as NDA records and RTR tapes are considered permanent and will be retained for at least 25 years.

Certification records are reviewed by a qualified Certification Specialist. This individual certifies, by his signature, that applicable procedures were followed and that the waste packages meet all WIPP criteria and requirements. The record of this review is noted by the Certification Specialists initials being recorded on the TWDB. These requirements are implemented by a RWMC/SWEPP Project Directive[9].

6.1.3 Content Code Assessments. Each waste content code, which describes the physical contents of

a waste container, has been evaluated to determine waste form, packaging information, and compliance with the waste form requirements of the WIPP-WAC. This assessment identified the presence, or potential presence, of free liquids, sludges, pyrophoric materials, explosives, compressed gases, respirable or dispersible fines, toxics, and corrosive materials in the waste package. Based on this assessment, an initial determination was made as to whether or not the content code would meet the WIPP-WAC. This information is used to assist SWEPP operators in evaluating waste container contents.

6.1.4 Sampling Program. The original TRU Waste Sampling Program was established at the Rocky Flats Plant to open, examine, and evaluate INEL stored TRU waste for compliance with the WIPP-WAC and determine the capabilities of the RTR system as a nondestructive examination technique for certifying waste to the WIPP-WAC. Only wastes generated by Rocky Flats were selected for sampling. Wastes generated by other facilities were not included since these wastes are comparable to Rocky Flats-generated waste, and Rocky Flats waste constitutes the majority of TRU waste stored at the INEL.

Since SWEPP operations began, sampling has been conducted on SWEPP-certified waste to ensure quality control of the certification process. The SWEPP-certified waste sampling program uses techniques similar to those used during the original TRU Waste Sampling Program conducted at Rocky Flats and also includes ultrasonic wall thickness measurements on the containers. This sampling program will be conducted at the INEL.

6.2 Control of the Certification Process

The documentation system for the EG&G Idaho Waste Management Programs (WMP) was described in Section 4.1. Certification of INEL stored TRU waste is controlled by the SWEPP Certification Program Plan and the RWMC-QPP (see Figure 4). These controlling documents are implemented by the Certification Plan Attachment.

The waste content codes used by all waste generators shipping TRU waste to the INEL have been evaluated and grouped into common waste form categories based on physical similarities (see Table 1). The Certification Plan Attachment used for a waste form applies to one or more certifiable content codes. The Certification Plan Attachment provides a brief description of the waste form and identifies the specific, detailed SWEPP operating documents and procedures that control each certification step. Quality control of the waste certification process is defined in the RWMC Quality Program Plan (QPP).

6.3 Waste Certification Techniques

The techniques that are used in SWEPP to certify INEL stored TRU waste to the WIPP-WAC are discussed below. Table 2 is a summary of these techniques.

6.3.1 Waste Container Requirements.

6.3.1.1 Waste Containers. Stored 55-gal drums presently underneath an air support weather shield and that have not been in closed-cell storage (see Section 3.2.1) are examined for container integrity using visual examination techniques, RTR inspection, and results from the SWEPP sampling program. Specifically, container integrity for these drums will be accomplished by: (1) visually verifying that the outer container is noncombustible; (2) visual inspection of markings to verify that the container is a DOT Type A package; (3) visual examination to determine damage or pressurization (e.g. bulging) that might negate the Type A qualification; (4) RTR examination results to ensure that no liquids exist between the drum and rigid liner; and (5) results from the SWEPP sampling program to verify compliance with the Type A wall thickness requirements. When wall thickness measurements are made, the minimum allowable thickness for a drum to be a DOT Type A container is 0.0428 inches. Drums not meeting this requirement are overpacked in an approved Type A metal container. Damaged drums, drums with liquid outside of the liner, non-Type A drums (30-gal and 83-gal), and fiberglass-reinforced polyester boxes are also overpacked into approved Type A metal containers. Metal containers used to overpack corroded drums are provided with corrosion protection, as needed. Requirements for procurement documentation, control of purchased material, handling, packaging, preservation, storage and shipping are defined in the RWMC-QPP.

Wall thickness of DOT Type A metal bins and boxes is measured using standard hand-held ultrasonic measuring instruments. Wall thickness must meet the minimum thickness specified for each type of container.

All materials used for labeling waste packages are selected to last 10 years.

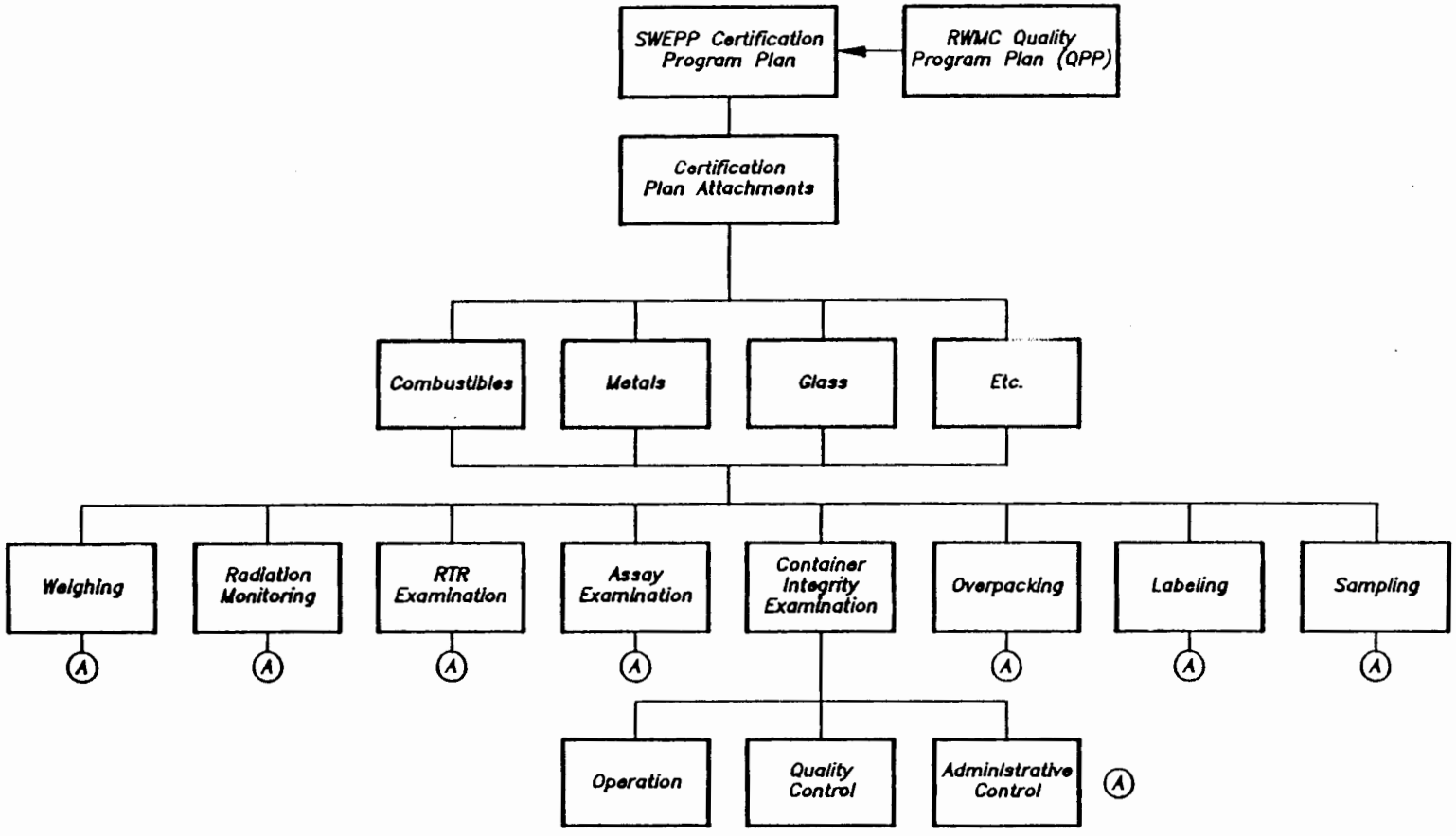

Figure 4. SWEPP Certification Documents.

Table 1. Waste form classifications*

Waste Form Category	Content Codes
1. Combustibles	010, 202, 330, 336, 337, 460, 801, 802, 804, 826, 827, 847, 900, 970
2. Metals	020, 101, 155, 156, 201, 320, 416, 480, 481, 803, 824, 825, 838, 848, 980
3. Glass	105, 440, 441, 442, 810
4. Nonmetal Molds and Crucibles	300, 301, 303, 312, 368, 370, 814
5. Uncemented Sludges	001, 002, 003, 007, 290, 292, 811
6. Cemented Sludges	004, 204, 836, 976, 978
7. Absorbed Liquids	102, 834, 835
8. Concrete, Brick	371, 377, 960
9. Salts	005, 409, 410, 411, 412, 414
10. Glovebox Gloves	339, 463
11. Benelex, Plexiglass	302, 464
12. Resins	430, 431, 432, 812
13. Mixed Waste–Paper Metal, Glass, etc.	100, 150, 203, 241, 950
14. Radioactive Sources	015, 152, 153, 157, 200
15. Other (Mercury,	154, 814, 832 Fuel Samples, etc.)
16. Filters	328, 335, 338, 360, 490, 805, 813
17. Particulate Wastes	030, 040, 090, 095, 310, 311, 361, 372, 374, 375, 376, 391, 392, 393, 420, 421, 422, 425, 842, 990, 995

* This classification represents all content codes, both certifiable and uncertifiable, used at the INEL.

Table 2. SWEPP Certification Techniques

WIPP - WAC	Container Integrity	Weighing	Radiography	Fissile Materials Assay	Measurement/ Analysis	Administrative Controls	Records (TWDB)	Content Code Assessments	Sampling Program
o WASTE CONTAINER REQUIREMENTS									
Waste Containers	X					X			X
Waste Package Size						X			
Waste Package Handling						X			
o WASTE FORM REQUIREMENTS									
Immobilization			X		X		X	X	X
Liquid Wastes	X		X				X	X	X
Sludges	X		X				X	X	X
Pyrophoric Material					X		X	X	X
Explosives and Compressed Gases			X		X		X	X	X
Radioactive Mixed Wastes	X		X		X		X	X	X
o WASTE PACKAGE REQUIREMENTS									
Waste Package Weight		X							
Nuclear Criticality				X					
Pu-239 Equivalent TRU Activity				X					
Total Alpha Curies				X					
Surface Dose Rate					X				
Surface Contamination					X				
Thermal Power				X					
Gas Generation		X	X		X				
Labeling						X			
Data Package/Certification						X	X (CWDB)		

6.3.1.2 Waste Package Size. Administrative controls are used to ensure that waste packages or package assemblies do not exceed size limitations. The size limit at the WIPP facility is 12 x 8 x 8.5 ft in overall L x W x H dimensions; however, waste packages will also be limited in size by the TRUPACT dimensions.

6.3.1.3 Waste Package Handling. Administrative controls are used to ensure that each waste package has standard or WIPP-acceptable handling features and that permanent lifting attachments have not significantly deteriorated during interim storage.

6.3.2 Waste Form Requirements.

6.3.2.1 Immobilization. Content codes considered to meet the immobilization criterion (waste matrix contains less than 1 wt% particles less than 10 microns in diameter or less than 15 wt% particles less than 200 microns in diameter) have been identified by the content code assessments and verified by the sampling program. A report[6] containing information on specific waste forms that meet the WIPP immobilization criterion is also used. The RTR examination is used to verify the waste form. The INEL sampling program monitors SWEPP-certified waste forms for compliance with the immobilization criterion.

If particulates are observed in a content code considered to be certifiable, an estimate of the total particulate weight is made by the RTR operator. The estimate is made by using a direct relationship from volume percent to weight percent. If this estimate is more than 1% of the waste weight, the waste package will be processed. A continuing training program for RTR operators includes testing of their ability to correctly estimate volumes. This conservative approach is an operational decision and assumes that all the particulate, including less than 200-micron particulates, is less than 10 microns in diameter.

6.3.2.2 Liquid Wastes. Waste containing free liquid will not be certified for shipment to WIPP. Minor liquid residue remaining in a waste package will be acceptable for certification. Residual liquid is defined as a free-liquid in quantities of less than one percent by volume of the waste container that results from remaining liquid residues in well-drained bottles, jars, or other similar containers, condensation, and liquid separation that may result from sludge or resin settling. Radiographic examination is used to detect the presence of liquids in a waste package. As a guideline, residual liquid in well-drained bottles, cans, or other similar rigid containers will be restricted to approximately one percent of the volume of the internal container, as estimated during radiographic examination. Plastic bags that contain individual waste items (e.g., combustibles, filters, metals, etc.) are not considered to be a rigid container. The real-time radiography examination process does not allow determination of the volume of a plastic bag or other non-rigid container. Therefore, the total volume of residual liquid in a non-rigid container is considered to be contained by the waste container. The sum of all liquids will not exceed one percent of the volume of the waste container. For wastes primarily contained by the waste container, without other internal packages such as bottles or cans, residual liquids will not exceed one percent of the volume of the waste container (e.g., sludges). The residual liquids will be doubly contained, as determined by radiographic examination. This containment may be provided by an overpack container, the original waste container, 90-mil rigid liner, plastic bags, bottles, etc. Residual liquid may be contained between the drum and the liner, but the container must be overpacked prior to the shipment to WIPP. If the volume of residual liquid cannot adequately be quantified by the examination technician, or if the volume of liquid exceeds residual quantities, the waste package will not be certified for shipment to WIPP. Waste with greater than residual quantities of liquid will be stored until the waste can be treated or otherwise approved for shipment to WIPP.

6.3.2.3 Sludges. Radiographic examination is used to verify that a polyethylene liner, or equivalent, is present to protect the container from corrosion and that there is no liquid between the liner and the drum.

Any waste containers not meeting the above requirements will be overpacked or processed, as required.

6.3.2.4 Pyrophoric Materials. No pyrophoric materials exceeding 1% of the waste weight in each package have been identified by the content code assessments or by the initial sampling program conducted at the Rocky Flats Plant. The continuing INEL sampling program will be used as the method for monitoring the absence of pyrophoric materials in SWEPP-certified waste forms.

Letters of agreement with waste generators and the INEL Waste Acceptance Criteria have historically prohibited the inclusion of pyrophoric materials in waste

packages. Waste generator compliance with this requirement has been substantiated by the absence of any problems during handling and interim storage operations at the INEL.

6.3.2.5 Explosives and Compressed Gases. No explosives have been identified by the content code assessments or by the initial sampling program conducted at the Rocky Flats Plant. The continuing INEL sampling program will be the method used for monitoring the absence of explosives in SWEPP–certified waste forms.

Radiographic examination is used to identify pressurized containers. Waste packages containing gas cylinders are not certified unless the RTR can detect the presence of a drill hole indicating that the cylinder has been depressurized.

6.3.2.6 Radioactive Mixed Wastes. Only TRU wastes will be shipped to WIPP. Any hazardous materials present will exist as co–contaminants with the transuranic isotopes. TRU waste will only contain minor liquid residues as described in Section 6.3.2.2. Radioactive mixed waste, as identified by the content code assessment and the sampling program, will be reported in the data package.

Radiographic examination of the container verifies that a polyethylene liner, or equivalent, is present to protect the container from corrosion and that there is no liquid between the liner and the drum. If a liner (or equivalent) is not present in the container, or if liquid is between the liner and the drum, the waste package is either overpacked with an approved Type A metal container or processed.

Content codes identified by the continuing INEL sampling program as containing reactive materials will be identified with the appropriate DOT label on the container and the data recorded in the data package. The content code assessment and the initial sampling program at Rocky Flats did not find reactive material in any of the waste containers.

Ignitable materials (pyrophorics) are discussed in Section 6.3.2.4. The continuing INEL sampling program is used as the method for monitoring the absence of pyrophoric and reactive materials in SWEPP–certified waste forms.

6.3.3 Waste Package Requirements.

6.3.3.1 Waste Package Weight. Each waste package is weighed to ensure that the weight is less than 21,000 lb (9,550 kg). Lower weight limits may be necessary to meet transportation requirements. The weight of the waste package is recorded on the container label and in the data package. The container Type A qualification weight will not be exceeded. Permissible weights for the different Type A containers may be found in the "Criteria for Packaging Transuranic Waste for Receipt at the Idaho National Engineering Laboratory Waste Management Complex, IDO–10074, current revision."[2]

6.3.3.2 Nuclear Criticality. The fissile isotope content of each waste package is measured by a combined active–passive neutron interrogation at the fissile inventory examination station. In the active phase, the prompt and delayed neutrons from fissions induced by interrogating thermal neutrons are counted. The number of observed prompt neutrons is directly related to the mass of fissile material present. The ratio of prompt to delayed neutrons indicates which fissile isotopes are present. The passive phase evaluates the spontaneous fissions to determine the Pu–240 content and the alpha–neutron reactions to calculate the Am–241 mass. Since the TRU waste processed at SWEPP has a constant isotopic concentration, the measurement can be used to estimate the total isotopic mass in a waste package.

The decision logic used for the assignment of either the passive or active assay results is identified below and is based on the assay data and container waste form. The following steps are evaluated in the sequential order to determine which assay value will be used for a container.

a. For content codes 1,2,3,4, and 7 (sludges), the active mass will be used.

b. If the active mass plus error is less than 20 grams, the active mass will be used.

c. If the absolute value of the passive mass error is less than 40 grams or the passive mass plus error is less than 200 grams, the passive mass will be used.

d. For all other cases, the active mass will be used.

Results of the examinations are reported as Pu–239 fissile gram equivalents. Gram equivalents will not ex-

ceed 200 g per 55–gal drum, 100 g per 30–gal drum, 500 g per DOT 6M drum, or 350 g per box. Any waste container exceeding the specified limits requires special handling. The total alpha content of the waste package is also reported.

6.3.3.3 Pu–239 Equivalent TRU Activity. The Pu–239 equivalent TRU activity (PE–Ci) is calculated for each waste package based on the measured fissile material content and the total TRU content obtained from the fissile inventory examination. The results for waste packages placed in assemblies is summed. The activity for a package or assembly will not exceed 1000 PE–Ci.

6.3.3.4 Surface Dose Rate. The surface dose rate for each waste package is measured using standard EG&G Health Physics instrumentation and procedures. The maximum surface dose rate for any package shipped to WIPP will not exceed 200 mRem/h. Neutron contributions of greater than 20 mRem/h to the total package dose rate are recorded in the data package.

6.3.3.5 Surface Contamination. The surface contamination levels are determined using standard EG&G Health Physics survey techniques. Surface contamination levels will not exceed 50 picocuries (110 dpm) per 100 cm^2 for alpha–emitting isotopes and 450 picocuries (1000 dpm) per 100 cm^2 for beta–gamma–emitting isotopes. If survey results exceed these levels, the waste container is either decontaminated or overpacked into an approved Type A metal container, as required. Survey results are recorded in the data package.

6.3.3.6 Thermal Power. A conservative estimate of the total alpha activity within the container and thermal power generation can be obtained by counting nonfission (single) neutrons during the fissile inventory examination. These single neutrons are produced by (α, n) reactions with certain elements such as ^{18}O or ^{19}F in the waste matrix. Once the total alpha activity is known, it is converted to thermal power. This information is recorded in the data package for waste packages exceeding 0.1 watt/ft^3.

6.3.3.7 Gas Generation. All INEL stored TRU waste drums will be vented and retrofitted with a carbon composite filter (or equivalent) as described in Section 5.2.1.1. The filter ensures that pressurization of the waste package does not occur and provides a pathway for hydrogen migration.

6.3.3.8 Labeling. In addition to DOT and EPA label requirements, each waste package is uniquely identified by means of a label permanently attached to the top and at 120° intervals on the side of the waste drum. All boxes will have the label placed on the top and all four sides. The package identification number is in medium to low density Code 39 barcode symbology in characters at least one inch high, and alphanumeric characters at least 1/2–inch high. The labels are made of materials that are expected to remain legible and affixed to the container for a period of 10 years under the anticipated interim storage conditions at the INEL and emplacement at WIPP.

6.3.3.9 Data Package/Certification. A Data/Certification Package will be transmitted to WIPP prior to shipment of the waste. The information used in the package will be available from the CWDB. The format of the package will be as specified in WIPP–DOE–157, "Data Package Format for Certified Transuranic Waste for the Waste Isolation Pilot Plant (WIPP)."

The Certification Specialist at SWEPP reviews the data generated for each waste package and certifies compliance with the WIPP–WAC. This individual also certifies that waste packages in a shipment meet the requirements of the WIPP–WAC.

6.3.4 Low–Level Waste.

The total alpha activity obtained from the fissile inventory examination station is used to identify waste packages containing less than 100 nCi/g TRU activity.

The SWEPP measured value and the instrument error determines the disposition of the waste. If the measured value plus the instrument error is less than 100 nCi/g, the waste will be managed as low–level waste. If the measured value minus the instrument error is greater than 100 nCi/g, the waste is treated as TRU waste. Waste assay values that are less than 100 nCi/g as described above, will be processed. The purpose is to restrict the amount of low–level waste shipped to WIPP but ensure that any waste managed as low–level waste meets the less than 100 nCi/g requirement.

6.4 WIPP Data Package

Data is gathered into the SWEPP Data Management System (DMS) for the elements listed and described in Section 6.3. This data is then uploaded to the CWDB as a secure storage for SWEPP examination data. Instructions on how to fill out the WIPP Data Package

and the data format are found in WIPP-DOE-157, "Data Package Format for Certified Transuranic Waste for the Waste Isolation Pilot Plant".

Both the WIPP Waste Information System (WWIS) and SWEPP's Certified Waste Data Base (CWDB) reside in the same computer at Idaho. For security purposes, the normal identification and password access is required for database access. The WIPP Data Administrator is contacted prior to the transmission of data to the WWIS. Problems with data transmittal and deletion or editing of the WWIS are coordinated through the WIPP Data Administrator. Other problems such as keyboard/terminal lockup are coordinated through User Services at EG&G. Amendments to data accepted by WIPP are coordinated through the WIPP Data Administrator. A file is maintained at SWEPP to show amended data and authorization for that data change.

6.4.1 Data Package Calculations. The WIPP Data Package requires an entry for the volume percent of organic materials in a waste container to the nearest ten percent. This is estimated at SWEPP by using the ratio of the estimated volume of organic material divided by the total volume utilized in the container. For drums that are overpacked in a Standard Waste Box (SWB), the total volume of the organic materials in the waste drums is divided by the volume of the SWB. Details of other calculations required for information in the WIPP Data Package are described in WIPP-DOE-069, "TRU Waste Acceptance Criteria for the Waste Isolation Pilot Plant".

6.4.2 Hazardous Materials Quantities. The hazardous material quantities that are reported in the WIPP Data Package are estimated based on process knowledge, evaluations by the generators, and a limited sampling programs.

7. QUALITY PROGRAM AND QUALITY ASSURANCE PLANS

The RWMC Quality Program Plan–QPP–130 invokes the applicable quality requirements of the Program/Project through design, construction, and operational phases; identifies the quality responsibilities of the respective organizations performing the tasks; and identifies the procedures to be followed in accomplishing quality–related tasks.

Specific responsibilities for the preparation, review, approval, and control of waste certification instructions, procedures, drawings, and related quality assurance involvement are discussed in the EG&G Quality Program Manual as implemented by QPP–130.

The RWMC Quality Program Plan (QPP–130) describes implementation of WIPP–DOE–120, "Quality Assurance Requirements for Certification of TRU Waste for shipment to the Waste Isolation Pilot Plant." It addresses each of the applicable WIPP–DOE–120 requirements and provides specific references to implementing operational documents.

In addition to the above operational plan controls and EG&G audit program requirements, the DOE–ID Field Office conducts periodic audits to assess the adequacy of the program for compliance to DOE requirements.

8. REFERENCES

1 Department of Energy, *Radioactive Waste Management*, DOE Order 5820.2A, Current Revision.

2 Department of Energy, *Criteria For Packaging Transuranic Waste for Receipt at the Idaho National Engineering Laboratory*, IDO–10074, Current Revision.

3 SWEPP Operating and Maintenance Manual, Assay System, O&MM 3.2, Current Revision.

4 W. G. Cochran, *Sampling Techniques*, Chapter 4, 3rd edition, John Wiley and Sons, 1977, pp. 72–78.

5 ANSI/ASTM E122–72, *Choice of Sample Size to Estimate the Average Quality of a Lot or Process*, ASTM, Part 15, 1980, pp. 1113 to 1118.

6 R. K. Blauvelt, *TRU Waste Particulate Characterization Study*, MLM–MU–85–62–0001, Table 1, Mound Laboratory, Miamisburg, Ohio, April 1, 1986.

7 D. A. Edling et al, *DOT 7A Type A Certification Document*, MLM–3245, Mound Laboratory, Miamisburg, Ohio, Current Revision.

8 T. L. Clements, Jr., *Content Code Assessments for INEL Contact–Handled Stored Transuranic Wastes*, WM–F1–82–021, EG&G Idaho, Inc., October, 1982.

9 RWMC/SWEPP Programs Project Directives, *SWEPP Operations Responsibilities*, PD–RS–1.2, Current Revision.

10 RWMC/SWEPP Programs Project Directives, *Record Retention*, PD–RS–3.2, Current Revision.

ATTACHMENT TO CERTIFICATION PLAN FOR CERTIFICATION OF INEL CONTACT–HANDLED STORED TRANSURANIC WASTE

May 1991

NOTE: Original signatures and changes appear on DRR WM–4005, WM–RS–020 and WM–RS–142

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CERTIFICATION PLAN ATTACHMENT FOR CERTIFICATION OF INEL CONTACT–HANDLED STORED TRANSURANIC WASTE

1. INTRODUCTION

This certification plan attachment identifies the methods that will be used to certify INEL contact–handled stored transuranic waste for shipment to the Waste Isolation Pilot Plant (WIPP). This certification plan attachment provides a description of each WIPP certifiable waste form and identifies the specific detailed operating documents and procedures that control each certification step.

1.1 Applicable Documents

The following documents support certification of INEL stored TRU wastes:

- Program Plan for Certification of INEL Contact–Handled Stored TRU Waste, current revision.
- RWMC Programs Quality Program Plan, QPP–130, current revision.
- Content Code Assessments for INEL Contact–Handled Stored Transuranic Wastes, WM–F1–82–021, October 1982.
- TRU Waste–Sampling Program: Volume I–Waste Characterization, Volume II–Gas Generation Studies, EG&G–WM–6503, September 1985.
- TRU Waste Particulate Characterization Study, MLM–MU–85–62–0001, Table 1, Mound Laboratory, Miamisburg, Ohio, April 1, 1986.
- SWEPP Operating and Maintenance Manual (O&MM)
- RWMC/SWEPP Programs Training Manual (TM)
- RWMC/SWEPP Programs Project Directives (PD) Manual
- P. M. Arnold, Characterization of Spent HEPA Filters From Rocky Flats Plant, September, 1986.
- TRUPACT–II Content Codes (TRUCON), DOE/WIPP 89–004, Current Revision.

2. WASTE FORMS

This section describes each of the waste forms that will be certified at SWEPP. The description of each waste form includes a summary of the content codes that will be certified in each waste form and any limits that apply to each code. The TRUPACT–II Content Codes may be used, in addition to the Content Codes listed, to identify the waste forms in this section or to describe the certified waste forms which have been repackaged into test bins for the WIPP Experimental Waste Characterization Program. The SWEPP Data Management System will contain content code assessment information and any limits that apply to each content code. This information will be available to the real–time x–ray radiography system operator and to the SWEPP individual responsible for certifying each waste package. This information is also available in SWEPP operating manuals.

2.1 Combustibles

Waste Form Description: The waste primarily consists of rags, gloves, plastic, paper, rubber, Carbo–Wax, filters, absorbed oil, wood, cloth overalls, canvas, cardboard, etc. The waste also includes limited amounts of noncombustibles such as glass, concrete, metal scrap, lead–lined glovebox gloves, etc.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
010	Combustibles (rags, gloves, ploy)	Bettis Atomic Power Laboratory
202	Combustible Solids	Battelle Columbus Laboratory
330	Paper and Rags—Dry	Rocky Flats
336	Paper and Rags—Moist	Rocky Flats
337	Plastic (Teflon, PVC, etc.) and Nonleaded Rubber	Rocky Flats
460	Washables, Rubber, Plastics	Rocky Flats
801	Rags, Paper, Wood, etc.	Mound Laboratory
802	Dry box Gloves and O–Rings	Mound Laboratory
804	Plastic, Tygon, Manipulator Boots, etc.	Mound Laboratory
826	Equipment Boxes—Combusi[illegible]s (1981 to present)	Mound Laboratory
827	Equipment Drums—Combustibles	Mound Laboratory
847	LSA less than 100 nCi/g Combustible*	Mound Laboratory
900	LSA Plastics, Paper, etc.*	Rocky Flats
970	Wood	Rocky Flats

* Only TRU waste (greater than 100 n/Ci/g) as determined by assay, will be shipped to WIPP

Limits: The following limits apply:

Contents Code	Description
826	Waste packaged after 1980 is certifiable. Prior to 1981, this content code was used for containers of floor sweepings and rust. Since 1980, the code has been used for boxes containing combustible wastes.

2.2 Metals

Waste Form Description: This waste primarily consists of contaminated metal equipment such as gloveboxes and glovebox equipment, ducting, vacuum pumps, centrifuges, tools, piping, valves, metal crucibles and funnels, lead bricks, tanks. The waste also contains limited amounts of combustible such as plastic tanks, fiberglass gloves boxes, etc.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
020	Noncompressible, Noncombustible	Bettis Atomic Power Laboratory
101	Cut–up Gloveboxes	Argonne National Laboratory–East
155	TRU Scrap	Idaho National Engineering Laboratory
156	Chem. Cell Rip–Out	Idaho National Engineering Laboratory
201	Noncombustible Solids	Battelle Columbus Laboratory
320	Heavy Non–SS (Special Source) Metals (Ta, W, Pt, Pb)	Rocky Flats
416	Zinc–Magnesium Alloy Metal	Rocky Flats
480	Unleached Light Non–SSMetal (Fe, Cu, Al, Stainless Steel, etc.)	Rocky Flats
481	Leached Non–SS Metal	Rocky Flats
803	Metal,k Equipment, Pipes, Valves, etc.	Mound Laboratory
824	Equipment Boxes	Mound Laboratory
825	Equipment	Mound Laboratory
980	Equipment	Rocky Flats

Limits: The following limits apply:

Contents Code	Description
803	The following Mound Laboratory drums contain cartons of floor sweepings and rust and may not be certifiable: Drum Number 13858 CD 76 13831 CD 76 13883 CD 76 13895 CD 76 13896 CD 76 13941 CD 76 13891 CD 76 13891 CD 76 13914 CD 76 13915 CD 76 13937 CD 76 13949 CD 76 13964 CD 76 13966 CD 76 13979 CD 76 13990 CD 76
824	Boxes that contain an excessive number of filters may not be certifiable.

2.3 Glass

Waste Form Description: This waste primarily consists of broken and unbroken sample vials and bottles, Raschig rings (leached and unleached) and laboratory glass ware.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
105	Empty Bottles	Argonne National Laboratory–East
440	Glass	Rocky Flats
441	Unleached Raschig Rings	Rocky Flats
442	Leached Raschig Rings	Rocky Flats
810	Glass, Flasks, Sample Vials, etc.	Mound Laboratory

Limits: The following limits apply:

Contents Code	Description of Limits
810	Drum 13948 CD 76 is expected to contain 1 carton of floor sweepings/rust (content code 826 prior to 1981) and may not be certifiable.

2.4 Nonmetal Molds and Crucibles

Waste Form Description: This waste primarily consists of Leco crucibles, graphite crucibles, and electrodes.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
300	Graphite Molds	Rocky Flats
303	Scarfed Graphite Chunks	Rocky Flats
312	Graphite, Coarse	Rocky Flats
368	Mg Oxide Ceramic Crucibles—Not Leco	Rocky Flats
370	Leco Crucibles	Rocky Flats
814	Graphite	Mound Laboratory

Limits: The following limits apply:

Contents Code	Description of Limits
300	Wastes packaged prior to December 1983 are not certifiable.

2.5 Uncemented Sludges

Waste Form Description: This waste consists of sludges produced from treatment of radioactive liquid wastes.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
001	First Stage Sludge—(Bldg 774)	Rocky Flats
002	Second Stage Sludge	Rocky Flats
003	Grease—Bldg 774	Rocky Flats
007	Wet Sludge—Bldg 374	Rocky Flats
290	Sludge, Filter	Rocky Flats
292	Cemented Sludges	Rocky Flats

Limits: The following limits apply:

Contents Code	Description of Limits
003	Waste packaged prior to 1980 are not certifiable due to the presence of PCBs.

2.6 Cemented Sludges

Waste Form Description: Waste consists of cemented liquid wastes.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
004	Special Setup	Rocky Flats
204	Solidified Solutions	Battelle Columbus Laboratory
836	High Level Sludge/Cement	Mound Laboratory
976	Building 776 Process Sludge	Rocky Flats
978	Laundry Sludge	Rocky Flats

Limits: The following limits apply:

Contents Code	Description of Limits
004	Some drums will contain empty polyethylene bottles. These drums will be examined by RTR and the proper content code assigned for combustible wastes.

2.7 Absorbed Liquids

Waste Form Description: Waste consists of acidic or caustic liquids absorbed on vermiculite or clay.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
102	Absorbed Liquids	Argonne National Laboratory–East
834	High Level Acid	Mound Laboratory
835	High Level Caustic	Mound Laboratory

Limits: The following limits apply:

Contents Code	Description of Limits
None	None

2.8 Concrete, Brick

Waste Form Description: This waste primarily consists of whole or broken pieces of brick, cinderblocks, and firebrick. It also contains concrete, asphalt, and limited amounts of the noncombustible and combustible waste.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
371	Firebrick	Rocky Flats
377	Coarse Firebrick	Rocky Flats
960	Concrete, Asphalt, etc.	Rocky Flats

Limits: The following limits apply:

Contents Code	Description of Limits
960	Waste packaged in other than half–size boxes may contain particulate material and may not be presently certifiable.

2.9 Salts

Waste Form Description: This waste primarily consists of a fused mixture of halide salts. Most of these salts are NaCl, KCl and $MgCl_2$.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
409	Molten Salts, 30% Unpulverized	Rocky Flats
410	Molten Salts, 30% Pulverized	Rocky Flats
411	Electrorefining Salts	Rocky Flats
412	Gibson Salts	Rocky Flats
414	Direct Oxide Reduction Salt	Rocky Flats

Limits: The following limits apply:

Contents Code	Description of Limits
None	None

2.10 Glovebox Gloves

Waste Form Description: This waste primarily consists of leaded glovebox gloves and aprons. The waste may also contain limited amounts of lead bricks and lead sheeting.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
339	Leaded Rubber Gloves and Aprons	Rocky Flats
463	Glove, Drybox	Rocky Flats

Limits: The following limits apply:

Contents Code	Description of Limits
None	None

2.11 Benelex, Plexiglas

Waste Form Description: This waste primarily consists of Benelex (tradename) neutron shielding and Plexiglas (trademark) glovebox windows. The Benelex may include metal hinges and pieces of angle iron and lead sheeting. In addition to Plexiglas other leaded glass may be present. Rubber gaskets from glovebox windows may also be present.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
302	Benelex and Plexiglas	Rocky Flats
464	Plexiglas and Benelex	Rocky Flats

Limits: The following limits apply:

Contents Code	Description of Limits
None	None

2.12 Resins

Waste Form Description: This waste consists of ins. leached and cemented anion and cation exchange res

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
432	Resin, Leached and Cemented	Rocky Flats

Limits: The following limits apply:

Contents Code	Description of Limits
None	None

2.13 Mixed Waste—Paper, Metal, Glass, Etc.

Waste Form Description: This waste primarily consists of paper, rags, rubber gloves, plastic bottles, glassware, small tools, balances, emtpy metal cans, fluxwire, fission counters, sample vials, ion exchange resins, Pu sources, piping, valves, glovebox gloves, etc.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
100	General Plant waste	Argonne National Laboratory–East
150	Laboratory Waste	Idaho National Engineering Laboratory
203	Paper, Metals, Glass	Battelle Columbus Laboratory
241	Americium Process Residue	Rocky Flats
950	LSA Metal, Glass, etc.*	Rocky Flats

* Only TRU waste (greater than 100nCi/g) as determined by assay, will be shipped to WIPP.

Limits: The following limits apply:

Contents Code	Description of Limits
100	Waste packaged prior to February 1981 may contain potentially unstable materials, which may not be detected by real–time x–ray radiography, and are not presently certifiable.
241	Lead–lined drums are not certifiable due to inadequate penetration by x–ray radiography. The TRU Waste Sampling Program found containerized free liquids that were not detected in a lead–lined drum.

2.14 Radioactive Sources

Waste Form Description: This waste consists of Pu–Be neutron sources and an Am neutron source. Some paraffin, wood, tools and noncombustibles may also be present.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
015	Neutron Sources	Bettis Atomic Power Laboratory
152	Pu Neutron Sources	Idaho National Engineering Laboratory
153	Combustible Lab Waste	Idaho National Engineering Laboratory
157	Miscellaneous Sources	Idaho National Engineering Laboratory
200	Americium Sources	Idaho National Engineering Laboratory

Limits: The following limits apply:

Contents Code	Description of Limits
None	None

2.15 Other (Fuel Samples, Etc.)

Waste Form Description: This waste primarily consists of metal containers of experimental fuel capsules, small vials of fuel, a radium needle and acinide neutron sources.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
154	Sample Fuel	Idaho National Engineering Laboratory
814	Contaminated Mercury	Mound Laboratory

Limits: The following limits apply:

Contents Code	Description of Limits
814	Mound Laboratory indicates that both drums actually contain graphite waste.

2.16 Other (Fuel Samples, Etc.)

Waste Form Description: This waste consists of a variety of filters. A Rocky Flats study, "Characterization of Spent HEPA filters from normal opoerational conditions do not release particulates in excess of WIPP–WAC limits. Limited amounts of other materials such as aluminum and wood frames, and combustibles and noncombustibles may also be present.

The Rocky Flats study does not apply to Mound Laboratory filters. A preliminary waste characterization study, "Content Code Assessment for INEL Contact–Handled Stored Transuranic Wastes" (Reference 8 of Program Plan determined that content code 813 should be WIPP certifiable.

Content Codes: This section covers the following content codes:

Content Code	Description	Waste Generator
335	Absolute Filters (8" X 8")	Rocky Flats Plant
338	Insulation and CWS Filter Media	Rocky Flats Plant
490	CWS Filters	Rocky Flats Plant
813	Glass Filters and Fiberglas	Mound Laboratory

Limits: The following limits apply:

Contents Code	Description of Limits
None	None

3. WASTE CERTIFICATION

The methods used to certify INEL stored TRU waste are described in Section 6.3 of the Program Plan for Certification of INEL Contact-Handled Stored Transuranic Waste (Current Revision). Table 1 is a summary of the methods used to meet each criterion of the WIPP-WAC and also references appropriate SWEPP operating documents used for certification.

Table 1. SUMMARY OF SWEPP DOCUMENTS USED FOR WASTE CERTIFICATION

WIPP-WAC	Certification Techniques	Document Reference	Applicable Section	Discussion
Waste Containers Requirements				
• Waste Containers	Administrative Controls	QPP-130	5	Describes the quality program for procurement
		WM-PD-86-015	4	
		ES 50393	Steel Bin	Specification for the Dot 7A steel bin (4.2 x 4.9 x 6 ft) used for overpack
		IDO 10074	4.1.4	Metal box specification
		O&MM	3.9.4.B	This document covers the examination of the package to ensure that the outer container is a noncombustible Type A container.
	Container Integrity Examination	O&MM	2.3	System Description
		O&MM	3.3	Operating Procedure
		O&MM	5.1	Calibration Requirements
		TM	4.6	Training and qualification of operators
		O&MM	3.3	Metal boxes will be measured using standard hand-held ultrasonic measuring instruments
		Cert. Plan	6.1.4	SWEPP-certified waste sampling program
• Waste Package Size	Administrative Control	O&MM	3.9.4.B.7	Ensures that the waste package does not exceed 12 x 8 x 8.5 ft (L x W x H)
• Waste Package Handling	Administrative Controls	O&MM	3.9.4.B.7	This document describes the methods used to ensure that each package has WIPP acceptable handling features that have not corroded
Waste Containers Requirements				
• Immobilization	RTR	O&MM	2.1	System Description
		O&MM	3.1	Operating Procedure
		TM	4.6	Training and qualification of operators
	TRU Waste Sampling Program	EGG-WM -6503	VOL I	Waste opening and examination results
	Mound Lab Report	Reference 6 of Program Plan	Table 1	List of WIPP acceptable waste forms
• Liquid Wastes	RTR	O&MM	2.1	System Description
		O&MM	3.1	Operating Procedure
		TM	4.6	Training and qualification of operators

Table 1. (continued)

WIPP-WAC	Certification Techniques	Document Reference	Applicable Section	Discussion
Waste Form Requirements (continued)				
• Sludges	RTR	O&MM	2.1	System Description
		O&MM	3.1	Operating Procedure
		TM	4.6	Training and qualification of operators
• Pyrophoric Materials	INEL Sampling Program	QPP-130	10.0	This document identifies the INEL sampling program
• Explosives	INEL Sampling Program	QPP-130	10.0	This document identifies the INEL sampling program
• Compressed Gases	RTR	O&MM	2.1	System Description
		O&MM	3.1	Operating Procedure
		TM	4.6	Training and qualification of operators
• Radioactive Mixed Wastes	RTR	O&MM	2.1	System Description
		O&MM	3.1	Operating Procedure
		TM	4.6	Training and qualification of operators
Waste Package Requirements				
• Weight	Weighing	O&MM	3.9	This document discusses the overall examination of the package which includes weighing
		O&MM	5.0	Calibration requirements for the scale are discussed
• Nuclear Criticality	DAS	O&MM	2.2	System Description
		O&MM	3.2	Operating Procedure
		O&MM	5.0	Calibration Requirements
		TM	4.6	Training and qualification of operators

Table 1. (continued)

WIPP–WAC	Certification Techniques	Document Reference	Applicable Section	Discussion
Waste Form Requirements (continued)				
• Pu–239 Equivalent TRU Activity	DAS	O&MM O&MM O&MM TM	2.2 3.2 5.0 4.6	System Description Operating Procedure Calibration Requirements Training and qualification of operators
• Total Alpha Curies	DAS	O&MM O&MM O&MM TM	2.2 3.2 5.0 4.6	System Description Operating Procedure Calibration Requirements Training and qualification of operators
• Surface Dose Rate	Measurement	O&MM	3.6.2	This is a standard EG&G health physics measurement technique
• Surface Contamination		O&MM	3.6.2	This is a standard EG&G health physics measurement technique
• Thermal Power	DAS	O&MM O&MM O&MM TM	2.2 3.2 5.0 4.6	System Description Operating Procedure Calibration Requirements Training and qualification of operators
• Gas Generation	Administrative Controls	O&MM PD	3.5.2 1.8.3.1	All Rocky Flats TRU waste drums received prior To June 1, 1983 will be provided with a filtered vent to ensure no pressurization of the container. Drums packaged since then are equipped with the semipermeable gasket. Boxes and bins do not require venting, as determined in tests conducted at the INEL.
• Labeling	Administrative Controls	O&MM	3.9.4	Application of the proper labels is discussed in this procedure
• Data Package/ Certification	Administrative Controls	PD	2.10	This project directive defines the process of certification and the requirements for documentation of waste certification.

CI = Container Integrity
DAS = Drum Assay System
RTR = Real–Time Radiography
UT = Ultrasonic Testing