APPENDICES A and B

VOLUME II

MARCH 1990

Prepared for the
Department of Energy
Under Contract DE-AC04-86AL31950

Westinghouse Electric Corporation
Waste Isolation Division
Carlsbad, New Mexico

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APPENDIX A

EMERGENCY PLAN

The Waste Isolation Pilot Plant (WIPP) Emergency Plan and Procedures (WP 12-9, Rev. 5, 1989) provides an organized plan of action for dealing with emergencies at the WIPP. A contingency plan is included which is in compliance with 40 CFR Part 265, Subpart D.

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Waste Isolation Pilot Plant
(WIPP)

EMERGENCY PLAN
AND
PROCEDURES

APRIL 1989

Cognizant Section: Emergency Preparedness

Approved By: Lyle Wilhelm

WIPP Manager: Jessee L. Reese

Westinghouse Waste Isolation Division General Manager: [Signature]
WIPP EMERGENCY PLAN AND PROCEDURES

WP 12-9, Rev. 5

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1.0 BASIC PLAN

1.1 Introduction

The Waste Isolation Pilot Plant (WIPP) is located in Eddy County in southeastern New Mexico, 26 miles east of Carlsbad (Figure 1-1). The site is approximately 4 miles square, covering an area of about 10,240 acres.

The WIPP site is located in an area of low population density, with approximately 16 permanent residents living within a 10-mile radius of the site. The nearest residents live at the J. C. Mills Ranch, about 3.5 miles from the center of the site. The area surrounding the site is used primarily for grazing, potash mining, and mineral exploration. There are no industrial areas, military installations, or airports within a 5-mile radius of the site. The population center nearest the site is the city of Carlsbad, 26 miles to the west, with an approximate population of 25,500. Two smaller communities, Loving (approximate population 1,100) and Malaga (approximate population 150), are located about 20 miles southwest of the site.

The WIPP includes both surface and underground facilities. The surface facilities are comprised of a Waste Handling Building, Support Building, Warehouse, Exhaust Filter Building, and other facilities. A drawing of the surface facilities is shown in Figure 1-2. The underground, connected to the surface by four shafts, is used for waste storage and experimental work (Figure 1-3). WIPP has three in-town facilities within the city of Carlsbad: 1) Office and Information Center, 101 W. Greene Street; 2) 401 Building, 401 N. Canal Street; and 3) The TRUPACT Assembly Facility, 5301 Sierra Vista.

The Department of Energy (DOE) is responsible for the WIPP facility. Westinghouse Electric Corporation is the Managing and Operating Contractor; and Sandia National Laboratory is the Scientific Advisor.

As Management and Operating Contractor, Westinghouse Electric Corporation has primary responsibility for response in the event of any emergency occurring at the WIPP site.

1.2 Purpose

The Waste Isolation Pilot Plant (WIPP) Emergency Plan provides an organized plan of action for dealing with emergencies at the WIPP. The plan identifies lines of authority, the responsibilities of emergency response personnel and organizations, and the WIPP manpower and equipment resources available to cope with emergencies.

This plan establishes the requirements and procedures in compliance with the following:

FIGURE 1-1: WIPP Facility Locations
FIGURE 1-2: WIPP Surface Facilities
FIGURE 1-2: HIPP Surface Facilities (Cont.)

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<td>PURCHASING TRAILER</td>
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<tr>
<td>SECURITY/SEC TRAILER</td>
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<tr>
<td>SANDIA LABORATORY</td>
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<td>SANDIA OFFICES</td>
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<td>SANDIA OFFICES</td>
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<tr>
<td>MOBILE STORAGE BUILDING</td>
</tr>
</tbody>
</table>

NOTE
FIGURE 1-3: WIPP Underground Layout
• DOE Order 5500Z, Emergency Planning, Preparedness, and Response for Operations
• CFR 265, Subpart D
• DOE Order 5500.1A, Emergency Management System

This Emergency Plan will be followed to minimize the impact of emergency events upon the health and safety of plant personnel, the general public, the environment, and the WIPP mission. Copies of this site Emergency Plan and all subsequent revisions will be available at:

Hobbs Fire Department - Hobbs
Otis Fire Department - Otis
U.S. Bureau of Land Management - Carlsbad
New Mexico State Police Office - Carlsbad
Guadalupe Medical Center - Carlsbad
Lea Regional Medical Center - Hobbs
Eddy County Administrator's Office - Carlsbad
Living Desert State Park Office - Carlsbad
Public Safety Department - Carlsbad

1.3 Scope

This WIPP Emergency Plan applies to safety and security emergency response actions relative to:

• Radiological emergencies
• Underground emergencies (non-radiological)
• Industrial emergencies
• Security emergencies
• Natural emergencies
• National emergencies

This plan shall be issued as a controlled document to ensure that all distributed copies are current. The plan will be revised as necessary and reviewed at least annually by appropriate DOE and WIPP management. The review will result in a revised plan to incorporate any changes to the following areas:

• Emergency resources
• Emergency response organization
• Emergency procedures
• Emergency response personnel
• Assistance agreements with off-site organizations
WID does not automatically respond to a TRUPACT or RH cask accident like other emergencies described in this plan. Regardless of the location of the accident, DOE-AL is responsible to direct the deployment of personnel and materials determined necessary to combat the situation.

In the event of an accident involving a TRUPACT or RH cask, the state and local officials at the scene will have command and control authority for emergency response. The DOE is responsible for responding (see Radiological Assistance Team) to emergencies involving DOE-owned radioactive materials and for cleanup and mitigation of accident impacts.
2.0 DEFINITIONS

2.1 Types of Safety and Security Emergencies

The safety and security emergencies that may affect the WIPP personnel and facilities are categorized into several types. Although the list of specific emergencies is not all inclusive; it provides guidance and classification of emergencies; and initiation of emergency response. Classification of the emergency is determined by the DOE/MPD Manager who acts as the Crisis Manager during any emergency event.

Radiological Emergency - A radiological emergency exists when a loss of control of radioactive materials presents a potential or real threat to property or the environment, or may result in exposure to radiation hazards beyond established limits to any member of the work force or general population. Emergency actions shall be initiated through activation of the radiation and/or evacuation alarms, depending upon the scope of the emergency.

Underground Emergency (Non-Radiological) - A non-radiological underground emergency exists when an event affects either portions of the WIPP facility that are underground, or surface WIPP facilities that affect underground workers and operations. The underground facility is a restricted environment that requires maintenance of air quality, access to the escape routes, and maintenance of the ground conditions for immediate personnel safety. Factors that have potentially severe impacts underground are fires that contaminate the ventilation route, inundation by either liquid or gas, entrapment of individuals, severe injuries or fatalities, the release and spread of radioactive contamination in hazardous concentrations, and blockages of access or egress from the facility. Emergency actions shall be initiated by notifying the Central Monitoring System (CMS) operator via the Public Address System Access telephone or by activating the manual fire alarm pull box.

Industrial Emergency - An industrial (non-radiological) emergency exists when a fire threatens or destroys a facility or operation. This category also includes: total power outages; release (uncontrolled) of flammable material (gasoline, fuels, propane, etc.); release of toxic materials (such as chlorine, hydrofluoric acid, pesticides, etc.); and explosions. In addition, industrial emergencies may include serious damage or disruption from failure of facility, mechanical, or water systems. Emergency actions shall be initiated by fire alarms, evacuation alarms, actual observations, or verbal direction.

Security Emergency - A security emergency exists when the WIPP Project is jeopardized by any condition or situation which poses a threat to the security interests of the project, the immediate safety of employees, or the protection of the WIPP facilities on site or at the Carlsbad facilities. Such conditions include, but are not limited to, terrorist threats, arson, sabotage, hostage-taking, bomb threats, and civil demonstrations. Emergency actions shall be initiated by direct communications.
Natural Emergency - A natural emergency exists when personnel or facilities are threatened or sustain physical damage as a result of natural phenomenon, such as flooding, severe weather (i.e., high winds, tornadoes, hail, drought, etc.), or seismic activity (earthquakes). These emergencies shall be handled by area managers and building landlords on a case-by-case basis to minimize or prevent damage to facilities.

National Emergency - A national emergency exists following a proclamation by the President of the United States of America, or a declaration by the Congress, that an attack upon the United States is probable, is imminent, or has occurred. National emergency response actions shall be initiated and directed by the DOE-AL.

2.2 Emergency Response Levels and Action Guidelines

The manner of response and degree of involvement in an emergency situation will depend upon the severity of real or potential emergencies. The emergency response level is determined by the Crisis Manager as advised by the Safety/Security Advisors.

Unusual Event - An unusual event is an occurrence that normally would not constitute an emergency but one that indicates a significant release of radioactive or other toxic material or significant disruption of facility operations. Activation of off-site response organizations is not normally required. Emergency response actions are limited to facility areas. Examples of unusual events are:

- Incipient fires
- Minor flooding
- Unplanned control ventilation failure.

Such occurrences are classified as unusual events if they do not constitute significant facility or off-facility impacts. Activation of a response organization is not expected when an unusual event occurs. Emergency response actions are covered by the plant area operating procedures.

Alert - An alert is an occurrence that involves an actual or potential substantial reduction in the level of safety of the facility and/or limited off-facility releases of radioactive or toxic materials which are not expected to exceed permissible limits. Instances of alerts include:

- Response of the Fire Department to a major fire
- Acid spill
- Industrial, security, natural, or national emergency in progress or having occurred which has potential for reducing the security or safety of the facility.

The purpose of the alert is to ensure that on-site and off-site emergency response personnel are promptly advised and available for activation. If the situation warrants, emergency personnel must be able to respond with appropriate emergency actions.
Site Emergency - A site emergency is an event in progress or having occurred that involves actual or likely major failures of facility functions needed for the protection of on-site personnel, the public health and safety, the environment, or the security interests of the facility/project. Examples of site emergencies include:

- Failure of facility safeguards potentially allowing radioactive or toxic material releases in excess of permissible limits.
- Major fire threatening key site operations.

The Emergency Operation Center (EOC) should be manned and protective measures for on-site personnel initiated in the event of a site emergency.

General Emergency - A general emergency is an event in progress or having occurred that involves actual or imminent substantial reduction of facility safety systems. An example would be; releases of radioactive materials are occurring or are expected to occur and exceed permissible radioactive release levels beyond the WIPP site boundaries. A general emergency also exists when off-site releases of any toxic material are expected to exceed applicable permissible limits and may endanger the public. Examples of a general emergency would be:

- Externally visible structural damage or debris from blast or fire
- Significant release of toxic materials from the facility
- A major natural or national emergency.

The purpose of the site emergency level is to ensure the EOC is manned and that all resources are available to effectively mitigate the consequences of the emergency.
3.0 ORGANIZATION AND RESPONSIBILITIES

3.1 Lines of Authority

3.1.1 Department of Energy (DOE)

The DOE Albuquerque (DOE-AL) Operations Manager, through the DOE/WPO Manager, is responsible for the overall executive direction of emergency planning, preparedness, and response for the WIPP.

3.1.2 WIPP Emergency Lines of Authority

The DOE/WPO Manager, or a designee, acts as the Crisis Manager during any emergency event that may take place at the WIPP. The succession of authority for both the DOE/WPO and the Westinghouse Electric Corporation, Waste Isolation Division (WID) is listed as a Succession of Authority List in Section C.

3.1.3 General WIPP Authority

WIPP crisis management authority, whether on site or at an in-town facility, will vary depending upon the time at which an emergency event may occur. The highest senior management official of both the DOE and the WID (as listed in Figure 2-1) is tasked with the responsibility to manage whatever effort may be necessary to mitigate the outcome of an emergency occurrence. All shifts have been provided with two programs that ensure an adequate coverage by management personnel. These programs are as follows:

1. The first program is a Duty Officer Manager program that has been implemented by both the DOE and WID. The program designates various management personnel to act as the highest senior management official during off-shift hours for a given period of time (normally one week). Each individual is provided with an updated manual that lists emergency response guidelines, as well as resources that can be called upon if needed. All in-town locations are provided for within this program.

2. The second program provides for an immediate on-site management response, and assures that proper notifications are made during an emergency event. This program tasks the Facility Operations Shift Supervisor who is the management official in charge of mitigation efforts until relieved by a management individual of higher authority. As a part of the responsibility, this individual will ensure that a proper emergency response is conducted at the same time notification to the Duty Officers is made.
In an emergency, attempts to conduct emergency notifications will continue until contact is made with someone in the established succession of authority. Copies of the Succession of Authority list be posted in the following locations:

- Duty Officer Manual (DOE)
- Duty Manager's Manual (WID on-site and in-town manuals)
- Security
- CMR
- Underground Assembly Areas

Off-shift and day shift authority also apply for emergencies that may occur within the WIPP Fire District.

3.1.4 General In-Town Authority

DOE facilities within the city limits of Carlsbad also fall under the lines of authority as described in this manual. However, a separate section within the WID Duty Officer Manual (WP 12-6) has been developed to cover the management response to an emergency that may occur at an in-town DOE facility.

3.1.5 Succession of Authority List

The following is a succession of authority list of personnel for the Crisis Management Team (CMT). If an individual is absent, the successor automatically assumes authority. Where a successor has another function in the CMT, the next person in the chain of command will assume the lower-tier functions.

1. **DOE**
   - Manager
     (Duty Officer)
   - DOE Deputy Manager
   - Management Support Manager
   - Operations Manager
   - ESH & RT Branch Chief

2. **Waste Isolation Division: Site and In-Town**
   - General Manager
Assistant General Manager
Operations Manager
Safety, Security, and Environmental Protection (SSEP) Manager
Engineering Manager

3. Sandia National Laboratories
Manager
WIPP Site Operations Division Supervisor

3.2 Crisis Management Organization

3.2.1 Crisis Management Team (CMT)

The CMT is composed of an executive decision-making group convened to respond to emergencies. The DOE Manager or designated alternate will function as the Crisis Manager. At the discretion of the Crisis Manager, the Crisis Management Team shall convene in the Emergency Operations Center (EOC), depending on the severity or type of emergency. The membership of the team is as follows:

- DOE Manager
- DOE Deputy Manager
- WID General Manager
- DOE Environment, Safety, Health, and Repository Technology Branch Chief
- DOE Manager, Maintenance Support
- DOE Operations Manager
- WID EOC Coordinator
- Specialty Advisor (as required)

NOTE: Refer to Figure 2-1 for Crisis Management Organization Chart.

3.2.2 CMT Support Positions

To provide administrative and logistical assistance to the CMT, the following support positions will be assembled, as required:

DOE-AL - DOE/WIPP Liaison
- Safety Communicator
- Security
3.3 Responsibilities

Emergencies that may affect the WIPP personnel and facilities are categorized into several types as defined in Section 2.0. The following list of duties and responsibilities of the Crisis Management Team members are to provide general guidance in the event of any type of emergency which has occurred.

3.3.1 Crisis Manager

The Crisis Manager (DOE Manager) or his alternates will verify that necessary emergency actions take place or will direct further emergency actions, including the following:

- Maintenance of executive control of all emergency situations affecting WIPP operations.
- Authorization for obtaining assistance from off-site organizations, such as hospitals, health departments, highway departments, law enforcement agencies, ambulance services, etc.
- Authorization for notification of off-site local and county officials.
- Authorization for major expenditures needed to cope with the incident.
- Implementation of requests for assistance from DOE-AL.
3.3.2 DOE Deputy Manager

The DOE Deputy Manager acts as the DOE General Advisor to the Crisis Manager, who supervises communications with DOE-AL and all public communications, as required.

3.3.3 WID General Manager

The WID General Manager acts as the WID General Advisor and is responsible for providing assistance, as needed, to the Crisis Manager. The WID General Advisor also ensures that the proper WID emergency response actions are being conducted, as appropriate, during an emergency situation.

3.3.4 DOE Environmental, Safety, Health and Repository Technology Branch Chief

The DOE Environmental, Safety, Health and Repository Technology Branch Chief is responsible for the DOE overview of safety aspects involved in an emergency, and the rescue and/or care of involved individuals.

In addition, the DOE Safety Advisor shall ensure that federal, state, and/or local response forces (and EOC late arrivals) are briefed on the situation at hand.

3.3.5 DOE Manager, Maintenance Support

The DOE Manager, Maintenance Support, acts as the DOE Security Advisor and is also responsible for providing the DOE overview of emergency security situations, and for emergency notifications of off-site, local and county authorities, with the exception of urgent support agencies (e.g., ambulance service, fire department, sheriff, and state police) when authorized by the Crisis Manager.

3.3.6 DOE Manager, Operations

The DOE Manager, Operations, acts as the DOE Operations Advisor and is responsible for providing the DOE overview of operations-related emergency situations, and is responsible for coordinating equipment and material logistics.

3.3.7 EOC Coordinator

The WID SSEP Manager shall designate a safety staff member to function as the WIPP Emergency Preparedness Coordinator (EPC). This individual shall coordinate WIPP emergency planning and preparedness activities with the DOE and other federal, state, and local agencies, as required. In an emergency that requires activation of the EOC, the EPC shall act as the real-time controller to assure that all EOC functions and systems operate in a smooth manner.
3.3.8 Specialty Advisor

A Specialty Advisor is an optional position and will be filled at the discretion of the CMT. The position will be filled by personnel with knowledge and expertise of the situation and/or a representative from an outside agency involved in the mitigation of the emergency.

3.3.9 DOE-AL - DOE/WIPP Liaison

These positions are filled by the DOE designated personnel to maintain open telephone communications with DOE-AL. The primary purpose is to status the emergency situation and ensure appropriate approvals are obtained, (i.e., press releases).

3.3.10 Communicators

Designated personnel who serve as communicators to ensure communications and announcements are established and properly logged during the emergency.

- Runners

The Runners carry emergency messages from the Communications Room to the proper addressee in the Crisis Management Room, transfer messages between Crisis Management Team members, and operate the telecopier.

- Radio Operators

The Radio Operators will handle audio communications from outside the EOC (e.g., base station radios, general communications frequency scanner, CB scanner, telephones, mine phone and pager system, and the PA system).

- Computer Operators

One Computer Operator will operate the PROCOM computer for communications with the DOE-AL EOC. The second Computer Operator will provide input to the Chronology of Events video display in the Crisis Management Room.

- Status Board Recorders

The Status Board Recorders enter, on the required Status Board, information that has been provided to them by the Crisis Management Team members.

- Switchboard Operator

The Switchboard Operator shall direct incoming calls to the appropriate personnel within the EOC. The operator does not release any information to incoming callers.
3.3.11 WIPP Tactical Coordinators

- WID Safety Manager

The WID SS&EP Manager is responsible for evaluating the safety, health, environmental, and security aspects of an emergency response, and assumes responsibility for overall mitigation efforts.

- WID Security

The WID Security Manager shall act as the WID Security Advisor. The WID Security Advisor shall provide general security information and advice to the Crisis Manager and shall assure notification of urgent support agencies (e.g., ambulance service, fire departments, sheriff and state police) when authorized by the Crisis Manager.

- WID Operations Manager

The WID Operations Manager, or his designee is responsible for the shutdowns or continued operation of plant equipment or facilities to mitigate the consequences of an emergency. In addition, the WID Operations Advisor is responsible for ensuring that an appropriate emergency response effort is conducted, through the response team captains, and that the WIPP EOC (if activated) is updated reporting events occurring in the field.

- WID Logistics Manager

The WID Engineering and Repository Technology Manager shall act as the Logistics Advisor. The Logistics Advisor assures that resources, both staff and materials, are available for an emergency response and will closely support the DOE Manager, Operations, and the Crisis Manager by providing engineering and technical information.

3.3.12 Tactical Teams

- Security

Upon notification of a WIPP-related emergency, Security personnel will respond in a manner consistent with the guidelines established in the WIPP Security Plan, WP 11-1. The WID Security Manager or designee will verify that the necessary actions have taken place, and will direct further security activity. The Security Manager or designee will provide the Emergency Response Coordinator with timely status reports.
• Operational Assistance Team (OAT)

In the event of an emergency and when the OAT is called upon to respond, the Facility Operations Manager shall be in charge of the casualty in the CMR. The Surface Operations Manager and the Underground Operations and Maintenance Manager shall serve as advisors to the Facility Operations Manager.

The Facility Operations Manager provides updates, responses, and reports to the Operations Manager. The Operations Manager may take his station in the CMR or the EOC. The Operations Manager reports to the WID General Manager (in EOC).

The Underground Services Manager, the Mining Operations Manager or the Waste Handling Operations Manager will man the communications link (mine-pager phone and/or GAI-TRONICS) to the scene. The casualty determines who mans the communications link. During waste handling casualties, the Waste Handling Operations Manager mans the communications. For other emergency conditions, the Underground Services Manager/Mining Operations Manager mans the communication and the Mining Operations Manager/Underground Services Manager advises the Underground Operations and Maintenance Manager and/or assists with status board upkeep. When not involved with communications, the Waste Handling Operations Manager shall advise the Surface Operations Manager.

The Facility Operations Shift Supervisor is in charge at the scene of a surface casualty and reports to the OAT.

The Underground Supervisor is in charge at the scene of an underground casualty and reports to the OAT.

The CMR Operator monitors plant parameters and conditions, changes plant configurations as directed by the Facility Operations Manager and procedures, and mans the two-way radio (surface communications).

The logkeeper is a designated person form Operations who logs the chronological events of the actions which have taken place. In addition, the logkeeper makes periodic announcements on the public address system.

The status board keeper is a designated person from Operations who maintains the status board of a summary of events pertinent to the casualty and plant conditions.

• Emergency Response Team (ERT)

The Emergency Response Team is trained to: respond to surface emergencies; fire fighting; medical; release of hazardous materials; and radiological events.
response to any one event by the team shall be in accordance with the applicable federal, state, or local standards and/or guidelines established for that response.

The ERT will respond to emergencies at the WIPP in accordance with procedures: Surface Fire Response, WP 12-902; Medical Emergency Response, WP 12-903; Medical Response for On-Site Contaminated Injured Personnel, WP 12-908; and Non-Radioactive Hazardous Material Spill Control, WP 12-909.

- First Line Initial Response Team (FLIRT)

The FLIRT is trained to respond to: underground fire fighting, medical, hazardous materials, and radiological emergencies. The response actions to emergencies shall be in accordance with the applicable federal, state, and local standards. The FLIRT responds to underground emergencies according to the Underground Emergency Response Procedure, WP 12-905.

- Mine Rescue Team

The Mine Rescue Team will strictly adhere to the requirements of CFR 30, should they be called to respond to a WIPP underground emergency. Details of mine rescue procedures can be found in WP 12-114, Mine Rescue Procedure; and WP 12-905, Underground Emergency Response Procedures.

- Radiological Assistance Team (RAT)

The Radiological Assistance Team shall respond to requests for radiological assistance received from the DOE Region 4, Albuquerque Operations Office, but may also come from local law enforcement, state, or tribal agencies. The RAT leader obtains as many details as possible regarding the emergency, the caller, and how contact may be reestablished. The RAT leader notifies the DOE-RAP Coordinator, relays all information regarding the emergency, and obtains authorization for activation of the Radiological Assistance Team.

The selection and composition of the RAT dispatched by the WID is dependent upon a number of factors such as the location, type, and severity of the incident. The RAT shall operate in accordance with Appendix C of the Radiation Safety Manual, Radiological Assistance Plan.
FIGURE 3-1: Crisis Management Organization Chart
4.0 NOTIFICATION AND ACTIVATION PROCEDURES

4.1 Emergency Notifications

All on-site emergencies shall be reported immediately to the Central Monitoring Room operator at extension 8111. All notifications shall include the following information, as appropriate:

- Severity (emergency response level)
- Magnitude
- Type
- Cause of emergency (if known)
- Assistance needed (if any)
- Areas or personnel affected
- Press inquiries made
- Investigation status

Standard Operating Procedure (SOP) for the City of Carlsbad includes notification of WIPP Security at 887-8324 in the event of an emergency at the WIPP in-town facilities.

Primary notification of emergencies at WIPP facilities in Carlsbad shall (during on or off-shifts) be reported to the appropriate city of Carlsbad response agencies by dialing 9-911.

Notification of the general public will be made by or under direction of the Crisis Manager, in conjunction with the DOE Public Affairs Officer. Notifications of off-site authorities (local and county) will be made only with approval of the Crisis Manager. State and federal officials will be notified by DOE-AL.

In an environmental, safety, or health emergency, the Director, Deputy Director, or appropriate Branch Chief of the DOE-AL Environment, Safety, and Health Division should be notified as required by DOE Order 5484.1.

Notification of DOE Headquarters will be made by the DOE-AL.

It is the policy of the DOE to provide accurate and timely information to the public, by the most expeditious means possible, concerning emergency situations at WIPP that may affect on-site personnel, public health and safety, and/or the environment. The DOE Public Affairs Officer shall coordinate with other agencies, when appropriate.

4.2 WIPP Management and/or Crisis Management Team Notification

Senior Management shall be notified promptly by the FOSS of any emergency, and given all the details of the emergency situation. This notice will be transmitted by the Security Inspectors, if requested or from the FOSS. As soon as Security is advised of an emergency, the Inspectors shall be requested to immediately notify the WIPP/DOE Deputy Manager and the General Manager or their alternates via the telephone/pager system. Security shall also be requested to notify other members of the Crisis Management Team (CMT), or other support teams, as
required. Management of the emergency situation will shift from the FOSS to the Crisis Manager when relieved by the Crisis Manager of this responsibility.

The WID Duty Manager acts as the senior management official during off-shift hours (see WIPP Duty Manager's Manual, WP 12-6). This person is responsible to ensure that the immediate actions necessary to protect personnel and equipment have been taken. This person is also responsible to ensure that all required notifications are made.

Upon being contacted by the WID Duty Manager, the DOE Duty Officer shall decide whether or not to activate the Emergency Operations Center and/or notify DOE-AL of the situation at hand.

4.3 Public Affairs Management Notification (PAMT)

The PAMT shall be notified promptly by the WPO-PA officer of an emergency and given details of the situation. After assessing the emergency, the extent of the activation of the Information Center (IC) will be determined. Notification of required personnel can be made via the telephone and/or paging system.

4.4 WIPP Emergency Operations Group

The Emergency Operations Group (EOG) may be assembled at the discretion of the WID General Manager or his designee (emergency alternates). The EOG may be activated if an event occurs that requires the immediate attention of WID Management and does not result in the activation of the Emergency Operations Center (EOC).

The WIPP EOG consists of designated WID personnel who, when called upon by the WID General Manager, will convene at the EOC to assist in the coordination of ongoing emergency response efforts, other than the initial efforts, and the corrective actions needed to assure that such an event is precluded from occurring again.

The EOG shall be chaired by the WID General Manager (or his alternates). The following personnel shall comprise part of the group:

- WID Manager, SSEP
- WID Manager, Security
- WID Manager, Operations

(Additional site personnel may be called upon by the EOC group to assist, as needed.)

4.5 Emergency Warning System/Evacuation Notification

Dependent upon the type of emergency and level of response required, the Crisis Management Team may deem it necessary to evacuate part or all of the affected facilities. Options to accomplish this are as follows:

- Voice Paging - In the event of an emergency, the voice paging system shall be a primary means of notification. The system
allows for specific direction to be given during any type of emergency situation.

- Evacuation Siren - The evacuation signal is an alternating siren. The action required by personnel is to proceed immediately to the staging areas in accordance with evacuation plans.

- Contingency Evacuation Notification - If the emergency warning system fails to operate when activated, as in a total power outage, notify Security, extension 8111, and provide them with the details concerning the emergency and request that the contingent evacuation plan be initiated.

- Security Inspectors shall drive through the WIPP site with sirens oscillating.

- Security Inspectors shall use voice amplifiers to instruct personnel to evacuate the area.

All WIPP employees and site visitors are responsible to comply with directions of the emergency personnel, alarm system notification, emergency equipment, shutdown procedures, and emergency evacuation routes and exits.

4.6 WIPP Emergency Operations and Control Facilities

4.6.1 The Emergency Operations Center (EOC)

The EOC is established to provide a decision-making management center for emergency situations and is activated, as needed. The EOC is located in the Safety and Emergency Services Building.

Access to the EOC is controlled by Security Inspectors.

The EOC is comprised of four areas:

- Strategy
- DOE-AL - DOE/WIPP Liaison
- Communications
- Tactical Coordination.

Specific information on each area is discussed in Section 3.0 of this document.

NOTE: The EOC is equipped and supplied to permit efficient actions by the emergency response personnel. An inventory has been established and is checked monthly to assure that all supplies and equipment are present and operate properly.

4.6.2 Alternate Emergency Operations Center (AEOC)

The Alternate Emergency Operations Center (AEOC), at the Living Desert State Park in Carlsbad, New Mexico is intended as an alternate command post for the WIPP site and/or a primary center
for the WIPP in-town facilities. Activation of the facility would occur in the event that the site EOC could not be manned, or if an emergency event at an in-town facility requires the assembly of the WIPP management personnel.

The AEOC is designed and equipped in a manner similar to the WIPP site EOC, with the exception that the amount of redundant communication systems are kept to a minimum in the AEOC.

In addition to the AEOC's primary purpose of serving the needs of the WIPP, the AEOC is also intended for use by the city of Carlsbad, Eddy County, and the State of New Mexico in emergency situations.

4.6.3 Information Center (IC)

The Information Center is established for the purpose of providing the Public Affairs Management Team a gathering and generating information center during emergency situations. It is activated as needed. The IC is located in Carlsbad, New Mexico at the 101 E. Greene St. Building. Access to the IC during emergencies will be controlled. Direct telephone numbers for the IC are found in the Communications section of the Public Affairs Emergency Response Plan.
5.0 FACILITIES AND EMERGENCY RESOURCES

5.1 Staging Areas/Evacuation Routes

Assigned staging areas have been established for the WIPP site. If it becomes necessary to evacuate the facilities, the employee parking lot, west of the main personnel entrance gate, is the designated primary staging area. In the event of an evacuation, employees are responsible for reporting to their assigned area and checking in with their Office Warden for personnel accountability.

If the Crisis Manager concludes that site personnel evacuation beyond the location of the personnel assembly area would be prudent, the most favorable evacuation route will be selected on the basis of information received from the Central Monitoring Room. The voice-paging system would be utilized to make this notification. The following diagrams provide the basic evacuation routes for surface and underground facilities.

5.2 Emergency Resources

A variety of emergency resources (manpower and equipment) have been identified and are available from DOE-AL and DOE sources, as well as from other federal, state, and local agencies. The resources of DOE and other agencies may be called upon to cope with on-site or off-site WIPP emergencies.

5.2.1 WIPP Emergency Equipment and Supplies

The WID has identified, procured, and maintained an adequate amount of equipment resources to mitigate any credible emergency event that may take place at the WIPP site or within the WIPP Fire District. In addition, specially trained emergency response teams have been identified, and trained, to utilize the equipment. (See Appendix 2, page 2,3, and 4 of 7).

Depending upon the type or extent of the hazard, all WIPP facilities have two or more types of fire protection systems. Temporary facilities have at least automatic detection and alarm systems and manual, portable fire extinguishers. All permanent facilities have at least automatic detection and alarm systems and manual, portable fire extinguishers. In addition, most permanent facilities have automatic sprinkler systems and hose reels. (See Appendix 2, page 1 of 7, Emergency Equipment).

WIPP communication systems include a telephone system, a mine/ surface phone system, hand-held radio system, mobile telephone system, and pagers.

In-town emergency response equipment and response personnel are provided by the city of Carlsbad.
FIGURE 5-1: Site Evacuation Routes

NOTE: Use most direct route avoiding hazardous conditions to the staging area.
FIGURE 5-2: Underground Evacuation Routes
UNDERGROUND FACILITIES

1. ROOM 0, ROCK MECHANICS STATION FOR BECHTEL BRINE INFLOW AND HUMIDITY SCALEUP
2. I-7, ROCK MECHANICS STATION AND PLUGGING AND SEALING EXPERIMENTS
3. C-1
4. C-2
5. I-6, INSTRUMENT SHED FOR ROOM A-3
6. I-5, INSTRUMENT SHED FOR ROOM A-2
7. I-4, INSTRUMENT SHED FOR ROOM A-1
8. ROOM A-3, THERMAL STRUCTURE INTERACTIONS, BASELINE
9. ROOM A-2, THERMAL STRUCTURAL INTERACTIONS, BASELINE
10. ROOM A-1, THERMAL STRUCTURAL INTERACTIONS, BASELINE WASTE PACKAGE PERFORMANCE, BASELINE
11. ROOM B, THERMAL STRUCTURAL INTERACTIONS, OVERTEST WASTE PACKAGE PERFORMANCE OVERTEST
12. I-3, INSTRUMENT SHED FOR ROOM A
13. ELECTRICAL SUBSTATION NO 2A
14. SWITCH STATION
15. ROOM 1, (EXPERIMENTAL)
16. SANDIA LAB SHOP
17. TEMPORARY UNDERGROUND SHOP
18. L-1, PLUGGING AND SEALING TEST SERIES D & INSTRUMENT SHED
19. L-2, PLUGGING AND SEALING TEST SERIES D
20. ROOM 2, (EXPERIMENTAL)
21. ROOM 3, MATERIALS INTERFACE INTERACTIONS TEST
22. ROOM 3, (EXPERIMENTAL)
23. CORE STORAGE
24. ROOM T, CH/TRU DRUM CRUSHING RH/TRU SIMULATED HEATERS
25. I-2 INSTRUMENT SHED FOR ROOM M, J, & T
26. ROOM 4, SALT BLOCK FABRICATION
27. ROOM M, THERMAL STRUCTURAL INTERACTIONS, ASYMMETRICAL PILLAR
28. ENTRY TO ROOM G
29. ELECTRICAL SUBSTATION NO. 2B
30. I-1, INSTRUMENT SHED FOR ROOM G
31. ROOM G, THERMAL STRUCTURAL INTERACTIONS, REFERENCE
32. MINING OPERATIONS TOOL AND STORAGE SHED
33. UNDERGROUND CONFERENCE ROOMS
34. MINING OPERATIONS TOOL AND STORAGE SHED
35. EMERGENCY VEHICLE PARKING
36. ELECTRICAL SUBSTATION No. 1 & SWITCH STATION
37. TEMPORARY FUEL STATION
38. ELECTRICAL SWITCH STATION
39. WASTE HANDLING VEHICLE PARKING
40. R+ DEMO AREA
41. CONSTRUCTION SITE VENTILATION BOOSTER FANS
42. UNDERGROUND SHOP
43. WASH BAY
44. PANEL 1, ROOM 1, UNDERGROUND STORAGE AREA
45. SPOV EXPLORATION DRIFT-SOUTH
46. WASTE HANDLING DIESEL FUEL STATION
47. PARTS, LUNCH, OFFICE

NOTES:
1. DRIFT VIEWS NOT SCALED. DISPLAY FOR CLarity.
2. NOTATIONS TO BE USED FOR PLANNING PURPOSES ONLY
3. DRAWING CHECKED AS OF SEPTEMBER 18, 1986
5.2.2 Local Off-Site Emergency Equipment and Supplies

The WID has established Memoranda of Understanding (MOU) with off-site emergency response agencies for both fire and medical assistance. Security assistance is automatically provided by the Eddy County Sheriff and New Mexico State Police. In the event that on-site response resources are unable to provide all of the needed response actions during either a medical, fire, or security emergency, the appropriate off-site response agency will be notified to assist.

The MOU with off-site cooperating agencies are available from the DOE Safety/Security Manager's office. A listing of the Memoranda of Understandings with state and local agencies and other mines is included in the references.

5.3 Transportation Vehicles

In the event of an evacuation involving the need to transport employees, the following transportation is available:

- Buses - WIPP buses are available for evacuation of personnel. The buses are stationed in the employee parking lot.

- DOE Vehicles - A number of passenger sedans, pickups, and vans are assigned to the WIPP. Although these vehicles are not specifically assigned for evacuation purposes, they may be utilized in an emergency.

5.4 Medical Resources

Medical resources available at the WIPP site include:

- Register nurse on duty during normal working hours.

- An Emergency Service Technician (EST) on duty 24 hours a day. The EST is trained in fire fighting and emergency medical response. The capabilities exist for basic and advance life support.

- Ambulance service (2 vehicles) on the surface and in the underground facility.

- Fire trucks (2 trucks) available on the surface and in the underground facility.

- Rescue truck that carries both light and heavy duty rescue equipment.
6.0 RADILOGICAL EMERGENCY SITUATIONS

This section provides both the information required for a proper response to radiological emergencies, and the mechanism for implementing that response. The intent of this section is to provide information for the mitigation of radiological incidents which have the potential to adversely affect the health and safety of the general public and/or the WIPP.

The information contained in this section applies to radiological emergencies related to WIPP activities, and outlines the responsibilities and duties of the WIPP personnel involved in a radiological emergency response situation.

The following contingencies are covered in this section:

- An on-site radiological incident that potentially affects site personnel only
- An on-site radiological incident that potentially affects site personnel and the general environment beyond site boundaries.

6.1 Definitions

A radiological emergency exists when: 1) a loss of control of radioactive materials presents a potential or actual threat to the life, health, or condition of individuals, property, or the environment; or 2) when a radiological condition may result in any occupant of the site—or member of the general public—exceeding established exposure limits to ionizing radiation as set forth by DOE Order 5480.11. In these cases, emergency actions are initiated by the activation of local radiation alarms and/or general evacuation alarms, depending on the scope of the emergency, as follows:

6.1.1 Local Radiation Alarm

Radiation levels exceeding preset limits will initiate local alarms provided by the continuous air monitors (CAMS) and area radiation monitors (ARMS). The alarms will consist of visual (flashing red light) and aural (klaxon) signals. When alerted by these alarms, personnel shall evacuate to a designated area.

6.1.2 General Radiation Alarm

Radiation emergencies resulting in a potential release of radioactive material outside of controlled areas require a general radiation evacuation alarm (gong), as provided by the master paging system. In the event of this alarm, all personnel shall evacuate to the employee parking lot assembly area. Office wardens or their alternates are responsible for the evacuation and accounting of personnel. Further information and instruction will be provided at the assembly areas.
6.2 Surface Radiological Emergencies

The most likely cause of a radiological incident at the WIPP would result from a handling accident involving a breach of a waste container. An accident of this nature could result in personnel being exposed to direct radiation and/or airborne contamination.

A surface radiological emergency may be indicated by the radiation emergency signals and/or the reporting of a waste handling accident (potential release), and/or by the reporting of such an emergency by RSEP based on the results of radiological surveys. RSEP is responsible for performing radiological surveys on the site (inside the fenced area) during emergencies.

When RSEP has determined that contamination is confined to areas within the Waste Handling Building or the Radioactive Materials Area (Figure 4-4), an emergency may require only local evacuation of these areas. Evacuation will be accomplished through controlled contamination checkpoints where RSEP personnel will perform personnel contamination checks and will initiate decontamination procedures, when required.

If it is determined that contamination has the potential for spreading beyond the Radioactive Materials Area Boundary, a general evacuation may be conducted. Also, if the radiological contamination has the potential for spreading off site, Regulatory and Environmental Program Section (REPS) personnel must be contacted to perform radiological monitoring, sampling, and dose calculation projections as per DOE/WIPP 88-025, Operational Environmental Monitoring Plan.

6.3 Underground Radiological Emergencies

An underground radiological emergency may be indicated by the activation of local alarms through the radiation monitoring system, and/or by the reporting of an accident (potential release), and/or by the reporting of such an emergency by Radiological Safety and Environmental Protection (RSEP) personnel.

If it is determined that contamination has the potential for spreading off site, Regulatory and Environmental Program Section (REPS) personnel must be contacted to perform radiological monitoring, sampling, and dose calculation projections as per DOE/WIPP 88-025, Operational Environmental Monitoring Plan.

Underground radiological emergencies may require the evacuation of the waste storage area only. In the unlikely event of the failure of the primary ventilation system during such an emergency, a general mine evacuation may be required; this in turn may require activation of the Mine Rescue Team.

In the case of an actual radioactive materials release, evacuation of the waste storage area shall be accomplished by retreating into the ventilation air upstream of the release point. Personnel downstream of
6.4 Radiological Medical Facilities

Medical services at the WIPP site are provided by the Safety, Security, and Environmental Protection Personnel.

Memoranda of Understanding for the treatment of radioactively contaminated personnel are in effect between DOE/WID and Lea Regional Hospital in Hobbs and Guadalupe Medical Center in Carlsbad.

Contaminated patients who have incurred injury will be transported by the site ambulance to the Lea County Regional Hospital, or Guadalupe Medical Center. Prior to transport, patients will be treated and decontaminated to the greatest extent allowed by the nature of their injuries. Contaminated patients will be escorted by RSEP personnel. During transport, precautions will be taken to control the spread of contamination from the patient while still allowing for stabilization efforts.

6.5 Exposure Limitations Under Emergency Conditions

During an emergency, certain conditions may exist which necessitate voluntary exposures considerably in excess of routine acceptable limits.

These conditions may include the following:

- Saving of life
- Reducing the potential for substantial population exposures
- Preserving facilities or property

Since personnel exposure judgments must be made on a case-by-case basis, dose limits cannot be specified. However, it must be recognized that incurred doses should be commensurate with the significance of the condition, and should be held to the lowest practical level that the emergency permits. It is also acceptable to rotate personnel in order to avoid exceeding maximum acceptable doses. The SSEP Manager shall have the primary responsibility for
making these determinations. It must be noted that all emergency exposures, above occupational dose limits, shall be voluntary.

The following tables are provided for general guidance during emergencies involving radiation exposure. As with routine operations, the ALARA philosophy of keeping exposures As Low As Reasonably Achievable also applies to emergency situations.
TABLE 1 - LIFESAVING ACTIONS

<table>
<thead>
<tr>
<th>Dose Type</th>
<th>Maximum Dose</th>
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<tr>
<td>Whole Body</td>
<td>100 rems</td>
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<tr>
<td>Extremities</td>
<td>200 rems (additional)</td>
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<tr>
<td>Internal</td>
<td>Minimized by use of respiratory protection and protective clothing.</td>
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TABLE 2 - PROTECTION OF FACILITIES AND POPULATION

<table>
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<tr>
<td>Extremities</td>
<td>75 rems (additional)</td>
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<tr>
<td>Internal</td>
<td>Minimized by use of respiratory protection and protective clothing.</td>
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**LIST OF REVIEWERS**

10/16/89

Procedure No.: **WP 12-9 SECTION 6.2**  
Revision No.: **5**

Procedure Title: **WIPP EMERGENCY PLAN AND PROCEDURES WP 12-9**

<table>
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<tr>
<th>Reviewer's Name</th>
<th>Department</th>
<th>Rev. #</th>
<th>* Page Changes</th>
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<tbody>
<tr>
<td>L. REED</td>
<td>ES &amp; H</td>
<td>5</td>
<td>PAGES 6-2 THROUGH 6-5</td>
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</tbody>
</table>

* Numbers correspond to changes as noted in Section 1.1 of the procedure

WP Form 1236: Rev. 1 Aug.?
7.0 UNDERGROUND EMERGENCY SITUATIONS

7.1 General Definitions and Information

Underground emergencies are events that affect either the portions of the WIPP facility that are underground, or surface WIPP facilities that affect underground workers and operations. The underground facility is a restricted environment that requires maintenance of air quality, access to the escape routes, and maintenance of the ground conditions for immediate personnel safety. Factors that have potentially severe impacts underground are fires that contaminate the ventilation route, inundation by either liquid or gas, entrapment of individuals, severe injuries or fatalities, the release and spread of radioactive contamination in hazardous concentrations, and blockages of access or egress from the facility.

Response to an underground emergency is addressed in the WIPP Underground Procedure WP 12-905.

The first priority of emergency response actions during any WIPP emergency is to save lives. As soon as practicable, all persons who can be directly affected by an underground emergency should be notified, and other project personnel should be alerted to the emergency. The supervision personnel involved in the emergency should make the decision whether an underground evacuation is necessary, and whether management is to be immediately involved.

Notification of an underground emergency is accomplished by calling the CMS operator who will notify the hoistman to activate the underground evacuation alarm. The CMS operator can be alerted on a Public Address system access telephone, or by activating a fire alarm pull box.

Notifying the CMS operator or Security of an underground emergency will activate the emergency notification system. The CMS operator or the Facilities Operations Shift Supervisor (FOSS) notifies emergency response personnel, as well as the on-call management personnel responsible for evaluating and assisting in the mitigation of the emergency. It is necessary to provide complete information concerning the emergency to Security, Management, and other emergency response personnel.

Underground personnel are required to report to assembly areas (Figure 7-1) upon notification or activation of the emergency evacuation system. Assembly areas have mine pager-telephones, evacuation maps, and procedures available to assist workers in evaluating the emergency and receiving directions on the pager-telephone of appropriate routes of egress. Assembly areas also serve to facilitate accountability for underground personnel.

Trained emergency response teams available to the underground include the First Line Initial Response Team (FLIRT) and the two WIPP mine rescue teams. The FLIRT is an underground immediate response team and the ESTs are immediate-response teams; mine rescue teams are trained to mitigate
emergencies expected to be of longer duration. WID also has reciprocal agreements with local mines to provide additional mine rescue teams that are available on call.

The Memoranda of Understanding (MOU) for utilization of Mine Rescue Teams outside WIPP are available from the WIPP Central/Document Library.

7.2 Immediate Underground Emergency Responses

All personnel who work underground or who go underground unescorted will be trained in WIPP evacuation procedures in the forty-hour Inexperienced Miner Training and they will be familiar with the ventilation maps and escapeway signs in the area in which they are working. These employees must also attend annual refresher courses on underground safety practices.

When the emergency notification system (a flashing light and/or audible alarm) is activated, all persons will evacuate to the closest designated assembly area. Each supervisor shall make a head count of personnel and call the underground dispatcher for any additional information. If so ordered by management, supervisors shall evacuate all of their personnel by the safest route possible.

To ensure that all supervisors are aware of an emergency situation, supervisors have been tasked to call in their name and location to the underground dispatcher. The underground dispatcher will provide supervisors and foremen with information regarding the type of emergency that exists and its location.

Should a power failure occur in the mine, all persons are required to evacuate the work area to the closest designated assembly area (Figure 7-1). All work and work areas must be left in a safe condition (i.e., lower buckets, forks, loads and secure any hazardous processes). Supervisors will call the underground dispatcher or the hoistman for further information. Because access to the mine area would not be readily available if a power failure has affected hoist operations, employees will not return to the work area until power has been re-established and the hoist is operational.

In the event that the hoistman becomes ill and cannot continue to operate the hoist, (as determined by the hoistman and hoistman's supervisor), upon notification, the underground mine foreman or designated representative will take action to stop all work activities underground and remove all personnel to the nearest designated assembly area until the hoistman is replaced by a certified hoistman.
7.3 Underground Emergency Assistance

- Mine Rescue Team

First Line Initial Response Team and Mine Rescue Team (FLIRT)

The FLIRT is a fast emergency response group who handles underground emergencies. If the emergency is such that it cannot be controlled in a short time, the Mine Rescue Team is called upon to provide assistance. (See Section 2.5 C, Mine Rescue Team and Plan for further details.) The FLIRT is automatically activated upon any underground emergency but does not respond until directed by management. (See Underground Emergencies WP 12-905 for details).

Mine rescue operations will be initiated if any of the following conditions exist or any of the listed requirements must be satisfied.

- An emergency mine evacuation has occurred and personnel are not accounted for on surface and are presumed to be trapped underground.

- An uncontrolled mine fire occurs.

- A reconnaissance is required of an area that has been destroyed or damaged as a result of the mine emergency.

- It is necessary to reestablish mine ventilation and to determine the safety of the mine before re-initiating mining operations.

The decision to activate Mine Rescue Teams, or to request outside assistance, rests with the Crisis manager. Notifications and coordination with outside agencies are conducted through the Crisis Manager and the Public Affairs Officer.

Surface Emergency Response Personnel

During any underground emergency, Emergency Services personnel shall be available to provide any necessary medical or other support services required. Emergency Services personnel will be notified and directed by the Operations Shift Supervisor or the OAT.

The call-out procedure is detailed in WP 12-104, Emergency Notification of Site Personnel.

Off-Site Response Groups

Off-site response groups are available to provide backup support for the WIPP mine rescue, fire fighting, and emergency medical treatment. Notification and activation of these backup support groups shall be by the direction of the Crisis Manager.
FIGURE 7-1: Designated Assembly Areas
All underground emergencies will be investigated and reported in accordance with WP 12-104, Emergency Notification of Site Personnel. All salvages and overhauls that become necessary will be conducted in accordance with pertinent section 1.7.4.12 of the WIPP Safety Manual (WP 12-1), Salvage and Overhaul Operations.
8.0 INDUSTRIAL EMERGENCY SITUATIONS

8.1 General Definitions and Information

Industrial emergencies include fires, explosions, uncontrolled releases of hazardous materials, personnel injuries and fatalities, and unplanned site power outages.

During an industrial emergency, designated areas are used for the assembly and accountability of personnel. The Facility Operations Shift Supervisor, as described in Section 2.2, is responsible for ensuring that an appropriate emergency response effort is conducted.

The following is a list of incidents that are required to be reported to the DOE:

- Death
- Serious Injury
- Ignition
- Fire
- Unplanned detonation of an explosive
- Unplanned release of a hazardous material
- Property damage in excess of $250

Specific actions in response to industrial emergencies are detailed in WP 12-9, Emergency Plan Manual.

All industrial and surface emergencies will be investigated and reported in accordance with WP 12-102, Reporting of Injuries, Incidents, and Unusual Occurrences.

General employees may perform incipient fire fighting using hand held fire extinguishers if they have been trained in their use. Fire fighting beyond the incipient stage should be performed by the ERT on the surface and by the FLIRT or the Mine Rescue Team underground.

Fires that appear uncontrollable by the FLIRT will be addressed by the Mine Rescue Team supported by the FLIRT.

General response to a surface fire is addressed in WP 12-902, Surface Fire Response. Specific fire suppression is performed based on site specific training that is given to the ERT, FLIRT, and the Mine Rescue Team in WIPP fire fighting training classes.

8.2 Hazardous Material Emergencies

Measures that must be taken to prevent, control, and handle accidental releases of nonradioactive hazardous materials are described in WP 02-8, WIPP Spill Prevention, Control, and Countermeasures Plan. Employees whose jobs routinely involve handling hazardous materials are trained in spill control techniques. The ERT and the FLIRT have been trained to respond to hazardous material incidents.
The ERT or FLIRT will respond to accidental releases of hazardous materials which cannot be safely controlled by employees in their immediate work area. Specific actions for response to incidents involving the release of hazardous materials are detailed in WP 12-909, Nonradioactive Hazardous Materials Spill Control.

After containment and control, spill cleanup and decontamination will be performed by the ERT, the FLIRT, or another specially trained team. Recovered waste, contaminated soil or water, or any other material resulting from a hazardous material incident will be managed in accordance with WP 02-601, Nonradioactive Hazardous Waste Management.

All hazardous material incidents to which the ERT or FLIRT responds, will be documented on WP 1563, WIPP Hazardous Material Incident Report. The on-duty EST shall be responsible for completing the materials incident. The information on the incident report will be used to prepare notification of releases in accordance with WP 02-605, Environmental Incident Reporting.

8.3 Personnel Injuries and Fatalities

Specific actions for response to incidents involving physical injury or death are detailed in WP 12-2, Occupational Health Manual.

Notification of a medical emergency will be given in one of the following ways:

- Radio
- Voice
- Telephone
- Through the Central Monitoring Room or Security at Ext. 8111
- Direct to First Aid Room at Ext. 8493

Staffing for the site Emergency Medical Program assures adequate coverage for all working shifts. There is an EST on duty 24 hours a day. The site RN is on duty during regular working hours. The medical staff complies with all applicable standards and regulations of the agencies governing licensing and certification of EMTs and RNs.

The Medical Department is equipped with a Type II Ambulance that is fully-equipped according to Federal Standard – KKK-A-1822A and New Mexico General Order 35 specifications. In addition to equipment on the ambulance, the site First Aid Room is equipped with supplies to handle emergencies ranging from first aid to medical/trauma situations.

All personnel are encouraged to be knowledgeable in First Aid and CPR, and are expected, if so trained, to respond if they are the first person to arrive on the scene of a medical emergency. The EST and the RN will respond to all medical emergencies that occur. They will work together to give the best possible care for the ill/injured person. The RN will assume responsibility in cases requiring
Advanced Cardiac Life Support. Members of the Medical Department will assure that all basic and advanced life support procedures are carried out to the best of their professional abilities prior to and during all phases of patient care and transport.

The ill/injured person will be transferred to Carlsbad South Eddy County Ambulance Service (CSECAS) to be transported to Guadalupe Medical Center (GMC) in accordance with MOU agreements with these facilities. In the event the ill/injured person is in such a condition that transfer to CSECAS would hamper treatment or further endanger him, the WIPP ambulance will provide the complete transport to GMC.

Notification of key personnel and completion of proper forms and paperwork will be done according to WIPP procedure.
9.0 SECURITY EMERGENCY SITUATIONS

9.1 General Definitions and Information

A security emergency is an action caused by people that disrupts the routine operation of the facility or jeopardizes the health and safety of personnel. Examples of a security emergency include, but are not limited to, the following: bomb threats; civil demonstrations; hostage situations; or sabotage.

During a security emergency, it is the responsibility of the WID Security Manager to provide general orders and direction for Security and site personnel.

During a security emergency, the WID SSEP Manager shall keep the Crisis Manager informed of findings and shall provide security expertise. Overall responsibility for a security incident at the WIPP site resides with the FBI, which may act in an advisory role or assume control of the situation, as appropriate.

9.2 Immediate Security Emergency Responses

Security will be notified of a security emergency incident in one or more of the following ways:

- Radio
- Voice
- Telephone (emergency notification 911)
- Alarm systems

During a security emergency, Security personnel will notify the WID Duty Manager and the on-call Security Manager. Further actions may be directed by these people. If it is determined that the EOC should be activated, the WID Duty Manager obtains permission from the DOE Duty Officer to direct Security to start notification to activate the EOC.

Security, directed by the Crisis Manager, will contact any off-site agencies that have agreed to provide immediate assistance. Security will take the immediate actions necessary to protect or safeguard personnel. Actions taken by Security include evacuations and notification of essential personnel. Further actions are based upon the situation. Security General Orders provide guidance on actions that should be taken in each type of credible emergency.

9.3 Security Emergency Assistance

The FBI has primary jurisdiction and control over all security incidents that occur at the WIPP site. Upon arrival of the FBI, control of the situation will be transferred to the FBI, as directed.

The FBI also has primary investigation responsibility for illegal activities against the WIPP site. If the FBI declines to conduct the investigation, the Eddy County Sheriff's Department may conduct criminal investigations at the request of DOE. Further investigations will be made as required or directed by DOE.
Evidence in a suspected crime will be safeguarded and released to bona fide law enforcement agencies only. Attempts will be made to obtain a photographic record of any security incident. As a minimum, an after-action report will be written with a section on lessons learned.
10.0 NATURAL EMERGENCY SITUATIONS

10.1 General Definitions and Information

Natural emergencies exist when WIPP site or off-site personnel (or facilities) are threatened—or sustain physical damage—as a result of natural phenomena such as flooding, severe weather (i.e., high winds, tornadoes, hail, heavy snows or blizzards, etc.), or seismic activity (earthquakes).

Corrective actions at facilities or areas experiencing a natural emergency are the responsibility of the Crisis Manager. State and local authorities are responsible for the assessment, control, and mitigation of the consequences of a natural emergency occurring outside the boundaries of the WIPP.

10.2 Immediate Natural Emergency Responses

Any person aware of the imminent danger or occurrence of a natural emergency should notify the CMR at 8111.

Upon receiving notification of an imminently threatening situation—or during the occurrence of an actual emergency resulting from natural phenomena—the Facility Operations Shift Supervisor shall initiate the proper emergency notifications. Notifications for any of the in-town facilities shall be handled by the appropriate city of Carlsbad response agency. The Crisis Manager, with the assistance of WID management and the DOE-AL, shall utilize appropriate federal, state, or local resources to determine the validity and scope of the emergency, and to mitigate any potential or actual consequences.

The Crisis Manager, with the assistance of DOE-AL, shall utilize appropriate contractor and other Federal agency manpower and resources to determine the validity and scope of natural emergencies and to mitigate the consequences of the emergency. The Crisis Manager shall keep DOE-AL informed of findings and shall provide technical data relative to the emergency on a timely basis.

If approved by the Crisis Manager, appropriate shutdown actions shall take place to ensure the safety of site personnel and facilities. Recovery actions shall take place only after the determination has been made by the Crisis Manager that conditions are safe enough for personnel to return to work.

The Crisis Manager will use all of the resources that are available from the project and DOE-AL to obtain any necessary additional assistance. The shutdown and recovery plan will be reviewed with DOE-AL prior to implementation, and, at the discretion of the Crisis Manager, additional review by outside agencies may be solicited. Local and state authorities will coordinate recovery operations for areas outside the boundaries of the facility.
11.0 NATIONAL EMERGENCY SITUATIONS

11.1 General Definitions and Information

A national emergency exists following a proclamation by the President of the United States, or a declaration by Congress, that an attack upon the United States is probable, imminent, or has occurred—or that some other internal situation has been created—that in some way impacts the security and/or well-being of the United States. All national emergency actions will be coordinated by the Federal Emergency Management Agency (FEMA).

Notifications of such emergencies will be made to the WIPP site directly by the Eddy County Sheriff's Office or Civil Defense Director. Warnings concerning the probability, imminence, and potential target areas of an attack on the United States—or important information concerning some other type of national emergency—are the responsibilities of other federal agencies such as the National Warning System (NANAS) and the Emergency Broadcast System (EBS). Emergency information is coordinated by the FEMA.

The FEMA has established readiness levels that will be adhered to by the WIPP. Upon receiving any one of the following levels, WIPP will comply as described below:

• **Communications Watch** - This corresponds to the normal preparedness posture of the WIPP

• **Initial Alert** - The WIPP will verify communications capability with the DOE-AL EOC on a 24-hour basis, and review readiness plans and procedures.

• **Advance Alert** - In addition to the general public's participation to achieve the highest state of civil emergency readiness, the WIPP Crisis Manager, under the direction of DOE-AL, will shut down nonessential facilities and evacuate the WIPP facility, except for essential shutdown surveillance and operations personnel.

11.2 Immediate National Emergency Responses

Should a national emergency occur, emergency response actions at WIPP are the responsibility of the Crisis Manager.

The DOE shall transmit alerts, warnings, appropriate evacuation, plant shutdown and other activities, as appropriate, by the most expedient means. The DOE shall begin appropriate evacuation, plant shutdown, etc. Activities will be implemented consistent with guidance from DOE-AL.

The assessment, control, and mitigation of consequences of a national emergency affecting areas outside the DOE exclusive use area of the WIPP are the responsibility of local and state authorities.
Following confirmed notification of a National Emergency, the Crisis Manager will immediately implement the appropriate emergency actions:

- Facilities and operations must be shut down or placed in a safe operating condition.
- Project personnel will be kept informed of national emergency developments. Emergency signals, warnings, and directions will be issued by the local county Civil Defense Director and utilize either personal (home), or community fallout shelters, as directed.

Since the nature and extent of an emergency attack is unpredictable, post attack (recovery) operations are based upon survival of personnel in the area. The resumption of operations will occur only upon direction of DOE-AL and should be in support of national and DOE goals.

Anytime the EOC is activated for reasons other than main drills and exercises, a log of activities will be made and submitted to WIPP Master Records Center.

The WIPP management will determine and report to the DOE-AL information on the WIPP facility.
12.0 BACKGROUND REFERENCES

- 40 CFR 265, Subpart D, Contingency Plan and Emergency Procedures
- Agreement between Westinghouse Electric, Amax Chemical Corporation, Western Ag-Minerals Company, Lundberg Industries Ltd., and Mississippi Chemical Corporation for Mine Rescue team assistance.
- DOE Documents, Memoranda of Understanding
  - Joint Powers Agreement between the DOE/WPO, the City of Carlsbad, Eddy County, and the Energy, Minerals, and Natural Resources Department for Alternate EOC (06/15/88).
  - Memorandum of Agreement between the City of Carlsbad and Westinghouse Electric Corporation for ambulance service assistance (08/13/81).
  - MOU between the DOE/WPO and Guadalupe Medical Center for Emergency Radiological Treatment Center for the Waste Isolation Pilot Plant Project (10/05/88).
  - MOU between the DOE/WPO and Lea Regional Hospital for Emergency Radiological Treatment Center for the Waste Isolation Pilot Plant Project (06/03/88).
• MOU between the DOE/WPO and the U.S. Department of the Interior New Mexico Office, Fire Portion Only, Bureau of Land Management (06/29/83).

• Mutual Aid Fire Fighting Agreement between the DOE/WPO and the Eddy County Commission (12/07/83).

• NCRP #65. Management of Personnel Accidentally Contaminated with Radionuclides.

• Title 30 CFR Federal Metal and Nonmetallic Mine Safety and Health Regulations, Part 49, Sections 1-10.

• WIPP Duty Officer Manual, WP 12-6

• WIPP Emergency Notification of Site Personnel, WP 12-104

• WIPP Emergency Procedures Manual, WP 12-9

• WIPP Environmental Compliance Manual, WP 02-6

• WIPP Master Drill Schedule for Training Exercises and Drills, WP 12-120

• WIPP Mine Rescue Procedure, WP 12-114

• WIPP Operational Security Plan, WP 11-1

• WIPP Public Affairs Emergency Response Plan, WPO/SOP 4.5

• WIPP Safety Manual, WP 12-1


• WIPP Underground Emergency Procedures, WP 12-108
### 13.0 ACRONYMS/ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AASHTO</td>
<td>American Association of State Highway Transportation Officials</td>
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<tr>
<td>ALARA</td>
<td>As Low As Reasonably Achievable</td>
</tr>
<tr>
<td>ANL</td>
<td>Argonne National Laboratory</td>
</tr>
<tr>
<td>AMS</td>
<td>Aerial Measurement Service</td>
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<tr>
<td>ANS</td>
<td>American Nuclear Society</td>
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<tr>
<td>ARG</td>
<td>Accident Response Group</td>
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<td>BARCT</td>
<td>Best Available Radionuclide Control Technology</td>
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<td>Basic Data Report</td>
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<td>Bechtel National, Incorporated</td>
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<td>Brookhaven National Laboratory</td>
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**MFP** - Mixed Fission Products  
**M&SH** - Mining & Salt Handling  
**MHTA** - Multistate Highway Transportation Agreement  
**mRem** - milliRems  
**MO** - Mound  
**MOC** - Management & Operating Contractor  
**MOCGS** - MIDWEST OFFICE of the Council of State Governments  
**MORT** - Management & Oversight Risk Tree  
**MRC** - Master Records Center  
**MRS** - Monitored Retrievable Storage (facility)  
**MSHA** - Mine Safety and Health Administration  
**NAS** - National Academy of Sciences  
**NDA** - Non-Destructive Assay  
**NDE** - Non-Destructive Examination  
**NE** - Office of Nuclear Energy  
**NEPA** - National Environmental Policy Act  
**NG** - Newly Generated  
**NPL** - National Priority List  
**NRC** - National Research Council  
**NRCC** - Nuclear Regulatory Commission  
**NSEP** - National Security Emergency Preparedness  
**NTS** - Nevada Test Site  
**NV** - Nevada Operations Office  
**NHTS** - National Waste Terminal Storage  
**OCRWM** - Office of Civilian Radioactive Waste Management (RH)  
**OEPO** - Office of Emergency Plans & Operations  
**OHMT** - Office of Hazardous Materials Transportation  
**OMB** - Office of Management & Budget  
**OR** - Oak Ridge Operations Office  
**ORGDP** - Oak Ridge Gaseous Diffusion Plant  
**ORNL** - Oak Ridge National Laboratory  
**ORR** - Operational Readiness Review  
**OSHA** - Occupational Safety and Health Act  
**OWT** - Overweight Truck  
**PAITHG** - Performance Assessment Inventory Team Working Group  
**PATRAM** - Packaging and Transportation of Radioactive Material  
**PGDP** - Paducah Gaseous Diffusion Plant  
**PNNL** - Pacific Northwest Laboratory  
**PREPP** - Process Experimental Pilot Plant  
**PUREX** - Plutonium-Uranium Extraction  
**QAPP** - Quality Assurance Program Plan  
**RAC** - Regional Assistance Committee  
**RAM** - Radioactive Material  
**RAP** - Radiological Assistance Program  
**RAT** - Radiological Assistance Team  
**R/B** - Rail/Barge  
**RBP** - Radiological Baseline Program  
**RCRA** - Resource Conservation & Recovery Act  
**REAC/TS** - Radiation Emergency Assistance Team/Training Site  
**REECO** - Reynolds Electric & Engineering Company  
**RFP** - Rocky Flats Plant  
**RH TRU** - Remote-Handled Transuranic  
**RL** - Richland Operations Office
RMA - Radioactive Materials Area
RQs - Reportable Quantities
RSPA - Research & Special Programs Administration
RTR - Real-Time Radiography (system)
RTS - Reference Transportation SYSTEM
RW - Office of Civilian Radioactive Waste Management
RWA - Reduction in Waste Arisings
RWMC - Radioactive Waste Management Complex
RNMS - Radioactive Waste Management System
SAN - San Francisco Operations Office
SARA - Superfund Amendments and Reauthorization Act
SARP - Safety Analysis Reports for Packaging
SCO - Support Contractor Office
SCP - Site Characterization Plan
SDA - Subsurface Disposal Area
SDR - Surface Dose Rates
SFPWR - Spent Fuel from Pressurized-Water Reactors
SIEB - Southern Interstate Energy Board
SMAC - Shipment Mobility/Accounting Collection
SNL - Sandia National Laboratories
SPDV - Site and Preliminary Design Validation
SR - Savannah River Operations Office
SRA - Systems Research and Applications Corporation
SRL - Savannah River Laboratory
SRP - Savannah River Plant
SRPO - Salt Repository Project Office
SRR - Site Recommendation Report
S3 - Social & Scientific Systems
SST - Safe Secure Transport
STB - Standard TRUPACK Box
SMB - Standard Waste Box
SMEPP - Stored Waste Examination Pilot Plant
TAGR - Transportation Analysis and Guidance Report
TAF - TRU PACK Assembly Facility
TCC - TRANSCOM Communications Center
TCG - Transportation Coordination Group
TCLP - Toxicity Characteristic Leaching Procedure
TDS - Total Dissolved Solids
TEM - Transient Electromagnetic
THMC - Thermal-Hydrological-Mechanical-Chemical
TMD - Transportation Management Division
TMOP - Transportation Management & Operations Plan
TPO - Transportation Project Office
TRAMPAC - TRU PACK-II Authorized Methods for Payload Control
TRU - Transuranic
TRUPACTs - Transuranic Package Transporters
TRUSAF - TRU Storage and Assay Facility
TSD - Treatment, Storage, or Disposal
TSI - Thermal/Structural Interaction
TNEAF - TRU Waste Examination Assay Facility
TWF - Transuranic Waste Facility
TWI - TRU Waste & Integration
USACE - U.S. Army Corps of Engineers
VSAT - Very Small Aperture Terminals
WAC - WIPP Acceptance Criteria
WIPP EMERGENCY PLAN

ACRONYMS/ABBREVIATIONS

WACCC - Waste Acceptance Criteria Certification Committee
WBS - Work Breakdown Structure
WCF - Waste Certification Facility
WEMD - Weapons Emergency Management Division
WERF - Waste Experimental Reduction Facility
WGA - Western Governors Association
WHPP - Waste Handling & Packaging Plant
WIEB - Western Interstate Energy Board
WIPP - Waste Isolation Pilot Plant
WOIC - WIPP Office & Information Center
WPO - WIPP Project Office
WRAP - Waste Receiving and Processing (facility)
WWIS - WIPP Waste Information System
14.0 APPENDICES
The asterisked name(s) in each group is the primary contact with the alternates listed in preferential order.

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### LIST OF PERSONNEL AND THEIR SPECIALTY POSITIONS WHO WILL BE CONTACTED BY THE EOC STAFF ON A CASE-BY-CASE BASIS

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EMERGENCY RESOURCES

BUILDING FIRE ALARM SYSTEMS

Guard and Security Building: 458-FP-314-01
Pumphouse: 456-FP-012-01
Warehouse/shops: 453-FP-012-01
Exhaust Filter Building: 413-FP-010-03
Support Building: 451-FP-011-32
CMR/Computer Room: 451-FP-089-41
TRUPACT Maintenance Facility: 412-FP-001-01
C&SH Shaft Station - U/G: 37U-YCP-00501
Waste Shaft Station - U/G: 534-FP-00601
Fuel Station No. 1 - U/G: 534-FP-14001
Fuel Station No. 2 - U/G: 534-FP-14002
C&SH Hoisthouse: 384-FP-050-01

Maintenance shops
Guard shack
Auxiliary warehouse
Construction Management trailer
Core storage building

CENTRAL SPRINKLER SYSTEMS

456 Pumphouse
458 Guard and Security Building
463 Warehouse/Shops Building
466 Auxiliary Warehouse Building
461 Support Building
412 TRUPACT Maintenance Facility
411 Waste Handling Building

All buildings with sprinkler systems also have hose reels.

HALON FIRE SUPPRESSION SYSTEMS

9 automatic systems at electronic data collection stations
1 Central Monitoring System Room

INDIVIDUAL FIRE EXTINGUISHER STATIONS

537 stations equipped with one or more fire extinguisher bottles
OTHER EMERGENCY EQUIPMENT

300 underground self-rescuer units

14 Mine Rescue Team Draeger self-contained breathing apparatus

Ambulance equipped as per Federal Specifications KKK-A-1822 and New Mexico EMSA Act General Order 35

Fire Trucks
1984 GMC 4 x 4 Sierra - "Emergency One" fire truck
Rated pump capacity of 750 gpm
Rated booster tank capacity of 500 gallons

Equipment on board is in compliance with "Class A" fire apparatus equipped with a fire pump and booster tank in accordance with NFPA 1901 standards.

1986 Ford Custom III - "EVF" special-purpose vehicle

This vehicle contains fire equipment in the form of:

1 - 150-lb mounted dry chemical fire extinguisher
3 - Portable fire extinguishers

Assorted rescue equipment used for forcible entry within the spectrum from light to heavy rescue/forcible entry.
**Radiation Detection and Measurement Equipment**

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Anti-Contamination Equipment

75 sets Anti Contamination Clothing

12 Full Face Positive Pressure Respirators

6 Spill Kits
EMERGENCY MEDICAL EQUIPMENT

1. Anti-Shock Trousers
   A. Ambulance (1)
   B. U/G Ambulance

2. Blankets
   A. Regular
      1. Ambulance (2)
      2. Health Services (HS) (1)
      3. Mine Rescue (2)
      4. U/G Ambulance (2)

3. C.P.R. Board
   A. Ambulance (1)

4. Life Pak 5
   A. Ambulance (1)
   B. U/G Ambulance (1)

5. Life Pak 6
   A. HS

6. Oxygen
   A. Size D
      1. Ambulance Stretcher (1)
      2. HS (1)
   B. Size (M)
      1. Ambulance (1)
   C. Size E
      1. Ambulance (2)
      2. HS (1) (2)
      3. Portable (ambulance) (1)
      4. U/G Ambulance (2) (1) Portable
      5. Rescue Truck (1)

7. Pillows and Pillow Cases
   A. Pillows
      1. Regular Ambulance (2)
      2. Small First Aid (4)
   B. Pillow Cases
      1. Ambulance (12)
      2. HS (25)

8. Resuscitators (Bag)
   A. Ambulance (1)
   B. HS (1)
9. Sheets
   A. Paper
      1. Ambulance (12)
      2. HS (12)
   B. Cloth
      1. Ambulance (3)
      2. HS (3)

10. Splints
    A. Hare Traction
       1. Ambulance (1)
       2. U/G Ambulance
    B. Air Splints
       1. PAK/Ambulance (1)
       2. HS
          a. Half Arm
          b. Foot and Ankle
          c. Hand and Wrist
          d. Full Leg
          e. Full Arm
       3. PAK/U/G Ambulance (1)
       4. U/G Cabinets (4)
    C. Thomas Half Ring
       1. Ambulance (1)
    D. Keds
       1. Ambulance (1)
       2. U/G Ambulance (1)
    E. Sandbags
       1. Ambulance (4)
    F. Fracture Aid Kit
       1. Ambulance (1)
    G. Padded Board
       1. Ambulance (1) (6)
       2. U/G Ambulance (6)

11. Stretchers
    A. Stretchers
       1. Ambulance (1)
       2. AUX WHSE (1)
       3. Rescue Truck
    B. Basic Life Support Litter
       1. HS (1)
       2. U/G Conference Room
    C. Aluminum Back Board
       1. Ambulance (1)
       2. HS (1)
       3. First Aid Room (1)
       4. U/G Ambulance (1)
    D. Portables
       1. Ambulance (2)
       2. U/G Cabinets (4)
E. Scoop Stretcher  
1. Ambulance (1)  
2. U/G Ambulance (1)  

F. Rescue Basket  
1. Mine Rescue  
2. U/G Ambulance (2)  
3. U/G Conference Room (1)  
4. AUX WHSE (1)  

12. Suctions  
A. Portable  
1. Ambulance (1)  
2. HS (1)  
3. U/G Ambulance  
B. Rico  
1. Ambulance (1)  

13. Trauma Kits  
A. Trauma  
1. Ambulance (1)  
2. HS (1)  
3. U/G Ambulance (1)  
4. Rescue (1)  
B. I-V  
1. Ambulance (1)  
2. U/G Ambulance (1)  
3. Rescue (1)
LIST OF REVIEWERS  
06-16-89

Procedure No.: WP 12-9  
Revision No.: 5

Procedure Title: WIPP EMERGENCY PLAN (RADIOLOGICAL EMERGENCY SITUATIONS)

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* Numbers correspond to changes as noted in Section 1.1 of the procedure
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**Procedure No.:** WP 12-9  
**Revision No.:** 5

**Procedure Title:** WIPP EMERGENCY PLAN

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<tr>
<td>Absorbant Sheets</td>
<td>(roll 3' x 100')</td>
<td>2</td>
<td>Rescue # 21</td>
</tr>
<tr>
<td>Absorbent Sock - General Liquid</td>
<td>(5 per roll)</td>
<td>8</td>
<td>Emergency Services Storage</td>
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<td>Absorbent Sock - General Liquid</td>
<td>(5 per roll)</td>
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<tr>
<td>Absorbent Sock - Oil</td>
<td>(5 per roll)</td>
<td>10</td>
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<tr>
<td>Absorbent Sock - Oil 'PIB'</td>
<td>(5 per roll)</td>
<td>1</td>
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<tr>
<td>Air Bag System - 125 ton</td>
<td>(40 per box)</td>
<td>60</td>
<td>Emergency Services Storage</td>
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<tr>
<td>Air Chisel</td>
<td>(plastic w/ lid)</td>
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<tr>
<td>Drum - 65 Gallon - Overpack</td>
<td>(5 gal. pail)</td>
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<td>Dry Chemical - Foray</td>
<td>(5 gal. pail)</td>
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<td>Fire Extinguisher</td>
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<td>Fire Extinguisher System</td>
<td>(4000 watt)</td>
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<td>Floor Squeegee</td>
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<td>Warehouse</td>
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<td>(5 gal. pail)</td>
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<td>(inner - cloth)</td>
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<td>(outer - pvc)</td>
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<td>(outer - vitron)</td>
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<td>(10 ton)</td>
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<td>(plastic)</td>
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<td>Jug - One Gallon</td>
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<tr>
<td>Jug - One Gallon</td>
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<td>(Circle &quot;D&quot;)</td>
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<td>Sensidyne</td>
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<td>Pail - 5 Gallon</td>
<td>(plastic w/ lid)</td>
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<td>(plastic w/ lid)</td>
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<td>Scoop - Non-sparking</td>
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<td>Spill I Containment System</td>
<td>(for caustics)</td>
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<tr>
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<td>Steel Salvage Drum - 20 Gallon</td>
<td>(w / locking lid)</td>
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<td>(w / locking lid)</td>
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<td>Steel Salvage Drum - 8 Gallon</td>
<td>(w / locking lid)</td>
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<td>(green)</td>
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<td>Suit - Fire Proximity</td>
<td>(aluminized)</td>
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<td>(tyvek - saranex)</td>
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<td>(tyvek - saranex)</td>
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WASTE ISOLATION PILOT PLANT
RADIATION SAFETY AND EMERGENCY PROGRAMS
HAZARDOUS MATERIALS RESPONSE EQUIPMENT
CURRENT INVENTORY OF RENEWABLE EQUIPMENT
15.0 PROCEDURES
### LIST OF REVIEWERS
04/28/89

**Procedure No.: WP 12-9**

**Procedure Title:** Emergency Plan

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<td>Asst. Gen. Mgr.</td>
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* Numbers correspond to changes as noted in Section 1.1 of the procedure*
# LIST OF REVIEWERS

5-17-89

Procedure No.: WP 12-9  
Revision No.: 5

Procedure Title: Emergency Plan and Procedures Manual  
SECTION 7.0

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* Numbers correspond to changes as noted in Section 1.1 of the procedure
1.0 SCOPE

This procedure outlines an immediate response in the event of a surface fire and details the basic steps to be taken by general employees and personnel assigned to the Emergency Response Team.

General Response for Fire/Evacuation Alarms (yelp tone) is covered in WP 12-911, Emergency Site Evacuation Procedures.

1.1 Change History

Pages 1, 2, 4, 6, and Att. 1 - 02/08/89; Page 1 and Att. 2 - 04/24/89

2.0 DEFINITIONS

Operations Shift Supervisor (OSS) - The on-duty Facility Operations Supervisor responsible for coordinating all fire fighting and support activities.

Health Physics Technician (HPT) - On-duty personnel assigned to the Emergency Response Team.

Radiologically Controlled Area (RCA) - Fenced-in area adjacent to and surrounding the Waste Handling Building where incoming shipments are staged prior to entrance into the Radioactive Materials Area. See Attachment 1.

Radioactive Materials Area (RMA) - Area of the Waste Handling Building and underground waste storage area where radioactive materials are stored and/or processed. The area is controlled by physical boundaries to limit access. See Attachment 1.

Emergency Response Team (ERT) - A team comprised of trained personnel responsible for immediate response to surface fire emergencies.

Emergency Service Technician (EST) - On-duty personnel assigned to the ERT with responsibilities for fire fighting and emergency medical support.

Area 1 - The area within the secured fence and the facility parking lot.

3.0 REFERENCES

NFPA Fire Codes
DOE Order 6430.1A
4.0 GENERAL

This procedure is generic in format as fires do not present themselves in a way that a step-by-step procedure can be produced.

The organizational structure of the ERT is shown in Attachment 2.

The effective use of fire extinguishers and fire hoses requires proper training. Attempts to fight fires by untrained personnel may create safety hazards, increase property damage and is discouraged.

All evacuations shall be in accordance with WP 12-911 (TBI), Emergency Site Evacuation Procedure.

All notifications for surface fires shall follow the matrix on Attachment 3.

In all fire-fighting activities, safety of personnel shall be the priority.

All personnel performing fire-fighting activities shall be properly trained according to site ERT Training Programs.
5.0 PROCEDURE

5.1 General Employee Response

1. Notify personnel in imminent danger (pull boxes, vocal, etc.).

2. Notify CMR/Security (Ext. 8111, radio, vocal, etc.).
   - Identify fire location
   - Identify fire type
   - Identify any injured personnel and their location
   - Any other pertinent information (i.e.: radioactive, hazardous materials involved)

3. Secure local equipment and operations, if time permits.

4. If trained in their use, attempt to extinguish the fire with a proper type extinguisher or fire hose.

5. Evacuate the area per WP 12-911, Evacuation Procedure.
5.2 Area 1 ERT Responses

1. CMR/Security notifies ERT, activates the P.A. all zone fire/evacuation alarm, announces the fire through the paging system, and initiates evacuation from affected areas.

2. ERT personnel nearest the emergency response equipment will respond with that equipment to the emergency scene.

   **NOTE:** Minimum response includes the ambulance and fire truck.

3. All other ERT personnel respond directly to the emergency scene.

4. Specific fire fighting activities will be directed by the OSS, based on training and pre-fire planning.

5. If the fire may involve underground power, ventilation, or hoisting equipment, the Underground Mine Supervisor shall be notified by the CMR operator at the direction of OSS.

6. If the fire is located within the RMA or RCA, or involves radioactive materials, notify the HP Supervisor or designee. Waste Handling Operations will be terminated immediately.

7. Additional back-up response personnel shall be requested by the OSS, as the situation dictates.
5.3 Other than Area 1 ERT Responses

DOE/WPO approval is required for this response.

1. Personnel shall only respond off site when specifically directed to do so by the OSS.

2. Personnel will respond to the fire truck, rescue truck, and the ambulance and proceed to the scene of the emergency at the direction of the OSS.

3. Specific fire fighting activities will be directed by the incident commander.

4. Additional back-up response personnel shall be requested by the OSS, as the situation dictates.
EMERGENCY RESPONSE TEAM

FACILITY OPERATIONS
SHIFT SUPERVISOR

BACK-UP

SECURITY INSPECTOR

SECURITY INSPECTOR

SECURITY INSPECTOR

ON-DUTY EST

MINE RESCUE TEAM

1st OUT BACKSHIFT
2nd OUT DAY SHIFT

2nd OUT BACKSHIFT
1st OUT DAY SHIFT

BACK-UP

EMERGENCY RESPONSE TEAM

REQUIRED POSITIONS
A - INCIDENT COMMANDER (1)
B - EMT (1)
C - SAFETY OFFICER (1)
D - TRUCK OPERATOR (1)
E - FIREFIGHTER (2)
F - BACK-UP RESCUE (2)

MINIMUM LEVEL OF FIRE TRAINING
- FIRE OFFICER I (NFPA 1021)
- STATE CERTIFIED BASIC LIFE SUPPORT
- FIRE OFFICER II (NFPA 1021)
- APPARATUS OPERATOR (NFPA 1002)
- FIREFIGHTER I (NFPA 1001)
- FIREFIGHTER I (NFPA 1001)
NOTIFICATIONS FOR SURFACE FIRE

**PERSONNEL IN IMMEDIATE DANGER**
- PULL BOX, VOCAL, ETC.

**CMR/SECURITY OPERATOR**
- EXT. 8111, RADIO, VOCAL, ETC.

**IMMEDIATE NOTIFICATIONS**

**SECONDARY NOTIFICATIONS**

**EMERGENCY RESPONSE TEAM**
- PAGERS #91, RADIO, ALERT TONE

**AFFECTED SITE PERSONNEL**
- PAGING SYSTEM ALARM & MESSAGE

**SECURITY**
- EXT. 8324, RADIO, VOCAL, ETC.

**OTHER SUPPORT GROUPS**
- AS DIRECTED BY THE F O S S

**H.O.C DUTY OFFICER**
- VARIES
- REFER TO DUTY OFFICER MANUAL

**D.O.E DUTY OFFICER**
- VARIES
- REFER TO DUTY OFFICER MANUAL

**ON-SITE**
- HEALTH PHYSICS
- ENVIRONMENTAL
- SECURITY
- SAFETY & PLANT PROT.
- MINE RESCUE
- BACK-UP EMERGENCY RESPONSE TEAM

**OFF-SITE**
- OTIS F.D.
- S.E. EDNY CO. AMBUL.
- STATE POLICE
**LIST OF REVIEWERS**

**Procedure Number:** WP-12-902  
**Revision Number:** Rev. 1  
**Procedure Title:** SURFACE FIRE RESPONSE

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WP-1236
**LIST OF REVIEWERS**  
*04/28/89*

**Procedure No.:** WP 12-902  
**Revision No.:** 1

**Procedure Title:** Surface Fire Response Procedure

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### LIST OF REVIEWERS

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**Revision Number:** Rev. 1  
**Procedure Title:** SURFACE FIRE RESPONSE  

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<th>Reviewer's Name</th>
<th>Department</th>
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<tr>
<td>W. R. Chiquelin</td>
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<td>Construction</td>
</tr>
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<td>M. L. Petermann</td>
<td>Controller</td>
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<tr>
<td>T. W. Halverson</td>
<td>TRUPACT</td>
</tr>
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<td>QA</td>
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<td>Engineering</td>
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<td>Admin. Services</td>
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<tr>
<td>L. H. Walter</td>
<td>Public Affairs</td>
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WP-1236
**LIST OF REVIEWERS**

04/28/89

Procedure No.: WP 12-902  
Revision No.: 1

Procedure Title: Surface Fire Response Procedure

<table>
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<tr>
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<tr>
<td>L. Reed</td>
<td>SS&amp;EP</td>
<td>1</td>
<td>pg. 1 and attach. 2</td>
</tr>
<tr>
<td>C. Jackson</td>
<td>SS&amp;EP</td>
<td>1</td>
<td>pg. 1 and attach. 2</td>
</tr>
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* Numbers correspond to changes as noted in Section 1.1 of the procedure
1.0 SCOPE

This procedure outlines an effective emergency response in the event that medical care is needed on-site or off-site or at any of the in-town offices. This procedure is intended for Waste Isolation Pilot Plant (WIPP) employees and medical personnel involved in a medical emergency.

The following activities are described in this procedure:

4.1 Emergency Actions - On- and Off-Site Calls
4.2 In-Town Medical Calls

2.0 DEFINITIONS

The following acronyms will be used in this procedure:

- EST - Emergency Services Technician
- FOSS - Facility Operations Shift Supervisor
- HPT - Health Physics Technician
- SI - Security Inspector

3.0 REFERENCES

WP 12-2, WIPP Occupational Health Manual
WP 12-904, Security Emergency Response Procedure
WP 12-908, Contaminated Injured Personnel

*This procedure has been completely revised; side barring will not be used to indicate changes.
4.0 PROCEDURE

4.1 Emergency Actions - On- and Off-Site Calls

Attachment 1 illustrates the appropriate notification hierarchies for surface, on- or off-site, and in-town medical incidents.

1. Security and/or CMR Operator will be notified of an incident in one or more of the following ways:
   - Radio
   - In person
   - Telephone (emergency notification 8111)
   - Messenger or written note
   - Alarm systems

2. The on-duty EST and one SI will respond to the scene.

   NOTE: If the nurse is available, he/she will also respond. The employee's supervisor will be notified. The FOSS will be notified as soon as possible.

3. Security personnel will notify the Westinghouse Duty Manager and the Security Manager. Further actions may be directed by these people.
4. If it is determined that the EOC should be activated, the Westinghouse Duty Manager will obtain permission from the DOE Manager or the DOE Duty Manager and direct Security personnel to activate the EOC.

5. Medical care is given to victims in accordance with the established protocol provided in the CHM (per WP 12-2).

6. If the call involves a medical and rescue situation, the Rescue Truck (Unit 2) will be taken to the scene by an additional SI or EST.

7. If any possibility of contamination exists, an HPT will be notified.

NOTE: Decontamination procedures will be performed in accordance with established protocols provided in WP 12-908.
MEDICAL CARE REQUIRED

8. Medical personnel determine if the victim requires advanced medical care at a hospital.

9. If additional advanced medical care is needed, Security will advise the Carlsbad South Eddy County Ambulance Service (SECAS) and request an ambulance be dispatched to the site.

   NOTE: If there are more injured personnel than can be transported by SECAS, then the Hobbs Ambulance Service will be used to transport the remainder of the injured to Lea Regional Hospital.

10. If medical personnel determine the victim's condition is not critical, he/she will be transferred to a Carlsbad South Eddy County Ambulance somewhere en-route to town.

   NOTE: The NIPP Ambulance will then return to the site to re-establish on-site medical service.

11. If advanced medical care is not required, basic treatment and disposition of victim will be given according to established protocols.
12. Security personnel will secure the accident scene until Safety personnel arrive for accident investigation.
4.2 In-Town Medical Calls

1. If an employee is injured or becomes seriously ill at any WIPP facility in town, the employee's supervisor will be notified immediately and the Carlsbad South Eddy County Ambulance Service called (911).

2. First Aid will be provided by fellow employees at the level they are capable of and with the equipment available until professional help arrives.

3. Emergency services personnel at the site will be notified in order to provide medical tracking and follow-up as required by HP 12-2.

2955+
NOTIFICATIONS FOR MEDICAL, 401 N. CANAL OR 101 W. GREENE

PERSONNEL IN AREA
VOCAL, ETC.

AMBULANCE SERVICE
911

SECURITY
887-8111

WID DUTY MANAGER VARI
SITE PHONE: VARI
HOME PHONE: VARI
PAGER: VARI

DOE MANAGER VARI
SITE PHONE: VARI
HOME PHONE: VARI
PAGER: VARI

WID SSEP MANAGER T. CAMPBELL 8485
HOME PHONE: 885-4472
PAGER: 02
MOBIL PHONE: 887-9472

WID SECURITY MANAGER H. MIKEL 8560
HOME PHONE: 885-3046
PAGER: 47
MOBIL RADIO: #40

WID RSEP MANAGER D. BOYER 8393
HOME PHONE: 885-6352
PAGER: 38

1088:2497b
NOTIFICATIONS FOR SURFACE MEDICAL, ON OR OFF SITE

PERSONNEL IN AREA
VOCAL, ETC.

SECURITY
EXT. 8111, RADIO, VOCAL, ETC.

EMERGENCY SERVICES
ON-DUTY EST
ALERT TONE, EXT. 8483 VOCAL, ETC.

F.O.S.S. FACILITY OPERATIONS SHIFT SUPERVISOR

24 HOUR SERVICE
WID DUTY MANAGER VARIES
SITE PHONE: VARIES
HOME PHONE: VARIES
PAGER: VARIES

DOE MANAGER VARIES
SITE PHONE: VARIES
HOME PHONE: VARIES
PAGER: VARIES

WID SSEP MANAGER T. CAMPBELL 8485
HOME PHONE: 885-4472
PAGER: 02
MOBIL PHONE: 887-9472

WID SECURITY MANAGER H. MIKEL 8560
HOME PHONE: 885-3046
PAGER: 47
MOBIL RADIO: #40

WID RSEP MANAGER D. BOYER 8393
HOME PHONE: 885-6352
PAGER: 38
**LIST OF REVIEWERS**

**Procedure Number:** WP 17-607

**Revision Number:** 1

**Procedure Title:** Medical Emergency Response Procedure

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<td>Admin. Services</td>
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<td>Operations</td>
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<td>T. Campbell</td>
<td>S&amp;ER</td>
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<td>T. Halverson</td>
<td>TWI</td>
</tr>
<tr>
<td>T. Miller</td>
<td>QA</td>
</tr>
<tr>
<td>V. Likar</td>
<td>ERT</td>
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</table>

...
1.0 SCOPE

This procedure describes appropriate emergency responses to be taken by all WIPP employees and subcontractors, including the employees of the Greene Street, Canal Street, and TRUPACT facilities whenever emergency circumstances arise.

2.0 DEFINITIONS

Security Emergencies - Any disruption of the routine operation of the facility or jeopardizes the health and safety of personnel such as bomb threats, civil demonstrations, or hostage situations.

3.0 REFERENCES

WIPP Safety Plan

WIPP Security Plan 11-1, 11-2

4.0 GENERAL

4.1 Responsibilities

It is the responsibility of the Westinghouse Security Manager to provide general orders and training for Security personnel.

The Security personnel will respond to emergencies in accordance with established guidelines.

The Westinghouse Safety, Security, and Environmental Protection Manager shall keep the Crisis Manager informed of findings and shall provide security expertise.

Overall responsibility for a severe security incident at the WIPP site resides with the FBI. The FBI may act in an advisory role or assume control, based on the situation. The U.S. Marshall's Office is another federal agency which can be called upon during incidents.

The FBI has primary investigative responsibility for illegal activities at WIPP. If the FBI declines the responsibility, the Eddy County Sheriff's Department may be called upon to conduct criminal investigations at the request of DOE. Further investigations will be made as required or directed by DOE.
III Jl III II I - II Illll I llN

The Crisis Manager may direct the Westinghouse Security Manager to contact the New Mexico State Police and/or the Eddy County Sheriff’s Department to provide assistance as required.

4.2 Notification Lists

The notification charts in this section serve as general guidelines. The Duty Manager or Security Manager may direct further notification.

The use of "designated" means that the position rotates and the name will be published. The following are notification lists for specific types of security-related emergencies:

SECURITY INCIDENT

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Home Phone</th>
<th>Pager #</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westinghouse Duty Manager</td>
<td>&quot;Designated&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security Manager</td>
<td>Harry Mikel</td>
<td>885-3046</td>
<td>47</td>
<td>8560</td>
</tr>
<tr>
<td>Westinghouse Manager</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety, Security, and Environmental Protection</td>
<td>T. K. Campbell</td>
<td>885-4472</td>
<td>02</td>
<td>8485</td>
</tr>
</tbody>
</table>

If the incident occurs at 401 N. Canal also contact:

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Home Phone</th>
<th>Pager #</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westinghouse Duty Manager</td>
<td>&quot;Designated&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Alternate)</td>
<td>Martell Petermann</td>
<td>None</td>
<td>885-0071</td>
<td></td>
</tr>
</tbody>
</table>

If the incident occurs at the Greene Street building also contact:

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Home Phone</th>
<th>Pager #</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Services Manager</td>
<td>Duty Officer</td>
<td>887-2379</td>
<td>None</td>
<td>885-8883</td>
</tr>
<tr>
<td>(Alternate)</td>
<td>Al Alonen</td>
<td>885-2630</td>
<td>None</td>
<td>885-8883</td>
</tr>
<tr>
<td>(Alternate)</td>
<td>Judy Seal</td>
<td>885-1252</td>
<td>None</td>
<td>885-8883</td>
</tr>
</tbody>
</table>
If the incident occurs at the Nuclear Packaging Facility in town also contact:

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Home Phone</th>
<th>Pager #</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear Packaging</td>
<td>Frank Humiston</td>
<td>887-1009</td>
<td>None</td>
<td>885-0665</td>
</tr>
<tr>
<td>TRU Waste and Integration</td>
<td>Tom Halverston</td>
<td>885-5566</td>
<td>None</td>
<td>885-0526</td>
</tr>
<tr>
<td>(Alternates)</td>
<td>Will Brown</td>
<td>885-5077</td>
<td>None</td>
<td>885-0665</td>
</tr>
<tr>
<td></td>
<td>Jack Johnson</td>
<td>885-5077</td>
<td>None</td>
<td>885-0526</td>
</tr>
<tr>
<td></td>
<td>Don Roberts</td>
<td>885-6203</td>
<td>None</td>
<td>885-8883</td>
</tr>
</tbody>
</table>

If directed by Don Roberts, contact:

<table>
<thead>
<tr>
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<th>Name</th>
<th>Home Phone</th>
<th>Pager #</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOE Safety/Security Manager</td>
<td>Ray Nations</td>
<td>887-3620</td>
<td>31</td>
<td>8114</td>
</tr>
</tbody>
</table>

(Personnel listed below are to be contacted only if incident involves that group.)

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Home Phone</th>
<th>Pager #</th>
<th>Ext.</th>
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<tbody>
<tr>
<td>Bechtel Project Manager</td>
<td>Bob Boutin</td>
<td>887-5179</td>
<td>04</td>
<td>8452</td>
</tr>
<tr>
<td>(Alternate)</td>
<td>Mary Lou Davis</td>
<td>887-0436</td>
<td>None</td>
<td>8458</td>
</tr>
<tr>
<td>Sandia Site Manager</td>
<td>Tom Schultheis</td>
<td>885-1285</td>
<td>24</td>
<td>8423</td>
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Immediate Assistance

<table>
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<tr>
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<tbody>
<tr>
<td>Eddy County Sheriff</td>
<td>887-7551</td>
</tr>
<tr>
<td>Lea County Sheriff</td>
<td>392-2515</td>
</tr>
<tr>
<td>Lea County Oil Field Patrol</td>
<td>397-1217</td>
</tr>
<tr>
<td>Carlsbad Police Department</td>
<td>885-2111</td>
</tr>
</tbody>
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PERSONNEL INJURY/FATALITY

<table>
<thead>
<tr>
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<th>Name</th>
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<th>Pager #</th>
<th>Ext.</th>
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<tr>
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<td>Listed</td>
<td>75</td>
<td>Listed</td>
</tr>
<tr>
<td>Security Manager</td>
<td>Harry Mikel</td>
<td>885-3046</td>
<td>47</td>
<td>8560</td>
</tr>
<tr>
<td>Title</td>
<td>Name</td>
<td>Home Phone</td>
<td>Pager #</td>
<td>Ext.</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>-----------------</td>
<td>------------</td>
<td>---------</td>
<td>------</td>
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<tr>
<td>Manager Emergency Preparedness</td>
<td>Bill Mairson</td>
<td>887-1027</td>
<td>52</td>
<td>8489</td>
</tr>
<tr>
<td>Westinghouse Manager Safety, Security, and Environmental Protection</td>
<td>T. K. Campbell</td>
<td>885-4472</td>
<td>02</td>
<td>8485</td>
</tr>
<tr>
<td>DOE Manager Safety/Security</td>
<td>Ray Nations</td>
<td>887-3620</td>
<td>31</td>
<td>8114</td>
</tr>
<tr>
<td>DOE Public Affairs Manager</td>
<td>Patty Baratti-Sallani</td>
<td>Listed</td>
<td>51</td>
<td>8117</td>
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If the incident occurs at 401 N. Canal also contact:

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<th>Pager #</th>
<th>Ext.</th>
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</thead>
<tbody>
<tr>
<td>Westinghouse Duty Manager</td>
<td>&quot;Designated&quot;</td>
<td>Listed</td>
<td>75</td>
<td>Listed</td>
</tr>
</tbody>
</table>

If the incident occurs at the Greene Street building contact:

<table>
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<th>Title</th>
<th>Name</th>
<th>Home Phone</th>
<th>Pager #</th>
<th>Ext.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Services Manager</td>
<td>Duty Officer</td>
<td>887-2379</td>
<td>None</td>
<td>885-8883</td>
</tr>
<tr>
<td>(Alternate)</td>
<td>Judy Seal</td>
<td>885-1252</td>
<td>None</td>
<td>885-8883</td>
</tr>
</tbody>
</table>

If the incident occurs at the TRUPACT Facility in town also contact:

<table>
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<th>Title</th>
<th>Name</th>
<th>Home Phone</th>
<th>Pager #</th>
<th>Ext.</th>
</tr>
</thead>
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<tr>
<td>TRU Waste and Integration Manager</td>
<td>Tom Halverson</td>
<td>885-5566</td>
<td>None</td>
<td>885-0526</td>
</tr>
<tr>
<td>(Alternate)</td>
<td>Jack Johnson</td>
<td>885-2089</td>
<td>None</td>
<td>885-0526</td>
</tr>
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**Emergency Operations Center (EOC) Activation**

When directed by the DOE-WIPP Project Manager, the Security Inspector will use the "Authorized Into EOC" call list. The Security Inspector will contact at least one person under each heading. If an individual is not contacted by phone, the Security Inspector will attempt to page the individual. In some incidents, a group page may be more expeditious in making notifications.
5.0 PROCEDURE

5.1 Emergency Actions

1. Security will be notified of an incident in one or more of the following ways:
   - Radio
   - In person
   - Telephone (emergency notification 8111)
   - Messenger or written note
   - Alarm systems

2. Security personnel will notify the Westinghouse Duty Manager and the Security Manager. Further actions may be directed by these people.

3. If it is determined the EOC should be activated, the Westinghouse Duty Manager gets permission from the DOE Project Manager or DOE Duty Manager and directs Security personnel to activate the EOC.
4. Upon authorization, Security personnel will contact those offsite agencies that can provide immediate assistance. This could include:

- Contacting the FBI agent in Roswell - (505) 622-6001
- Contacting GTE to initiate tracing a bomb threat - (505) 887-2233
- Sheriff's Department to provide armed deputies - (505) 887-7551
- State Police to investigate traffic accidents, establish roadblocks, or assemble their local SWAT team - (505) 885-3137
- City Ambulance Service - 911
- Otis Fire Department - 885-2111

5. Security personnel will take the immediate actions necessary to protect or safeguard personnel including evacuations and notification of essential personnel. Further actions are based upon the situation.

**NOTE:** Security general orders provide guidance on actions that should be taken in each type of emergency.
6. Security personnel will collect Essential Elements of Information (EEI) to forward to the Crisis Manager and Security Manager. Security will also control access to and from the EOC.

NOTE: During security incidents, security personnel rely heavily on outside support. Lists of agencies the WIPP site coordinates with, specifically for security, are maintained in the WIPP site Security Plan.

NOTE: The FBI has primary jurisdiction and control over all security incidents that occur at the WIPP site. Upon arrival of the FBI, control of the situation may be transferred to the FBI if required.

7. Evidence in a suspected crime will be safeguarded and released to bona fide law enforcement or security agencies only. Security will immediately take measures to control the concerned area for investigative purposes. Attempts will be made to obtain a photographic record of any security incident. As a minimum, an after-action report will be written with a section on lessons learned.
8. Recovery from a security incident will be an organized event. Additional Security personnel will be utilized as necessary to prevent further incidents.

297s+
## LIST OF REVIEWERS

**Procedure Number:** WP 12-904  
**Revision Number:** 0  
**Procedure Title:** Security Emergency Response Procedures

<table>
<thead>
<tr>
<th>Reviewer's Name</th>
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<td>H. Mike</td>
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<td>T. Campbell</td>
<td>SS&amp;EP</td>
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<tr>
<td>T. Halverson</td>
<td>Tru Waste &amp; Interg.</td>
</tr>
<tr>
<td>L. Walter</td>
<td>Public Affairs</td>
</tr>
<tr>
<td>D. Cash</td>
<td>Construction</td>
</tr>
<tr>
<td>V. Likar</td>
<td>E&amp;RT</td>
</tr>
<tr>
<td>P. VerColen</td>
<td>Administrative Serv.</td>
</tr>
<tr>
<td>T. Miller</td>
<td>QA</td>
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<td>W. Chiquelin</td>
<td>Operations</td>
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<td>Controller</td>
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</table>
LIST OF REVIEWERS

Procedure Number: WP 12-904

Revision Number: 0

Procedure Title: Security Emergency Response Procedures

Reviewer's Name | Department
----------------|----------------
W. Moffitt       | General Manager
FIELD CHANGE APPROVAL FORM

Procedure Being Revised: WIPP Underground Emergency

Field Change #: 1, 2, and 3

Date: 04/07/89

Cognizant Manager: Les Reed

Signature

(Print Name)

(Signature)

□ Temporary  □ Permanent

Changes being incorporated (explain location of change; reason for change -- attach revised pages)

1 and 2. Pg. 4

3. Pg. 8.

These changes are to make this procedure and WP 04-5 coincide.

Immediate distribution of field change completed by cognizant manager (list location of manuals to which field change has been completed)

Underground Operations

SS&EP

Affected pages (list all pages affected by this field change)

Page 4 and 8.

983 2449

WP 1637
FIELD CHANGE APPROVAL FORM

Procedure Being Revised: WIPP Underground Emergency

Field Change #: 1, 2, and 3. Procedure Date: 04/07/89

Cognizant Manager: Les Reed

☐ Temporary  ☑ Permanent

Changes being incorporated (explain location of change; reason for change -- attach revised pages)

1 and 2. Pg. 4
3. Pg. 8.

These changes are to make this procedure and WP 04-5 coincide.

Affected pages (list all pages affected by this field change)

Page 4 and 8.

Immediate distribution of field change completed by
cognizant manager (list location of manuals to which
field change has been completed)

Underground Operations

SS&EP
1.0 SCOPE

This procedure provides guidance to Waste Isolation Pilot Plant (WIPP) personnel in underground (U/G) mine facilities during emergency situations that may cause loss of life, serious injury, or serious damage to mine personnel, equipment, or facilities. This procedure will apply to all personnel working or visiting the WIPP U/G mine facilities.

The following activities are detailed in this procedure:

5.1 Response to a Level I Emergency
5.2 Response to a Level II Emergency
5.3 Response to a Level III Emergency
5.4 Response to a Level IV Emergency
5.5 Response to a Special Case Emergency

2.0 DEFINITIONS

Assembly Area - The U/G area used for preliminary accountability of personnel prior to evacuating to the Construction and Salt Handling (C&SH) Shaft station or the Waste Shaft station. Attachment 1 details designated assembly areas.

Central Monitoring Room (CMR) - The location in the Support Building where displays and alarms indicate the mechanical, electrical, chemical, and radiological condition at various points on the site both above and below ground.

Designated Person - A person who is appointed to handle specific responsibilities related to an emergency.

Emergency Services Technician (EST) - Licensed Emergency Medical Technician whose major function in U/G emergencies is to advise the FLIRT and the Mine Rescue Team about treatment of injured personnel. The EST relieves the FLIRT and MRT of injured personnel and accompanies the injured to treatment centers in Carlsbad or Hobbs.

First Line Initial Response Team (FLIRT) - The Emergency Team responding initially to an U/G emergency.

Health Physics (HP) Assembly Area - These assembly areas are located outside of the Radioactive Materials Area (RMA) boundaries for use by individuals working within the RMA. These areas are located at S-1950 and E-100, W-30 and S-700, and the Waste Shaft.
11.54 and restore the plant to a safe, stable condition.

4.0 GENERAL

General responsibilities for U/G emergency procedures are listed below.

The Management and Operating Contractor (MOC) Mining Operations Manager (or designated alternate) is responsible for: (1) establishing a field response headquarters location and alerting crisis management of the location; and (2) taking the necessary steps to control the emergency.

The MOC SS&EP Manager (or designated alternate: Safety and Plant Protection Manager) is responsible for: (1) ensuring that the actions being performed are safe; (2) initiating safety personnel recall, as required; and (3) ensuring emergency facilities and personnel are available, as required.

The MOC Operations Manager (or the designated alternate) is responsible for ensuring that proper operations are being carried out to mitigate the emergency and restore the plant to a safe, stable condition.
The MOC Maintenance Manager (or designated alternate) is responsible for: (1) assuring recall of required Maintenance personnel, as directed through the assistance of the EOC; (2) supporting the Mining Operations Manager and MOC SS&EPM Manager; and (3) providing additional logistics support needed in a given emergency, as directed by the MOC Operations Manager.

The MOC U/G Service Manager (or designated alternate) is responsible for: (1) providing hoisting support as necessary, and (2) coordinating shafts usage for evacuation or emergency control.

The MOC Engineering and Repository Technology Support Manager is responsible for providing engineering support, as required.

The MOC U/G Dispatcher (lamphouse attendant) is responsible for personnel accountability.

The CMR operator is responsible for communicating the emergency and on instruction of the OAT instigating field response by initiating the FLIRT.

The U/G Supervisors and leadpersons are responsible for: (1) reporting mine emergencies to the CMR and Mining Operations Manager; (2) accounting for employees in their area; (3) reporting personnel accountability to the U/G Dispatcher; (4) requesting any additional or available information from the CMR on the emergency situation; and (5) providing for prompt and orderly evacuation of personnel in their area to the closest designated assembly area and then to proceed to the designated shaft station.

The MOC U/G Operations Manager is responsible for: (1) ensuring that adequate communications are established with the EOC, and that timely updates are provided to crisis management therein; (2) arranging for any needed outside assistance and/or coordinating such needs through the Crisis Manager; (3) designating the holding area for evacuated mine personnel; (4) requesting assistance from the EOC to notify the families of the personnel who are authorized to stay at the site as emergency operations personnel; (5) supporting EOC operations as required; (6) ensuring that U/G personnel are properly trained to respond; and (7) field directing of the MRT and the FLIRT.

U/G employees are responsible for: (1) reporting emergencies to the CMR; and (2) following appropriate procedures for U/G emergency response.

The OAT is responsible for: (1) notifying Security to activate the mine emergency notification list; (2) initiating MRT call-out through Security; (3) initiating Mine Rescue Backup Team through Security; (4) initiating FLIRT; (5) notifying ESTs; and (6) supporting EOC operations in directing mine rescue field response activities.

4. Mine Emergency Situations That Require Reporting

   Level I:

   Entrapment (without injury)
   Isolated roof fall (without injury)
   Bomb threat
   Violent demonstrations on surface
Level II:
Non-toxic inundation
Power outage
Hoist failure (30 minutes or greater)
Unplanned release of entrapped gasses (without injury)
Seismic activity as recorded in the CMR
Release of airborne radioactive contamination
Loss of ventilation control
Level III:
Isolated fire (contained)
Isolated inundation with toxic gasses (originating underground)
Roof fall with injuries or hazardous condition
Injury requiring medical attention before transportation to surface
Level IV:
Uncontrolled fire
Inundation of the ventilation system with toxic gasses (originating underground)
Unplanned detonation or U/G explosion
5.0 PROCEDURE

5.1 Response to a Level I Emergency

1. The CMR and Mining Operations Supervisor identifies an emergency situation, after notification by the employee nearest to the emergency area.

2. The Mining Operations Supervisor establishes barriers access to the emergency area.

3. The emergency area is investigated and problem is identified.

4. If the emergency area is not a Level I emergency, the Area Supervisor awaits further instruction from CMR.

5. If a Level I emergency is identified, the Area Supervisor initiates evacuation activities, as appropriate.

6. Personnel evacuate to safe assembly areas and await further instructions.

   NOTE: Personnel inside RMA boundaries, evacuate to HP assembly area.

7. Supervisors or leadpersons account for personnel in their assembly areas and report to dispatcher.
8. The CMR activates the OAT, using PA and radio systems.

9. The OAT activates the FLIRT team.

10. The OAT notifies ESTs of possible injuries.
5.2 Response to a Level II Emergency

1. After notification of a Level II emergency by the CMR or Mining Operations Supervisor, U/G employees evacuate to assembly areas.

   NOTE: The CMR and Mining Operations Supervisor are notified by the employee closest to the emergency.

2. The CMR activates the OAT.

   NOTE: In case of radiological release, OAT shall notify HP.

3. The CMR activates the FLIRT.

4. Crew supervisors or their alternates account for personnel in their assembly areas.

   NO

5. The U/G Mining Operations Supervisor investigates the emergency to determine if the emergency Level II condition still exists.

   YES

6. If the Level II emergency does not exist, the CMR contacts the OAT for further evaluation.
7. If the OAT determines it is safe to return to operations, the emergency situation is called off and operations resume.

8. If the Level II emergency does still exist, the OAT initiates a Level III emergency.

NOTE: HP is notified of the situation.

NOTE: In case of loss of electrical power or hoist failure, the OAT shall determine at which level of emergency the situation merits.
5.3 Response to a Level III Emergency

1. The employee nearest to the emergency situation notifies the CMR.

   **NOTE:** U/G alarms are sounded, if necessary.

2. The CMR activates the FLIRT and the OAT.

   **NOTE:** The MRT is placed on alert standby status.

3. U/G employees are evacuated to the proper assembly areas.

4. The FLIRT Captain and U/G Mining Operations Supervisor respond to the emergency and appraise the emergency situation to determine if it is adequately controlled.

   YES

5. If the emergency situation is adequately controlled, the U/G Mining Operations Supervisor contacts OAT for further directions.

6. If the emergency situation is not yet controlled, a Level IV emergency is initiated.
7. All non-emergency response team personnel, including those in the HP assembly areas, are evacuated.

NOTE: The Area Supervisor must give clear direction as to the condition and route to be taken to the evacuation shaft.
5.4 Response to a Level IV Emergency

NOTE: Level IV emergencies will all be upgraded from Level III by the FLIRT team and the U/G Mining Operations Supervisor. Therefore, reaction to Level IV emergencies will be the same as reactions to Level III emergencies.

1. The employee nearest the emergency notifies the CMR.

2. The CMR activates the OAT and FLIRT.

   NOTE: EOC and MRT are alerted to standby status.

3. The U/G Mining Operations Supervisor and FLIRT Captain initiate a Level IV response from Level III.

4. All U/G employees, including those in the HP assembly areas, evacuate to surface, except for FLIRT and U/G Mining Operations Supervisor.

   NOTE: OAT contacts EOC and places MRT into action.
5. U/G Supervisor and FLIRT Captain evaluate the emergency to determine if it is stable enough for FLIRT action.

6. If the situation is sufficiently stable for FLIRT action, the FLIRT responds to the emergency and establishes an U/G fresh air base.

   NOTE: The MRT responds, as directed.

7. If the situation is not sufficiently stable for FLIRT action, the U/G Mining Operations Supervisor contacts the CMR and remaining personnel evacuate.

   NOTE: The MRT responds, as directed.
5.5 Response to a Special Case Emergency

**NOTE:** Special case emergency response would apply U/G to a surface (on site) emergency. This emergency would consist of a surface fire or release of hazardous material which inundates an intake shaft with smoke and/or hazardous airborne substances.

1. The U/G Services Supervisor is alerted by surface personnel of the special case emergency situation.

**NOTE:** The CMR is notified, and places MRT on alert.

2. The U/G Services Supervisor sounds alarms.

3. U/G Area Supervisors make a check to determine if all U/G employees are accounted for.

4. If some U/G employees are not accounted for, the U/G Area Supervisors notify the CMR and place the MRT into action through the EOC.

5. When all U/G employees are accounted for, the U/G Services Supervisor directs personnel to assembly areas for proper evacuation.
6. The U/G Services Supervisor directs personnel evacuation to the surface through clear egress routes.
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<tr>
<th>Reviewer's Name</th>
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<tr>
<td>R. Nyman</td>
<td>Underground Ops.</td>
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<td>F. Ashford</td>
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<td>B. Lucus</td>
<td>Underground Ops.</td>
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1.0 SCOPE

This procedure outlines an effective emergency response in the event of a national emergency and details the capacities of emergency response to provide search, rescue, and recovery operations when so directed by the Emergency Operations Center (EOC).

2.0 DEFINITIONS

None

3.0 REFERENCES

None

4.0 GENERAL

4.1 Notifications

A national emergency exists following a proclamation by the President of the United States, or a declaration by Congress, that an attack upon the United States is probable, imminent, or has occurred. This effort will be coordinated by the Federal Emergency Management Agency (FEMA).

1. Emergency Warnings

Warnings of the probability, imminence, and potential target areas of an attack on the United States are the responsibility of other Federal Agencies through the National Warning System (NAWAS) and the Emergency Broadcast System (EBS).

The following Civil Readiness Levels and Warning Conditions have been established by FEMA and are to be implemented:

a. Communications Watch

This corresponds to the normal preparedness posture of the WIPP facility.

b. Initial Alert

The WIPP Project will verify communications capability with DOE-AL EOC on a 24-hour basis and review readiness plans and procedures.
c. **Advance Alert**

In addition to general and public participation to achieve the highest state of civil emergency readiness, the Crisis Manager, under the direction of DOE-AL, will shut down nonessential facilities and evacuate the WIPP facility, except for essential shutdown surveillance and operations personnel.

4.2 **Responsibilities**

Should a national emergency occur, the WIPP Crisis Manager is responsible for all emergency response actions at WIPP.

In the event of a national emergency, WIPP will be notified (either by radio or telephone communication) by either DOE-AL, the Eddy County Sheriff, or the Eddy County Civil Defense Director.

Upon receiving notification, the DOE/WPO shall transmit alerts and warnings received to WIPP personnel by the most expedient means. The appropriate evacuation, plant shutdowns, etc. shall begin accordingly. Activities will be implemented consistent with guidance received from DOE-AL.

Local and state authorities are responsible for the assessment, control, and mitigation of consequences of a national emergency affecting areas outside the boundary of the WIPP Project.
5.0 PROCEDURE

5.1 Emergency Actions

1. Following confirmed notification of a National Emergency, the Crisis Manager will immediately assemble the Crisis Management group in the EOC and establish communications with DOE-AL.

2. Facilities and operations will be shut down or placed in a safe operating condition as required.

3. Project personnel will be kept informed of national emergency developments. Emergency signals, warnings, and information will be obtained from the local county Civil Defense Director.
5.2 Recovery Operations

1. Since the nature and extent of a national emergency is unpredictable, recovery operations are based upon survival of personnel or extent to which the emergency had an impact on the nation. The resumption of operations will occur only upon direction of DOE-AL and will be in support of national and DOE goals.

2. The WIPP Project management will assess the WIPP site prior to reentry, and provide the findings to DOE-AL.
LIST OF REVIEWERS

Procedure Number: WF 12-906
Revision Number: 0
Procedure Title: National Emergencies Response Procedure

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<td>General Manager</td>
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1.0 SCOPE

This procedure provides for effective emergency response at the Waste Isolation Pilot Plant (WIPP) in the event of a force of nature incident. In addition, the procedure outlines the plans for WIPP personnel to provide inspections, search, rescue, and recovery operations when so deemed necessary by management personnel.

The following activities are detailed in Section 5.0:

5.1 Severe Meteorological Conditions: Tornadoes or High Winds (Pre-Event Occurrence)

5.2 Severe Meteorological Conditions: Tornadoes or High Winds (Post-Event Occurrence)

5.3 Severe Meteorological Conditions: Thunderstorms, Flash Floods, and Heavy Snowfalls (Pre-Event Occurrence)

5.4 Severe Meteorological Conditions: Thunderstorms, Flash Floods, and Heavy Snowfalls (Post-Event Occurrence)

5.5 Earthquakes (Seismic Alarms)

1.1 Change History

Revision 2 represents a complete revision of WP 12-907; therefore, sidebar indications of procedural changes are not used.

2.0 DEFINITIONS

AGM - Assistant General Manager
AIS - Air Intake Shaft
AOMS - Air Quality Monitoring System
CH - Contact-Handled
CMR - Central Monitoring Room
DOE - Department of Energy
DOE-AL - DOE Albuquerque

EFB - Exhaust Filter Building

EOC - Emergency Operations Center

ERT - Emergency Response Team

E&RT - Engineering and Repository Technology

FLIRT - First Line Initial Response Team

FOSS - Facility Operations Shift Supervisor

FSAR - Final Safety Analysis Report

HP - Health Physics

HVAC - Heating, Ventilation, and Air Conditioning System

LCO - Limiting Conditions of Operations

LPU - Local Processing Unit

MMI - Man Machine Interface

QAT - Operations Assistance Team

OSR - Operational Safety Requirement

PA - Public Address (System)

RH - Remote-Handled

RMA - Radioactive Materials Area

RMS - Remote Monitoring System

SH - Salt Handling (Hoist)

Sufficient Magnitude - 0.1g (gravity - a unit of force equal to the force exerted by gravity on a body at rest) as monitored by the seismic monitoring system.

TRU - Transuranic

U/G - Underground

UPS - Uninterrupted Power Supply

WH - Waste Handling (Hoist)
4.0 GENERAL

General Definitions and Information

Natural emergencies exist when the WIPP site or off-site personnel (or facilities) are threatened—or sustain physical damage—as a result of natural phenomena such as flooding, severe weather (i.e., high winds, tornadoes, hail, lightning, heavy snows, or blizzards, etc.), or seismic activity (earthquakes).

Corrective actions at the facilities or areas experiencing a natural emergency is the responsibility of the FOSS, until relieved by higher authority (i.e., DOE Duty Officer/Crisis Manager). Actions to mitigate the natural emergency will be accomplished in accordance with established procedures and standard known practices as deemed by management, personnel, and state and local officials. The actions taken are based on the following, which are listed in order by priority: 1) provide safety to personnel; 2) secure operations to prevent radioactive contamination both on- and off-site; and 3) provide protection for the facility and equipment. State and local authorities are responsible for the assessment, control, and mitigation of the consequences of a natural emergency occurring outside the boundaries of the WIPP; this includes all Greene Street and 401 Canal personnel.

4.1 Immediate Natural Emergency Responses

Any person aware of the imminent danger or occurrence of a natural emergency shall notify the CMR at 8111 (in-town facilities will phone the Carlsbad Fire Department at 9-911 then the CMR at 887-8111). The CMR will take the actions and make all necessary notifications in accordance with WP 04-4.
Upon receiving notification of an imminently threatening situation—or during the occurrence of an actual emergency resulting from natural phenomena—the FOSS shall initiate appropriate shutdown actions to ensure the safety of personnel and facilities.

Notifications for any of the in-town facilities shall be handled by the appropriate city of Carlsbad response agency. After the proper notification by the CMR, the DOE Duty Officer/Crisis Manager, with the assistance of WID management and the DOE-AL, shall utilize federal, state, or local resources to determine the validity and scope of the emergency, and to mitigate any potential or actual consequences. For information on the notification hierarchy see Attachments 1 and 2.

The DOE Duty Officer/Crisis Manager shall keep DOE-AL informed of the status and shall provide technical data relative to the emergency on a timely basis.

Shutdown and recovery actions shall take place as directed by the FOSS to ensure the immediate safety of site personnel and facilities. The recovery plan will be reviewed with DOE-AL prior to implementation, and, at the discretion of the Crisis Manager, additional review by outside agencies may be solicited. Local and state authorities will coordinate recovery operations for areas outside the boundaries of the facility.

If normal plant operations are suspended following an event, the length of the interruption will depend upon the results of the inspection and the necessary corrective actions. Plant recovery actions will be directed toward returning the plant to a condition that meets the limiting conditions for operations as set forth in Chapter 10 of the FSAR.

NOTE: For the protection of personnel and/or facilities during an unexpected event (i.e., tornado), the FOSS, in accordance with WP 04-4, will activate the FLIRT and the ERT for rescue/shutdown activities.

An initial emergency recovery checklist to be used by the ERT/FLIRT is found in Attachment 3. The checklist will be used until the recovery plan can be developed. All activities listed in Attachment 3 will be assigned by the WID E&RT Manager as directed by the Crisis Manager.

4.2 Site Inspections

Post-emergency event inspections will be conducted for assurance of operability of the WIPP critical facilities after obtaining the Crisis Manager's approval. A technical inspection team organized by the WID E&RT Manager will perform inspections and will be comprised of personnel from the following departments:

- Environment, Safety and Health
- Mining, Maintenance and Total Quality
- Operations
- Engineering and Repository Technology
- Quality Assurance
The WID E&RT Manager shall use the Inspection Team Call-Out List (Attachment 4) to assemble the inspection team. Attachment 4 lists the individuals that will assist the WID E&RT Manager in assembling a qualified inspection team (i.e., structural engineer will assist in inspecting structural damage to a system). The assembled team, under the direction of the WID E&RT Manager, will develop an inspection plan that will be approved by the DOE Duty Officer/Crisis Manager.

Checklists (Attachments 5 - 7) have been developed and will be used for documentation by the assigned inspection team for inspections that include the following areas: Note: The WID E&RT Manager determines the areas to be inspected. Also, the inspection forms used during the inspections are not limited to the items listed on the forms. An additional attachment sheet will be provided for other items that may require inspection.

The following facilities, systems, and associated equipment will be evaluated for inspection requirements based on the type, security, and affected areas of the event. For seismic events, all listed facilities and systems will be inspected for damage.

4.2.1 Hoists

Shafts and Hoist Systems

- AIS Hoisting Plant
- SH Shaft Hoisting Plant
- WH Shaft Hoisting Plant

4.2.2 Plant Facilities

Building Structure

- Waste Handling Building
- Exhaust Filter Building
- Support Building
- Pump House
- Site Substation
- Diesel Generator Sheds
- CMR
- UPS
- Guard and Security Building
- Safety Building/EOC
- MMI
- Secondary EOC
Waste Handling System

Waste Handling Systems and Equipment

- CH Bay Area (cranes and docks)
- RH Bay Crane
- Cask Receiving Area
- Remote Handling (Hot Cell)
- Waste Container Transfer
- Shuttle Car
- Hot Cell
- Cask Loading Room
- Cask Unloading Room
- Transfer Cell

Monitoring Systems, Controls and Instrumentation

- Radiation Monitoring and Alarm Systems
- All OSR related LPUs
- Central Monitoring System

HVAC Systems

- Contamination Control (WHB, HVAC, hot cell HVAC)
- Underground Ventilation

As noted on the inspection form, the inspections will be conducted after an occurrence involving a tornado or earthquake.

NOTE: Other post-event inspections will be determined by the Crisis Manager (i.e., damage due to high winds). In such cases, the same inspection forms will be used.

Also other items located on site may require inspection as directed by the Crisis Manager (i.e., sewage pond, trailers, underground conditions, etc.).

The intent of these inspections is to assure usability of the facilities for the following:

- Emergency egress of site personnel
- Continued monitoring of critical site facilities
- Containment control
- Monitoring of site environment (AQMS, RMS, etc.)

The severity and magnitude of the events will be assessed by the WIPP engineering groups following completion of the damage assessment checklists. Recommendations for continued usage or shutdown for repairs, if necessary, will be evaluated and acted upon as deemed necessary by management participants.
5.0 **PROCEDURE**

The following subsections (5.1-5.5) describe the actions the CMR will take upon their awareness of the imminent danger or occurrence of a natural emergency. The DOE Duty Officer will be notified by the CMR as illustrated in Attachments 1 and 2.

5.1 **Severe Meteorological Conditions: Tornadoes or High Winds (Pre-Event Occurrence)**

**NOTE:** Warnings of tornadoes or high winds will be announced by the National Weather Service or by observance of the Weather Channel by the CMR operator or by local observers. Warnings received by Security will be passed on to the CMR. The following actions shall be taken if one of the following actions occur: 1) tornado warning in the WIPP area; 2) a tornado is sighted in the WIPP site area; 3) winds reach 60 mph; or 4) winds are predicted to exceed 60 mph.

1. The CMR operator will warn personnel via the PA system of the danger, and direct all personnel to seek shelter. Personnel located in trailers will be notified by phone to ensure notification.

2. The Shift Supervisor shall contact the DOE Duty Officer updating the current status of the situation. Also, an inquiry will be made to stop incoming waste shipments to the site. If a decision is made to stop an incoming shipment, the CMR operator will notify the transporter per WP 06-3A.

3. Again direct personnel via PA system to take shelter in nearest permanent building, if time permits.

4. The Shift Supervisor shall direct ERT and Security personnel to make a rapid search of all site surface areas, particularly the trailers, to ensure all site personnel have taken shelter inside permanent WIPP buildings.
NOTE: If winds reach 60 mph, employees located in trailers will be instructed via telephone to stay inside and seek cover.

5. The Shift Supervisor shall direct that 1) all waste handling activities be stopped; and 2) hoist operations will be limited to emergency mantrips only.

6. Office wardens shall ensure personnel have moved away from outside building walls and windows via the telephone and PA system.

7. The Waste Handling Supervisor shall verify all waste handling activities have been secured and that any waste on the surface has been placed in safe condition (i.e., no suspended loads).

NOTE: If weather conditions are determined normal by the National Weather Service or by local observers, the DOE Duty Officer/Crisis Manager will determine if normal operations are to be resumed and/or will direct recovery actions, if required.
5.2 Severe Meteorological Conditions: Tornadoes or High Winds (Post-Event Occurrence)

NOTE: The following actions shall be taken after one of the following events occur: 1) a tornado strikes the WIPP site; 2) winds reach 90 mph or above at the WIPP site.

1. The CMR operator will notify personnel via the PA system updating the status of the event.

2. Waste Handling personnel shall notify the CMR of any known or potential releases of waste materials following the event.

   NOTE: The tornado dampers will be checked to verify correct position for operational compliance.

3. The CMR operator, under the direction of the FOSS and in accordance with WP 04-4, will activate the FLIRT and the OAT.

4. The FLIRT will conduct a visual search of all underground areas and the ERT will conduct a visual search on the surface for injured personnel and obvious structural damage.

5. The technical inspection team will be organized as described in Section 4.2.
NOTE: The hoist(s) will not be used until a preoperation inspection is conducted.

6. If damage to critical site structures (e.g., hoist, MHB, EFB, and equipment) or other RMA structures occurs as a result of the high winds or tornado, a recovery plan will be implemented via direction of the DOE Duty Officer/Crisis Manager.
5.3 Severe Meteorological Conditions: Thunderstorms, Flash Floods, and Heavy Snowfalls (Pre-Event Occurrences)

NOTE: Warnings of severe meteorological conditions (e.g., thunderstorms, lightning, flash floods, heavy snowfall) will be announced by the National Weather Service and monitored on the Weather Channel by the CMR operator or by local observers. Warnings received by Security will be passed on to the CMR.

1. The CMR operator will warn personnel via the site PA system of the danger, and will direct all personnel to seek shelter. The CMR operator will warn personnel located in trailers by phone to ensure notification.

2. The Shift Supervisor shall contact the DOE Duty Officer updating the current status of the situation. Also, an inquiry will be made to stop incoming waste shipments to the site. If a decision is made to stop an incoming shipment(s), the CMR operator will notify the transporter per WP 06-3A.

3. Due to the possibility of lightning and hail during a severe thunderstorm warning, the Shift Supervisor shall direct all waste handling building cranes be secured and hoist mantrips limited to emergencies only.
NOTE: If weather conditions are determined normal by the National Weather Service or by local observers, the DOE Duty Officer/Crisis Manager will determine if normal operations are to be resumed and/or will direct recovery actions, if required. Site personnel shall be directed to take shelter inside buildings via the PA system.
5.4 Severe Meteorological Conditions: Thunderstorms, Flash Floods, and Heavy Snowfalls (Post-Event Occurrences)

NOTE: The following actions shall be done after one of the events occurs as directed by the DOE Duty Officer/Crisis Manager.

1. The CMR operator will notify personnel via the PA system updating the status of the event.

2. Waste Handling personnel shall notify the CMR of any known or potential releases of waste materials following the event (i.e., thunderstorms, flash floods, or heavy snowfalls).

3. The CMR operator, under the direction of the FOSS and in accordance with WP 04-4, will activate the FLIRT, ERT, and the OAT, as required.

4. At the end of the meteorological condition, the FOSS shall activate the ERT and conduct a visual search of all surface areas for injured personnel and obvious structural damage.

5. The WID E&RT Manager, under the Crisis Manager's direction, will appoint a technical inspection team, if required.

NOTE: The hoist(s) will not be used until a pre-operational inspection is conducted.
6. If, as a result of a meteorological event there is damage to site facilities or personnel have been injured, a recovery plan will be implemented via direction of the DOE Duty Officer/Crisis Manager.
5.5 Earthquakes (Seismic Alarms)

NOTE: Seismic alarms may come from one of two seismic instruments or from personnel. One is located underground and the other on the surface (free field). They are set to alarm at 0.1g acceleration in any one of three axes. The following actions shall be carried out if one of the following conditions occur: 1) a seismic alarm (>0.1g) confirmed by the U.S. Geological Service; 2) a seismic alarm (>0.1g) confirmed by reports of ground movement felt by site personnel; or 3) reports of ground movement felt by site personnel and obvious physical damage to site facilities.

The CMR operator will notify personnel via the PA system updating the status of the event.

1. The WH Supervisor or other area personnel shall:
   - Notify the CMR of any known or potential releases of waste materials resulting from the earthquake.
   - Notify the CMR when all waste handling activities have been secured and placed in a safe configuration.

2. The Hoistman (AIS, SH, WH) shall secure all hoisting operations once any mantrips in progress have been completed, and will notify the CMR updating the status of the hoist.

   NOTE: The hoist(s) will not be used until a preoperation inspection is conducted by an appointed inspection team.
3. The FOSS shall verify all seismic dampers have been closed and the associated ventilation systems are secured.

NOTE: Damage and injuries resulting from a seismic event may be site-wide and may have disrupted normal communications.

NOTE: If the seismic alarm is verified to be a spurious alarm, the FOSS may restore the facility.

4. Under the direction of the Shift Supervisor, the ERT, assisted by available Security personnel, shall make an immediate search of all surface facilities for injured personnel and obvious structural damage.

5. The FLIRT shall make a search of all underground areas for injured personnel and obvious structural damage.

6. The HP Supervisor shall immediately initiate checks on the effluent monitoring stations to verify they are still in operation, as required by plant conditions, and will provide guidance to the OAT on directing movement of personnel in the RMA.
7. The FOSS shall initiate additional radiation surveys, as necessary to determine the spread of contamination from waste storage and handling areas, if any.

8. The DOE Duty Officer/Crisis Manager will direct that inspection of facilities and equipment be made by appointing a qualified inspection team, as directed in Section 4.2. If significant damage to critical site structures is found, a recovery plan will be implemented via the direction of the DOE Duty Officer/Crisis Manager.

NOTE: If effluent monitoring stations are not operational, Chapter 10 of the FSAR (Limiting Conditions for Operation) will be followed for alternate monitoring methods.
NOTIFICATIONS FOR FORCES OF NATURE:
401 N. CANAL, 101 W. GREENE
or TRUPACT OFFICE

Personnel in Imminent Danger
VOCAL, ETC.

CMR
887-8111

Carlsbad Fire Department
9-911

Primary Notification

DOE Duty Officer
Security
887-8324

Notification of Personnel Listed Below to Be Made by Security

MOC Duty Manager
MOC ES&H Manager
MOC Sec. Manager

Emergency Services
On-Duty EST
Alert Tone, Ext. 8493
Vocal, ETC.

Safety and Plant Protection Manager

WID General Manager
Assistant General Manager
Operations Manager

WID Engineering and Repository Technology Manager
QA Manager
Tru Waste and Integrations Manager

Underground Services Managers
Facility Operations Manager
Fire Protection Engineer

* Mandatory notifications
NOTIFICATIONS FOR SURFACE FORCE OF NATURE, ON or OFF THE SITE

PRIMARY NOTIFICATION

PERSONNEL IN AREA
VOCAL, ETC.

CMR
EXT. 8111, RADIO
VOCAL, ETC.

DOE DUTY OFFICER
SECURITY
8324

1) Make an appropriate site wide notification via the PA system
2) Notify the Facility Operations Shift Supervisor.
3) Notify the Underground Foreman and Hoisting Supervisor.
4) Notify the Waste Handling Supervisor.

NOTIFICATION OF PERSONNEL LISTED BELOW TO BE MADE BY SECURITY

MOC DUTY MANAGER • MOC ES&H MANAGER • MOC SEC. MANAGER

EMERGENCY SERVICES

ON DUTY EST
ALERT TONE, EXT. 8493
VOCAL, ETC.

SAFETY AND PLANT PROTECTION MANAGER

WID GENERAL MANAGER
ASSISTANT GENERAL MANAGER
OPERATIONS MANAGER

ENGINEERING AND REPOSITORY TECHNOLOGY MANAGER
UNDERGROUND OPERATIONS AND MAINTENANCE MANAGER
TRU WASTE AND INTEGRATIONS MANAGER

UNDERGROUND SERVICES MANAGER
FACILITY OPERATIONS MANAGER
FIRE PROTECTION ENGINEER

UNIVERSITY OF CHICAGO COLUMBIAN HOSPITAL
OTIS FIRE DEPARTMENT
SOUTH EDGLEY COUNTY AMBULANCE
885-2111
911 or 885-2111

Mandatory notifications

2032 5a
RECOVERY PLAN
CHECKLIST

Initial
When Complete

1) Direct office warden to account for personnel via Office Warden Program.

2) Direct FLIRT to make rapid search of underground areas for injured personnel and obvious structural damage.

3) Direct ERT to make rapid search of surface areas for injured personnel and obvious structural damage.

4) Establish conditions of plant; and perform a visual inspection of the AIS, SH, and waste hoists.

5) Establish normal plant lineups for electrical distribution and ventilation.

6) Direct Radiation Safety to verify containment of wastes.

7) Direct Radiation Safety to initiate checks of the effluent monitoring stations. If possible, restore operability.

8) Perform CH preoperational checks and record on checklists.

9) Perform RH preoperational checks per WP 05-013, WP 05-015, WP 05-017, WP 05-019, WP 05-020, and WP 05-202.

10) Develop a plan to return to normal operations.
### INSPECTION TEAM
### CALL-OUT LIST

<table>
<thead>
<tr>
<th>Group</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering and Repository Technology</td>
<td>V. F. Likar G. B. Becker</td>
</tr>
<tr>
<td></td>
<td>J. J. Garcia M. R. Brown</td>
</tr>
<tr>
<td></td>
<td>R. F. Cook</td>
</tr>
<tr>
<td></td>
<td>T. F. Kocialski T. P. Burrington</td>
</tr>
<tr>
<td>Operations</td>
<td>R. Kuginskisie W. W. Bridges</td>
</tr>
<tr>
<td></td>
<td>C. E. Conway</td>
</tr>
<tr>
<td></td>
<td>H. R. White</td>
</tr>
<tr>
<td>Mining, Maintenance and Total Quality</td>
<td>J. R. Halls H. Bibby</td>
</tr>
<tr>
<td></td>
<td>H. Lucas D. L. Schoen</td>
</tr>
<tr>
<td></td>
<td>S. O. Watson J. L. Ray</td>
</tr>
<tr>
<td>Environment, Safety and Health</td>
<td>T. K. Campbell L. L. Reed</td>
</tr>
<tr>
<td></td>
<td>R. D. Boyer</td>
</tr>
<tr>
<td></td>
<td>R. F. Kehrman</td>
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<tr>
<td>Quality Assurance</td>
<td>T. D. Miller</td>
</tr>
<tr>
<td></td>
<td>J. E. Atchenson</td>
</tr>
<tr>
<td></td>
<td>M. J. Trefren</td>
</tr>
<tr>
<td>Assistant General Manager</td>
<td>W. P. Poirier</td>
</tr>
</tbody>
</table>

**NOTE:** Security will contact individuals listed above.

* Primary Notification
# WASTE HOIST POST TORNADO/ EARTHQUAKE INSPECTION

**I. WASTE HOIST**

<table>
<thead>
<tr>
<th>Initial</th>
<th>Normal</th>
<th>Repair Req'd.</th>
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<tbody>
<tr>
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</tbody>
</table>

1. Visual inspection of hoist ropes from collar to head sheave, deflection sheave back to collar. Verify in grooves.
2. Visual inspection of guide ropes from collar to suspension anchors
3. Visual inspection of hoist rockers and bolts
4. Visual inspection of brake fluid levels
5. Visual inspection of brake piping
6. Visual inspection of concrete at collar area
7. Check motor armature clearances
8. Check for bearing movement
9. If possible, visual inspection of guide ropes, tail ropes and brake weights in the sump
10. Visual inspection of dry transformers, converter and bus bars
11. Visual inspection of conduit and conduit penetration
12. Standard hoist and conveyance preoperational checks
13. Shaft inspection ropes, lining and utilities
14. Visual inspection of structural steel
15. Tornado resistant doors

**Comments:**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

FACILITY IS USABLE FOR EMERGENCY ACCESS AND EGRESS: YES [ ] NO [ ]

**WID E&RT Manager**

**Date**

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Page 1 of 2
WASTE HOIST
POST TORNADO/EARTHQUAKE INSPECTION

CONTINUATION SHEET

ADDITIONAL COMMENTS:

________________________________________________________________________
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WP Form 1859; 10/4/89
Page 2 of 2
AIR INTAKE SHAFT AND SALT HANDLING HOISTS
POST TORNADO/ EARTHQUAKE INSPECTION

<table>
<thead>
<tr>
<th>Initial</th>
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<th>Repair Req.</th>
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<tbody>
<tr>
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</tbody>
</table>

1. Visual inspection of building
2. Visual inspection of hoist rope from collar over head sheave back to drum
3. Visual inspection of head frame, including sheaves and bearings
4. Visual inspection of collar area
5. Visual inspection of head sheaves and bearings
6. Visual inspection of concrete and collar doors at collar area
7. Visual inspection of concrete supporting hoist; if heaving or cracking, check shaft alignment
8. Visual inspection of drums, bearing and shafts
9. Visual inspection of electrical gear
10. Visual inspection of oil lines
11. Check motor armature clearances - SH hoist
12. Visual inspection of conduit, cable and penetrations
13. Visual inspection of dry transformers, converters, bus bars and grids (etc.), as appropriate
14. Standard hoist and conveyance preoperational checks
15. Shaft inspection lining and utilities
16. Visual inspection of rope as it unwinds from the drum

Comments: ______________________________________________________

__________________________________________________________________

__________________________________________________________________

FACILITY IS USABLE FOR EMERGENCY ACCESS AND EGRESS: YES □ NO □

WID E&RT Manager ____________________________ Date ____________

WP Form 1858; 10/4/89
Page 1 of 2
AIR INTAKE SHAFT AND SALT HANDLING HOISTS
POST TORNADO/EARTHQUAKE INSPECTION

CONTINUATION SHEET

ADDITIONAL COMMENTS:

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__________________________________________________________________________
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__________________________________________________________________________
__________________________________________________________________________
# FACILITY INSPECTION REPORT
## POST TORNADO/EARThQUAKE INSPECTION

<table>
<thead>
<tr>
<th>FACILITY NO.</th>
<th>FACILITY NAME</th>
<th>DATE</th>
</tr>
</thead>
</table>

## FACILITY CONDITION

1. SUMMARY

## 2. COMPONENT CONDITIONS

### STRUCTURAL COMPONENTS
- FOUNDATION
- ROOF
- EXTERIOR SIDING
- INTERIOR WALLS
- FLOORS
- DOORS

### MECHANICAL COMPONENTS
- PIPING
- HEATING
- AIR COND.
- VENTILATION
- DOOR CONTROLS
- SPECIALITY ITEMS

### ELECTRICAL COMPONENTS
- CONTROLS
- WIRING
- FIXTURES
- SWITCHES
- OUTLETS

### YARD COMPONENTS
- YARD SURFACE
- WALKWAYS
- ROAD SURFACE
- ROAD SHOULDERS
- CULVERTS
- CATTLE GUARDS
- BERMS

### OTHER COMPONENTS

---

WID E&R'T Manager | Date
---|---

CONTINUED ON BACK
<table>
<thead>
<tr>
<th>FACILITY INSPECTION REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST TORNADO/EA RTHQUAKE INSPECTION</td>
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</tbody>
</table>

**DEFICIENCIES REQUIRING IMMEDIATE CORRECTION:**

<table>
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<tr>
<th>ITEM</th>
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</table>

**DEFICIENCIES REQUIRING DEFERABLE CORRECTION:**

<table>
<thead>
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<th>ITEM</th>
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</thead>
<tbody>
<tr>
<td>Reviewer's Name</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>T.D. MILLER</td>
</tr>
<tr>
<td>J.R. WALLS</td>
</tr>
<tr>
<td>R. KUGINSKIE</td>
</tr>
<tr>
<td>T.K. CAMPBELL</td>
</tr>
<tr>
<td>V.F. LIKAR</td>
</tr>
<tr>
<td>T.W. HALVERSON</td>
</tr>
</tbody>
</table>

* Numbers correspond to changes as noted in Section 1.1 of the procedure
1.0 SCOPE

This procedure outlines an effective emergency response to be initiated in the event that contaminated personnel require medical care on site.

2.0 DEFINITIONS

None

3.0 REFERENCES

WP 12-9, Emergency Procedure Manual
WP 12-2, WIPP Occupational Health Manual
WP 12-501, Personnel Decontamination Procedure
WP 12-903, Medical Response Procedure
DOE 5480.11

4.0 GENERAL

The following acronyms will be used in this procedure:

ERT - Emergency Response Team
EST - Emergency Services Technician
HSA - Health Services Administrator, Site Nurse
HPT - Health Physics Technician
SI - Security Inspector

Maximum whole body exposure to workers is limited to 5 rem/yr.
4.0 GENERAL

4.1 Spill Preparedness and Prevention

In no case will oil or hazardous material be dumped into a sewer or on the ground. All containers will be kept closed when not in use to prevent evaporation or spills. Managers will ensure that spill control material is available in areas in which hazardous materials are routinely stored or used. Training in spill control techniques will be provided by the Radiation Safety and Emergency Programs Section (RSEPS).

4.2 Spill Reporting

If a spill occurs and can be fully cleaned up with no loss to the environment (air, water, soil), no special reporting is required. If a hazardous material enters a sewer or is lost to the environment, it is imperative that the individual causing or detecting the spill call extension 8111 immediately. If there is any question about whether or not a release to the environment has occurred, the employee should contact the Regulatory and Environmental Programs Section (REPS) Manager. In accordance with WP 02-605, REPS must report the release to DOE, which in turn must report the incident to the proper authorities, usually within 24 hours. Therefore, timely notification is of the utmost importance.

4.3 Hazardous Material Incident Response

The initial response to any hazardous material incident will be to protect human health and safety, then the environment. Identification, containment, treatment, and disposal will be secondary responses. All hazardous material incident response will be conducted by personnel wearing the appropriate personal protective equipment.

Attachment 1 lists spill levels and corresponding response and cleanup responsibilities. The ERT will provide initial response to spills which cannot be safely managed by the responsible individual(s). After the spill has been stabilized, any contamination will be removed. If necessary, REPS will arrange for a cleanup contractor. Any wastes will be disposed in accordance with WP 02-601, Nonradioactive Hazardous Waste Management.

4.4 Recordkeeping and Reporting

A WIPP Hazardous Material Incident Report, WP 1563, will be completed for each reportable spill incident immediately following the response. The incident report will be maintained in a file by the Radiation Safety and Emergency Programs Section for a minimum of three years.
6. The on-duty EST and/or the HSA and one HPT will accompany the victim to the hospital in the site ambulance.

7. If patient is in a radiation zone and injuries are not life threatening, remove patient to non-radiation area.

8. If advanced medical care is not required, medical treatment and decontamination protocols will be followed as outlined in the WIPP Occupational Health Manual (WP 12-2) and the Personnel Decontamination Procedure (WP 12-501).

9. Security personnel will secure the accident scene until proper authorities arrive for accident investigation.
<table>
<thead>
<tr>
<th>Reviewer's Name</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. Campbell</td>
<td>IP</td>
</tr>
<tr>
<td>D. Cash</td>
<td>Administration</td>
</tr>
<tr>
<td>W. Chiquelin</td>
<td>Operations</td>
</tr>
<tr>
<td>T. Miller</td>
<td>OI</td>
</tr>
<tr>
<td>E. Gardner</td>
<td>Human Services</td>
</tr>
<tr>
<td>V. Likar</td>
<td>Engineering</td>
</tr>
<tr>
<td>F. VerGalen</td>
<td>Admin. Services</td>
</tr>
<tr>
<td>D. Farrow</td>
<td>Grants, Contracts</td>
</tr>
</tbody>
</table>
1.0 **SCOPE**

This procedure delineates the proper methods which will be used to control spills of nonradioactive hazardous materials at the Waste Isolation Pilot Plant (WIPP). The intent of this procedure is to protect human health and safety, to minimize the effect of a hazardous material spill on the environment, and to ensure safe and prompt control, containment, cleanup, and disposal of hazardous material spills. This document provides guidance for personnel who become aware of any unintentional release of a hazardous material to the environment, as well as for employees involved in control, containment, and cleanup.

2.0 **DEFINITIONS**

**Emergency Response Team (ERT)** - Group of individuals trained to provide response to emergency incidents involving the release or potential release of nonradioactive hazardous materials.

**Hazardous Material** - Chemical designated as hazardous by 49 CFR 172.101, including those chemicals designated as hazardous by 40 CFR 302 and 40 CFR 261. This definition includes fuels and oils.

**Spill** - Includes, but is not limited to any spilling, leaking, pumping, pouring, emitting, or dumping of oil or other hazardous materials.

**Spill Control Material** - Material used to stabilize, absorb, and/or neutralize releases of hazardous materials in order to minimize hazards and to facilitate cleanup.

3.0 **REFERENCES**

29 CFR 1910.120, Hazardous Waste Operations

40 CFR 261, Identification and Listing of Hazardous Waste

40 CFR 302, Designation, Reportable Quantities, and Notification

49 CFR 172.101, Hazardous Materials Table

WP 02-601, Nonradioactive Hazardous Waste Management

WP 02-605, Environmental Incident Notification

WP 02-8, WIPP Spill Prevention, Control, and Countermeasures Plan
WP 12-7, WIPP Emergency Plan

WP 12-911, Emergency Response Team Operations Nonradioactive Decontamination Procedures

4.0 GENERAL

4.1 Spill Preparedness and Prevention

In no case will oil or hazardous material be dumped into a sewer or on the ground. All containers will be kept closed when not in use to prevent evaporation or spills. Managers will ensure that spill control material is available in areas in which hazardous materials are routinely stored or used. Training in spill control techniques will be provided by the Radiation Safety and Emergency Programs Section (RSEPS).

4.2 Spill Reporting

If a spill occurs and can be fully cleaned up with no loss to the environment (air, water, soil), no special reporting is required. If a hazardous material enters a sewer or is lost to the environment, it is imperative that the individual causing or detecting the spill call extension 8111 immediately. If there is any question about whether or not a release to the environment has occurred, the employee should contact the Regulatory and Environmental Programs Section (REPS) Manager. In accordance with WP 02-605, REPS must report the release to DOE, which in turn must report the incident to the proper authorities, usually within 24 hours. Therefore, timely notification is of the utmost importance.

4.3 Hazardous Material Incident Response

The initial response to any hazardous material incident will be to protect human health and safety, then the environment. Identification, containment, treatment, and disposal will be secondary responses. All hazardous material incident response will be conducted by personnel wearing the appropriate personal protective equipment.

Attachment 1 lists spill levels and corresponding response and cleanup responsibilities. The ERT will provide initial response to spills which cannot be safely managed by the responsible individual(s). After the spill has been stabilized, any contamination will be removed. If necessary, REPS will arrange for a cleanup contractor. Any wastes will be disposed in accordance with WP 02-601, Nonradioactive Hazardous Waste Management.

4.4 Recordkeeping and Reporting

A WIPP Hazardous Material Incident Report, WP 1563, will be completed for each reportable spill incident immediately following the response. The incident report will be maintained in a file by the Radiation Safety and Emergency Programs Section for a minimum of three years.
4.5 **Responsibilities**

**Plant Personnel** - Responsible for attending training classes on safe handling of hazardous materials and spills, becoming familiar with the specific hazardous materials used routinely and with safety precautions to be used in handling these materials, to know how to deal with spills, leaks and other potential emergencies involving hazardous materials used routinely and to call extension 8111 to report any release or potential release of hazardous materials to the environment.

**Job Supervisors** - Responsible for ensuring that all hazardous materials are handled in accordance with special procedures or requirements addressed in a safe work permit. Supervisors must also ensure that employees involved in the handling of hazardous materials are familiar with the associated hazards of the materials and appropriate emergency procedures and ensure the availability of appropriate and adequate spill control material in hazardous material use and storage areas.

**Operations Shift Supervisor** - Responsible to act as coordinator of all emergency activities related to the control and cleanup of hazardous material spills in order to eliminate any immediate hazards to personnel and the environment. The Operations Shift Supervisor will also request assistance from supporting organizations, and ensure appropriate notifications of site personnel.

**Radiation Safety and Emergency Programs** - Personnel are responsible for maintaining a supply of spill control material and equipment for use during response, and for providing spill control training.

**Regulatory and Environmental Programs** - Personnel will provide guidance on cleanup activities after an incident has been controlled, make arrangements for cleanup contractors if necessary, provide guidance on the proper containerization of wastes, arrange for the treatment, storage, and disposal of hazardous wastes and ensure that proper notification of federal, state and local authorities is made.

**Safety and Plant Programs** - Personnel will assist with hazard determination, provide material safety data sheets, advise on the proper personal protective equipment, provide on-scene industrial hygiene monitoring, advise on required spill control material and equipment, and promote spill prevention awareness.
5.0 PROCEDURE

5.1 Spill Reporting

1. In the event of an unintentional release of a hazardous material, any employee who becomes aware of the release should attempt, without taking risk, to contain the spill. He or she should use spill control material available in the area or soil diked to prevent the spill from spreading.

   **NOTE:** Spill control material should be applied beginning at the outer edge of the spill and working towards the center.

2. Once the initial containment has been completed or if the employee is unable to stabilize the spill, the employee shall report the spill by dialing the CMR or Security Operator on extension 8111 or by using radio channel 3.

   **NOTE:** The caller should state the exact location and type of spill, an estimate of the quantity involved, and his/her name and location.
3. Immediately after the spill is reported, the CMR or Security Operator will contact the Operations Shift Supervisor (OSS) and the Emergency Services Technician (EST). The FOS will ensure that the REPS and Safety and Plant Programs Section (S&PPS) Managers are notified.

4. If the spill has not been contained by the personnel involved, the OSS will determine whether activation of the ERT is necessary.

5. If the spill has been contained, the EST will provide assistance with cleanup.

6. If activation of the ERT is necessary, the OSS will request that the CMR Operator notify the members.

7. The ERT members will assemble at an area designated by the OSS.
5.2 Hazardous Material Incident Response

1. The ERT will isolate the hazard area in order to keep personnel not directly involved in emergency response operations away from the affected area.

2. The EST with the assistance of S&PPS, will identify immediate and potential hazards.

   NOTE: Personnel responding must be made aware of hazards associated with materials involved.

3. The ERT, under the direction of the OSS, will initiate response procedures that prevent the recurrence or spread of fires, explosions, or spilled hazardous materials. If a spill has occurred, the ERT will stabilize the spill using an appropriate spill control material.

4. As soon as the incident has been controlled, the OSS or EST will provide REPS with the information necessary for notification of the proper authorities in accordance with WP 02-605.
5.3 Spill Cleanup

1. The OSS will determine whether cleanup can be performed by site personnel or if the assistance of a cleanup contractor will be required.

2. If the assistance of a cleanup contractor is required, the OSS will notify the REPS Manager who will make the appropriate arrangements.

3. If the cleanup can be performed by site personnel, a trained team will remove and containerize contaminated spill control materials and/or contaminated soils. This team will label all containers with the identity of the contents.

   Note: Hazardous materials, as well as contaminated soil and spill control material, become waste upon spillage. The REPS Manager must be notified of any waste generated by a hazardous material spill cleanup.

4. The ERT will inspect each piece of equipment used in response to the incident. The OSS shall ensure that the equipment is decontaminated, in operating condition for future emergency response, and is replaced if necessary.
5. Contaminated personal protective equipment will be decontaminated or containerized for proper disposal in accordance with WP 02-601.

6. Contaminated personnel will be decontaminated in accordance with WP 12-911. Proper medical treatment will be administered and personnel will be notified of any exposure data.
5.4 Recordkeeping and Reporting

1. Immediately following the response, the on-duty EST will complete WP 1563, WIPP Hazardous Material Incident Report (Attachment 2) except for Section XII according to the instructions.

2. The EST will immediately transmit a copy of the report to the REPS Manager and transmit the original to the OSS, the Radiation Safety and Emergency Programs Section (RS&EPS) and REPS Managers for review and signature.

3. Copies of the signed report will be distributed to managers of all organizations involved.

4. The original incident report shall be maintained in a RS&EPS file for a minimum of three years.

5. After wastes generated by the incident have been disposed, the REPS Manager will complete Section XII of the original incident report and return the form for filing in the appropriate RS&EPS file.
<table>
<thead>
<tr>
<th>Spill Level</th>
<th>Type of Spill</th>
<th>Emergency Response</th>
<th>Cleanup</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Spill which poses a significant risk to human health or safety or to the environment and which because of its size or hazard cannot be adequately managed by Facility Emergency Response Teams</td>
<td>By Facility Emergency Response Team or if necessary an outside emergency response contractor</td>
<td>As soon as possible by an outside cleanup contractor</td>
<td>Leak in underground storage tank system</td>
</tr>
<tr>
<td>II</td>
<td>Spill which once contained has potential for loss to the environment and poses a risk to human health or safety or to the environment</td>
<td>By Facility Emergency Response Team</td>
<td>By a trained team immediately following initial response</td>
<td>Reportable quantity release of sulfuric acid</td>
</tr>
<tr>
<td>III</td>
<td>Spill which once contained has little or no potential for loss to the environment and does not pose a risk to human health or safety or to the environment</td>
<td>By Facility Emergency Response Team</td>
<td>By a trained team, may be delayed until next working day</td>
<td>Oil spill contained on impermeable surface of such a magnitude that it cannot be managed without assistance of personnel outside the work area</td>
</tr>
<tr>
<td>IV</td>
<td>Small spill discovered by trained employee(s) in his (their) work area, which can be safely contained and cleaned up by same employee(s) without loss to the environment</td>
<td>By employee(s) in his (their) work area</td>
<td>By employee(s) in his (their) work area, immediately following containment and control</td>
<td>Oil spill on impermeable surface discovered and cleaned up by employee in his work area</td>
</tr>
</tbody>
</table>

NOTE: If an employee feels he/she cannot safely contain or clean up a spill, he/she should immediately report the spill to the CMR Operator by dialing 8111.

**Spills which involve a reportable quantity of a hazardous substance shall be classified as at least a Level II spill.**

**All wastes resulting from spill cleanup must be managed in accordance with WP 02-601.**
<table>
<thead>
<tr>
<th>I.</th>
<th>SITE - SURFACE</th>
<th>SITE - UNDERGROUND</th>
<th>OFF SITE RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>II.</td>
<td>DATE:</td>
<td>TIME:</td>
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<tr>
<td>E.S.T. ON DUTY:</td>
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<tr>
<td>REPORTED LOCATION:</td>
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<tr>
<td>REPORTED BY:</td>
<td>DEPARTMENT:</td>
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</tr>
<tr>
<td>INITIALLY REPORTED TO:</td>
<td>DEPARTMENT:</td>
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<td></td>
</tr>
<tr>
<td>RESPONSIBLE DEPARTMENT:</td>
<td>SUPERVISOR:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III.</td>
<td>TYPE OF INCIDENT: (SPILL, LEAK, ETC.)</td>
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<tr>
<td>MATERIAL INVOLVED</td>
<td>UN/NA #</td>
<td>QUANT.</td>
<td>HAZ. CLASS</td>
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<td></td>
</tr>
<tr>
<td>IV.</td>
<td>SCENE WEATHER CONDITIONS: (OBTAIN FROM SECURITY OR REGIONAL AIRPORT)</td>
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<td>WIND DIRECTION:</td>
<td>WIND SPEED:</td>
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<td>TEMPERATURE:</td>
<td>C/F</td>
<td>FORECAST:</td>
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<td>V.</td>
<td>INTERNAL NOTIFICATIONS:</td>
<td></td>
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<tr>
<td>DEPARTMENT</td>
<td>NAME OF PERSON</td>
<td>TIME</td>
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</table>
### WIPP HAZARDOUS MATERIAL INCIDENT REPORT

<table>
<thead>
<tr>
<th>VI.</th>
<th>IF MATERIALS INVOLVED IGNITED, PLEASE FILL OUT PROPER FIRE REPORT AND ATTACH COPY TO OFFICIAL REPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII.</td>
<td>WAS THERE AN RQ RELEASE OF AN E.P.A. HAZARDOUS SUBSTANCE?</td>
</tr>
<tr>
<td></td>
<td>IF YES, DETERMINATION MADE BY: ___ DEPT: ___</td>
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<tr>
<td></td>
<td>NOTIFICATION MADE BY: ___ DEPT: ___</td>
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<td>AGENCIES NOTIFIED:</td>
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<td>TIME: ___ HRS DATE: ___</td>
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<td>TIME: ___ HRS DATE: ___</td>
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<td>TIME: ___ HRS DATE: ___</td>
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<td>VIII.</td>
<td>METHOD OF CONTAINMENT AND CONTROL:</td>
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<tr>
<td></td>
<td>METHOD:</td>
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<td>IX.</td>
<td>METHOD OF CLEAN-UP:</td>
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<td>METHOD</td>
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<tr>
<td>X.</td>
<td>CONTAINMENT, CONTROL AND CLEAN-UP ACTIVITIES:</td>
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<td>PERSONNEL INVOLVED</td>
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<tr>
<td>XI.</td>
<td>LIST EQUIPMENT USED FOR CLEAN-UP AND CONTROL MEASURES:</td>
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<td>MATERIAL/EQUIPMENT</td>
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WIPP HAZARDOUS MATERIAL INCIDENT REPORT

XII. DISPOSAL:

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>EPA HAZARDOUS WASTE (Y/N)</th>
<th>METHOD OF DISPOSAL</th>
<th>FINAL DISPOSITION</th>
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</table>

XIII. LIST ANY CONTAMINATED PERSONNEL:

<table>
<thead>
<tr>
<th>NAME</th>
<th>DEPT/AGENCY</th>
<th>DECON (Y/N)</th>
<th>MEDICAL TREATMENT</th>
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XIV. NARRATIVE/DESCRIPTION OF INCIDENT AND RESPONSE:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

ATTACHMENTS? YES ☐ NO ☐

XV. CC:

CC: ____________________________

RAD. SAFETY AND S.P. MGR. REVIEW DATE: ____________________________

OPERATIONS SHIFT SUPERVISOR REVIEW DATE: ____________________________

REGULATORY AND ENV. PROG. MGR. REVIEW DATE: ____________________________

REPORT SUBMITTED BY: ____________________________ DATE: ____________________________

652.1563
WIPP Hazardous Material Incident Report

WP 1563

Instructions

I. Indicate the location of the incident.

II. Identify the date and time the incident occurred and the EST on duty. Enter the specific location of the incident and the name and department of the individual who initially reported the incident. Indicate the name and department of the individual to whom the incident was initially reported. Identify the department responsible for the work area in which the incident occurred and the name of the supervisor or manager in charge.

III. Briefly describe the type of incident, e.g. spill, leak, etc. For each hazardous material involved fill in the name of the material, the DOT UN/NA number, the quantity of material involved, the DOT hazard class and the NFPA code. If necessary enter UNK for items without an appropriate answer or if the answer is unknown.

IV. Indicate the weather conditions at the time and scene of the incident.

V. List the department, the name of the individual notified, the time and the name of the individual who made the notification.

NOTE: Notifications should at a minimum include Radiation Safety and Emergency Programs, Safety and Plant Programs, Regulatory and Environmental Programs and the department/section responsible for the area in which the incident occurred.

VI. If a fire was involved, attach the appropriate fire report.

VII. In this section indicate whether there was a release of an EPA hazardous substance in a reportable quantity (RQ) as defined by 40 CFR 302. Indicate the name and department of the individual who made this determination. If there was an RQ release, indicate the time and date of the initial notification and the agency or agencies notified. Identify the name and department of the individual who made the notification(s).

VIII. List the methods of containment and control.

IX. Identify the method of cleanup and the name and department of the individual who approved the cleanup measures.

X. List the name and department of all personnel involved in containment, control and cleanup activities. For each individual indicate any material contact.

XI. List the type and quantity of any equipment during control and cleanup and indicate whether decontamination or replacement is required.
XII. For each hazardous material fill in the chemical name. Indicate whether it is an EPA hazardous waste. Identify the method of disposal and the final disposition of the waste.

XIII. List the name and department of any contaminated personnel. Indicate whether decontamination was required and identify any medical treatment administered.

XIV. Provide a description of the incident which took place and the response activities which occurred.

XV. CC: managers of any departments involved. Upon review Radiation Safety and Emergency Programs Manager, Operations Shift Supervisor, and Regulatory and Environmental Programs Manager sign and date. The EST responsible for preparation of the report signs and dates the incident report.
# LIST OF REVIEWERS

Procedure Number: WP 12-09

Revision Number: 0

Procedure Title: Nonradioactive Hazardous Materials Spill Control

<table>
<thead>
<tr>
<th>Reviewer's Name</th>
<th>Department</th>
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<tbody>
<tr>
<td>W. Bridges</td>
<td>Facility Operations</td>
</tr>
<tr>
<td>R. Boyer</td>
<td>RS&amp;EP</td>
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<tr>
<td>M. Brown</td>
<td>E&amp;RT</td>
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<tr>
<td>R. Allen</td>
<td>Construction</td>
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<tr>
<td>L. Wilhelm</td>
<td>S&amp;FFS</td>
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<tr>
<td>L. Rencehausen</td>
<td>S&amp;FFS</td>
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<tr>
<td>B. Fehrman</td>
<td>Reps</td>
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<tr>
<td>R. Youngman</td>
<td>QA</td>
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</table>
1.0 SCOPE

This procedure defines emergency evacuation from the WIPP site surface and underground areas to a specified safe destination. The procedure does not include provision for events that happen subsequent to an evacuation.

The purpose of this plan is to provide the necessary direction and information to conduct a safe and orderly evacuation from the WIPP site to a specified safe destination(s). This plan supplements plans for the evacuation of individual areas.

An evacuation may be needed for one or more of the following conditions:

- Hazardous Chemical Release
- Radiological Release
- Fire
- Bomb Threat
- Anti-Nuclear Demonstrator Acts
- Seismic Activity
- Natural Disaster
- National Emergency

2.0 DEFINITIONS

Alternate Staging Area - An area designated by the Facility Operations Shift Supervisor if the primary staging area is unusable.

Area Evacuation - An evacuation of a specific area or areas of the facility (i.e., Zone 1, Support Building; Zone 2, Waste Handling Building; Zone 3, Auxiliary; or Zone 4, Underground). See Attachment 1, CMS Zone Maps.

Assembly Area - A designated underground (U/G) area for the assembly of U/G personnel during evacuation of the mine. U/G personnel muster in this area to determine initial personnel accountability and to await direction from supervisors/senior personnel/hoistman. See Attachment 2.

Building Evacuation - Evacuation of a specific building.

Crisis Manager - The DOE WIPP Manager, or designee.

Dosimetry - A method used to measure personnel ionizing radiation exposure. A TLD is a type of dosimeter.
Evacuation Alarm - An alarm (yelp tone) initiated either locally (i.e., fire pull box) in a building, within a specific zone, or initiated by the CMR operator for multiple areas, to begin evacuation procedures.

Essential Personnel - Personnel who have assigned duties which prevent their immediate departure from the site during an evacuation. The hoistman, Facility Operations Shift Supervisor and Emergency Response Team personnel are examples of essential personnel.

Operations Shift Supervisor (OSS) - The Facility Operations Supervisor in charge of operations during a specified shift, at the WIPP site.

Hoistman - Operator of the hoist (waste or M&M). The hoistman is responsible for assisting the CMR Operator with communications and coordination of the underground evacuation.

Operations Assistance Team (OAT) - Includes one CMR operator, the U/G Manager and at least one cognizant manager from Experimental Operations, Mining Operations, or Support Services. This team assembles at the CMR during any underground emergency.

Nonessential Personnel - Personnel who do not have assigned duties during a facility emergency.

Office Warden - An individual assigned responsibility for assuring that all personnel are evacuated from the office warden's assigned area or building during evacuations. Responsibilities include:

- Maintaining order
- Directing personnel to the staging area
- Performing accountability of assigned personnel at the staging area
- Reporting to the Staging Area Supervisor the results of the personnel accountability.

Primary U/G Evacuation Route - Designated drifts in the mine, identified by green reflectors on the rib, which make up the preferred route of evacuation.

Pre-Staging Area - An area immediately west of the Guard and Security Building designated for the assembly of personnel who were working in a contamination area when the site evacuation was announced. See Attachment 3.

Secondary U/G Evacuation Route - Designated drifts in the mine, identified by red reflectors on the rib, which make up the alternate route to be used during an evacuation should the primary route be impassable or hazardous.

Staging Area - The WIPP site parking lot located north and west of the Guard and Security Building (the main gate). See Attachment 3.
Staging Area Supervisor (SAS) - An individual assigned responsibilities during evacuations at the staging area. These duties include:

- Maintaining order at the staging area
- Direction of office wardens at the staging area
- Receiving reports from the office wardens for personnel accountability
- Reporting to security on evacuation status
- Control of personnel at the staging area

Site (or Site-Wide) Evacuation - An evacuation of all areas of the facility, surface and underground, within the secured, fenced boundary.

3.0 REFERENCES

DOE Order 5500.2, Emergency Planning, Preparedness and Responsibilities for Operations

DOE AL Order 5500.2A Emergency Planning, Preparedness and Responsibilities for Operations

DOE Order 5480.1 Environmental Protection, Safety and Health Protection Program for DOE Operations

Office Wardens Handbook

WP 12-7, WIPP Emergency Plan

WP 04-4, Site Operations and Monitoring Plan

WP 12-107, Emergency Notification of Site Personnel

WP 12-108, Underground Emergency Procedure

WP 12-5, WIPP Radiation Safety Manual

4.0 GENERAL

4.1 Authorization of a site evacuation must come from the Crisis Manager (DOE Duty Manager).

4.2 The OSS is the senior official on site until relieved by higher ranking management. The OSS may authorize a site evacuation if personnel danger is imminent.

4.3 Each employee shall proceed to the main parking lot and line up behind the sign corresponding to his/her organization.

4.4 All WIPP employees who are not assigned specific evacuation actions, all visitors, and all employees of contractors shall proceed to the staging area for accountability. Personnel shall stay at the staging area until instructed to return to normal duties or released from the site by the Staging Area Supervisor.
4.5 Supervisors and Office Wardens shall be responsible for the welfare of all employees in case of emergency.

4.6 All supervisors with disabled employees shall ensure physically impaired employees are assisted to the staging area and/or the evacuation buses or private vehicles.

4.7 Supervisors shall account for all personnel, including visitors, in their group and report to the SAS.

4.8 When released from the Site by the SAS, personnel shall board buses or private vehicles (in the same manner they came to work, if possible). Employees shall travel to their place of residence unless otherwise directed by the SAS. The routes to be taken are as follows:

**Primary**

Carlsbad/Otis/Artesia, - North on North Access Road to the junction of 62-180, turn west and proceed to their residence

Hobbs - North on North Access Road to the junction of US 62-180, turn east and proceed to their residence

**Alternate**

South on South Access Road to the junction of NM 128 (Jal Highway) turn west to the Junction of NM 128 and NM 31

Carlsbad/Otis/Artesia residents turn south to the junction of NM 31 and US 285, turn west and proceed to place of residence

Hobbs residents turn north on NM 31 to junction of US 62-180, turn right on 62-180 and proceed to place of residence.

In instances involving the release of hazardous materials (chemical or radiological), all personnel released from the site shall stop at a location to be designated for monitoring unlimited release.

4.9 Safety, Security and Environmental Protection (SSEP) shall be responsible for:

- Planning and coordination of the site wide evacuation plan. SSEP shall also ensure that all training necessary in connection with this plan is performed by the responsible party.
- Providing staff, training, and actions necessary for radiological and medical response.
- Providing personnel and equipment to screen evacuees for radioactive contamination or toxic exposure and necessary medical assistance.
• Traffic control from the parking lot. Security shall also be responsible for coordination with city county, and state law enforcement agencies.

• Maintaining an up-to-date roster of personnel by name and dosimetry number at Security.

4.10 Employees working in contaminated areas when the evacuation is announced shall minimize contact with other personnel during the evacuation. These personnel shall evacuate to the pre-staging area and notify Health Physics personnel at the pre-staging area of their need to be monitored for contamination.
5.0 PROCEDURE
5.1 Underground Evacuation


2. CMR/Security notify waste hoistman and M&M hoistman.

3. CMR operator activates U/G PA evacuation alarm.

4. Waste hoistman activates U/G PA evacuation alarm, if necessary.

5. Personnel evacuate to assembly areas.

6. Supervisor/senior person at each assembly area accounts for all personnel. Accountability is to be accomplished per Attachment 4.

7. Report status of accountability to CMR.

8. Supervisor/senior person establishes communication with CMR operator.

9. Personnel evacuate mine based on direction from the OAT. Use primary route when possible. Use the secondary route to go around impassable areas of the primary route. Personnel are to evacuate to shaft as directed by the OAT.
10. When the U/G employees have reached the surface, they shall follow section 5.2 of this procedure.

NOTE: If there is a potential for contamination of U/G personnel, they should assemble at the pre-staging area.
5.2 Surface Evacuation

1. Notify the CMR/Security (8111, radio, vocal, other) of emergency condition.

2. CMR/Security notify the OSS of emergency condition.

3. CMR notify waste hoistman and M&M hoistman of emergency condition.

4. OSS directs notification to the Crisis Manager.

5. When authorized by the Crisis Manager, the OSS directs the CMR operator to sound the evacuation alarm to evacuate the site. The OSS shall direct personnel to the alternate staging area should conditions not permit access to the staging area.

6. CMR operator sounds the evacuation alarm. The CMR operator makes the following announcement:

   "A site evacuation is in effect— all nonessential personnel evacuate. This is not a drill." Repeat message twice.

   The CMR operator shall announce the alternate staging area at this time, if required. Repeat the alternate staging area message twice.

7. OSS direct Security to notify Office Wardens of evacuation.
8. Office Wardens instruct all personnel to leave the work station in an orderly manner and to muster in the staging area.

9. Nonessential personnel perform an orderly evacuation of their work areas to the staging area. Personnel shall take their personnel dosimetry with them during the evacuation. Dosimetry shall be collected at the staging area.

10. Employees are to ensure that all personnel they are escorting are taken with them to the staging.

11. Personnel in anti-contamination clothing shall follow the guidelines in Attachment 5.

12. Employees shall assist other employees or visitors who have physical impairments to the staging area.

13. Essential personnel shall report to their supervisor/duty station for instructions.

14. Office Wardens verify area personnel are evacuated and then proceed to the staging area.

15. Personnel who have evacuated to the staging area shall assemble at their designated locations. The locations are indicated by signs along the fence in the parking lot (primary staging area). (See Figure 1.)
16. Essential personnel shall evacuate when released by their supervisor.

17. Office Wardens/supervisors shall collect dosimetry and initiate accountability of personnel per Attachment 4.

18. Employees shall report missing persons or persons who were not at work to the Office Warden at time of muster.

19. Office Wardens and supervisors determine if personnel are missing and report the status to the SAS.

20. SAS shall notify EOC of status of personnel accountability.

21. OSS is responsible for directing efforts to locate missing personnel.

22. Health Physics shall survey personnel who have the potential of being contaminated.

23. If further site evacuation is necessary, SAS shall release personnel.

24. Personnel are to leave in the vehicle they came to the site in, whenever possible. Private vehicles and buses are to leave in an orderly, caravan manner. All vehicles shall use the designated route. When released from the site personnel shall proceed to their home or residence.
| Facilities and Structures Numbers | Telephone Hut | Armory Building | Hazardous Waste Storage Building | Gatehouse | Vehicle Fuel Station | EXHAUST SHAFT HOIST EQUIPMENT WAREHOUSE | SULLAIR COMPRESSOR BUILDING | UIS & QA | OEG TRAILER | PP & C TRAILER | 5k Cable Fab Trailer | 5k Cable Fab Trailer | Safety Trailer | Environmental Safety and Health | SANDIA CAL LAB #1 | SANDIA M101 | SANDIA Annex | SANDIA MOBILE TRANSPORT | SANDIA CAL LAB #2 | SANDIA BS&B Annex | SANDIA LABORATORY TRAILER | TRAINING TRAILER | CONSTRUCTION Mgmt and Maintenance Complex | CONSTRUCTION Mgmt Annex | CONSTRUCTION Mgmt | SANDIA NATIONAL LAB TRAILER | SANDIA STORAGE AND PREPARATION TRAILER | REGULATORY AND ENVIRONMENTAL STORABLES | NEWS CHANGE TRAILER | SAFETY EVALUATION PROGRAMS TRAILER | PP & C TRAILER | SANDIA TRAILER | PURCHASING TRAILER | PURCHASING TRAILER | SECURITY/TOC TRAILER | MOBILE STORAGE BUILDING | MOBILE STORAGE BUILDING | MOBILE STORAGE BUILDING | MOBILE STORAGE BUILDING | MOBILE STORAGE BUILDING | MOBILE STORAGE BUILDING | WIND TURBINE BUILDING |
|----------------------------------|----------------|----------------|---------------------------------|-----------|---------------------|------------------------------------------|-----------------------------|---------|-----------|------------|----------------|-------------------|----------------|-------------------------|-----------------|----------------|----------------|----------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| SPA'S UTILITY SUBSTATION | FAC 253 | BLD 488 | BLD 473 | BLD 474 | BLD 475 | BLD 480 | BLD 482 | BLD 485 | TRL 806 | TRL 807 | TRL 808 | TRL 808A | TRL 808B | TRL 909 | TRL 910 | TRL 911A | TRL 911B | TRL 911C | TRL 911D | TRL 911E | TRL 911F | TRL 911G | TRL 912 | TRL 913 | TRL 914 | TRL 914A | TRL 915 | TRL 916 | TRL 917 | TRL 918 | TRL 931B | TRL 971 | TRL 982 | TRL 984 | TRL 985 | TRL 986 | TRL 987 | TRL 988 | TRL 989 | TRL 989A | TRL 989B | TRL 989C | TRL 989D | TRL 989E |
| 13.8 KV SWITCHGEAR 25P-SWM18/1 | FAC 253 | BLD 488 | BLD 488 | BLD 474 | BLD 475 | BLD 480 | BLD 482 | BLD 485 | TRL 806 | TRL 807 | TRL 808 | TRL 808A | TRL 808B | TRL 909 | TRL 910 | TRL 911A | TRL 911B | TRL 911C | TRL 911D | TRL 911E | TRL 911F | TRL 911G | TRL 912 | TRL 913 | TRL 914 | TRL 914A | TRL 915 | TRL 916 | TRL 917 | TRL 918 | TRL 931B | TRL 971 | TRL 982 | TRL 984 | TRL 985 | TRL 986 | TRL 987 | TRL 988 | TRL 989 | TRL 989A | TRL 989B | TRL 989C | TRL 989D | TRL 989E |
UNDERGROUND FACILITIES

1. ROOM D: ROCK MECHANICS STATION FOR BECKTEL BRINE INFLOW AND HUMIDITY SCALEUP
2. 1-7: ROCK MECHANICS STATION AND PLUGGING AND SEALING EXPERIMENTS
3. C-1:
4. C-2:
5. 1-8: INSTRUMENT SHED FOR ROOM A-3
6. 1-9: INSTRUMENT SHED FOR ROOM A-2
7. 1-4: INSTRUMENT SHED FOR ROOM A-1
8. ROOM A-3: THERMAL STRUCTURE INTERACTIONS, BASELINE
9. ROOM A-2: THERMAL STRUCTURAL INTERACTIONS, BASELINE
10. ROOM A-1: THERMAL STRUCTURAL INTERACTIONS, BASELINE WASTE PACKAGE PERFORMANCE, BASELINE
11. ROOM B: THERMAL STRUCTURAL INTERACTIONS, OVERTEST WASTE PACKAGE PERFORMANCE OVERTEST
12. 1-3: INSTRUMENT SHED FOR ROOM B
13. ELECTRICAL SUBSTATION NO. 2A
14. SWITCH STATION
15. ROOM 1: (EXPERIMENTAL)
16. SANDIA LAB SHOP
17. TEMPORARY UNDERGROUND SHOP
18. L-1: PLUGGING AND SEALING TEST SERIES D & INSTRUMENT SHED
19. L-2: PLUGGING AND SEALING TEST SERIES D
20. ROOM 2: (EXPERIMENTAL)
21. ROOM 4: MATERIALS INTERFACE INTERACTIONS TEST
22. ROOM 3: (EXPERIMENTAL)
23. CORE STORAGE
24. ROOM T: CH/TRU DRUM CRUSHING RH/TRU SIMULATED HEATERS
25. I-2: INSTRUMENT SHED FOR ROOM H, J, & T
26. ROOM 4: SALT BLOCK FABRICATION
27. ROOM H: THERMAL STRUCTURAL INTERACTIONS, ASYMMETRICAL PILLAR
28. ENTRY TO ROOM G
29. ELECTRICAL SUBSTATION NO. 2B
30. I-1: INSTRUMENT SHED FOR ROOM G
31. ROOM G: THERMAL STRUCTURAL INTERACTIONS, REFERENCE
32. MINING OPERATIONS TOOL AND STORAGE SHED
33. UNDERGROUND CONFERENCE ROOMS
34. MINING OPERATIONS TOOL AND STORAGE SHED
35. EMERGENCY VEHICLE PARKING
36. ELECTRICAL SUBSTATION NO. 1 & SWITCH STATION
37. TEMPORARY FUEL STATION
38. ELECTRICAL Switch STATION
39. WASTE HANDLING VEHICLE PARKING
40. RH DEMO AREA
41. CONSTRUCTION SITE VENTILATION BOOSTER FANS
42. UNDERGROUND SHOP
43. WASH BAY
44. ROOM 1: UNDERGROUND STORAGE AREA
45. UPOV EXPLORATION DRIFT-SOUTH
46. WASTE HANDLING DIESEL FUEL STATION
47. PARTS, LUNCH, OFFICE
ACCOUNTABILITY

Site Personnel

Note: Site personnel shall evacuate through the vehicle trap, unless directed otherwise, to the staging area. Personnel shall take their dosimetry with them.

A. Supervisors/Office Wardens

1. Receive an Accountability Form and personnel roster from Security at guard station and proceed to staging area.
2. Report to his/her assigned staging area.
3. Collect the dosimetry badges of your employees as they check in with you.
4. Identify escorted personnel.
5. Indicate missing or injured persons and their possible whereabouts.
6. Report results of accountability to SAS.
7. Release people as directed by the SAS.

B. Employees

1. Bring any escorted personnel with you to your assigned area.
2. Assist disabled or injured personnel, if possible, to the staging area.
3. Report to your responsible supervisor/Office Warden at the assigned area in the staging area.
4. Report missing or injured employees, if known, to your supervisor/Office Warden. Remain in assigned area and wait to be released.

C. Essential Personnel

Vehicle(s) shall be available for all essential personnel. Examples of essential personnel are: CMR Operator, hoistman, bottomlander, OSS, Emergency Operations Center personnel, Emergency Response Team members, Security Inspectors, and Supervisors.

Essential personnel may be identified by yellow and international orange background stripes behind their badge portrait.
ACCOUNTABILITY

Surface

1. Accountability of personnel will be achieved by comparison of film badges collected from personnel at the staging area and from the guard house to a site roster.

2. Personnel whose badge is not "in hand" will be considered to be on-site.

3. Communication by on-site team leaders and the SAS will be required to account for essential personnel who are at their duty station.

4. Individuals who are not accounted for at this point shall be deemed missing and reported as such to the EOC.

Underground at Assembly Area

1. Supervisors/senior personnel perform head count at assembly area and at hoist area.

Underground Personnel at Staging Area

See Surface (above)
ACCOUNTABILITY FORM

Organization ____________________________________________

Supervisors/Office Wardens

1. Receive Accountability Form and personnel roster from Security at guard station and proceed to staging area.
2. Report to his/her assigned staging area.
3. Collect the dosimetry badges of your people as they check in with you.
4. Identify escorted personnel.
5. Indicate missing or injured persons and their possible whereabouts.
6. Collect dosimetry badges.

I. Item 3 - Personnel have been accounted for per attached roster
   y / n / see item 6

<table>
<thead>
<tr>
<th>Office Warden</th>
<th>Area Supervisor</th>
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II. Item 4 - Identify escorted personnel

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ACCOUNTABILITY FORM
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III. Item 6 - Identify missing or injured personnel

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IV. COMMENTS:

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GUIDELINES FOR PERSONNEL WORKING IN CONTAMINATION AREAS

Personnel in Contamination Areas*

1. Remove outer set of anti-C coveralls and shoe covers at stepoff pads before evacuating.

   If only one set of anti-C coveralls are worn, remove shoe covers and outer gloves only at pad.

2. Report to the pre-staging area.

   Note: Be careful not to touch anyone or any objects unless necessary, and maintain a reasonable distance from other personnel.

3. Health Physics Technician shall survey personnel for contamination and provide yellow poly bags at the pre-staging area for disposal of radiation protection and/or contaminated clothing.

*NOTE: Should removal of outer anti-C clothing in steps 1 and 2 delay evacuation such that personnel safety is impacted, personnel should evacuate to an area removed from the danger and then perform steps 1 or 2.
# List of Reviewers

**Procedure Number:** 12-01-01

**Revision Number:** 00

**Procedure Title:** Site Evaluation

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1.0 SCOPE

This procedure establishes the actions necessary to respond to an event during which surface contamination is found, including the initiation of recovery actions.

1.1 Change History

Pages 1 and 3 - 10/02/89

2.0 DEFINITIONS

HPS - Health Physics Supervisor
HPT - Health Physics Technician
WHT - Waste Handling Technician
WHS - Waste Handling Supervisor

3.0 REFERENCES

WP 12-501, Personnel Decontamination
WP 12-505, Direct Radiation Surveys
WP 12-503, Personnel Contamination Surveys
WP 12-504, Surface Contamination Surveys
WP 05-030, Radiation Work Permits
WP 04-4, CMS Operational Monitoring Plan

4.0 GENERAL

The operating philosophy at the WIPP is to keep radiation exposures ALARA, As Low As Reasonably Achievable. One way to accomplish this goal is to clean up contamination to acceptable levels as soon as it is discovered. Whenever contamination or unexpected radiation levels are encountered, ensure the equipment involved is placed in a safe, stable configuration and notify the Health Physics Technician (HPT) and the Waste Handling Supervisor (WHS). If the contamination can be sealed in a container, such as a TRUPACT or a cask, normal operations can continue once the container is removed from the normal handling stream. Decontamination can then be conducted in an area remote from other operations.

If the contamination event determined that the area was evacuated and a reentry is necessary, a pre-reentry briefing shall be conducted by the Waste Handling Supervisor and Health Physics Supervisor prior to reentry.

The steps in this procedure will be conducted as a joint effort between Operational Health Physics and Waste Handling Operations.
5.0 PROCEDURE

1. STOP all activities in the immediate area.

2. WARN personnel, and evacuate the area. Go to a known safe area as directed by the HPT. Notify the CMR, and request that the appropriate notifications and announcements be made per WP 04-4. As a minimum, provide the CMR with the following information:
   - Contaminated personnel
   - Alarming Continuous Air Monitor (CAM) or Area Radiation Monitor (ARM)
   - Injured personnel
   - Fire in or near contaminated waste
   - Actual or possible spread of contamination outside the Waste Handling Building
   - Number and location of dropped or damaged waste packages

3. ISOLATE the area. Post personnel at each entrance until barricades using radiological tape or rope and signs can be emplaced.
4. **MITIGATE the incident.**

- Perform a whole body frisk of affected personnel, and segregate contaminated from uncontaminated personnel. When necessary, decontaminate personnel per WP 12-501.
- Limit the potential spread of contamination:
  - WMS and HPS conduct briefing
  - Don Anti-Cs per WP 12-502
  - Reenter incident area
  - Assess the extent of contamination, if any, and quantify
  - Fix loose surface contamination as it is found
  - Exit the incident area, and remove Anti-Cs per WP 12-502

Response actions are now complete.

5. **Initiate recovery operations by processing a Radiation Work Permit (RWP) utilizing information acquired during the mitigation operation. Use the following guidelines in writing the RWP:**

- Determine scope of recovery operations
- Assign recovery personnel
- Evaluate known radiological conditions
- Determine protective equipment requirements
- Determine extent of health physics coverage
• Supply any special instructions which may include:

- Setting up a barrier and control points encompassing the known contaminated area

- Changing barricade locations at entrances to the incident area, as necessary, to allow restoration of peripheral routine operations to the extent possible

- Collecting FAS and CAM filters; and setting up a portable air sampler(s), if necessary

• Obtain appropriate signatures

6. Convene a committee comprised of appropriate Operations and Radiation Safety personnel to formulate decontamination plans by issuing a RWP using Section 11.0 of WP 12-5, WIPP Radiation Safety Manual for guidance.

7. Using a management appointed committee, determine the requirements for recovery to normal operations.
# LIST OF REVIEWERS

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* Numbers correspond to changes as noted in Section 1.1 of the procedure.
APPENDIX B

WASTE ANALYSIS PLAN

The Waste Analysis Plan provides a description of the chemical and physical characteristics of the wastes to be emplaced in the WIPP underground facility. A detailed discussion of the WIPP Waste Acceptance Criteria and the rationale for its established units are also included.
WASTE ISOLATION PILOT PLANT

WASTE ANALYSIS PLAN
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1.0 FACILITY INFORMATION

1.1 FACILITY DESCRIPTION

The Waste isolation Pilot Plant (WIPP) is a research and development facility operated for the U.S. Department of Energy (DOE) by Westinghouse Electric Corporation to demonstrate the safe disposal of transuranic (TRU) radioactive wastes derived from the defense activities of the United States. Containerized TRU wastes are transported to the plant and emplaced in bedded salt of the Salado Formation, 2,150 feet below ground surface. Details of the project and its mission can be found in Public Law 96-164, the Final Environmental Impact Statement (FEIS) (DOE, 1980), and the Draft WIPP Final Safety Analysis Report (FSAR) (DOE, 1988). As a geologic repository, the WIPP facility is regulated as a "miscellaneous unit" as defined under 40 CFR Part 260. Specific standards for miscellaneous units are set forth in 40 CFR Part 264, Subpart X.

The WIPP facility is designed to handle a maximum of 14,160 cubic meters (500,000 cubic feet) per year of contact-handled (CH) TRU waste and 2,832 cubic meters (10,000 cubic feet) per year of remote-handled (RH) TRU waste. The operational life of the facility is 25 years. The full design capacity of the facility [178,416 cubic meters (6.3 million cubic feet)] will not be utilized until sufficient operating and scientific data have been accumulated to assure the safe long-term disposal of radioactive waste in salt. The facility and equipment are designed to allow for retrieval of the waste during an initial operations demonstration period of up to five years. Depending on the results of the operations demonstration and on the results of a performance assessment conducted under 40 CFR Part 191, Subpart B, DOE will make a decision to retrieve or permanently emplace the waste.

The WIPP facility includes surface structures, shafts, and underground areas. Surface facilities accommodate the personnel, equipment, and support services required for the receipt, preparation, and transfer of waste from the surface to the underground. The primary surface operations at the WIPP facility are conducted in the Waste Handling Building. A detailed description of the aboveground support facilities is provided in the Draft FSAR. The WIPP facility has four vertical shafts which extend from the surface to the underground horizon. These include the waste shaft, the construction and salt handling shaft, the exhaust shaft, and the air intake shaft. The waste shaft collar is located between the CH TRU and the RH TRU waste handling areas in the Waste Handling Building. The waste shaft is 5.8 meters (19 feet) in diameter and utilizes a hoist cage to transport the waste from the surface to the underground storage areas.

A typical underground storage panel consists of up to seven rooms. Each room is 10 meters (33 feet) wide, 4 meters (13 feet) high, and 91.5 meters (300 feet) long. These rooms are separated by pillars of salt 30.5 meters (100 feet) wide and 91.5 meters (300 feet) long. Panel entries at each end of these storage rooms are 10 meters (33 feet) wide and 4 meters (13 feet) high and will also be used to store waste. The first 61 meters (200 feet) of the main panel entries will be used to seal the rooms once they are filled with waste.
1.2 DESCRIPTION OF WIPP FACILITY OPERATIONS

Operations at the WIPP entail receiving, unloading, and transferring radioactive and radioactive-mixed waste from the surface structures to the underground storage rooms. TRU waste is delivered to the WIPP Waste Handling Building by truck or rail car. The DOE has agreed to use only Nuclear Regulatory Commission (NRC) certified waste shipping containers for transporting waste to the WIPP. CH TRU waste arrives in DOT Type-B shipping containers known as TRUPACT IIs (TRansUranic PACkage Transporters). RH TRU waste is transported to WIPP in shielded shipping casks. CH TRU wastes enter the building through air-locks. The air in the building is maintained below atmospheric pressure to prevent any potential contaminants from leaking to the outside air. CH TRU wastes are emplaced in the WIPP facility in drums and metal boxes. RH TRU waste enters the Waste Handling Building on a road cask transfer car. The cask is remotely transferred into the hot cell to inspect the RH canister and prepare it for emplacement in the underground horizon. RH TRU wastes are emplaced in the WIPP facility in steel canisters.

Each TRUPACT II will contain two sets of seven 55-gallon drums or two metal boxes. The TRUPACT II is brought into the Waste Handling Building for unloading after it is surveyed for surface radionuclide contamination. It is then opened, surveyed for internal contamination, and if no contamination exceeding predetermined limits is detected, the containers of waste are removed and placed on a facility pallet. At this point, an accounting is made of the contents of the shipment. This is done by comparing the unique markings on the drums or boxes to information provided on the shipping documents and in the waste data package. Once the shipment is reconciled, it is released for placement underground. Details of the waste data package, the shipping papers, and the procedures for handling waste documentation are provided subsequently in this document and in procedure manuals at the WIPP facility. Contaminated containers are moved to the overpack-and-repair room where the containers are examined and decontaminated or overpacked. The pallet of drums is transferred to the cage loading car and moved into the hoist cage for transfer to the underground storage horizon. The empty TRUPACT II is decontaminated, if necessary, inspected, and reloaded onto the vehicle leaving the plant for reuse.

CH TRU waste containers are transferred to the underground waste-receiving station in a hoist cage designed to handle a payload of 45 tons. At this station the waste containers are loaded onto an underground transporter and moved to a CH TRU waste storage room. In the storage room, the containers are removed from the pallet and placed in the waste stack. A decontamination and radiation safety check station is located near the waste shaft on the storage horizon. This station is used to check personnel and equipment for radiological contamination before they are transported to the surface.

Essentially the same procedures are followed for the RH TRU waste, except that it is processed through the RH TRU waste handling area and transported underground in a shielded facility cask. The RH TRU waste canisters are horizontally emplaced in holes in the walls of the barrier pillars along selected drifts.
2.0 WASTE IDENTIFICATION

2.1 TRU WASTE CHARACTERIZATION

DOE has designed, developed, tested, and produced nuclear weapons for more than 40 years. These defense activities have created waste materials contaminated with TRU elements, which are defined in DOE Order 5820.2A as radioactive waste having an atomic number greater than 92. TRU waste managed at the WIPP facility also is defined in DOE Order 5820.2A as, without regard to source or form, waste that is contaminated with alpha-emitting transuranic radionuclides with half-lives greater than 20 years and concentrations greater than 100 nanoCuries per gram (nCi/g) at the time of assay.

TRU waste may be classified by the type of radiation emitted. The greatest percentage of TRU wastes are CH and emit primarily alpha radiation. Alpha particles are dangerous if inhaled or ingested and do not represent an external radiation hazard. CH TRU waste contains alpha-emitting radioisotopes and is handled in closed steel containers. CH TRU wastes have a measured radiation dose rate at the container surface of less than or equal to 200 millirems per hour (mRem/hr).

A small percentage of TRU waste contains isotopes that emit beta and gamma radiation as well as alpha radiation. Beta radiation can be stopped by a sheet of aluminum. Gamma radiation can pass through several inches of lead and must be shielded for safe handling and storage. The RH TRU waste contains beta- and gamma-emitting radioisotopes and, typically, has a measured radiation dose rate at the container surface that ranges from greater than 200 mRem/hr to 100 Rem/hr. Five percent of the RH TRU waste certified for emplacement at the WIPP facility may have a surface dose rate of up to 1,000 Rem/hr.

The TRU wastes certified for disposal at the WIPP facility are generated by ten DOE national defense facilities involved in plutonium fabrication and recovery, defense-related research and development programs, and decontamination and decommissioning operations. The wastes consist largely of items routinely used by employees at these facilities, such as laboratory glassware, tools, crucibles, and paper. Newly generated TRU wastes, as well as retrievably stored wastes generated since 1970 will be received by the WIPP facility.

2.2 TRU MIXED WASTE CHARACTERIZATION

TRU mixed waste is defined as TRU waste that contains those hazardous constituents or exhibits characteristics specified in 40 CFR Part 261, Subparts C and D. Until recently, few records were maintained to document the chemical constituents of the waste. Due to their complex matrices and the potential radiation exposure to personnel, these wastes are not routinely sampled and analyzed for chemical constituents. Currently available waste analyses are included in Attachments H through O. The majority of these wastes are characterized by the generators through knowledge of the wastes and/or the processes generating them. The next eight sections (Sections 3 to 10) include process flow diagrams from each DOE generator site and a description of the wastes generated by each process. DOE generators characterize and certify each container of waste before it is transported to the WIPP facility (see Sections 11 and 12).
Waste characterization information has been compiled by DOE generator sites [i.e., Argonne National Laboratory - East, Idaho National Engineering Laboratory (INEL), Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory, Mound, Nevada Test Site, Oak Ridge National Laboratory (ORNL), Rocky Flats Plant (RFP), Richland Hanford, and Savannah River Plant] with each site-specific section providing waste characterization information on the CH TRU wastes generated or stored there. Each section is similar to the TRUPACT-II Content Codes (TRUCON) document, which groups similar waste types (e.g., combustibles, metals, etc.) together into shipping content codes. Each content code may consist of one or more Item Description Codes (IDCs). IDCs are site-assigned identification codes for wastes generated or stored. For example, the Rocky Flats content code RF 116 is combustible waste, which consists of IDC 831, dry combustibles, IDC 832, wet combustibles, and IDC 833, plastics.

Each content code is a three-digit numerical code, subdivided into a number of subsets within the content code. For Rocky Flats and INEL content codes, which always begin with RF and ID, respectively, the letters A, B, and C at the end of the content codes are used primarily to distinguish between waste forms with and without experimental additions.

For content codes from the other DOE sites, which do not have experimental equivalents, the letters A and B at the end of the content code usually signify differences in solidification and/or packaging of the waste.

In most of the attachments to the Waste Analysis Plan, content codes are referred to specifically; i.e., using A, B, or C at the end of the content code, as appropriate. In order to be consistent with the attachments, content codes are referred to specifically in discussions of waste characterization information.

For each content code, the waste characterization information has been divided into two parts. The first part includes a content code description and its corresponding IDCs. Following this, flow diagrams and accompanying narration provide process flow information for each content code. This usually includes one or more buildings, and processes which generate waste in each building. Building and process descriptions for each site are provided at the end of its section. In addition, if the waste is treated or processed, details on these operations are provided. The second part includes waste characterization data that has been compiled from a number of sources for each content code (and in some cases, for each IDC). This consists of analyses and/or any quantified information for the waste that can support process knowledge.

The following items should be kept in mind while reviewing this section:

- The waste streams documented in the flow diagrams are representative of wastes generated from processes that are performed on a routine basis. Those wastes generated from decommissioning and decontamination work or strip-out activities are usually not included in the flow diagrams. These wastes can be generated (as transuranic wastes) from any of the buildings or facilities mentioned in the following sections.

- Many of the waste streams documented in the flow diagrams have the potential to be transuranic or low-level waste. This determination is usually not made until after the waste has been packaged (drum or box) and assayed.
• Upon assaying, some of the waste streams have the potential to be transuranic or above the economic discard limit (EDL) and therefore eligible for recovery. The wastes above EDL are referred to as residue waste, and either sent to a recovery operation or to storage until recovery can be performed.

• The buildings and operations documented in this section may not always be operable. They have been included if the buildings and processes have generated TRU waste in the past, are currently generating waste, or will generate waste in the future.

• Many of the waste streams are generated from glovebox operations. Those wastes labeled "line generated" refer to wastes originating from inside the gloveboxes. Those wastes labeled "non-line generated" refer to wastes which are generated from operations outside of the gloveboxes. The non-line generated wastes are very often low level.

• For Idaho National Engineering Laboratory and the Nevada Test Site, which store waste generated at the Rocky Flats Plant and Lawrence Livermore National Laboratory respectively, the flow diagrams for current operations at these generating sites should also be applicable for the stored waste. The types of processes and operations at each of the sites has not changed much over the years. Only the packaging or mode of waste treatment has been altered. IDCs may have changed for identical waste types because of these modifications in processes.

Characteristic and listed hazardous wastes that are emplaced at the WIPP facility are listed in the TRU Mixed Waste Characterization Database (Attachment E). As previously noted, TRU wastes are categorized by IDCs based on the physical characteristics of the material and, in some instances, the area in which the material is generated or processed. This is done, in part, to obtain accurate radionuclide assay results based on a uniform matrix. These assays determine whether the material is recoverable residue, TRU waste, or low-level waste. A shipping content code may include more than one IDC. For example, individual IDCs are assigned to liquid filters, glovebox filters and building intake and exhaust filters. The shipping content code for filters includes all of the IDCs. New IDCs may be added by generators to accommodate new process identification or waste processing requirements.

Table 2-1 provides a summary of the waste characterization information available for wastes to be emplaced at the WIPP. The table is sectioned by waste type as follows:

• Waste Type I - Solidified Aqueous or Homogeneous Inorganic Solids
• Waste Type II - Solid Inorganics
• Waste Type III - Solid Organics
• Waste Type IV - Solidified Organics

Within each waste type, a list of TRUPACT-II Content Codes (TRUCON) shipping content codes is provided, along with the corresponding IDCs. Each TRUCON shipping content code is unique to a generator or storage site. In some cases, an "NYD XXX" content code is reported. This is for content codes which are "not yet determined" because they are listed in the TRU Mixed Waste Characterization Database (Attachment E), but not in the TRUCON document (Attachment A) or the TRUPACT-II Chemical List (Attachment B). A content code will be assigned to these wastes when sufficient waste characterization information is obtained for the TRUCON (Attachment A) and the TRUPACT-II Chemical Lists (Attachment B). Sites and processes which generate the waste, and waste descriptions for
the content codes are also provided in Table 2-1. The content codes, IDCs, processes generating the waste, and waste descriptions are summarized information from the TRUCON, (Attachment A).

Table 2-1 also lists RCRA-regulated hazardous chemicals for each shipping content code. Hazardous chemicals are one or more of the following:

- Hazardous wastes listed in the TRU Mixed Waste Characterization Database (Attachment E). Non-toxic compounds which are potentially ignitable were only included in Table 2-1 if they were listed in Attachment E.

- Hazardous constituents listed in the TRUPACT-II Chemical List (Attachment B) (Appendix VIII, of 40 CFR Part 261).

- Hazardous constituents reported in analytical results from waste sampling programs (see Attachments H, N, O) which were not previously listed in the TRUPACT-II Chemical List. The TRUPACT-II Chemical List will be amended to incorporate these changes.

If a content code does not have any hazardous wastes or constituents it has been indicated by a dashed line. Concentrations for the hazardous chemicals, which are obtained from the TRUPACT-II Chemical Lists (Attachment B) are also provided. For NYD content codes listing hazardous chemicals, concentrations will be made available when more information is obtained and a content code is determined.

Total quantities of waste (stored and projected to the year 2013) are also provided in Table 2-1 for TRUCON shipping content codes. Quantities given are inclusive of the grouped content codes with "A", "B", and "C" trailers. For example, the quantity of waste listed in Table 2-1 for ID 118A (175 m^3) includes waste in the content codes ID 118B and ID 118C content code. The quantity of waste given includes the TRU and TRU mixed waste. Future waste inventories reported for the Rocky Flats Plant are based on projected volumes of supercompacted waste.

Changes to a site's certification program require the revision of applicable documents and the prior approval of the WIPP Waste Acceptance Criteria Certification Committee (WACCC). After approval by the WACCC, the WIPP Waste Certification and Database personnel are notified and the new IDC information is added to the WIPP Waste Information System (WWIS) database. The data package information and format that are required for the WWIS for each shipment of waste are given in Table 2-2. Each generator must also prepare a Uniform Hazardous Waste Manifest (EPA Form 8700-22) for each shipment of TRU mixed waste, according to the instructions included in the Appendix to 40 CFR Part 262.

2.3 CHEMICAL COMPATIBILITY

Waste management procedures control the flow of materials from generation of the waste to segregation and certification for shipment to the WIPP facility. Examples of the types of controls include:

- The maintenance of records that document the quantities of chemicals added to the process streams.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. AE 111A</td>
<td>131</td>
<td>Argonne National Laboratory (Bldgs. 205 &amp; 350)</td>
<td>Solidified (nonflammable) aqueous waste (i.e., acids, detergents); waste solidified with #2 grade vermiculite. Waste comes from research activities, decontamination and decommissioning activities, and liquids removed from usable and non-usable equipment.</td>
<td>Cadmium T</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solidified Laboratory Waste</td>
<td></td>
<td></td>
<td></td>
<td>Lead T</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Arsenic T</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chromium T</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mercury T</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. RF 111A</td>
<td>800</td>
<td>Rocky Flats Plant Aqueous effluent from uranium &amp; plutonium processing activities at RFP (treated at Bldgs. 374 &amp; 774 at RFP)</td>
<td>Solidified aqueous waste generated by vacuum filtration of precipitated solids from pre-treated aqueous slurry. Filter medium is diatomaceous earth. Wet sludge is solidified with Portland cement.</td>
<td>1,1,1-Trichloroethane T2</td>
<td>8,886</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td>803</td>
<td></td>
<td></td>
<td>Carbon tetrachloride T2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>807</td>
<td></td>
<td></td>
<td>1,1,2-Trichloroethane T1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,2,2-trifluoroethane T1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Methylene chloride T1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Xylene T2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Methanol T2</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Butanol T2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Cadmium T2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lead T</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Beryllium T2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IDCs 803, 807: Same as IDC 800, as well as: Toluene T2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ethyl benzene T2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. RF 111B</td>
<td>800</td>
<td>Rocky Flats Plant Same as RF 111A</td>
<td>Same as RF 111A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as RF 111A. Included in: RF 111A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td>803</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>807</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* T3 = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.*
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. ID 111A</td>
<td>800</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 111A [Wastes stored at INEL]</td>
<td>Same as RF 111A.</td>
<td>Same as RF 111A.</td>
<td>822</td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td>803</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>807</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. ID 111C</td>
<td>800</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 111A [Wastes stored at INEL]</td>
<td>Same as RF 111A, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as RF 111A</td>
<td>Included in: ID 111A</td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td>803</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>807</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* T3 - Trace (<1 ppm by weight); T2 - Trace (few ppm by weight); T1 - Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %)

Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE [m^3]</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. ID 211A</td>
<td>001</td>
<td>Rocky Flats Plant</td>
<td>Plutonium processing areas at RFP.</td>
<td>Wet sludge from chemical treatment &amp; mixed with absorbents (i.e., Portland cement and Oil-Dri to absorb free liquid).</td>
<td>IDC 001: 1,1,1-Trichloroethane T, Carbon tetrachloride T, 1,1,2-Trichloro-1,2,2-trifluoroethane T, Methylene chloride T, Xylene T, Methanol T, Butanol T, Beryllium T, Cadmium T, Lead T, Trichloroethylene T, Tetrachloroethylene T, Sodium chromate T, 1,2-Dichloroethane T, Chloroform T, 1,1,2,2-Tetrachloroethane T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solidified Aqueous</td>
<td>002</td>
<td></td>
<td></td>
<td></td>
<td>IDC 002: Same as IDC 001, as well as: Mercury T, Reactive Lithium --</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste</td>
<td>007</td>
<td></td>
<td></td>
<td></td>
<td>IDC 007: Same as IDC 001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>076</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>078</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* T3 = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %)

Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. ID 211A (Cont’d.)</td>
<td></td>
<td></td>
<td></td>
<td>IDC 976: Sludges removed from tanks that collected liquid effluent from floor drains; sludge consists of dirt, sand, gravel, floor sweepings, &amp; similar materials; sludges mixed with Portland cement.</td>
<td>IDC 976: Same as IDC 001, as well as: Sodium chromate</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. ID 111B</td>
<td>001</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 211A. [Waste stored at INEL]</td>
<td>Same as ID 211A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as ID 211A</td>
<td>Included in: ID 211A</td>
<td></td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td>002</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>976</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>978</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. RF 114A</td>
<td>806</td>
<td>Rocky Flats Plant</td>
<td>Particulate and sludge type waste from plutonium recovery operations (Bldg. 371 &amp; 771 at RFP)</td>
<td>Cemented inorganic process solids; waste is filter sludge, grit, &amp; fire brick fines. Waste is solidified in Portland cement.</td>
<td>1,1,1-Trichloroethane Carbon tetrachloride 1,1,2-Trichloro- 1,2,2-trifluoroethane Methylene chloride Methanol Butanol Xylene Lead</td>
<td>T1 T1 T1 T1 T1 T2 T2 T2 T1</td>
<td>206</td>
</tr>
<tr>
<td>Cemented Inorganic Process Solids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. RF 114B</td>
<td>806</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 114A</td>
<td>Same as RF 114A, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as RF 114A</td>
<td>Included in: RF 114A</td>
<td></td>
</tr>
<tr>
<td>Cemented Inorganic Process Solids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T3 = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE $ (m^3) $</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. ID 114A</td>
<td>817</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 114A</td>
<td>Same as RF 114A</td>
<td>Same as RF 114A</td>
<td></td>
<td>73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[Waste stored at INEL]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>818</td>
<td></td>
<td></td>
<td>Same as RF 114A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>820</td>
<td></td>
<td></td>
<td>Same as RF 114A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>823</td>
<td></td>
<td></td>
<td>Same as RF 114A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>290</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 114A</td>
<td>Waste consists of particulate sludge generated from the Recovery Building filter, plenums, pumps, and incinerator off-gas system. Portland cement was added to sludge for absorption of free liquid.</td>
<td>1,1,1-Trichloroethane</td>
<td>--</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>292</td>
<td></td>
<td></td>
<td>[Waste stored at INEL]</td>
<td>Carbon tetrachloride</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>11. ID NYD$^f$</td>
<td></td>
<td></td>
<td></td>
<td>Waste consists of particulate sludge generated from the Recovery Building filter, plenums, pumps, and incinerator off-gas system. Portland cement was added to sludge for absorption of free liquid.</td>
<td>1,1,2-Trichloro-</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[Waste stored at INEL]</td>
<td>1,2,2-Trifluorooethane</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Waste consists of particulate sludge generated from the Recovery Building filter, plenums, pumps, and incinerator off-gas system. Portland cement was added to sludge for absorption of free liquid.</td>
<td>Methylene chloride</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[Waste stored at INEL]</td>
<td>Xylene</td>
<td>--</td>
<td></td>
</tr>
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<td></td>
<td></td>
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<td></td>
<td>Waste consists of particulate sludge generated from the Recovery Building filter, plenums, pumps, and incinerator off-gas system. Portland cement was added to sludge for absorption of free liquid.</td>
<td>Methanol</td>
<td>--</td>
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</tr>
<tr>
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<td></td>
<td>[Waste stored at INEL]</td>
<td>Butanol</td>
<td>--</td>
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<td>Waste consists of particulate sludge generated from the Recovery Building filter, plenums, pumps, and incinerator off-gas system. Portland cement was added to sludge for absorption of free liquid.</td>
<td>Cadmium</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[Waste stored at INEL]</td>
<td>Lead</td>
<td>--</td>
<td></td>
</tr>
<tr>
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<td></td>
<td>Waste consists of particulate sludge generated from the Recovery Building filter, plenums, pumps, and incinerator off-gas system. Portland cement was added to sludge for absorption of free liquid.</td>
<td>Lead</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>12. ID NYD$^f$</td>
<td></td>
<td>Idaho National</td>
<td>PREPP - Process</td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>1,1,1-Trichloroethane</td>
<td>--</td>
<td>486</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineering Lab</td>
<td>Experimental Pilot Plant</td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>Carbon tetrachloride</td>
<td>--</td>
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<td></td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>1,1,2-Trichloro-</td>
<td>--</td>
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<td></td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>1,2,2-Trifluoroethane</td>
<td>--</td>
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<td></td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>Methylene chloride</td>
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<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>Xylene</td>
<td>--</td>
<td></td>
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<td></td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>Methyl Alcohol</td>
<td>--</td>
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<td></td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>Butyl Alcohol</td>
<td>--</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>Cadmium</td>
<td>--</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>Lead</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TRU waste determined by SWEPP to fail the WIPP-WAC, but meet the PREPP-WAC will be processed at PREPP. Unopened containers will be shredded, incinerated (815-912 degrees C), and the ash grouted into a solid cement form in 55-gallon drums.</td>
<td>Mercury</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

$^f$ Trace (≤1 ppm by weight), $^g$ Few ppm by weight, $^h$ Trace (≤0.1 weight %), $^i$ Trace (≤1 weight %), $^j$ Minor (1-10 weight %), $^k$ Dominant (≥10 weight %)
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. LA 111A</td>
<td>002</td>
<td>Los Alamos National Lab</td>
<td>Beneath Los Alamos Plutonium Facility (TA-55) and treated in Building TA-50-1 (LANL Waste Treatment Facility).</td>
<td>Aqueous effluent from processing plutonium is treated; solidified aqueous waste is residue from treating acidic &amp; caustic wastes &amp; by using Ca(OH)₂, FeSO₄, &amp; a flocculation aid. The caustic sludge is mixed with Portland cement, sodium silicate, &amp; vermiculite to produce a concrete monolith.</td>
<td>Lead</td>
<td>T3</td>
<td>1,669</td>
</tr>
<tr>
<td>14. LA 211A</td>
<td>002</td>
<td>Los Alamos National Lab</td>
<td>Same as LA 111A [Waste stored at LANL]</td>
<td>Same as LA 111A</td>
<td>Same LA 111A</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>15. LA 111B</td>
<td>003</td>
<td>Los Alamos National Lab</td>
<td>Waste generated at Los Alamos Plutonium Facility (TA-55) and treated at TA-50-1 (LANL Waste Treatment Facility)</td>
<td>Sludge is produced from vacuum filtration of solids from pre-treated aqueous waste slurry. Solids are trapped on the surfaces of the filter media (diatomaceous earth). The filter medium with entrapped filtrate is placed in drums with dry concrete as absorbent.</td>
<td>Di-N-Octyl Phthalate²</td>
<td>T2</td>
<td>1,107</td>
</tr>
</tbody>
</table>

* T3 = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %), and D = Dominant (>10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL QUANTITY OF CONC.</th>
<th>TOTAL WASTE [m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. LA 211B</td>
<td>003</td>
<td>Los Alamos</td>
<td>Same as LA 111B</td>
<td>Same as LA 111B</td>
<td>Same as LA 111B</td>
<td>Included in:</td>
<td>LA 111B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>National Lab</td>
<td>[Waste stored at LANL]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. LA 114A</td>
<td>006</td>
<td>Los Alamos</td>
<td>Waste originates from</td>
<td>Solidified process solids (process residue from evaporated bottom and other discardable solutions, processed leached solids, ash, filter cake, salts, metal oxides, fines, etc.) are immobilized in gypsum cement.</td>
<td>Cadmium T2</td>
<td>1,685</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>National Lab</td>
<td>TA-55 at LANL and is</td>
<td></td>
<td>Chromium T2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>from processing of</td>
<td></td>
<td>Lead T2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>plutonium.</td>
<td></td>
<td>Hydrofluoric acid T2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bromoform T2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Carbon tetrachloride T2</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Arsenic T2</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Beryllium T2</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Mercury T2</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trichloroethylene T2</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>1,1,1-Trichloroethane T2</td>
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<td></td>
<td></td>
<td></td>
<td>Dichloroethane T2</td>
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<tr>
<td>18. LL 111A</td>
<td>002</td>
<td>Lawrence</td>
<td>Bldg. 419 &amp; 332 at</td>
<td>Water-based liquids (which contain trace amounts of organics) are solidified with Portland cement. Acids &amp; caustics are neutralized before solidification.</td>
<td>Carbon tetrachloride T</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Livermore</td>
<td>LLNL</td>
<td></td>
<td>Trichloroethylene T</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>National Lab</td>
<td></td>
<td></td>
<td>Methyl ethyl ketone T</td>
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<td>Beryllium T</td>
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<td>Chromium T</td>
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<td></td>
<td>Lead T</td>
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<td></td>
<td>Hydrofluoric acid T</td>
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<td></td>
<td></td>
<td>Chloroform T</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T3 = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %).

Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. MD 111A</td>
<td>836</td>
<td>Mound Lab</td>
<td>Bldg. SM, PP, and R at Mound</td>
<td>Solidified aqueous waste:</td>
<td>Arsenic T3</td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td></td>
<td></td>
<td></td>
<td>aqueous effluent from</td>
<td>Beryllium T</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>decontamination &amp;</td>
<td>Barium T3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>decommissioning activities</td>
<td>Cadmium T2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>in former Pu 238</td>
<td>Chromium T2</td>
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<td>processing areas. Sludge</td>
<td>Lead T1</td>
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<td>produced by standard</td>
<td>Mercury T</td>
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<td></td>
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<td></td>
<td>batch type precipitation</td>
<td>Selenium T2</td>
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<td>process. After pH</td>
<td>Silver T2</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>adjustment, CaCl₂</td>
<td>1,1,1-Trichloroethane T2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fe₃(SO₄)₂ &amp; carbon are</td>
<td>Trichloroethylene T1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>added. Sludge solidified</td>
<td>Hydofluoric acid T2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>with Portland cement.</td>
<td>Nickel T</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>1,1,2-Trichloro-</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>1,2,2-Trifluoroethane T1</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Unsopedified solvents (See</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Footnote 4)</td>
</tr>
<tr>
<td>20. MD 111B</td>
<td>842</td>
<td>Mound Lab</td>
<td>Waste originates from WD hillside &amp; pipeline removal at Mound Lab.</td>
<td>Soil contaminated with</td>
<td>Cadmium T2</td>
</tr>
<tr>
<td>Contaminated Soil</td>
<td></td>
<td></td>
<td></td>
<td>aqueous solutions which may contain trace levels of organics.</td>
<td>Chromium T2</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>Lead T1</td>
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<td></td>
<td></td>
<td></td>
<td>Mercury T2</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Selenium T2</td>
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<td>Silver T2</td>
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<td></td>
<td>Unsopedified solvents (See</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Footnote 4)</td>
</tr>
<tr>
<td>21. NT 111A</td>
<td>002</td>
<td>Lawrence</td>
<td>Waste originates at Bldgs. 419 &amp; 332 at LLNL. [Waste stored at Nevada Test Site.]</td>
<td>Same as LL 111A</td>
<td>Same as LL 111A</td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td></td>
<td>Livermore</td>
<td>National Lab</td>
<td>Same as LL 111A</td>
<td>Same as LL 111A</td>
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<td>292</td>
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<td>Same as NT 111A</td>
<td>Same as LL 111A</td>
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<tr>
<td>22. NT 211A</td>
<td>002</td>
<td>Lawrence</td>
<td>Same as NT 111A</td>
<td>Same as LL 111A</td>
<td>Same as LL 111A</td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td></td>
<td>Livermore</td>
<td>National Lab</td>
<td>Included in:</td>
<td>NT 111A</td>
</tr>
</tbody>
</table>

* T3 = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (< 1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
### TABLE 2.1
WASTE CHARACTERIZATION INFORMATION
(Waste Type I: Solidified Aqueous or Homogeneous Inorganic Solids)

<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDGS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>23, RH 114A</td>
<td>003</td>
<td>Richland Hanford</td>
<td>Plutonium Finishing Plant (PFP) generates sludges from operations in the Plutonium Reclamation Facility, Plutonium Conversion Remote Mechanical C Line, and Analytical/Chemical Laboratory.</td>
<td>Waste consists of sludges that cannot be absorbed back into process; sludges scraped out of hoods or trays &amp; containing any or all of the following: plutonium oxide, plutonium oxalate, HNO₃ &amp; trace metal ions (Fe, Ni, Cr). Sludge mixed with Portland cement.</td>
<td>Nickel, Chromium</td>
<td>T3</td>
<td>5</td>
</tr>
</tbody>
</table>

* T3 = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
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<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. RF 115A</td>
<td>300</td>
<td>Rocky Flats Plant</td>
<td>Graphite from plutonium casting &amp; waste from lab operations. (Bldgs. 371, 374, 559, 707, 771, &amp; 776 at RFP.)</td>
<td>Broken graphite molds &amp; graphite furnace equipment or graphite chunks &amp; pieces from mold cleaning &amp; declassification. Also discarded lab equipment.</td>
<td>-------</td>
<td>--</td>
<td>394</td>
</tr>
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<td>Graphite Waste</td>
<td>303</td>
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</tr>
<tr>
<td>2. RF 115B</td>
<td>300</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 115A.</td>
<td>Same as RF 115A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>-------</td>
<td>--</td>
<td>Included in: RF 115A</td>
</tr>
<tr>
<td>Graphite Waste</td>
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<td>Graphite wastes from foundry operations, plutonium recovery operations, &amp; size reduction facilities &amp; R&amp;D projects (Bldgs. 707, 771, 371, &amp; 776). [Wastes stored at INEL]</td>
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* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %)

Information based on process knowledge.
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<th>CONTENT CODE</th>
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<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
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<td>7. RF 117A</td>
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<td>Rocky Flats Plant</td>
<td>Waste forms include gloveboxes, used shielding, tools, crucibles, machinery, &amp; empty containers. (Bldgs. 371, 374, 559, 707, 771, 774, 776, 777 &amp; 779 at RFP)</td>
<td>Waste consists of non-pyrophoric waste metals (iron, copper, aluminum, stainless steel, tungsten, lead, &amp; tantalum).</td>
<td>IDC 480; 1,1,1-Trichloroethane, T2</td>
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* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
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<th>WASTE DESCRIPTION</th>
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<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE(m³)</th>
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<td>combustible items (i.e., filters, metal equipment, furnace brick, metal crucibles, &amp; funnels). Metals are tantalum, tungsten, platinum, &amp; lead.</td>
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<td>Rocky Flats Plant</td>
<td>Same as ID 217B. [Waste stored at INEL]</td>
<td>Waste form consists of metals from small hand tools, valves, trays, clamps, pipes, gloveboxes, furnaces, tanks, respirator filters, control panels, etc. Metal wastes processed by hot water washing for plutonium recovery.</td>
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<td>Same as ID 217A, B, &amp; C.</td>
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</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %) Information based on process knowledge.
<table>
<thead>
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<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
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<td>Bettis Atomic Power Laboratory</td>
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<td>The binary material is made of ceramic-based UO₂ and ThO₂. The waste includes fuel rods, constructed of fuel pellets within hollow zirconium tubes. Lead is used for shielding the pellets.</td>
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<td>16. RF 118A</td>
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<td>Waste from recovery maintenance &amp; lab operation. (Bldg. 371, 374, 559, 707, 771, 774, 776, 777, &amp; 779 at RFP)</td>
<td>Glass &amp; ceramic wastes including rasching rings, ceramic crucibles, glovebox windows, lab glassware, process equipment, &amp; empty containers.</td>
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<th>WASTE DESCRIPTION</th>
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<td>370</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>440</td>
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<td></td>
<td>442</td>
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<td></td>
<td>443</td>
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<td></td>
<td>444</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>20. ID 218A</td>
<td></td>
<td>Rocky Flats Plant</td>
<td>Generated by all plutonium areas.</td>
<td>Leached glass neutron absorbers (Faschig rings).</td>
<td>IDC 442</td>
<td></td>
<td>183</td>
</tr>
<tr>
<td>Glass Waste</td>
<td>442</td>
<td></td>
<td>[Waste stored at INEL]</td>
<td></td>
<td>Carbon tetrachloride T</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lead T</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Methylene chloride T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. ID 218B</td>
<td></td>
<td>Rocky Flats Plant</td>
<td>Generated by all plutonium areas.</td>
<td>Waste consists of a variety of waste glass from laboratory glassware to glass</td>
<td>Same as ID 218A.</td>
<td></td>
<td>185</td>
</tr>
<tr>
<td>22. ID 118B</td>
<td></td>
<td>Rocky Flats Plant</td>
<td>Waste generated from all plutonium processing areas.</td>
<td>Same as ID 218 A&amp;B, but with naturally occurring salt, clay, &amp; wire screen</td>
<td>Same as ID 218 A&amp;B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>442</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. RF 122A</td>
<td></td>
<td>Rocky Flats Plant</td>
<td>Wastes generated during maintenance &amp; strip-out activities</td>
<td>Waste consists of firebrick, clay absorbent (Oil-Dri), &amp; insulation.</td>
<td>IDC 375</td>
<td></td>
<td>125</td>
</tr>
<tr>
<td>Solid Inorganic Waste</td>
<td>371</td>
<td></td>
<td>(e.g., replacement of firebrick refractory or insulation)</td>
<td></td>
<td>Carbon tetrachloride T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>375</td>
<td></td>
<td>(Bldg. 371, 374, 375, 558, 707, 771, 774, 776, 777, &amp; 779</td>
<td></td>
<td>1,1,2-Trichloro-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>377</td>
<td></td>
<td>at RFPP)</td>
<td></td>
<td>1,2,2-trifluoroethane T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>379</td>
<td></td>
<td></td>
<td></td>
<td>Methylene chloride T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>438</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE [m³]</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. RF 122B</td>
<td>371</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 122A.</td>
<td>Same as RF 122A, but with naturally occurring salt, clay, &amp; wood screen added for experimental purposes.</td>
<td>Same as RF 122A.</td>
<td>Included in:</td>
<td>RF 122A</td>
</tr>
<tr>
<td>Solid Inorganic Waste</td>
<td>375</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>377</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>379</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>438</td>
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<td></td>
</tr>
<tr>
<td>25. ID 122A</td>
<td>371</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 122A.</td>
<td>Same as RF 122A.</td>
<td>Same as RF 122A.</td>
<td>30</td>
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</tr>
<tr>
<td>Solid Inorganic Waste</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>377</td>
<td></td>
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<td></td>
<td>379</td>
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<tr>
<td></td>
<td>438</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. ID 122C</td>
<td>371</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 122A.</td>
<td>Same as RF 122A, but with naturally occurring salt, clay, &amp; wood screen added for experimental purposes.</td>
<td>Same as RF 122A.</td>
<td>Included in:</td>
<td>ID 122A</td>
</tr>
<tr>
<td>Solid Inorganic Waste</td>
<td>375</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>377</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>379</td>
<td></td>
<td></td>
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<td></td>
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<td>438</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. ID 222A</td>
<td>370</td>
<td>Rocky Flats Plant</td>
<td>Waste generated at the Plutonium Analytical Laboratories at RFP. [Waste stored at INEL]</td>
<td>Leco crucible waste: silicate-based ceramic crucibles &amp; caps that were used for analyzing plutonium samples. Some contain an accelerator (Fe, Sn, Cu, Ti, steel).</td>
<td>------</td>
<td>--</td>
<td>4</td>
</tr>
<tr>
<td>Solid Inorganic Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %)

Information based on process knowledge.
TABLE 2-1
WASTE CHARACTERIZATION INFORMATION
(Waste Type II: Solid Inorganics)

<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC. *</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>29:ID NYD²</td>
<td>360</td>
<td>Rocky Flats Plant</td>
<td>Waste generated by Plutonium Recovery Operations was from routine maintenance and removal of pipe insulation from steam and process lines. This content code has not been used since 1973. (Bldgs. 771 &amp; 776 at RFP) [Waste stored at INEL]</td>
<td>Waste consists of asbestos-type insulation, asbestos gloves and fire blankets, pipe insulation and pipe filters, and filter media (fiberglass and asbestos).</td>
<td>1,1,1-Trichloroethane</td>
<td>--</td>
<td>29</td>
</tr>
<tr>
<td>30. ID NYD²</td>
<td>375</td>
<td>Rocky Flats Plant</td>
<td>This waste is generated at the plutonium recovery incinerator during processing of wet combustible waste. (Bldgs. 771 &amp; 776 at RFP) [Waste stored at INEL]</td>
<td>Oil-Dri waste was generated at the recovery incinerator sorting box during processing of above-discard contaminated wet combustibles. The Oil-Dri, which was added as an absorbent when the waste was initially packaged, could not be incinerated and was segregated from the combustible waste and repackaged for disposal.</td>
<td>1,1,1-Trichloroethane</td>
<td>--</td>
<td>2</td>
</tr>
<tr>
<td>31. ID NYD²</td>
<td>154</td>
<td>INEL</td>
<td>Waste generated from the Test Reactor Area at INEL.</td>
<td>Waste consists of actinide neutron sources, a radium needle, small vials of fuel, and metal containers of experimental fuel capsules. Lead shot was used for shields.</td>
<td>Lead</td>
<td>--</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

* T = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32. ID NYD*</td>
<td>201</td>
<td>Battelle Columbus Laboratories</td>
<td>All waste is generated from decontamination and decommissioning of the Plutonium Laboratory. [Waste stored at INEL]</td>
<td>Waste consists of piping, vessels, tools, crucibles, pieces of equipment, lead bricks, plexiglas, and filters.</td>
<td>Lead</td>
<td>--</td>
<td>5</td>
</tr>
<tr>
<td>33. ID 122B</td>
<td>370</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 222A &amp; B. [Waste stored at INEL]</td>
<td>Same as ID 222A &amp; B, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as ID 222B.</td>
<td>--</td>
<td>Included in: ID 222A, ID 222B</td>
</tr>
<tr>
<td>INEL Solid Inorganic Waste</td>
<td>371</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. RF 124A</td>
<td>411</td>
<td>Rocky Flats Plant</td>
<td>Wastes generated from molten salt extraction, electro-refining or direct oxide reduction (Bldg. 371, 776, &amp; 779 at RFP)</td>
<td>Waste consists of spent chloride salt (combinations of cesium, calcium, magnesium, potassium, &amp; NaCl) from pyrochemical operations.</td>
<td>------</td>
<td>--</td>
<td>31</td>
</tr>
<tr>
<td>Pyrochemical Salt Waste</td>
<td>429</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>433</td>
<td></td>
<td></td>
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<tr>
<td>454</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. ID 124A</td>
<td>411</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 124A. [Waste stored at INEL]</td>
<td>Same as RF 124A.</td>
<td>------</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>Pyrochemical Salt Waste</td>
<td>429</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>433</td>
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<tr>
<td>454</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %)

Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>36. ID 224A</td>
<td>410</td>
<td>Rocky Flats Plant</td>
<td>Wastes generated by the Process Chemistry &amp; Development Group in Bldg. 776 at RFP. [Waste stored at INEL]</td>
<td>Waste consists of fused halide salt mixtures that were used for pyrochemical &amp; electrochemical separation &amp; purification processes. Salts are primarily mixtures of NaCl, KCl, and/or CaCl₂; some salts also contain MgCl₂, CaF₂, CaO.</td>
<td>--------</td>
<td>---</td>
<td>3</td>
</tr>
<tr>
<td>37. LA 115A</td>
<td>004</td>
<td>Los Alamos National Lab</td>
<td>Waste generated from plutonium processing activities at the Los Alamos Plutonium Facility (TA-55).</td>
<td>TRU graphite waste: consists of discarded graphite mold and furnace equipment which may contain some small fraction of combustible waste such as plastics.</td>
<td>Lead, T2</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>38. LA 117A</td>
<td>005(LM)</td>
<td>Los Alamos National Lab</td>
<td>Same as LA 115A.</td>
<td>Metal waste (motors, pumps, tools, process equipment, etc.) which contains some small fraction of combustible waste (such as plastics).</td>
<td>Carbon tetrachloride, Lead, T2</td>
<td>1,830</td>
<td></td>
</tr>
<tr>
<td>39. LA 118A</td>
<td>005(LG)</td>
<td>Los Alamos National Lab</td>
<td>Same as LA 115A.</td>
<td>Glass waste (discarded lab-ware, windows, bottles; etc.) which contain some small fraction of combustible waste (such as plastics).</td>
<td>Lead, Carbon tetrachloride, Hydrofluoric acid, Barium hydroxide, Barium chloride</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M= Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE ('m³')</th>
</tr>
</thead>
<tbody>
<tr>
<td>40. LA 124A</td>
<td>005(P2S)</td>
<td>Los Alamos National Lab</td>
<td>Same as LA 115A.</td>
<td>Pyrochemical salt waste consists of used chloride salts from pyrochemical processes such as electro-refining, molten salt extraction, salt stripping, fluoride reduction, direct oxide reduction and may contain some small fraction of combustible waste (such as plastics).</td>
<td>Mercury</td>
<td>T2</td>
<td>520</td>
</tr>
<tr>
<td>41. LL 124A</td>
<td>004</td>
<td>Lawrence Livermore National Lab</td>
<td>LLNL from pyrochemical process.</td>
<td>Waste consists of used chloride and fluoride salts from pyrochemical processes (electrorefining, molten salt extraction, &amp; direct oxide reduction).</td>
<td>------</td>
<td>----</td>
<td>See Footnote 6</td>
</tr>
<tr>
<td>42. MD 117A</td>
<td>824</td>
<td>Mound Laboratory</td>
<td>Bldgs. SM, PP, and R at Mound.</td>
<td>Noncombustible waste: glass (analytical glassware, reagent bottles), metal (tools, laboratory apparatus, gloveboxes, fume hoods, duct work, electrical wire &amp; conduit, piping, pumps, fittings, sheet-metal, etc.) and masonry (bricks, concrete blocks, &amp; pieces of poured walls &amp; floors). Wastes generated during routine glovebox operations &amp; during decontamination &amp; decommissioning activities.</td>
<td>Barium</td>
<td>T2</td>
<td>259</td>
</tr>
<tr>
<td>43. NT NYD²</td>
<td>201</td>
<td>Nevada Test Site</td>
<td>Discarded isotopic sources.</td>
<td>Discarded sources, foils, and activated metal with shielding.</td>
<td>Lead</td>
<td>--</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %), and D = Dominant (>10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE(m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>44. SR 122A</td>
<td>N/A</td>
<td>Savannah River Plant</td>
<td>Plutonium production facilities (221-HB line and 221-FB line) and laboratories (772-F, 773-A, and 235-F).</td>
<td>Noncombustible job control wastes; includes small tools, glassware, metal cans, etc.</td>
<td>Same as SR 125A (Waste Type III).</td>
<td>Included in:</td>
<td>SR 125A</td>
</tr>
<tr>
<td>45. SR 122B</td>
<td>N/A</td>
<td>Savannah River Plant</td>
<td>Same as SR 122A.</td>
<td>Same as SR 122A.</td>
<td>Same as SR 122A.</td>
<td>Included in:</td>
<td>SR 125A</td>
</tr>
<tr>
<td>46. SR 122C</td>
<td>N/A</td>
<td>Savannah River Plant</td>
<td>Same as SR 122A.</td>
<td>Same as SR 122A.</td>
<td>Same as SR 122A.</td>
<td>Included in:</td>
<td>SR 125A</td>
</tr>
</tbody>
</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (Few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %) Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. AE 116A</td>
<td>110</td>
<td>Argonne National Lab - East</td>
<td>Research generation and decommissioning activities. (Bldg. 200, 205, 212, and 350)</td>
<td>Solid combustible wastes, including soft plastics, cardboard, rags, paper, cloth, concrete, &amp; laboratory apparatus. Wastes come from research activities and decontamination and decommissioning activities of facility and ancillary systems (gloveboxes).</td>
<td>IDC 111/121: Cadmium M Lead M Arsenic T Chromium T Mercury T Barium chloride T Beryllium T</td>
<td>175</td>
<td></td>
</tr>
<tr>
<td>2. AE 116B</td>
<td>110</td>
<td>Argonne National Lab - East</td>
<td>Same as AE 116A.</td>
<td>Same as AE 116A.</td>
<td>Same as IDC 110/120 in AE 116A.</td>
<td>Included in: AE 116A</td>
<td></td>
</tr>
<tr>
<td>3. RF 116A</td>
<td>831</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 116A.</td>
<td>Same as RF 116A, but with naturally occurring salt, clay, and wire added for experimental purposes.</td>
<td>Solid combustible wastes, including paper, rags, cloth, coveralls, plastic, rubber, wood, &amp; other similar material.</td>
<td>1,1,1-Trichloroethane T Carbon tetrachloride T 1,1,2-Trichloro-1,2,2-Trifluoromethane</td>
<td>5,111</td>
</tr>
<tr>
<td>4. RF 116B</td>
<td>831</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 116A.</td>
<td>Same as RF 116A.</td>
<td>Same as RF 116A.</td>
<td>Included in: RF 116A</td>
<td></td>
</tr>
<tr>
<td>5. ID 116A</td>
<td>330/831</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 116A. [Waste stored at INEL]</td>
<td>Same as RF 116A.</td>
<td>Same as RF 116A.</td>
<td>Same as RF 116A.</td>
<td>2,629</td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T₂ = Trace (few ppm by weight), T₁ = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %)
Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE* (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. ID 216A Combustible Waste</td>
<td>336 970</td>
<td>Rocky Flats Plant</td>
<td>Wastes generated from all of the plutonium areas. [Waste stored at INEL]</td>
<td>Wastes consist of combustible solids (dry, damp, or moist), including paper, rags, plastic, surgeon's gloves, coveralls and boots, cardboard, wood, plywood sheathing, filter frames, ladders, bottles, 'sundry list, Kims, canvas, sample vials, respirator face masks, etc.; some waste coated with paint and some contain trace levels of HNO₃ (IDC 336, prior to 1975).</td>
<td>Carbox tetrachloride 1,1,1-Trichloroethane 1,1,2-Trichloro- 1,2,2-trifluoroethane Methylene chloride Trichloroethylene Lead</td>
<td>T T T T T T</td>
<td>1,322</td>
</tr>
<tr>
<td>8. ID 216B Combustible Waste</td>
<td>900</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 216A.</td>
<td>Same as ID 216A.</td>
<td>Same as ID 216A.</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>9. ID 216C Combustible Waste</td>
<td>330 337</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 216A.</td>
<td>Same as ID 216A.</td>
<td>Same as ID 216A.</td>
<td>5,180</td>
<td></td>
</tr>
<tr>
<td>10. ID 116B Combustible Waste</td>
<td>330 336 337 900 970</td>
<td>Rocky Flats Plant</td>
<td>Wastes generated from all of the plutonium areas. [Waste stored at INEL]</td>
<td>Same as ID 216A, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as ID 216A.</td>
<td>Included in: ID 216A ID 216B ID 216C</td>
<td></td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. ID NYD² Combustible Waste</td>
<td>802</td>
<td>Mound Laboratory</td>
<td>Decontamination and decommissioning operations at the Plutonium Processing and Research buildings.</td>
<td>Waste consists of neoprene dry box gloves, neoprene o-rings, and leaded glovebox gloves.</td>
<td>Lead</td>
<td>T</td>
<td>14</td>
</tr>
<tr>
<td>12. ID NYD² Combustible Waste</td>
<td>460</td>
<td>Rocky Flats Plant</td>
<td>Waste generated in plutonium area. [Waste stored at INEL]</td>
<td>Waste consists of plastics such as polypropylene, PVC, teflon, and nonleaded rubber items.</td>
<td>1,1,1-Trichloroethane, 1,1,2-Trichloro-1,2,2-trifluoroethane</td>
<td>--</td>
<td>&lt;1</td>
</tr>
<tr>
<td>14. RF 119A Filter Waste</td>
<td>335</td>
<td>Rocky Flats Plant</td>
<td>Filter wastes, including dry box filters, HEPA filters, filter media, and Flo-Flo filters (for liquids). (Bldg. 371, 374, 559, 707, 771, 774, 776, 777, &amp; 779 at RFP)</td>
<td>Frames of filters made of wood or metal and medium is fiberglass or Nomex type material. Flo-Flo filter cartridges consist of polypropylene plastic. Some filter wastes are processed by the addition of Portland cement.</td>
<td>IDCs: 335, 338, 376, 490, 491</td>
<td>1,648</td>
<td></td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %)
Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE' (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. RF 119B</td>
<td>335</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 119A.</td>
<td>Same as RF 119A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as RF 119A.</td>
<td>Included in:</td>
<td>RF 119A</td>
</tr>
<tr>
<td></td>
<td>338</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>342</td>
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</tr>
<tr>
<td></td>
<td>376</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td>491</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. ID 119A</td>
<td>335</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 119A.</td>
<td>Same as RF 119A.</td>
<td>Same as RF 119A.</td>
<td>388</td>
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</tr>
<tr>
<td>Filter Waste</td>
<td>338</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>342</td>
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<tr>
<td></td>
<td>491</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>17. ID 119C</td>
<td>335</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 119A.</td>
<td>Same as RF 119A, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as RF 119A.</td>
<td>Included in:</td>
<td>ID 119A</td>
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<tr>
<td>Filter Waste</td>
<td>338</td>
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<td></td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>491</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. ID 219A</td>
<td>335</td>
<td>Rocky Flats Plant</td>
<td>Wastes generated at all plutonium areas at RFP, especially Plutonium Recovery Operations, Chemical Operations Support, and Analytical Labs. [Waste stored at INEL]</td>
<td>Waste consists of absolute filters, HEPA filters, Chemical Warfare Service (CWS) filters, fiberglass &amp; asbestos filter media, asbestos pipe insulation, &amp; asbestos gloves and fire blankets. Filter frames are wood, particle board, or aluminum; filter media either fiberglass or asbestos.</td>
<td>1,1,1-Trichloroethane Carbon tetrachloride 1,1,2-Trichloro-1,2,2-trifluoroethane Methylene chloride</td>
<td>T</td>
<td>2,050</td>
</tr>
<tr>
<td>Filter Waste</td>
<td>338</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>490</td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

*T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE* (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. ID 119B Filter Waste</td>
<td>335</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 219A.</td>
<td>Same as ID 219A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as ID 219A.</td>
<td>Included in: ID 219A</td>
<td></td>
</tr>
<tr>
<td>Filter Waste</td>
<td>338</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. ID NYD² Cemented Filter Waste</td>
<td>376</td>
<td>Rocky Flats Plant</td>
<td>All plutonium areas at RFP.</td>
<td>Waste consists of filter media, whole filters, and insulation waste such as asbestos gloves and fire blankets.</td>
<td>1,1,1-Trichloroethane Carbon tetrachloride 1,1,2-Trichloro- 1,2,2-trifluoroethane Methylene chloride</td>
<td>--</td>
<td>300</td>
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<tr>
<td>Filter Waste</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>21. ID NYD² Filters</td>
<td>328</td>
<td>Rocky Flats Plant</td>
<td>Waste consists of Ful-Flo filters from incinerator. [Waste stored at INEL]</td>
<td>Waste consists of fibrous polypropylene filter media.</td>
<td>1,1,1-Trichloroethane Carbon tetrachloride 1,1,2-Trichloro- 1,2,2-Trifluoroethane Methylene chloride</td>
<td>--</td>
<td>1</td>
</tr>
<tr>
<td>22. RF 121A Organic Solid Waste</td>
<td>302</td>
<td>Rocky Flats Plant</td>
<td>The waste consists of organic solid waste that is noncombustible. Benelex/Plexiglas is removed from gloveboxes. (Bldg. 371, 374, 559, 707, 771, 774, 776, 777, &amp; 779 at RFP).</td>
<td>Organic solid waste that is noncombustible. Benelex/Plexiglas neutron shielding, black top, concrete, dirt, &amp; sand.</td>
<td>IDC 374: 1,1,1-Trichloroethane Methylene chloride</td>
<td>T</td>
<td>211</td>
</tr>
<tr>
<td>374</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. RF 121B Organic Solid Waste</td>
<td>302</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 121A.</td>
<td>Same as RF 121A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as RF 121A.</td>
<td>Included in: RF 121A</td>
<td></td>
</tr>
<tr>
<td>374</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %) information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE' (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. ID 121A</td>
<td>302</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 121A. [Waste stored at INEL]</td>
<td>Same as RF 121A.</td>
<td>IDC 374:</td>
<td>T</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Organic Solid Waste</td>
<td>374</td>
<td></td>
<td></td>
<td>1,1,1-Trichloroethane</td>
<td>1,1,2-Trichloro-</td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,2,2-Trifluorotoluene</td>
<td>Carbon tetrachloride</td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Methylene chloride</td>
<td></td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td>25. ID 121C</td>
<td>302</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 121A. [Waste stored at INEL]</td>
<td>Same as RF 121A, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as ID 121A.</td>
<td></td>
<td>Included in: ID 121A</td>
</tr>
<tr>
<td>Organic Solid Waste</td>
<td>374</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. ID 221A</td>
<td>302</td>
<td>Rocky Flats Plant</td>
<td>Most waste generated from maintenance and renovation projects by Plutonium Recovery Operations. [Waste stored at INEL]</td>
<td>Waste consists of Benelex &amp; Plexiglas glovebox windows. Benelex (dense laminated, lignocellulose hardboard made from wood chips &amp; particles.) Benelex usually coated with fire retardant paint sometimes had lead sheeting attached to it. Also, leaded glass may be present.</td>
<td>IDC 302 &amp; 464: Lead</td>
<td>D</td>
<td>48</td>
</tr>
<tr>
<td>Solid Organic Waste</td>
<td>464</td>
<td></td>
<td></td>
<td></td>
<td>1,1,1-Trichloroethane</td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trichloroethylene</td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Carbon tetrachloride</td>
<td>T1</td>
<td></td>
</tr>
<tr>
<td>27. ID 121B</td>
<td>302</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 221A. [Waste stored at INEL]</td>
<td>Same as ID 221A, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as ID 221A.</td>
<td></td>
<td>Included in: ID 221A</td>
</tr>
<tr>
<td>Solid Organic Waste</td>
<td>464</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### TABLE 2-1
WASTE CHARACTERIZATION INFORMATION
(Waste Type III: Solid Organics)

<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>28. ID NYD²</td>
<td>90</td>
<td>Rocky Flats Plant</td>
<td>Most waste generated from decontamination and decommissioning procedures in plutonium areas. [Waste stored at INEL]</td>
<td>Waste consists of blacktop, concrete, cinder blocks, bricks, dirt, and sand.</td>
<td>1,1,1-Trichloroethane Carbon tetrachloride 1,1,2-Trichloro-1,2,2-trifluoroethane Trichloroethylene Perchloressig acid Methanol Butanol Methylene chloride</td>
<td>--</td>
<td>298</td>
</tr>
<tr>
<td>Solid Organic &amp; Inorganic Waste</td>
<td>374</td>
<td>Rocky Flats Plant</td>
<td>Waste consists of leaded gloves &amp; aprons comprised of layers of hypalon rubber &amp; PbO-impregnated neoprene. Leaded rubber that has been exposed to nitric acid has been washed to remove any lead nitrate that may have formed.</td>
<td>Lead</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. RF 123A</td>
<td>339</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 123A.</td>
<td>Same as RF 123A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as RF 123A.</td>
<td>Included in: RF 123A</td>
<td></td>
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<tr>
<td>Leaded Rubber</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>30. RF 123B</td>
<td>339</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 123A.</td>
<td>Same as RF 123A.</td>
<td>Same as RF 123A.</td>
<td>Included in: RF 123A</td>
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</tr>
<tr>
<td>Leaded Rubber</td>
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</tr>
<tr>
<td>31. ID 123A</td>
<td>339</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 123A.</td>
<td>Same as RF 123A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as RF 123A.</td>
<td>Included in: ID 123A</td>
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</tr>
<tr>
<td>Leaded Rubber</td>
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</tr>
<tr>
<td>32. ID 123C</td>
<td>339</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 123A.</td>
<td>Same as RF 123A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as RF 123A.</td>
<td>Included in: ID 123A</td>
<td></td>
</tr>
<tr>
<td>Leaded Rubber</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %)

Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>33. ID 223A</td>
<td>339</td>
<td>Rocky Flats Plant</td>
<td>Waste generated by all plutonium areas. [Waste stored at INEL]</td>
<td>Same as RF 123A.</td>
<td>1,1,1-Trichloroethane T1</td>
<td>96.0</td>
<td></td>
</tr>
<tr>
<td>Loaded Rubber Waste</td>
<td>463</td>
<td></td>
<td></td>
<td></td>
<td>Carbon tetrachloride T1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Methylene chloride T1</td>
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<td>Lead D</td>
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<tr>
<td>34. ID 123B</td>
<td>339</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 223A. [Waste stored at INEL]</td>
<td>Same as RF 123A. but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as ID 223A.</td>
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<td>Loaded Rubber Waste</td>
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<tr>
<td>35. ID 225A</td>
<td>241</td>
<td>Rocky Flats Plant</td>
<td>Waste originated from the americium processing glovebox in the Plutonium Recovery Operations at RFP. [Waste stored at INEL]</td>
<td>Waste consists of both combustible and non-combustible solids, i.e., dissolve lab samples, absorbed in Oil-Dri, uranium pellets, plutonium sources, glassware, gloves, Kimwipes, &amp; used equipment. Also, piping, flanges, valves, tools, glasswears, filters, polyethylene bottles, glovebox gloves, paper &amp; plastics.</td>
<td>Methylene chloride T</td>
<td>14.0</td>
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<tr>
<td>Combustible &amp; Noncombustible Waste</td>
<td></td>
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<td>Xylene T</td>
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<td>Lead M</td>
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</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %) Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>36. ID NYD²</td>
<td>950</td>
<td>Rocky Flats Plant</td>
<td>All plutonium processing areas. [Waste stored at INEL]</td>
<td>Waste contains non-line-generated noncombustible waste generated from routine maintenance and renovation projects. Such items as; electrical conduit, control panels, electronic instrumentation, water and steam pipes, office equipment, windows, light bulbs, lead shielding, and structural metal could be included in this waste. Content Code 950 has not been used since 1974.</td>
<td>Lead</td>
<td>--</td>
<td>593</td>
</tr>
<tr>
<td>37. ID 225B</td>
<td>441</td>
<td>Rocky Flats Plant</td>
<td>All plutonium processing areas. [Waste stored at INEL]</td>
<td>Waste consists of unleached glass neutron-absorbing Raschig rings.</td>
<td>1,1,1-Trichloroethane  Carbon tetrachloride  Lead  Trichloroethylene</td>
<td>T</td>
<td>180</td>
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<tr>
<td>38. ID 125A</td>
<td>241</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 225A &amp; B. [Waste stored at INEL]</td>
<td>Same as ID 225A &amp; B, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as ID 225A &amp; B.</td>
<td>T1</td>
<td>Included in: ID 225A ID 225B</td>
</tr>
<tr>
<td>39. RF 126A</td>
<td>809</td>
<td>Rocky Flats Plant</td>
<td>Waste consists of resins used in the purification and recovery of plutonium. (Bldgs. 371 &amp; 771 at RFP).</td>
<td>The leached and cemented resins are both anionic and cationic washed resins. The resins are mixed with Portland cement and water to form a solid mass.</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>40. RF 126B</td>
<td>809</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 126A.</td>
<td>Same as RF 126A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>---</td>
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</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %) Information based on process knowledge.
<table>
<thead>
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<th>CONTENT CODE</th>
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<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
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<tbody>
<tr>
<td>41. ID 126A</td>
<td>806</td>
<td>Rocky Flats Plant</td>
<td>All inorganic particulate and sludge-like wastes generated during plutonium recovery operations. (Bldgs. 371 &amp; 771 at RFP) [Waste stored at INEL]</td>
<td>Cemented or solidified process solos (i.e., grit, fire brick fines, filter sludges, &amp; resins). Wastes are solidified with Portland cement.</td>
<td>IDC 806: 1,1,1-Trichloroethane T1</td>
<td>Carbon tetrachloride T1</td>
<td>1,1,2-Trichloro-1,2,2-trifluoroethane T1</td>
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<tr>
<td>42. ID 126C</td>
<td>806</td>
<td>Rocky Flats Plant</td>
<td>Same as ID 126A.</td>
<td>Same as ID 126A, but with naturally occurring salt, clay, &amp; wire added for experimental purposes.</td>
<td>Same as ID 126A.</td>
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</tr>
<tr>
<td>43. ID 226A</td>
<td>432</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 126A. [Waste stored at INEL]</td>
<td>Anion &amp; cation exchange resins that were used in purification and recovery of plutonium &amp; americium. Resins washed with hot HNO₃ &amp; water then mixed with water and Portland cement to form solid mass. Resins are a polystyrene and divinylbenzene copolymer.</td>
<td>1,1,1-Trichloroethane T1</td>
<td>Carbon tetrachloride T1</td>
<td>Methylen chloride T1</td>
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<td>44. ID 126B</td>
<td>432</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 126A. [Waste stored at INEL]</td>
<td>Same as ID 226A, but with naturally occurring salt, clay, &amp; wire screen added for experimental purposes.</td>
<td>Same as ID 226A.</td>
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</table>

T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (<0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %)

Information based on process knowledge.
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<th>TOTAL QUANTITY OF WASTE (m3)</th>
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<tr>
<td>45. RF 127A</td>
<td>302</td>
<td>Rocky Flats Plant</td>
<td>Waste is a mixture of inorganic sludges and combustibles for experimental purposes. (Bldgs. 371, 374, 559, 707, 771, 774, 776, 777, and 779 at RFP)</td>
<td>Waste is a mixture of RF111A, 116A, 119A, 121A, and 123A, but with naturally occurring salt, clay, and wire screen added for experimental purposes.</td>
<td>Same as RF 111A, 116A, 119A, 121A, and 123A.</td>
<td>Included in: RF 121A</td>
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<td>Combined Solid</td>
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<td>Same as RF 127A.</td>
<td>Same as ID 111A, 116A, 119A, 121A, and 123A.</td>
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</table>

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<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
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<tr>
<td>48. LA 116A</td>
<td>004</td>
<td>Los Alamos National Lab</td>
<td>Waste generated from plutonium processing activities (TA-55 at LANL).</td>
<td>Waste consists of combustible solids (paper, rags, plastic, rubber, etc.) &amp; some small fraction of noncombustible solids such as scrap metals.</td>
<td>Lead T2 Toluene T2 1,1,1-Trichloroethane T1 Carbon tetrachloride T2 Dichloroethane T2 Trichloroethylene T1 Mercury T2 Cadmium T2 Hydrofluoric acid T1 Barium hydroxide T2 Bromolorm T2 Nickel* T2 Arsenic T2 Barium chloride T2 Beryllium T2 Beryllium hydroxide T1</td>
<td></td>
<td>3,806</td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %).

Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49. LA 123A</td>
<td>005(P1)</td>
<td>Los Alamos National Lab</td>
<td>Same as LA 116A.</td>
<td>Lead-lined glovebox gloves are discarded with metal waste (motors, tools, discarded metals, etc.)</td>
<td>Nickel</td>
<td>T2</td>
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<td></td>
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<td></td>
<td></td>
<td>Bromoform</td>
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<tr>
<td>50. LA 125A</td>
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<td>Los Alamos National Lab</td>
<td>TA-54 at LANL.</td>
<td>Waste contains metal equipment (gloveboxes, process equipment, duct work from decommissioning operations) along with small volumes of combustibles generated during decommissioning, sectioning, &amp; packaging.</td>
<td>Lead</td>
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<td>Mercury</td>
<td>T2</td>
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<td></td>
<td></td>
<td></td>
<td>Hydrofluoric acid</td>
<td>T2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Beryllium</td>
<td>T2</td>
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</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %). Information based on process knowledge.
<table>
<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>52. LL 116A</td>
<td>001</td>
<td>Lawrence, Livermore National Lab</td>
<td>Bldg. 332 &amp; 251 at LLNL</td>
<td>Waste consists mostly of untreated dry solids (tissue, paper, assorted plastics, glassware, ceramics, metals). Portland cement is used to solidify water-based liquids. Emulstone is used to solidify small amounts of solvent and oil-based liquids. Waste consists predominantly of organics.</td>
<td>Hydrofluoric acid Chloroform Nickel Lead</td>
<td>T T T T</td>
<td>588</td>
</tr>
<tr>
<td>53. MD 116A</td>
<td>827</td>
<td>Mound Laboratory</td>
<td>Bldgs. SM, PP, and R at Mound</td>
<td>Combustible wastes consist of paper, plastics, rags, cardboard, wood generated from glovebox operations &amp; decontamination &amp; decommissioning program.</td>
<td>Lead Mercury Unspecified solvents (See Footnote 4)</td>
<td>T1 T2</td>
<td>21</td>
</tr>
<tr>
<td>54. NT 116A</td>
<td>001</td>
<td>Lawrence, Livermore National Lab</td>
<td>Same as LL 116A. [Waste stored at Nevada Test Site]</td>
<td>Same as LL 116A.</td>
<td>1,1,1-Trichloroethane Acetone Lead Beryllium 1,1,2-Trichloro-1,2,2-trifluoroethane Carbon tetrachloride Trichloroethylene Methyl ethyl ketone Chromium Hydrofluoric acid Chloroform Nickel</td>
<td>T T T T T T T T T T T</td>
<td>458</td>
</tr>
</tbody>
</table>

*T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (<0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
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<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>55. NT 225A</td>
<td>001</td>
<td>Lawrence</td>
<td>Same as LL 116A.</td>
<td>Same as LL 116A, except that waste is mostly dry combustibles to mostly noncombustibles.</td>
<td>Same as LL 116A.</td>
<td>Included in: NT 116A</td>
<td></td>
</tr>
<tr>
<td>Combustible &amp;</td>
<td>330</td>
<td>Livermore</td>
<td>(Waste stored at Nevada Test Site)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noncombustible Waste</td>
<td>961</td>
<td>National Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>993</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56. OR 125A</td>
<td>N/A</td>
<td>Oak Ridge</td>
<td>Waste originates from Bldgs. 7920, 2026, 5505, 3019, Analytical Chemicals at Y-12 Plant &amp; Isotopes Production Area at ORNL</td>
<td>TRU irradiated paper, metal, glass, generated chemistry lab waste (empty reagent bottles, wipes, paper waste, vials, contaminated clothing, gloves &amp; lab glassware &amp; containers. Containers may include small quantities of metal waste in the form of canisters, other containers, or Pb shielding. Ventilation system filters &amp; leaded rubber glovebox gloves may be present.</td>
<td>Lead</td>
<td>T</td>
<td>1,330</td>
</tr>
<tr>
<td>Mixed Paper, Metal, &amp; Glass</td>
<td></td>
<td>National Lab</td>
<td></td>
<td></td>
<td>Carbon tetrachloride</td>
<td>T2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hydrofluoric acid</td>
<td>T2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hydrazine</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nickel</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>57. OR 125B</td>
<td>N/A</td>
<td>Oak Ridge</td>
<td>Same as OR 125A, but also Bldg. 3505 at ORNL</td>
<td>Construction debris, including concrete, duct work, other materials resulting from decontamination &amp; decommissioning activities, such as dismantling hot cells &amp; removing structures.</td>
<td>Same as OR 125A.</td>
<td>416</td>
<td></td>
</tr>
<tr>
<td>Mixed Paper, Metal, &amp; Glass</td>
<td></td>
<td>National Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %) Information based on process knowledge.
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<thead>
<tr>
<th>CONTENT CODE</th>
<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>58. RH 123A</td>
<td>N/A</td>
<td>Richland Hanford</td>
<td>Plutonium finishing plant (PFP) generates waste from operations in Plutonium Reclamation Facility, Plutonium Conversion-Remote Mechanical C-Line, &amp; product handling; also, Plutonium-Uranium Extraction facility (PurOak).</td>
<td>Waste consists of one or more of the following: leaded glass, lead-lined hood gloves, lead blankets, &amp; misc. equipment containing lead.</td>
<td>Lead</td>
<td>D</td>
<td>2,255</td>
</tr>
<tr>
<td>59. RH 125A</td>
<td>001</td>
<td>Richland Hanford</td>
<td>Same as RH 123A.</td>
<td>Waste consists of one or more of the following: surgical gloves, plastic bags &amp; sheets, paper products, cloth, tape, rubber, leather, wood glass, failed process equipment, leaded glass, lead-lined hood gloves, lead blankets, fluorescent lamps, flattight batteries, piping, conduit, wiring, glass &amp; metal portions of gloveboxes, pumps, motors, standard lab equipment, &amp; HEPA filters.</td>
<td>IDC 001: Lead</td>
<td>M</td>
<td>412</td>
</tr>
<tr>
<td></td>
<td>002</td>
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<td></td>
<td></td>
<td>IDC 002: Lead</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>60. SR 116A</td>
<td>N/A</td>
<td>Savannah River Plant</td>
<td>Plutonium production facility (221 - HB Line &amp; 221 - FB Line) &amp; Labs (772-F, 773-A, &amp; 235-F) at Savannah River Plant.</td>
<td>Combustible job control wastes: consists of contaminated equipment &amp; miscellaneous incidental wastes—dry solid wastes such as plastics, wood, cloth, paper &amp; other incidental wastes.</td>
<td>Same as SR 125A.</td>
<td>Included in: SR 125A</td>
<td></td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %). Information based on process knowledge.
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<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>61. SR 116B</td>
<td>N/A</td>
<td>Savannah River Plant</td>
<td>Same as SR 116A.</td>
<td>Same as SR 116A.</td>
<td>Same as SR 116A.</td>
<td>Included in:</td>
<td>SR 125A</td>
</tr>
<tr>
<td>Combustible Job Control Waste</td>
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<td></td>
<td>SR 125A</td>
<td></td>
</tr>
<tr>
<td>62. SR 116C</td>
<td>N/A</td>
<td>Savannah River Plant</td>
<td>Same as SR 116A.</td>
<td>Same as SR 116A.</td>
<td>Same as SR 116A.</td>
<td>Included in:</td>
<td>SR 125A</td>
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<tr>
<td>Combustible Job Control Waste</td>
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<td></td>
<td></td>
<td>SR 125A</td>
<td></td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %). Information based on process knowledge.
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<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
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<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>63. SR 125A</td>
<td>001</td>
<td>Savannah River Plant</td>
<td>Same as SR 116A. May contain some noncombustibles such as small tools, metal cans, glassware, etc.</td>
<td>Lead</td>
<td>D</td>
<td>14,248</td>
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<tr>
<td>Combustible Job</td>
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<td>Cadmium</td>
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<td>Control Waste</td>
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<td>Mercury</td>
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<td>Toluene</td>
<td>T</td>
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<td>1,1,2-Trichloro-1,2,2-trifluoroethane</td>
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<td>Silver</td>
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<td>Formic acid</td>
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<td></td>
<td>Hydrazine</td>
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<td></td>
<td></td>
<td>Barium hydroxide</td>
<td>T</td>
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<td></td>
<td></td>
<td>Barium oxide</td>
<td>T</td>
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<td>Chloroform</td>
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<td>Nickel</td>
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<td>Barium sulfate</td>
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<td>Beryllium</td>
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<td></td>
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<td>Lead nitrate</td>
<td>T</td>
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<td></td>
<td></td>
<td>Lead oxide</td>
<td>T</td>
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</tr>
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<td></td>
<td></td>
<td>Nickel nitrate</td>
<td>T</td>
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<td></td>
<td></td>
<td>Silver nitrate</td>
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<td>Beryllium hydroxide</td>
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<td></td>
<td></td>
<td>Barium fluoride</td>
<td>T</td>
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<td></td>
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<td>Mercuric nitrate</td>
<td>T</td>
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<td>Chromic acid</td>
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<td>Potassium dichromate</td>
<td>T</td>
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<td></td>
<td></td>
<td>Sodium chromate</td>
<td>T</td>
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<td></td>
<td></td>
<td>Sodium dichromate</td>
<td>T</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T = Trace (<1 ppm by weight); T2 = Trace (few ppm by weight), T1 = Trace (< 0.1 weight %), T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (> 10 weight %). Information based on process knowledge.
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<tr>
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<th>IDCS</th>
<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL QUANTITY OF WASTE (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. RF 112A</td>
<td>801</td>
<td>Rocky Flats Plant</td>
<td>Waste organic liquids transferred to Bldg. 774 at RFP for cementation.</td>
<td>Waste organic liquid (oil and/or solvents) mixed with gypsum cement; oils are machining oil &amp; lathe coolant.</td>
<td>IDC 801: 1,1,1-Trichloroethane D, Carbon tetrachloride M, 1,1,2-Trichloro-1,2,2-trifluoroethane M</td>
<td>1.755</td>
</tr>
<tr>
<td>Solidified Aqueous Waste</td>
<td>808</td>
<td></td>
<td></td>
<td>IDC 808: Chloroform D, Xylene M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ID 112A</td>
<td>700</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 112A. [Waste stored at INEL]</td>
<td>Same as RF 112A.</td>
<td>Same as RF 112A.</td>
<td>166</td>
</tr>
<tr>
<td>Solidified Organics</td>
<td>801</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. ID 212A</td>
<td>003</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 112A. [Waste stored at INEL]</td>
<td>Liquid organic wastes (trichloroethane, oils, CCl₃, TCE, PCE) mixed with Ca silicate to form grease or paste-like material; small amounts of Oil-Dri mixed with waste. Other organics from lab are organophosphate &amp; nitrobenzene.</td>
<td>1,1,1-Trichloroethane M, 1,1,2-Trichloro-1,2,2-trifluoroethane M, Trichloroethylene M, Perchloroethylene T, Carbon tetrachloride D, Beryllium T, Methylene chloride M, Nitrobenzene T</td>
<td>848</td>
</tr>
<tr>
<td>Solidified Organic Process Solids</td>
<td>808</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. RF 113A</td>
<td>802</td>
<td>Rocky Flats Plant</td>
<td>Laboratory wastes in Bldg. 774 at RFP.</td>
<td>Aqueous laboratory wastes that are not compatible with primary aqueous treatment system; waste contains organic acids. Wastes are pH adjusted &amp; mixed with Portland &amp; magnesia cement.</td>
<td></td>
<td>157</td>
</tr>
<tr>
<td>Solidified Lab Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. ID 113A</td>
<td>802</td>
<td>Rocky Flats Plant</td>
<td>Same as RF 113A. [Waste stored at INEL]</td>
<td>Same as RF 113A.</td>
<td>Same as RF 113A.</td>
<td>17</td>
</tr>
<tr>
<td>Solidified Lab Waste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
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<thead>
<tr>
<th>CONTENT CODE</th>
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<th>GENERATOR SITE</th>
<th>PROCESS GENERATING WASTE</th>
<th>WASTE DESCRIPTION</th>
<th>HAZARDOUS CHEMICALS</th>
<th>MAX. TOTAL CONC.*</th>
<th>TOTAL QUANTITY OF WASTE*(m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. ID 213A</td>
<td>004</td>
<td>Rocky Flats Plant</td>
<td>From lab: generated by various operations, in plutonium recovery; processed by aqueous waste treatment [Waste stored at INEL]</td>
<td>Waste consists of solidified organics that contain plutonium complexing chemicals (i.e., alcohols, organic acids, &amp; chelating agents (EDTA)). Liquids mixed with Portland cement &amp; magnesia cement.</td>
<td>1,1,1-Trichloroethane Carbon tetrachloride 1,1,2-Trichloro- 1,2,2-Trifluoroethane Methylene chloride Xylene Butanol Methanol Cadmium Lead Trichloroethylene</td>
<td>T T T T T T T T T</td>
<td>179</td>
</tr>
<tr>
<td>7. RH 112A</td>
<td>004</td>
<td>Richland Hanford</td>
<td>Wastes come from plutonium finishing plant from operations in the plutonium reclamation facilities, plutonium conversion-remote mechanical C- line, &amp; analytical chemistry lab.</td>
<td>Waste consists of absorbed organics that cannot be absorbed back into process. Material may contain any or all of the following: carbon tetrachloride, tributyl phosphate, xylene, Fe, Ni, Cr, normal paraffin hydrocarbons, trimethylbenzene, triocca phosphate oxide. Liquid material absorbed in inert material.</td>
<td>Xylene Carbon tetrachloride Nickel Chromium</td>
<td>D D T T</td>
<td>65</td>
</tr>
</tbody>
</table>

* T3 = Trace (< 1 ppm by weight); T2 = Trace (few ppm by weight); T1 = Trace (< 0.1 weight %); T = Trace (<1 weight %); M = Minor (1-10 weight %); and D = Dominant (>10 weight %). Information based on process knowledge.
TABLE 2-1
WASTE CHARACTERIZATION INFORMATION
FOOTNOTES


2. NYD = NOT YET DETERMINED. This waste is listed in Attachment E, TRU Mixed Waste Characterization Database, but not summarized in TRUCON or TRUPACT-II Chemical List.

3. Di-N-Octyl Phthalate was used for filter testing until 1988. It is no longer used.

4. Based on the laboratory operations, these wastes may contain trace quantities of any of the listed halogenated or nonhalogenated organic compounds.

5. Xylene was not listed in Attachment E for this waste; however, RFP has recently added xylene (F003) as a potential hazardous waste for IDC 808.

6. This waste has not been generated as yet, and quantities have not been determined.
TABLE 2-2
DATA PACKAGE INFORMATION

Shipment Data
- Shipment Number
- Shipment Date
- Vehicle Type
- Waste Type (CH or RH)
- Shipment Certification Date

Waste Package Data
- TRUPACT-II/Cask Number
- Package Assembly Number
- Internal RH TRU Container
- Container Code (WIPP assigned)
- Closure Date
- Weight
- Surface Dose Rate
- Neutron Contribution
- Organic Materials (Weight)
- Organic Materials (Percent by Volume)
- Thermal Power
- Content Code
- Pu-239 Fissile Gram Equivalent
- Total Alpha Activity
- Plutonium Equivalent (Pe-Ci)
- EPA Hazardous Waste Number(s)-40 CFR Part 261, Subparts C and D
- Quantity of Hazardous Wastes
- Waste Package Certification Date
- Certifying Facility
- Name of Certifying Official
- Radionuclide(s)
- Quantity of Radionuclide(s)
• The use of operating manuals which include directions for the adding and mixing of chemicals (e.g., the sequence for mixing solutions and the opening and closing of process valves which dispense chemicals).

• The use of flow diagrams to display the individual tasks assigned to a waste process.

In addition, DOE generator facilities determine the compatibility of the chemical constituents within an individual waste container and the chemical constituents within a total transporter payload. The document, "A Method for Determining the Compatibility of Hazardous Wastes" (EPA, 1976), provides the basis for assessing these chemical compatibilities. Compounds found within the waste are classified as "incompatible" if the potential for a reaction exists that might result in any of the following:

• An explosion
• Heat generation
• Gas generation
• Pressure build up
• The generation of toxic byproducts

A comprehensive list of all chemicals that could be present in a given waste form was obtained from each generator site. These lists were compiled based on process technology and flow analysis with all chemical inputs into the system accounted for. The concentration levels of these chemicals were reported as either trace (<1 percent), minor (1-10 percent), or dominant (>10 percent). These waste constituents were then divided into groups based on their chemical structure and nature (e.g., aldehydes, caustics, cyanides, etc.). Interactions between different groups could potentially lead to the incompatibilities listed above. For example, a reaction between Group 1 (acids, minerals, nonoxidizers) and Group 10 (caustics) could result in heat generation. All combinations of such potential incompatibilities were identified using a dBase III computer program. Incompatibilities were sought both within a given waste form and wherein a mixing of waste forms may occur. In the latter case, potential incompatibilities were examined across all waste forms from all generator sites (Attachment D).

Interactions of a compound with any compound present in trace quantities are not of concern in terms of the consequences of incompatibilities. By the very nature of the waste forms (solidified or solid materials), and the insignificant quantities of the trace chemicals present, reactions of the trace chemicals with the other compound(s) will either be precluded or will not generate any of the consequences of incompatibilities. In most cases, any possible reactions take place before the waste is generated in its final form.

Potential incompatibilities between minor and dominant components of the different waste forms were compiled for each site and analyzed on a case-by-case basis. Given the physical and chemical nature of each waste form (cemented, solidified, etc.), it was possible to determine whether any interaction between the potentially incompatible compounds could occur. Typically, chemicals listed as present in the waste are reacted prior to becoming waste. For example, a site listing a caustic (Group 10) and an acid (Group 1) as part of the waste has only the neutralized product in an immobilized form in the waste. No further reactions are possible once the waste is generated in its final form.

Incompatibilities between minor and dominant waste constituents that were not resolved by the physical nature of the waste or from waste generation practices were identified, and incompatible wastes were segregated. The generator sites with these waste forms were informed that these could not be shipped until it could be adequately demonstrated by testing that they posed no concerns for shipping or storage. In other words, no chemical incompatibilities will exist in the waste that is to be stored at the WIPP facility.
3.0 ROCKY FLATS PLANT AND
IDAHO NATIONAL ENGINEERING LABORATORY

3.1 RF 111 AND ID 111

Content codes RF 111A, ID 111A, RF 111B, and ID 111C, described in the TRUPACT-II
Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at
the Rocky Flats Plant (RF 111) and stored at the Idaho National Engineering Laboratory (ID
111). These content codes are classified as Waste Type I, Solidified Aqueous and
Homogeneous Inorganic Solids. Each content code includes the following IDCs:

- 800 Solidified sludge from Building 774
- 803 Solidified sludge from Building 374
- 807 Solidified bypass sludge from Building 374

RF 111B and ID 111C are experimental equivalents of RF 111A and ID 111A and will have
naturally occurring salt, clay (bentonite), and steel added to the payload containers to
simulate conditions after breaching of drums, boxes, and bins in the WIPP repository after
closure. ID 211A is the retrievably stored equivalent of RF 111A and ID 111A. The
relationship between these content codes is discussed in more detail in Section 3.2 (ID
211A).

3.1.1 General Process Knowledge - IDC 800

IDC 800 is processed in Building 774. More than 99% of the process aqueous wastes
treated in Building 774 originate from Building 771, a plutonium (Pu) recovery facility.
These wastes can be categorized as follows: ion column nitric acid effluent, americium (Am)
ton column nitric acid effluent, steam condensate, evaporator distillate, caustic scrub solution
and miscellaneous basic and acidic solutions.

Figure 3.1-1 represents a flow diagram that demonstrates how the different waste streams
from Building 771 are treated in Building 774. A short narrative on the processes that
generate the waste, to accompany the flow diagram, follows below.

General

The acidic aqueous wastes are processed through neutralization, filtration and
coprecipitation equipment. The basic aqueous wastes are processed through the
coprecipitation and then the filtration equipment. The resultant sludge from filtration is
immobilized prior to offsite shipment as CH TRU waste. The resultant low-activity liquid
wastes from the coprecipitation containing less than 13,500 picoCuries per liter (pCi/l) can
be transferred to the Building 374 evaporation process. Coprecipitation effluent containing
more that 13,500 pCi/l but less than 200,000 pCi/l can be transferred to the Building 374
coprecipitation process. Normally, the Building 774 precipitation effluent is transferred to the
Building 374 coprecipitation process because the contamination level is above 13,500 pCi/l.

Hydrochloric Acid Waste Neutralization

The hydrochloric acid (HCl) wastes from Building 771 can be neutralized with sodium
hydroxide (NaOH) in the receiving tank or they can be neutralized with the nitric acid
(HNO₃) wastes in the nitric acid waste neutralization equipment. The neutralized
hydrochloric acid waste (or the as-received HCl waste, depending on chloride concentration)
is combined with the nitric acid waste and neutralized in the nitric acid neutralization equipment.

**Nitric Acid Waste Neutralization, Filtration, and Immobilization**

Nitric acid wastes from Building 771 containing large quantities of metal ions that are insoluble in basic solutions are neutralized with 50 weight-percent (wt %) sodium hydroxide resulting in a liquid waste with a pH of about 12. Metal hydroxide solids and soluble salts are produced. The liquid waste is cooled by recycling the liquid through a heat exchanger. The neutralized acidic waste is combined with the caustic sludge from the coprecipitation process and fed to a precoated rotary drum vacuum filter. The resultant wet sludge material is collected with Portland cement and an absorbent in a 55-gallon drum to produce an immobilized product (IDC 800). The filtrate product is a caustic liquid suitable for feed to the coprecipitation process.

**Caustic Coprecipitation**

This process reduces the contamination of the caustic (pH from 10 to 13) wastes from various Building 771 processes to produce a low specific activity liquid waste. Multiple cycles through the coprecipitation process may be required for feed streams with high actinide concentrations.

Ferric sulfate, calcium chloride, magnesium sulfate, and a coagulating agent are used to form a floc that coprecipitates with the radioactive contaminant in the flash mixer tank. The liquid then flows to a flocculator, where an anionic polyelectrolyte flocculent is added to enhance agglomeration of the suspended solid flocs. The flocculated mixture flows to the clarifier where the solids are permitted to settle. The slurry is removed by a continuously moving rake in the bottom of the clarifier tank. The suspended radioactive solids leave the clarifier in this slurry and are transferred to the filtration and immobilization process.

The clarifier liquid effluent overflows through a launder trough located at the top of the clarifier and is transferred to the second stage precipitation process. The second stage is a batch precipitation process to further reduce the level of radioactive and chemical contamination. The batch process utilizes the same chemical reagents as the first stage precipitation.

The precipitated sludge from the first and second stage precipitation are combined in a slurry tank with the neutralized acidic waste. This combined feed is processed in the rotary drum vacuum filtration process. The resultant wet sludge is immobilized with Portland cement and an absorbent in a 55-gallon drum. These drums are referred to as IDC 800, solidified aqueous waste.

The treated effluents from the second-stage process are held in an isolated tank until analytical sample data can be obtained. When the liquid meets radioactive specifications, it is transferred to Building 374 for further processing. Treated waste that is less than the radioactive specifications is recycled through the second stage process.

**Solidified Laboratory Waste**

The process which is shown on the flow diagram for Building 774 as processing IDC 802, solidified laboratory waste, will be addressed later in this section.

3.1.2 General Process Knowledge - IDCs 803 and 807
Figure 3.1-1. Flow Diagram for Building 774 Processing of Contact Handled Transuranic Aqueous Waste from Building 771 (Shipping Content Codes 111 and 112; IDCs 800, 802)
Buildings 371, 559, 707, 774, 776, 779, 865, 881, and 883 produce aqueous process waste which feeds into Building 374 and are processed into IDCs 803 and 807. In addition, a small amount of non-piped waste is also fed into the aqueous process sludge from Buildings 444, 460, 334, and 881.

The flow diagrams in Figures 3.1-2 to 3.1-10 depict processes in each of the above mentioned buildings which generate aqueous waste sent to Building 374 for processing. Figure 3.1-11 shows how these aqueous wastes are subsequently processed into solidified waste forms (IDCs 803 and 807) in Building 374.

Building 371 - Aqueous Wastes

Caustic solution from the caustic treatment operations in Building 371 includes glovebox exhaust fume scrubber solution, vacuum pump seal solution, and neutralized nitric acid from building processes. The solutions (Figure 3.1-2) are filtered to remove plutonium and sent to Building 374 where it feeds in the process to produce aqueous sludge (IDC 803 or 807).

Building 559 - Aqueous Wastes

Building 559 generates aqueous waste from three different sources (Figure 3.1-3) that feed into the Building 374 coprecipitation process:

- Aqueous waste is generated from chemical resistance and atomic absorption tests run on raschig rings.
- Aqueous wastes from the house vacuum system which uses a mist tank to neutralize acids that enter the system through the gloveboxes. The caustic used is sodium hydroxide with a sodium tripolyphosphate inhibitor.
- Aqueous wastes from washing glassware in the process sinks in the laboratory.

Building 528 is a temporary holding point for the process waste from Building 559. The waste is made up primarily of hydrochloric acid, nitric acid, sulfuric acid, potassium hydroxide, water, soap, and very low levels of other numerous chemicals. From Building 528 the waste is sent via pipe to Building 374, where it enters the coprecipitation process to produce the solidified aqueous sludges (IDC 803, 807).

Building 707 - Aqueous Waste

Building 707 (Figure 3.1-4) generates aqueous waste sent to the coprecipitation process in Building 374 from these following areas:

- Non-Destructive Testing - Developer rinse water is produced from rinsing of parts in a water bath following the developer bath used in photographic analysis for detecting defects.
- Utilities and Maintenance Operations - Wastes collected from decontamination showers and equipment drains throughout the building are collected into tanks in the Building 731 holding tank for transfer to Building 374.
- Utilities and Maintenance Operations - Cooling system inhibitors from the cooling system, flushed once every 5 to 10 years. Inhibitors are used to prevent corrosion and formation of algae.
Two process waste tanks in pumping station 731 are used to collect wastes from Building 707. The tanks are used alternately; one receives waste while the other is sampled and pumped to Building 374 for processing of aqueous effluent.

These wastes are treated and processed in Building 374 into solidified aqueous sludges (IDCs 803 and 807).

Building 774 - Aqueous Waste

Most of the process aqueous wastes treated in Building 774 (Figure 3.1-5) originate from Building 771. These wastes are neutralized and fed into the coprecipitation and filtration processes in Building 774. The resultant low specific activity effluent from the Building 774 coprecipitation process containing more than 13,500 pCi/l but less than 200,000 pCi/l are transferred to the Building 374 coprecipitation process.

Building 776 - Aqueous Waste

Aqueous wastes from the Advanced Size Reduction Facility (ASRF) and process sinks throughout Building 776 (Figure 3.1-6) are collected in composite aqueous tanks and pumped through the valve vault system to Building 374 where it enters the coprecipitation process to produce aqueous sludges (IDCs 803 and 807). These wastes typically consist of steam condensate from the steam cleaning of metal pieces and from plasma-arc cutting and process wastes generated from the building sinks and sumps which are emptied into the building process drain system.

Building 779 - Aqueous Waste

Aqueous waste is generated from the following processes in Building 779 (Figure 3.1-7):

- **Utilities Group Processes** - Because the utilities group is responsible for all liquid process waste in the building, the flow diagram shows two main streams from here: scrubber blowdown wash and other process wastes. Scrubber blowdown wash results when exhaust from various labs, commonly high in nitric acid is scrubbed through a water filter. The resulting acidic solution is neutralized with sodium hydroxide. Other process waste constituents may range from mop water to acids used in research areas. A more detailed description of the streams that feed into process waste is provided below.

- **Physical Metallurgy** - Process wastes include acids, organic solvents, activators, stabilizers, acetone, alcohol, 1,1,2-trifluoro-1,2,2-trichloroethane, toluene, monochlorobenzene, perchloric acid, ethanol and film developers. Typically no more than 200 milliliters (ml) of any one reagent is used at one time during sample preparation.

- **Production Physical Chemistry** - This group does not need large amounts of liquids and therefore does not generate large quantities of process waste. The primary contribution is waste water.

- **Custodial** - Waste water from mopping floors, cleaners and detergents. Excess wax stripper, excess wax and removed wax are generated during re-waxing activities. The strippers are primarily composed of solvents. Floors in hallways and offices, with linoleum are waxed once a month. Water from the testing of eye wash and emergency shower stations is stored in a designated 44-gallon drum. The stations are inspected monthly for proper water pressure and water clarity. The waste water is poured down a process drain.
Figure 3.1-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 371 (Shipping Container Code 111, IDCs 803 & 807).
Figure 3.1-3. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 559 (Shipping Content Code 111, IDCs 803 & 807).
Figure 3.1-4. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 707 (Shipping Container Code 111, ICs 803 & 807).
Figure 3.1-5. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 774 (Shipping Content Code 111, IDCs 803 & 807).
Figure 3.1-6. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 776 (Shipping Content Code 111, IDCs 803 & 807).
Figure 3.1-7. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 779 (Shipping Content Code 111, IDCs 603 & 807).
• Nuclear (NUC) Joining - Water used to rinse parts and acid residues from etched samples. Chemicals used include HCl, HNO₃, phosphoric acid (H₃PO₄), oxalic acid, copper sulfate (CuSO₄), and sulfuric acid (H₂SO₄).

• Coatings - A sink in the coatings area is periodically used to wash parts and equipment.

The above-mentioned liquid wastes are transported by process drain to holding tanks in Building 776. After sampling, the waste is sent to Building 374 for processing into aqueous sludges (IDC 803 or 807).

Building 865 - Aqueous Waste

Aqueous waste (Figure 3.1-8) is generated from three areas: the R&D machine shop, the metallography laboratory, and the maintenance machine shop. The aqueous waste is emptied into process drains which are connected to a process waste system for the building. The liquids are then pumped to a pump station in Building 866 where sampling is performed. If the waste is acidic, it will enter the coprecipitation process in Building 374 to produce solidified aqueous sludges (IDC 803 or 807). The waste streams are described in detail below.

• Metallography Laboratory - This group prepares and examines metal samples. Aqueous wastes are generated from the grinding, polishing and etching operations, and miscellaneous chemical work done in the laboratory. Waste polishing solution, which consists of varsol and a solution of deionized water, ethanol, and perchloric acid is also generated.

• Maintenance Shop - Aqueous wastes from grinding, polishing, and etching operations and miscellaneous chemical processes is generated. Solutions used for personal and equipment cleaning which contains soaps and detergents are generated as waste.

• R&D Machine Shop - Aqueous waste which is approximately 50% nitric acid with water used for etching parts and materials generated in very small quantities.

Building 881 - Aqueous Waste

Aqueous waste is generated from several processes in Building 881 (Figure 3.1-9). Even though the wastes are usually low level and not transuranic, they are still fed into the coprecipitation process in Building 374 for producing aqueous sludges (IDCs 803, 807). This is usually because the process wastes are acidic and are sent through the neutralization, flocculation and precipitation processes before going to the evaporation process (a process that produces low-level saltcrete). The waste streams are described in more detail below.

• Model Construction - This group is responsible for the fabrication of scale models of future designs. Very small quantities of photographic solution used in the dark room are generated.

• Testing Laboratory - Chemical and mechanical testing of plastics, ceramics and metals are performed in this lab. The testing lab generates waste acids, bases and other miscellaneous aqueous waste.
• Fine Machining - This group is responsible for precision machining on research and development prototypes. Liquid waste which may contain a variety of organics (acetone, ethanol, oxalic acid) and inorganics (ammonia, potassium and iron salts).

• Silver Recovery - Silver is recovered from waste nitric acid solutions by precipitation. Waste sulfamic acid, used as the plating bath solution for silver recovery is generated. Waste alkaline solutions are generated as a byproduct of silver precipitation processes. Aqueous waste is generated from leaching out residual hydroxides or nitrates from the roasted silver in a water bath.

• Plasma Spectroscopy - Samples generated from various groups on the plant site. Examples of items analyzed include chromium metal, miscellaneous metals and alloys, stainless steel, plating baps, erbium salts, niobium metal and oils which are analyzed by plasma emission spectrometry to determine various metal concentrations. Aspiration fluids from the instrument and residual samples are emptied periodically. The solutions can contain HCl, HNO₃, chromium and stainless steel.

• Water Analysis - Responsible for ground water monitoring at the Rocky Flats Plant. Liquid waste includes acids, bases, and small amounts of solvents.

• Organic Analysis - Hydrochloric acid, sulfuric acid, sodium hydroxide, and other aqueous chemicals used in the organic analyses of aqueous samples.

• Combustion Analysis - Product samples are combusted and gases are analyzed for carbon, sulfur, nitrogen, oxygen and hydrogen. Acid waste includes nitric, hydrochloric, acetic and hydrofluoric acids.

• Chemical Standards Preparation - Inorganic standard solutions are prepared for use on the plant site. Acid solutions, acetone, and Freon-113 used in cleaning glassware are included in this stream. (Very small quantities are generated; less than 5 gallons/year total waste).

• Exhaust Air Scrubber - Exhaust from hoods in the general chemistry laboratory are sent to a wet scrubber.

• Microshaping - Advanced precision machining techniques for the shaping of various metal parts. Electroplating rinse water and waste chemicals used include acids, bases, and some solvents.

• Radiochemistry - Process waste from uranium separation, which includes HCl, ammonium iodide (NH₄I), HNO₃, and acetic acid, and from tritium distillation, which includes NaOH and potassium permanganate (KMnO₄). Uranium analysis involves digestion in nitric acid and purification with an anion exchange resin. Tritium analysis involves distillation from a strong base solution. Aqueous wastes are also generated from water trapped in vacuum pump lines. If this waste is hot, it goes to Building 774 by truck. If it is cold, the waste goes to Building 374 via process drain.

• Atomic Absorption - A flame atomic absorption instrument is used for metal analysis. Aspiration fluid is collected in neoprene bottles located under the instrument. It is added to the residual sample in the process drain. Solutions contain hydrochloric acid, nitric acid, uranium (U), beryllium (Be), vanadium (V), and stainless steel.
Figure 3.1-8. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 865 (Shipping Content Code 111, IDCs 803 & 807).
Figure 3.1.9. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 881 (Shipping Container Code 111; IDCs 803, 807)
• Emission Spectroscopy - Metals are analyzed by an emission spectrometer to determine levels of purity. Nitric acid is used for cleaning platinum crucibles before they are used in sample preparation. (A very small amount is generated.)

• Special Chemistry - A variety of specialized chemical analyses are performed. Major job categories include plating bath analyses, analyses of water from part rinsing, silver assays and compatibility studies. This stream includes all aqueous chemicals and solvents used for performing these chemical analyses, including acids, bases, salts, and small amounts of solvents such as acetone.

• Reagent Specification - Specification analyses are performed on reagents used throughout the plant. Reagents analyzed include acids, bases, cleaning solutions, hydrogen peroxide, ferrous sulfamate, beryllium, and uranium assays. Waste includes all liquid, aqueous, and organic waste chemicals that are used to perform specification analyses. Waste cyanide is oxidized to cyanate using sodium hypochlorite and is included in this stream.

The waste streams listed above are emptied into the process drain which feeds into a lift station in Building 887. The waste is sampled and transported by a valve vault system to Building 374, where it enters the coprecipitation process.

**Building 883 - Aqueous Waste**

Building 883 generates aqueous waste (Figure 3.1-10) from metallurgical operations, which involves heating, rolling, pressing, machining, and treating uranium, stainless steel, beryllium, and other ferrous and non-ferrous metals and alloys. The aqueous waste is typically not transuranic; however, if upon sampling it is acidic, it is piped to the coprecipitation process in Building 374 for producing aqueous sludges (IDC 803 or 807). The waste streams are described below.

• Quench Tank - Quench water from portable stainless steel quench tanks used in the heat treating of metals are dumped to the process drain when the water becomes dirty.

• Acid Etch - Metal parts are acid-cleaned in nitric acid and rinsed with water. Waste water and acid are collected in process tanks and then combined with the quench water listed above.

• Sheet Scrubber - Waste water generated from a process for scrubbing salt from the salt bath off uranium sheets.

• Caustic Fume Scrubber - Waste caustic solution from scrubbing fumes.

The waste streams identified above are emptied into the process drain which feeds into process waste tanks, where they are sampled before going to Building 374.

**Building 374 - Aqueous Waste Processing**

Waste from all the buildings listed above feed into the Building 374 aqueous waste reprocessing (Figure 3.1-11).

**General**
The acidic aqueous wastes are processed through the neutralization, filtration, and coprecipitation processes. The basic aqueous wastes are processed through the coprecipitation and filtration processes. The resultant sludge from filtration is immobilized prior to offsite shipment as IDC 803 or 807 CH TRU wastes.

Nitric/Phosphoric Acid Waste Neutralization

The nitric and phosphoric acid wastes contain large quantities of metal ions that are insoluble in basic solutions. The combined acidic aqueous wastes are neutralized to produce a basic liquid containing filterable solids. The combined acidic wastes are continuously mixed in the neutralizer by an agitator and by the recirculation of the tank contents. The neutralizer cooler, on the recycle line, removes the heat generated by the neutralization process. As the liquid circulates, a controller with an in-line pH analyzer regulates the amount of 50 wt % sodium hydroxide added to the process to maintain a pH of 12.

The neutralized waste is fed with the slurry from the precipitation process to a precoated rotary drum vacuum filter. The slurry solution is filtered to form a sludge that can be immobilized with cement and diatomite to produce IDC 803. The sludge mixture is collected in a 55-gal drum, visually inspected for drum integrity, examined for free liquids by Real Time Radiography (RTR), and shipped offsite as a TRU waste. The filtrate product is a caustic liquid suitable for feed to the coprecipitation process.

Caustic Coprecipitation

Neutral and basic liquid wastes are mixed with 50 wt % sodium hydroxide to ensure that the liquid is basic. There are three stages of precipitation available for use. However, only the third stage has been required since the equipment was started in 1980. If the third stage is inoperative for any reason, the second stage is activated until the third stage equipment is repaired. The first stage of precipitation has not been operated since the startup tests. Due to the existing piping configuration, the process aqueous waste flows through the first and second stages but no chemical reactions occur.

Each of the three stages include precipitation, flocculation, and clarification. Ferric sulfate, magnesium sulfate, and calcium chloride are added to form a floc, which precipitates the majority of the chemical and radioactive contaminants in the liquid waste streams. An anionic polyelectrolyte flocculent is added in the flocculator to increase the precipitate density through agglomeration. Mild agitation and long residence times (1 to 2 hours) in the tank provide the proper condition for effective particle growth. The flocculated mixture flows to the clarifier where the solids are permitted to settle. The agglomerated slurry is drawn to the bottom of the clarifier by a slowly rotating rake and is transferred to the rotary drum vacuum filter feed tanks. The resulting supernatant will be reprocessed through precipitation, filtration and clarification until radioactivity is low enough to be transferred to the evaporator.

The slurry collected in the clarification unit is periodically drained to filter-feed storage. The solids are separated from the bulk of the water by rotary drum vacuum filtration. The slurry solution is filtered to form a sludge that can be immobilized with cement and diatomite to produce IDC 807. The sludge mixture is collected in a 55-gal drum, visually inspected for drum integrity, examined for free liquids by RTR, and shipped offsite as a TRU waste.

IDC 803, which is generated by the same process as IDC 807 except that a sludge dryer and direct cementation process is used, is shown on the flow diagram for Building 374. It has not been generated for about two years.
Figure 3.1-10. Process Flow Diagram for the Generation of Contact Handled Transuranic Aqueous Waste for Building 883 (Shipping Content Code 111, IDCs 803 & 807).
Figure 3.1-11  Flow Diagram for the Processing of Contact Handled Transuranic Aqueous Waste for Building 374  (Shipping Content Code 111; IDCs 803, 807)
General waste process information for shipping content codes RF 111A, ID 111A, RF 111B, and ID 111C is contained in the following sections of the TRUCON document:

- RF 111A and 111B: Section 19
- ID 111A and 111C: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.1.3 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.1.3.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 111A, ID 111A, RF 111B, and ID 111C are listed in the following sections of Attachment B1 to Nu Pac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 111A and 111B: Section 8
- ID 111A and 111C: Section 2

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. The reader is reminded that the estimates presented, particularly for volatile organic compounds (VOCs), are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals in RF 111A wastes, listed in Attachment B, corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste," issued by the Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.1.3.2 Chemical Compatibility of Wastes Identified by Content Codes RF 111 and ID 111

The chemical compatibility of the wastes identified by shipping content codes RF 111A and RF 111B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages.
• General description of RF 111A and RF 111B waste - Pages 7 and 48 of Appendix 2.10.12

• Chemical list for RF 111A and RF 111B (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12

• Assessment of chemical compatibility within RF 111A and RF 111B - Pages 7 and 48 of Appendix 2.10.12

• Summary of potential incompatibilities within RF 111A and RF 111B - Table 3 of Appendix 2.10.12

• Assessment of chemical compatibility between RF 111A and RF 111B and other content codes at RFP - Pages 59 and 60 of Appendix 2.10.12

• Summary of potential incompatibilities between RF 111A and RF 111B and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 111A and ID 111A and their experimental equivalents RF 111B and ID 111C, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.1.3.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 111A, RF 111B, ID 111A, and ID 111C

Shipping content codes RF 111A, ID 111A, RF 111B, and ID 111C wastes are classified as hazardous because of the presence of volatile organic compounds and heavy metals detected in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the hazardous wastes potentially present in RF 111A, ID 111A, RF 111B, and ID 111C, and their Hazardous Waste Numbers, are:

For all IDCs:

• F001 1,1,1-Trichloroethane
  F001 Carbon tetrachloride
  F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)

• F002 Dichloromethane (Methylene chloride)

• F003 Methanol
  F003 Butanol
  F003 Xylene

• F005 Ethyl benzene
  F005 Toluene
  (See Note 2 below)

• D006 Cadmium
• D008 Lead

The F001 solvents are common degreasing compounds. These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D. The hazardous wastes listed above are discussed in Attachment F. In Attachment F, TRU mixed waste (and its hazardous constituents) are identified by Waste Form Number (WFN) and IDC.

Note 2: In Attachment F, RFP has added ethyl benzene and toluene to RF 111A (identified as WFN 111 in Attachment F) as an F005 hazardous waste potentially present in IDCs 803 and 807. Since the submittal of the No-Migration Variance Petition (February 1989) to EPA, these two chemicals have been added by RFP as potential contaminants in inorganic aqueous wastes.

Note 3: There are some chemicals that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, beryllium is listed for RF 111A, RF 111B, ID 111A, and ID 111C.

Note 4: Acetone has been recognized as a trace constituent [T2, a few parts per million (ppm)] in IDCs 803 and 807. Although acetone does not appear in the present TRUPACT-II Chemical List (Rev. 3), it will be added to the list for Rev. 4. Acetone is not listed as a hazardous constituent in 40 CFR Part 261 Appendix VIII; it is regulated under RCRA only for ignitability.

Note 5: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

3.1.3.4 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of sludge, cement, etc.) of drummed waste in retrievable storage at INEL. This data is presented in spreadsheet format, sorted by drum IDC. The information for IDCs 001, 002, and 007 in the spreadsheet is representative of RF 111 and ID 111 (IDCs 800, 803, 807), except that these newer content codes are a cemented waste form, rather than using dry cement as only a sorbent for excess free liquid.

3.1.3.5 Sampling and Analysis Programs Applicable to RF 111A, ID 111A, RF 111B, and ID 111C

The following sampling and analysis data is available for RF 111A, ID 111A, RF 111B, and ID 111C, and is discussed in Sections 3.1.3.6 to 3.1.3.11:

• Analyses of solidified aqueous waste - total VOC analyses
• Total metals analyses
• TCLP test results for sludge samples
• Leachable metal data based on EP toxicity tests
• Headspace analyses of solidified aqueous inorganic solids - TRUPACT-II Program
• Headspace analyses of solidified aqueous inorganic solids - Clements and Kudera

In a number of these programs, results are reported in terms of IDCs, which correspond to the various content codes. Within the IDC designation, some older IDCs are equivalent to the IDCs of newly generated wastes. For content codes RF 111A, ID 111A, RF 111B, and ID 111C, and related content codes ID 211A and ID 111B, the following IDCs are equivalent:

<table>
<thead>
<tr>
<th>New IDCs (in RF 111 and ID 111)</th>
<th>Old IDCs (in ID 211)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>001/002</td>
</tr>
<tr>
<td>803/807</td>
<td>007</td>
</tr>
</tbody>
</table>

This information will assist the reader in understanding the applicability of the various analytical results across content codes.

3.1.3.6 Analyses of Solidified Aqueous Waste - Total VOC Analyses

Data on total VOC analyses of inorganic sludge samples are included in Attachment H as Table H-1. Table H-1 was previously included in the RFP Report No. 4311, "Waste Drum Gas Generation Sampling Program at Rocky Flats". Five of the seven analyses presented were performed on waste included under IDC 001. These five samples are identified in the table. IDC 001 corresponds to ID 211A waste, which is in retrievable storage at INEL. The processes at RFP have remained essentially the same over the years with regard to the generation of inorganic aqueous waste; that is, fundamental plutonium aqueous chemistry has not changed in the years since production first started. For this reason, the total analyses for IDC 001 (an "older" IDC) can be considered representative of IDC 800, which is part of RF 111A, ID 111A, RF 111B, and ID 111C.

In four of the five IDC 001 sludges analyzed, no VOCs above the detection limits were found. The sludge sample for which VOCs were detected was taken from an "older" waste drum (1973). More recent waste minimization efforts, including product substitutions, are expected to further decrease the presence of some hazardous solvents in the wastes.

Note 6: The sludge samples in Attachment H were analyzed for a total of 36 VOCs that are listed in Table H-2.

3.1.3.7 Total Metals Analyses for IDCs 803 and 807

Attachment I contains results of total metals analyses of inorganic aqueous liquids corresponding to IDCs 803 and 807. These analyses were conducted on samples from tanks of aqueous liquids prior to any treatment (i.e., neutralization, precipitation, or vacuum filtration). The samples were analyzed for 27 metals including tritium and uranium.

3.1.3.8 TCLP Test Results for Sludge Samples

Attachment J contains the results from Toxicity Characteristic Leaching Procedure (TCLP) tests on ten samples of sludges that represent IDCs 803/807 (corresponding to RF 111A, ID 111A, RF 111B, and ID 111C). Three sludge samples were analyzed in 1988 (pages J-1 to J-7), and seven in 1989 (pages J-8 to J-13). These sludge samples were analyzed for constituents of F001-F005 spent solvent wastes, methanol, and TCLP-acid compounds.

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Note 7: These TCLP tests were performed on sludges generated in Building 374 at RFP (IDCs 803/807). The leach test was performed on the sludge after vacuum filtration. The final solidified sludge generated as IDC 803/807 is mixed with cement and some water (IDC 803) to produce the final solidified product.

Note 8: The sludges from Building 374 contain both transuranic and low-level waste from the same process lines. The differentiation between transuranic and low-level is not made until the sludge is assayed. The sludges that were analyzed were low-level based on the assay, but are representative of transuranic, the only difference being the plutonium concentration.

3.1.3.9 Leachable Metal Data Based on EP Toxicity Tests

Attachment K contains results of analyses of inorganic aqueous liquids. The results of these analyses are equivalent only to IDC 803/807 wastes. These analyses were done on samples from tanks of aqueous liquids prior to any treatment (i.e., neutralization, precipitation, or vacuum filtration). The solutions analyzed could have been either transuranic or low-level, depending upon the assay of the resulting cemented sludge.

3.1.3.10 Headspace Analyses of Solidified Aqueous Inorganic Solids - TRUPACT-II Program

Many analyses of headspace gases from IDCs at RFP (i.e., IDCs 800, 803, 807) and the equivalent IDCs in retrievable storage at INEL (in ID 211A, where 001 and 002 = 800, and 007 = 803/807) have been performed. The "older" sludges at INEL (IDCs 001, 002, and 007) only differ from the newly generated sludges at RFP (IDCs 800, 803, and 807) in the method of solidification. That is, for IDC 001, the sludge was placed directly into a drum that had about 30 lbs of Portland cement in the bottom to act as a sorbent. For IDC 002, layers of the sludge and dry Portland cement were alternated in the drum. A total of about 40-50 lbs of dry Portland cement were used in IDC 002. At RFP, the newly generated IDCs 800, 803 and 807 are mixed with varying amounts of water (803) and Portland cement (800, 803, and 807) to create a cemented waste form.

Attachment L contains headspace analyses of 22 drums generated at RFP that were analyzed in support of the TRUPACT-II program, including: three analyses of IDC 800, six analyses of IDC 001, and one analysis of IDC 007 drummed wastes. None of the analyses of solidified aqueous solids showed any VOCs in the headspace [at a detection limit of 500 ppm].

Note 9: The analyses included in Attachment L were performed by mass spectrometry. This analytical technique would have detected any other VOCs that might have been present, in addition to carbon tetrachloride, 1,1,1-trichloroethane, methylene chloride, and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113).

Attachment M includes headspace analyses for several of the drums listed in Attachment L. In the tables on pages 15, 16, and 17, analytical results are presented for several layers of confinement (plastic bags) within each drum, and were performed to estimate "G" values (a measure of the rate of gas generation) to determine gas generation/consumption rates in drums of transuranic waste. The VOCs were analyzed to ascertain what percentage of drums might contain these compounds.
3.1.3.11 Headspace Analyses of Solidified Aqueous Inorganic Solids - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Both volumes have been included as Attachments N and O. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP under the RF 111A and RF 111B shipping content codes, stored at INEL under the ID 111A and ID 111C content codes (IDCs 800, 803, and 807), and the equivalent waste in temporary storage at INEL (IDCs 001, 002, and 007).

Table 7 from Attachment N contains the headspace analytical data for fifteen IDC 001 drums and seven IDC 002 drums (equivalent to IDC 800). The table also contains four IDC 007 drums (equivalent to IDC 803/807). A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. The overall concentrations of VOCs in the headspace of all the solidified aqueous inorganic materials are low.

Attachment O contains gas generation data from four IDC 001 solidified inorganic sludges. This data represents four drums of newly generated 001 sludge (at the time of the tests) which were monitored for headspace gases (including VOCs) for thirteen weeks in a vented condition, and then sealed for thirteen additional weeks and monitored for headspace gases.

All of the figures and tables that represent data from the IDC 001 solidified inorganic sludges are included in Attachment O on pages A-3 to A-14 and B-3 to B-23. No VOCs were found in either the vented or sealed IDC 001 drums, except for "Other Hydrocarbons" (methane and ethane from radiolysis of polyethylene bags within the drums) and isopropanol (from the glue used to seal the gaskets in the drums).

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting held in Denver, on October 11, 1989, and attended by EPA, DOE, and their contractors.

Note 10: The statistical analysis presented in Attachment Q contains IDC 292 solidified sludges in Waste Type I, in addition to IDCs 001, 002, and 007. IDC 292 represents particulate sludges from incineration ash and not chemically precipitated sludges (IDCs 001, 002, and 007).

3.2 ID 211

Content codes ID 211A and ID 111B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (originally as the equivalent of RF 111A) and stored at Idaho National Engineering Laboratory (ID 211A). These content codes are classified as Waste Type I, Solidified Aqueous or Homogeneous Inorganic Process Solids, and correspond to the following IDCs:

• 001 Uncemented sludge
• 002 Second stage sludge
• 007 Wet sludge - Bldg. 374
• 976 Process sludge - Bldg. 776
• 978 Laundry sludge

ID 211A waste was generated and placed in storage prior to the establishment of the WIPP Waste Acceptance Criteria (WAC). However, it was generated by the same processes that currently produce the waste included in content codes RF 111A and ID 111A, which are
WAC-certified. Waste Acceptance Criteria is discussed in Section 11.1. The primary difference between the new waste (RF 111A and ID 111A) and the old waste (ID 211A) is in the method of solidification, discussed later in this summary. ID 111B is the experimental equivalent of ID 211A and will have naturally occurring salt, clay (bentonite), and steel added to the payload containers for experimental purposes.

3.2.1 General Process Knowledge - IDCs 001, 002, 007, 976, and 978

The stored solidified aqueous sludges (ID 211A) consist of IDCs 001, 002, 007, 976, and 978. IDCs 001, 002, and 007 are similar to the chemically treated aqueous wastes in RF 111. IDC 007 was processed in Building 374 and is equivalent to IDCs 803 and 807. IDCs 001 and 002 were generated in Building 774, and similar to IDC 800, they were also treated effluents from Building 771. More information on IDCs 001 and 002 is included in the discussion of RF 111, IDC 800. IDC 976 waste consisted of a sludge mixed with Portland cement. The sludge was removed from process tanks which collected effluent from the floor drains in Building 776. The sludge typically consisted of dirt, sand, gravel, floor sweepings, and other similar materials. IDC 976 was used for only one year (1976). IDC 978 also consisted of a sludge mixed with Portland cement. The sludge was removed from two tanks which collected liquid effluent from the laundry in Building 776. The sludge typically consisted of lint, spent detergent, dirt, and other similar wastes generated by laundry operations.

The process flow diagrams (Figures 3.1-1 to 3.1-11) for newly generated waste from the Rocky Flats Plant are applicable to waste in storage at Idaho National Engineering Laboratory, except for possible changes in location of processes in buildings and changes in the final waste form noted in the text.

General waste process information for shipping content codes ID 211A and ID 111B is contained in Section 13 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.2.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.2.2.1 Chemicals Potentially Present in Waste
Chemicals potentially present in wastes identified by shipping content codes ID 211A and ID 111B are listed in Section 2 of Attachment B1 to Nu Pac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989).

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. The reader is reminded that the estimates presented, particularly for volatile organic compounds are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

3.2.2.2 Chemical Compatibility of Wastes Identified by Content Codes ID 211A and ID 111B

Attachment D contains an evaluation of potential chemical incompatibilities within content code ID 211A and its experimental equivalent, ID 111B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.2.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in ID 211A and ID 111B

Shipping content codes ID 211A and ID 111B wastes are classified as hazardous because of the presence of VOCs and heavy metals detected in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the VOCs and heavy metals potentially present in ID 211A and ID 111B, and their Hazardous Waste Numbers, are:

For all IDCs except 978:

- F001 1,1,1-Trichloroethane
  F001 Carbon tetrachloride
  F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- F002 Dichloromethane (Methylene chloride)
- F003 Methanol
  F003 Butanol
  F003 Xylene
- D006 Cadmium
- D008 Lead

In addition, IDC 002 may also contain mercury (D009) and reactive lithium (D003); IDC 976 may also contain sodium chromate (D007). IDC 978 is nonhazardous.

The F001 solvents are common degreasing compounds. These wastes are described in Attachment E. The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D.

Note 1: Several chemicals are included in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E:

- Trichloroethylene
- Tetrachloroethylene
- Beryllium
Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

Note 3: The following VOCs were detected in the sampling program discussed in Attachment H, but were not included in Attachment B for ID 211 waste:

- 1,2-Dichloroethene
- 1,1,2,2-Tetrachloroethane
- Chloroform

3.2.2.4 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of sludge, absorbents, etc.) of drummed waste in retrievable storage at INEL. This data is presented in spreadsheet format, sorted by drum IDC. Information that applies to content codes ID 211A and ID 111B is listed under IDCs 001, 002, and 007.

3.2.2.5 Sampling and Analysis Programs Applicable to ID 211A and ID 111B

The following analytical data is available for ID 211A and ID 111B wastes, discussed in the remaining sections of this report:

- Analyses of solidified aqueous waste - total VOC analyses
- Total metals analyses
- TCLP test results for sludge samples
- Leachable metal data based on EP toxicity tests
- Headspace analyses of solidified aqueous inorganic solids - TRUPACT-II Program
- Headspace analyses of solidified aqueous inorganic solids - Clements and Kudera

In many of these analyses, results are reported in terms of IDCs, which correspond to the various content codes. Within the IDC designation, some older IDCs are equivalent to the IDCs of newly generated wastes. As stated in Section 3.1.3.5, content code ID 211A (IDCs 001, 002, and 007) is equivalent to the newer content codes RF 111A and ID 111A (IDCs 800, 803, and 807); thus, analyses performed on IDC 800, 803, and 807 wastes can be considered representative of the IDC 001, 002, and 007 wastes.

3.2.2.6 Analyses of Solidified Aqueous Waste - Total VOC Analyses

Data on total VOC analyses of inorganic sludge samples are included in Attachment H, Table H-1. Table H-1 was included in the RFP Report No. 4311 on "Waste Drum Gas Generation Sampling Program at Rocky Flats". Five of the seven analyses presented were performed for IDC 001 wastes; IDC 001 corresponds to ID 211A. These five samples are indicated in the table. In four of the five IDC 001 sludges analyzed, no VOCs above the detection limits listed were found. The sludge that did show some VOCs is in an "older" drum from 1973. More recent waste minimization efforts, including product substitutions, are expected to further decrease the presence of some hazardous solvents in the wastes.

Note 4: The five IDC 001 sludge samples were analyzed for a total of 36 VOCs. The list of VOCs is also included as Table H-2.

3.2.2.7 Total Metals Analyses
Attachment I contains results of total metals analyses of inorganic aqueous liquids corresponding to IDCs 803 and 807 (equivalent to IDC 007). These analyses were conducted on samples from tanks of aqueous liquids prior to any treatment (i.e., neutralization, precipitation, or vacuum filtration). The samples were analyzed for 27 metals including tritium and uranium. The samples analyzed could have been either transuranic or low-level, depending upon the assay of the resulting cemented sludge.

3.2.2.8 TCLP Test Results For Sludge Samples

Attachment J contains the results from Toxicity Characteristic Leaching Procedure (TCLP) tests on three samples of sludges that represent IDCs 803/807 from RFP (which are equivalent to IDC 007). Because of the equivalence of the IDCs noted in Section 3.1.3.5, the TCLP analyses can be considered representative of content codes ID 211A and ID 111B. These sludge samples were analyzed for constituents of F001-F005 spent solvent wastes, methanol, and TCLP-acid compounds.

Note 5: These TCLP tests were performed on sludges generated in Building 374 at RFP (IDCs 803/807). The leach test was performed on the sludge after vacuum filtration. The final solidified sludge generated as IDC 803/807 is mixed with cement and some water (IDC 803) to produce the final solidified product.

Note 6: The sludges from Building 374 contain both transuranic and low-level waste from the same process lines. The differentiation between transuranic and low-level is not made until the sludge is assayed. The sludges that were analyzed were low-level based on the assay, but are representative of transuranic, the only difference being the plutonium concentration.

3.2.2.9 Leachable Metal Data Based on EP Toxicity Tests

Attachment K contains results of Extraction Procedures (EP) Toxicity tests for inorganic aqueous liquids. The results of these analyses are representative of IDC 803/807 wastes (IDC 803/807 = IDC 007). These analyses were done on samples from tanks of aqueous liquids prior to any treatment (i.e., neutralization, precipitation, or vacuum filtration). The solutions analyzed could have been either transuranic or low-level, depending upon the assay of the resulting cemented sludge.

3.2.2.10 Headspace Analyses of Solidified Aqueous Inorganic Solids - TRUPACT-II Program

Many analyses of headspace gases from IDCs at RFP and the equivalent IDCs in retrievable storage at INEL [in ID 211A, where IDCs 001 and 002 = IDC 800 (RFP), and IDC 007 = IDCs 803/807 (RFP)] only differ from the newly generated sludges at RFP (IDCs 800, 803, and 807) in the method of solidification. That is for IDC 001, the sludge was placed directly into a drum that had about 30 pounds of Portland cement in the bottom to act as a sorbent.

For IDC 002, layers of sludge and dry Portland cement were alternated in the drum. A total of about 40-50 pounds of dry Portland cement were used in IDC 002. At RFP, the newly generated IDCs 800, 803, and 807 are mixed with varying amounts of water and Portland cement to create a cemented waste form.
Attachment L contains headspace analyses of twenty-two drums from RFP; three analyses of IDC 800, six analyses of IDC 001, and one analysis of IDC 007 drummed wastes. Note that none of the analyses for these IDCs showed any VOCs in the headspace (at a detection limit of 500 ppm).

Note 7: The analyses included in Attachment L were performed by mass spectrometry. This analytical technique would have detected any other VOCs that might have been present, in addition to carbon tetrachloride, 1,1,1-trichloroethane, methylene chloride, and 1,1,2-trichloro-1,2,2-trifluoromethane (Freon-113).

Attachment M includes headspace analyses for several of the drums listed in Attachment L. In Attachment M, analytical results are presented for several layers of confinement (plastic bags) within each drum, and were performed to estimate "G" values (a measure of the rate of gas generation) to determine gas generation/consumption rates in drums of transuranic waste. The VOCs were analyzed to ascertain what percentage of drums might contain these compounds.

3.2.2.11 Headspace Analyses of Solidified Aqueous Inorganic Solids - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Both volumes have been included as Attachments N and O. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP and stored at INEL under the content codes ID 211A and ID 111B corresponding to IDCs 001, 002, and 007.

Table 7 from Attachment N contains the headspace analytical data for fifteen IDC 001 drums and seven IDC 002 drums. Table 7 also contains four drums of IDC 007. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall concentrations of VOCs in the headspace of all the solidified aqueous inorganic materials are low.

Attachment O contains gas generation data from four IDC 001 solidified inorganic sludges. The data from Attachment O represents four drums of newly generated IDC 001 sludge (at the time of the tests) which were monitored for headspace gases (including VOCs) for thirteen weeks in a vented condition, and then sealed for thirteen additional weeks and monitored for headspace gases.

All of the figures and tables that represent data from the IDC 001 solidified inorganic sludges are included in Attachment O on pages A-3 to A-14 and B-3 to B-23.

No VOCs were found in either the vented or sealed IDC 001 drums, except for "Other Hydrocarbons" (methane and ethane from radiolysis of polyethylene bags within the drums) and isopropanol (from the glue used to seal the gaskets in the drums).

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting held in Denver on October 11, 1989, and attended by EPA, DOE, and their contractors.

Note 8: The statistical analysis presented in Attachment Q contains IDC 292 solidified sludges in Waste Type I, in addition to IDCs 001, 002, and 007. IDC 292
represents particulate sludges from incineration ash and not chemically precipitated sludges (IDCs 001, 002, and 007).

3.3 RF 112 AND ID 112

Content codes RF 112A and ID 112A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 112A) and stored at the Idaho National Engineering Laboratory (ID 112A). These content codes are classified as Waste Type IV, Solidified Organics, and correspond to the following IDCs:

- 700 OASIS Wastes
- 801 Solidified Organics - Bldg. 774
- 808 Solidified Laboratory Organic Wastes - Bldg. 774

ID 212A, corresponding to IDC 003, is the retrievably stored waste equivalent to RF 112A and ID 112A, and is discussed in more detail in the summary for ID 212A.

Note 1: IDC 700 is included only in shipping content code ID 112A because it is no longer being generated at RFP; the small amount of IDC 700 waste generated has already been shipped to INEL and placed in retrievable storage.

3.3.1 General Process Knowledge - IDCs 801 and 808

Building 774 is the only building at the Rocky Flats Plant that processes TRU liquid organic wastes into sludges for off-site disposal. IDC 801 consists of TRU organic wastes which include mixtures of waste oils and solvents from degreasing, lathe and machinery operations in Buildings 707 and 777. A substantially smaller amount of TRU organic liquid is transported to Building 774 in individual bottles from Building 771 and Building 559 and is also processed into IDC 801. IDC 808 was established for waste generated from Building 559 which may include chloroform or xylenes. There are no IDC 808 wastes currently in the inventory. IDC 801 is used for all other liquid organic wastes processed in Building 774.

The flow diagrams in Figures 3.3-1 to 3.3-4 depict the different liquid waste streams from the processes in the buildings mentioned above. The flow diagram in Figure 3.3-5 shows how TRU organic wastes are immobilized in the Organic And Sludge Immobilization System (OASIS) process in Building 774.

**Building 559 - Liquid Organic Waste**

Building 559 occasionally generates a very small amount of liquid organic waste for the Building 774 organic sludge process (IDCs 801, 808). These wastes are reported to originate from three sources (Figure 3.3-1): 1) solvent and organic wastes generated from infrared analysis, 2) phosphoric acid waste generated from a uranium stripping process done with an aqueous phase, and 3) discard waste from lab reagents and chemicals. All of these wastes are transferred to a room discard drum by bottles. The drums are transported by truck to Building 774, where they feed into the organic sludge process.

**Building 707 - TRU Liquid Organic Waste**

Building 707 primarily generates liquid organic waste (Figure 3.3-2) from the following four operations:
Figure 3.3-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Liquid Organic Waste for Building 559 (Shipping Content Code 112, IDC 801).
Figure 3.3-2. Process Flow Diagram for the Generation of Contact-Handled Transuranic Liquid Organic Waste for Building 707 (Shipping Container Code 112, ID 801).
• Assembly Operations - Trichloroethane used during assembly for component in-process and final cleaning operations is discarded by process drain to a trichloroethane waste collection area. The waste trichloroethane is separated from the foundry, machining, and inspection liquid organic waste.

• Foundry Operations - This process generates waste carbon tetrachloride, used as a degreasing agent. Small amounts of machine oils and coolants are usually mixed with the carbon tetrachloride.

• Inspection Operations - This process uses Freon-113 for measuring the density of samples. The waste Freon-113 originates from the dumping of the process collection tanks from the density balance equipment. The waste Freon-113 is mixed with carbon tetrachloride and small amounts of coolants and oil.

• Machining Operations - Oil is used during cutting of parts; it is usually sprayed on the part during machining operations, then rinsed off with carbon tetrachloride. This waste stream usually consists of a mixture of large amounts of oil/coolant and small amounts of carbon tetrachloride.

Waste oils and solvents are collected in a process drain in Building 707, which contains three tanks. Two of the tanks collect wastes from the foundry, inspection and machining. The third tank collects the trichloroethane from the cleaning baths in the assembly area. The wastes are filtered, sampled and then sent to Building 774 for processing.

Building 771 - Liquid Organic Waste

A very small amount of TRU liquid organic waste from Building 771 is transferred by bottles or drums to Building 774 where it is introduced into processes for solidification (Figure 3.3-3). These wastes originate from the following areas:

• Chemical Operations Support Lab - This lab receives samples from Buildings 559, 707, 771 and 779. Waste oil and extracted solvent (typically carbon tetrachloride) from Process Chemistry is sent to the lab for analyses and are discarded.

• Maintenance Machine Shop - Oil and water-base coolants used in machines are changed periodically.

• Maintenance Oil Change Out - Oil is changed out from pumps and compressors in the process area and discarded.

Building 777 - Liquid Organic Waste

Organic liquids are generated in Building 777 from the following four areas (Figure 3.3-4):

• Assembly - Trichloroethane, used in vapor degreasing operations in the assembly and coatings area, is disposed of to a trichloroethane collection area, where it is filtered for plutonium and sampled for radionuclide concentration.

• Fabrication - This process generates waste oil and coolant from the machining and lathe operations and waste carbon tetrachloride, which is used for degreasing.
• Metallurgical Operations - This group uses Freon-113 for measuring the density of samples. The waste Freon-113 originates from the dumping of the process collection tanks from the density balance equipment. The waste Freon-113 is usually mixed with carbon tetrachloride and small amounts of coolants and oil.

• Trichloroethane Collection and Filter System - Used oil from operating the trichloroethane collection and filter system is also disposed to the oil/coolant/carbon tetrachloride collection tank.

The waste is piped to Building 774 where it is processed into the organic sludges (IDC 801). The types of liquid organic waste generated in Building 777 are similar to Building 707, with the exception that Building 777 has no foundry.

**Building 774 - Liquid Organic Sludge Processing**

TRU organic liquid wastes (Figure 3.3-5), which include a mixture of waste oils and solvents, enter a glovebox mixer called the Organic and Sludge Immobilization System (OASIS). In this process, TRU organic wastes are mixed with an emulsifier, water and Envirostone™ cement are added to the waste in 55-gallon drums. The drums are assayed to determine whether they are TRU or low level and then sent to Building 664 storage until offsite shipment is made. The drums are examined for free liquids by RTR prior to offsite shipment.

General waste process information for shipping content codes RF 112A and ID 112A is contained in the following sections of the TRUCON document:

- RF 112A: Section 19
- ID 112A: Section 13

The TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

### 3.3.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

#### 3.3.2.1 Chemicals Potentially Present in Waste
Figure 3.3-3. Process Diagram for the Generation of Contact Handled Transuranic Liquid Organic Waste for Building 771 (Shipping Content Code 112, IDC 801)
Figure 3. Process Flow Diagrams for the Generation of Contact Handled Transuranic Liquid Organic Waste for Building 777 (Shipping Content Code 112, IDC 801)
Figure 3.3-5. Flow Diagram for the Processing of Contact Handled Transuranic Liquid Organic Waste for Building 774 (Shipping Content Code 112; IDCs 801, 808)
Chemicals potentially present in wastes identified by shipping content codes RF 112A and ID 112A are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 112A: Section 8
- ID 112A: Section 2

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

Note 2: The concentrations of hazardous chemicals in RF 112A wastes, listed in Attachment B, correspond to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste," issued by Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.3.2.2 Chemical Compatibility of Wastes Identified by Content Codes RF 112A and ID 112A

The chemical compatibility of the wastes identified by shipping content code RF 112A is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages and tables:

- General description of RF 112A waste - Page 49 of Appendix 2.10.12
- Chemical list for RF 112A (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 12.10.12
- Assessment of chemical compatibility within RF 112A of Appendix 2.10.12
- Summary of potential incompatibilities within RF 112A - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 112A and other content codes at RFP - pages 59 and 60 of Appendix 2.10.12.
- Summary of potential incompatibilities between RF 112A and other content codes at RFP - Table 4 of Appendix 2.10.12.

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 112A and ID 112A, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.3.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 112A and ID 112A

Shipping content codes RF 112A and ID 112A wastes are classified as hazardous because of volatile organic compounds detected in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the VOCs potentially present in RF 112A and ID 112A are:
The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

The hazardous wastes listed above are discussed in Attachment F. In Attachment F, TRU mixed waste (and its hazardous constituents) are identified by Waste Form Number and IDC. Only IDC 801 is included in Attachment F for shipping content code RF 112.

Note 4: Chloroform is reported in Attachment B as a dominant component of IDC 808.

Note 5: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

3.3.2.4 Drum Contents

Attachment G provides information on the actual contents (e.g., weight of sludge, absorbents, etc.) of drummed waste in storage at INEL. The data is presented in spreadsheet format, sorted by IDCs. Although the information presented is for ID 212A (IDC 003), the information is representative of RF 112A (IDCs 801 and 808) and ID 112A (IDCs 700 and 801) wastes, except that a gypsum cementation process has been substituted in RF 112A and ID 112A for the calcium silicate process in ID 212A.

3.3.2.5 Sampling and Analysis Programs Applicable to RF 112A and ID 112A

The following analytical data is available for RF 112A and ID 112A wastes, and is discussed in the following sections and in Section 3.4 (ID 212):

- Analyses of solidified aqueous waste - total VOC analyses
- Headspace analyses of solidified organics - TRUPACT-II Program
- Headspace analyses of solidified organics - Clements and Kudera

In a number of these programs, results are reported in terms of IDCs, which correspond to the various content codes. Within the IDC designations, certain older IDCs are equivalent to the IDCs of newly generated wastes. For content codes RF 112A and ID 112A, and the related content code ID 212A, the following IDCs are equivalent:

<table>
<thead>
<tr>
<th>New IDCs (RF 112A, ID 112A)</th>
<th>Old IDC (ID 212A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>700/801/808</td>
<td>003</td>
</tr>
</tbody>
</table>

This information will assist the reader in understanding the applicability of the various analytical results across content codes.

3.3.2.6 Analyses of Solidified Aqueous Waste - Total VOC Analyses
Data on total VOC analyses of organic and inorganic sludge samples are included in Attachment H, Table H-1. The table was included in the RFP Report No. 4311 on "Waste Drum Gas Generation Sampling Program at Rocky Flats." Two of the seven analyses are for IDC 003 wastes. These two samples are identified in the table. IDC 003 corresponds to shipping content code ID 212A. Note that the organic solvents only occur in ppm quantities in these solidified organic drums of waste. The sludges that did show some VOCs in the waste are "older" drums from 1973. More recent waste minimization efforts, including product substitutions, are expected to further decrease the presence of solvents in the wastes.

Note 5: The two IDC 003 samples presented in Attachment H were analyzed for a total of 36 VOCs. The list of VOCs is included in Attachment H, Table H-2.

3.3.2.7 **Headspace Analyses of Solidified Organics - TRUPACT-II Program**

Several analyses of headspace gases from IDC 003 at INEL should show equivalent results to that expected for IDCs 801 and 808 generated at RFP. The "older" sludges at INEL (IDC 003) only differ from the newly generated sludges at RFP (IDCs 801 and 808) in the method of solidification. For example, IDC 003 is solidified using calcium silicate, while IDCs 801 and 808 are solidified using gypsum cement (Envirostone™). Thus, the headspace sampling results obtained for IDC 003 (content code ID 212A) can be considered representative of IDCs 801 and 808 (content codes RF 112A and ID 112A). A full discussion of the headspace sampling results for IDC 003 is presented in the following summary for content code ID 212A. The headspace analyses for IDC 003 are included as Attachments L and M.

3.3.2.8 **Headspace Analyses of Solidified Organics - Clements and Kudera**

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Both volumes are included as Attachments N and O. The information that is representative of waste generated at RFP under the content code RF 112A and stored at INEL under the content code ID 112A is presented in detail in Section 3.4 (ID 212A) and Attachments N and O.

3.4 **ID 212**

Content code ID 212A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), is waste that was generated at the Rocky Flats Plant (originally as the equivalent of RF 112A) and is in retrievable storage at the Idaho National Engineering Laboratory. This content code represents Waste Type IV, Solidified Organics, and corresponds to IDC 003, Organic Setups at RFP. ID 212A waste is generated by the identical processes that produce RF 112A and ID 112A wastes; however, the method of solidification is different for ID 212A. Also, ID 212A was generated and placed in storage prior to establishment of the WIPP Waste Acceptance Criteria (WAC). There is no experimental equivalent of ID 212A.

3.4.1 **General Process Knowledge**

General waste process information for shipping content code ID 212A is contained in Section 13 of the TRUCON document. ID 212A (IDC 003) is very similar to RF 112A (IDC 801) except for the final processing into a solidified waste form. ID 212A was processed by blending approximately 30 gallons of organic wastes with 100 pounds of calcium silicate in
a continuous mixer to form a solid-like paste or "grease." Small amounts (10 tablespoons) of Oil-Dri are usually mixed with the waste.

The process flow diagrams (Figures 3.1-1 to 3.1-11) for newly generated waste from the Rocky Flats Plant are applicable to waste in storage at Idaho National Engineering Laboratory, except for possible changes in location of processes in buildings and changes in the final waste form noted in the text.

The TRUCON description for ID 212A includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.4.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

3.4.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes, identified by shipping content code ID 212A, are listed in Section 2 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989).

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. These estimates, particularly for volatile organic compounds are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

3.4.2.2 Chemical Compatibility of Wastes Identified by Content Code ID 212A

Attachment D contains an evaluation of potential chemical incompatibilities within content code ID 212A and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

3.4.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in ID 212A

Shipping content code ID 212A waste is classified as hazardous because of volatile organic compounds and beryllium present in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the hazardous wastes potentially present in ID 212A are:
• F001 1,1,1-Trichloroethane
• F001 1,1,1-Trichloro-1,2,2-trifluoroethane (Freon-113)
• F001 Trichloroethylene
• F001 Tetrachloroethylene (Perchloroethylene)

• F002 Carbon tetrachloride

• P015 Beryllium

The F001 solvents are common degreasing compounds. These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: Dichloromethane (methylene chloride) is reported in Attachment B as present in ID 212A, and nitrobenzene is reported in the TRUCON (Attachment A) as present in ID 212A waste.

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

3.4.2.4 Drum Contents

Attachment G provides information on the actual contents (e.g., weight of sludge, absorbents, etc.) of drummed waste in storage at INEL. The data is presented in spreadsheet format, sorted by IDC. Information representative of ID 212A wastes is listed under IDC 003.

3.4.2.5 Sampling and Analysis Programs Applicable to ID 212A

The following sampling and analysis data is available for wastes included in content code ID 212A (IDC 003), and is discussed in Sections 3.4.2.6 to 3.4.2.8:

• Analyses of solidified aqueous waste - total VOC analyses
• Headspace analyses of solidified organics - TRUPACT-II Program
• Headspace analyses of solidified organics - Clements and Kudera

For content code ID 212A, and its more recently generated waste counterparts RF 112A and ID 112A, the following IDCs are equivalent:

<table>
<thead>
<tr>
<th>New IDCs (RF 112A, ID 112A)</th>
<th>Old IDC (ID 212A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>700, 801, 808</td>
<td>003</td>
</tr>
</tbody>
</table>

This information will assist the reader in understanding the applicability of the various analytical results across content codes.

3.4.2.6 Analyses of Solidified Aqueous Waste - Total Analyses

Two total analyses of organic sludge samples (IDC 003) are included in Attachment H, Table H-1. The table was included in the RFP Report No. 4311 on "Waste Drum Gas Generation Sampling Program at Rocky Flats." Two analyses are for IDC 003 wastes.
These two samples are identified in the table. IDC 003 corresponds to ID 212A. Note that the organic solvents only occur in ppm quantities in these solidified organic drums of waste. More recent waste minimization efforts, including product substitutions, are expected to further decrease the presence of solvents in the wastes.

Note 3: The two IDC 003 sludge samples presented in Table H-1 were analyzed for a total of 36 VOCs. A list of the VOCs has been included as Table H-2.

3.4.2.7 Headspace Analyses of Solidified Organics - TRUPACT-II Program

Analyses of drum headspace gases for content code 212A (IDC 003) have been performed. Attachment L contains headspace analyses of twenty-two drums from RFP; four drums of IDC 003 wastes were analyzed. Low volume percent concentrations of carbon tetrachloride were found in the headspace of three drums, 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113) was detected in two of the drums, and 1,1,1-trichloroethane and methylene chloride were detected in one drum.

Note 4: The analyses presented in Attachment L were performed by mass spectrometry. This analytical technique would have detected any other VOCs that might be present, in addition to carbon tetrachloride, 1,1,1-trichloroethane, methylene chloride, and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113).

Attachment M presents headspace analyses for several of the drums listed in Attachment L. In these tables, analytical results are presented for several layers of confinement (plastic bags) within each drum, and were performed to estimate “G” values (a measure of the rate of gas generation) to determine gas generation/consumption rates in drums of transuranic waste. The VOCs were analyzed to ascertain what percentage of drums might contain these compounds.

3.4.2.8 Headspace Analyses of Solidified Organics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, “TRU Waste Sampling Program: Volumes I and II”. Both volumes are included as Attachments N and O. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP and stored at INEL under the content code ID 212A, corresponding to IDC 003.

Table 7 from Attachment N contains the headspace analytical data for twelve IDC 003 drums. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall concentrations of VOCs in the headspace of all the solidified aqueous organic materials are low and concentrations of VOCs never approached saturation values in drums of IDC 003 waste.

Attachment O contains gas generation data from IDC 003 solidified organic waste. The data from Attachment O represents two drums of newly generated IDC 003 waste (at the time of the tests) which were monitored for headspace gases (including VOCs) for thirteen weeks in a vented condition, and then sealed for thirteen additional weeks and monitored for headspace gases. The two drums had identification numbers D-31254 and D-31403.

A copy of all the figures and tables that represent data from the IDC 003 solidified organics is included in Attachment O on page B-22, and pages B-24 to B-34. In the analysis of the sealed drums, only low volume percent concentrations of VOCs (carbon tetrachloride,
methylene chloride, 1,1,1-trichloroethane, Freon-113, and isopropanol) were detected, and concentrations of VOCs never approached saturation values in drums of IDC 003 waste.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver, on October 11, 1989, and was attended by EPA, DOE, and their contractors.

3.5 RF 113 AND ID 113

Content codes RF 113A and ID 113A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WWIP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 113A) and stored at Idaho National Engineering Laboratory (ID 113A). These content codes are classified as Waste Type IV, Solidified Organics, and correspond to IDC 802. IDC 802 is described in the TRUCON as aqueous laboratory waste that is not compatible with the primary aqueous treatment system because of organic acid content. The wastes are solidified by mixing with Portland and magnesia cements.

Content code ID 213A, which corresponds to IDC 004, is a retrievably stored waste form which is equivalent to RF 113A and ID 113A. ID 213A is discussed in Section 3.6. There are no experimental equivalents of RF 113A, ID 113A, or ID 213A.

3.5.1 General Process Knowledge - IDC 802

IDC 802 is solidified lab waste, which is processed in a special glovebox operation in Building 774. These aqueous wastes are usually incompatible with the ferric hydroxide coprecipitation process and are therefore separated from the primary liquid stream in Building 774. The aqueous waste is neutralized with sodium hydroxide and mixed by hand with Portland cement and absorbent material in a 55-gallon waste drum. These wastes originate from a variety of places on the plant. Those which may be transuranic are brought in by bottles from Buildings 559, 771, and 779. Because the waste is generated only intermittently, no flow diagrams are included for these buildings. A flow diagram (Figure 3.1-1) for the Building 774 generation of IDC 802 is included with the IDC 800 (RF 111) process description. Most of the transuranic waste processed in this area is acid chloride waste from Building 771 which cannot go through the coprecipitation equipment. Additional waste process information for shipping content codes RF 113A and ID 113A is contained in the following sections of the TRUCON document:

- RF 113A: Section 19
- ID 113A: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
• Chemical Compatibility (Within the Content Code)
• Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.5.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.5.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 113A and ID 113A are listed in the following sections of Attachment B1 of NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

• RF 113A: Section 8
• ID 113A: Section 2

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. These estimates, particularly for volatile organic compounds are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals in RF 113A, listed in Attachment B, corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste," issued by Rocky Flats Plant. A copy of this letter, dated May 23, 1989, is included as Attachment F.

3.5.2.2 Chemical Compatibility of Wastes Identified By Content Codes RF 113A and ID 113A

The chemical compatibility of the wastes identified by shipping content code RF 113A is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

• General description of RF 113A waste - Page 49 of Appendix 2.10.12.
• Chemical list for RF 113A (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
• Assessment of chemical compatibility within RF 113A - Page 47 of Appendix 2.10.12
• Summary of potential incompatibilities within RF 113A - Table 3 of Appendix 2.10.12
• Assessment of chemical compatibility between RF 113A and other content codes at RFP - pages 59 and 60 of Appendix 2.10.12
• Summary of potential incompatibilities between RF 113A and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.
Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 113A and ID 113A, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.5.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 113A and ID 113A

Shipping content codes RF 113A and ID 113A wastes are classified as nonhazardous in Attachment F, which identifies RFP TRU mixed wastes and their hazardous constituents by Waste Form Number and IDC. These wastes are not reported in the TRU Mixed Waste Characterization Database (Attachment E), which describes the hazardous wastes by generator site and IDC.

3.5.2.4 Drum Contents

Attachment G provides information on the actual physical contents (e.g., amount of concreted waste) of drummed waste in storage at INEL. The data is presented in spreadsheet format, sorted by IDC. Information that applies to shipping content code RF 113A (IDC 802) and ID 113A (IDC 802) is listed under ID 213A (IDC 004). Waste generated under ID 213A (IDC 004) was concreted as a solid mass in a 55-gallon drum. The only difference in processing for RF 113A and ID 113A is that the waste is mixed in one-gallon containers, and the individual cemented one-gallon aliquots are added to a drum.

3.5.2.5 Sampling and Analysis Programs Applicable to RF 113A and ID 113A

The following analytical data is available for RF 113A and ID 113A wastes and is discussed in Section 3.5.2.6 and in the accompanying summary for ID 213A:

- Headspace analyses of solidified organic wastes - Clements and Kudera

In the Clements and Kudera sampling program, results are reported in terms of IDCs, which correspond to the various content codes. Within the IDC designations, certain older IDCs are equivalent to the IDCs of newly generated wastes. For content codes RF 113A and ID 113A, and the related content code ID 213A, the following IDCs are equivalent:

<table>
<thead>
<tr>
<th>New IDCs (RF 113A, ID 113A)</th>
<th>Old IDCs (ID 213A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>802</td>
<td>004</td>
</tr>
</tbody>
</table>

This information will assist the reader in understanding the applicability of the various analytical results across content codes.

3.5.2.6 Headspace Analyses of Solidified Organic Wastes - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. These analyses of headspace gases were actually performed for IDC 004 (corresponding to content code ID 213A) currently in storage at INEL; however the results can be considered representative of IDC 802 (content codes RF 113A and ID 113A). The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP under the content code RF 113A and identified as IDC 802, stored at INEL (ID 113A) and the equivalent older waste in temporary storage at INEL (ID 213A).
Table 8 from Attachment N contains the headspace analytical data from eleven IDC 004 drums (equivalent to IDC 802). A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall concentrations of VOCs in the headspace of all the solidified organic materials are low.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver, on October 11, 1989, that was attended by EPA, DOE, and their contractors.

3.6 ID 213

Content code ID 213A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), is waste that was generated at the Rocky Flats Plant (the equivalent of RF 113A) and is in retrievable storage at the Idaho National Engineering Laboratory (ID 213A). This content code is classified as Waste Type IV, Solidified Organics, corresponding to IDC 004, Special Lab Setups at RFP. ID 213A waste was generated and placed in storage prior to the establishment of the WIPP Waste Acceptance Criteria (WAC). However, it was generated by the same processes that currently produce the waste included in content codes RF 113A and ID 113A. There is no experimental equivalent of ID 213A.

3.6.1 General Process Knowledge

The ID 213A waste is generated and processed in the same way as newly generated RF 113A. Therefore, the process flow diagram (Figure 3.1-1) for RF 113A is applicable to the waste stored at Idaho National Engineering Laboratory.

General waste process information for shipping content code ID 213A is contained in Section 13 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.6.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.
3.6.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code ID 213A are listed in Section 2 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989).

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. These estimates, particularly for VOCs, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

3.6.2.2 Chemical Compatibility of Wastes Identified by Content Code ID 213A

Attachment D contains an evaluation of potential chemical incompatibilities within content code ID 213A and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.6.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in ID 213A

Shipping content code ID 213A waste is classified as hazardous because of VOCs and heavy metals present in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the hazardous chemicals potentially present in ID 213A are:

- F001 1,1,1-Trichloroethane
  - F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
  - F001 Carbon tetrachloride
- F003 Xylene
  - F003 Butanol
  - F003 Methanol
- D006 Cadmium
- D008 Lead

The F001 solvents are common degreasing compounds. These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: Methylen chloride is included in the TRUPACT-II Chemical List (Attachment B) for ID 213A, but is not regulated as a hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D and therefore does not appear in Attachment E.

Note 2: In addition to the chemicals listed above, trichloroethylene was detected in the headspace of IDC 004 drums (see Section 3.2.3.6).

Note 3: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
3.6.2.4 Drum Contents

Attachment G provides information on the actual physical contents (e.g., amount of concreted waste) of drummed waste in storage at INEL. The data is presented in spreadsheet format, sorted by IDC. Information that applies to shipping content code ID 213A is listed under IDC 004.

3.6.2.5 Sampling and Analysis Programs Applicable to ID 213A

The following analytical data is available for ID 213A wastes, and are discussed in Section 3.6.2.6:

- Headspace analyses of solidified organics - Clements and Kudera

In the Clements and Kudera sampling program, results are reported in terms of IDCs, which correspond to the various content codes. Within the IDC designation, some older IDCs are equivalent to the IDCs of newly generated wastes.

For content codes RF 113A and ID 113A, and the related content code ID 213A, the following IDCs are equivalent:

<table>
<thead>
<tr>
<th>New IDCs (RF 113A, ID 113A)</th>
<th>Old IDCs (ID 213A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>802</td>
<td>004</td>
</tr>
</tbody>
</table>

This information will assist the reader in understanding the applicability of the various analytical results across content codes.

3.6.2.6 Headspace Analyses of Solidified Organics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP and stored at INEL under the content code ID 213A, corresponding to IDC 004.

Table 8 from Attachment N contains the headspace analytical data for eleven IDC 004 drums. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall low concentrations of VOCs were detected in the headspace several drums.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver, on October 11, 1989, and was attended by EPA, DOE, and their contractors.

3.7 RF 114

Content codes RF 114A and RF 114B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant. These content codes are classified as Waste Type I, Solidified Aqueous or Homogeneous Inorganic Solids, and correspond to IDC 806, Cemented Process Solids. RF 114B, the experimental equivalent of RF 114A, will have naturally occurring salt, clay (bentonite), and steel mesh added to the payload containers to simulate conditions after
breaching of drums, boxes, and bins in the WIPP repository after closure. ID 114A is a related content code, presented in Section 3.8.

3.7.1 General Process Knowledge - IDC 806

All particulate and sludgy waste must be immobilized by processing into a solidified form and is identified as IDC 806. Examples of IDC 806 waste are Building 771 incinerator sludge, residue heels, spent exchange resins, grit and fire brick fines. The waste is mixed with a Portland cement mixture in a one-gallon mold. The cement mixtures used vary with the type of waste being cemented. The resulting "pucks" are allowed to cure, then placed in a 55-gallon drum. Although these wastes were mixed with Portland cement and shipped to INEL for storage in the past, the area where this waste was cemented is undergoing RCRA closure. Building 371 has the only approved process to produce IDC 806.

A majority of the waste that was cemented originated in Building 771. The following flow diagrams (Figures 3.7-1 to 3.7-4) show waste streams and processes documented before the cementing area in Building 371 was shut down.

Building 771 - Inorganic Process Solids

The following processes in Building 771 generate waste which is processed to IDC 806 from the following sources (Figure 3.7-1):

- Incinerator Scrubber - Incinerator filter sludge is created from the particulate (fly ash) and diatomaceous earth cut off the filter wheel. (The incinerator is not in operation.)
- Ion Exchange - Ion exchange resin* from ion exchange columns is changed out about every six months.
- Process Chemistry Technology - Deionizer exchange resin* column is changed out on a yearly basis.

Building 371 - Cemented Inorganic Process Solids

In the past, some inorganic process solids were cemented and sent to INEL for storage. Building 371 is the only facility that solidifies inorganic process solids. The area where this waste was cemented is currently undergoing RCRA closure. Those process solids which require cementing are not shipped offsite until they can be further processed to a certifiable form. The process is shown in Figure 3.7-2.

Residues from plutonium recovery processes were dried, and immobilized in cement in preparation for offsite shipment. Residues included Building 771 incinerator ash, residue heels (sand, slag, and crucible), and spent ion exchange resin.* The waste was typically mixed with a Portland cement mixture in a one-gallon mold. The cement mixtures used vary by the procedure with the type of waste being cemented. The resulting "pucks" were allowed to cure before being placed in 55-gallon drums.

* Ion exchange resins are now classified in shipping Content Code RF 126A due to higher gas generation rates from radiolysis during transportation.
General waste process information for shipping content codes RF 114A and RF 114B is contained in Section 19 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.7.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.7.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 114A and RF 114B are listed in Section 8 of Attachment B1 of NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989).

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals in RF 114A, listed in Attachment B, corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste", issued by the Rocky Flats Plant. A copy of this letter, dated May 23, 1989, is included as Attachment F.

3.7.2.2 Chemical Compatibility of Wastes Identified by Content Codes RF 114A and RF 114B

The chemical compatibility of the wastes identified by shipping content code RF 114A and RF 114B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 114A and RF 114B waste - Pages 49 and 50 of Appendix 2.10.12
- Chemical list for RF 114A and RF 114B (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
Figure 3.7-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Inorganic Process Solid Waste from Building 771 to be Cemented (Shipping Content Code 114, IDC 806).
Figure 3.7-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Cemented Inorganic Process Solid Waste for Building 371 (Shipping Content Code 114, IDC 806).
• Assessment of chemical compatibility within RF 114A and RF 114B - Pages 49 and 50 of Appendix 2.10.12
• Summary of potential incompatibilities within RF 114A and RF 114B - Table 3 of Appendix 2.10.12
• Assessment of chemical compatibility between RF 114A and RF 114B and other content codes at RFP - Pages 59 and 60 of Appendix 2.10.12
• Summary of potential incompatibilities between RF 114A and RF 114B and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content code RF 114A and its experimental equivalent RF 114B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.7.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 114A and RF 114B

Shipping content codes RF 114A and RF 114B wastes are classified as hazardous because of volatile organic compounds and heavy metals detected in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the hazardous constituents potentially present in RF 114A and RF 114B are:

- F001 1,1,1-Trichloroethane
- F001 Carbon tetrachloride
- F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- F002 Dichloromethane (Methylene chloride)
- F003 Methanol
- F003 Butanol
- F003 Xylene
- D008 Lead

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

The hazardous constituents listed above correspond to Attachment F, which identifies hazardous constituents of Rocky Flats waste by Waste Form Number (WFN) and IDC. IDC 806 is included in this discussion.

3.7.2.4 Sampling and Analysis Programs Applicable to RF 114

The following sampling and analysis data is available for wastes generated as uncemented equivalents of content code RF 114A:

- Headspace analyses of solidified aqueous wastes - Clements and Kudera
In the Clements and Kudera sampling program, results are reported in terms of IDCs, which correspond to the various content codes. Within the IDC designations, some older IDCs are equivalent to the IDCs of newly generated wastes. For content codes RF 114A and RF 114B, the related uncemented IDC at INEL is 292. IDC 292 is a particulate sludge from incinerator ash (not chemically precipitated), which is now included in the newer IDC 806 (i.e., it is now cemented into RF 114A).

3.7.2.5 Headspace Analyses of Solidified Aqueous Wastes - Clements and Kudera

The important waste characterization work performed by Clements and Kudera at INEL is described in the document, "TRU Waste Sampling Program: Volumes I and II". Both volumes have been included as Attachments N and O. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP and stored at INEL under the IDC 292. IDC 292 is one of the IDCs that is now cemented into RF 114A (IDC 806).

Table 7 from Attachment N contains the headspace analytical data for eight IDC 292 drums. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall concentrations of VOCs in the headspace of all the IDC 292 solidified aqueous inorganic materials is low.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting held in Denver, on October 11, 1989, and attended by EPA, DOE, and their contractors.

3.8 ID 114

Content code ID 114A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), is waste generated at the Rocky Flats Plant (RF 114A) and stored at Idaho National Engineering Laboratory (ID 114A). This content code is included in the Waste Type I classification, Solidified Aqueous or Homogeneous Inorganic Solids, and corresponds to IDCs 817, 818, 820, and 823. All IDCs represent cemented inorganic process solids (e.g., filter sludge, grit, and fire brick fines), as described in the TRUCON.

Note 1: In the TRUCON, ID 114A is listed as corresponding to IDC 806, not 817, 818, 820, and 823. The TRUCON is incorrect for the following reason, and a revision will be submitted to the Nuclear Regulatory Commission (NRC) for approval in Spring 1990:

When RFP instituted the IDC 800 series a few years ago, the following IDC wastes were produced under RF 114: IDC 817, 818, 820, 822, and 823. All IDCs were inorganic process solids with the exception of IDC 822, an organic resin. When some of the wastes were packaged and transferred to INEL for storage, all of the above IDCs were recorded as a new IDC 806, not discriminating between drums that were inorganic waste and others that were organic waste.

Because of differences in gas generation potential for cemented inorganics and cemented organics, IDC 806 under RF 114A has been split into IDC 806 for cemented inorganic materials, and IDC 809 for cemented organic materials. Thus, the organic IDC 822 was now separated out from the others, and given the new IDC 809. IDC 809 corresponds to shipping content code RF 126A. RF 126A and ID 126A were created solely for the organic resin, IDC 809. See Section 3.20 further explanation of RF 126. Since the initiation of the TRUPACT-
III program, shipping content code ID 114A was created to include IDCs that are inorganic process solids; i.e., 817, 818, 820, and 823.

As seen in the previous summary, content code RF 114A includes IDC 806; any IDC 806 waste being generated now at RFP includes only inorganic process solids.

3.8.1 General Process Knowledge

The ID 114A waste is generated and processed by the identical methods used for RF 114A. Therefore, the process flow diagrams (Figures 3.7-1 and 3.7-2) for RF 114A are applicable to the waste stored at Idaho National Engineering Laboratory.

General waste process information for shipping content code ID 114A is contained in Section 13 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.8.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

3.8.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in ID 114A wastes were accidentally left out of the TRUPACT-II Chemical List that is included as Attachment B. A chemical list identical to RF 114A will be added to the next revision (4.0) to the TRUPACT-II Chemical List that will be submitted to the NRC in March 1990 for approval.

Chemicals potentially present in wastes identified by shipping content code ID 114A will be the same as that listed for RF 114A after revision of Attachment B. The Chemical Compatibility Assessment in Attachments C and D for RF 114A are identical to the ID 114A assessment that will be submitted to the NRC in March 1990. Refer to RF 114A for the Chemical Compatibility Assessment.

3.8.2.2 Occurrence of RCRA-Regulated Hazardous Chemicals in ID 114A

After submittal of Revision 4.0 of Attachment B to the NRC, the hazardous chemicals in ID 114A will be identical to RF 114A. Refer to RF 114A for discussion.
3.8.2.3 Sampling and Analysis Programs Applicable to ID 114A

The discussion of uncemented IDC 292 waste in RF 114A is applicable to ID 114A.

3.9 RF 115 AND ID 115

Content codes RF 115A, RF 115B, ID 115A, and ID 115C, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 115A) and stored at Idaho National Engineering Laboratory (ID 115A). These content codes are classified as Waste Type II, Solid Inorganics, and correspond to IDCs 300, 303, and 312, Graphite Waste. RF 115B and ID 115C are experimental equivalents of RF 115A and ID 115A and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally occurring salt added to the waste to simulate conditions after breaching of drums, boxes and bins in the WIPP repository after closure.

3.9.1 General Process Knowledge - IDCs 300, 303, and 312

TRU graphite waste is generated by the plutonium foundry in Building 707 and the plutonium metallurgy R&D operations in Building 771. TRU graphite wastes consists of graphite molds (IDC 300), scarfed graphite chunks (IDC 303), and coarse graphite pieces (IDC 312) which have been used for casting molten plutonium. The graphite molds may be used several times before they become unusable and are discarded as waste. The molds are cleaned to remove plutonium metal which may have adhered to the surface or are imbedded in the mold before they are discarded.

The following flow diagrams show processes in Building 771 (Figure 3.9-1) and 707 (Figure 3.9-2) which generate graphite wastes. There are no waste stream descriptions for these processes, due to limited information.

General waste process information for shipping content codes RF 115A, ID 115A, RF 115B, and ID 115C are contained in the following sections of the TRUCON document:

- RF 115A and RF 115B: Section 19
- ID 115A and ID 115C: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives / Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.
Figure 3.9-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Graphite Waste for Building 707 (Shipping Content Code 115, IDCs 300, 303, & 312).
Figure 3.9-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Graphite Waste for Building 771 (Shipping Content Code 115, IDCs 300, 303, & 312).
3.9.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.9.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 115A, ID 115A, RF 115B, and ID 115C are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 115A and RF 115B: Section 8
- ID 115A and ID 115C: Section 2

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B.

3.9.2.2 Chemical Compatibility of Wastes Identified By Content Codes RF 115A, RF 115B, ID 115A, and ID 115C

The chemical compatibility of the wastes identified by shipping content code RF 115A and RF 115B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 115A and RF 115B waste - Page 50 of Appendix 2.10.12
- Chemical list for RF 115A and RF 115B (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
- Assessment of chemical compatibility within RF 115A and RF 115B - Pages 50 and 51 of Appendix 2.10.12
- Summary of potential incompatibilities between RF 115B and other content codes at RFP - Table 3 of Appendix 2.10.12.
- Assessment of chemical compatibility between RF 115A and RF 115B and other content codes at RFP - Pages 59 and 60 of Appendix 2.10.12
- Summary of potential incompatibilities between RF 115A and RF 115B and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 115A and ID 115A and their experimental equivalents RF 115B and ID 115C, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.
3.9.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 115A, ID 115A, RF 115B, and ID 115C

Available data indicates that shipping content codes RF 115A, ID 115A, RF 115B, and ID 115C wastes do not contain any hazardous wastes; there are no hazardous chemicals listed in the TRUPACT-II Chemical List (Attachment B), the TRU Mixed Waste Characterization Database (Attachment E), or the RFP Internal letter, "Hazardous Constituents of Rocky Flats Transuranic Wastes" (Attachment F). Although no hazardous chemicals were reported in these sources, VOCs were detected in IDC 300 and 312 drums through headspace gas sampling, discussed in Section 3.9.2.7.

3.9.2.4 Drum Contents

Attachment G contains data on the physical contents (e.g., amount of graphite) of drummed waste in storage at INEL. The data is presented in spreadsheet format, sorted by IDC. Information for content codes RF 115A, RF 115B, ID 115A, and ID 115C is listed under IDCs 300 and 312.

3.9.2.5 Sampling and Analysis Programs Applicable to RF 115A, ID 115A, RF 115B, and ID 115C

The following analytical data is available for wastes included in the above content codes, and discussed in the remaining sections of this report and in the accompanying summary for ID 215A:

- Headspace analyses of solid inorganics - TRUPACT-II Program
- Headspace analyses of solid inorganics - Clements and Kudera

In a number of these programs, results are reported in terms of IDCs, which correspond to the various content codes. For content codes RF 115A, RF 115B, ID 115A, and ID 115C, analyses performed on IDC 300 and 312 waste are applicable.

3.9.2.6 Headspace Analyses of Solid Inorganics - TRUPACT-II Program

Attachment L contains headspace analyses of 22 drums from RFP that were analyzed in support of the TRUPACT-II program, including one IDC 300 drum. The analysis of the IDC 300 drum headspace did not show any VOCs (at a detection limit of 500 ppm).

Note 2: The analyses presented in Attachment L were performed by mass spectrometry. This analytical technique would have detected any other VOCs that might have been present, in addition to carbon tetrachloride, 1,1,1-trichloroethane, and Freon-113.

3.9.2.7 Headspace Analyses of Solid Inorganics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. Analyses of headspace gases were conducted for eight drums of IDC 300, two drums of IDC 312, and one drum of IDC 301.

Table 3 from Attachment N contains the headspace analytical data from the eleven drums noted above. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Trace amounts of saturated hydrocarbons and 1,1,1-trichloroethane were detected in the headspace of several IDC 300
drums and the IDC 301 drum; 1,1,1-trichloroethane and dichloromethane were detected in the IDC 312 drums. In most cases, concentrations were less than 1% by volume.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver, on October 11, 1989, and was attended by EPA, DOE, and their contractors.

3.10 ID 215

Content codes ID 215A and ID 115B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant, the equivalent of RF 115A, and stored at the Idaho National Engineering Laboratory (ID 215A). These content codes are classified as Waste Type II, Solid Inorganics, and correspond to IDC 300, Graphite Molds. ID 115B is the experimental equivalent of ID 215A, and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally-occurring salt added to the waste to simulate conditions after the breaching of drums, boxes and bins in the WIPP repository after closure.

ID 215A was generated and placed into retrievable storage at INEL prior to establishment of the WIPP Waste Acceptance Criteria (WAC). RF 115A and ID 115A are the more recently generated waste equivalents of ID 215A.

3.10.1 General Process Knowledge - IDC 300

The ID 215A waste is generated and processed in the same way as newly generated RF 115A. Therefore, the process flow diagrams (Figures 3.9-1 and 3.9-2) for RF 115A are applicable to the waste stored at Idaho National Engineering Laboratory. General waste process information for shipping content codes ID 215A and ID 115B is contained in Section 13 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives / Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.10.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.
3.10.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes ID 215A and ID 115B are listed in Section 2 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). A copy of the complete TRUPACT-II Chemical List is provided as Attachment B.

3.10.2.2 Chemical Compatibility of Wastes Identified by Content Codes ID 215A and ID 115B

Attachment D herein contains an evaluation of potential chemical incompatibilities within content code ID 215A and its experimental equivalent ID 115B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.10.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in ID 215A and ID 115B

Available data indicates that shipping content codes ID 215A and ID 115B wastes do not contain any hazardous chemicals; there are no hazardous chemicals listed in the TRUPACT-II Chemical List (Attachment B), the TRU Mixed Waste Characterization Database (Attachment E), or the RFP internal letter, "Hazardous Constituents of Rocky Flats Transuranic Wastes" (Attachment F). Although no hazardous chemicals were reported in these sources, VOCs were detected in IDC 300 drums through headspace gas sampling, discussed in Section 3.10.2.7.

3.10.2.4 Drum Contents

Attachment G contains data on the physical contents (e.g., amount of graphite) of drummed waste in storage at INEL. The data is presented in spreadsheet format, sorted by IDC. Information for content codes ID 215A and ID 115B is listed under IDC 300.

3.10.2.5 Sampling and Analysis Programs Applicable to ID 215A and ID 115B

The following analytical data is available for wastes included in the above content codes, and is discussed in the following sections of this report:

- Headspace analyses of solid inorganics - TRUPACT-II Program
- Headspace analyses of solid inorganics - Clements and Kudera

In a number of these programs, results are reported in terms of IDCs, which correspond to the various content codes. For content codes ID 215A and ID 115B, analyses performed on IDC 300 waste are applicable.

3.10.2.6 Headspace Analyses of Solid Inorganics - TRUPACT-II Program

Attachment L contains headspace analyses of 22 drums from RFP that were analyzed in support of the TRUPACT-II program, including one IDC 300 drum. The analysis of the IDC 300 drum headspace did not show any VOCs (at a detection limit of 500 ppm).

Note 1: The analyses presented in Attachment L were performed by mass spectrometry. This analytical technique would have detected any other VOCs that might have been present, in addition to carbon tetrachloride, 1,1,1-trichloroethane, and Freon-113.
3.10.2.7 Headspace Analyses of Solid Inorganics Wastes - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. Analyses of headspace gases were conducted for eight drums of IDC 300. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP and in temporary storage at INEL under the content codes ID 215A and ID 115B.

Table 6 from Attachment N contains the headspace analytical data from the eight drums noted above. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Trace amounts of saturated hydrocarbons and 1,1,1-trichloroethane were detected in the headspace of several IDC 300 drums.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver, on October 11, 1989, and attended by EPA, DOE, and their contractors.

3.11 RF 116, ID 116 and ID 216

Content codes RF 116A, ID 116A, RF 116B, ID 116C, ID 216A, ID 216B, ID 216C, AND ID 116B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 116A) and stored at the Idaho National Engineering Laboratory (ID 116A or ID 216A, ID 216B, and ID 216C). These content codes are classified as Waste Type III, Solid Organics. Each content code corresponds to a number of different IDCs:

<table>
<thead>
<tr>
<th>Content Code</th>
<th>IDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 116A, RF 116B</td>
<td>831, 832, 833</td>
</tr>
<tr>
<td>ID 116A, ID 116C</td>
<td>330/831, 336/832, 337/833</td>
</tr>
<tr>
<td>ID 216A</td>
<td>336, 970</td>
</tr>
<tr>
<td>ID 216B</td>
<td>900</td>
</tr>
<tr>
<td>ID 216C</td>
<td>330, 337</td>
</tr>
<tr>
<td>ID 116B</td>
<td>330, 336, 337, 900, 970</td>
</tr>
</tbody>
</table>

A brief description of each IDC, as presented in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>330/831</td>
<td>Combustibles, dry</td>
</tr>
<tr>
<td>336/832</td>
<td>Combustibles, wet</td>
</tr>
<tr>
<td>337/833</td>
<td>Plastics</td>
</tr>
<tr>
<td>900</td>
<td>Plastics and paper</td>
</tr>
<tr>
<td>970</td>
<td>Wood</td>
</tr>
</tbody>
</table>
RF 116B and ID 116C are experimental equivalents of RF 116A and ID 116A, and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally occurring salt added to the waste to simulate conditions after the breaching of drums, boxes, and bins in the WIPP repository after closure. ID 216A, B, and C are "older" waste forms, generated and placed into retrievable storage prior to the WIPP Waste Acceptance Criteria (WAC). ID 116B is the experimental equivalent of ID 216A, ID 216B, and ID 216C.

Note 1: IDCs 330, 336, and 337 are "older" IDCs that correspond to new IDCs for the same waste form (i.e., 330 = 831, 336 = 832, and 337 = 833).

Note 2: Content codes ID 216A, ID 216B, and ID 216C differ only in that they contain different IDCs, and the packaging of the wastes varies (i.e., each content code may have a different number of packaging layers).

3.11.1 General Process Knowledge - IDCs 300, 336, 337, 831, 832, 833, 900, 970

Combustible wastes which consist of dry combustibles (IDC 831), wet combustibles (IDC 832) and plastics (IDC 833) are generated from Buildings 371, 374, 559, 707, 771, 774, 776, 777 and 779. Before 1989, most of the combustible waste was sent to Building 776, the size reduction facility (see process description under Building 776 description). The waste is now packaged for offsite shipment in the buildings in which the waste was generated.

The following flow diagrams (Figure 3.11-1 to 3.11-9) show where combustible wastes originate in each of the buildings listed above. Most of the line-generated combustibles are transuranic. The non-line generated combustibles are usually low-level waste, however some non-line-generated waste may be transuranic at times. If this is the case, these waste streams are documented here. All combustible waste is packaged and sent to a drum counter, where it is determined whether the waste is above the economic discard limit (EDL) and eligible for recovery or below the EDL (and determined to be transuranic or low level waste) and transferred to an approved storage site until offsite shipment is made.

Building 371 - Generation of Combustible Waste

Combustibles from routine maintenance and from strip-out of old processes and equipment are generated in-line on a building-wide basis. Waste typically consists of kimwipes, rags, and gloves (other than the leaded glovebox gloves) and is inclusive of all IDCs 831, 832, and 833 (Figure 3.11-1).

Building 374 - Generation of Combustible Waste

Combustibles (IDCs 831, 832, and 833) are generated during operations and maintenance activities in Building 374 (Figure 3.11-2). The waste typically consists of kimwipes, plastic bags, containers, coveralls and gloves. This waste is almost always low-level, and very rarely TRU.

Building 559 - Generation of Combustible Waste

Glovebox operations generate combustible waste (IDCs 831, 832, 833) from several sources in Building 559 (Figure 3.11-3). The waste typically consists of surgical gloves, rags, kimwipes, plastic and paper generated from processes inside the gloveboxes.
Figure 3.11-1. Process Flow Diagram for Generation of Contact Handled Transuranic Combustible Waste for Building 371 (Shipping Content Code 116, IDCs 831, 832, & 833).
Figure 3.11-2. Process Flow Diagram for Generation of Contact Handled Transuranic Combustible Waste for Building 374 (Shipping Content Code 116, IDCs 831, 832, & 833).
Figure 3.11-3: Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible Waste for Building 559 (Shipping Content Codes 116; IDCs 831, 832, 833)
Building 707 - Generation of Combustible Waste

Line-generated and non-line-generated combustibles are generated by the foundry, machining, assembly and inspection and non-destructive testing operations (Figure 3.11-4). These wastes include all three IDCs 831, 832, and 833. Most of the combustible waste is comprised of plastic, paper, rags, kimwipes, texwipes, cheesecloth, towels, surgeon gloves, and non-leded rubber gloves. Four processes were identified as using hazardous chemicals: the machining and foundry area uses carbon tetrachloride, inspection uses small amounts of Freon-113 and carbon tetrachloride, and the assembly area uses 1,1,1-trichloroethane.

Building 771 - Generation of Combustible Waste

Dry and wet combustibles and plastics are generated from several areas in Building 771 (Figure 3.11-5). The combustible wastes vary from low-level to above the discard limit. The waste consists of typical lab products such as poly bottles, rags, kimwipes, cheesecloths, texwipes, filter cloths, towels, surgeon gloves, mylar cellophane, paper, supplied air suits, plastic tents, etc. Two processes were identified as using hazardous chemicals: 1) inspection, which uses small amounts of a Freon-113/carbon tetrachloride mixture, and 2) process chemistry, which may use several different solvents.

Building 774 - Generation of Combustible Waste

Plastic gloves, plastic containers and kimwipes are generated from operations and maintenance of Building 774 (Figure 3.11-6). This waste is very rarely TRU, and almost always low level.

Building 776 - Generation of Combustible Waste

TRU combustible waste is generated from the advanced size reduction and manual size reduction areas in Building 776 (Figure 3.11-7).

- Size Reduction - Waste supplied-air suits and combustibles are generated from the splitting of bags and separation and cutting of materials inside an airlock vault. This waste is typically low level. Because the size reduction facility has cut down the volume of waste that is processed there, it no longer generates the large amount of combustible waste that it once did.

- Advanced Size Reduction - Very small amounts of paint chips from stripping lead from the gloveboxes is collected in a vacuum and disposed to a line generated combustible drum.

Building 777 - Generation of Combustible Waste

Combustible wastes are generated from assembly, disassembly, special assembly, inspection and metallurgical glovebox operations (Figure 3.11-8). Typical wastes are kimwipes, gauze and lint-free cloths from cleaning and wiping oil from parts. These wastes are often soiled with Freon-113, carbon tetrachloride, alcohol, 1,1,1-trichloroethane and in some cases, paint remover. The combustible wastes are always IDC 832 (wet combustibles) and are almost always low level.
Building 779 - Generation of Combustible Waste

Plastic waste (IDC 833) is generated from physical metallurgy and hydride operations (Figure 3.11-9). Both wet and dry line-generated combustibles (IDCs 831 and 832) are generated from the production physical chemistry and pyrochemistry technology operations. Typical wastes include kimwipes, rags, towels, etc. Kimwipes used with solvents for general cleaning purposes from the utilities group, may also be generated as TRU waste, but are almost always low-level waste.

For ID 216A, 216B, and 216C waste, IDCs 900 and 970 are equivalent to IDC 330. As stated earlier, IDC 330 is equivalent to IDC 831; IDC 336 is equivalent to IDC 832, and IDC 337 is equivalent to IDC 833. Therefore, the process flow diagrams for newly generated waste should be representative of retrievably stored waste at Idaho National Engineering Laboratory. The actual buildings that generate TRU RF 116 waste may vary over time but the processes remain the same for generation of plutonium-contaminated wastes.

General waste process information for shipping content codes RF 116A, RF 116B, ID 116A, ID 116C, ID 216A, ID 216B, ID 216C, and ID 116B are contained in the following sections of the TRUCON document:

- RF 116A and RF 116B: Section 19
- ID 116A, ID 116C, ID 216A, and ID 116B: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used ICDs)

The TRUCON document has been included as Attachment A.

3.11.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.
Figure 3.11-4. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible Waste for Building 707 (Shipping Container Code 116, ICOS 831, 832, & 833).
Figure 3.11-5. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible Waste for Building 771 (Shipping Content Code 116, IDCs 831, 832, & 833).
Figure 3.11-6. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible Waste for Building 774 (Shipping Content Code 116, IDCs 831, 832, & 833).
Figure 3.11-7. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible Waste for Building 776 (Shipping Content Code 116, IDCs 831, 832, & 833).
Figure 3.11-8. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible Waste for Building 777 (Shipping Content Code 116, IDCS 831, 832, 833).
3.11.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 116A, ID 116A, RF 116B, ID 116C, ID 216A, ID 216B, and ID 216C, and ID 116B are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 116A and 116B: Section 8

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

Note 3: The concentration of hazardous chemicals in RF 116A and RF 116B wastes corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste" issued by Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.11.2.2 Chemical Compatibility of Wastes Included in RF 116A and RF 116B

The chemical compatibility of the wastes identified by shipping content codes RF 116A and RF 116B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 116A and RF 116B waste - Pages 51 and 52 of Appendix 2.10.12
- Chemical lists for RF 116A and RF 116B (same as that in the TRUPACT-II Chemical List) - Table 2 - of Appendix 12.10.12
- Assessment of chemical compatibility within RF 116A and RF 116B - Page 51 of Appendix 2.10.12
- Summary of potential incompatibilities within RF 116A and RF 116B - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 116A, RF 116B, and other content codes at RFP - Pages 59 and 60 of Appendix 2.10.12.
- Summary of potential incompatibilities between RF 116A, RF 116B, and other content codes at RFP - Table 4 - of Appendix 2.10.12.

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 116A, ID 116A, ID 216A, ID 216B, and ID 216C and their experimental equivalents, RF 116B, ID 116C, and ID 116B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes in the TRUCON.

The above-listed shipping content codes are classified as hazardous because of traces of VOCs detected in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the VOCs potentially present in wastes included in these content codes are:

- F001 1,1,1-Trichloroethane
- F001 Carbon tetrachloride
- F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- F002 Dichloromethane (Methylene chloride)

Note 4: IDCs 900 and 970 are not included in Attachment E; no hazardous constituents were reported. However, VOCs were detected in the headspace of IDC 900 and 970 drums (see Section 3.11.2.7).

These solvent wastes are common degreasing compounds. These wastes are described in Attachment E. The Hazardous Waste Numbers identified in the table are derived from 40 CFR Part 261, Subparts C and D.

Note 5: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous wastes under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, trichloroethylene and lead are listed for ID 216A, ID 216B, ID 216C, and ID 116B.

Note 6: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

The hazardous wastes listed above, which appear in Attachment E, are also discussed in Attachment F. As noted earlier, Attachment F is the RFP internal letter dated May 23, 1989, "Hazardous Constituents of Rocky Flats Transuranic Waste". In Attachment F, TRU mixed wastes are identified by Waste Form Number (WFN) and IDC. IDCs 831, 832, and 833 (WFN 116) are included in this discussion.

3.11.2.4 Drum Contents

Attachment G provides information on the actual contents of drummed waste in storage at INEL. The data is presented in spreadsheet format, sorted by IDCs. Drum/box contents data is presented in Attachment G for 36 drums/boxes from IDCs 330, 336, and 337 and eight drums/boxes from the IDCs 900 and 970. The data on the drums/boxes from IDCs 330, 336, and 337 should be representative of IDCs 831, 832, and 833.


The following analytical data is available for the content codes listed above, and is discussed in section 3.11.2.6 to 3.11.2.7:
• Headspace analyses of solid organics - TRUPACT-II Program
• Headspace analyses of solid organics - Clements and Kudera

In a number of these programs, results are reported in terms of IDCs, which correspond to the various content codes. Analyses for IDCs 330, 336, 337, 900, and 970 are representative of the RF 116, ID 116, and ID 216 content codes.

3.11.2.6 Headspace Analyses of Solid Organics - TRUPACT-II Program

Analyses of headspace gases from IDCs at RFP and the equivalent IDCs in retrievable storage at INEL have been performed. The headspace sampling results obtained for IDCs 330, 336, and 337 reported in the TRUPACT-II SAR can be considered representative of IDCs 831, 832, and 833.

Attachment L contains headspace analyses of 22 drums from RFP that were analyzed in support of the TRUPACT-II program, including one drum each of IDC 330, 336, and 337 waste. None of the analyses of solid organics showed any VOCs in the headspace (at a detection limit of 500 ppm).

Note 7: The analyses included in Attachment L were performed by mass spectrometry. This analytical technique would have detected any other VOCs that might have been present, in addition to carbon tetrachloride, 1,1,1-trichloroethane, methylene chloride, and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113).

Attachment M presents headspace analyses for the IDC 330, 336, and 337 drums listed in Attachment L. In the tables shown in Attachment M, analytical results are presented for several layers of confinement (plastic bags) within each drum; analyses were performed to estimate "G" values (a measure of the rate of gas generation) for calculation of gas generation/consumption rates in drums of transuranic waste. The VOCs were analyzed to ascertain what percentage of drums might contain these compounds.

3.11.2.7 Headspace Analyses of Solid Organics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Both volumes have been included as Attachments N and O. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP under the RF 116A and RF 116B shipping content codes (IDCs 831, 832, and 833) and stored at INEL under the ID 116A, ID 116C, ID 216A, and ID 116B content codes (IDCs 330, 336, 337, 900, and 970).

Table 3 from Attachment N contains the headspace analytical data for eighteen IDC 330 drums, seven IDC 336 drums, eleven IDC 337 drums, four IDC 900 and four 970 drums. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. In several IDC 330 drums, trace (<1% by volume) amounts of 1,1,1-trichloroethane, trichloroethylene, and dichloromethane were detected. Trace levels of 1,1,1-trichloroethane, trichloroethylene, dichloromethane, and freon were detected in some of the IDC 336, 337, 900, and 970 drums.
Attachment O contains gas generation data from four IDC 330 drums (dry combustibles), two IDC 336 drums (wet combustibles), and two IDC 337 drums (plastic and rubber). The wastes, which were newly generated at the time of the tests, were monitored for thirteen weeks in a vented condition, and then sealed for thirteen additional weeks and monitored for headspace gases (including VOCs).

All of the figures and tables that represent data from the IDC 330, 336, and 337 solid organics are included in Attachment O on the following pages: page 19 (summary table), pages A-23 to A-50, and pages B-35 to B-77. The data from the second thirteen weeks (Phase II) of monitoring, is located on pages B-45, B-51, B-57, and B-67.

Attachment O provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting held in Denver on October 11, 1989, and attended by EPA, DOE, and their contractors.

3.12 RF 117, ID 117, and ID 217

Content codes RF 117A, ID 117A, RF 117B, ID 117C, ID 217A, ID 217B, ID 217C, and ID 117B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 117A) and stored at the Idaho National Engineering Laboratory (ID 117A, ID 217A, ID 217B, and ID 217C). These content codes are classified as Waste Type II, Solid Inorganics, and correspond to several IDCs:

<table>
<thead>
<tr>
<th>Content Codes</th>
<th>Corresponding IDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 117A</td>
<td>320, 321, 480, 488, 854</td>
</tr>
<tr>
<td>ID 117A</td>
<td>320, 321, 480, 488, 854</td>
</tr>
<tr>
<td>RF 117B</td>
<td>320, 321, 480, 488, 854</td>
</tr>
<tr>
<td>ID 117C</td>
<td>320, 321, 480, 488, 854</td>
</tr>
<tr>
<td>ID 217A</td>
<td>416</td>
</tr>
<tr>
<td>ID 217B</td>
<td>320</td>
</tr>
<tr>
<td>ID 217C</td>
<td>480, 481</td>
</tr>
<tr>
<td>ID 117B</td>
<td>320, 416, 480, 481</td>
</tr>
</tbody>
</table>

A description of each of the IDCs, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>Heavy Non-Special Source (SS) Metal</td>
</tr>
<tr>
<td>321</td>
<td>Lead</td>
</tr>
<tr>
<td>416</td>
<td>Zinc-Magnesium Alloy</td>
</tr>
<tr>
<td>480</td>
<td>Light Metal</td>
</tr>
<tr>
<td>481</td>
<td>Leached Light Non-SS Metal</td>
</tr>
<tr>
<td>488</td>
<td>Glovebox Parts with Lead</td>
</tr>
<tr>
<td>854</td>
<td>Beryllium</td>
</tr>
</tbody>
</table>

RF 117B and ID 117C are the experimental equivalents of RF 117A and ID 117A, and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally occurring salt added to the waste to simulate conditions after breaching of drums, boxes, and bins in the WIPP repository after closure. ID 217A, 217B, and 217C wastes were generated by the same processes that currently produce RF 117A and ID 117A;
however, ID 217A, ID 217B, and ID 217C were generated and placed in storage prior to the establishment of the WIPP Waste Acceptance Criteria (WAC). ID 117B is the experimental equivalent of ID 217A, ID 217B, and ID 217C.

3.12.1 General Process Knowledge - IDCs 320, 321, 416, 480, 481, 488, 854

Most of the metal waste which comes from routine processes is the light metal (IDC 480) or the heavy non-special source metal (IDC 320). Buildings 371, 374, 707, 771, 774, 776, 777, and 779 all generate metal waste.

Lead and glovebox parts with lead (IDCs 321 and 488 respectively) are usually only generated during strip-out activities. Strip-out has occurred in all of the buildings at one time or another, therefore they have all generated both of these waste forms. Additional metal waste (IDC 480) may also be generated from stripping out gloveboxes. Since these are not routine processes, these wastes are usually not documented on the flow diagrams. IDC 854, which consists of waste beryllium, was created for operations in Building 777.

The discarded metal waste is packaged and sent to a drum counter, where it is determined whether the waste is above the economic discard limit (EDL) and eligible for recovery. It also determines whether the waste is transuranic or low-level. The TRU and low-level waste goes to an approved storage area until offsite shipment is made.

The following flow diagrams (Figures 3.12 to 3.12-8) show the buildings and processes which may generate TRU metal waste.

Building 371 - Generation of Metal Waste

Building 371 generates both heavy metal (IDC 320) and light metal (IDC 480) waste (Figure 3.12-1). The heavy metal waste is a by-product of electrorefining, consisting mainly of discarded tungsten crucibles from furnaces, molds, baskets, and anode rods. The light metal waste is typically scrap metal, other equipment and metal containers generated from glovebox operations. Most of the light metal waste is above the discard limit and stored for future processing.

Building 374 - Generation of Metal Waste

Metal waste, typically process piping and machinery generated from repair and maintenance is discarded (Figure 3.12-2). This waste is most often low level and very rarely TRU. It is considered mixed waste because of hazardous chemicals that may flow in the process pipes.

Building 707 - Generation of Metal Wastes

Building 707 generates waste metals, IDC 480 (light metals) from the foundry, machining, assembly and inspection operations (Figure 3.12-3). Generally these wastes include metal scraps, metal containers, part carriers, etc., that originate from processes both in-line and outside the line.

Tantalum crucibles, funnels and rods used in the casting operations of the foundry which are to be discarded are first processed by heating the items in a "burn-box" to convert adhering plutonium metal to plutonium oxide. After cooling, the tantalum items are scraped...
and brushed off to recover the plutonium oxide. The discarded tantalum items are placed into the heavy metal drum, IDC 320, and sent to the drum counter.

These processes use the following hazardous chemicals: the machining and foundry areas use carbon tetrachloride, inspection uses small amounts of Freon-113 and carbon tetrachloride, and the assembly area uses 1,1,1-trichloroethane.

**Building 771 - Generation of Metal Waste**

Building 771 generates metal waste from the following processes (Figure 3.12-4):

- **Classified Line - Non-nuclear light metal generated during process.**
- **Process Chemistry Technology - Various metals such as tools, screws, and hot plates are occasionally removed from the glovebox.**
- **Residue Processing - Metal waste from cutting-up of used HEPA filters and other scrap metal.**
- **Chemical Operations Support Lab - Light metal wastes from processes in the lab.**
- **Plutonium Metallography - Metal waste from within the gloveboxes.**
- **Process Chemistry - Tools and other metal items used in the gloveboxes.**
- **Solvent Extraction, Precipitation and Calcining - Discarded tools used in the gloveboxes.**
- **Raschig Ring Changeout - Discarded tools used in changeout operations.**
- **Maintenance Machine Shop - Material used in machining parts for maintenance includes stainless steel and mild steel.**
- **Maintenance General Shop - Metal chips from metals used in maintenance includes stainless steel, mild steel and some leaded glass.**
- **Maintenance Line Strip Out - Metal piping from the strip out of glovebox lines.**

At the time of this waste stream documentation, Building 771 was under major renovation and strip-out activity was high.

**Building 774 - Generation of Metal Waste**

Building 774 generates contaminated pipe and metal waste from maintenance operations (Figure 3.12-5). This waste is rarely TRU and almost always low level.

**Building 776 - Generation of Metal Waste**

Metal chips from the stripping of lead and plasma-arc cutting of gloveboxes in the advanced size reduction facility are collected using a magnet (Figure 3.12-6).
Figure 3.12-1. Process Flow Diagram for Generation of Contact Handled Transuranic Metal Waste for Building 371 (Shipping Content Code 117, IDCs 320 and 480).
Figure 3.12-2. Process Flow Diagram for Generation of Contact Handled Transuranic Metal Waste for Building 374 (Shipping Content Code 117, IDCs 320, 321, 460 and 460).
Figure 3.12-3. Process Flow Diagram for the Generation of Contact Handled Transuranic Metal Waste for Building 707 (Shipping Content Code 117, IDCs 320 and 480).
Figure 3.12-4. Process Flow Diagram for the Generation of Contact Handled Transuranic Metal Waste for Building 771 (Shipping Content Code 117, IDCs 320, 321, 480, and 488).
Figure 3.12-5. Process Flow Diagram for the Generation of Contact Handled Transuranic Metal Waste for Building 774 (Shipping Content Code 117, IDCs 320, 321, 480 and 488).
Figure 3.12-6. Process Flow Diagram for the Generation of Contact Handled Transuranic Metal Waste for Building 776 (Shipping Content Code 117, IDCs 320, 321, 480, 488, and 854).
Since almost all of the gloveboxes come from other buildings in the plant, the metal waste generated from stripping gloveboxes, such as glovebox parts with lead (IDC 488) and glovebox iron parts (IDC 320), is not accounted for here, but is addressed in other sections.

Building 777 - Generation of Waste Metal

Building 777 operations primarily generate light metal (IDC 480) waste, and at times may generate a very small amount of beryllium chips (IDC 854) (Figure 3.12-7). To date, there are no TRU IDC 854 drums. The waste is described in more detail below:

- Disassembly - Line-generated metal chips may include stainless steel, aluminum, beryllium and tool steel from cutting operations. Non-line-generated metal chips, which may also include the materials listed above, are discarded separately from the line generated.
- Inspection - Nonfunctional or out-of-use gaging is bagged out of the gloveboxes and discarded.
- Metallurgical Operations - Various metal items and infrequently used small items such as discarded glovebox tools are removed from the glovebox. The waste is disposed in an area line-generated metal drum.
- Special Assembly - Very small amounts of aluminum and beryllium chips are generated inside the gloveboxes when special assembly is in operation.

Building 779 - Generation of Metal Waste

Building 779 typically generates light metal waste (IDC 480) from glovebox operations (Figure 3.12-8). More description on the waste streams is provided below:

- Physical Metallurgy - Following sample preparation, residual amounts of non-nuclear metal remain. Typical types of metal include stainless steel, aluminum (Al), titanium (Ti), chromium (Cr), yttrium (Y), erbium (Er), tantalum (Ta), and tungsten (W).
- Production Physical Chemistry - Metal waste of various composition is generated in several ways, including machining, sample transfer and broken parts removed from glovebox operations.
- Process Chemistry - Tantalum chemical stirrers are used for all processes. The stirrers are leached with hydrochloric acid to remove any residues before they are disposed of.
- Pyrochemistry Technology - Scrap metal including old or broken metal parts generated by normal laboratory processes.

For ID 217A, 217B, 217C, the processes outlined for the newly generated waste has not changed at Rocky Flats Plant over the lifetime of the plant. IDC 416 represents one drum in the inventory of zinc-magnesium (Zn-Mg) alloy. IDC 481 is currently inactive at RFP. The process flow diagrams for newly generated waste should be representative of retrievably stored waste at Idaho National Engineering Laboratory.
General waste process information for shipping content codes RF 117A, ID 117A, RF 117B, ID 117C, ID 217A, ID 217B, ID 217C, and ID 117B is contained in the following sections of the TRUCON document:

- RF 117A, RF 117B: Section 19

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.12.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.12.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 117A, ID 117A, RF 117B, ID 117C, ID 217A, ID 217B, ID 217C and ID 117B are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 117A, RF 117B: Section 8

The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.
Figure 3.12-7. Process Flow Diagram for the Generation of Contact Handled Transuranic Metal Waste for Building 777 (Content Code 117, IDCs 320, 321, 480, 488, and 854).
Figure 3.12-8. Process Flow Diagram for the Generation of Contact Handled Transuranic Metal Waste for Building 779 (Shipping Content Code 117, IDCs 320, 321, 480 and 488).
Note 1: The concentration of hazardous chemicals in RF 117A and RF 117B wastes corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste". A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.12.2.2 Chemical Compatibility of Wastes identified by RF 117, ID 117, and ID 217

The chemical compatibility of the wastes identified by shipping content codes RF 117A and RF 117B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 117A and RF 117B - pages 52 to 53 of Appendix 2.10.12
- Chemical list (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
- Assessment of chemical compatibility with RF 117A and RF 117B - pages 52 to 53 of Appendix 2.10.12
- Summary of potential incompatibilities with RF 117A and RF 117B - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 117A, RF 117B and other content codes at RFP - pages 59 and 60 of Appendix 2.10.12
- Summary of potential incompatibilities between RF 117A, RF 117B and other content codes at RFP - Table 4 of Appendix 2.10.12.

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 117A, ID 117A, ID 217A, ID 217B, and ID 217C, and their experimental equivalents RF 117B, ID 117C, and ID 117B, and any other potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.


The shipping content codes listed above are classified as hazardous because of the presence of VOCs and heavy metals. As listed in the TRU-Mixed Waste Characterization Database (Attachment E), the VOCs and heavy metals present in the wastes for the content codes RF 117A, ID 117A, RF 117B, and ID117C, and their Hazardous Waste Numbers, are:

IDC 480:

- F001 1,1,1-Trichloroethane
- F001 Carbon tetrachloride
- F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- F002 Dichloromethane (Methylene chloride)
- D008 Lead
IDCs 320, 321, and 488:

- D008 Lead

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

The hazardous constituents listed above, which appear in Attachment E, correspond to the RFP internal letter included as Attachment F, which identifies the hazardous constituents of RFP waste by Waste Form Number (WFN 117) and IDC. IDCs 320, 321, 480, 488 and 854 are discussed in Attachment F.

Content code ID 217A, corresponding to IDC 416, does not contain any hazardous constituents. The following hazardous wastes are reported for the other "older" (i.e., ID 217) content codes:

**IDC 320 (ID 217B):**
- 1,1,1-Trichloroethane
- 1,1,2-Trichloro-1,2,2-trifluoroethane
- Carbon tetrachloride
- Methylene chloride
- Lead

**IDC 481 (ID 217C):**
- 1,1,1-Trichloroethane
- 1,1,2-Trichloro-1,2,2-trifluoroethane
- Carbon tetrachloride
- Methylene chloride
- Lead

**IDC 480 (ID 217C):**
Same as IDC 481, as well as:
- Trichloroethylene
- Dichloroethane

(See Note 2 below.)

These wastes are also reported in the TRUPACT-II Chemical List (Attachment B).

**Note 2:** Trichloroethylene and dichloroethane, which are not reported in Attachment B, were detected in the headspace of IDC 480 and 320 drums - see Section 3.12.2.7.

**Note 3:** There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous wastes under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, beryllium is listed for IDCs 480 and 854.
Note 4: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

3.12.2.4 Drum Contents
Attachment G provides information on the physical contents (e.g., weight of metals, equipment, etc.) of drummed waste stored at INEL. The data is presented in spreadsheet format, sorted by drum IDCs. Information representative of the content codes in this summary is listed under IDCs 320, 480, and 481.


The following sampling and analysis data is available for wastes included in content codes RF 117A, ID 117A, RF 117B, ID 117C, ID 217A, ID 217B, ID 217C and ID 117B, and is discussed in sections 3.12.2.6 and 3.12.2.7:

- Headspace analyses of solid inorganics - TRUPACT-II Program
- Headspace analyses of solid inorganics - Clements and Kudera

In these sampling programs, results are reported in terms of IDCs, which correspond to the various content codes. Analyses conducted for wastes included in IDCs 320, 480, and 481 are representative of RF 117, ID 117, and ID 217.

3.12.2.6 Headspace Analyses of Solid Inorganics - TRUPACT-II Program
Attachment L contains headscape analyses of 22 drums from RFP that were analyzed in support of the TRUPACT-II program, including two analyses of IDC 480 drummed waste. One of the analyses of solid inorganics showed no VOCs in the headspace at a detection limit of 500 ppm. One drum showed 0.1 volume-percent for 1,1,1-trichloroethane.

Note 5: The analyses presented in Attachment L were performed by mass spectrometry. This analytical technique would have detected any other VOCs that might have been present, in addition to carbon tetrachloride, 1,1,1-trichloroethane, methylene chloride, and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113).

3.12.2.7 Headspace Analyses of Solid Inorganics - Clements and Kudera
The important waste characterization work performed by Clements and Kudera is described in "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. These analyses of headspace gases were conducted for IDCs 320, 480 and 481 in storage at INEL. The results for each of the three IDCs can be considered representative of the following content codes:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Content Codes Represented</th>
</tr>
</thead>
<tbody>
<tr>
<td>481</td>
<td>ID 217C and ID 117B</td>
</tr>
</tbody>
</table>
The following is a summary of the information in these two volumes that are representative of waste generated at RFP under these seven TRUPACT-II shipping content codes and three IDCs.

Table 4 of Attachment N contains the headspace analytical data from four IDC 320 drums, twenty-five IDC 480 drums, and five IDC 481 drums. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Trace levels of VOCs (1,1,1-trichloroethane, trichloroethylene, dichloroethylene, carbon tetrachloride, dichloromethane, freon, and 1,2-dichloroethane) were detected in several of the IDC 320, 480, and 481 drums analyzed. Overall concentrations of VOCs in the headspace of all the metal waste materials are very low.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during a meeting in Denver on October 11, 1989, attended by EPA, DOE, and their contractors.

3.13 RF 118, ID 118, and ID 218

Content codes RF 118A, ID 118A, RF 118B, ID 118C, ID 218A, ID 218B and ID 118B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 118A) and stored at the Idaho National Engineering Laboratory (ID 118A, ID 218A, and ID 218B). These content codes are classified as Waste Type II, Solid Inorganics. The content codes correspond to several IDCs:

<table>
<thead>
<tr>
<th>Content Codes</th>
<th>Corresponding IDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 118A</td>
<td>368, 370, 440, 442, 443, 444</td>
</tr>
<tr>
<td>ID 118A</td>
<td>368, 370, 440, 442, 443, 444</td>
</tr>
<tr>
<td>RF 118B</td>
<td>368, 370, 440, 442, 443, 444</td>
</tr>
<tr>
<td>ID 118C</td>
<td>368, 370, 440, 442, 443, 444</td>
</tr>
<tr>
<td>ID 218A</td>
<td>442</td>
</tr>
<tr>
<td>ID 218B</td>
<td>440, 442</td>
</tr>
<tr>
<td>ID 118B</td>
<td>440, 442</td>
</tr>
</tbody>
</table>

A description of each of the IDCs, as described in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>368</td>
<td>Magnesium Oxide Crucibles</td>
</tr>
<tr>
<td>370</td>
<td>Leco Crucibles</td>
</tr>
<tr>
<td>440</td>
<td>Glass</td>
</tr>
<tr>
<td>442</td>
<td>Leached Raschig Rings</td>
</tr>
<tr>
<td>443</td>
<td>Leached Raschig Rings (Solvent Residue)</td>
</tr>
<tr>
<td>444</td>
<td>Ground/Leaded Glass</td>
</tr>
</tbody>
</table>

RF 118B and ID 118C are the experimental equivalents of RF 118A and ID 118A, and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally occurring salt added to the wastes to simulate conditions after breaching of drums, boxes, and bins in the WIPP repository after closure. ID 218A and 218B were generated by the same processes that currently produce RF 118A and ID 118A; however, ID 218A and 218B are "older" waste forms that were generated and placed in retrievable storage...
prior to establishment of the WIPP Waste Acceptance Criteria (WAC). ID 118B is the experimental equivalent of ID 218A and ID 218B.

3.13.1 General Process Knowledge - IDCs 368, 370, 440, 442, 443, 444

The majority of the TRU glass waste consists of IDCs 440, 442, and 443 (glass, leached raschig rings and leached raschig rings with solvent residues, respectively). There is a very small quantity of crucibles (IDC 368 and 370) generated because the majority are sent to recovery operations. The ground leaded glass (IDC 444) may come from glovebox window covers or shielding for the tops of the gloveboxes, this IDC may also include fluorescent lights which contain small amounts of mercury. These wastes are rarely if ever transuranic. TRU glass wastes have routinely been generated from Buildings 371, 559, 707, 771, 777, and 779. See Figures 3.13-1 to 3.13-6 for more details on the glass waste streams from these buildings.

The discarded glass waste is packaged and sent to a drum counter, where it is determined whether the waste is above the economic discard limit (EDL) and eligible for recovery, or below the EDL and transuranic or low level. The TRU and low-level waste goes to an approved storage area until offsite shipment is made.

Building 371 - Generation of Glass Waste

Line-generated glass and raschig rings from glovebox operations (Figure 3.13-1).

Building 559 - Generation of Glass Waste

Building 559 generates glass waste from the following sources (Figure 3.13-2):

- Glass film plates used in omission spectroscopy.
- Glass bottles and pipes used in the distillation and titration processes in tritium analysis.
- Crucibles used for placing samples in the induction furnace in carbon analysis. Glass vials also used in the carbon analysis.
- Discarded glass pipettes, tubes and vials from the uranium analysis.
- New and used raschig rings from raschig ring analyses.
- Glass sample containers and miscellaneous lab glassware from non-routine chemical analysis.
- Glass fragments and broken pieces from glovebox cleaning.

Building 707 - Generation of Glass Wastes

Building 707 (Figure 3.13-3), generates three types of glass waste: discarded glass vials and glass wire mesh windows (IDC 440) and leached raschig rings, with solvent residue (IDC 443). The glass vials are used to retain plutonium casting samples until a sample analysis has been completed in the foundry. The glass wire mesh windows are positioned below the fluorescent lights in the gloveboxes.
Raschig rings, which are small rings of borosilicated glass used as a neutron poison in storage tanks which contain plutonium solution, are leached in whatever they have been used in and discarded. The tank of waste trichloroethylene from the assembly process and the tank of waste carbon tetrachloride/Freon-113/oil from the foundry, machining and inspection operations generates raschig rings during change-out.

Building 771 Generation of Glass Waste

Glass waste is generated from the following areas in Building 771 (Figure 3.13-4):

- Chemical Operations Support Lab - Glass sample containers and broken glassware are routinely discarded.
- Process Chemistry Technology - Occasionally glass chemistry equipment or glovebox windows break and the glass is discarded.
- Plutonium Metallography - Glass sample containers are occasionally discarded.
- Process Chemistry Lab - Waste glass is generated when chemistry glassware breaks in the line.
- Chemical Standards Support Lab - Broken glass from sample containers and lab glassware.
- Raschig Ring Change Out - Leached raschig rings are changed out periodically and discarded.
- Maintenance Line Strip Out - Glass and leaded glass from strip-out activities on gloveboxes.

Building 777 - Generation of Glass Waste

General glovebox glass waste is generated from special assembly, inspection, and metallurgical operations (Figure 3.13-5). The waste typically consists of glass vials, pipettes, etc.

Raschig rings used in the 1,1,1-trichloroethane tank from the assembly processes and from the oil/carbon tetrachloride/coolant tank are changed out on a routine basis.

Building 779 - Generation of Glass Waste

TRU glass waste may be generated from these processes in Building 779 (Figure 3.13-6):

- Production Physical Chemistry - A variety of glass wastes generated from several activities in this area.
- Process Chemistry - Discarded magnesium oxide from process area. This waste is most often eligible for recovery.
Figure 3.13-1. Process Flow Diagram for Generation of Contact Handled Transuranic Glass Waste for Building 371 (Shipping Content Code 118, IDCs 440 and 442.).
Figure 3.13-2. Process Flow Diagram for Generation of Contact Handled Transuranic Glass Waste for Building 559 (Shipping Content Code 118, IDCs 368, 440 and 442).
Figure 3.13-3. Process Flow Diagram for the Generation of Contact Handled Transuranic Glass Waste for Building 707 (Shipping Containers Code 118, IDCs 440 and 442).
Figure 3.13-4. Process Flow Diagram for the Generation of Contact Handled Transuranic Glass Waste for Building 771 (Shipping Content Code 118, IDCs 368, 370, 440, 442, 443, & 444).
Figure 3.13-5. Process Flow Diagram for the Generation of Contact Handled Transuranic Glass Waste for Building 777 (Shipping Content Code 118, IDCs 368, 370, 440, 442, 443, & 444).
Figure 3.13-6. Process Flow Diagram for the Generation of Contact Handled Transuranic Glass Waste for Building 779 (Shipping Content Code 118, IDCs 368, 370, 440, 442, 443, & 444).
• Pyrochemistry Technology - Glass waste which includes broken flasks and other glass containers generated by normal lab activities. Magnesium oxide ceramics are generated in the direct oxide reduction and electorefining processes. This waste is usually above the economic discard limit and eligible for recovery, but may at times be below the discard limit and therefore a TRU or low-level waste.

For content codes ID 218A and 218B the same IDCs are generated today as those in storage at Idaho National Engineering Laboratory. Therefore, the process flow diagrams for newly generated waste are applicable to the retrievably stored waste at INEL.

General waste process information for shipping content codes RF 118A, ID 118A, RF 118B, ID 118C, ID 218A, ID 218B and ID 118B is contained in the following sections of the TRUCON document:

- RF 118A, RF 118B: Section 19
- ID 118A, ID 118C, ID 218A, ID 218B, and ID 118B: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.12.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.13.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 118A, ID 118A, RF 118B, ID 118C, ID 218A, ID 218B and ID 118B are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List-Rev. 3, July 1989):
The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemical in RF 118A and RF 118B wastes corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste," issued by the Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.13.2.2 Chemical Compatibility of Wastes Identified by RF 118, ID 118, and ID 218

The chemical compatibility of the wastes identified by shipping content codes RF 118A and RF 118B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 118A and RF 118B - page 53 of Appendix 2.10.12
- Chemical list (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
- Assessment of chemical compatibility with RF 118A and RF 118B - page 53 of Appendix 2.10.12
- Summary of potential incompatibilities with RF 118A and RF 118B - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 118A and RF 118B and other content codes at RFP - pages 59 and 60 of Appendix 2.10.12
- Summary of potential incompatibilities between RF 118A, RF 118B, and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 118A, ID 118A, ID 218A, and 218B and their experimental equivalents RF 118B, ID 118C, and ID 118A, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.13.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 118A, ID 118A, RF 118B, ID 118C, ID 218A, ID 218B and ID 118B

The IDCs that correspond to shipping content codes RF 118A, ID 118A, RF 118B, ID 118C, ID 218A, ID 218B and ID 118B do not appear in the TRU Mixed Waste Characterization Database (Attachment E), which lists RCRA-regulated hazardous waste by IDC. Attachment F identifies the hazardous constituents (if any) of RFP waste by Waste Form Number (WFN
and IDCs. IDCs 368, 370, 440 and 442 are discussed in Attachment F; information on the first page of the letter indicates that none of these IDCs include TRU mixed waste.

Note 2: Attachment B (the TRUPACT-II Chemical List) contains the following chemicals which are not regulated as hazardous waste according to 40 CFR Part 261 Subparts C and D and therefore are not listed in Attachment E, or in Attachment F:

For content codes RF 118A, ID 118A, RF 118B and ID 118C:

**IDC 443:**
- 1,1,1-Trichloroethane
- 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- Carbon tetrachloride

**IDC 444:**
- Mercury
- Lead

For content codes ID 218A, ID 218B, and ID 118B:

**IDCs 440, 442:**
- 1,1,1-Trichloroethane
- Carbon tetrachloride
- Lead
- Methylene chloride (see Note 3)

Note 3: Methylene chloride, though not reported in Attachment B, was detected in the headspace of IDC 442 and 440 drums - see Section 3.13.2.7.

3.13.2.4 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of glass, sorbents, etc.) of drummed waste stored at INEL. The data is presented in spreadsheet format, sorted by IDCs. Information applicable to the content codes in this summary is listed under IDCs 440 and 442.

3.13.2.5 Sampling and Analysis Programs Applicable to RF 118A, ID 118A, RF 118B, ID 118C, ID 218A, ID 218B and ID 118B

The following sampling and analysis data is available for wastes included in content codes RF 118A, ID 118A, RF 118B, ID 118C, ID 218A, ID 218B and ID 118B, and is discussed in sections 3.13.2.6 to 3.13.2.7:

- Headspace analyses of solid inorganics - TRUPACT-II Program
- Headspace analyses of solid inorganics - Clements and Kudera

In a number of these programs, results are reported in terms of IDCs, which correspond to the various content codes. For the sampling programs listed above, analyses performed for IDCs 440 and 442 are representative of wastes included in the content codes discussed in this summary.
3.13.2.6 Headspace Analyses of Solid Inorganics - TRUPACT-II Program

Attachment L contains headspace analyses of 22 drums from RFP that were analyzed in support of the TRUPACT-II program, including one analysis of IDC 440 drummed waste and one analysis of IDC 442 drummed waste. The analysis for the IDC 442 drum of solid inorganics showed no VOCs in the headspace at a detection limit of 500 ppm. The analysis on the drum of IDC 440 waste showed 0.4 volume-percent for 1,1,1-trichloroethane.

Note 4: The analyses presented in Attachment L were performed by mass spectrometry. This analytical technique would have detected any other VOCs that might have been present, in addition to carbon tetrachloride, 1,1,1-trichloroethane, methylene chloride, and 1,1,2-trichloro-1,2,2-trifluoroethane (Freon-113).

Attachment M presents headspace analyses for several of the drums listed in Attachment L. In Attachment M, analytical results are presented for several layers of confinement (plastic bags) within each drum, and were performed to estimate "G" values (a measure of the rate of gas generation) for calculation of gas generation/consumption rates in drums of transuranic waste. The VOCs were analyzed to ascertain what percentage of drums might contain these compounds.

3.13.2.7 Headspace Analyses of Solid Inorganics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. These analyses of headspace gases were conducted for IDCs 440 and 442 in storage at INEL. The following is a summary of the Clements and Kudera information in these two volumes that are representative of waste generated at RFP (RF 118A and RF 118B) and stored at INEL (ID 118A, ID 118C, ID 218A, ID 218B, and ID 118B).

Table 5 from Attachment N contains the headspace analytical data from twelve IDC 440 drums and ten IDC 442 drums. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall concentrations of VOCs in the headspace of all the glass waste materials are low.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver on October 11, 1989, attended by EPA, DOE, and their contractors.

3.14 RF 119, ID 119 and ID 219

Content codes RF 119A, ID 119A, RF 119B, ID 119C, ID 219A and ID 119B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 119A) and stored at the Idaho National Engineering Laboratory (INEL) (ID 119A and ID 219A). These content codes are classified as Waste Type III, Solid Organics. The content codes correspond to several IDCs:
A description of each of the IDCs, as presented in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>335</td>
<td>Absolute Dry Box Filters</td>
</tr>
<tr>
<td>338</td>
<td>Filter Media</td>
</tr>
<tr>
<td>342</td>
<td>Absolute Dry Box Filters (acid residues)</td>
</tr>
<tr>
<td>376</td>
<td>Processed Filter Media</td>
</tr>
<tr>
<td>490</td>
<td>HEPA Filters</td>
</tr>
<tr>
<td>491</td>
<td>Plenum Prefilters</td>
</tr>
</tbody>
</table>

RF 119B and ID 119C are experimental equivalents of RF 119A and ID 119A, and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally occurring salt added to the waste to simulate conditions after breaching of drums, boxes, and bins in the WIPP repository after closure. ID 219A waste was generated and placed into retrievable storage prior to the establishment of the WIPP Waste Acceptance Criteria (WAC). However, it was generated by the same processes that currently produce new waste included in content codes RF 119A and ID 119A. The primary difference between the new waste (RF 119A and ID 119A) and the old waste (ID 219A) is in the method of solidification. ID 119B is the experimental equivalent of ID 219A.

3.14.1 General Process Knowledge - IDCs 335, 338, 342, 376, 490 and 491

Dry box filters with and without acid residues (IDCs 335 and 342) are routinely generated as TRU waste from glovebox operations in Buildings 371, 374, 559, 707, 771, 774, 776, 777 and 779. The dry box filters are a high efficiency particulate air (HEPA) filter used on the gloveboxes for filtering intake and exhaust air.

HEPA filters (IDC 490) are used on all building ventilation intake and exhaust systems. In the past, only the filters from the first stage of the four-stage exhaust system in plutonium processing areas were considered TRU waste and were segregated during processing from the second, third, and fourth stage filters. Presently all of the individual filters are assayed. Plenum prefilters (IDC 491) are positioned in front of HEPA filters on the same exhaust system. Changed-out HEPA filters and plenum prefilters can be generated as TRU waste from Buildings 371, 374, 559, 707, 771, 774, 776, 777, and 779. Because these filters are not wastes from particular processes in a building, but rather from the building itself, they are not included in the following flow diagrams.

Filter media (IDC 338) typically consists of a fiberglass material. The filter media is generated from splitting dry box filters and HEPA filters apart in the process areas.
FuI-FIo filters, which consist of polypropylene filter media, are used to remove particulates from liquid streams. Only those FuI-FIo filters from the Building 771 incineration process are generated as TRU waste. The FuI-FIo filters, dry box filters with acid residues and filter media are usually processed by adding dry Portland cement to the waste packages as a precautionary measure to neutralize any residual nitric acid and absorb any residual liquids that may be present in the waste. The processed filter media (IDC 376) consists of all these processed items.

Until recently, IDCs 338 and 342 were required to be mixed with dry Portland cement to neutralize acids and absorb residual liquid to become IDC 376 before they could be certified by the Waste Acceptance Criteria Certification Committee (WACCC). This is no longer a requirement of the WACCC for IDCs 338 and 342 and they will be shipped in the future under their own IDCs.

The filter waste is packaged and sent to a drum counter, where it is determined whether the waste is above the economic discard limit (EDL) and eligible for recovery, or below the EDL and transuranic or low level. The TRU and low-level waste is sent to an approved storage area until offsite shipment is made.

Building 371 - Generation of Filter Waste

Air plenum filters (IDC 491) from ventilation intake and exhaust systems for the building and dry box filters (IDC 335) from the gloveboxes are changed on a routine basis and discarded (Figure 3.14-1).

Building 559 - Generation of Filter Waste

Discarded dry box filters used on the gloveboxes in Building 559 lab operations are changed and discarded on a routine basis (Figure 3.14-2).

Building 707 - Generation of Filter Waste

Building 707 (Figure 3.14-3), typically generates two types of filter waste from the foundry, machining, and assembly operations; dry box filters (IDC 335) which are used at the gloveboxes for filtering intake and exhaust air and Ful-Flo filters which are used to remove particulates from liquid streams. The filters are composed of wood or particle board frames and a fiber glass-type media. On occasion, filter media (fiberglass) is generated from splitting filters apart in the process areas. Any loose particulate materials are dislodged from the filter during this process and disposed of separately.

The Ful-Flo filters are almost always eligible for recovery and are processed further. In all cases the Ful-Flo filters, filter media and dry box filters are mixed with Portland cement to neutralize any acids and absorb any residual liquids, before they are sent for storage.

Building 771 - Generation of Filter Waste

Filter waste is generated from several processes in Building 771 (Figure 3.14-4). Most of these wastes are filters from the gloveboxes (IDCs 335 and 342). In addition, Ful-Flo filters which are processed to IDC 376, HEPA filters (IDC 490) and plenum air filters (IDC 491) are also generated.
ROCKY FLATS PLANT
BUILDING 371
Pu RECOVERY

GENERAL
TO ALL PROCESSES

GLOVEBOX FILTERS & AIR
PLENUM FILTERS
(IDC 491)

DRUM COUNTER

BELOW EDL WASTE
TO APPROVED
STORAGE

Figure 3.14-1. Process Flow Diagram for Generation of Contact Handled Transuranic Filter Waste for Building 371 (Shipping Content Code 119, IDCs 335 and 491).
Figure 3.14-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Filter Waste for Building 559 (Shipping Content Code 119, IDC 335).
Figure 3.14-3. Process Flow Diagram for the Generation of Contact Handled Transuranic Filter Waste for Building 707 (Shipping Content Code 119, IDCs 335, 338, 376, 342, 490, & 491).
Figure 3.14-4. Process Flow Diagram for the Generation of Contact Handled Transuranic Filter Waste for Building 771 (Shipping Content Code 119, IDCs 335, 338, 342, 349, 376, & 491).
Building 774 - Generation of Filter Waste

Dry box filters from all gloveboxes in Building 774 (Figure 3.14-5) are routinely changed and discarded. These wastes are rarely TRU and almost always low level.

Building 776 - Generation of Filter Waste

Dry box filters, with and without acid residues (IDC 335 and 342) are generated from the following operations in Building 776 (Figure 3.14-6):

- Advanced Size Reduction - Dry box filters from the manipulator chamber in the advanced size reduction facility are replaced on a routine schedule or when filter integrity is lost.
- Size Reduction Vault - Dry box filters from the size reduction vault are replaced on a routine schedule or when filter integrity is lost.
- Fluid Bed Incinerator and Pilot Plant Incinerator - These processes are presently not operating, although from past operations, used dry box filters were generated as waste.

Filters exposed to acid (IDC 342) have dry Portland cement added to them in the drum.

Building 777 - Generation of Filter Waste

Dry box filters (IDC 335) and Ful-Flo filters are generated from glovebox processes in Building 777 (Figure 3.14-7). The Ful-Flo filters are above the EDL, and are eligible for recovery, but are not certifiable without processing. The dry box filters are used in all gloveboxes. They are changed out on a routine plant maintenance and operation schedule or when filter integrity is lost.

Building 779 - Generation of Filter Waste

Filter waste is generated from utilities, hydride operations, physical metallurgy, production physical chemistry, and pyrochemistry in Building 779 (Figure 3.14-8).

- Utilities - Batting paper filters (same as air plenum filters, IDC 491) used in the first stage of filtration of all air entering Building 779 removes the largest portion of particulate, lint and other airborne debris. The condition of the filters is checked every three months or as required. The filters are bagged and drummed upon removal. Dry box filters (IDC 335) used for glovebox exhaust filtering and hood exhaust filtering are changed out and disposed of. HEPA filters (IDC 490) used for building intake filtering and return filtering are also changed out and discarded.
- Hydride Operations - Dry box filters with acid residue (IDC 342) from the glovebox exhaust system are changed out in accordance to a preventive maintenance operation schedule or when filter integrity is lost.
- Physical Metallurgy - Dry box filters (IDC 335) used to filter glovebox exhaust are changed out in accordance to a preventive maintenance operation schedule or when filter integrity is lost.
• Production Physical Chemistry - Dry box filter (IDC 335) waste is generated by filtration of gaseous streams involved in research activity. Gas streams include argon (Ar), helium (He), oxygen (O₂), air, nitrogen (N₂), deuterium (D₂), hydrogen (H₂) or some mixtures required by a specific program. Dry box filters (IDC 342) resulting from the change out of glovebox exhaust filtering system.

• Pyrochemistry Technology - Dry box filters (IDC 342) used to vent vapors or dusts from processes in the gloveboxes are changed out periodically. The vapors result from the liquid processing of very small amounts of reagents. Typical reagents include HCl, KOH, HNO₃, NaOH, thionyl chloride, xylene, carbon tetrachloride, dichloromethane, acetone, ethanol, methanol, and other reagent alcohols.

For ID 219A, the same IDCs (335, 338 and 490) are still produced from the same processes, therefore, the process flow diagrams for newly generated waste are representative of waste stored at Idaho National Engineering Laboratory.

General waste process information for shipping content codes RF 119A, ID 119A, RF 119B, ID 119C, ID 219A, and ID 119B is contained in the following sections of the TRUCON document:

• RF 119A, RF 119B: Section 19
• ID 119A, ID 119C, ID 219A, ID 119B: Section 13

A TRUCON description includes the following information:

• Content Description
• Generating Site
• Waste Description
• Generating Sources
• Waste Form (Description)
• Assay (Method)
• Free Liquid (Methods of Control)
• Explosives/Compressed Gases (Methods of Control)
• Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
• Corrosives (Methods of Control)
• Chemical Compatibility (Within the Content Code)
• Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.14.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.14.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 119A, ID 119A, RF 119B, ID 119C, ID 219A and ID 119B are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):
Figure 3.14.5. Process Flow Diagram for the Generation of Contact Handled Transuranic Filter Waste for Building 774 (Shipping Content Code 119, IDCs 335, 338, 372, 376, 490 & 491).
Figure 3.14-6. Process Flow Diagram for the Generation of Contact Handled Transuranic Filter Waste for Building 776 (Shipping Content Code 119, IDCs 335 and 342).
Figure 3.14-7. Process Flow Diagram for the Generation of Contact Handled Transuranic Filter Waste for Building 777 (Shipping Content Code 119, IDCs 335, 338, 342, 376, 490, & 491).
• RF 119A, RF 119B: Section 8

• ID 119A, ID 119C, ID 219A, ID 219B: Section 2

The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals in RF 119A and RF 119B wastes corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste," issued by Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.14.2.2 Chemical Compatibility of Wastes Identified by Content Codes RF 119A, ID 119A, RF 119B, ID 119C, ID 219A, and ID 119B

The chemical compatibility of the wastes identified by shipping content codes RF 119A and RF 119B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

• General description of RF 119A and RF 119B - pages 54 to 55 of Appendix 2.10.12.

• Chemical list (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12.

• Assessment of chemical compatibility with RF 119A and RF 119B - pages 54 to 55 of Appendix 2.10.12.

• Summary of potential incompatibilities with RF 119A and RF 119B - Table 3 of Appendix 2.10.12.

• Assessment of chemical compatibility between RF 119A and RF 119B and other content codes at RFP - pages 59 and 60 of Appendix 2.10.12.

• Summary of potential incompatibilities between RF 119A, RF 119B, and other content codes at RFP - Table 4 - of Appendix 2.10.12.

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 119A, ID 119A, and ID 219A, and their experimental equivalents RF 119B, ID 119C, and ID 119B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes in the TRUCON.

The shipping content codes listed above are classified as hazardous waste because of the presence of volatile organic compounds in the waste. As listed the TRU Mixed Waste Characterization Database (Attachment E), the VOCs potentially present in the wastes for the content codes in this summary, and their Hazardous Waste Numbers, are:

IDCs 335, 338, 376, 490, 491:

- F001 1,1,1-Trichloroethane
- F001 Carbon tetrachloride
- F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- F002 Dichloromethane (Methylene chloride)

Note 2: IDC 342 does not contain any of the above RCRA-regulated hazardous constituents.

The F001 solvents are common degreasing compounds. These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

The hazardous constituents listed above, which appear in Attachment E, correspond to estimates included in Attachment F. Attachment F identifies the hazardous constituents of RFP waste by Waste Form Number (WFN 119) and IDC. IDCs 335, 338, 342, 376, 490, and 491 are discussed in Attachment F.

Note 3: Attachment F and Attachment B (the TRUPACT-II Chemical List) do not identify any hazardous chemicals that are not already listed above.

3.14.2.4 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of filters, sorbent, etc.) of drummed waste stored at INEL. The data is presented in spreadsheet format, sorted by IDCs. Information applicable to the content codes in this section is provided under IDCs 335, 338, 376, and 376.

3.14.2.5 Sampling and Analysis Programs Applicable to RF 119A, ID 119A, RF 119B, ID 119C, ID 219A and ID 119B

The following sampling and analysis data is available for wastes included in content codes RF 119A, ID 119A, RF 119B, ID 119C, ID 219A and ID 119B, and are discussed in Section 3.14.2.6:

- Headspace analyses of solid organics - Clements and Kudera

Analyses performed for IDCs 335, 338, and 376 are representative of wastes included in the above-listed content codes.
The important waste characterization work performed by Clements and Kudera is described in their "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. These analyses of headspace gases were conducted for IDCs 335, 338, and 376 in storage at INEL. The results for IDCs 335 and 338 can be considered representative of all six content codes discussed in this summary, and IDC 376 applies to RF 119A and ID 119A and their experimental equivalents (RF 119B and ID 119C).

The following is a summary of the information in these two volumes that are representative of waste generated at RFP under these six TRUPACT-II shipping content codes and three IDCs.

Tables 15 and 16 from Attachment N contain the headspace analytical data from one IDC 335 drum, two IDC 338 drums, and three IDC 376 drums. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall concentrations of VOCs in the headspace of all the filter waste materials are low.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver, on October 11, 1989, attended by EPA, DOE, and their contractors.

Content codes RF 121A, ID 121A, RF 121B, ID 121C, ID 221A and ID 121B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 121A) and stored at the Idaho National Engineering Laboratory (ID 121A and ID 221A). These content codes are classified as Waste Type III, Solid Organics, and correspond to the following IDCs:

<table>
<thead>
<tr>
<th>Content Codes</th>
<th>Corresponding IDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 121A</td>
<td>302, 374</td>
</tr>
<tr>
<td>ID 121A</td>
<td>302, 374</td>
</tr>
<tr>
<td>RF 121B</td>
<td>302, 374</td>
</tr>
<tr>
<td>ID 121C</td>
<td>302, 374</td>
</tr>
<tr>
<td>ID 221A</td>
<td>302, 464</td>
</tr>
<tr>
<td>ID 121B</td>
<td>302, 464</td>
</tr>
</tbody>
</table>

A description of each of the IDCs, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>302</td>
<td>Benelex and Plexiglas</td>
</tr>
<tr>
<td>374</td>
<td>Blacktop/Concrete/Dirt/Sand</td>
</tr>
<tr>
<td>464</td>
<td>Benelex and Plexiglas</td>
</tr>
</tbody>
</table>

RF 121B and ID 121C are experimental equivalents of RF 121A and ID 121A, and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally occurring salt added to the waste to simulate conditions after the breaching of drums, boxes, and bins in the WIPP repository after closure. ID 221A was generated by the same
processes that currently produce RF 121A and ID 121A; however, it was generated and placed in storage prior to the WIPP Waste Acceptance Criteria (WAC). ID 121B is the experimental equivalent of ID 221A.

3.15.1 **General Process Knowledge - IDC 302, 374**

Benelex and Plexiglas waste (IDC 302) is generated during strip-out operations. The Plexiglas is usually used for glovebox windows, which are replaced periodically. The Benelex is used as a neutron absorber inside the gloveboxes for added protection. This waste may be generated as TRU waste from Buildings 371, 374, 559, 707, 771, 774, 776, 777 and 779 sporadically and therefore process and building-specific information is not included. However, Building 707, the foundry facility, generates this waste on more of a routine schedule.

Dirt/concrete/soil (IDC 374) is generated as a TRU waste as a result of decontamination and decommissioning activities of the facilities and areas of Buildings 371, 374, 559, 707, 771, 774, 776, 777, and 779. Since IDC 374 waste is only generated on a periodic basis, flow diagrams are not included.

**Building 707 - Generation of Organic Solid Waste**

Building 707 (Figure 3.15-1) generates Plexiglas from four operations: foundry, assembly, machining and inspection. The waste Plexiglas is generated from glovebox window change-out. During operations, these windows become fogged and scratched and require replacement.

Benelex, which is used in gloveboxes of the machining, foundry, and assembly operations for added protection (it is a neutron absorber) is changed out and disposed.

The Benelex and Plexiglas are drummed and labeled IDC 302, and sent to the drum counter where a determination is made if the waste is eligible for recovery or sent to an approved storage for off-site shipment as either TRU or low-level waste.

For IDCs 302 and 374 the processes that generate the waste have not changed over time; therefore, the process flow diagram for the newly generated waste is applicable to waste that is retrievably stored at Idaho National Engineering Laboratory.

General waste process information for shipping content codes RF 121A, ID 121A, RF 121B, ID 121C, ID 221A and ID 121B is contained in the following sections of the TRUCON document:

- RF 121A, RF 121B: Section 19
- ID 121A, ID 121C, ID 221A, ID 121B: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
• Assay (Method)
• Free Liquid (Methods of Control)
• Explosives/Compressed Gases (Methods of Control)
• Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
• Corrosives (Methods of Control)
• Chemical Compatibility (Within the Content Code)
• Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.15.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.15.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 121A, ID 121A, RF 121B, ID 121C, ID 221A, and ID 121B are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

• RF 121A, RF 121B: Section 8
• ID 121A, ID 121C, ID 221A, ID 121B: Section 2

The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals in RF 121A and RF 121B wastes corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste," issued by the Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.15.2.2 Chemical Compatibility of Wastes Identified by Content Codes RF 121A, ID 121A, RF 121B, ID 121C, ID 221A, AND ID 121B

The chemical compatibility of the wastes identified by shipping content codes RF 121A and RF 121B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

• General description of RF 121A and RF 121B - page 55 of Appendix 2.10.12
• Chemical list (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
• Assessment of chemical compatibility with RF 121A and RF 121B - page 55 of Appendix 2.10.12
• Summary of potential incompatibilities with RF 121A and RF 121B - Table 3 of Appendix 2.10.12

• Assessment of chemical compatibility between RF 121A, RF 121B, and other content codes at RFP - pages 59 and 60 of Appendix 2.10.12

• Summary of potential incompatibilities between RF 121A, RF 121B, and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 121A, ID 121A, and ID 221A, their experimental equivalents RF 121B, ID 121C, and ID 121B, and any other potential incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.15.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 121A, ID 121A, RF 121B, ID 121C, ID 221A, and ID 121B

The shipping content codes listed above are classified as hazardous because of the presence of volatile organic compounds and heavy metals. As listed in the TRU-Mixed Waste Characterization Database (Attachment E), the VOCs potentially present in the wastes for the RF 121 content codes are:

**IDC 374:**
- F001 1,1,1-Trichloroethane
- F002 Methylene chloride

The VOCs and heavy metals for the ID 121 content codes are:

**IDC 374:**
- F001 1,1,1-Trichloroethane
- F001 Carbon tetrachloride
- F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)

The VOCs and heavy metals present for the ID 221 content codes are:

**IDCs 302, 464:**
- Lead
- 1,1,1-Trichloroethane

**IDC 302:**
- Trichloroethylene
- Carbon tetrachloride
(See Note 3.)
Figure 3.15-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Organic Solid Waste for Building 707 (Shipping Content Code 121, IDCs 302 & 374).
The F001 solvents are common degreasing compounds. These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

The hazardous wastes listed above, which appear in Attachment E, correspond to estimates in Attachment F. Attachment F for RF 121 identifies the hazardous constituents of RFP waste by Waste Form Number (WFN 121) and IDC. IDCs 302 and 374 are discussed in Attachment F.

Note 2: Attachment B (the TRUPACT-II Chemical List) does not contain any hazardous chemical constituent not listed in Attachment E for RF 121A, RF 121B, ID 121A and ID 121C.

Note 3: Although not reported in the TRUPACT-II Chemical List, 1,1,1-trichloroethane, carbon tetrachloride, and trichloroethylene were detected in the headspace of IDC 302 and 464 drums (see Section 3.15.2.6).

3.15.2.4 Drum Contents

Attachment G provides information on the physical contents of drummed waste stored at INEL. The data is presented in spreadsheet format, sorted by IDCs. Information applicable to the content codes in this summary is listed under IDCs 302, 374 and 464.

3.15.2.5 Sampling and Analysis Programs Applicable to RF 121A, ID 121A, and ID 221A.

The following sampling and analysis data is available for wastes included in content codes RF 121A, ID 121A, RF 121B, ID 121C, ID 221A and ID 121B, and is discussed in section 3.15.2.6:

- Headspace analyses of solid organics - Clements and Kudera

In the Clements and Kudera analyses, results are reported in terms of IDCs, which correspond to the various content codes. Analyses conducted for IDCs 302, 374, and 464 are representative of content codes RF 121, ID 121, and ID 221.

3.15.2.6 Headspace Analyses of Solid Organics - Clements and Kudera

The important work characterization performed by Clements and Kudera is described in their "TRU Waste Sampling Program: Volumes I and II". Both volumes are included as Attachments N and O. The following is a summary of the Clements and Kudera information in these two volumes of work that are representative of waste generated at RFP under content code RF 121A and stored at INEL under the content codes ID 121 and ID 221.

Table 12 from Attachment N contains the headspace analytical data from one IDC 464 drum and six IDC 302 drums. Table 9 contains data from one IDC 374 drum. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall concentrations of VOCs in the headspace of all the filter waste materials are low.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver, on October 11, 1989, attended by EPA, DOE, and their contractors.
3.16 RF 122, ID 122, and ID 222

Content codes RF 122A, ID 122A, RF 122B, ID 122C, ID 222A, ID 222B, and ID 122B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 122A) and stored at the Idaho National Engineering Laboratory (ID 122A, ID 222A, and ID 222B). These content codes are classified as Waste Type II, Solid Inorganics. The content codes correspond to several IDCs:

<table>
<thead>
<tr>
<th>Content Codes</th>
<th>Corresponding IDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 122A</td>
<td>371, 375, 377, 379, 438</td>
</tr>
<tr>
<td>ID 122A</td>
<td>371, 375, 377, 379, 438</td>
</tr>
<tr>
<td>RF 122B</td>
<td>371, 375, 377, 379, 438</td>
</tr>
<tr>
<td>ID 122C</td>
<td>371, 375, 377, 379, 438</td>
</tr>
<tr>
<td>ID 222A</td>
<td>370</td>
</tr>
<tr>
<td>ID 222B</td>
<td>371</td>
</tr>
<tr>
<td>ID 122B</td>
<td>370, 371</td>
</tr>
</tbody>
</table>

A description of each of the IDCs, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>370</td>
<td>Leco Crucibles</td>
</tr>
<tr>
<td>371</td>
<td>Firebrick</td>
</tr>
<tr>
<td>375</td>
<td>Oil-Dri</td>
</tr>
<tr>
<td>377</td>
<td>Firebrick, Coarse</td>
</tr>
<tr>
<td>379</td>
<td>Firebrick, Scarfed</td>
</tr>
<tr>
<td>438</td>
<td>Insulation (Including Fire Blankets)</td>
</tr>
</tbody>
</table>

RF 122B and ID 122C are the experimental equivalents of RF 122A and ID 122A and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally occurring salt added to the waste to simulate conditions after breaching of drums, boxes, and bins in the WIPP repository after closure. ID 222A and ID 222B were generated by the same processes that currently produce RF 122A and ID 122A; however, ID 222A and ID 222B are older waste forms that were generated and placed in storage prior to establishment of the WIPP Waste Acceptance Criteria (WAC). ID 122B is the experimental equivalent of ID 222A and ID 222B.

3.16.1 General Process Knowledge - IDCs 370, 371, 375, 377, 379, 438

Leco crucibles (IDC 370) are fired-ceramic, silicate-based crucibles used for analyzing plutonium samples. Leco crucibles contain accelerating metal (e.g. iron, tin, copper, titanium, stainless steel, etc.) used to calibrate the Leco Analyzer. Crucibles are used in Building 559.

Firebrick (IDC 371) is a high-density refractory clay insulating material. Firebrick becomes a TRU waste when plutonium process furnaces or incinerators are dismantled or repaired. Coarse firebrick (IDC 377) is waste from IDC 371 which is smaller than 1-inch in diameter and larger than 1/4 inch in diameter. Scarfed firebrick (IDC 377) has been cleaned by scarfing. These wastes are usually only generated from strip-out activities and have therefore not been documented as waste streams.
Oil-Dri (IDC 375) is an absorbent clay which is placed in waste packages with damp materials. Oil-Dri becomes a specific waste item when it is collected and packaged by itself. Since this waste form is not routinely generated from any specific building or process, it has not been documented on the flow diagrams.

Discarded insulation (IDC 438) usually refers to the insulating materials used in casting operations and possibly with furnaces. Building 707 has the only documented stream for this waste form. However, because this waste may not always be generated as the result of a routine process, it may come from other buildings. IDC 438 also includes discarded fireblankets.

All of the waste mentioned above could be generated as a TRU waste from Buildings 371, 374, 559, 707, 771, 774, 776, 777 and 779.

Building 707 - Generation of Inorganic Solids

Line-generated insulation (IDC 438) used in casting operations is generated from foundry operations in Building 707 (Figure 3.16-1).

IDCs 370 and 371 are still generated at the Rocky Flats Plant and the processes should be the same for the retrievably stored waste at Idaho National Engineering Laboratory. Therefore, the process flow diagrams are applicable.

General waste process information for shipping content codes RF 122A, ID 122A, RF 122B, ID 122C, ID 222A, ID 222B, and ID 122B is contained in the following sections of the TRUCON document:

- RF 122A, RF 122B: Section 19
- ID 122A, ID 122C, ID 222A, ID 222B, and ID 222B: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.
3.16.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.16.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 122A, ID 122B, ID 122B, ID 122C, ID 222A, ID 222B, and ID 122B are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 122A, RF 122B: Section 8
- ID 122B, ID 122C, ID 222A, ID 122B,
  and ID 222B: Section 2

The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals in RF 122A and RF 122B wastes corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste," issued by Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.16.2.2 Chemical Compatibility of Wastes Identified by RF 122, ID 122, and ID 222

The chemical compatibility of the wastes identified by shipping content codes RF 122A and RF 122B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 122A and RF 122B - pages 55 to 56 of Appendix 2.10.12
- Chemical list (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
- Assessment of chemical compatibility with RF 122A and RF 122B - pages 55 to 56 of Appendix 2.10.12
- Summary of potential incompatibilities with RF 122A and RF 122B - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 122A and RF 122B and other content codes at RFP - pages 59 and 60 of Appendix 2.10.12
- Summary of potential incompatibilities between RF 122A, RF 122B, and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.
Figure 3.16-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Solid Inorganic Waste for Building 707 (Shipping Content Code 122, IDC 438).
Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 122A, ID 122A, ID 222A, and ID 222B and the experimental equivalents RF 122A, ID 122C, and ID 122B and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.16.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in 122A, ID 122A, RF 122B, ID 122C, ID 222A, ID 122B, and ID 222B

In this series of shipping content codes and corresponding IDCs, only IDC 375 contains hazardous constituents. As listed in the TRU Mixed Waste Characterization Database, (Attachment E), the VOCs present in IDC 375 (RF 122A, ID 122A, RF 122B, and ID 122C) and their Hazardous Waste Numbers are:

- F001 1,1,1-Trichloroethane
- F001 Carbon tetrachloride
- F001 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- F002 Methylene chloride

The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

The hazardous wastes listed above, which appear in Attachment E, correspond to estimates in Attachment F, which identifies the hazardous constituents (if any) of RFP waste by Waste Form Number (WFN 122) and IDC. IDCs 370, 371, 375, 377, 379, and 438 are discussed in Attachment F; information on the first page of the attachment indicates that IDC 375 is the only TRU mixed IDC (i.e., the only IDC that contains RCRA-regulated hazardous chemicals).

Note 2: Although not reported in the TRUPACT-II Chemical List (Attachment B), the following VOCs were detected in the headspace of IDC 371 drums (see Section 3.16.2.6):

- 1,1,1-Trichloroethane
- Methylene chloride
- Trichloroethylene

3.16.2.4 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of solids, sorbents, etc.) of drummed waste stored at INEL. The data is presented in spreadsheet format, sorted by IDCs. Information applicable to the content codes in this summary is listed under IDCs 371 and 377.

3.16.2.5 Sampling and Analysis Programs Applicable to RF 122A, ID 122A, RF 122B, ID 122C, ID 222A, ID 122B and ID 222B

The following sampling and analysis data is available for wastes included in content codes RF 122A, ID 122A, RF 122B, ID 122C, ID 222A, ID 222B, and ID 122B and is discussed in Section 3.16.2.6:

- Headspace analyses of solid organics - Clements and Kudera
In the Clements and Kudera program, results are reported in terms of IDCs, which correspond to the various content codes.

### 3.16.2.6 Headspace Analyses of Solid Organics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in their "TRU Waste Sampling Program: Volumes I and II". Volumes I and II have been included as Attachments N and O. These analyses of headspace gases were conducted for IDCs 371 and 377 in storage at INEL. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP and stored at INEL under shipping content codes RF 122, ID 122, and ID 222.

Table 3 from Attachment N contains the headspace analytical data from seven IDC 371 drums and one IDC 377 drum. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Overall concentrations of VOCs in the headspace of all the concrete and brick waste materials is low.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver on October 11, 1989, attended by EPA, DOE, and their contractors.

### 13.17 RF 123, ID 123, and ID 223

Content codes RF 123A, ID 123A, RF 123B, ID 123C, ID 223A, and ID 123B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 123A) and stored the Idaho National Engineering Laboratory (ID 123A and ID 223A). These content codes are included in Waste Type III, Solid Organics, and correspond to the following IDCs:

<table>
<thead>
<tr>
<th>Content Codes</th>
<th>Corresponding IDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 123A</td>
<td>339</td>
</tr>
<tr>
<td>ID 123A</td>
<td>339</td>
</tr>
<tr>
<td>RF 123B</td>
<td>339</td>
</tr>
<tr>
<td>ID 123C</td>
<td>339</td>
</tr>
<tr>
<td>ID 223A</td>
<td>339, 463</td>
</tr>
<tr>
<td>ID 123B</td>
<td>339, 463</td>
</tr>
</tbody>
</table>

A description of each of the IDCs, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>339</td>
<td>Leaded Rubber Gloves and Aprons</td>
</tr>
<tr>
<td>463</td>
<td>Gloves, Drybox</td>
</tr>
</tbody>
</table>

RF 123B and ID 123C are the experimental equivalents of RF 123A and ID 123A, and will have bentonite (clay), steel mesh (to act as simulated corrosion of drums), and moist, naturally occurring salt added to the waste to simulate conditions after the breaching of drums, boxes, and bins in the WIPP repository after closure. ID 223A was generated by the same processes that currently produce RF 123A and ID 123A; however, it was generated and placed into storage prior to establishment of the WIPP Waste Acceptance Criteria (WAC). ID 123B is the experimental equivalent of ID 223A.
3.17.1 General Process Knowledge - IDC 339

Leaded rubber waste consists of leaded rubber gloves and aprons. The leaded rubber gloves are attached to the gloveboxes, changed out routinely and disposed in drums. Buildings 371, 559, 707, 771, 774, 776, 777 and 779 routinely generate TRU leaded rubber waste.

Changed-out gloves are packaged and sent to a drum counter, where it is determined whether the waste is above the economic discard limit (EDL) and eligible for recovery or below the EDL and transuranic or low level. The TRU and low-level waste is transferred to an approved storage area until it is shipped offsite. See Figures 3.17-1 to 3.17-8 for more details on individual waste streams.

Buildings 371, 559, 771, 774 - Generation of Lead Rubber Waste

Line-generated leaded gloves from the gloveboxes in Buildings 371, 559, 771, and 774 (Figures 3.17-1 to 3.17-4) are routinely changed out and discarded. Information on specific glovebox operations which generated leaded rubber waste is not available for these buildings.

Building 707 - Generation of Lead Rubber Waste

Leaded gloves (IDC 339) used on gloveboxes in Building 707 (Figure 3.17-5) foundry, machining, assembly, and inspection operations are replaced periodically and discarded.

Building 776 - Generation of Lead Rubber Waste

Glovebox gloves from the manipulator chamber in the advanced size reduction facility (Figure 3.17-6) are changed out on a routine schedule or when glove integrity is lost.

Building 777 - Generation of Lead Rubber Waste

Leaded rubber gloves from the gloveboxes (Figure 3.17-7) in metallurgical operations, parts assembly, disassembly, special assembly and inspection are changed on a periodic maintenance schedule or when glove integrity is lost. The gloves from inspection are reported to be separated from the other waste because they are most likely to be transuranic. The other streams are often low level.

Building 779 - Generation of Lead Rubber Waste

Lead-lined gloves from glovebox operations such as hydriding, physical metallurgy, pyrochemistry technology, and production physical chemistry are replaced routinely or when glove integrity is lost (Figure 3.17-8).

The use of leaded rubber gloves in glovebox procedures have not significantly changed in the Rocky Flats Plant. Figures 3.17-1 to 3.17-8 should be applicable to retrievably stored waste at Idaho National Engineering Laboratory.

General waste process information for shipping content codes RF 123A, ID 123A, RF 123B, ID 123C, ID 223A and ID 123B is contained in the following sections of the TRUCON document:

Master3A Rev. 3 3-83
• RF 123A, RF 123B: Section 19
• ID 123A, ID 123C, ID 223A, ID 123B: Section 13

A TRUCON description includes the following information:

• Content Description
• Generating Site
• Waste Description
• Generating Sources
• Waste Form (Description)
• Assay (Method)
• Free Liquid (Methods of Control)
• Explosives/Compressed Gases (Methods of Control)
• Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
• Corrosives (Methods of Control)
• Chemical Compatibility (Within the Content Code)
• Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.17.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.17.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 123A, ID 123A, RF 123B and ID 123C, ID 223A, and ID 123B are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

• RF 123A, RF 123B: Section 8
• ID 123A, ID 123C, ID 223A, ID 123B: Section 2

The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals in RF 123A and RF 123B wastes corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste" issued by the Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.
Figure 3.17-1. Process Flow Diagram for Generation of Contact Handled Transuranic Leaded Rubber Waste for Building 371 (Shipping Content Code 123, IDC 339).
Figure 3.17-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Leaded Rubber Waste for Building 559 (Shipping Content Code 123, IDC 339).
Figure 3.17-3. Process Flow Diagram for the Generation of Contact Handled Transuranic Leaded Rubber Waste for Building 771 (Shipping Content Code 123 , IDC 339).
Figure 3.17-4. Process Flow Diagram for the Generation of Contact Handled Transuranic Leaded Rubber Waste for Building 774 (Shipping Content Code 123, IDC 339).
Figure 3.17-5. Process Flow Diagram for the Generation of Contact Handled Transuranic Leaded Rubber Waste for Building 707 (Shipping Content Code 123, IDC 339).
Figure 3.17-6. Process Flow Diagram for the Generation of Contact Handled Transuranic Leaded Rubber Waste for Building 776 (Shipping Content Code 123, IDC 339).
Figure 3.17-7. Process Flow Diagram for the Generation of Contact Handled Transuranic Leaded Rubber Waste for Building 777 (Shipping Content Code 123, IDC 339).
Figure 3.17-8. Process Flow Diagram for the Generation of Contact Handled Transuranic Leaded Rubber Waste for Building 779 (Shipping Content Code 123, IDC 339).
3.17.2.2 Chemical Compatibility of Wastes Identified by RF 123, ID 123, and ID 223

The chemical compatibility of the wastes identified by shipping content codes RF 123A and RF 123B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 123A and RF 123B - page 56 of Appendix 2.10.12
- Chemical list (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
- Assessment of chemical compatibility with RF 123A and RF 123B - pages 56 to 57 of Appendix 2.10.12
- Summary of potential incompatibilities with RF 123A and RF 123B - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 123A and RF 123B and other content codes at RFP - pages 59 and 60 of Appendix 2.20.12
- Summary of potential incompatibilities between RF 123A, RF 123B, and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 123A, ID 123A, and ID 223A and their experimental equivalents RF 123B and ID 123C and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.17.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals 123A, ID 123A, RF 123B, ID 123C, ID 223A, and ID 123B

The shipping content codes listed above for leaded rubber waste are classified as hazardous because of the presence of lead. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the Hazardous Waste Number for lead is D008. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

The hazardous constituents information presented for these content codes corresponds to estimates in Attachment F, which identifies the hazardous constituents of RFP waste by Waste Form Number (WFN 123) and IDC. IDC 339 is discussed in Attachment F.

Note 2: Attachment F and Attachment B (the TRUPACT-II Chemical List) do not identify any chemicals besides lead as present in the waste.

3.17.2.4 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of gloves, cement, etc.) of drummed waste in retrievable storage at INEL. This data is presented in spreadsheet format, sorted by drum IDC. The information representative of the content codes in this summary is listed under IDC 339 in Attachment G.
3.17.2.5 Sampling and Analysis Programs Applicable to RF 123A, ID 123A, RF 123B, ID 123C, ID 223A, and ID 123B

The following sampling and analysis data is available for wastes included in content codes RF 123A, ID 123A, RF 123B, ID 123C, ID 223A, and ID 123B, and is discussed in section 3.17.2.6:

- Headspace analyses of solid organics - Clements and Kudera

In the Clements and Kudera sampling program, results are reported in terms of IDCs, which correspond to the various content codes. Analyses presented for IDC 339 is representative of the wastes included in content codes RF 123A, ID 123A, RF 123B, ID 123C, ID 223A, and ID 123B.

3.17.2.6 Headspace Analyses of Solid Organics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in their "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. These analyses of headspace gases were conducted for IDC 339 in storage at INEL. The following is a summary of information in these two volumes of work that are representative of waste generated at RFP and the equivalent waste in retrievable storage at INEL under the content codes RF 123, ID 123, and ID 223.

Table 11 from Attachment N contains the headspace analytical data from seven IDC 339 drums. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. Very low concentrations of 1,1,1-trichloroethane, carbon tetrachloride, methylene chloride, and trichloroethylene were detected in the headspace of several drums.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting in Denver on October 11, 1989, attended by EPA, DOE, and their contractors.

Attachment O contains gas generation data from two drums of IDC 339 solid organic waste. The drums were monitored for headspace gases (including VOCs) for 13 weeks in a vented condition, then sealed for 13 additional weeks and monitored for headspace gases. The figures and tables that represent data from IDC 339 are included on the following pages of Attachment O: A-51 to A-57, and B-78 to B-87.

3.18 RF 124, ID 124, and ID 224

Content codes RF 124A, ID 124A, and ID 224A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 124A) and stored at the Idaho National Engineering Laboratory (ID 124A and ID 224A). These content codes are classified as Waste Type II, Solid Inorganics. The content codes correspond to the following IDCs:

<table>
<thead>
<tr>
<th>Content Codes</th>
<th>Corresponding IDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 124A</td>
<td>411, 429, 433, 454</td>
</tr>
<tr>
<td>ID 124A</td>
<td>411, 429, 433, 454</td>
</tr>
<tr>
<td>ID 224A</td>
<td>410, 411, 412</td>
</tr>
</tbody>
</table>
A description of each of the IDCs, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>Molten salts</td>
</tr>
<tr>
<td>411</td>
<td>Electrorefining Salts</td>
</tr>
<tr>
<td>412</td>
<td>Gibson Salts</td>
</tr>
<tr>
<td>429</td>
<td>Molten Salt</td>
</tr>
<tr>
<td>433</td>
<td>Scrub Alloy Spent Dicesium Salt</td>
</tr>
<tr>
<td>454</td>
<td>Direct Oxide Reduction Salt</td>
</tr>
</tbody>
</table>

There are no experimental equivalents of these content codes.

3.18.1 General Process Knowledge - IDCs 410, 411, 412, 429, 433, and 454

The TRU waste salts consist of electrorefining salt (IDC 411), molten salts (IDC 429), direct oxide reduction salts (IDC 454), and cesium salts (IDC 433). The waste electrorefining salt was generated from the electrorefining process in Building 371; this process is currently not operating. The pyrochemistry technology group in Building 779 may generate all of the waste salts mentioned above, because of the research and development work conducted in this area. Building 776 has in the past generated the molten salts from the molten salt extraction process; however, cesium salts have replaced the molten salts because of higher efficiency. There have been no TRU cesium salts generated to date because they have been a low-level waste.

The discarded salts are drummed and sent to a drum counter, where it is determined whether the waste is eligible for recovery or, if measured, transuranic or low-level waste, and transferred to an approved storage until offsite shipment can be made. Flow diagrams are included for Buildings 371, 776 and 771.

**Building 371 - Generation of Pyrochemical Salts**

Salt residue is a product of the electrorefining process containing impurities and a small amount of radioactive materials (Figure 13.8-1).

**Building 776 - Generation of Pyrochemical Salts**

The molten salt extraction process in Building 371 (Figure 13.8-2) generates a dicesium hexachloro-plutonate (DCHP)/CaCl₂/PuCl₃/AmCl₂ waste salt (IDC 433). The salt is made in Building 771 and transferred to Building 776 for the extraction process. This particular salt has been reported to be very effective in the extraction process and therefore has only been generated as a low level waste to date. It has been included as a precautionary measure, in case it is transuranic in the future.

**Building 779 - Generation Pyrochemical Salts**

Waste salts including calcium chloride (CaCl₂), sodium chloride (NaCl), potassium chloride (KCl), manganese chloride (MnCl₂), and magnesium chloride (MgCl₂) are used in a plutonium cleaning process in Building 779 (Figure 13.18-3). Since this is an R&D group which develops new processes, all of the waste salts (IDCs 411, 429, 433, 454) can be generated from this area.
The pyrochemical salts at Idaho National Engineering Laboratory (IDCs 410 and 412) are inactive IDCs at the Rocky Flats Plant but were generated at Building 776 by the process chemistry and development group and are represented by the other current IDCs.

General waste process information for shipping content codes RF 124A, ID 124A and ID 224A is contained in the following sections of the TRUCON document:

- RF 124A: Section 19
- ID 124A, ID 224A: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

3.18.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.18.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 124A, ID 124A and ID 224A are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 124A: Section 8
- ID 124A, ID 124B: Section 2

The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals in RF 124A waste corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste," issued by Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.
Figure 3.18-1. Process Flow Diagram for Generation of Contact Handled Transuranic Pyrochemical Salt Waste for Building 371 (Shipping Content Code 124, IDC 411).
Figure 3.18-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Pyro-Chemical Salt Waste for Building 776 (Shipping Content Code 124, IDCs 411, 429, 433, & 454).
Figure 3.18-3. Process Flow Diagram for the Generation of Contact Handled Transuranic Pyrochemical Salt Waste for Building 779 (Shipping Content Code 124, IDCs 411, 429, 433, & 454).
3.18.2.2 Chemical Compatibility of Wastes Identified by RF 124, ID 124, and ID 224

The chemical compatibility of the wastes identified by shipping content code RF 124A is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 124A - page 57 of Appendix 2.10.12
- Chemical list (same as that in the TRUPACT-II Chemical List) for RF 124A - Table 2 of Appendix 2.10.12
- Assessment of chemical compatibility with RF 124A - page 57 of Appendix 2.10.12
- Summary of potential incompatibilities with RF 124A - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 124A and RF 124B and other content codes at RFP - pages 59 and 60 of Appendix 2.10.12
- Summary of potential incompatibilities between RF 124A, RF 124B, and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 124A, ID 124A, and ID 224A and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.18.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 124A, ID 124A and ID 224A

The IDCs that correspond to content codes RF 124A, ID 124A, and ID 224A do not appear in the TRU Mixed Waste Characterization Database (Attachment E), which lists RCRA-regulated hazardous constituents of the waste by IDC.

Also, there are no hazardous constituents listed in the TRUPACT-II Chemical List (Attachment B), nor in Attachment F, which identifies the hazardous constituents of RFP waste by Waste Form Number (WFN 124) and IDC.

3.18.2.4 Drum Contents

Attachment G provides information on the physical contents (e.g. quantity of salt) of drummed waste in retrievable storage at INEL. The data is presented in spreadsheet format, sorted by IDCs. Information that is representative of RF 124A, ID 124A, and ID 224A is included under IDCs 414 and 409.

Note 2: IDCs 414 and 409 are old IDCs that are no longer used. IDC 414 represents direct oxide reduction (DOR) salts; IDC 409 represents molten salts (30% unpulverized). IDC 414 is now processed into IDC 454, and IDC 409 is processed into 429.
3.18.2.5 Sampling and Analysis Programs Applicable to RF 124A, ID 124A, and ID 224A

The following sampling and analysis data is available for RF 124A, ID 124A, and ID 224A, and is discussed in section 3.18.2.6:

- Headspace analyses of solid inorganics - Clements and Kudera

In the Clements and Kudera sampling program, results are reported in terms of IDCs, which correspond to the various content codes. Analyses conducted for IDCs 409 and 414 are representative of the wastes included in RF 124A, ID 124A, and ID 224A.

3.18.2.6 Headspace Analyses of Solid Inorganics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. The information that is representative of waste generated at RFP under the content code RF 124A and stored at INEL under the content codes ID 124A and ID 224A is summarized below.

Table 10 of Attachment N presents gas sampling results from analyses of two IDC 409 and 1 IDC 414 drum. These IDCs are representative of the salt wastes included in content codes RF 124A, ID 124A, and ID 224A. Concentrations for 1,1,1-trichloroethane and other hydrocarbons are less than 1% by volume. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting held in Denver on October 11, 1989, and attended by EPA, DOE, and their contractors.

3.19 ID 225 and ID 125

Content codes ID 225A, ID 225B, and ID 125A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant and stored at Idaho National Engineering Laboratory. These content codes are classified as Waste Type III, Solid Organics. Content code ID 225A corresponds to IDC 241, americium process residues; content code ID 225B corresponds to IDC 441, unleached Raschig rings with oil residues. Content code ID 125A is the experimental equivalent of the two content codes; it includes both IDCs 241 and 441. As an experimental equivalent, ID 125A will have bentonite (clay), steel mesh, and naturally occurring salt added to the waste to simulate conditions in the WIPP repository after closure.

3.19.1 General Process Knowledge

IDC 241, americium process residues, was generated by Plutonium Recovery Operations (Building 771). The waste consists of piping, flanges, valves, tools, equipment, PVC piping, glassware, glass filters, polyethylene bottles, leaded glovebox gloves, paper, and plastics generated primarily from renovation of the americium recovery line. IDC 241 waste was shipped in 1972 and 1973 only, as part of the renovation. Because IDC 241 is no longer generated at RFP, there are no equivalent content codes at RFP. There are no process flow diagrams corresponding to IDC 241.
IDC 441 consists of unleached Raschig rings with oil residues, generated by the plutonium processing areas. IDC 441 wastes are generated by the same processes as IDC 442, included in content code RF 118; the only difference in the waste form is that the IDC 441 glass waste is unleached. Also, IDC 441 contains oil residue, which requires that it be included in the organic waste content code, ID 225. Content code RF 118 includes only inorganics. For process information and a corresponding process flow diagram, refer to Section 3.13 for RF 118.

General waste process information for shipping content codes ID 225A, ID 225B, and ID 125A is contained in Section 13 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

### 3.19.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

#### 3.19.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes ID 225A, ID 225B, and ID 125C are listed in Section 2 of Attachment B1 to Nu Pac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989).

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

#### 3.19.2.2 Chemical Compatibility of Wastes Identified by Content Codes ID 225A, ID 225B, and ID 125A

Attachment D contains an evaluation of potential chemical incompatibilities within content codes ID 225A and ID 225B, and the experimental equivalent ID 125A and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.
3.19.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in ID 225A, ID 225B, and ID 125A

Shipping content codes ID 225A and ID 125A wastes are classified as hazardous because of the presence of VOCs and heavy metals detected in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the VOCs and heavy metals potentially present in ID 225A and ID 125A, and their Hazardous Waste Numbers, are:

- F002 Methylene chloride
- F003 Xylene
- D008 Lead

Note 1: The hazardous constituents are listed in Attachment E for IDC 241 only.

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D.

Note 2: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional constituents are listed for ID 225B and ID 125A:

- 1,1,1-Trichloroethane
- Carbon tetrachloride

Though not reported in the TRUPACT-II Chemical List, trichloroethylene was detected in the headspace of IDC 441 waste drums (see Section 3.19.2.5).

Note 3: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

3.19.2.4 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of combustibles, sorbents, etc.) of drummed waste in retrievable storage at INEL. This data is presented in spreadsheet format, sorted by drum IDC. The information for IDC 241 is representative of ID 225A and ID 125A; the information for IDC 441 is representative of ID 225B and ID 125A.

3.19.2.5 Sampling and Analysis Programs Applicable to ID 225A, ID 225B, and ID 125A

The following sampling and analysis data is available for ID 225A, ID 225B, and ID 125A and is discussed in the remaining sections of this report:

- Headspace analyses of solid organics - Clements and Kudera
In the Clements and Kudera sampling program, results are reported in terms of IDCs, which correspond to the various content codes. For content codes ID 225A and ID 125A, analyses performed on IDC 241 are representative of these wastes and for ID 225B and ID 125A, analyses performed on IDC 441 are representative of these wastes.

3.19.2.6 Headspace Analyses of Solid Organics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Both volumes have been included as Attachments N and O. The following is a summary of the information in these two volumes of work that corresponds to waste generated at RFP and stored at INEL under the ID 225A (IDC 240), ID 225B (IDC 441), and ID 125A (IDCs 241 and 441) content codes.

Table 14 of Attachment N contains the headspace analytical data for one drum of IDC 241 waste, and Table 23 contains data for four drums of IDC 441 waste. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. No VOCs were detected in the headspace of the IDC 241 drum; however, trace (<1% by volume) levels of trichloroethylene, 1,1,1-trichloroethane, and carbon tetrachloride were detected in the IDC 441 drums.

Attachment O provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting held in Denver on October 11, 1989, attended by EPA, DOE, and their contractors.

3.20 RF 126, ID 126, and ID 226

Content codes RF 126A, ID 126A, RF 126B, ID 126C, ID 226A, and ID 126B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant and stored at Idaho National Engineering Laboratory. These content codes are classified as Waste Type III, Solid Organics. Each content code corresponds to the following IDCs:

<table>
<thead>
<tr>
<th>Content Code</th>
<th>Corresponding IDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 126A, RF 126B</td>
<td>809</td>
</tr>
<tr>
<td>ID 126A, ID 126C</td>
<td>806, 809, 822</td>
</tr>
<tr>
<td>ID 226A, ID 126B</td>
<td>432</td>
</tr>
</tbody>
</table>

A brief description of each content code, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>806</td>
<td>Solidified process solids</td>
</tr>
<tr>
<td>809</td>
<td>Cemented resin</td>
</tr>
<tr>
<td>432</td>
<td>Resin, leached and cemented</td>
</tr>
</tbody>
</table>

RF 126B and ID 126C are the experimental equivalents of RF 126A and ID 126A. ID 226A was generated by the same processes that currently produce RF 126A and ID 126A; however, it was generated and placed into retrievable storage prior to establishment of the WIPP Waste Acceptance Criteria (WAC). ID 126B is the experimental equivalent of ID 226A. As experimental equivalents, RF 126B, ID 126C, and ID 126B all have naturally occurring salt, steel mesh, and bentonite (clay) added to the payload containers for experimental purposes.
1: IDC 432 is an older IDC which is now cemented into IDC 809 or 822. IDC 432 waste may also be part of some IDC 806 waste; IDC 806 is undifferentiated between organic and inorganic process solids.

3.20.1 General Process Knowledge

General waste process information for shipping content codes RF 126A, ID 126A, RF 126B, ID 126C, ID 226A, and ID 126B, is contained in the following sections of the TRUCON document:

- RF 126A and RF 126B: Section 19
- ID 126A, 126C, 226A and 126B: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross index to previously used IDCs)

The TRUCON document has been included as Attachment A. For additional process information, refer to Section 3.7 (Building Descriptions for Buildings 771 and 371) and the accompanying flow diagram, and Section 3.8, Note 1, which discusses IDC 806.

3.20.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

3.20.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 126A, ID 126A, RF 126B, ID 126C, ID 226A, and ID 126B are listed in the following sections of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 126A and 126B: Section 8
- ID 126A, 126C, 226A, and 126B: Section 2

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.
3.20.2.2 Chemical Compatibility of Wastes Identified by Content Codes RF 126A, ID 126A, RF 126B, ID 126C, ID 226A, and ID 126B

The chemical compatibility of the wastes identified by shipping content code RF 126A and RF 126B is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 126A and RF 126B waste - Page 57 and 58 of Appendix 2.10.12
- Chemical list for RF 126A and RF 126B (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
- Assessment of chemical compatibility within RF 126A and RF 126B - Page 57 and 58 of Appendix 2.10.12
- Summary of potential incompatibilities within RF 126A and RF 126B - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 126A and RF 126B and other content codes at RFP - Pages 59 and 60 of Appendix 2.10.12.
- Summary of potential incompatibilities between RF 126A, RF 126B, and other content codes at RFP - Table 4 of Appendix 2.10.12.

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 126A, ID 126A, and ID 226A, and the experimental equivalents RF 126B, ID 126C, and ID 126B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

3.20.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 126, ID 126, and ID 226

The shipping content codes listed above are classified as hazardous because of the presence of VOCs and heavy metals detected in the waste. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the VOCs and heavy metals potentially present in these content codes, and their Hazardous Waste Numbers, are:

IDC 806:
- F001 1,1,1-Trichloroethane
- F001 Carbon tetrachloride
- F001 1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon-113)
- F002 Methylene chloride
- F003 Methanol
- F003 Butanol
- F003 Xylene
- D008 Lead
These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 2: Only IDC 806 is listed in Attachment E as having RCRA-regulated hazardous constituents present in the waste. Though not reported in Attachments E or B, the following VOCs were detected in the headspace of IDC 432 drums (see Section 3.20.2.5):

- 1,1,1-Trichloroethane
- Carbon tetrachloride
- Methylene chloride
- Trichloroethylene

Note 3: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

3.20.2.4 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of cement, etc.) of drummed waste in retrievable storage at INEL. This data is presented in spreadsheet format, sorted by drum IDC. In the spreadsheet, the information for IDC 432 is representative of RF 126, ID 126, and ID 226.

3.20.2.5 Headspace Analyses of Solid Organics - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in the document, "TRU Waste Sampling Program: Volumes I and II". Both volumes have been included as Attachments N and O. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP under the RF 126A and RF 126B content codes and stored at INEL under the ID 126A, ID 126C, ID 226A, and ID 126B content codes. For these content codes, analyses on IDC 432, an "older" IDC, is representative of the newer waste forms.

Table 13 of Attachment N contains the headspace analytical data for thirteen drums of IDC 432 waste. A copy of a LOTUS spreadsheet printout made from data entered from these tables, organized by IDC, has been included as Attachment P. The overall concentrations of VOCs in the headspace of the drums are low.

Attachment Q provides a summary of the drum headspace analyses for VOCs. This data was presented during an NMVP meeting held in Denver on October 11, 1989, attended by EPA, DOE, and their contractors.

3.21 RF 127A AND ID 127A

Content codes RF 127A, ID 127A, and ID 127B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated at the Rocky Flats Plant (RF 127A) and stored at Idaho National Engineering Laboratory (ID 127A). These content codes are classified as the Waste Type I, Solidified Aqueous and
Homogeneous Inorganic Solids. These content codes represent an experimental mixture of a number of different content codes, listed below:

<table>
<thead>
<tr>
<th>Experimental Content Code</th>
<th>Content Code Mixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF 127A</td>
<td>RF 111A, RF 116A, RF 119A, RF 121A, and RF 123A</td>
</tr>
<tr>
<td>ID 127A</td>
<td>ID 111A, ID 116A, ID 119A, ID 121A, and ID 123A</td>
</tr>
<tr>
<td>ID 127B</td>
<td>ID 211A, ID 216A, ID 219A, ID 221A, ID 223A, and ID 225A</td>
</tr>
</tbody>
</table>

The waste included in content codes RF 127A, ID 127A, and ID 127B is described in the TRUCON as combined solid organics and solidified inorganics, consisting of paper, rags, cloth, coveralls, plastic, rubber, wood, small quantities of metals (iron, copper, stainless steel, aluminum, tungsten, lead, and tantalum), glass and ceramic waste. The waste will also include aqueous effluent from uranium and plutonium processing activities, treated in Buildings 374 and 774 at RFP, which is solidified by mixing the wet sludge with 30% Portland cement. ID 127B will additionally have naturally occurring salt, clay (bentonite), and steel added to the payload containers for experimental purposes.

3.21.1 General Process Knowledge

General waste process information for shipping content codes RF 127A, ID 127A and ID 127B is contained in the following sections of the TRUCON document:

- RF 127A: Section 19
- ID 127A and 127B: Section 13

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross index to previously used IDCs)

The TRUCON document has been included as Attachment A.

For additional process information on the content codes (and their corresponding IDCs) included in RF 127A, ID 127A, and ID 127B, the reader is referred to the appropriate sections for those content codes.
3.21.2 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes RF 127A, ID 127A and ID 127B are listed in the following sections of Attachment B1 to Nu Pac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

- RF 127A: Section 8
- ID 127A and 127B: Section 2

A copy of the complete TRUPACT-II Chemical List is provided as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, though not necessarily in every drum or box of the waste.

Note 1: The concentration of hazardous chemicals, listed in Attachment B, in RF 127A wastes corresponds to the estimates in the internal letter, "Hazardous Constituents of Rocky Flats Transuranic Waste" issued by Rocky Flats Plant. A copy of the letter, dated May 23, 1989, is included as Attachment F.

3.21.3 Chemical Compatibility of Wastes Identified by Content Codes RF 127A, ID 127A, and ID 127B

The chemical compatibility of the wastes identified by shipping content code RF 127A is described in the TRUPACT-II Safety Analysis Report (SAR) on the following pages:

- General description of RF 127A waste - Pages 58 and 59 of Appendix 2.10.12
- Chemical list for RF 127A (same as that in the TRUPACT-II Chemical List) - Table 2 of Appendix 2.10.12
- Assessment of chemical compatibility within RF 127A - Pages 58 and 59 of Appendix 2.10.12
- Summary of potential incompatibilities within RF 127A - Table 3 of Appendix 2.10.12
- Assessment of chemical compatibility between RF 127A and other content codes at RFP - Pages 59 and 60 of Appendix 2.10.12
- Summary of potential incompatibilities between RF 127A and other content codes at RFP - Table 4 of Appendix 2.10.12

A copy of Appendix 2.10.12 of the TRUPACT-II SAR is included as Attachment C.

Attachment D contains an evaluation of potential chemical incompatibilities within content codes RF 127A and ID 127A and the experimental equivalents, ID 127B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.
3.21.4 Occurrence of RCRA-Regulated Hazardous Chemicals in RF 127A, ID 127A, and ID 127B

Shipping content codes RF 127A, ID 127A, and ID 127B wastes are classified as hazardous because of the presence of volatile organic compounds and heavy metals detected in the waste. Hazardous constituents of the wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D. For information on the hazardous constituents contained by RF 127A, ID 127A and ID 127B, refer to the sections which discuss the following content codes:

- RF 111A, ID 111A
- ID 211A
- RF 116A, ID 116A and ID 216A
- RF 119A, ID 119A and ID 219A
- RF 121A, ID 121C and ID 221A
- RF 123A, ID 123A and ID 221A
- ID 225A

The hazardous constituents for the content codes listed above, which appear in Attachment E, correspond to the estimates in Attachment F, which identifies the hazardous constituents of RFP waste by Waste Form Number (WFN) and IDC.

Note 4: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents identified in Appendix VIII of 40 CFR Part 261.

3.21.5 Drum Contents

Attachment G provides information on the physical contents (e.g., weight of sludge, cement, etc.) of drummed waste in retrievable storage at INEL. This data is presented in spreadsheet format, sorted by drum IDC.

3.21.6 Sampling and Analysis Programs Applicable to RF 127A, ID 127A, and ID 127B

The sampling and analysis data representative of the content codes included in RF 127A, ID 127A and ID 127B is discussed in the sections for those content codes. The sampling and analysis data includes:

- Total sludge analyses
- Total metals analyses
- TCLP sludge analyses
- Leachable metal (EP toxicity) data for inorganic aqueous liquids
- Headspace analyses - TRUPACT-II Program
- Headspace analyses - Clements and Kudera

In a number of these programs, results are reported in terms of IDCs, which correspond to the various content codes. Within the IDC designation, some older IDCs are equivalent to the IDCs of newly generated wastes. Again, the reader is referred to the sections for the appropriate content codes (listed in section 3.21.4) for sampling and analysis information.
3.22 BUILDING AND PROCESS DESCRIPTIONS

3.22.1 Building 371 - Plutonium Recovery

Building 371 was originally planned to be a plutonium recovery facility. The main purpose of the operation was to recover plutonium from plutonium-bearing materials by electorefining. Support operations included residue processing, caustic exhaust scrubbing, shipping and receiving, and maintenance activities. Most of the processes that were formerly operating in this building have been shut down. The only operation presently active is the production of pyrochemical salts, which are transferred to Building 776 and used as a reagent in the molten salt extraction process. The only wastes currently being generated are those from building maintenance. The waste stream description and flow diagrams in Sections 3.1 through 3.21 may include information on processes and waste streams that are no longer active. These are provided because these wastes have been produced in the past and are in the TRU waste inventory at INEL.

Processes identified for this building are:

1. Electrorefining
2. Caustic Treatment
3. Residue Processing
4. Shipping and Receiving
5. Maintenance to Machine Shops
6. General to All Processes

(1) Electrorefining. Electrorefining techniques are used to refine impure plutonium metal delivered to or generated at Rocky Flats. The material is cut up, put in crucibles, and converted to a molten state in an enclosed furnace. Salts are used to extract impurities in the molten state. (This process is not currently operating).

(2) Caustic Treatment. Caustic solutions are used for scrubbing acidic exhaust fumes generated from gloveboxes and process equipment, and as a seal solution in a vacuum pump system. The caustic treatment process is used to recover plutonium from these caustic solutions. (This process is operating on a limited basis).

(3) Residue Processing. Residues from plutonium recovery processes are immobilized in cement in preparation for shipment. Residues may include Building 771 incinerator sludge, residue heels (sand, slag, and crucible), and spent ion exchange resins. (This process is currently under RCRA closure).

(4) Shipping and Receiving. Shipments of materials into and out of Building 371 are introduced in and out of the glovebox system. Also, waste packages that do not meet packing criteria are repackaged.

(5) Maintenance Machine Shops. Maintenance operations have several satellite machine shops located in buildings other than the main shop areas. Although the machine shop is not actually a part of the mainstream operation of Building 371, it is a daily part of their production activities.

(6) General to All Processes. Air plenum and HEPA filters are changed on a routine schedule. They are first bagged inside an airlock, outer bagged outside the airlock, and boxed in their original boxes; then sent to the drum counter prior to size reduction.
3.22.2 Building 374 - Liquid Waste Treatment Facility

Building 374 is a liquid waste treatment facility. It presently treats aqueous wastes from the following buildings: 122, 123, 443, 444, 460, 559, 707, 776, 778, 865, 881, and 883. Aqueous wastes received from these locations are piped directly into Building 374. Building 374 also receives non-pipeline aqueous wastes from Buildings 334, 440, 444, 460, and 881, and other buildings as necessary. Non-pipeline wastes include those wastes received in drums, containers, or other types of packaging. Building 374 has the capability to treat the process acidic aqueous wastes, basic aqueous wastes and liquid wastes with low levels of radioactivity.

Building 374 processing equipment removes radioactive and chemical contaminants from aqueous process effluents collected from operations throughout the plant. These effluents are converted into reusable distilled water, disposable solid residues, and exhaust gases. The distilled water is transferred to boilers and cooling towers. The solid residues are immobilized, tested for radioactivity, and properly packaged for offsite disposal. The exhaust gases are continuously filtered, sampled, and subsequently vented to the atmosphere.

Plant aqueous process wastes containing chemical and/or radioactive contaminants are received through the plant waste collection pipeline or by portable tankage at Building 374. These waste streams are divided into two general categories: 1) treatable waste, which may or may not be TRU waste, and 2) desaltable waste, which is never a CH TRU waste, and always low level.

Treatable waste is defined as an aqueous liquid containing radioactive contaminants above the limit (13,500 picuries per liter [pCi/l]) established for direct introduction into the evaporation process. Also included in this category are acid wastes (even though they may be below the 13,500 pCi/l limit) because neutralization, precipitation, and filtration of the waste are necessary prior to the evaporation process. Desaltable waste is defined as an aqueous liquid in which the radioactive contaminant is below the limit (13,500 pCi/l) established for direct introduction into the evaporation process.

Processes identified for this building are:

1. Evaporation (Desaltable waste)
2. Radioactive Decontamination (Treatable waste)
3. Sludge Treatment (Treatable waste)
4. Operation and Maintenance

(1) Evaporation. The evaporation process receives waste water that does not require chemical treatment and effluents from radioactive decontamination (Process 2). The evaporation process consists of four stages of evaporation resulting in the production of a concentrated salt solution. The evaporator effluent condensate goes to facility utilities. The concentrated salt solution is sent to a spray dryer, where a dry salt is produced and the process water is exhausted to the atmosphere through HEPA filters. The dry salt is mixed with salt concentrate and cement and solidified in tri-walled fiberboard cartons. This waste is always low level.
(2) **Radioactive Decontamination (Coprecipitation process).** This is a three-stage process involving the addition of caustics, precipitation, floculation, and clarification. This process receives waste from a number of sources. (More information on specific sources is provided in the discussion and flow diagrams for RF 111, IDCs 803 and 807). The radionuclides are precipitated and produce a floc that settles out in the clarifiers. The clarifier sludge is pumped to the rotary drum filter in the sludge treatment (Process 3). The clarifier overflow is filtered, and the filtrate is tested for radioactive contamination. Radioactive water is returned to the third stage of the process for re-treatment. Non-contaminated water enters the evaporator feed tank in evaporation (Process 1). When the filter is backwashed, the backwash water is sent to sludge treatment (Process 3). All effluent streams leaving the coprecipitation process are input into either evaporation or sludge treatment (Processes 1 and 3).

(3) **Sludge Treatment.** Acidic wastes entering Building 374 are neutralized with sodium hydroxide. The neutralized acid waste is combined with the sludge generated in coprecipitation and sent through a rotary drum filter, then to a sludge dryer, and finally solidified with cement in drums and sent as TRU waste to drum counting (assay), and then to Building 684. Air from the sludge dryer, as well as exhaust air from gloveboxes and tanks, is sent to a wet scrubber, then through a HEPA filter, and finally vented to the atmosphere. Scrubber washwater is sent back to Process 2 for precipitation, as is water removed from the sludge in the rotary drum filter. For more information and flow diagrams for the coprecipitation and sludge treatment processes the reader is referred to RF 111, IDCs 803 and 807.

(4) **Operation and Maintenance.** Routine operation and maintenance in Building 374 generates a variety of waste products, which are segregated by waste type and collected in drums. The drums are labeled metal waste, glass, soft waste, or filters. Soft waste includes such items as kimwipes, plastic containers and bags, and disposable clothing such as coveralls and plastic gloves.

### 3.22.3 Building 559 - Plutonium Analytical Laboratory

Building 559 houses labs which perform plutonium analyses and special analyses which are requested by various groups in the Perimeter Security Zone (PSZ). Most of these analyses are performed in gloveboxes.

Processes identified for this building are:

1. Sample Receiving
2. Sample Cutting
3. Bag-in and Bag-out
4. Emission Spectroscopy
5. Atomic Absorption
6. Infrared Analysis
7. Gallium Analysis
8. Plutonium Assay
9. Carbon Analysis
10. Uranium Analysis
11. Raschig Ring Analysis
12. Tritium Analysis
13. Oxide Burn
14. Non-Routine Chemical Analysis
(15) Anion/Cation Solution Analysis
(16) Isotopic Analysis
(17) X-Ray Analysis
(18) Thermal Analysis
(19) Gas Analysis
(20) Spark Source Mass Spectroscopy
(21) A-Box Cleaning
(22) In-Line Bag Out
(23) Utilities
(24) Laboratories Glassware Wash

(1) **Sample Receiving.** Samples sent to Building 559 for requested analyses are brought into the building, checked, and then distributed.

(2) **Sample Cutting.** Solid samples received in the Building 559 labs are sent to the sample cutting lines for cleaning, filing, and cutting to standard size before distribution for analyses. Samples come from all over the Perimeter Security Zone and may include metal coupons, turnings, oxides, plutonium fluoride, and molten salt.

(3) **Bag-In and Bag-Out.** Line combustibles consist of contaminated surgical gloves, rags, kimwipes, plastics, and paper generated from processes conducted inside gloveboxes. Most combustible waste results from bag-in and bag-out procedures. Line combustibles are disposed to the room combustible waste drum following bag-out from gloveboxes.

(4) **Emission Spectroscopy.** Emission spectroscopy is used for elemental analysis of various samples. The technique aids in the determination of rare earth metals and impurities in various metal sample and oxides. This process consists of two stages. Stage 1, Inductively Coupled Plasma (ICP), involves extraction by dissolving metal samples in acid and drying them in an oven to a low-density oxide. Stage 2, Direct Reading Spectroscopy, involves mixing sodium fluoride with the oxide, then packing the mixture into a graphite electrode that is fired with an arc.

(5) **Atomic Absorption.** A flame atomic absorption unit is used for analysis of metals, oxides, and products such as gloveboxes and plastics.

(6) **Infrared Analysis.** Solvent and organic waste is generated from infrared analysis. The waste is put into four liter polyethylene jugs and sampled prior to removal from the glove boxes. The samples are sent to non-destructive assay (NDA) for determination of the activity level.

(7) **Gallium Analysis.** The samples for this analysis are prepared by dissolution and extraction before being exposed to a spectrophotometer. The spectrophotometer measures absorbance of gallium by comparison to an iron standard with an iron interference correction factor. Other analyses are accomplished by x-ray fluorescence radiation.

(8) **Plutonium Assay.** Plutonium assay analysis may be performed on plutonium metal, uranium metal, or uranium oxide. The assay is performed by dissolving a metal or oxide sample in specific acid mixes, then causing elemental reduction using a titanium (III) solution. For plutonium metal samples, reduction is followed by autotitration with ceric ammonium nitrate. Results give elemental proportions of the sample. Acids used include hydrochloric for plutonium, and nitric and sulfuric for uranium.
(9) **Carbon Analysis.** Samples of plutonium slag are placed in crucibles in a furnace, and the combustion product is measured with an infrared detector to obtain percent carbon in the sample.

(10) **Uranium Analysis.** Uranium solution is separated from other metals by liquid-liquid extraction using an organic solvent. The uranium is then reduced and stripped from the organic phase with an acid. The resulting uranium in solution is then exposed to a laser fluorometer to detect and measure uranium fluorescence.

(11) **Raschig Ring Analysis.** New and used rasching rings are exposed to five tests for compliance and integrity analysis. The tests include: 1) dimensional with a gauge block; 2) neutron absorption using a neutron counter; 3) chemical resistance by heating and cooling; 4) density testing (performed by Building 444 Non-Destructive Testing [NDT]); and 5) mechanical resistance by tumble test. Additional information is obtained by physical appearance and atomic absorption testing for boron content.

(12) **Tritium Analyses.** Samples of oxides, smears, liquids, oils, and metals undergo heating or dissolution and distillation for tritium liquid scintillation counting.

(13) **Oxide Burn.** Metal from turnings, buttons, and oxides are burned and re-burned on a hot plate for recovery purposes. Resulting burnt oxides are then packaged and sent to Building 771 calorimeter to measure plutonium content. Further recovery or disposal depends on the measured plutonium or uranium content of the oxide.

(14) **Non-Routine Chemical Analysis.** Non-routine chemical analyses may include: silicon in plutonium metal; determination of carbon, hydrogen, and nitrogen in plutonium bearing and non-plutonium bearing samples; controlled potential coulommbetric titration analyses, and ion exchange separation of metals. Determination of silicon in plutonium metal involves taking silicon into solution with hydrochloric, nitric, and hydrofluoric acids and analyzing with a spectrophotometer.

Determination of carbon, hydrogen, and nitrogen in plutonium-bearing and non-plutonium bearing samples is made by combusting a sample in the presence of an oxidizing catalyst, separating components on a gas chromatographic column, and passing them through a thermal conductivity detector.

Controlled potential coulommbetric titrations are performed on uranium, plutonium, and neptunium.

Ion exchange separation is used to separate neptunium from neptunium-plutonium or neptunium-uranium-plutonium alloys.

(15) **Anion/Cation Solution Analysis.** Anion/cation ratios in samples are determined by ion chromatography.

(16) **Isotopic Analysis.** Salvageable metal samples from mass spectrometer analyses are placed in stainless steel cans before bag out.

(17) **X-Ray Analysis.** Freon is used to clean metal samples before analysis.
(18) **Thermal Analysis.** Samples of metals, oxides, liquids, or commercial products are placed on a micro balance and heated to measure for endothermic, exothermic, or weight changes in the sample.

(19) **Gas Analysis.** Oil from the vacuum pump on the mass spectrometer is drained and put in a poly bottle. It is then sampled and analyzed before further disposal.

(20) **Spark Source Mass Spectroscopy.** Mass spectroscopy is used to determine the composition of metal samples. The spectrometer utilizes induced sparks from a graphite electrode to achieve the analysis.

(21) **A-Box Cleaning.** Oxide shavings and turnings are collected from glovebox floor, and placed in stainless steel cans or vials.

(22) **In-Line Bag Out.** In-line drum bag cut is a waste handling process servicing Room 101 processes via a conveyor belt system. Waste is moved along the conveyor belt to an "A" box (E-23) for disposal in properly prepared waste drums.

(23) **Utilities.** The house vacuum system uses a mist tank to neutralize acids that enter the system through glove boxes. The caustic used is sodium hydroxide with a sodium tripolyphosphate inhibitor. The mist tank discharges the waste to the process tanks in Building 561.

(24) **Laboratory Glassware Wash.** Lab glassware is washed in process sinks located throughout the lab. The sinks are not inside of gloveboxes. The wash water is discharged into the process waste tanks and trucked to Building 774 for treatment.

3.22.4 **Building 707, Manufacturing Building**

Building 707 contains processes for the production of classified plutonium components, subassemblies, and assemblies. The first step in these processes is forming and casting of plutonium components in the foundry. These parts are then sent to machining for final shaping. Machined parts are tested and inspected prior to final assembly. Support services include maintenance and building utilities.

Building 707 process drains flow into two waste tanks located in the Building 731 pump station. Aqueous waste from decontamination showers, equipment drains, and cooling coils is pumped to these two 1,250-gallon holding tanks where it is sampled for pH and total alpha activity before being pumped to Building 374 for processing.

All oils and solvents used in the fabrication and assembly processes are collected in the C-pit of Building 707. Machine oils and coolants are filtered, sampled, and then pumped to a shipping tank, where it is re-sampled and transferred to Building 774 for solidification. C-pit also contains a waste solvent tank, which receives trichloroethane from cleaning baths in the assembly area. This solvent waste is also transferred to Building 774 for solidification.

Processes identified for this building are:

1. Foundry
2. Machining
3. Assembly
4. Non-Destructive Testing
(5) Inspection
(6) Utilities/Maintenance

(1) Foundry. Foundry operations include casting, rolling and forming, thermal cycling, and performing physical measurements of plutonium components. The foundry operation uses carbon tetrachloride as a degreasing agent. Machine coolants/oils are also used in this area.

(2) Machining. Formed or cast parts from the foundry operations are machined into final specified shapes for further assembly. Oils are used in cutting parts, and then rinsed off with carbon tetrachloride. Lathe coolants are also used.

(3) Assembly. Final machined and inspected components are assembled into product units inside gloveboxes. The final steps in the assembly operation are performed over downdraft tables. Also, site returns are disassembled for recovery of components. Trichloroethane is used in the ultrasonic vapor degreasing during assembly.

(4) Non-Destructive Testing. The non-destructive testing laboratory is used for radiography, ultrasonic, and acoustic testing of parts and components prior to final assembly.

(5) Inspection. Inspection operations included physical, visual, and certification inspection of parts. Freon-113 is used in a process to determine the density of parts. Carbon tetrachloride is used for degreasing.

(6) Utilities and Maintenance. This process includes general utility and maintenance operations for production support throughout the entire building.

3.22.5 Building 771, Plutonium Recovery Facility

Building 771 houses laboratories, plutonium recovery operations, and support operations. The majority of Building 771 work is done inside gloveboxes.

Processes identified for this building are:

(1) Fast-side Dissolution
(2) Feed Evaporation
(3) Spray Leach Operation
(4) Batching
(5) Peroxide Precipitation
(6) Filtrate Evaporator
(7) Oxide Calciner
(8) Hydrofluorination
(9) Caustic Filtration
(10) Anhydrous Hydrofluorination
(11) Residue Processing
(12) Reduction
(13) OY Leach
(14) Analytical Lab Waste Process
(15) Incinerator (not in operation)
(16) Incinerator - Scrubber (not in operation)
(17) Slow-side Dissolution
(18) Ion exchange
(19) Americium recovery  
(20) Process fume scrubber  
(21) Chemical Operations Support Lab  
(22) Process Chemistry Technology  
(23) Plutonium Metallurgy  
(24) Plutonium Metallography  
(25) Process Chemistry  
(26) Special Recovery Operations  
(27) Canner Line  
(28) Classified Line  
(29) Solvent Extraction, Precipitation and Calcination  
(30) Chemical Standards Support Lab  
(31) Wet Chemical Make Up (Room 247)  
(32) Dry Chemical Make Up (Room 246)  
(33) Drum Counter  
(34) Health Safety & Environment Radiation Monitoring  
(35) Raschig Ring Change Out  
(36) Maintenance Machine Shop  
(37) Maintenance Line Strip Out  
(38) Maintenance Oil Change Out  
(39) Utilities  
(40) Cooling Towers

(1) Fast-Side Dissolution. Plutonium oxide generated in foundry operations and (chemical operations) button recycle is exposed to airlift dissolvers using nitric acid. Resulting product is a plutonium nitrate solution sent to batching (Process 4), and eventually reduced to plutonium metal. Nitric acid used in fast-side dissolution is sent to Ion Exchange Process 18 for separation. Generated oxide heels are calorinated and returned for recycle.

(2) Feed Evaporation. Nitrate solution from dissolution (Process 1) is concentrated by evaporation in a steam heated evaporator to allow higher concentration nitrate solutions for precipitation (Process 5).

(3) Spray Leach Operation. Sulfuric acid and nitric acid are used in a spray dissolver to leach elements off metal scraps. Spray leach is also known as Part 5 Processing. Metal scraps are returned to the foundry for recycling and plutonium bearing acids are sent by vacuum pipeline to Process 18, ion exchange, for further reprocessing.

(4) Batching. Batching is accomplished by mixing solutions and reagents to attain a constant composition, specific acid normality (by addition of sulfuric and nitric acid), maximum allowable iron content, and plutonium concentration necessary for peroxide precipitation (Process 5). The product is a plutonium nitrate solution, which will be precipitated. Nitric acid from acid normality mixing is sent by vacuum pipeline to anion exchange (Process 18).

(5) Peroxide Precipitation. Plutonium nitrate feed from batching (Process 4) is fed to precipitation reactors where hydrogen peroxide is added. A slurry is formed and flows through digestors and is filtered on a vacuum rotary drum filter. The peroxide cake is washed on a vacuum rotary drum filter. The peroxide cake is washed with nitric acid to remove impurities and is collected in stainless steel containers to be transported to the calciner (Process 7). Nitric concentrated solution is sent by pipeline to anion exchange (Process 18) for reprocessing. A nitric acid and peroxide solution comprises the mixed
Filtrate and wash solution from precipitation. Solution is sent by vacuum system to filtrate evaporation (Process 6), where it is concentrated and excess hydrogen peroxide is destroyed. The filtrate evaporator functions the same as the feed evaporator (Process 2).

(6) **Filtrate Evaporator.** Nitrate solution from peroxide precipitation (Process 5) is concentrated by evaporation in a steam-heated evaporator. The evaporator destroys excess hydrogen peroxide and concentrates the solution.

(7) **Oxide Calciner.** Peroxide cake from precipitation (Process 5) requires drying and conversion to oxide form for hydrofluorination (Process 8). The peroxide cake is passed through a heated rotary tube calciner that vaporizes the water, nitric acid, and excess hydrogen peroxide. The product is a dry oxide powder called green cake. Dirty green cake that collects in thermal expansion bellows and piping is collected in a Vollrath can and sent, after calorimetry, to residue dissolution (Process 17). A nitric acid solution is used to scrub calciner off-gas for plutonium recovery solution and is transported to anion exchange (Process 18).

(8) **Hydrofluorination.** Oxide from calcination (Process 7) is converted to plutonium tetrafluoride in a rotary tube fluorinator with anhydrous hydrogen fluoride. Oxide conversion occurs by contact with the hydrogen fluoride. Water vapor and excess hydrogen fluoride produced by the reaction is scrubbed with potassium hydroxide. The plutonium tetrafluoride is put into a poly bottle and transported to reduction button break out (Process 12). Potassium hydroxide is sent by vacuum system to caustic filtration (Process 9), for plutonium recovery. The clean off-gas is scrubbed with potassium hydroxide (KOH) solution yielding an impure fluoride that is put into stainless steel Vollrath cans and taken to calorimetry to obtain a gram value, then to slow-side dissolution, (Process 17) for reprocessing.

(9) **Caustic Filtration.** Caustic waste from hydrofluorination (Process 8) is filtered to recover plutonium. After filtering, the caustic is sampled to determine the radioactivity level. If the sampling indicates an activity above the effluent discharge limit (EDL), the caustic is refiltered. When the activity is below the EDL, the caustic is piped to Building 774 for processing to IDC 800.

(10) **Anhydrous Hydrofluorination.** A rotating tube is used in the HF process and must be maintained at 650 degrees in order to convert calcinated plutonium oxide to plutonium tetrafluoride. This room is responsible for circulation of the closed loop water system. It is also responsible for providing pressurized hydrogen fluoride gas to the line. This is accomplished by heating and evaporating liquid hydrogen fluoride.

(11) **Residue Processing.** Residue processing includes several miscellaneous waste processing operations. Waste leaching resins from ion exchange columns are collected before being sent to Building 371 for solidification. Used HEPA filters are cut up before disposal, creating metal waste that is collected in combustible waste drums and the rinse water is sent to anion exchange (Process 8). Failed glovebox gloves and equipment is collected and drummed. Acid waste is produced from washing acid-soaked rags with water. Nitric acid is also used to dissolve sludges. The acid waste is sent to anion exchange (Process 18) for further treatment.
(12) Reduction. Plutonium tetrafluoride produced by hydrofluorination (Process 8) is reduced to plutonium metal by reaction with calcium metal in an induction-heated reduction vessel. The reduction vessel contains a magnesium oxide crucible with an annular space filled with magnesium oxide sand. An initiator is placed in the vessel in contact with the plutonium tetrafluoride. The reduction vessel is then placed in an induction furnace and purged with argon gas to create an inert atmosphere. The vessel is heated until reduction reaction occurs. Cooling causes the metal to settle to the bottom and calcium tetrafluoride to form on the metal button as a slag. When cooled, the material in the reduction vessel is removed and separated. The metal button will go to a vault to be held until lab analyses return, then sent to the foundry or Building 371 for electrorefining. Sand, crucible, and calcium fluoride slag is separated out, put into a two- or four-liter poly bottle, and then transported to can count before processing. Pickling solution from the reaction of water with calcium or magnesium is transported by vacuum system to hydrofluorination (Process 4).

(13) OY Leach. OY signifies classified material. OY leach consists of three lines: one line, A3, takes parts received from Building 777 and leaches the parts with heated nitric acid, then washes the parts with water. The other two lines are water and acid evaporators for waste from Line A3. Nitric acid which is used for leaching becomes contaminated by plutonium. Nitric acid goes to OY leach acid evaporation by vacuum pipeline to a hood tank. Steam condensate and water from rinsing leached parts goes to OY leach water evaporation by vacuum pipeline to a hood tank. Waste water from water evaporation is sent by vacuum pipeline to a holding tank in OY leach, where it is sampled before being sent to holding tanks in Room 146.

Residuals from this process are returned to dissolution and are not considered waste streams.

(14) Analytical Lab Waste Process. Waste solutions from analytical labs in Buildings 559, 771, and 371 are not compatible with regular process waste due to complexing agents. The plutonium in solution is precipitated as plutonium tetrafluoride and separated from the solution. The plutonium tetrafluoride is sent to slow-side dissolution (Process 17) for plutonium recovery.

(15) Incinerator. This process is not operating. Contaminated miscellaneous paper, plastic, rags, rubber, and sludges were burned in the incinerator. The incinerator includes a ball mill to pulverize ash, vacuum system, and a scrubber (to be treated as a separate process). Ash pulverized in the ball mill to increase surface area is put in two- or four-liter poly bottles, sent to can count, and then stored in drums to be dissolved when the ash recovery plan is created.

(16) Incinerator - Scrubber. The incinerator is not operating, therefore this process is also not operating. Combustion gases resulting from incineration are cooled in two heat exchangers, quenched with a caustic solution spray, and then passed across a filter wheel. Vacuum holds a polypropylene cloth with diatomaceous earth on the filter wheel to catch particulates. The diatomaceous earth and particulates form a sludge.

(17) Slow-Side Dissolution. There are three lines for slow-side dissolution, each with dissolvers in series positioned to allow solution cascades. All lines use steam for heating and air lift dissolvers. One line for higher level solutions uses air lift circulation for agitation. Feed material for the lines consist of sand, slag, crucible, dirty plutonium fluoride oxide heel, and incinerator ash. Product solution is piped to anion exchange (Process 18).
(18) **Ion Exchange.** Ion exchange purifies and concentrates plutonium-bearing nitric acid solutions mainly from dissolutions processes. The plutonium nitrate solution is adjusted for standard acid molarity and valence state by adding nitric acid, ferrous sulfamate, and aluminum nitrate. The solution is then pumped through three resin ion exchange columns. Nitric acid is used to elute plutonium from the column. Ion columns are reconditioned by using more nitric acid solution. The pure plutonium is sent to batching, (Process 4).

(19) **Americium Recovery.** Americium is purified through a series of anion/cation exchange operations, then precipitated and calcined to an oxide. Effluent from the oxidation process is fed to cation exchange columns to separate americium and plutonium. The process of ion exchange is performed several more times for separation and removal of fissionable material. Plutonium nitrate solution is a product of americium recovery and is piped to a holding tank before being sent to anion exchange (Process 18).

(20) **Process Fume Scrubber.** Vapors containing nitric acid and particulates originating from dissolution (Process 17), filtrate evaporators (Process 6), and feed evaporators (Process 2) are collected and sent through the off-gas lines leading to the process fume scrubber. The scrubber utilizes an aqueous potassium hydroxide solution which also removes particulates. The recirculating solution is cooled and returned to the top of two scrubber towers. The air is then sent to the building exhaust plenum system.

(21) **Chemical Operations Support Lab.** The chemical operations support lab receives samples from chemical operations in R&D groups of Buildings 771 and 779, laboratories of Buildings 771 and 559, and the foundry in Building 707. Samples include oxides, fluorides, salts, floor sweepings, oil, acids, bases, and miscellaneous liquids. Analyses include x-ray fluorescence and gross alpha counting to quantitatively determine fissionable elements present, and gamma count to measure isotopic and quantitative concentrations. Other analyses include x-ray diffraction to identify unknown compounds quantitatively, scanning electron microscope (SEM), and sample preparation by chemical separation. Solid waste consists of solid samples of oxides. Samples are analyzed and put into a stainless steel Vollrath can (1500 grams to 2 kilograms) with other solids. The can is sent to calorimetry to obtain a gram value, then to chemical operations for reprocessing.

(22) **Process Chemistry Technology.** Aqueous recycle technology is responsible for developing equipment and processes for use in plutonium recovery at the Rocky Flats Plant. Various materials containing fissile material are brought into the area to support the development. These materials include, but are not limited to, pyrochemical salt residues, plutonium oxide, various plutonium-bearing residues, and plutonium-bearing solutions (including anion exchange elute and effluent). Development tests are performed using several processes, including, but not limited to, anion exchange, calcination, liquid extraction, peroxide precipitation, and cation exchange. Test-related responsibilities include reagent solution makeup, general dry box operations, and isotopic drum storage from past operations.

(23) **Plutonium Metallurgy.** Plutonium metallurgy takes metal pieces and forms them for R&D testing. Machines used include rolling mills, presses, die casting, and sample cutting with saws. The metal forms are coated to guard against contamination. Fabrication houses a vacuum arc furnace, muffle furnace to burn oxide, and several heat treating furnaces used to observe changes of material properties. Non-plutonium metal is generated mainly from sample cutting and die casting operations.
Most gloveboxes in plutonium fabrication produce varying amounts of oxide. The oxide is put into stainless steel Vollrath cans, then transported by cart and courier to chemical operations, fast-side dissolution (Process 1) for processing.

(24) **Plutonium Metallography.** Plutonium metallography is an R&D and quality assurance control lab. Samples of metals are prepared for testing by casting in a gamma furnace or heat treating before tensile testing or exposing metal to heating or pressing. Physical tests include tensile, hardness, density, and dilatometer (measures expansion and contraction of metals). Tests for quality assurance use an image analyzer and x-ray diffraction to check metal welds and threads, to look for cracks and defects, and to analyze for type of alloy. No flow diagram is provided. Most gloveboxes in plutonium metallography produce varying amounts of oxide. The oxide is put into stainless steel Vollrath cans, then transported by cart and courier to chemical operations, fast-side dissolution (Process 1) for processing.

(25) **Process Chemistry.** R&D process chemistry runs a number of experiments on a small scale in an attempt to develop more effective chemical procedures. Specific operations include ion exchange, solvent extraction, solution preparation, and water purification. Cation exchange recovery process wastes include calcium chloride (CaCl₂) and HCl. Waste is put in four-liter bottles, then bagged out to a 55-gallon drum. Products of cation exchange include plutonium and americium.

Anion exchange recovery process wastes include HCl, CaCl₂, NaCl, and KCl. Waste is put into four-liter bottles, then bagged out to a 55-gallon drum. The products of anion exchange include plutonium and americium.

(26) **Special Recovery Operations.** Recovery operations is responsible for the recovery of plutonium from various solid residues through nitric acid leaching. The room is equipped to handle ion exchange recovery, processes requiring manual (remote) manipulation, americium dissolution, precipitation, and calcination, although these operations have not been utilized for several years. Residue from nitric acid loading process is bagged out and put into a drum.

(27) **Canner Line.** The canner line is used to aid in packaging of materials generated from special recovery operations (Process 26). It is also used for miscellaneous repackaging, sampling, and calcination of oxide residues.

(28) **Classified Line.** Plutonium metal generated from this process is bagged out and sent to the foundry.

(29) **Solvent Extraction, Precipitation and Calcination.** The solvent extraction process is responsible for cleaning out impurities from uranium-plutonium solutions. The material is precipitated with ammonium and calcined to an oxide. Ammonium nitrate and sulfate solutions are the precipitation filtrate liquids generated in the precipitation process. Nitric acid solution is the extraction effluent generated during processing. These wastes go to Building 774 for further treatment.

(30) **Chemical Standards Support Lab.** The chemical standards lab prepares control sample standards for analytical labs in Buildings 771 and 559.
(31) **Wet Chemical Make-Up.** This operation is responsible for providing various wet chemicals of specific molarity and normality to processes in Building 771. Most chemicals are directly fed by pipe to building process tanks. Smaller quantity chemicals are batched in bottles and delivered to various areas.

(32) **Dry Chemical Make-Up.** This operation is a storage facility for dry chemicals used in various operations in Building 771.

(33) **Drum Counter.** The Building 771 drum counter utilizes a standard and a segmented drum counter. The drum counter gives standard and background radiation readings, weights, and densities according to IDC for every sixth drum. This drum counter services Buildings 771, 371, 559, 776, 779, 777, 374, 774, and 707 drum counter backlog.

(34) **HS & E Radiation Monitoring.** Health, safety, and environment or radiation monitoring performs radiation monitoring and control in process areas and of process personnel. HS&E has monitoring stations for personnel monitoring and smear sampling of articles removed from process areas. HS&E also has a decontamination room and electronic repair facility.

(35) **Raschig Ring Change Out.** Raschig rings are used in tanks on the plant site containing fissile materials. Raschig rings have a life expectancy of five years. Four rings are removed from each tank every six months with a total of forty removed from any one tank before a ring change is required. This sample determines ring integrity and indicates whether or not a change is necessary.

(36) **Maintenance Machine Shop.** The machine shop services Buildings 774 and 771 with building of parts for process areas and building maintenance. Machines in the shop include lathes, drill presses, end mill, and band and cut-off saws. Material machined may include stainless steel, mild steel, benelex, and plexiglas.

(37) **Maintenance Line Strip Out.** When a line is scheduled to be replaced it must be stripped out. Building 771 has been under renovation recently; thus, strip-out activity has been high. On strip-out, "houses" of plastic and tape are built to control contamination. Plasma arc cutters are used to reduce the size of a box. Materials are sorted by like type and put into "coffins" or shipping crates and sealed.

(38) **Maintenance Oil Change Out.** Oil for hydraulic systems, pumps, compressors, etc. used in process areas has to be changed when a breakdown or strip-out of line occurs. On change-out, a pump cart is used to remove the oil, the oil is put into a four-liter poly bottle and sampled before being sent to Building 774.

(39) **Utilities.** Utilities provide building heat, air conditioning, ventilation, and cooling water for processes. Heat is provided by steam, air conditioning by air washers, clean cooling water by water treatment, and ventilation is treated by passing air through a plenum and exhaust system. Process waste tanks in the Building 771 annex handle plenum and exhaust system blowdown. The sanitary sewage lift station handles cooling tower and air washer blowdown.

(40) **Cooling Towers.** Cooling towers on the roof of Building 771 provide cooling for processes in the building. There are two old towers and five new towers. All pumps are electric.
13.22.6 Building 774, Liquid Waste Treatment Facility

Building 774 is a liquid waste treatment facility. It presently treats TRU aqueous wastes from Building 771 and TRU organic waste from Buildings 707 and 777. Wastes received from these locations are piped directly into Building 774. In addition, non-pipeline TRU organic wastes are received from Buildings 559 and 771 and non-pipeline TRU aqueous waste is received from Buildings 371, 559, 771 and from 779. (Most all of the non-piped TRU aqueous waste is from Building 771). Non-pipeline wastes include those wastes received in drums, containers, or other types of packaging.

Building 774 also processes low-level aqueous waste (only in a special glovebox setup, discussed later) and stores low-level waste oil from several locations in the plant in two 10,000 gallon tanks and that will be burned in the Building 776 fluidized bed incinerator at a later date. A process for silver recovery from photographic waste also operates in Building 774.

Acidic and basic TRU aqueous wastes received by pipeline are treated by a two-stage precipitation process, followed by vacuum filtration and sludge solidification. The precipitation process effluent is piped to Building 374 for further treatment. TRU waste oil/solvent mixtures are processed in the organic sludge immobilization system (OASIS). TRU complex aqueous wastes are solidified with cement in a special glovebox setup.

Processes identified for Building 774 are:

1. Acid and Base Treatment (TRU aqueous wastes)
2. Complex Aqueous Waste Solidification
3. Organic Sludge Immobilization System (TRU organic wastes)
4. Continuous Silver Recovery
5. Waste Oil Storage
6. Operation and Maintenance

(1) Acid and Base Treatment. Acidic and basic wastes from Building 771, the plutonium recovery area, are transferred by pipeline to Building 774 for treatment. These wastes may include ion exchange column nitric acid effluent, incinerator caustic scrub solution, hydrochloric acid effluent, and cooling water.

Acidic waste is neutralized with sodium hydroxide and then filtered to separate solids. Distillate precipitate, cooling water, and caustic from Building 771 are combined and sent through a precipitation process involving flash mixing with precipitation reagents, flocculation, and clarification. Radioactive contaminants coprecipitate with the floc. A portion of the clarifier effluent is recycled through the first stage precipitation process and second stage batch precipitation process. Following second stage precipitation, the effluent water is sent to Building 374 for further treatment.

The precipitated sludge from the first and second stage precipitation and photographic waste from Process 4 are combined in a slurry tank with the settled solids from the acidic and caustic waste streams. This combined solids stream is then sent to a vacuum filter which separates the solids and water. The solids are solidified with cement and sent to Building 771 for drum counting assay and then to Building 664 before final offsite disposal as TRU waste. The water is recycled back into the process. More information on this process is provided in the discussion and flow diagrams for RF 111, IDC 800.
(2) **Complex Aqueous Waste Solidification.** Complex wastes from Buildings 371 and 771 are sometimes incompatible with other wastes received in 774 and are handled separately. The complex wastes are received in four liter bottles packed in drums for transport. The bottles are opened inside a glovebox and are emptied into a 55-gallon drum. Approximately 60 to 80 liters are put in each drum. The waste is then solidified by the addition of portland cement and is sent to Building 664. More information on this process is provided in the discussion and flow diagrams for RF 113, IDC 802.

(3) **Oil and Solvent Solidification.** Waste oils mixed with trichloroethane and carbon tetrachloride from lathes and machinery in Buildings 707 and 777 are transferred by pipeline to tanks in Building 774. Some waste oil from Building 559 and 771 is transferred to 774 in four-liter bottles and added to one of the tanks. Approximately ten liters per month are received in bottles. The empty bottles have an absorbent added and are put in the soft waste drums. The waste oil and solvents from these tanks are transferred to a glovebox mixer, called the organic sludge immobilization system (OASIS), where emulsifier, water, and Envirostone cement are added to the waste in 55-gallon drums. More information on this process is provided in the discussion and flow diagrams for RF 112, IDCs 801 and 808.

(4) **Continuous Silver Recovery.** Fixer solutions from photographic processes are received from Buildings 121, 444, 560, 707, and 777 in 55-gallon drums. Silver is recovered by electroplating onto anodes, then placed in a crucible and melted in a furnace. The oxidized impurities are removed and the molten silver is cast in iron molds. The oxidized impurities remain in the oven. The resulting silver ingots are sent to Building 881 for further purification. The silver-depleted fixer is sent to Tank 10 where it is treated in Process 1. Empty drums are returned to the location of waste generation for future collection of fixer solution.

(5) **Waste Oil Storage.** Low-level waste oil is brought to Building 774 in 55-gallon drums from Buildings 444, 771, 779, 881, 559, 374, 991, as well as other buildings, if needed, and pumped into two 10,000-gallon tanks (No. 102 and 103) for storage. This oil will eventually be sent to the fluidized bed incinerator in Building 776 for disposal. This process does not generate any TRU waste.

(6) **Operation and Maintenance.** Routine operation and maintenance in Building 774 generates a variety of waste products, which are separated by waste type and collected in drums. The drums are labeled hot pipe and metal, soft combustible waste, dry box filters, and dry box gloves. Soft combustible waste includes such items as kimwipes, plastic containers, and plastic gloves. The drums are sent to a drum counter assay and then Building 664, generally as low-level waste. Laundry used in Building 774 is routinely tested for radioactive contamination. Any laundry items found to be contaminated are disposed with soft waste. Non-contaminated laundry is sent to Building 778 for cleaning.

13.21.7 **Building 776, Production Support Building**

Building 776 primarily houses waste handling processes, including the fluid bed incinerators (currently not operating), size reduction, and advanced size reduction.

Waste generated in both Building 776 and 777 is disposed in composite area waste drums located in a central area. Non-line combustibles are disposed to area combustible drums located in several places.
Processes identified for this building are:

1. General Area Maintenance
2. Size Reduction
3. Advanced Size Reduction
4. Fluid Bed Incinerator
5. Pilot Plant Incinerator

1. General Area Maintenance. General area maintenance services Buildings 776, 777, 779, and 991 in changing filters, oils, coolants, and refrigerants, for production and building equipment. There are approximately 25 lathes and 4 drills to be serviced.

2. Size Reduction. The size reduction facility is now operating on a very limited basis. Until recently, this area handled drums containing metal, lead, glass, filters, and insulation from processes in the Perimeter Security Zone (PSZ) of the Rocky Flats Plant. Materials were removed from the drums and separated in an airlock vault. Materials such as glass, filters, and HEPA filters are put into waste boxes with like materials or washed in a ball mill. The ball mill washing is no longer done in Building 776). Waste boxes are made of metal for TRU waste or wood for low-level waste, and after full, lids and locks are put on them and they are sent to Building 664 for shipping. Personnel involved in this process work in supplied air suits when in the vault or full face respirators in the air lock area.

3. Advanced Size Reduction. An Advanced Size Reduction Facility (ASRF) at the Rocky Flats Plant provides a remotely operated facility for the size reduction of plutonium contaminated gloveboxes and miscellaneous equipment. The new facility has "state-of-the-art" processing techniques which meet the through-put and safety requirements for the decommissioning of several plutonium-contaminated processing facilities.

The facility is used to section plutonium-contaminated gloveboxes and miscellaneous equipment to a size which can be easily handled and disposed of in approved waste containers. Central Research System 50 Master/Slave Manipulators and Programmed and Remote (PaR) Model 3000 Manipulators are used to reduce the glovebox to the desired sizes.

4. Fluid Bed Incinerator. The Fluid Bed Incinerator (FBI) is currently not operating. All descriptions and information regarding the FBI are based on past (if applicable) and potential waste streams from operation. Liquid wastes received in 55-gallon drums are pumped through filters into two incinerator feed tanks. From these tanks, liquid is sprayed into the incinerator through nozzles.

Solid waste received in 55-gallon drums is transferred to a glovebox for hand sorting. Tramp metal is returned to a 55-gallon drum, and solid combustible waste is shredded and conveyed by screw feeder to the incinerator. Incineration takes place in fluidized beds of sodium carbonate and chromic oxide catalyst. There is a primary reactor and an afterburner. Process flue gas passes through two stages of cyclone separators, a stainless steel sintered metal filter bank, and a one stage HEPA filter before being exhausted into the HEPA filter plenum of the building ventilation system.

The ash collected by the filters and cyclone separators is bagged out in 55-gallon drums. Spent HEPA filters are sent to Building 771 for drum count.
(5) Pilot Plant Incinerator. The pilot incinerator is not operating. All information and descriptions regarding the pilot incinerator is based on past (if applicable) and potential waste streams from operation. The pilot incinerator was the original unit built to test and develop the incinerator design based on a bench-scale model. This pilot unit was then scaled up by nine to one for the production unit. The incinerators are therefore virtually identical.

13.21.8 Building 777, Assembly Building

Building 777 is a support facility for R&D work. Work includes fabrication, coating, assembly and disassembly, inspection, and non-destructive testing for quality assurance on parts or components. Building support activities include maintenance, utilities, and shipping and receiving. Most of this work is performed in gloveboxes.

Processes identified for this building are:

1. Super Dry Parts Assembly
2. Disassembly
3. Electro Etch
4. Gas Analyzing Control
5. Tritium Surveillance Lab
6. TCA Collection and Filter System
7. Machining/Fabrication
8. Coatings
9. Special Assembly
10. Inspection
11. Metallurgical Operations
12. Shipping and Receiving

(1) Super Dry Parts Assembly. Super Dry is an assembly and parts building process which is performed in a nearly moisture-free air lock chamber. Most work is performed within a glovebox in the air lock. Materials used in cleaning and decontamination include alcohol and trichloroethane. Aluminum foil is used to protect parts before and after assembly. A wash room in the super dry chamber is being prepared for operation in the near future. The room will house a vapor degreaser that will generate waste trichloroethane. Solid waste goes to respective area waste cans from which it is double-bagged in polyvinylchlole (PVC) bags and placed in 55-gallon drums.

(2) Disassembly. Site returns are disassembled using various cutting techniques. The resulting parts are considered to be classified shapes. Metals include stainless steel, aluminum, beryllium, and tool steel. All waste generated is either “line” or “non-line”.

(3) Electro Etch. Electromark liquid is used in the electronic etcher to engrave serial numbers on parts or components. The electromark liquid is neutralized with water which is applied to the part with kimwipes. Before and after engraving, the part or component is cleaned with alcohol. The electro etch process is part of special assembly.

(4) Gas Analyzing Control. Air compressors are used for gas testing and analysis. Following analysis, the gas is used in production operations in Buildings 776 and 777. The types of gases analyzed are classified.
(5) **Tritium Surveillance Lab.** Tritium analysis is performed by using liquid scintillation counting. Analysis is performed on tritium samples sent to the lab from extraction processes performed in Building 559, tritium analysis.

(6) **Trichloroethane Collection and Filter System.** The trichloroethane collection and filter system services assembly and production control activities in Buildings 776 and 777. Waste trichloroethane from these operations is pumped to a raschig ring-filled collection tank (T1) with a 600-liter capacity. From T1, the trichloroethane is sent through an eight Ful-flo filter system into a raschig ring-filled, filtered holding tank (T2) with 650-liter capacity. Trichloroethane is sampled from T2 for uranium-238, trichloroethane, and ammonium. If the trichloroethane meets specifications, it is pumped to Building 774 for further treatment. If it does not meet specifications, it is rerouted through T1 for refiltering and sampling.

(7) **Machining/Fabricating.** Building 777 machining is responsible for preparation of parts to be used in other building processes. Oils are used for cutting parts and then they are rinsed off with carbon tetrachloride. Lathe coolants are also used in this area.

(8) **Coatings.** This process involves coating one metal on another to prepare a finished product.

(9) **Special Assembly.** Special Assembly is an R&D assembly facility responsible for building classified war reserve (WR) parts and for fitting WR and other specially fabricated parts and materials. Details of the process are classified.

(10) **Inspection.** Inspection is responsible for determining and checking size accuracy of part components.

(11) **Metallurgical Operations.** Metallurgical operations is responsible for thoroughly cleaning specific classified parts and determining the density of various materials in the part.

(12) **Shipping and Receiving.** Shipping and receiving is responsible for channeling (or handling) all materials entering or leaving the building and for cleaning drum exteriors. Consequently, cleaning materials are the only waste stream actually generated in this area.

Wastes enter this area from other areas on plant site sealed in drums. They are not opened here. This operation deals with drums containing classified materials, including site return metals, classified shapes, and various other materials including plastics and combustibles, beryllium half-sheets (line), stainless steel (line and non-line), vanadium, aluminum, and D38 and classified molds.

13.22.9 **Building 779, Plutonium Development**

Building 779 houses plutonium research and development facilities. Currently, processes are ongoing and include dry chemistry, wet chemistry, metallurgy, chemical and engineering studies, electron microscopy, physical metallurgy, plutonium metallurgy, process chemistry, and hydride operations.

Processes identified for this building are:

(1) Utilities
(2) Hydride Operations
(3) Physical Metallurgy
(4) Production Physical Chemistry
(5) Process Chemistry
(6) Pyrochemistry Technology
(7) Custodial
(8) Machine Shop
(9) Nuc Joining
(10) Coatings
(11) Mechanical R&D

(1) Utilities. The utilities group is responsible for supply and control of potable water, air ventilation, glovebox air supply, vacuum supply, emergency electrical power, domestic comfort control, nitrogen, argon, compressed air, eyewash basin/emergency body shower water, laboratory equipment cooling water, and health physics monitoring vacuum for the building. They are also responsible for liquid process waste, sanitary sewage, and sanitary trash removals from the building.

(2) Hydride Operations. The hydride operation is responsible for small scale plutonium recovery from processes in Building 779, 707, and 776. All recovered plutonium is returned to production.

(3) Physical Metallurgy. Physical metallurgy is responsible for applied research on plutonium, stainless steel, beryllium, molybdenum, and uranium, and for supporting production. Common sources of samples to be analyzed include Buildings 865, 707, 444, 460, 779, and 371. When analysis is complete, the sample is returned to the source, if so requested; otherwise, Building 777 handles the disposal. Typically, large specimens (>100 grams) are received in which only a very small portion (approximately one gram) is used to analyze.

(4) Production Physical Chemistry. Production physical chemistry is a research and development group responsible for providing production support, production material surveillance, basic material research, material compatibility study, and coatings investigations. The group encompasses offices, research, analytical and test laboratories, and storage vaults. Processes performed by production physical chemistry include nuclear and non-nuclear metal experiments and material storage.

(5) Process Chemistry. The process chemistry lab performs basic chemical processes for the entire site. This lab also develops new processes. Processes performed are:

**Pyrochemical**
- Molten salt extraction
- Electro-refining
- Direct oxide reduction
- Salt scrub
- Phase diagram studies

**Aqueous**
- Microwave denitrification
- Anion exchange
- Plutonium dissolution
- Plutonium peroxide precipitation
- Actinide separation

(6) Pyrochemistry Technology. Pyrochemistry technology is a research and development group responsible for the development of processes used by production. Primary areas of research are in high temperature/non-aqueous chemical reactivity studies. This group utilizes offices, storage areas, and a laboratory.
(7) **Custodial.** The custodial group provides four support activities including cleaning, container delivery and shipping, trash collection, and monthly eye wash and emergency shower inspections. The group cleans restrooms, locker rooms, hallways, and offices.

(8) **Machine Shop.** The machine shop in Building 779 works with non-nuclear, uncontaminated metals. Types of materials machined in this shop include mild steel, stainless steel, lexon plexiglas, inconel, copper, and aluminum. The shop provides support for the entire plant.

(9) **NUC Joining.** The NUC Joining Department performs welding for production joining, process development, production support (after processes are developed), and advanced technology development. Welding processes used in NUC joining include gas tungsten arc welding, gas metal arc welding, electron beam welding, and laser welding.

(10) **Coatings.** The Coatings Lab is responsible for application of a thin silver layer to various copper and iron parts. A hot hollow cathode coating technique is used in this lab.

(11) **Mechanical R&D.** Mechanical R&D is involved with equipment specification, tolerances, and procurement for plant site. Failure analysis during implementation of machining processes is also performed.
4.0 ARGONNE NATIONAL LABORATORY-EAST

4.1 AE 111

Content code AE 111A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), is waste generated and temporarily stored at Argonne National Laboratory-East. In the past, newly generated waste has been sent to Idaho National Engineering Laboratory for retrievable storage. This content code is included in Waste Type I, Solidified Aqueous or Homogeneous Inorganic Solids, and corresponds to IDC 131, Solidified Laboratory Waste. There is no experimental equivalent of this content code.

4.1.1 General Process Knowledge

Shipping content code AE 111 (IDC 131) consists of solidified liquid waste. The liquid originates in Buildings 205 and 350 from research activities, decontamination and decommissioning activities, disposal of liquid waste from usable items (equipment), or disposal of liquid from nonusable items.

The liquid waste is immobilized by absorption into vermiculite. Typically, the absorbed liquid wastes are acidic nonflammable liquids with a pH of less than 2 that have been neutralized to a pH between 7 and 10. The solidified wastes are packaged at Building 306 in 55-gallon drums. The drums are stored in Facility 317, which is an underground storage area. Figure 4.1-1 shows how the aqueous wastes are generated and subsequently solidified into IDC 131.

General waste process information for shipping content code AE 111A is contained in Section 12 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.
4.1.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

4.1.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code AE 111A are listed in Section 1 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment 3. The reader is reminded that these estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

4.1.2.2 Chemical Compatibility of Wastes Identified by Content Code AE 111A

Attachment D contains an evaluation of potential chemical incompatibilities within content code AE 111A and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

4.1.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in AE 111A

There are no hazardous constituents reported for IDC 131, which corresponds to shipping content code AE 111A in the TRU Mixed Waste Characterization Database (Attachment E).

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) for AE 111A that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore are not reported in Attachment E:

- Cadmium
- Lead
- Arsenic
- Chromium
- Mercury

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

4.2 AE 116

Content codes AE 116A and AE 116B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), are wastes generated and temporarily stored at Argonne National Laboratory-East. In the past, newly generated waste from Argonne has been sent to Idaho National Engineering Laboratory for retrievable storage. These content codes are included in Waste Type III, Solid Organics. Each content code corresponds to the following IDCs:
Figure 4.1-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Solidified Aqueous or Homogenous Inorganic Solids for Argonne National Laboratory - East (Shipping Content Code 111, IDC 131)
A description of each of the IDCs, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>Research-Generated Combustible Waste (RGW)</td>
</tr>
<tr>
<td>120</td>
<td>Decontamination and Decommissioning Combustible Waste (DDW)</td>
</tr>
<tr>
<td>111</td>
<td>Research-Generated Noncombustible Waste (RGW)</td>
</tr>
<tr>
<td>121</td>
<td>Decontamination and Decommissioning Noncombustible Waste (DDW)</td>
</tr>
</tbody>
</table>

There are no experimental equivalents of these content codes. AE 116A and AE 116B are WAC-certified. The "A" and "B" on AE 116 separate these two content codes due to packaging differences.

The TRUCON document describes the waste as generated by research activities performed in a laboratory environment. The waste includes soft plastics, cardboard, rags, paper, cloth, concrete, and laboratory apparatus from various processes.

4.2.1 General Process Knowledge

Shipping content code AE 116 consists of IDC 110, 111, 120, and 121 waste. AE 116 consists of solid combustible and some noncombustible waste, produced by two sources: research generation and decontamination and decommissioning activities. Research-generated waste is produced as a by-product from research activities performed in a laboratory environment on a routine basis. Decontamination and decommissioning wastes are derived from decontamination and disposal of facilities and ancillary systems (e.g. gloveboxes).

The waste originates from research activities performed in a laboratory environment in Buildings 200, 205, 212, and 350. The waste includes soft plastics, cardboard, rags, paper, cloth, concrete, and laboratory apparatus. The waste is packaged at Building 306 in five-gallon cans. The cans are stored in Facility 317, which is an underground storage area. Figure 4.2-1 shows how the wastes are generated and packaged as IDCs 110, 111, 120, and 121.

General waste process information for shipping content codes AE 116A and AE 116B is contained in Section 12 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
• Explosive/Compressed Gases (Methods of Control)
• Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
• Corrosives (Methods of Control)
• Chemical Compatibility (Within the Content Code)
• Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

4.2.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

4.2.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in waste identified by shipping content codes AE 116A and AE 116B are listed in Section 1 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989).

The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

4.2.2.2 Chemical Compatibility of Wastes Identified by Content Codes AE 116A and AE 116B

Attachment D contains an evaluation of potential chemical incompatibilities within content codes AE 116A and AE 116B and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

4.2.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in AE 116A and AE 116B

IDC 111, which is one of the IDCs contained in AE 116A, is classified as a hazardous waste because of the presence of the following heavy metals:

- D006 Cadmium
- D008 Lead

These wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D. IDCs 110 and 120, which correspond to shipping content code AE 116B, do not have any hazardous waste reported in Attachment E.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore are not reported in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are reported for AE 116A and AE 116B:
IDC 111/121:

- Cadmium
- Lead
- Arsenic
- Chromium
- Mercury
- Barium chloride
- Beryllium

IDC 110/120:

- Arsenic
- Cadmium
- Lead

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
5.0 LOS ALAMOS NATIONAL LABORATORY

5.1 LA 111 AND LA 211

Content codes LA 111A, LA 211A, LA 111B, and LA 211B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated and stored at Los Alamos National Laboratory (LANL). These content codes are included in Waste Type I, Solidified Aqueous or Homogeneous Inorganic Solids, and correspond to the following IDCs:

<table>
<thead>
<tr>
<th>Content Code</th>
<th>Corresponding IDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 111A, LA 211A</td>
<td>002</td>
</tr>
<tr>
<td>LA 111B, LA 211B</td>
<td>003</td>
</tr>
</tbody>
</table>

A brief description of the IDCs, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>002</td>
<td>Solidified aqueous waste</td>
</tr>
<tr>
<td>003</td>
<td>Dewatered sludge</td>
</tr>
</tbody>
</table>

There are no experimental equivalents of these content codes. The difference between the content codes ending with “A” and those ending with “B” is in the method of solidification of the waste.

The following flow diagram, Figure 5.1-1, depicts processes in Building PF-4 which generate aqueous waste sent to Building WM-1 for further processing. Figures 5.1-2 and 5.1-3 show how these aqueous wastes are subsequently processed to solids, IDC 002 and IDC 003 in Building WM-1.

5.1.1 General Process Knowledge - IDC 002

Shipping content codes LA 111A and LA 211A are classified as IDC 002. Aqueous effluent originates from the processing of plutonium at Building PF-4 and is treated in Rooms 60 and 116 of Technical Area (TA) 50, Building WM-1. The resultant sludge is packaged as content code LA 111A. LA 211A waste was generated by the same processes that currently produce LA 111A; however, LA 211A represents “older” waste that was generated and placed in storage prior to the WIPP Waste Acceptance Criteria (WAC).

IDC 002 is the precipitate from treating blended acidic and caustic aqueous liquid radioactive waste by the use of calcium hydroxide, ferric sulfate, and a flocculation aid. This treatment produces a thin caustic sludge (approximately 25% solids) that is always alkaline and compatible with Portland cement. The supernatant liquor is piped to the main treatment plant in Room 116 to be processed as IDC 002. The final cemented waste monolith is produced by tumbling 55-gallon drums containing empirically determined quantities of sludge, Portland cement, vermiculite, and sodium silicate.
General waste process information for shipping content codes LA 111A and LA 211A is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.1.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

5.1.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes LA 111A and LA 211A are listed in Section 3 of Attachment B1 of NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds (VOCs), are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.1.2.2 Chemical Compatibility of Wastes Identified by Content Codes LA 111A and LA 211A

Attachment D contains an evaluation of potential chemical incompatibilities within content codes LA 111A and LA 211A, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

5.1.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 111A and LA 211A

Shipping content codes LA 111A and LA 211A wastes are classified as hazardous because of the presence of the following heavy metals:

- D004 Arsenic
- D006 Cadmium
- D007 Chromium
- D008 Lead
Figure 5.1.1. Process Flow Diagram for the Generation of Contact Handled Transuranic Solidified Aqueous or Homogenous Inorganic Solids for Building PF-4 (Shipping Content Codes 11A or 11B, ID# 002).

Los Alamos National Laboratory

Plutonium Processing Facility

Evaporator

Facility Equipment

Overflow Chilled Water Circulating Plant Vacuum System Overflow

Recovery Incinerator (No Longer in Operation)

Down Solution Off-Gas Scrub

Chemical Recovery Processes

Filtrate Caustic

Metal Production Processes

Down Solution Off-Gas Scrub

Acidic Liquid Waste to Room 60, BLDG WM-1

Caustic Liquid Waste to Room 60, BLDG WM-1
Figure 5.1-2. Flow Diagram for the Processing of Contact Handled Transuranic Solidified Aqueous or Homogenous Inorganic Solids for Building WM-1, Room 60 (Shipping Content Code 111A, IDC 002)
Figure 5.1-3. Flow Diagram for the Processing of Contact Handled Transuranic Solidified Aqueous or Homogenous Inorganic Solids for Building WM-1, ROOM 116 (Shipping Content Code 111B, IDC 003)
These wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in the TRU Mixed Waste Characterization Database (Attachment E). In the TRUPACT-II Chemical List, the following additional chemicals are listed for LA 111A and LA 211A (IDC 002):

- Mercury
- Beryllium
- Beryllium hydroxide
- Barium hydroxide
- Barium chloride
- Methyl ethyl ketone

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.1.2.4 Headspace Analyses of Solidified Aqueous Waste - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in their "TRU Waste Sampling Program: Volumes I and II". Both volumes are included as Attachments N and O. The following is a summary of the information in these two volumes of work that are representative of waste generated at RFP under shipping content codes LA 111A and LA 211A (IDC 002).

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided by LANL indicates that A-76 is the LANL waste code that is included under IDC 002 and shipping content codes LA 111A and LA 211A. Table 57 in Attachment N includes three containers from LANL Waste Code A-76. The headspace gas analyses for the three drums (50011, 50016, and 50048) do not show any VOCs. The waste was newly generated at the time of sampling (20-70 days old).

Attachment O does not contain any information specific to LA 111A and LA 211A.

5.1.3 General Process Knowledge - IDC 003

Shipping content codes LA 111B and LA 211B are classified as IDC 003. Aqueous effluent originates from the processing of plutonium at Building PF-4 and is treated in Rooms 60 and 116 of TA-50, Building WM-1. The resultant sludge is packaged as content code LA 111B. LA 211B waste was generated by the same processes that currently produce LA 111B; however, LA 111B represents "older" waste that was generated and placed in storage prior to establishment of the WIPP WAC.
The main treatment plant (Room 116) normally receives low radioactive liquid waste from Building PF-4 and supernatant liquor from the pretreatment process in Room 60. The IDC 003 aqueous waste is produced by vacuum filtration of solids from pretreated aqueous waste slurry. Lime, ferric sulfate, and a flocculation aid are added to the waste liquid. The liquid then undergoes gravity filtration and vacuum filtration. Solids are trapped on the surfaces of the filter medium as the liquid passes through. The surface of the filter medium, with entrapped solids, is skimmed off as wet sludge. The precipitated solids are chiefly metallic hydroxides with a pH of 10-12. The waste is placed into a 55-gallon drum. The drum is initially filled with approximately 6-8 pounds of Portland cement. The sludge is then placed into the drum and an additional 6-8 pounds of cement is added on top of the sludge.

The following flow diagram, Figure 5.1-3, depicts processes in Building PF-4 which generate aqueous waste sent to Building WM-1 for further processing. Figure 5.1-3 shows how these aqueous wastes are subsequently processed to solids, IDC 003, in Building WM-1.

General waste process information for shipping content codes LA 111B and LA 211B is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.1.4 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

5.1.4.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes LA 111B and LA 211B are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.
5.1.4.2 Chemical Compatibility of Wastes Identified by Content Codes LA 111B and LA 211B

Attachment D contains an evaluation of potential chemical incompatibilities within content codes LA 111B and LA 211B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

5.1.4.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 111B and LA 211B

Shipping content codes LA 111B and LA 211B wastes are classified as hazardous because of the possible presence of the following hazardous wastes in IDC 003:

- F002 Spent, halogenated solvents
- F003 Spent, non-halogenated solvents
- F005 Spent, non-halogenated solvents

These wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LA 111B and LA 211B:

- Methyl ethyl ketone
- Cadmium
- Mercury
- Lead
- Beryllium
- Beryllium hydroxide
- Barium hydroxide
- Barium chloride
- Arsenic
- Di-N-Octyl Phthalate
- Selenium
- Silver
- Chromium
- Nickel
- Thallium

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.1.4.4 Analyses of Solidified Aqueous Waste - Total VOCs/EP Toxicity Metals

Attachment H contains two sets of data for sludge samples (IDC 003) taken from LANL. Three samples were analyzed in 1988, and two were analyzed in 1989.
In the 1988 sampling program, three sludge filter cake samples were analyzed for volatile organics, pesticides, and bases/neutral/acidic (BNAs) using EPA standard methods 8240, 8270, and 8080 from SW-846.

In the 1989 sampling program, two sludge filter cake samples were analyzed for chemicals on the Target Compound List (TCL) and additional volatile organics, and semivolatile organics by gas chromatography/mass spectroscopy. The samples were also analyzed for EP-toxic metals using EPA standard method 1310 from SW-846.

All analyses were run on low-level samples, but are representative of transuranic waste, since all drums sampled were produced from the same waste stream.

5.1.4.5 Analyses of Leachable Metals - EP Toxicity Tests

Attachment K contains the results of EP toxicity tests, conducted in a 1987 onsite program, on solidified aqueous wastes from LANL. Twelve sludge filter cake samples were analyzed for metals content. All heavy metals listed in 40 CFR Part 261.24 were analyzed, as well as nickel and thallium.

5.1.4.6 Headspace Analyses of Solidified Aqueous Waste - Clements and Kudera

The important waste characterization work performed by Clements and Kudera is described in their "TRU Waste Sampling Program: Volumes I and II". Volumes I and II are included as Attachments N and O. The following is a summary of the information in these two volumes that are representative of waste generated at LANL under the LA 111B and LA 211B shipping content codes, and identified as IDC 003.

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUACT-II content codes. Information provided by LANL indicates that A-75 is the LANL waste code that is included under IDC 003 and shipping content codes LA 111B and LA 211B. Table 57 in Attachment N includes four containers from LANL Waste Code A-75. Unfortunately, no headspace analyses for these four drums (012124, 012307, 012327, and 012535) are reported. Therefore, there are no gas sampling results for LA 111B and LA 211B (IDC 003).

Attachment O does not contain any information specific to LA 111B and LA 211B.

5.2 LA 114

Content code LA 114A, described in the TRUACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON) is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type I, Solidified Aqueous or Homogeneous Inorganic Solids, and corresponds to IDC 006, Solidified Process Solids. There are no experimental equivalents of this shipping content code.

The waste is described in the TRUCON as solidified process solids (process residue from evaporator bottom and other discardable solutions, process leached solids, ash, filter cakes, salts, metal oxides, fines, etc.) that are immobilized in gypsum cement to form a noncorrosive solid matrix in a 55-gallon drum or one-gallon cans.
5.2.1 General Process Knowledge - IDC 006

Shipping content code LA 114 consists of IDC 006 waste. The aqueous effluent and several types of fine particulates that comprise IDC 006 are from the processing of plutonium at Building PF-4. The resultant waste is immobilized in gypsum cement in Room 401.

Process residues to be cemented arise primarily from the evaporator in Rooms 434 and 401 of Building PF-4. These acidic aqueous bottoms are collected in a tank in Room 401 and neutralized as needed. Small liquid waste streams from throughout PF-4 are generally included in this stream for solidification. Organic liquids (usually oil or cleaning solvent) are mixed with an emulsifier before being added to the stream.

After adjusting the pH, the liquid is mixed with gypsum cement in a steel drum. Fine particulates, generally from graphite molds and salt cake breaking, and fines from the leaching processes in Rooms 409 and 420, are added to the cement paste before it hardens.

This waste stream is packaged in lead-lined drums. The drums are then transported to TA-54, Area G, for storage.

Figure 5.2-1 depicts the treatment process in Building PF-4 which generates the process solids, IDC 006.

General waste process information for shipping content code LA 114A is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.2.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.
5.2.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes LA 114A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.2.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 114A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 114A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

5.2.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 114A

Shipping content code LA 114A wastes are classified as hazardous because of the presence of the following heavy metals:

- D006 Cadmium
- D007 Chromium
- D008 Lead

These wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional constituents are listed for LA 114A:

- Beryllium
- Arsenic
- Mercury
- Bromoform
- 1,1,1-Trichloroethane
- Trichloroethylene
- Carbon tetrachloride
- Dichloroethane
- Hydrofluoric acid

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
Figure 5.2-1. Flow Diagram for the Processing of Contact Handled Transuranic Solidified Inorganic Process Solids for Building PF-4, Room 401 (Shipping Content Code 114, IDC 006)
5.2.2.4 **Headspace Analyses of Solidified Aqueous Wastes - Clements and Kudera**

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work on LANL wastes is included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided by LANL indicates that the waste streams that make up IDC 006 are more recent than the 1985 Clements and Kudera study. The new LANL waste code comparable to IDC 006 and shipping content code LA 114 is waste code A-24. The Appendix C listing of the LANL waste codes does not include an A-24 code, and Tables 52 to 60 in Attachment N do not include A-24. Therefore, there are no gas sampling results for LA 114A.

5.3 **LA 115**

Content code LA 115A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON) is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type II, Solid Inorganics, and corresponds to IDC 004, TRU Graphite Waste. There is no experimental equivalent of this shipping content code.

This waste is described in the TRUCON as discarded graphite mold and furnace equipment from plutonium casting operations, etc., which may contain trace quantities of combustible waste such as plastics (mainly packaging).

5.3.1 **General Process Knowledge**

Shipping content code LA 115 (IDC 004) is graphite waste generated from the processing of plutonium at Building PF-4. Graphite waste is made up of mainly broken graphite molds which originate in the casting process in Room 327. Small particulates are sent to Room 401 for inclusion in the cemented process residuals. Large graphite chunks are sent to the waste management room (432). There, they are packaged as shipping content code LA 115 if there is enough to fill a 55-gallon drum. Small quantities may be included in the combustible waste drums (shipping content code LA 116). The drums are sent to TA-54, Area G, for storage. Figure 5.3-1 depicts the generation and processing of the graphite waste.

General waste process information for shipping content code LA 115A is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
• Chemical Compatibility (Within the Content Code)
• Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.3.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

5.3.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes LA 115A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.3.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 115A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 115A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

5.3.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 115A

Shipping content code LA 115A (IDC 004) wastes are classified as hazardous because of the presence of lead. The Hazardous Waste Number for lead is D008. Hazardous wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional constituents are listed for LA 115A:

- Beryllium
- Nickel
- Arsenic
- Cadmium
- Beryllium hydroxide
- Chromium

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
Figure 5.3-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Graphite Waste for Building PF-4  
(Shipping Content Code 115, IDC 004)
5.3.2.4 Headspace Analyses of Solid Inorganics - Clements and Kudera

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work on LANL wastes are included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can generally be correlated to TRUPACT-II content codes. TRUPACT-II shipping content code LA 115A is not comparable to any of the LANL waste codes, and should not be considered as being represented in Tables 52 to 60 in Attachment N, which display the results of headspace gas analyses.

5.4 LA 116

Content code LA 116A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON) is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type III, Solid Organics, and corresponds to IDC 004, Combustible Waste. There is no experimental equivalent of this shipping content code.

This waste is described in the TRUCON as combustible solids such as paper, rags, plastic, and rubber, which may contain some small fraction of noncombustible solids such as scrap metals.

5.4.1 General Process Knowledge - IDC 004

Shipping content code LA 116A (IDC 004) consists of combustible solids collected from nearly all operations in Building PF-4. The wastes include rubber gloves, polyethylene bags, PVC sheets and bags, wood scraps, paper, and rags. This stream normally contains no hazardous materials except solvent residues on cleaning rags. The waste is collected in the waste management room (432) for packaging, documentation, and assay. The drummed waste is then shipped to TA-54, Area G, for storage. Figure 5.4-1 depicts the generation and processing of the combustible waste.

General waste process information for shipping content code LA 116A is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross index to previously used IDCs)

The TRUCON document has been included as Attachment A.
5.4.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

5.4.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes LA 116A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.4.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 116A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 116A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

5.4.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 116A

Shipping content code LA 116A waste is classified as hazardous because of the presence of lead. The Hazardous Waste Number for lead is D008. Hazardous wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional constituents are listed for LA 116A:

- Toluene
- 1,1,1-Trichloroethane
- Trichlorethylene
- Bromoform
- Carbon tetrachloride
- Dichloroethane
- Hydrochloric acid
- Arsenic
- Barium hydroxide
- Barium chloride
- Beryllium
- Beryllium hydroxide
- Mercury
- Cadmium
- Nickel
Figure 5.4-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible Waste for Building PF-4 (Shipping Content Codes 116, IDC 004)
Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.4.2.4 Headspace Analyses of Solid Organics - Clements and Kudera

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work on LANL wastes are included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided from LANL indicates that the following LANL waste codes are included under IDC 004 and shipping content code LA 116A:

- A-10
- A-14
- A-15
- A-16
- A-17
- A-18
- A-19
- A-60

Tables 52, 54, 55, and 59 include the results of gas sampling from these LANL waste codes, and are included in Attachment N. Drums were sampled for gases, including hydrogen, nitrogen, oxygen, carbon monoxide (CO), carbon dioxide (CO₂), argon and nitrous oxides (NOₓ), as well as 1,1,1-trichloroethane, saturated hydrocarbons (methane through propane), and other hydrocarbons as specified. No 1,1,1-trichloroethane was detected in any of the drums. Trace (<1% by volume) saturated hydrocarbon gases were detected in several drums (see Tables 52 and 54).

5.5 LA 117

Content code LA 117A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type II, Solid Inorganics, and corresponds to IDC 005 LM, TRU Metal Waste. There is no experimental equivalent of this shipping content code.

5.5.1 General Process Knowledge - IDC 005

Shipping content code LA 117 (IDC 005) consists of metal waste from Building PF-4. The metal waste consists of motors, pumps, tools, and process equipment, which may contain some small fraction of combustible waste, such as plastics (mainly packaging), etc. Small particulates are sent to Room 401 for inclusion in the cemented process residues. Large chunks are sent to room 432 to be drummed and then stored in TA-54, Area G.

Figure 5.5-1 depicts the generation and processing of the metal waste.

General waste process information for shipping content code LA 117A is contained in Section 14 of the TRUCON document.
A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.5.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

5.5.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LA 117A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.5.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 117A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 117A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

5.5.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 117A

Shipping content code LA 117A wastes are classified as hazardous because of the presence of lead. The Hazardous Waste Number for lead is D008. Hazardous wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LA 117A:
Figure 5.5-1: Process Flow Diagram for the Generation of Contact-Handled Transuranic Metal, Glass, and Pyrochemical Salt Waste & Leaded Rubber for Building PF-4 (Shipping Content Codes 117, 118, 123, and 124, IDC 005).
- Barium chloride
- Barium hydroxide
- Carbon tetrachloride
- Hydrofluoric acid

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.5.2.4 Headspace Analyses of Solid Inorganics - Clements and Kudera

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work on LANL wastes are included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided from LANL indicates that the following LANL waste codes are included under IDC 005 and shipping content code LA 117A:

- A-50
- A-52
- A-61

Tables 53 and 56 in Attachment N include the results of gas sampling from these LANL waste codes. Drums were sampled for gases, including hydrogen, nitrogen, oxygen, CO, CO₂, argon and NOx, as well as 1,1,1-trichloroethane, saturated hydrocarbons (methane through propane), and other hydrocarbons as specified. No 1,1,1-trichloroethane was detected in any of the drums. No hydrocarbons were detected.

5.6 LA 118

Content code LA 118A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type II, Solid Inorganics, and corresponds to IDC 005 LG, TRU Glass Waste. There is no experimental equivalent of this shipping content code.

This waste is described in the TRUCON as discarded labware, windows, bottles, etc., which may contain some small fraction of combustible waste, such as plastics (mainly packaging).

5.6.1 General Process Knowledge - IDC 005

Shipping content code LA 118 consists of IDC 005. The glass waste is generated from operations in Building PF-4. Most of the glass waste comes from used laboratory glassware from the leaching processes in Rooms 409 and 420. Some glass waste originates from repair operations such as replacing glovebox windows. The waste is sent to Room 432 to be drummed and then stored in TA-54, Area G.

Figure 5.5-1 depicts the generation and processing of the glass waste.
General waste process information for shipping content code LA 118A is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.6.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

5.6.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LA 118A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.6.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 118A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 118A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

5.6.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 118A

Shipping content code LA 118A wastes are classified as hazardous because of the presence of lead. The Hazardous Waste Number for lead is D008. Hazardous wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.
Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LA 118A:

- Hydrofluoric acid
- Barium chloride
- Barium hydroxide
- Carbon tetrachloride

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.6.2.4 Headspace Analyses of Solid Inorganics - Clements and Kudera

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work at LANL are included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided from LANL indicates that LANL waste code A-47 is included under IDC 005 and shipping content code LA 118A.

Containers 010405 and 010494, in Table 60, include the results of gas sampling from this LANL waste code and are included on page 101 in Attachment N. Drums were sampled for gases, including hydrogen, nitrogen, oxygen, CO, CO₂, argon and NOₓ, as well as 1,1,1-trichloroethane, saturated hydrocarbons (methane through propane), and other hydrocarbons as specified. No 1,1,1-trichloroethane was detected in any of the drums. No hydrocarbons were detected.

5.7 LA 123

Content code LA 123A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989: DOE/WIPP 89-004 (TRUCON), is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type III, Solid Organics, and corresponds to IDC 005 P1, Lead rubber and Metal Waste. There is no experimental equivalent of this shipping content code.

5.7.1 General Process Knowledge - IDC 005

Shipping content code LA 123 (IDC 005) consists of TRU leaded rubber waste and metal generated in Building PF-4. The waste includes lead-lined gloves that are discarded along with metal waste (discarded metals, motors, and tools).

The waste is sent to Room 432 to be drummed, documented, and assayed. The waste is placed into 55-gallon drums and transported to TA-54, Area G, for storage.

Figure 5.5-1 depicts the generation and processing of the leaded rubber.

General waste process information for shipping content code LA 123A is contained in Section 14 of the TRUCON document.
A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.7.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

5.7.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LA 123A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.7.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 123A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 123A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

5.7.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 123A

Shipping content code LA 123A wastes are classified as hazardous because of the presence of lead. The Hazardous Waste Number for lead is D008. Hazardous wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LA 123A:
Nickel
Hydrofluoric acid
Bromof orm
Beryllium hydroxide
Arsenic
Carbon tetrachloride
Methyl ethyl ketone
Dichloromethane
Cadmium
Mercury

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.7.2.4 Headspace Analyses of Solid Organics - Clements and Kudera

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work on LANL wastes are included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided from LANL indicates that LANL waste code A-61 is included under IDC 005 and shipping content code LA 123A.

Tables 53 and 56 include seven drums of LANL waste code A-61 which were sampled for gases, including hydrogen, nitrogen, oxygen, CO, CO₂, argon and NOx, as well as 1,1,1-trichloroethane, saturated hydrocarbons (methane through propane), and other hydrocarbons as specified. No 1,1,1-trichloroethane was detected in any of the drums. No hydrocarbons were detected.

5.8 LA 124

Content code LA 124A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type II, Solid Inorganics, and corresponds to IDC 005 P2S, Pyrochemical Salt Waste. There is no experimental equivalent of this shipping content code.

5.8.1 General Process Knowledge - IDC 005

Shipping content code LA 124 (IDC 005) consists of pyrochemical salt waste generated from processing activities at Building PF-4. The waste consists of used chloride salts from pyrochemical processes such as electorefining, molten salt extraction, salt stripping, fluoride reduction, and direct oxide reduction, which may contain some small fraction of combustible waste such as plastics (mainly packaging).

The waste is packaged in tin or stainless steel cans and placed into a 55-gallon drum. Small particulates are sent to Room 401 for inclusion in the cemented process residues, as shown in Figure 5.5-1. Large chunks are sent to room 432 to be drummed and then stored in TA-54, Area G.
Figure 5.5-1 depicts the generation and processing of the pyrochemical salt waste.

General waste process information for shipping content code LA 124A is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.8.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

5.8.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LA 124A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.8.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 124A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 124A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

5.8.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 124A

Shipping content code LA 124A wastes are classified as hazardous because of the presence of lead. The Hazardous Waste Number for lead is D008. Hazardous wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.
Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LA 124A:

- Arsenic
- Beryllium and beryllium salts
- Cadmium
- Mercury
- Hydrofluoric acid
- Nickel

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.8.2.4 Heatpace Analyses of Solid Inorganics - Clements and Kudera

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work on LANL wastes is included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided from LANL indicates that the following LANL waste codes are included under IDC 005 and shipping content code LA 124A:

- A-27
- A-28
- A-29

Table 58 of Attachment N includes the results of gas sampling from A-27, shown on page 100. Drums were sampled for gases, including hydrogen, nitrogen, oxygen, CO, CO₂, argon and NOₓ, as well as 1,1,1-trichloroethane, saturated hydrocarbons (methane through propane), and other hydrocarbons as specified. No 1,1,1-trichloroethane was detected in any of the drums. No hydrocarbons were detected.

5.9 LA 125

Content code LA 125A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type III, Solid Organics, and corresponds to IDC 001, Incidental Combustibles and Mixed Metal Scrap. There is no experimental equivalent of this shipping content code.

The waste is described in the TRUCON as gloveboxes, process equipment, and ductwork from decommissioning operations. Gloveboxes may come complete with gloves, wiring, plastic or glass windows, plastic wrapping, and lead shielding.
5.9.1 General Process Knowledge - IDC 001

Shipping content code LA 125 consists of IDC 001. The waste is generated from the Transuranic Waste Size Reduction Facility (SRF), Building WM-69 in TA 50. Large metallic items such as gloveboxes are size-reduced by cutting (usually with a plasma-arc torch) and repackaged for shipment. The feed comes from decommissioning projects throughout the laboratory, but mostly from Building PF-4 and from TA-54 where the residue from decommissioning an old plutonium facility is stored. The waste is packaged in steel boxes which are transported to Area G in TA-54, for storage.

Figure 5.9-1 depicts the generation and processing of the combustible and noncombustible waste.

General waste process information for shipping content code LA 125A is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.9.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

5.9.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LA 125A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.

5.9.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 125A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 125A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.
Figure 5.9-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible and Noncombustible Waste for Building WM-69 (Shipping Content Code 125, IDC 001)
5.9.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 125A

Shipping content code LA 125A wastes are classified as hazardous because of the presence of lead. The Hazardous Waste Number for lead is D008. Hazardous wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LA 125A:

- Formaldehyde
- Cadmium
- Mercury

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.9.2.4 Headspace Analyses of Solid Organics - Clements and Kudera

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work on LANL wastes are included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided from LANL indicates that A-30, A-31, and A-36 are the LANL waste codes included under IDC 005 and shipping content code LA 125A. Table 52 to 60 in Attachment N do not include any containers from LANL waste codes A-30, A-31, and A-36. Therefore, there are no gas sampling results for LA 125A or IDC 001.

5.10 LA 126

Content code LA 126A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and stored at Los Alamos National Laboratory. This content code is included in Waste Type III, Solid Organics, and corresponds to IDC 006, Solidified Organic Process Solids. There is no experimental equivalent of this shipping content code.

5.10.1 General Process Knowledge - IDC 006

Shipping content code LA 126 (IDC 006) waste originates from aqueous effluents and leached solids from processes in Building PF-4. The process solids (process residue from evaporator bottoms and other discardable solutions, process leached solids, ash, filter cakes, salts, metal oxides, fines, etc.) are neutralized and then immobilized in gypsum cement to form a noncorrosive solid matrix in 55-gallon drums or one-gallon cans.
May 1987 - September 1988: One-Gallon Cement Fixation Process

In the one-gallon cement fixation process, the waste was mixed with a cement powder in one-gallon cans to form a noncorrosive solid matrix. The one-gallon cans were then packaged in a 55-gallon drum. The packaging within the drum included a 1/16-inch thick lead sheet. The lead shielding consists of two disks, placed at the top and bottom of a 1/16-inch thick lead sheet fitted to the inside circumference of the drum wall.

July 1988 - Present: 55-Gallon Cement Fixation Process

In the 55-gallon cement fixation process, the waste is mixed with a cement powder to form a noncorrosive solid monolith. One or more 2-inch thick styrofoam disks are placed on top of the 12-mil outer bag as bracing for the top lead disk. The lead shielding consists of two disks, placed at the top and bottom of a 1/16-inch thick lead sheet fitted to the inside circumference of the drum wall.

Figure 5.2-1 depicts the generation and processing of the cemented waste.

General waste process information for shipping content code LA 126A is contained in Section 14 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosive (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

5.10.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

5.10.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LA 126A are listed in Section 3 of Attachment B1 of the NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or other material that could be in the waste, although not necessarily in every drum or box of the waste.
5.10.2.2 Chemical Compatibility of Wastes Identified by Content Code LA 126A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LA 126A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

5.10.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LA 126A

Shipping content code LA 126A wastes are classified as hazardous because of the presence of the following heavy metals:

- D006 Cadmium
- D007 Chromium
- D008 Lead

These wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are a number of chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LA 126A:

- Hydrofluoric acid
- Beryllium
- Arsenic
- Carbon tetrachloride
- Bromoform
- Mercury
- Dichloroethane
- Trichloroethylene
- 1,1,1-Trichloroethane

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

5.10.2.4 Headspace Analyses of Solid Organics - Clements and Kudera

Clements and Kudera conducted headspace gas analyses for a number of LANL containers. The results of their work on LANL wastes are included in Attachment N. Appendix C in Attachment N lists the LANL waste codes ("A-codes") for LANL containers sampled. The waste code system used by LANL is based on waste material description and can be correlated to TRUPACT-II content codes. Information provided from LANL indicates that the waste streams that make up IDC 006 are more recent than the 1985 Clements and Kudera study. The new LANL waste code comparable to IDC 006 and shipping content code LA 126A is A-24. Older "A" codes (A-25, A-26, A-29, and A-46) represent particulates that could occur under LA 126A as cemented waste forms. Table 60 in Attachment N includes containers that would have headspace gases representative of the new cemented waste
Drums were sampled for gases, including hydrogen, nitrogen, oxygen, CO, CO₂, argon and NOx, as well as 1,1,1-trichloroethane, saturated hydrocarbons (methane through propane), and other hydrocarbons as specified. No 1,1,1-trichloroethane was detected in any of the drums. No hydrocarbons were detected.

5.11 BUILDING AND PROCESS DESCRIPTIONS

Provided below are descriptions of the buildings and processes at LANL where the wastes discussed in this section are generated and treated.

5.11.1 Description of Building PF-4 and Its Processes

Building PF-4 at TA-55 in Los Alamos National Laboratory contains the Plutonium Processing Facility. Plutonium operations at the facility involve research and development, oxide production, metal preparation, and fabrication and recovery work with Pu-238 and Pu-239 materials.

Acidic aqueous wastes are produced by four processes. A small recovery incinerator (not currently operating) produces a stream of off-gas scrub solution. The plant vacuum system also produces mildly acidic aqueous liquid waste when it collects acidic vapors from various process areas. The circulating chilled water overflow system produces similar waste. The process evaporator distillates are also acidic. None of these sources routinely use significant quantities of solvents, but traces of solvent vapors may be collected when equipment is being cleaned. All of the above aqueous liquid waste streams are piped directly via the acid waste line to the liquid waste treatment plant at TA-50, Building WM-1, Room 60, for treatment.

One additional acidic aqueous liquid waste stream comes from the evaporator. This liquid is transferred to the cementing process in Room 401.

Caustic aqueous waste streams are produced by two processes. One is a caustic off-gas scrubbing solution from the metal production process. The other consists of caustic filtrate from several chemical recovery processes. None of these processes routinely use solvents. Both of these waste streams are piped directly, via the caustic waste line, to the liquid waste treatment facility at TA-50, Building WM-1, Room 60.
6.0 LAWRENCE LIVERMORE NATIONAL LABORATORY

6.1 LL 111

Content code LL 111A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989, DOE/WIPP 89-004 (TRUCON), is waste generated at Lawrence Livermore National Laboratory. This content code is included in Waste Type I, Solidified Aqueous or Homogeneous Inorganic Solids, and corresponds to IDCs 002 and 292, Solidified Aqueous Waste. There is no experimental equivalent of this content code.

Note 1: IDC 292 is no longer generated, and the waste is in retrievable storage at Nevada Test Site. For this reason, IDC 292 actually corresponds to content code NT 111A and NT 211A (see Section 6.2).

6.1.1 General Process Knowledge - IDCs 002, 292

IDCs 002 and 292 are nitric acid sludge from the purification of plutonium. Most of the waste is generated in Building 332, but small quantities are also generated in Building 251.

The sludge contains nitric acid with only trace amounts of organics. The sludge is neutralized to a pH of 8 to 12 then solidified with Aquiset, Portland cement, or other solidification agent in 1-gallon cans which are placed in 55-gallon drums. Liquids are solidified in Building 332 or 419. Figures 6.1-1 and 6.1-2 show the process that generates the aqueous waste. Figure 6.1-3 depicts the solidification process flow.

General waste process information for shipping content code LL 111A is contained in Section 15 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.
6.1.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.

6.1.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LL 111A are listed in Section 4 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

6.1.2.2 Chemical Compatibility of Wastes Identified by Content Code LL 111A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LL 111A and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

6.1.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LL 111A

There are no hazardous constituents reported for IDC 002, which corresponds to shipping content code LL 111A, in the TRU Mixed Waste Characterization Database (Attachment E).

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore are not reported in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LL 111A:

- Carbon tetrachloride
- Trichloroethylene
- Methyl ethyl ketone
- Beryllium
- Hydrofluoric acid
- Chloroform
- Lead
- Chromium

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

6.2 NT 111 and NT 211

Content codes NT 111A and NT 211A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are waste generated at Lawrence Livermore National Laboratory and stored at the Nevada Test Site. These content codes are included
Fig. 6.1-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Waste (Shipping Content Codes LL 111, LL 116, LL 124, IDCs 001, 002, 004, 292)
Fig. 6.1-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Waste for the Plutonium Facility (Shipping Content Codes LL 111, LL 116, LL 124, IDCs 001, 002, 004, 292)
Fig. 6.1-3. Process Flow Diagram for the Solidification of Contact Handled Transuranic Aqueous Sludge Waste in Buildings 332 and 419 (Shipping Content Code LL 111, IDC 002, 292)
in Waste Type I, Solidified Aqueous or Homogeneous Inorganic Solids. Each content code corresponds to the following IDCs:

<table>
<thead>
<tr>
<th>Content Codes</th>
<th>Corresponding IDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT 111A</td>
<td>002, 292</td>
</tr>
<tr>
<td>NT 211A</td>
<td>002, 292</td>
</tr>
</tbody>
</table>

These content codes have the same general process information and waste characterization data as LL 111A (see Section 6.1).

6.3 LL 116

Content code LL 116A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated at Lawrence Livermore National Laboratory. This content code is included in Waste Type III, Solid Organics, and corresponds to IDC 001, Mixed Glovebox Waste. There is no experimental equivalent of this content code.

6.3.1 General Process Knowledge - IDC 001

TRU combustible wastes generated at Lawrence Livermore National Laboratory consists of paper, tissues, gloves, laboratory glassware, small equipment, tools, plastic and small quantities of solidified aqueous sludge. Combustible wastes generated in Building 332 are non-line wastes. Building 251 conducts analytical chemistry, and generates typical inorganic laboratory waste. Figures 6.1-1 and 6.1-2 show the processes that generate combustible waste.

General waste process information for shipping content code LL 116A is contained in Section 15 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.
6.3.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.

6.3.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LL 116A are listed in Section 4 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List, Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

6.3.2.2 Chemical Compatibility of Wastes Identified by Content Code LL 116A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LL 116A and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

6.3.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LL 116A

IDC 001, which corresponds to shipping content code LL 116A, combustible waste, is classified as hazardous because of the presence of VOCs and metals. The VOCs and metals present in the combustible waste are:

- F002 1,1,1-Trichloroethane
- F003 Acetone
- P015 Beryllium
- D008 Lead

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore are not reported in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for LL 111A:

- Hydrofluoric acid
- Chromium
- Nickel
- 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- Methyl ethyl ketone
- Carbon tetrachloride
- Chloroform
- Trichlorethylene
Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generator sites through process knowledge and/or analytical data.

6.4 NT 116 and NT 225

Content codes NT 116A and NT 225A, described in the TRUCON, are waste generated at Lawrence Livermore National Laboratory and stored at the Nevada Test Site. These content codes are included in Waste Type III, Solid Organics. Each content code corresponds to the following IDCs:

<table>
<thead>
<tr>
<th>Content Codes</th>
<th>Corresponding IDCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT 116A</td>
<td>001, 993</td>
</tr>
<tr>
<td>NT 225A</td>
<td>001, 993, 330, 961</td>
</tr>
</tbody>
</table>

A description of each of the IDCs, as provided in the TRUCON, is as follows:

<table>
<thead>
<tr>
<th>IDC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Mixed Glovebox Bagout Waste</td>
</tr>
<tr>
<td>993</td>
<td>Mixed Glovebox Bagout Waste</td>
</tr>
<tr>
<td>330</td>
<td>Dry Combustibles</td>
</tr>
<tr>
<td>961</td>
<td>Contaminated Equipment/Metal</td>
</tr>
</tbody>
</table>

NT 225A is an "older" waste form that was generated and placed in retrievable storage at Nevada Test Site prior to establishment of the WIPP Waste Acceptance Criteria (WAC). There are no experimental equivalents of these content codes.

6.4.1 General Process Knowledge - IDCs 001, 993, 330, 961

Combustible and noncombustible NT 116A and NT 225A waste is generated in Building 332 at Lawrence Livermore National Laboratory. It consists of mixed glovebox bagout waste (small tools and dry solids), non-line generated laboratory trash (paper, tissues, rags, etc.), some small equipment, and small quantities of solidified sludge. NT 116A and NT 225A contain the same materials and were generated by the same processes; however, the glass and metal content is higher in NT 225A.

General waste process information for shipping content codes NT 116A and NT 225A is contained in Section 17 of the TRUCON document (Attachment A).

6.4.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes.

6.4.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes NT 116A and NT 225A are listed in Section 6 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):
The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

6.4.2.2 Chemical Compatibility of Wastes Identified by Content Codes NT 116A and NT 225A

Attachment D contains an evaluation of potential chemical incompatibilities within content codes NT 116A and NT 225A, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

6.4.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in NT 116A and NT 225A

IDCs 001, 330, 961, and 993, which correspond to shipping content codes NT 116A and NT 225A, are classified as hazardous because of the presence of volatile organic compounds, lead, and beryllium. The hazardous constituents present in content codes NT 116A and NT 225A are:

- F002 1,1,1-Trichloroethane
- F003 Acetone
- D008 Lead
- P015 Beryllium

These wastes are described in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore are not reported in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for NT 116A and NT 225A.

- 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- Carbon tetrachloride
- Chloroform
- Trichloroethylene
- Methyl ethyl ketone
- Chromium
- Hydrofluoric acid
- Nickel

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
6.5 LL 124

Content code LL 124A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated at Lawrence Livermore National Laboratory. This content code is included in Waste Type II, Solid Inorganics, and corresponds to IDC 004, Special Isotope Separation (SIS) Salt Waste. There is no experimental equivalent of this content code.

6.5.1 General Process Knowledge - IDC 004

A calcium-containing pyrochemical is used in Building 332 during the plutonium purification process. The spent salt contains trace amounts of calcium and has been demonstrated to be non-pyrophoric. The waste is drummed and shipped to the Nevada Test Site. Figure 6.1-2 shows the process that generates the waste.

General waste process information for shipping content code LL 124A is contained in Section 15 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

6.5.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.

6.5.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code LL 124A are listed in Section 4 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989).

The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.
6.5.2.2 Chemical Compatibility of Wastes Identified by Content Code LL 124A

Attachment D contains an evaluation of potential chemical incompatibilities within content code LL 124A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

6.5.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in LL 124A

IDC 004, which corresponds to shipping content code LL 124A, is classified as nonhazardous; no hazardous constituents are reported in Attachment E.

Note 1: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

6.6 BUILDING AND PROCESS DESCRIPTIONS

The following processes and buildings from the flow diagrams in Figures 6.1-1 to 6.1-3 are described below.

6.6.1 Building 332 - Plutonium Facility

Building 332 contains processes for the fabrication, metallurgy, and reclamation of plutonium-containing materials. TRU waste is generated as a byproduct of these operations. Typical waste includes: combustible materials from contamination control procedures, plutonium residues from thermal reclamation processes, pyrochemical salt waste (non-pyrophoric), and small amounts of liquids.

All wastes, with the exception of liquids, are packaged in plastic and metal containers and placed in 55-gallon drums for storage. Liquid wastes are solidified within Building 332, or sent to Building 419 for solidification.

Wastes are transferred to the materials management division for radionuclide analysis, and then moved to Building 612 for storage.

6.6.2 Building 251 - Nuclear Chemistry Division

Building 251, the heavy elements facility, handles TRU-contaminated material for radiochemical analysis, separation, and other programmatic work. Small quantities of combustible waste and liquids are generated for disposal as TRU waste. All wastes, with the exception of liquids, are packaged in plastic and metal containers and placed in 55-gallon drums for storage. Liquid wastes are solidified within Building 251, or sent to Building 419 for solidification.

6.6.3 Building 419 - Hazardous Waste Management Decontamination Facility

Aqueous TRU-contaminated liquid wastes from Buildings 332 and 251 are solidified in the hazardous waste management decontamination facility. Wastes are solidified using Portland cement, Aquiset, and other solidification agents. Liquids are solidified in one-gallon containers, cured, inspected, and packaged into 55-gallon drums. The drums are transferred to Building 612 after sealing.

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Small amounts of combustible waste generated during the solidification process are also included within the 55-gallon drums.

6.6.4 Building 234 - Materials Management Counting Facility

In Building 234, radioassay is conducted on waste materials generated in Buildings 332 and 251. Some of the solid waste is returned to Building 332 for plutonium recovery. The remainder is sent to Building 612.

6.6.5 Building 612 - Hazardous Waste Management Solid Waste Facility

Building 612 receives the solidified aqueous liquid waste, spent salt and combustible waste from the other buildings. From there, most of the waste is shipped to the Nevada Test Site.
7.0 MOUND LABORATORY

7.1 MD 111

Content codes MD 111A and MD 111B, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated and temporarily stored at Mound Laboratory. In the past, newly generated waste has been sent to Idaho National Engineering Laboratory for retrievable storage. These content codes are included in Waste Type I, Solidified Aqueous or Homogeneous Inorganic Solids, and correspond to IDC 836, Solidified Sludge, and IDC 842, Contaminated Soil. There are no experimental equivalents for these content codes.

The TRUCON document describes IDC 836 waste as aqueous effluent from decontamination and decommissioning activities in former Pu-238 processing areas. The sludge, which contains 20-25% solids, is mixed with cement. The TRUCON document describes IDC 842 waste as soil contaminated to transuranic levels with Pu-238 from pipeline breaks and spills. The contaminated fluids are aqueous solutions with trace levels (if any) of organics in the fluids.

7.1.1 General Process Knowledge - IDC 836

Shipping content code MD 111A consists of IDC 836. IDC 836 originated from the decommissioning and decontamination activities in the former plutonium processing, special metallurgical, and research buildings, and is treated in the waste disposal building. These wastes can be categorized as follows: low-level, alpha-contaminated waste water primarily from decontamination and decommissioning operations and shower facilities.

The following flow diagram, Figure 7.1-1, shows how these aqueous wastes are generated and subsequently processed to aqueous solids, IDC 836. The following is a short narration on these wastes and the processes that generate them.

General

The acidic aqueous wastes from decommissioning and decontamination are processed through neutralization, filtration, and coprecipitation equipment. The resultant sludge from filtration is stabilized prior to shipment to Building 23 for storage.

Caustic Coprecipitation

This process reduces the contamination of the caustic (pH from 11 to 11.5) waste, producing a low specific activity liquid waste. Multiple cycles through the coprecipitation process may be required for feed streams with high actinide concentrations. Ferric sulfate, calcium chloride, and a coagulating agent are used to form a floc that coprecipitates with the radioactive contaminant in the flash mixer tank. The liquid then flows to a flocculator, where an anionic polyelectrolyte flocculent is added to enhance agglomeration of the suspended solid flocs. The flocculated mixture flows to the clarifier where the solids are permitted to settle. The slurry is removed by a continuously moving rake in the bottom of the clarifier tank. The suspended radioactive solids leave the clarifier in this slurry and are transferred to the filtration and immobilization process.
The clarifier liquid effluent overflows through a launder trough located at the top of the clarifier and is transferred to the second stage precipitation process. The second stage is a batch precipitation process to further reduce the level of radioactive and chemical contamination. The batch process utilizes the same chemical reagents as the first stage precipitation.

The precipitated sludge from the first and second stage precipitation are sent to two 1,000-gallon storage pits. The sludge is then placed into 55-gallon drums and solidified with cement. These drums are referred to as IDC 836, solidified aqueous waste. The solidified sludge is sent to Building 23 for storage. The supernatant from the first and second stage precipitation is sent through a carbon adsorption unit and then filtered through a 12-inch sand bed, a bone char column, and a 1 micrometer (um) filter. The filtrate is stored in a 120,000-gallon tank until an analytical sample can be obtained. When the liquid meets radioactive specifications, it is discharged to the river. Filtrate less than the radioactive specifications is recycled through the entire treatment process.

General waste process information for shipping content code MD 111A is contained in Section 16 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

7.1.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

7.1.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code MD 111A are listed in Section 5 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.
Figure 7.1-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Solidified Aqueous or Homogeneous Inorganic Solids for the Waste Disposal Building (Shipping Content Code 111A, IDC 836)
7.1.2.2 Chemical Compatibility of Wastes Identified by Content Code MD 111A

Attachment D contains an evaluation of potential chemical incompatibilities within content code MD 111A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

7.1.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in MD 111A

IDC 836, which corresponds to shipping content code MD 111A, is classified as a hazardous waste because of the potential presence of listed solvents and heavy metals. As reported in the TRU Mixed Waste Characterization Database (Attachment E), the hazardous constituents present in the waste are:

- F001 Listed solvents (unspecified)
- F002 Listed solvents (unspecified)
- F003 Listed solvents (unspecified)
- F004 Listed solvents (unspecified)
- F005 Listed solvents (unspecified)
- D005 Barium
- D006 Cadmium
- D007 Chromium
- D008 Lead
- D009 Mercury
- D010 Selenium
- D011 Silver

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D. Because of lack of historical information, Mound has included listed solvents and EP-toxic metals as potential hazardous wastes. Further process information and/or analytical data will be required to discharge these waters.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are expected to be present and potentially regulated under RCRA according to 40 CFR Part 261, Subparts C and D. In the TRUPACT-II Chemical List, the following additional chemicals are listed for MD 111A:

- 1,1,1-Trichloroethane
- Trichloroethylene
- Mercury
- Beryllium
- Hydrofluoric acid
- Nickel
- 1,1,2-Trichloro-1,2,2 trifluoroethane (Freon-113)

Note 2: Table 2-1 contains a listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
7.1.2.4 Sludge Analyses - EP Toxicity Results

Attachment K lists the results of three samples of sludge that were analyzed according to standard procedure 1310 in SW-846, extraction procedure (EP) toxicity. The three samples are low-level (LLW) drums of waste, but are generated from a waste stream that generates both LLW and transuranic waste. One sample is represented by two of the analyses (duplicate). The third analysis was sampled at a different time.

7.1.3 General Process Knowledge - IDC 842

Shipping content code MD 111B consists of IDC 842. IDC 842 is drummed onsite and sent to Building 31 for storage. It is anticipated that some TRU-contaminated soil will be generated as DOE cleans up contaminated sites at the Mound Plant. Some of these sites are the result of historical pipeline breaks or leaks. The contaminated soil is classified as MD 111B and will be boxed, and then excess absorbent material added to absorb any water from soil compaction.

Figure 7.1-2 shows how the MD 111B (IDC 842) waste is generated and processed.

General waste process information for shipping content code MD 111B is contained in Section 16 of the TRUCON document (Attachment A).

7.1.4 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.

7.1.4.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code MD 111B are listed in Section 5 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

7.1.4.2 Chemical Compatibility of Wastes Identified by Content Code MD 111B

Attachment D contains an evaluation of potential chemical incompatibilities within content code MD 111B, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

7.1.4.3 Occurrence of RCRA-Regulated Hazardous Chemicals in MD 111B

Shipping content code MD 111B is classified as hazardous waste because of the potential presence of listed solvents and heavy metals. As reported in Attachment E, the constituents present in the contaminated soil are:

- F001 Listed solvents (unspecified)
- F002 Listed solvents (unspecified)
- F003 Listed solvents (unspecified)
- F004 Listed solvents (unspecified)
- F005 Listed solvents (unspecified)
Figure 7.1-2. Process Flow Diagram for the Generation of Contaminated Transuranic Homogenous Inorganic Solids (Shipping Container Code 111B, IDO 842)
• D006 Cadmium
• D007 Chromium
• D008 Lead
• D009 Mercury
• D010 Selenium
• D011 Silver

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D.

Site remedial investigations should include plans to more accurately characterize these soils.

Note 1: Table 2-1 contains a listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

7.2 MD 116

Content code MD 116A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and temporarily stored at Mound Laboratory. In the past, newly generated waste was sent to Idaho National Engineering Laboratory for retrievable storage. This content code is included in Waste Type III, Solid Organics, and corresponds to IDC 827, Combustible Waste. There is no experimental equivalent of this content code.

The TRUCON document describes the waste included in MD 116A as combustible waste consisting of paper, rags, cardboard, and wood generated from glovebox operations and the decontamination and decommissioning program.

7.2.1 General Process Knowledge - IDC 827

Shipping content code MD 116A consists of IDC 827 waste. IDC 827 is drummed on-site and sent to Building 23 for storage.

The combustible wastes originate from the plutonium processing building, the special metallurgical building, and the research building. These wastes can be categorized as follows: paper from Kimwipes, plastic gloves, shoe covers, bags, bubble suits, plywood, and 90-mil HDPE drum liners. This waste was generated in gloveboxes and during the decontamination and decommissioning program. Mound expects to generate no TRU combustible waste in the future.

The following flow diagram, Figure 7.2-1, depicts processes which generated the combustible waste and shows how the waste is treated.

General waste process information for shipping content code MD 116A is contained in Section 16 of the TRUCON document.

A TRUCON description includes the following information:

• Content Description
• Generating Site
• Waste Description
• Generating Sources
• Waste Form (Description)
• Assay (Method)
• Free Liquid (Methods of Control)
• Explosives/Compressed Gases (Methods of Control)
• Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
• Corrosives (Methods of Control)
• Chemical Compatibility (Within the Content Code)
• Correlation Table (Cross index to previously used IDCs)

The TRUCON document has been included as Attachment A.

7.2.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code, including any analyses.

7.2.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code MD 116A are listed in Section 5 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

7.2.2.2 Chemical Compatibility of Wastes Identified by Content Code MD 116A

Attachment D contains an evaluation of potential chemical incompatibilities within content code MD 116A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

7.2.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in MD 116A

IDC 827, which corresponds to shipping content code MD 116A, is classified as hazardous because of the presence of listed solvents and heavy metals. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the hazardous constituents present in the waste are:

• F001 Listed solvents (unspecified)
• F002 Listed solvents (unspecified)
• F003 Listed solvents (unspecified)
• F004 Listed solvents (unspecified)
• F005 Listed solvents (unspecified)
• D008 Lead
• D009 Mercury

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D.

Note 1: Table 2-1 contains a listing of all hazardous chemicals identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
Figure 7.2.1: Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible Waste for Plutonium Processing, Special Metallurgical, and Research Buildings (Shipping Content Code 116, IDC 827).
Note 2: There are no additional hazardous chemicals listed in Attachment B.

7.3 MD 117

Content code MD 117A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and temporarily stored at Mound Laboratory. In the past, newly generated waste was sent to Idaho National Engineering Laboratory for retrievable storage. This content code is included in Waste Type II, Solid Inorganics, and corresponds to IDC 824 (noncombustible TRU Waste). There is no experimental equivalent of this content code.

The TRUCON document describes the noncombustible TRU waste as glass, metal and masonry from the plutonium processing building, research building and special metallurgical building, generated during routine glovebox operations and during decontamination and decommissioning activities. A description of the building activities is provided in Section 7.4. Glass consists of analytical glassware and occasional reagent bottles. Metal includes tools, laboratory apparatus, gloveboxes, fumehoods, duct work, electrical wire and conduit, piping, pumps, fittings, sheet metal and other miscellaneous metallic objects. Masonry consists of bricks, concrete block, pieces of poured walls or floors, and plaster.

7.3.1 General Process Knowledge

Shipping content code MD 117A consists of IDC 824. IDC 824 is boxed onsite and sent to Building 31 for storage.

The following flow diagram, Figure 7.3-1, depicts processes which generate this noncombustible waste and show how the waste is treated. General waste process information for shipping content code MD 117A is contained in Section 16 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross index to previously used IDCs)

The TRUCON document has been included as Attachment A.

7.3.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.
7.3.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code MD 117A are listed in Section 5 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

7.3.2.2 Chemical Compatibility of Wastes Identified by Content Code MD 117A

Attachment D contains an evaluation of potential chemical incompatibilities within content code MD 117A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

7.3.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in MD 117A

IDC 824, which corresponds to shipping content code MD 117A, is classified as hazardous because of the potential presence of listed solvents and heavy metals. As listed in the TRU Mixed Waste Characterization Database (Attachment E), the hazardous constituents present in the MD 117A waste are:

- F001 Listed solvents (unspecified)
- F002 Listed solvents (unspecified)
- F003 Listed solvents (unspecified)
- F004 Listed solvents (unspecified)
- F005 Listed solvents (unspecified)
- D005 Barium
- D006 Cadmium
- D007 Chromium
- D008 Lead
- D009 Mercury
- D010 Selenium
- D011 Silver

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore are not reported in Attachment E. In the TRUPACT-II Chemical List, nickel is listed as an additional constituent for MD 117A.

Note 2: Table 2-1 contains a listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
Figure 7.3-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Metal Waste for the Plutonium Processing, Special Metallurgical, and Research Buildings (Shipping Content Code 117, IDC 824)
7.4 BUILDING AND PROCESS DESCRIPTIONS

Plutonium Processing Building

The former plutonium processing building has undergone extensive decommissioning and decontamination. Decontamination and shower water is transported to the waste disposal building for treatment. No hazardous chemicals are used.

Waste Disposal Building

The waste disposal building is a waste water treatment facility for low-level alpha contaminated waste water primarily from decontamination and decommissioning operations and shower facilities. Presently, aqueous wastes from the plutonium processing, special metallurgical, and research buildings are received and treated at the waste disposal building.

Special Metallurgical Building

The special metallurgical building housed the plutonium operations in the 1960's. The building underwent extensive decontamination and decommissioning in the 1970s and is currently being demolished.

Research Building

The research building housed an assortment of research operations. Most of the radioactive work has been removed. Currently, there are a few designated sinks which feed into the waste water treatment process. Small quantities of various laboratory chemicals, such as solvents and acids could contribute to the waste water stream. The aqueous wastes are pH adjusted, and the effluent is filtered, sampled, and discharged. The resultant sludge is solidified.
8.0 OAK RIDGE NATIONAL LABORATORY

8.1 OR 125

Content codes OR 125A and OR 125B, described in the TRUPACT-II Content Codes (TRUCON) Rev. 3, July 1989; DOE/WIPP 89-004, are waste generated and stored at Oak Ridge National Laboratory. These content codes are included in Waste Type III, Solid Organics. There are no corresponding IDCs, and there are no experimental equivalents of this content code.

8.1.1 General Process Knowledge

Content code OR 125 includes general chemical laboratory waste generated in Buildings 2026, 3019, 3033A, 3038, 5505, 7920, and 9735. Building 7824 receives and assays the waste. Buildings 7826 and 7834 store the waste. Building and process descriptions are provided in Section 8.2.

All TRU combustible and noncombustible waste generated at Oak Ridge National Laboratory is produced by some form of laboratory-related operation (OR 125A) or laboratory clean-up/hot cell renovation (OR 125B). The waste consists of materials such as empty reagent bottles, wipes, paper waste, vials, contaminated clothing, and gloves. The waste will also contain glass, plastic, and metal laboratory type containers and fixtures. The waste generated from laboratory clean-up/hot cell renovation will contain a higher percentage of metals.

Figure 8.1-1 depicts the generation and processing of the combustible and noncombustible waste.

General waste process information for shipping content codes OR 125A and OR 125B is contained in Section 18 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.
8.1.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.

8.1.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes OR 125A and OR 125B are listed in Section 7 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989):

The complete TRUPACT-II Chemical List is included as Attachment B. The reader is reminded that these estimates, particularly for volatile organic compounds, are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

8.1.2.2 Chemical Compatibility of Wastes Identified by Content Codes OR 125A and OR 125B

Attachment D contains an evaluation of potential chemical incompatibilities within content codes OR 125A and OR 125B, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

8.1.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in OR 125A and OR 125B

Waste from Oak Ridge National Laboratory does not have IDCs assigned that correspond to shipping content codes OR 125A and OR 125B. TRU mixed paper, metal and glass waste is classified as hazardous because of the presence of lead. The EPA Hazardous Waste Number for lead is D008. This information is found in the TRU Mixed Waste Characterization Database (Attachment E). The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for OR 125A and OR 125B:

- Hydrofluoric acid
- Hydrazine
- Toluene
- Carbon tetrachloride
- Nickel

Note 2: Table 2-1 contains a listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
Figure 8.1-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible and Noncombustible Waste (Shipping Content Code 125, IDC N/A)
8.2 BUILDING AND PROCESS DESCRIPTIONS

The following building and process descriptions, referred to in the flow diagrams, are discussed below.

Building 2026 - High-Radiation-Level Analytical Laboratory (HRLAL)

The primary function of this laboratory is to perform chemical analyses of radioactive materials as requested. All analyses of transuranic materials are performed by the Inorganic Physical Analysis (IPA) group within HRLA'. All TRU waste generated by the HRLAL is produced by the IPA group.

Building 3019 - Radiochemical Development Facility (RDF)

The RDF is managed by the Chemical Technology Division at Oak Ridge National Laboratory, and is used for solid fissile material storage and dispensing, and for the experimentation and development of radiochemical processes. This facility has been designated as a national repository for U-233.

Building 3033A - Isotope Production Programs (IPP)

The IPP at Oak Ridge National Laboratory is managed by the Chemical Technology Division. Services provided by the IPP include the custom order fabrication of research materials from various isotopic materials including small quantities of highly enriched actinides. The processes involve vacuum, metallurgical, and ceramic technologies. Isotope production involves a complex of several different buildings, most of which are located in close proximity. Several buildings within the complex contain laboratory facilities such as hot cells or gloveboxes that are shared by the different groups involved in isotope production. The production of isotopes at Oak Ridge National Laboratory, which has been drastically curtailed in the past few years, has recently been halted pending administrative decisions.

Building 3033A is used for neutron dosimeter fabrication. The dosimeters, as well as other actinide products, are weighed and packaged for shipment in this building.

Building 3038 - Isotope Production Programs (IPP)

Building 3038 is divided into three different sections that generate TRU waste. The Alpha Handling Facility (AHF) is used for neutron source fabrication and to extract decay products (such as U-234) from plutonium isotopes such as Pu-238. The east wing of the building is used as an actinide research facility for fabrication and material processes. An annex to the AHF is used to weigh and package samples for shipment.

Building 5505 - Transuranium Research Laboratory (TRL)

Building 5505 conducts studies of the chemical and physical properties of the actinide elements and their compounds. In general, each experiment will involve microgram to milligram quantities of the materials being studied.
Building 7920 - Radiochemical Engineering Development Center (REDC)

The REDC is the production, storage, and distribution center for the heavy-element research program of the U.S. Department of Energy. The REDC and the neighboring High Flux Isotope Reactor (HFIR) were built to produce quantities of transuranium elements for research. Basic operations at the REDC include the preparation of target samples to be irradiated at the HFIR reactor, and the extraction of desired materials from irradiated samples. Supporting operations include analytical chemical development studies, process development, process control analysis, final product purification steps, and product packaging operations.

Building 9735 - Mass Spectrometry Laboratory (MSL)

The MSL provides thermal ionization mass spectrographic services for Oak Ridge National Laboratory customers as requested. A subdivision of the MSL, the Actinides and Isotopic Mass Spectrometry (AIMS) group, provides mass spectrometry services for the actinides and other special isotopes. All mass spectrometry services for TRU elements are performed in the High-Alpha Transuranium Research (HATR) laboratory, which is part of the AIMS group. All TRU waste generated by the MSL is produced in the HATR laboratory by the AIMS group.

Building 7824 - Waste Examination and Assay Facility (WEAF)

All drums of TRU waste that are generated at Oak Ridge National Laboratory are examined at the WEAF for non-conforming items using Real Time Radiography (RTR) techniques. The drums are also assayed to obtain information relating to the radioisotopic content of the waste. If the drums fail the RTR examination, the drums are assayed and are transferred to the generator for repackaging. After passing RTR examination, the drums are assayed and transferred to Buildings 7826 and 7834.

Buildings 7826 and 7834 - Retrievable Storage Sites for TRU Waste

Both buildings are single-story concrete block structures that are located approximately 85 percent below grade. Each building is divided into twenty-four cells or compartments that are separated by concrete blocks. The cells are used to store drums of contact-handled TRU waste.
9.0 RICHLAND HANFORD

9.1 RH 112

Content code RH 112A, described in the TRUPACT-II Content Codes (TRUCON) Rev. 3, July 1989; DOE/WIPP 89-004, is waste generated and stored at Richland Hanford. This content code is included in Waste Type IV, Solidified Organics, and corresponds to IDC 004, Solidified Organics. There is no experimental equivalent of this content code.

The TRUCON document describes RH 112A waste as absorbed organics from plutonium processing, recovery processing, and analytical/chemical technology laboratories. The waste comes from the Plutonium Finishing Plant (PFP) which generates liquid organics from operations in the Plutonium Reclamation Facility, Plutonium Conversion - Remote Mechanical C Line, and Analytical/Chemical Laboratories. Building and process descriptions are provided in Section 9.5.

9.1.1 General Process Knowledge - IDC 004

Shipping content code RH 112 consists of IDC 004 waste. RH 112 is generated from the Plutonium Reclamation Facility (PRF) in the PFP. See Section 9.5 for more information on the buildings and their processes.

The PFP generates sludges and liquid organics that cannot be readily absorbed into the process system. These liquid organics are in an unusable form. The material may contain any or all of the following in a compatible configuration: carbon tetrachloride, tributyl phosphate, xylene, iron, nickel, chromium, normal paraffin hydrocarbons, trimethylbenzene, and tri-octyl phosphine oxide.

The liquid organics are absorbed in an inert material sufficient to absorb twice the amount of liquid. The absorbed organic is placed into a 1-gallon plastic jar.

The following flow diagrams, Figure 9.1-1 depict processes in the PFP which generate liquid organic waste. Figure 9.1-2 shows how these liquid wastes are subsequently processed to solidified organics, IDC 004.

General waste process information for shipping content code RH 112A is contained in Section 20 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)
The TRUCON document has been included as Attachment A.

9.1.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.

9.1.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code RH 112A are listed in Section 9 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

9.1.2.2 Chemical Compatibility of Wastes Identified by Content Code RH 112A

Attachment D contains an evaluation of potential chemical incompatibilities within content code RH 112A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

9.1.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RH 112A

IDC 004, which corresponds to shipping content code RH 112A, solidified organics, is classified as hazardous because of the presence of xylene (F003), as reported in the TRU Mixed Waste Characterization Database (Attachment E).

The Hazardous Waste Numbers identified in Attachment E are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for RH 122A:

- Carbon tetrachloride
- Nickel
- Chromium

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

9.2 RH 114

Content code RH 114A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and stored at Richland Hanford. This content code is included in Waste Type I, Solidified Aqueous or Homogeneous Inorganic Solids, and corresponds to IDC 003, Solidified Process Solids. There is no experimental equivalent of this content code.
Fig. 9.11. Process Diagram for the Generation of Contact-Handled Transuranic Leaded Rubber, Solidified Organics, & Noncombustible Waste for the Plutonium Reclamation Facility: Solvent Extraction (Ship Content Codes 112, 123, & 125, IAC 002 & 004).

* See Plutonium Reclamation Facility
Fig. 9.1-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Solidified Organics for the Plutonium Finishing Plant (Shipping Content Code 112, IDC 004)
The TRUCON document describes the RH 114A waste as sludges from plutonium processing, recovery processing and analytical/chemical technology laboratories. The source is the Plutonium Finishing Plant, which generates sludges from operations in the Plutonium Reclamation Facility and Plutonium Conversion-Remote Mechanical C line. Building and process descriptions are provided in Section 9.5.

9.2.1 General Process Knowledge - IDC 003

Shipping content code RH 114 consists of IDC 003 waste. RH 114 is generated from the Mechanical C-Line and the Plutonium Reclamation Facility in the PFP. See Section 9.5 for more information on the buildings and processes. The PFP generates sludges that cannot be readily absorbed into the process system. These sludges are scraped out of hoods or trays in an unusable form. The material may contain any or all of the following in a compatible configuration: plutonium oxide, plutonium oxalate, nitric acid, and traces of metal ions (e.g., iron, nickel, and chromium).

The PFP neutralizes the sludge with Portland cement. The sludge is mixed with cement in 0.5-liter plastic jars. The mixture is allowed to solidify before it is placed into the waste drum.

Figures 9.2-1 and 9.2-2 depict processes in the PFP which generate the sludge. Figure 9.2-3 shows how the sludge is subsequently processed to solidified inorganics, IDC 003.

General waste process information for shipping content code RH 114A is contained in Section 20 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross-Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

9.2.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.
9.2.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code RH 114A are listed in Section 9 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

9.2.2.2 Chemical Compatibility of Wastes Identified by Content Code RH 114A

Attachment D contains an evaluation of potential chemical incompatibilities within content code RH 114A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

9.2.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RH 114A

IDC 003, which corresponds to shipping content code RH 114A, does not have any hazardous constituents reported in Attachment E.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore are not reported in Attachment E. For RH 114A, nickel and chromium are additional chemical constituents in the waste.

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

9.3 RH 123

Content code RH 123A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), is waste generated and stored at Richland Hanford. This content code is included in Waste Type III, Solid Organics. Content code RH 123A has no corresponding IDC. There is no experimental equivalent of this content code.

The TRUCON document describes RH 123A waste as support equipment, support supplies, and failed equipment containing lead used for glovebox operations. It may consist of leaded glass, lead-lined hood gloves, lead blankets and miscellaneous equipment containing lead.

9.3.1 General Process Knowledge

The PFP generates waste such as leaded glass, lead-lined hood gloves, lead blankets, and miscellaneous equipment containing lead from operations in the Plutonium Reclamation Facility, Plutonium Conversion - Remote Mechanical C Line, and Product Handling. Similar waste is also generated from the PUREX facility. See Section 9.5 for more information on buildings and process.

The waste is packaged in at least two layers of plastic for contamination control and placed into galvanized 55-gallon drums lined with a polyethylene plastic liner.
Fig. 9.2-1. Process Diagram for the Generation of Contact Handled Transuranic Leaded Rubber, Solidified Inorganic Solids & Combustible and Noncombustible Waste for the PFP Remote Mechanical C-Line (Shipping Content Codes 114, 123 & 125, IDCs 002, & 003)
Fig. 9.2-2. Process Diagram for the Generation of Contact Handled Transuranic Leaded Rubber, Inorganic Process Solids, & Combustible and Noncombustible Waste for the Plutonium Reclamation Facility (Shipping Content Codes 114, 123, & 125, IDCs 002 & 003)

* See Plutonium Reclamation Facility - Solvent Extraction
Fig. 9.2-3. Process Flow Diagram for the Generation of Contact Handled Transuranic Solidified Inorganic Process Solids for the Plutonium Finishing Plant (Shipping Content Code 114, IDC 003)
Figures 9.1-1, 9.2-1, 9.2-2, 9.3-1 to 9.3-5 depict processes in the PFP and PUREX facilities which generate leaded rubber waste.

General waste process information for shipping content code RH 123A is contained in Section 20 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross index to previously used IDCs)

The TRUCON document has been included as Attachment A.

9.3.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for this shipping content code.

9.3.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content code RH 123A are listed in Section 9 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

9.3.2.2 Chemical Compatibility of Wastes Identified by Content Code RH 123A

Attachment D contains an evaluation of potential chemical incompatibilities within content code RH 123A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

9.3.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in RH 123A

There are no hazardous constituents reported in Attachment E for RH 123A; however, in the TRUPACT-II Chemical List, lead (D008) is reported for RH 123A.

Note 1: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.
9.4 RH 125

Content code RH 125A, described in the TRUPACT-II Content Codes (TRUCON) Rev. 3, July 1989; DOE/WIPP 89-004, is waste generated and stored at Richland Hanford. This content code is included in Waste Type III, Solid Organics, and corresponds to IDCs 001 and 002, TRU combustible waste. There is no experimental equivalent of this content code.

9.4.1 General Process Knowledge - IDCs 001 and 002

Shipping content code RH 125 consists of IDCs 001 and 002 waste. IDC 002 is generated from the Plutonium Reclamation Facility, Plutonium Conversion-Remote Mechanical C Line, Product Handling, Decontamination and Decommissioning, and Analytical/Chemical Laboratory operations in the Plutonium Finishing Plant. The Plutonium-Uranium Extraction Facility (PUREX) generates IDC 001 from the plutonium conversion operations, process solution sampling operations, laboratory analysis operations, plant ventilation operations, and facility modification operations. See Section 9.5 for more information on these buildings and processes.

The waste consists of any or all of the following items: surgical gloves, plastic bags and sheets, paper products, cloth, tape, rubber, leather, wood, glass, failed process equipment (made of stainless steel, carbon steel, Teflon, various gasket materials, etc.), leaded glass, lead-lined hood gloves, lead blankets, fluorescent lamps, flashlight batteries, piping, conduit, wiring, glass and metal portions of gloveboxes, pumps, motors, standard laboratory equipment (beakers, sample vials, flasks, etc.), and High-Efficiency Particulate Air (HEPA) filters.

The waste is packaged in at least two layers of plastic for contamination control and placed into galvanized 55-gallon drums lined with a polyethylene plastic liner.

Figures 9.1-1, 9.2-1, 9.2-2, 9.2-3, 9.3-1 to 9.3-5 depict processes in the PFP and PUREX facilities which generate the RH 125 (IDC 001 and 002) waste.

General waste process information for shipping content code RH 125A is contained in Section 20 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosives/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.
Fig. 9.3-1. Process Diagram for the Generation of Contact Handled Transuranic Leaded Rubber & Combustible and Noncombustible Waste for the Plutonium Reclamation Facility Hood HC-60 (Shipping Content Codes 123 & 125, IDC 002)

* See Plutonium Reclamation Facility - Solvent Extraction
Fig. 9.3-2. Process Diagram for the Generation of Contact Handled Transuranic Leaded Rubber & Combustible and Noncombustible Waste for the Product Handling Facility (Shipping Content Codes 123 & 125, IDC 002)
Fig. 9.3-3. Process Diagram for the Generation of Contact Handled Transuranic Leaded Rubber & Combustible and Noncombustible Waste for the PUREX Oxide Rework-N-Cell Facility (Shipping Content Codes 123 & 125, IDC 001)
Fig. 9.3-4. Process Diagram for the Generation of Contact Handled Transuranic Leaded Rubber & Combustible and Noncombustible Waste for the PUREX Oxide/N-Cell Facility (Shipping Content Codes 123 & 125, IDC 001)
Fig. 9.3-5. Process Diagram for the Generation of Contact Handled Transuranic Leaded Rubber & Combustible and Noncombustible Waste for the PUREX Nitrate Loadout-PR Room (Shipping Content Codes 123 & 125, IDC 001)
9.4.2 **Waste Characterization Data**

Listed below is a summary of all waste characterization data available for this shipping content code.

9.4.2.1 **Chemicals Potentially Present in Waste**

Chemicals potentially present in wastes identified by shipping content code RH 125A are listed in Section 9 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

9.4.2.2 **Chemical Compatibility of Wastes Identified by Content Code RH 125A**

Attachment D contains an evaluation of potential chemical incompatibilities within content code RH 125A, and any potential chemical incompatibilities that might occur between this content code and all other content codes that occur in the TRUCON.

9.4.2.3 **Occurrence of RCRA-Regulated Hazardous Chemicals in RH 125A**

IDCs 001 and 002, which correspond to shipping content code RH 125A, TRU combustible waste, are classified as hazardous because of the presence of lead. The EPA Hazardous Waste Number for lead is D008. This information is found in Attachment E. The Hazardous Waste Numbers identified in the attachment is derived from 40 CFR Part 261, Subparts C and D.

Note 1: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

9.5 **BUILDING AND PROCESS DESCRIPTIONS**

The Plutonium Finishing Plant and the Plutonium-Uranium Extraction Facility and their processes are described below. The information can be used to better understand the flow diagrams and their processes.

9.5.1 **Plutonium Finishing Plant**

**General**

The PFP generates wastes from operations in its Plutonium Conversion - Remote Mechanical C Line, Plutonium Reclamation Facility (PRF), and Analytical/Chemical Laboratories. Descriptions of these facilities are presented below.

**Plutonium Conversion - Remote Mechanical C Line (RMC).** The RMC process at PFP involves a series of gloveboxes. TRU waste results from the failed equipment and support materials used to maintain operations in these gloveboxes. Any time chemical leak(s) and/or chemical spill(s) occur in a glovebox, the glovebox is flushed. The flush solution becomes part of the TRU waste. Any TRU waste that may have residual nitric acid associated with it is neutralized by the addition of an excess of diatomaceous earth. The major waste stream consists of combustible and noncombustible items such as paper,
plastic bags, stainless steel tubing, process pumps, wrenches, etc. The minor waste stream consists of lead-lined hood gloves and other miscellaneous leaded material. These major and minor waste streams produces at the RMC facility correspond with shipping content codes RH 114 (IDC 003), RH 123, and RH 125 (IDC 001 and 002).

Plutonium Reclamation Facility (PRF). Another function of PFP is the multi-operation PRF. One activity involves the dissolving of out-of-specification material and the transfer of this material into the repurification process. The gloveboxes used in this activity generate the same kind of TRU waste as described above. Any chemical that is released into a glovebox is returned to the process. The waste streams produced at the PRF facility correspond with shipping content codes RH 114 (IDC 003), RH 123, and RH 125 (IDC 001 and 002).

PRF - Solvent Extraction. This section of PRF involves the purification process. Again, a series of gloveboxes generates TRU waste, similar to those described above. In addition to major and minor streams (described above), a solidified organic waste stream is produced. This organic waste stream is a very minor stream. If any organic solids accumulate in a glovebox, they are solidified using approved methods. This type of waste is generated very infrequently and in very small amounts when it is generated. All chemicals released into the gloveboxes are recovered and returned to the process. The wastes produced in the solvent extraction process correspond to shipping content codes RH 112 (IDC 004), RH 123, and RH 125 (IDC 001 and 002).

PRF - Hood HC-60. The final function of PRF involves Hood HC-60. This recovery glovebox generates the two common TRU waste streams described above. Combustible waste is the major stream and the lead-lined hood gloves are the minor stream. Any chemicals released in this hood are handled in a similar fashion as other gloveboxes at PFP. Wastes produced in Hood HC-60 correspond to shipping content codes RH 123 and RH 125 (IDC 001 and 002).

Product Handling. This section of PFP consists of one glovebox and a staging area for TRU waste. The glovebox is used to repackage waste that has been determined to be TRU and/or TRU waste that was packaged inconsistent with certification criteria. There are no chemical penetrations into the glovebox. Wastes produced in the product handling area correspond to shipping content codes RH 123 and RH 125 (IDC 001 and 002).

9.5.2 Plutonium-Uranium Extraction Facility Waste Processing

Plutonium-Uranium Extraction Facility (PUREX)

PUREX waste processing consists of three operations: the oxide conversion operation and the oxide rework process in the N-Cell, along with the nitrate loadout operation in the product removal room. These operations are described below.

PUREX Oxide/N-Cell. The N-cell in the PUREX plant produces an oxide TRU product. Failed equipment and supporting supplies used in this process are discarded as TRU waste. The major waste stream consists of combustible and non-combustible items removed from gloveboxes. The gloveboxes are flushed with a dilute solution of nitric acid any time a leak and/or a chemical spill occurs in the glovebox. This flush solution is pumped back into the PUREX process for repurification and/or discharged into storage tanks. None of the chemicals or solutions becomes part of the TRU waste. Any residual nitric acid remaining on the items that will become waste is neutralized with an excess of diatomaceous earth. A minor waste stream consists of lead-lined hood gloves. The waste produced in the N-cell corresponds to shipping content codes RH 123 and RH 125 (IDC 001 and 002).
PUREX Oxide Rework/N-Cell. Another function of the N-cell is the dissolving of out-of-specification oxide powder. This operation is performed in a glovebox. The sodium fluoride and aluminum nitrate nonahydrate are placed into the dissolver(s). These chemicals are flushed back into the PUREX process if they are somehow released into the glovebox. Any TRU waste that may have residual nitric acid associated with it is neutralized by the addition of an excess of diatomaceous earth. Activities associated with this process are similar to those described above and produce similar TRU waste. The waste produced in the N-cell corresponds to shipping content codes RH 123 and RH 125 (IDC 001 and 002).

PUREX Nitrate Loadout/Product Removal Room. The product removal room at PUREX has four gloveboxes used to support nitrate solution transfers and nitrate loadout activities. No chemical processing or chemical additions are made in this area. Waste produced during waste handling activities are similar to those discussed above and correspond to the following shipping content codes RH 123 and RH 125 (IDC 001 and 002).
10.0 SAVANNAH RIVER PLANT

10.1 SR 116 and SR 125

Content codes SR 116A, SR 116B, SR 116C and SR 125A, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated and stored at Savannah River Plant. These content codes are included in Waste Type III, Solid Organics. Content code SR 125A corresponds to IDC 001, Job-Control Waste; content codes SR 116A, SR 116B and SR 116C do not have corresponding IDCs but are equivalent to IDC 001. There are no experimental equivalents of these content codes.

10.1.1 General Process Knowledge - IDC 001

Shipping content code SR 116 consists of IDC 001 waste. IDC 001 is produced or will be produced in the following facilities:

- 221 HB-Line
- 221 FB-Line
- 772-F Laboratory
- 773-A Laboratory
- Building 235-F

See Section 10.3 for building and process descriptions.

Shipping content code SR 116 (IDC 001) consists of dry, solid waste materials such as plastics, wood, cloth, paper, and other incidental wastes. The waste is stored in 55-gallon drums with a zinc-galvanized coating.

Shipping content code SR 125 also consists of IDC 001 waste. SR 125 is produced, or will be produced, in the following facilities:

- 221 HB-Line
- 221 FB-Line
- 772-F Laboratory
- 773-A Laboratory
- Building 235-F

See Section 10.3 for building and process descriptions.

Shipping content code SR 125 (IDC 001) wastes consist of dry, solid waste materials such as plastics, wood, cloth, paper, and other incidental wastes. This waste may contain some noncombustible material such as small tools, metal cans, glassware, etc. The waste is stored in 55-gallon drums with a zinc-galvanized coating.

Figures 10.1-1 to 10.1-6 depict the processes which generate the SR 116 and SR 125A (IDC 001) waste.

General waste process information for shipping content codes SR 116A, SR 116B, SR 116C, and SR 125A is contained in Section 21 of the TRUCON.
A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

10.1.2 Waste Characterization Data

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

10.1.2.1 Chemicals Potentially Present in Waste

Chemicals potentially present in wastes identified by shipping content codes SR 116A, SR 116B, SR 116C and SR 125A are listed in Section 10 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative; the generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.

10.1.2.2 Chemical Compatibility of Wastes Identified by Content Codes SR 116A, SR 116B, SR 116C, and SR 125A

Attachment D contains an evaluation of potential chemical incompatibilities within content codes SR 116A, SR 116B, SR 116C, and SR 125A, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

10.1.2.3 Occurrence of RCRA-Regulated Chemicals in SR 116A, SR 116B, SR 116C, and SR 125A

IDC 001, which corresponds to or is equivalent to shipping content codes SR 116A, SR 116B, SR 116C, and SR 125A, combustible job control waste, are classified as hazardous because of the presence of heavy metals. Heavy metals present in IDC 001 are:

- D006 Cadmium
- D008 Lead
- D009 Mercury

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D.
Fig. 10.1-1. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible, Inorganic Solid, and Non-combustible Waste for 773-A Laboratory (Shipping Content Codes 116, 122, & 125 IDC 001)
Fig. 10.1-2. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible, Inorganic Solid, & Noncombustible Waste for the Plutonium Fuel Form Facility and Billet Line (Shipping Content Codes 116, 122, & 125, IDC 001)

* - Waste is stored in 55 gallon zinc galvanized drums
Fig. 10.1-3. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible, Inorganic Solid, & Noncombustible Waste for the PEF and MET Lab (Shipping Content Code 116, 122, & 125, IDC 001)
Fig. 10.1-4. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible, Inorganic Solid, and Noncombustible Waste for the 772-F Laboratory (Shipping Content Codes 116, 122, & 125, IDC 001)
Fig. 10.1-5. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible, Inorganic Solid, and Noncombustible Waste for the 221-HB Line (Shipping Content Codes 116, 122, & 125, IDC 001)
Fig. 10.1-6. Process Flow Diagram for the Generation of Contact Handled Transuranic Combustible, Inorganic, and Noncombustible Waste for the 221-FB Line (Shipping Content Codes 116, 122, & 125, IDC 001)

* Waste is stored in 55 gallon zinc galvanized drums.
Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous waste under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for SR 116A, SR 116B, SR 116C, and SR 125A:

- Silver nitrate
- Barium
- Barium chloride
- Barium hydroxide
- Barium fluoride
- Barium nitrate
- Barium sulfate
- Barium oxide
- Formic acid
- Chloroform
- Carbon tetrachloride
- 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- Mercuric nitrate
- Beryllium
- Beryllium hydroxide
- Hydrazine
- Toluene
- Nickel
- Silver
- Chromium
- Chromic acid
- Potassium dichromate
- Sodium chromate
- Sodium dichromate
- Lead nitrate
- Lead oxide
- Hydrofluoric acid

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E, and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

10.2 SR 122

Content codes SR 122A, SR 122B, and SR 122C, described in the TRUPACT-II Content Codes, Rev. 3, July 1989; DOE/WIPP 89-004 (TRUCON), are wastes generated and stored at the Savannah River Plant. These content codes are included in Waste Type II, Solid Inorganics; they do not have corresponding IDCs, but are equivalent to IDC 001. There are no experimental equivalents of these content codes.
10.2.1 **General Process Knowledge - IDC 001**

Shipping content code SR 122 consists of IDC 001 waste. SR 122 is produced or will be produced in the following facilities:

- 221 HB-Line
- 221 FB-Line
- 772-F Laboratory
- 773-A Laboratory
- Building 235-F

See Section 10.3 for building and process descriptions.

Shipping content code SR 122 consists of noncombustibles such as small tools, glassware, and metal cans. The waste is stored in 55-gallon drums with a zinc-galvanized coating.

Figures 10.1-1 to 10.1-6 depict the processes which generate the SR 122 (IDC 001) waste. General waste process information for shipping content codes SR 122A, SR 122B, and SR 122C is contained in Section 21 of the TRUCON document.

A TRUCON description includes the following information:

- Content Description
- Generating Site
- Waste Description
- Generating Sources
- Waste Form (Description)
- Assay (Method)
- Free Liquid (Methods of Control)
- Explosive/Compressed Gases (Methods of Control)
- Pyrophoric (Methods of Control for Nonradioactive Pyrophorics)
- Corrosives (Methods of Control)
- Chemical Compatibility (Within the Content Code)
- Correlation Table (Cross Index to previously used IDCs)

The TRUCON document has been included as Attachment A.

10.2.2 **Waste Characterization Data**

Listed below is a summary of all waste characterization data available for these shipping content codes, including any analyses.

10.2.2.1 **Chemicals Potentially Present in Waste**

Chemicals potentially present in wastes identified by shipping content codes SR 122A, SR 122B, and SR 122C are listed in Section 10 of Attachment B1 to NuPac Letter Ref. No. L-10013 (referred to as the TRUPACT-II Chemical List - Rev. 3, July 1989). The complete TRUPACT-II Chemical List is included as Attachment B. These estimates are conservative. The generator sites were asked to list any chemical or material that could be in the waste, although not necessarily in every drum or box of the waste.
10.2.2.2 Chemical Compatibility of Wastes Identified by Content Codes SR 122A, SR 122B, and SR 122C

Attachment D contains an evaluation of potential chemical incompatibilities within content codes SR 122A, SR 122B, and SR 122C, and any potential chemical incompatibilities that might occur between these content codes and all other content codes that occur in the TRUCON.

10.2.2.3 Occurrence of RCRA-Regulated Hazardous Chemicals in SR 122A, SR 122B, and SR 122C

IDC 001, which corresponds to or is equivalent to shipping content codes SR 122A, SR 122B, and SR 122C, non-combustible job control waste, is classified as hazardous because of the presence of heavy metals. Heavy metals present in the non-combustible job control waste are:

- D006 Cadmium
- D008 Lead
- D009 Mercury

These wastes are described in Attachment E. The Hazardous Waste Numbers identified in the attachment are derived from 40 CFR Part 261, Subparts C and D.

Note 1: There are some chemical compounds that appear in the TRUPACT-II Chemical List (Attachment B) that are not regulated as hazardous wastes under RCRA according to 40 CFR Part 261 Subparts C and D, and therefore do not appear in Attachment E. In the TRUPACT-II Chemical List, the following additional chemicals are listed for SR 122A, SR 122B, and SR 122C:

- Silver nitrate
- Barium
- Barium chloride
- Barium hydroxide
- Barium fluoride
- Barium nitrate
- Barium sulfate
- Barium oxide
- Formic acid
- Chloroform
- Carbon tetrachloride
- 1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)
- Mercuric nitrate
- Beryllium
- Beryllium hydroxide
- Hydrazine
- Toluene
- Nickel
- Silver
- Chromium
- Chromic acid
- Potassium dichromate
- Sodium chromate
• Sodium dichromate
• Lead nitrate
• Lead oxide
• Hydrofluoric acid

Note 2: Table 2-1 contains a complete listing of all hazardous wastes identified by Hazardous Waste Number in Attachment E and any additional hazardous constituents in Appendix VIII of 40 CFR Part 261 identified by the generators through process knowledge and/or analytical data.

10.3 BUILDING AND PROCESS DESCRIPTIONS

Descriptions for the following Savannah River Plant facilities 221 FBI-Line, 221 HB-Line, 772F Laboratory, 235-F, 773-A Laboratory, are provided below to be used in conjunction with the flow diagrams in Figures 10.1-1 to 10.1-6.

10.3.1 221 FB-Line

The facility known as 221 FB-Line is a production facility. Processes identified for this facility are:

1. Cation Exchange
2. Precipitation and Filtration
3. Mechanical Line
4. Recovery
5. Special Recovery

Cation Exchange. The purpose of cation exchange is to concentrate dilute (approximately 1.5 to 2.5 grams of plutonium per liter) plutonium product solution received from the 221-F Canyon facility. The dilute plutonium solution is absorbed on cation exchange columns. The plutonium is eluted off the columns, and the concentrated product stream contains approximately 30 grams of plutonium per liter. In addition, the cation exchange columns are treated with reconditioning washes, refrigerated washes, and uranium elution washes. The process uses cadmium metal, lead shielding, and lead-loaded gloves.

Precipitation and Filtration. The purpose of the precipitation and filtration operations is to produce plutonium trifluoride cake from the plutonium solution eluted from the cation exchange columns. The concentrated plutonium trifluoride slurry is then filtered in a filter boat. The filtrate is neutralized and transferred to the F-Canyon 5.2 tank. The plutonium trifluoride cake is then processed in the mechanical line. Hydraulic oil, lead shielding, and lead-loaded gloves are used.

Mechanical Line. The purpose of the mechanical line operations is to produce plutonium metal from the precipitated plutonium trifluoride cakes. The plutonium trifluoride cakes are first dried using warm air. The dried cakes are then roasted in an oxygen atmosphere which converts the plutonium trifluoride to a mixture of plutonium tetrafluoride and plutonium dioxide. The converted cake is then reduced with calcium metal to form plutonium metal. The plutonium metal is then pickled, sampled, weighed, and packaged. Hydraulic oil, lead shielding, and lead-loaded gloves are used.
Recovery. The purpose of the recovery operation is to recover, purify, and concentrate plutonium from miscellaneous sources. Mechanical line glovebox sweepings, slag and crucible, and metal turnings are dissolved in nitric acid. The dissolved solution and other miscellaneous liquid recycle streams are then absorbed on anion exchange columns. The effluent stream is collected and sampled. If the effluent is below the discard limit, it is transferred to F-Canyon tank 5.2, otherwise it is recycled. The plutonium is eluted off the columns, and then the purified concentrated plutonium solution is transferred to F-Canyon facility. In addition, the anion exchange columns are treated with bed washes and recondition washes. Lead shielding and lead-loaded gloves are used.

Special Recovery. The purpose of the special recovery operation is to recover plutonium from solids received from both onsite and offsite which are not suitable for processing in the recovery dissolver. Plutonium compounds are dissolved in nitric acid, filtered, and transferred to the F-Canyon facility. Plutonium metal used to be dissolved in sulfamic acid, filtered, and transferred to the F-Canyon facility; however, this equipment is no longer in operation. Lead shielding and lead-loaded gloves are used.

10.3.2 221 HB-Line

The facility known as 221 HB-Line is a production facility.

Processes identified for this facility are:

1. Scrap Recovery
2. Neptunium Oxide Production
3. Pu-238 Oxide Production

Scrap Recovery. The scrap recovery facility is designed to routinely generate nitrate solutions of Pu-238 or U-235/Pu-239 scrap suitable for purification by anion exchange or solvent extraction in the canyon. Scrap is received, and dissolver batches are prepared based on assay by calorimetry or assay specified on the scrap declaration form. The solid scrap is dissolved in hot nitric acid containing trace fluoride ion, transferred through a filter bag, collected in a tank, sampled for accountability and process control, diluted with nitric acid, and transferred to the proper canyon vessel as a nitrate solution.

Neptunium Oxide Production. The neptunium oxide facility is designed to convert nitrate solutions of neptunium to neptunium oxide powder suitable for blending with aluminum powder and fabrication into billets. The facility will also be used to convert nitrate solutions of fissile plutonium to oxide suitable for dissolution, blending, or long term storage in other facilities.

Pu-238 Oxide Facility. Pu-238 nitrate solution is converted to plutonium oxide powder by the oxalate precipitation and calcination method.

10.3.3 772-F Laboratory

The 772-F Laboratory is a production support laboratory. The lab uses beryllium, cadmium, and chromium as analytical standards. Lead-lined gloves are also used.
10.3.4 Building 235-F

Building 235-F contains the Plutonium Experimental Facility (PEF), the Metallurgical (MET) Lab, the Plutonium Fuel Form Facility (PUFF), and the Billet Line.

Plutonium Experimental Facility (PEF)

The PEF is designed to provide semiworks capability for developing and demonstrating processes for the production of dense fuel forms manufactured from PuO$_2$ powder. Operations in the PEF will include oxygen-16 enrichment, hot pressing, sintering, vacuum outgassing, pellet sectioning, and particle size analysis. Freon is used for leak checking vacuum manifolds and as a decontaminant. Lead is also used in the form of lead-lined gloves.

Metallurgical (MET) Lab

The Met Lab is used to provide metallurgical quality assurance support for the PEF and the PUFF. Operations in the Met Lab will include sectioning, mounting, grinding, polishing, and examination of pellet sections. Ethanol is used to clean the metallography mounts before examination. Acetone is also used as a cleaning and drying agent for metallography mounts. Freon is used as a lubricant and coolant during sample preparation and for decontamination. Lead is also used for shielding.

Plutonium Fuel Form Facility (PUFF)

PUFF receives plutonium-238 oxide from the 221 HB-Line. The oxide is introduced into the PUFF cells and weighed. The oxide is then pressed into a ceramic pellet and welded into an iridium shell. The shell is decontaminated, quality assurance tested, and welded into a shipping container to be sent off-plant to be made into a general purpose heat source. The facility uses lead-lined gloves, leaded glass windows, lead shielding, absorbed oils, mercury vapor lights, and freon.

Billet Line

Building 235-F receives neptunium-237 oxide from the 221 HB-line. The oxide is introduced into the actinide billet line cabinets and is weighed. The neptunium-237 oxide is then mixed with aluminum powder and pressed into compacts. The compacts are then welded into a billet and sent to be extruded into target rods for the reactors. This process uses lead shielding, leaded glass windows, lead-lined gloves, aluminum powder, absorbed oils, and freon.

10.3.5 773-A Laboratory

The 773-A Laboratory contains the Analytical Development Section (ADS) and the Actinide Technology Section (ATS).

Analytical Development Section (ADS)

The ADS provides analytical chemistry and materials characterization services and develops new analytical technology for Savannah River Site (SRS) programs. TRU waste is generated in hoods, radiobenches, and gloveboxes in the lab primarily from the analytical and materials characterization work.
From process knowledge, the following chemical wastes have been identified as potentially present in the ADS TRU waste:

- Cadmium
- Chloroform
- Hexane
- Hydrazine
- Kerosene
- Lead
- Mercury
- Pentane
- Petroleum ether
- Toluene

The presence of any of these hazardous materials in the waste stream depends on the particular samples and laboratory analyses that generated the TRU waste:

- With the exception of chromium and lead, all the hazardous materials listed above would only be present in the waste stream as constituents of samples submitted by various SRS facilities to ADS for analysis.
- Chromium can be present in the waste stream primarily as a constituent of the stainless steel alpha plates used by ADS to prepare samples for alpha counting.
- Lead can be present in the waste stream both as a constituent of samples submitted to ADS and as small quantities of TRU-contaminated bulk metal (shielding or containers in hoods and gloveboxes).

TRU waste generated in ADS laboratories generally consists of:

- Combustibles such as plastic vials/containers, paper/kimwipes, and plastic gloves
- Glass vials/beakers, etc.
- Stainless steel alpha plates

**Actinide Technology Section (ATS)**

ATS develops state-of-the-art separations processes for the actinide elements to be utilized by the DOE complex. TRU waste is generated in hoods, cells, and gloveboxes in ATS laboratories as a result of process and flowsheet demonstrations.

From development experience, the following hazardous wastes have been identified as potentially present in ATS TRU waste:

- Lead
- Silver

The presence of any of these hazardous materials in the waste stream depends on the particular samples and laboratory analyses that generated the TRU waste:
• Silver can be present in the waste stream from the silver catalyzed dissolver development. In this process, silver is used to assist in dissolution of actinides (primarily PuO₂) which resist normal acid dissolution techniques. The silver is recovered for reuse (Figure 10.1-1), and only relatively small amounts are expected in waste streams.

• Lead will be present in the waste stream from ATS laboratories involved in experimental studies on the recovery of plutonium from incinerator ash and samples from this work submitted to ADS for analysis. Lead may also be present as small quantities of TRU-contaminated bulk metal used as shielding or containers in hoods and gloveboxes.

TRU waste generated in ATS laboratories generally consists of:

• Combustibles such as plastic vials/containers, paper/kimwipes, plastic gloves, and poly bottles

• Glass vials/beakers, tools, metal clamps, etc.
11.0 PROCESS TOLERANCE LIMITS AND MONITORING PARAMETERS

11.1 WASTE ACCEPTANCE CRITERIA

The DOE has developed WIPP Waste Acceptance Criteria (WAC) (Table 11-1, current revision), by which defense-generated TRU waste is certified for emplacement at the WIPP. These criteria establish limits on the physical, radiological, and chemical composition of the waste, the specifications of the waste containers, and the content and format of the data package transmitted to the WIPP Waste Information System (WWIS) database. The technical basis for the criteria is given in the WAC. The primary objective of the WAC is to assure the safe handling of the waste and optimum repository performance resulting in the isolation of TRU and TRU-mixed wastes. [The implementing documents for the WAC are WIPP-DOE-144 (newly generated CH waste), WIPP-DOE-137 (retrievably stored CH waste), and WIPP-DOE-159 (RH waste).]

Waste composition and characteristics are monitored at the DOE generator facilities for compliance with the WAC and all applicable Resource Conservation and Recovery Act (RCRA) requirements. The waste is certified for compliance with the WAC before it is transported to the WIPP facility to minimize or eliminate personnel or environmental exposure to radioactivity. This section describes the rationale for the limits established by the WAC and the certification procedures used by DOE generator facilities.

A waste certification officer at each facility inspects each container of waste and certifies in writing that the waste meets the specifications of the WAC and that the data package is accurate and complete. As required by DOE Order 5820.2A, the WAC Certification Committee (WACCC) conducts an audit of each certification program periodically and must approve the certification of each waste form. The data package (specified in WIPP-DOE-157) is routinely transmitted from a personal computer at the generator site to the mainframe computer that contains the WWIS. The data package is automatically checked by an extensive set of audit and range checks. The data package is not accepted for transfer into the production database until all errors have been corrected. If the shipper cannot transmit the data package to the WWIS, Waste Certification and Database personnel visually perform the WWIS checks on a hard copy of the data package prior to shipment of the waste.

An additional level of independent oversight is imposed on the TRU Waste Certification Program. Pursuant to the "Agreement for Consultation and Cooperation Between the Department of Energy and the State of New Mexico on the Waste Isolation Pilot Plant," the State of New Mexico uses the Environmental Evaluation Group (EEG), which operates out of the New Mexico Institute of Mining and Technology (NMIMT), to provide independent technical oversight of WIPP project activities which may affect the health and safety of the citizens of New Mexico. In this role, EEG representatives review and provide input to waste certification and QA plans and accompany the WACCC audit teams.
## TABLE 11-1

**SPECIFIC ACTIVITY, PE-CI WEIGHT FACTORS, AND FGE FOR WIPP RADIONUCLIDES**

<table>
<thead>
<tr>
<th>RADIONUCLIDE</th>
<th>SPECIFIC ACTIVITY (Ci/g)</th>
<th>Pu-239 FGE (FGE/g)</th>
<th>PE-CI WEIGHTING (Ci/PE-CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Th-232</td>
<td>1.11E-07</td>
<td>0.00E+00</td>
<td>3.30E-01</td>
</tr>
<tr>
<td>U-233</td>
<td>9.76E-03</td>
<td>1.00E+00</td>
<td>4.00E+00</td>
</tr>
<tr>
<td>U-235</td>
<td>2.19E-06</td>
<td>1.00E+00</td>
<td>4.30E+00</td>
</tr>
<tr>
<td>U-236</td>
<td>3.40E-07</td>
<td>0.00E+00</td>
<td>4.30E+00</td>
</tr>
<tr>
<td>Np-237</td>
<td>7.13E-04</td>
<td>1.50E-02</td>
<td>1.00E+00</td>
</tr>
<tr>
<td>Pu-238</td>
<td>1.73E+01</td>
<td>1.13E-01</td>
<td>1.10E+00</td>
</tr>
<tr>
<td>Pu-239</td>
<td>6.29E-02</td>
<td>1.00E+00</td>
<td>1.00E+00</td>
</tr>
<tr>
<td>Pu-240</td>
<td>2.30E-01</td>
<td>2.25E-02</td>
<td>1.00E+00</td>
</tr>
<tr>
<td>Pu-241</td>
<td>1.04E+02</td>
<td>2.25E+00</td>
<td>5.20E+01</td>
</tr>
<tr>
<td>Pu-242</td>
<td>3.97E-03</td>
<td>7.50E-03</td>
<td>1.10E+00</td>
</tr>
<tr>
<td>Am-241</td>
<td>3.47E+00</td>
<td>1.87E-02</td>
<td>1.00E+00</td>
</tr>
<tr>
<td>Cm-244</td>
<td>8.18E+01</td>
<td>9.00E-02</td>
<td>1.90E+00</td>
</tr>
<tr>
<td>Cf-252</td>
<td>5.44E+02</td>
<td>0.00E+00</td>
<td>3.50E+00</td>
</tr>
</tbody>
</table>
11.2 PHYSICAL FORM OF THE WASTE

The physical form of each waste is determined and verified by certification personnel at the certifying facilities. The approved methods include visual inspection during packaging of the waste and/or Real Time Radiography (RTR). RTR permits examination of waste without the need for opening containers by the use of x-rays. It is used to identify free liquids, pressurized containers, and the general waste content and form. RTR may also be used to infer the presence of respirable fines.

11.2.1 Free Liquids

Liquids could accelerate container corrosion rates, causing a release of liquid to the salt storage medium and adversely affecting retrieval operations. Eliminating liquids also reduces the probability and potential magnitude of contamination events if a container is breached during emplacement or retrieval. Free liquids are treated by the addition of absorbents or solidification of the waste.

11.2.2 Particulates

The quantity of respirable particles in a waste is limited to less than one percent by weight. A waste containing particulates is treated if greater than one percent of the particulates are less than ten microns in size, or if greater than 15 percent of the particulates are less than 200 microns. Treatment may involve cementing or microwaving the waste, and is done to avoid personnel exposure to radionuclides and to decrease the potential for environmental contamination in the case of an accident.

11.2.3 Explosives

Because of potential hazards which could damage the integrity of the salt formation, compressed gases and other explosives, as defined in 49 CFR Part 173, Subparts C and G, are prohibited in waste received at the WIPP facility. The waste is monitored for explosive materials by visual inspection, RTR, and/or process and administrative controls.

11.2.4 Quality Control

The Idaho National Engineering Laboratory has established a continuing quality control program for the waste certification process. A sampling program for WIPP certified wastes consists of opening and visually examining a portion of the TRU waste containers certified at SWEPP to determine compliance with the WAC. During fiscal year (FY) 1986 and FY 1987, 47 certified TRU wastes were examined to verify the adequacy of certification procedures.

An extensive sampling program, called the TRU Waste Sampling Program, was undertaken during 1983-1985 at INEL. A total of 199 drums and 10 boxes of Pu-239 contaminated wastes from INEL and 15 drums of Pu-239 and 18 drums of Pu-238 contaminated wastes from the Los Alamos National Laboratory (LANL) were opened and examined. A total of 212 INEL waste drums and 41 LANL drums were sampled to determine gas composition. The results of these investigations are summarized in the TRU Waste Sampling Program Final Report (Clements and Kudera, 1985, included as Attachments N and O).

Based on the results of both sampling programs, INEL will continue to sample one out of every 97 drums destined for the WIPP facility. This sampling frequency is expected to provide a 95 percent confidence level that WAC certification is appropriate. All generator sites with retrievably stored waste intended for shipment to the WIPP are required to establish quality assurance programs similar to the program at INEL.
The data obtained during the TRU Waste Sampling Program were based on the results of gas sampling and gas generation studies, radiographic examinations and visual inspections. The objectives of the investigations were:

- To provide information on gas generation in newly generated and stored TRU wastes.
- To evaluate the adequacy of venting/filtering devices (carbon composite filter, Hanford vent clip, and the styrene butadiene gasket) for maintaining safe hydrogen levels in sealed waste drums.
- To determine the adequacy of the INEL real-time radiography system as a nondestructive certification technique.
- To examine wastes for compliance with the WIPP Waste Acceptance Criteria.

The drums examined were randomly selected, and documentation was maintained to verify compliance with quality assurance/quality control procedures. Of the investigations, the gas sampling studies are most pertinent in terms of characterizing any potentially RCRA-regulated volatile organic compounds, although the measurement of headspace gases does not yield information on either the source of the organic constituent or its concentration in the waste. Gas compositional analyses included tests for 1,1,1-trichloroethane, 1,2-dichloroethane, dichloromethane (methylene chloride), trichloroethylene, carbon tetrachloride, and freon (not all tests were performed on all samples). The concentrations of volatile organic compounds are summarized in Attachments L and M.

11.3 CHEMICAL PROPERTIES OF THE WASTE

The generator determines the chemical composition of each container of waste to be sent to the WIPP facility. The approved methods include performing a process flow analysis of the waste generating process and/or applying knowledge of the constituents in the waste. Information is updated to reflect any changes in procedures and/or processes generating a waste. Administrative controls also are used to exclude WAC-prohibited materials from the waste.

11.3.1 TRU-Mixed Wastes

The WIPP does not accept hazardous wastes that are not co-contaminants with TRU wastes. The quantity and composition of isotopes are determined using applicable standard methods [e.g., American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM)]. The identification of hazardous constituents is described in Section 2.0. These constituents are identified in Attachment E.

Rocky Flats Plant, the largest generator of TRU waste to be shipped to the WIPP facility, has relied upon process knowledge and very limited analytical data to characterize the hazardous component of its currently generated wastes. These estimates are extremely conservative, and can be considered fairly representative of the total newly-generated waste inventory destined for the WIPP facility. These estimates are included in Attachment F.

11.3.2 Corrosive Wastes

For the purpose of the WAC, corrosive materials are defined according to 49 CFR Part 173, Subpart F. Corrosive substances are treated (e.g., neutralized or cemented) or contained in a 90-ml polyethylene liner in order to maintain container integrity during the five-year Pilot Plant phase of the WIPP facility.
11.3.3 Pyrophoric Wastes

Pyrophoric materials are defined in the WAC as those which may spontaneously ignite under ambient conditions of shipment or storage in the WIPP. Packaging, transport, handling, and emplacement of uncontrolled quantities of pyrophoric or ignitable substances could result in fire, personnel injury or, during an accident, increase the spread of contamination through the products of combustion. Pyrophoric materials, other than radionuclides, are rendered nonignitable with chemically stable materials (e.g., concrete or glass). Administrative and process controls are used to assure that no more than one percent by weight of the waste in each container is in pyrophoric forms of radionuclides, and these are dispersed in the waste.

11.3.4 Reactive Wastes

Small quantities of water-reactive materials (e.g., magnesium, sodium, and potassium) may be present in some waste forms and are identified by the appropriate DOT label on the container and in the data package. Because liquid wastes are not approved for shipment to the WIPP facility, and storage is in bedded salt, small quantities of reactive wastes are not a management problem.

11.3.5 EP Toxic Wastes

The WIPP can safely handle and dispose of wastes exhibiting the characteristic of extraction procedure (EP) toxicity for metals listed in 40 CFR 261.24. Lead is the predominant EP toxic contaminant of TRU waste. It is used for shielding and/or is contained in discarded equipment. DOE facilities have conservatively characterized the presence and concentrations of these metals because analytical data derived from the extraction procedure toxicity test are largely unavailable.

11.3.6 Waste Subject To The Land Disposal Prohibitions

Some TRU-mixed waste certified for disposal at the WIPP facility contains hazardous constituents and/or exhibits characteristics that are or will be subject to the land disposal restrictions found in 40 CFR Part 268. Disposal at the WIPP facility is considered the safest means possible for isolating transuranic wastes from the accessible environment, and the siting, design and construction of the facility have all been conducted under stringent requirements in this regard, including compliance with the long-term performance requirements in 40 CFR Part 191. Compliance with these requirements for containment of radionuclides provides for the same degree of assurance that there will be no migration of hazardous constituents from the repository. The DOE will submit a No-Migration Variance Exemption Petition, as provided by 40 CFR 268.6, to allow acceptance of wastes subject to the land disposal restrictions.

11.4 DETERMINATION OF RADIONYCLIDE INVENTORY IN CH TRU WASTE

Compliance with the waste acceptance criteria for WIPP requires that particular waste characteristics be determined for each container of waste. These characteristics include the total radioactivity, represented in plutonium-239 equivalent curies (PE-Ci) and the total fissile content, represented in plutonium-239 fissile gram equivalents (FGE). This section describes the safety relevance of each of these characteristics and how each of these characteristics are determined and used.
11.4.1 Determination of Radionuclide Inventory and Total Curies

Calculation of PE-Ci and FGE values requires that the radioactivity (curies) associated with each radionuclide within a container be known. The radionuclide distribution of the waste is determined by isotopic analysis on uniform product material, e.g., mass spectrometry of weapons-grade plutonium (dominantly Pu-239), reactor-grade plutonium (dominantly Pu-239), or heat-source plutonium (dominantly Pu-238). Since product quality and uniformity is strictly controlled by routine analysis of lots of product material, the isotopic composition of such process waste streams does not vary. The radionuclide distribution within the wastes can be inferred from knowledge of the generating process (e.g., miscellaneous solid inorganic and solid organic waste at sites belong in this group). Where waste streams are variable, process knowledge may be supplemented by gamma ray pulse height analysis or radiochemical analysis to define the radionuclide distribution (e.g., inorganic sludges from the Rocky Flats Plant and other sites belong in this group). Knowledge of the radionuclide distribution of the waste, coupled with assay results, allows the curies of radioactivity associated with each radionuclide within the waste to be determined.

The curies of radioactivity in each container may be estimated from assay results for an individual container, or by direct measurement of a representative sample of the waste stream from which the contents of a container are composed (e.g., sludges and liquids). Assay of waste containers may be accomplished by a variety of means including calorimetry, radiochemistry, passive gamma assay, passive neutron coincidence counting, or passive-active neutron assay. Each of these is briefly described below.

Calorimetry involves measurement of the heat flow from a waste package and, with knowledge of the radionuclide distribution within the waste and the rate of decay heat generation of each radionuclide, is capable of producing precise results of the total mass of each radionuclide. Since experimental difficulties increase with waste container size, the technique is limited to relatively small waste packages, a few liters at most. This technique is not used at any of the Department of Energy sites for determining radionuclide inventory of contact-handled transuranic waste.

Radiochemical methods of assay, alpha and/or gamma-ray spectroscopy, are applicable to uniform waste compositions such as process liquids or sludges. Using this method, the curies of radioactivity associated with each radionuclide within a waste container can be inferred from the radiochemistry results and the concentration of radionuclides in the sample can be converted to total curies in a waste container based on the average volume of waste. Precision of results is dependent on obtaining a representative sample for analysis and maintenance of the homogeneity of the batch of process waste as waste containers are filled.

Other waste assay methods rely on the nuclear emissions that occur naturally or that are induced by irradiation to infer the radioactivity content of a waste container. Segmented gamma scanning methods utilize gamma-rays of known energy emitted by radionuclides within the waste to determine the total radioactivity associated with each radionuclide. Discrete segments of the waste container are sequentially scanned to improve the precision of the results. The method may also employ a selected external transmission source of gamma-rays to determine attenuation correction factors that should be applied to the measurement results. This method of assay is most useful for waste of relatively uniform composition and low to moderate density (e.g., contaminated paper, plastic, and cloth). Particles containing the radionuclide must also be small to minimize errors introduced by self-absorption of emitted gamma radiation.
The passive neutron coincidence counting method relies on the spontaneous fission that occurs within transuranic radionuclides by detecting the coincident neutrons emitted by such events. Knowledge of the isotopic composition of the waste is required to allow interpretation of the assay results by comparison to the known rate of spontaneous fission per unit mass of the source. The method is useful for single element waste with reasonable rates of spontaneous fission and is typically used to assay small packages that are subsequently placed into larger waste containers to improve the precision of the result.

Passive-active neutron assay systems seek to provide the flexibility to accurately assay waste containers with a variety of waste matrices and to provide two independent assay measurements to increase confidence in the results. The passive portion of the system is an adaptation of the passive neutron coincidence counting method using "self measurement" matrix corrections. Two passive neutron detection systems may be used to assay radionuclides undergoing spontaneous fission and to provide semi-quantitative information on alpha particle emitters in the waste. The active portion of the system performs a high sensitivity, pulsed thermal neutron interrogation assay of the waste container. Fissions are induced within the waste which, in turn, result in prompt-fission, spectrum neutrons being emitted. The detection of these fission spectrum neutrons, corrected for waste matrix effects, provides a quantitative measure of the fissile material within the waste container.

The passive and active assay results, when coupled with knowledge of the radionuclide distribution within the waste, provides the means to calculate the radioactivity associated with each radionuclide. This is the most common assay technique used at Department of Energy sites to assay contact-handled waste.

11.4.2 Plutonium-239 Equivalent Curies

The concept of plutonium-239 equivalent curies (PE-Ci) was developed to provide a means to express the radiotoxicity of the radioactive material within a container of transuranic waste without the need for a detailed assessment using each waste container's unique radionuclide composition. Plutonium-239, as a common component of defense transuranic wastes, was selected as the radionuclide to which the inhalation hazard of other transuranic radionuclides would be indexed. The characterization of radioactivity in terms of PE-Ci is useful for radiological dose assessment modeling when the inhalation pathway is of primary concern. The ratios of internal dose equivalent for inhalation of plutonium-239 to those of other transuranic radionuclides establish the PE-Ci relationships. Thus, the health risk of inhalation of a given quantity of transuranic radioactivity expressed in PE-Ci is equivalent to the risk which would be calculated if the risk associated with each individual radionuclide was calculated separately and then summed. This concept has been applied to radiological dose assessment of WIPP routine operations and postulated accidents where the airborne release pathway is dominant.

To ensure that the safety-related design features and operational procedures established for WIPP remain valid, a radioactivity limit was established for an individual waste container to be managed at the facility. This limit is documented in the WIPP Waste Acceptance Criteria, where similar criterion constrain the acceptable characteristics of individual waste containers such as allowable physical weight, thermal power, and fissile material content. A specific limit on total radioactivity was deemed necessary since, theoretically, a few waste streams at certain waste generator sites could produce containers of waste that are not constrained by these other allowable characteristics. The total radioactivity permitted within any single drum or standard waste box is limited to 1000 PE-Ci by the WIPP WAC. This WIPP imposed limit ensures that radiological safety requirements for the facility will not be exceeded.
11.4.3 Plutonium-239 Fissile Gram Equivalent

A characteristic of many radionuclides is their ability to undergo fission, a nuclear transformation characterized by the splitting of a nucleus into at least two other nuclei, the emission of neutrons, and the release of a relatively large amount of energy. For practical purposes, the lower the energy required to induce fission, the more useful the radionuclide as a reactor fuel or nuclear weapons material. The most important source of this energy is through neutron absorption. Those radionuclides that lead to fission following the absorption of a neutron of "zero" kinetic energy are termed fissile. When a sufficient mass of these radionuclides are arranged under ideal conditions, the mass is said to be critical, capable of sustaining a chain reaction through the continuous absorption and emission of neutrons.

To ensure that a nuclear criticality event does not occur within a waste container or group of containers, strict limits are established on the allowable quantity of fissile and fissionable material for individual waste containers. For the purpose of establishing nuclear criticality safety limits, the fissile gram equivalent (FGE) of all fissile and fissionable radionuclides is indexed to that of plutonium-239. The FGE for radionuclides is established within the safety standard ANSI/ANS-8 15-1981, "Nuclear Criticality Control of Special Actinide Elements." The fissile content of waste drums and standard waste boxes is limited to 200 FGE and 325 FGE, respectively. These limits ensure that even under ideal conditions (e.g., full moderation and reflection and optimal geometry) that a nuclear criticality event will not occur. Adherence to these FGE limits ensures nuclear criticality safety during both routine handling conditions and conditions that could conceivably occur in the event of an accident.

11.4.4 Calculation of PE-Ci and FGE of Waste Containers

Once a waste container's contents have been expressed in terms of curies of radioactivity or mass of each radionuclide, the calculation of PE-Ci and FGE is straightforward. For each of the radionuclides within WIPP contact-handled waste, Table 11-1 lists the specific activity, the curie to PE-Ci relationships, and the plutonium-239 FGE to gram relationships. Calculation of the PE-Ci and FGE content of a waste container is accomplished by maintaining units and summing the individual radionuclide contribution to each of these values.

Weapons-grade waste, such as is produced by the Rocky Flats Plant, consists primarily of fissile plutonium-239, by mass. As such, the WAC limit of 200 FGE constrains the maximum allowable radioactivity content of a 55-gallon drum of Rocky Flats' waste to approximately 18 PE-Ci. In contrast, the FGE limit when applied to heat source waste, such as is produced by the Mound Plant, would allow in excess of 1000 PE-Ci per drum in the absence of other considerations such as the WAC PE-Ci limit or the 40-watt payload compliance limit for decay heat currently established for the TRUPACT-II shipping container (either 40 watts/14 drums or 40 watts/2 standard waste boxes). This latter consideration would restrict the drums of Mound waste on the maximum payload for the TRUPACT-II to an average of 79 PE-Ci per drum. As evidenced by these examples, the contents of waste containers produced by different sites or waste streams can be restricted by the WAC PE-Ci limit, the WAC FGE limit, or by other requirements including limitations on decay heat and physical weight.
12.0 WASTE SHIPMENT SCREENING PROCEDURES

12.1 WASTE HANDLING OPERATIONS

The waste handling systems at the WIPP facility are not designed to allow the opening of containers of TRU waste for visual inspection or sampling. This is in keeping with DOE commitments to keep radiation exposures as low as reasonably achievable (ALARA) and to minimize risks to the public and the environment from radioactivity. Container integrity is verified before the waste is shipped to the WIPP facility. After receipt at the WIPP facility, radiation and contamination surveys are performed on boxes and seven-packs of CH TRU drums or package assemblies and remotely on RH TRU waste canisters before emplacement. If a drum or box has been breached or the surface contamination exceeds allowable limits, it may be decontaminated or overpacked.

Each drum, box, or canister of waste is labelled with a unique identification number (on a bar code label for CH waste) designated by the generator. This identification number corresponds to the WIPP Waste Information System data package that describes in detail the waste form, hazardous constituents, and radionuclide content of each waste package (Table 2-2). The data package is transmitted and verified as described in Section 11-1. The data package procedures are subject to audit and verification by WACCC.

12.2 VERIFICATION OF MANIFEST INFORMATION

A Uniform Hazardous Waste Manifest accompanies each shipment of TRU-mixed waste. The bar code on a box or on one drum in each seven-pack or the package I.D. Number on a canister is read by the waste handling personnel to verify the contents of the shipment with the data package in the WWIS.

Personnel from Transportation Operations and from Regulatory and Environmental Programs will review the manifest to ensure that:

- All information required on the manifest is complete and the manifest is signed by the generator and the transporter, and
- The manifest information is checked for conformance with the data package information.

Waste handling personnel will visually inspect the shipment for the following items:

- The number and type of containers match the manifest information, and
- Shipment labels/placards (EPA and DOT) match the manifest.

Waste emplacement data and the manifest number are added to the WWIS. These data include emplacement date, the panel, room, and X-Y-Z coordinate designating the location where each seven-pack of drums or box is emplaced underground, and the overpack identification number, as required. This information is cross-referenced to the manifest document number in accordance with HWMR, Part VI, Sec. 265.309.
12.3 MANIFEST DISCREPANCY PROCEDURES

In the case of a discrepancy between the manifest information and the waste shipment, the waste is stored in the Waste Handling Building until the discrepancy is resolved. The generator is contacted and corrections to the manifest are made with documentation verifying the changes. All discrepancies in manifest information are resolved prior to emplacement of the waste.

12.4 REVOCATION/SUSPENSION OF CERTIFICATION AUTHORITY

The WAC Certification Committee may deny certification of a waste if the generator cannot demonstrate that adequate procedures exist to accurately characterize a waste. The WACCC may revoke or suspend a site's certification authority and permission to ship waste to the WIPP if repeated record-keeping discrepancies occur.
REFERENCES


Westinghouse Electric Corporation, 1989, "TRUPACT-II Content Codes," (DOE/WIPP 89-004, Rev. 3), Carlsbad, NM.

END

DATE FILMED

9/3/1993