Waste Isolation Pilot Plant
Technical Safety Requirements

Prepared by

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Carlsbad, NM

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List of Acronyms

AC	Administrative Control
ASME	American Society of Mechanical Engineers
ANSI	American National Standards Institute
CBFO	Carlsbad Field Office
CCP	Central Characterization Program
CFR	*Code of Federal Regulations*
CH	contact-handled
CLR	Conveyance Loading Room
CMR	Central Monitoring Room
CMS	Central Monitoring Station
CUR	Cask Unloading Room
CVS	Confinement Ventilation System
DF	Design Features
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
ECO	Engineering Change Order
ETO	Evaluation of Technical Operability
FCLR	Facility Cask Loading Room
FM	Factory Mutual Research
FP	Fire Protection
FSM	Facility Shift Manager
FSS	Fire Suppression System
gpm	gallons per minute
HalfPACT	Half-Package Transporter
HEPA	High Efficiency Particulate Air
HWFP	Hazardous Waste Facility Permit
ICE	Integrated Cooling Material
ISBC	Interim Safety Basis Changes
ISI	IN SERVICE Inspections
IVS	Interim Ventilation System
JCO	Justification for Continued Operations
KE	Key Elements
LCO	Limiting Conditions for Operation
LED	Light Emitting Diode
LWFC	Light Weight Facility Cask
M&O	management and operating
MAR	Material at Risk
MSHA	Mine Safety and Health Administration

List of Acronyms (continued)

MOI	Maximally Exposed Offsite Individual
NFPA	National Fire Protection Association
NPH	Natural Phenomenon Hazard
NWP	Nuclear Waste Partnership LLC
PAC	Programmatic Administrative Control
PDI	pressure differential indicator
PDT	pressure differential transmitter
PISA	Potential for Inadequate Safety Analysis
psig	pounds per square inch gauge
RH	remote-handled
RWP	Radiological Work Permit
SAC	Specific Administrative Control
SDD	System Design Description
SL	Safety Limit
SMP	Safety Management Program
SR	Surveillance Requirement
SSC	Structures, Systems, and Components
STD	Standard
TRU	Transuranic
TRUDOCK	TRUPACT-II Unloading Dock
TRUPACT-II	Transuranic Package Transporter Model II
TRUPACT-III	Transuranic Package Transporter Model III
TMF	TRUPACT Maintenance Facility
TSR	Technical Safety Requirement
UL	Underwriters Laboratories, Inc.
USQ	Unreviewed Safety Question
UVFS	Underground Ventilation Filtration System
UVS	Underground Ventilation System
WAC	Waste Acceptance Criteria
WAP	Waste Analysis Plan
WDS	WIPP Waste Data System
WHB	Waste Handling Building
WH	Waste Handling
WIPP	Waste Isolation Pilot Plant

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Section 1
Use and Application

1.0 USE AND APPLICATION

Title 10, Code of Federal Regulations, Part 830 (10 CFR 830), "*Nuclear Safety Management*," Section 205, "*Technical Safety Requirements*," requires U.S. Department of Energy (DOE) contractors responsible for Hazard Category 1, 2, and 3 DOE nuclear facilities to develop Technical Safety Requirements (TSRs) that are based on the Documented Safety Analysis (DSA).

This document contains the TSRs for the Waste Isolation Pilot Plant (WIPP) activities. This TSR document was prepared in accordance with guidance in DOE Guide 423.1-1B, *Implementation Guide for Use in Developing Technical Safety Requirements* and DOE-STD-1186-2004, *Specific Administrative Controls*. The derivation of TSRs and operational controls are contained in DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis*, Chapter 5.0, "Derivations of Technical Safety Requirements."

1.1 Definitions

Note: Defined terms in this list appear in uppercase type throughout this TSR.

Term	Definition
ACTION(S)	The part of a Limiting Condition for Operation (LCO) that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
ACTIVE PANEL	A Panel that contains emplaced WASTE and is not a filled Panel, or has not been isolated by a closure system or substantial barrier, as described in the Hazardous Waste Facility Permit.
ACTIVE ROOM	A room in a Panel that contains emplaced WASTE and is not a filled room, or has not been isolated by a ventilation or isolation structure (e.g., bulkhead). This includes the intake drift portion of the room, the main body of the room, and the exhaust drift portion of the room.
ACTIVITY	The collection of tasks or steps commonly associated with a process.
AFFECTED/AFFECTED AREA	The area identified by the Facility Shift Manager (FSM) that identifies the part or all of a PROCESS AREA(S) where a credited control is not available. The AFFECTED AREA is determined by the situation.
ATTEND(ED)/ ATTENDANT	An ATTENDANT is an individual assigned to a liquid-fueled vehicle/equipment. An ATTENDANT is trained and is responsible for two basic functions. One function (referred to in the WIPP DSA Chapter 3.0 as a “Spotter”) is a Spotter and is preventive in nature and includes the responsibilities of recognizing potential collision risks and vehicle/equipment anomalies or malfunctions that could result in a fire and taking appropriate action, including alerting the vehicle/equipment operator. The other function (referred to in the WIPP DSA Chapter 3.0 as “Notification”) is mitigative in nature and includes the responsibilities of making appropriate notifications to the Central Monitoring Room (CMR). The ATTENDANT duties are separate from the duties of the designated FIRE WATCH. The ATTENDANT may be riding the vehicle/equipment being ATTENDED while moving or in near proximity and having visual contact with the vehicle/equipment. The ATTENDANT SHALL not be the individual operating the vehicle/equipment.
CALIBRATE(D)/ CALIBRATION	The comparison of a measurement standard or instrument with another standard or instrument to report, or reduce by adjustment, any variation (deviation) in the accuracy of the item being compared. A requirement to perform a CALIBRATION on an instrument (e.g., alarm) also requires a CALIBRATION to be performed on all components in the circuit that are subject to drift and that could adversely affect the performance of the instrument.

1.1 Definitions (continued)

CLOSED	Refers to site-derived WASTE CONTAINERS as follows: Standard Waste Box container with the lid in place and a minimum of eight bolts (two on each side) are installed and hand tight. **OR** A drum with the lid on, bung ring in place, and the bolt and nut are hand tight. Refers to Type B SHIPPING PACKAGES as follows: Transuranic Package Transporter Model II (TRUPACT-II) or Half-Package Transporter (HalfPACT) Model with the outer lid bolted in place with all bolts present. **OR** Transuranic Package Transporter Model III (TRUPACT-III) Shipping Container with the Outer Cover in place with all bolts in place. **OR** RH-TRU 72-B Shipping Container with both impact limiters properly installed when on a trailer, or on a Road Cask Transfer Car with no lid bolts loosened.
DISPOSAL ROOM	A room in either an active, closed, or open Panel designated for emplacement of WASTE.
DOWNLOAD(ING)	The transfer of WASTE CONTAINERS from the Waste Shaft Collar Room to the WASTE SHAFT STATION via the Waste Shaft Conveyance or from the WASTE SHAFT STATION to the Waste Shaft Collar Room.
ENSURE (ING)	To confirm and substantiate that an ACTIVITY or condition has been implemented in conformance with requirements. Manipulation of equipment or instrumentation to conform to the specified requirement is permitted.
FIRE WATCH	A trained person assigned to an AFFECTED AREA for the purpose of making fire safety observations, notifying building occupants and the CMR of an emergency, minimizing the potential for a fire to occur, and/or extinguishing incipient fires. The person assigned a FIRE WATCH can have no other duties.
FREQUENCY(IES)	How often a specific surveillance must be performed. See Section 1.3 of this TSR for detailed information on the use of this term.
FUNCTIONAL(LY) TEST(ED)	An active check or test to determine if equipment is OPERABLE. For an instrument, it is typically performed by inputting a signal as close as possible to the sensor, using a CALIBRATED device or a traceable physical standard and verifying the credited safety response (+/– the allowed tolerance) and/or that an indicator reports the corresponding values (+/– the allowed tolerance) over the required range.

1.1 Definitions (continued)

IMMEDIATELY	Without delay. IMMEDIATELY is used as a Completion Time when a Condition cannot be permitted to continue and the corresponding Required Action must be initiated without delay and continued until completed.
IN SERVICE	A system, subsystem, train, component, or device performing its specified function.
INTERIM SAFETY BASIS CHANGES (ISBC)	A documented plan used to recover from a condition where the credited safety function has not been met or is newly identified. The ISBC SHALL include a description of the noncompliant condition, compensatory measures (as needed), and corrective actions. (See Section 1.6 of this TSR.)
MODE	The status or operating condition of the facility or a PROCESS AREA. Section 1.2 of this TSR describes the individual MODES.
NOT OPERABLE	A system, structure, component, or device is NOT OPERABLE when it is not capable of performing its specified safety function(s) or when any necessary associated instrumentation, controls, electrical power, cooling or seal water, lubrication, or other auxiliary equipment that are required for the system, subsystem, component, or device to perform its specified safety function(s) are not capable of performing their related support function(s). The requirements for each system, structure, component, or device to be OPERABLE are defined in each LCO. Failure to meet Surveillance Requirements (SRs) within the specified FREQUENCY must be evaluated to determine if a system, subsystem, component, or device should be declared NOT OPERABLE.
OPERABLE/ OPERABILITY	A system, structure, component, or device is OPERABLE when it is capable of performing its specified safety function(s) and when all necessary associated instrumentation, controls, electrical power, cooling or seal water, lubrication, or other auxiliary equipment that are required for the system, subsystem, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s). The requirements for each system, structure, component, or device to be OPERABLE are defined in each LCO. Successful completion of SRs within the specified FREQUENCY is required to declare a system, subsystem, component, or device as being OPERABLE.

1.1 Definitions (continued)

PROCESS AREA	A defined area in the facility that may consist of a room, several rooms, or an entire area. A PROCESS AREA may be a portion of a facility or an entire facility area covered by a particular operation or procedure (see Table 1.1-1 for PROCESS AREA description).
RESPONSE PLAN	A document that specifies, based on existing conditions, the detailed plan of action for restoring compliance with the LCO or Administrative Control. Section 5.4.4 discusses the use and content of RESPONSE PLANS. A RESPONSE PLAN can be used to restore compliance with an LCO or Administrative Control. RESPONSE PLANS SHALL be approved by DOE prior to implementation.
ROVING FIRE WATCH	A roving inspection of AFFECTED AREAS for the purpose of making fire safety observations, notifying building occupants and the CMR of an emergency, minimizing the potential for a fire to occur, and/or extinguishing incipient fires. A ROVING FIRE WATCH may have other duties between inspections.
SAFE CONFIGURATION	SAFE CONFIGURATION is the minimization of risk by placing an ACTIVITY or equipment in the least vulnerable position.
SHALL	A mandatory requirement that must be complied with to maintain the requirements, assumptions, or conditions of the facility safety basis.
SHIPPING PACKAGE	Nuclear Regulatory Commission – authorized Type B SHIPPING PACKAGE, excluding its contents. Type B SHIPPING PACKAGES used at WIPP are TRUPACT-II, TRUPACT-III, HalfPACT, and RH-TRU 72-B.
SUSPEND WASTE HANDLING ACTIVITIES	The minimum number of discrete steps needed to stop moving WASTE and place WASTE in a SAFE CONFIGURATION.
TIME OF DECLARATION	The actual time when the FSM determines that an LCO or SR is not met. As soon as possible upon notification of a problem, the problem should be evaluated and a declaration made by the FSM if it is determined that an LCO is not met. Time specified for completion of Required Actions within an LCO Condition is measured from the TIME OF DECLARATION unless otherwise specified within the action statement.
TRANSPORT PATH	The route below ground that the WASTE travels during WASTE HANDLING ACTIVITIES. The TRANSPORT PATH includes the width of the drift between the ribs.

1.1 Definitions (continued)

VERIFY/VERIFIED/ VERIFIES/ VERIFICATION	To confirm and substantiate that an ACTIVITY or condition has been implemented in conformance with requirements. Manipulation of equipment or instrumentation to conform to the specified requirement is not permitted.
WASTE	Content in a WASTE CONTAINER that is outside of a CLOSED SHIPPING PACKAGE and may be: CH – Transuranic (TRU) WASTE with a surface dose rate less than 200 millirem per hour per container. **OR** RH – Any of the various forms of high beta-gamma or neutron TRU WASTE requiring remote handling and with a surface dose rate equal to or greater than 200 millirem per hour per container but less than 1,000 rem per hour. **OR** Site-derived – TRU WASTE generated at the WIPP facility as a direct result of managing the TRU WASTE received from the generator sites.
WASTE CONTAINER	Payload container authorized for shipment in Type B SHIPPING PACKAGES (see the WIPP DSA Chapter 3.0, Table 3.3-8).
WASTE FACE	The area of the emplaced WASTE array where the WASTE is susceptible to damage from collisions, fires, explosions, and other events that could lead to a release of radiological material.
WASTE HANDLING VEHICLES/EQUIPMENT	Vehicles and equipment used to load, unload, transport, emplace, and retrieve WASTE. The Waste Shaft Conveyance is not defined as WASTE HANDLING EQUIPMENT.
WASTE HANDLING ACTIVITY(IES)	Activities involving WASTE being handled. Examples of WASTE HANDLING ACTIVITIES include unloading, transporting, emplacing, retrieving outside a CLOSED SHIPPING PACKAGE, or loading WASTE into a SHIPPING PACKAGE to be returned to a generator site, or a MgO sack being placed at the WASTE FACE in the ACTIVE ROOM.
WASTE SHAFT STATION	The WASTE SHAFT STATION includes the E-140/S-400 intersection and the portion of the S-400 drift from the E-140/S-400 intersection to the Waste Shaft.
WHB PARKING AREA UNIT	The asphalt and concrete surface extending from north of the rail sidings to the Waste Handling Building (WHB), within the Waste Storage Areas, as depicted in DSA Chapter 2.0, Figure 2.4-1.

1.1 Definitions (continued)

Table 1.1-1. Process Area Description

PROCESS AREA NAME	PROCESS AREA DESCRIPTION
CH BAY	Area of the WHB used for CH WASTE HANDLING ACTIVITIES.
ROOM 108	Area within the CH WHB used for CH WASTE HANDLING ACTIVITIES for TRUPACT-III.
RH BAY	Area of the WHB used for RH WASTE HANDLING ACTIVITIES.
HOT CELL COMPLEX	Area of the WHB that includes the transfer cell, Cask Unloading Room (CUR), and the Upper Hot Cell.
OUTSIDE AREA	The aboveground areas external to the WHB, within the Property Protection Area.
UNDERGROUND	The Waste Shaft, WASTE SHAFT STATION, TRANSPORT PATH, and DISPOSAL ROOM(S).
WASTE SHAFT ACCESS AREA	Area of the WHB that includes the Facility Cask Loading Room (FCLR), Conveyance Loading Room (CLR), Waste Shaft Collar Room, and Waste Hoist Tower.

1.2 Operational MODES

The MODES for the applicable PROCESS AREAS are defined in Table 1.2-1. The WIPP consists of multiple PROCESS AREAS that perform specific independent functions in the accomplishment of its mission. In addition, the applicable MODES vary by PROCESS AREAS as indicated in Table 1.2-1. Therefore, each PROCESS AREA can be in a specific MODE independent of any other PROCESS AREA. Table 1.2-2 provides a matrix of MODES that are available for each PROCESS AREA. MODE changes are administrative declarations made by the FSM or designee.

Table 1.2-1. Mode Descriptions

MODE	CONDITION
WASTE HANDLING	A MODE in which WASTE is permitted to be handled, stored, or placed in a storage configuration **OR** moved outside of a CLOSED SHIPPING PACKAGE **OR** magnesium oxide may be placed in an ACTIVE ROOM.
WASTE STORAGE	A MODE in which WASTE may be temporarily stored, but no WASTE HANDLING ACTIVITIES are permitted. WASTE may be outside of a CLOSED SHIPPING PACKAGE. Site-derived WASTE (when present in the CH BAY or RH BAY) must be in a CLOSED WASTE CONTAINER.
DISPOSAL	A MODE in which no WASTE HANDLING ACTIVITIES are permitted in the UNDERGROUND.
STANDBY	A MODE in which WASTE is not permitted to be present unless in a CLOSED SHIPPING PACKAGE. Site-derived WASTE (when present in the CH BAY or RH BAY) must be in a CLOSED WASTE CONTAINER.

Table 1.2-2. MODE and Process Area Matrix

MODE	CH BAY	ROOM 108	RH BAY	HOT CELL COMPLEX	WASTE SHAFT ACCESS AREA	UNDERGROUND	OUTSIDE AREA
WASTE HANDLING	X	X	X	X	X	X	
WASTE STORAGE	X	X	X	X	X		
DISPOSAL						X	
STANDBY	X	X	X	X	X		

Note: OUTSIDE AREA has no MODES assigned. OUTSIDE AREA is indicated by LCO applicability statements and is applicable at all times.

1.3 Frequency

Purpose

The purpose of this section is to explain the application and use of FREQUENCY notation.

Background

Each SR has a specified FREQUENCY in which the surveillance SHALL be performed. The FREQUENCY notation used in this TSR document is in agreement with DOE-G-423.1-1.

FREQUENCY Notation

The FREQUENCY notations used in this TSR are defined in Table 1.3-1.

Use of FREQUENCY/ Periodicity

Failure to complete the LCO SR within the required FREQUENCY (see Table 1.3-1), as qualified in the table notes, SHALL constitute an LCO violation. Failure to complete LCO SRs within the required FREQUENCY SHALL constitute failure of the SR requiring entry into the applicable Condition of the LCO. For SRs, the FREQUENCY requirement is extended to 1.25 times the specified interval (SR 4.0.2). This extension applies only to the FREQUENCY specification for SRs; it does not apply to the Completion Time requirement for ACTION statements. The time extension is intended to provide operational flexibility for completion of SRs. It should not be relied upon as a routine extension of the specified interval. Dates and times that LCO SRs are performed SHALL be documented.

1.3 Frequency (continued)

Table 1.3-1. Surveillance Requirement Frequency

NOTATION	FREQUENCY	FREQUENCY +25%
EACH SHIFT (Notes 1 and 2)	Once per Shift	N/A
DAILY (Note 3)	Once per day	N/A
WEEKLY	7 Days	8 Days
MONTHLY	31 Days	38 Days
PRIOR TO USE (Note 4)	N/A	N/A
QUARTERLY	92 Days	115 Days
SEMIANNUAL(LY)	184 Days	230 Days
ANNUAL(LY)	365 Days	456 Days
5 YEAR(S)	1826 Days	2282 Days

Note 1: For the UNDERGROUND, surveillances are required to be performed only when personnel are present in the UNDERGROUND.

Note 2: EACH SHIFT means that the surveillance is required to be performed once anytime during that shift. Exceptions are stated in specific LCOs.

Note 3: DAILY means that the surveillance is performed once each day anytime during the day that the equipment/system is to be used.

Note 4: PRIOR TO USE means prior to the initial use of equipment/system each day or prior to each RH WASTE Handling evolution. If the equipment selected for use is used several times throughout a day or an RH evolution that requires multiple days to complete, the initial application of the surveillance is adequate for the balance of the day or the RH evolution.

1.3 Frequency (continued)

EXAMPLES

The following example illustrates the way that FREQUENCIES are specified. In this example, the LCO MODE applicability is WASTE HANDLING and WASTE STORAGE.

EXAMPLE 1.3-1

Surveillance Requirements

SURVEILLANCE REQUIREMENT	FREQUENCY
SR 4.x.x.x VERIFY one CVS exhaust fan 41-B-816 **OR** 41-B-817 IN SERVICE.	DAILY

Example 1.3-1 contains the type of SR most often encountered in the TSR. The FREQUENCY specifies an interval (DAILY) during which the associated surveillance must be performed at least one time. Performance of the surveillance initiates the subsequent interval. Although the FREQUENCY is stated as DAILY, an extension of the time interval to 1.25 times the stated FREQUENCY is allowed by SR 4.0.2 for operational flexibility. The 25% extension should be used on an "as needed" basis and should not be considered as a "normally relied on" FREQUENCY. If a SR is not performed within the specified interval, then SR 4.0.3 becomes applicable.

If the interval specified by SR 4.0.2 is exceeded while the facility is not in a MODE or other specified condition in the applicability of the LCO for which performance of the SR is required, the surveillance must be performed within the FREQUENCY requirements prior to entry into the MODE or other specified condition. Failure to do so would violate SR 4.0.4.

Special conditions may dictate when a surveillance is to be met. These conditions apply to the surveillance, the FREQUENCY, or both. They are "otherwise stated" conditions allowed by SR 4.0.1. They may be stated as clarifying notes in the surveillance, the FREQUENCY, or both.

1.4 Logical Connectors

Purpose

The purpose of this section is to explain the use and application of logical connectors.

Background

Logical connectors are used in TSRs to discriminate between (and yet connect) discrete conditions, Required Actions, Completion Times, SRs, and FREQUENCIES. The logical connectors include the "**AND**" and "**OR**." The physical arrangement of this connector on a page constitutes a specific meaning in accordance with the convention established in DOE-G-423.1-1B.

Use of Logical Connectors

Several levels of logic may be used to state ACTIONS. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to each Required Action and the placement of the logical connector in the first level of nesting (for example, left justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indenting of the logical connectors.

When logical connectors are used to state a condition, usually only the first level of logic is used and the logical connector is left justified with the Condition statement. In a few cases, successive levels of logic are used. This lower level is identified solely by indenting the logical connector because subparts of a Condition statement are not numbered separately.

When logical connectors are used to state a Completion Time, SRs, or FREQUENCY, only the first level of logic is used and the logical connector is left justified with the statement of the Completion Time, SR, or FREQUENCY.

Definition of Logic Terms

The defined terms of this section appear in capitalized type, bolded, and underlined throughout the TSR document.

TERM	DEFINITION
AND	Used to connect two or more sets of criteria that must both (all) be satisfied for a given logical decision.
OR	Used to denote alternate combinations or Conditions, meaning either one or the other criterion is acceptable.

1.5 Completion Times

Purpose

The purpose of this section is to explain the use and application of Completion Times.

Background

The LCO specifies the lowest functional capabilities or performance levels that are required to ensure safe operation of the facility. The LCO identifies Conditions for which these functional or performance requirements are not met, and the LCO states Required Action(s) that may be taken within a limited time (the Completion Time) or within a specified periodicity under these Conditions. The ACTION statements provide interim remedial ACTION(S) or compensatory protection for the same safety concerns as the LCO while attempting to restore the functional capabilities or performance levels required by the LCO. Failure to complete the ACTION(S) within the Completion Time results in a violation of the LCO.

Completion Time

The Completion Time is the amount of time allowed to complete a Required Action. It is referenced to the TIME OF DECLARATION. A Required Action can be done any time during the specified completion interval.

If situations require entry into more than one Condition within a single LCO (multiple Conditions), the Required Action(s) for each Condition SHALL be performed within the associated Completion Times. When in multiple Conditions, separate Completion Times are tracked for each Condition, starting from the TIME OF DECLARATION of the situation that required entry into the Condition.

Once a Condition has been entered, subsequent discovery of subsystems, components, or variables that are NOT OPERABLE or not within limits as a result of cascading effects from entering the Condition SHALL not result in separate entry into the Condition. The Required Action(s) of the Condition continue to apply to each additional failure, and Completion Times are based on initial entry into the Condition.

Entry into an LCO ACTION and LCO Required Action Completion Times SHALL be documented.

1.6 Interim Safety Basis Changes

Purpose The purpose of this section is to establish the use and application for conditions that require an ISBC.

Background In the lifetime of a facility, operational events, changes in conditions, and equipment failures are expected and do occur.

Situations arise that require a disciplined approach to ensure that WIPP is maintained within the approved safety basis. Due to the broad spectrum of the way equipment can fail and operational events can arise, preparation and approval of an ISBC may be required. The development, preparation, and approval of the ISBC will ensure that potential impacts to risk are evaluated, compensatory measures are established (if needed), and DOE approval of the disciplined approach or corrective actions to restore the safety function is obtained.

ISBCs may include Justifications for Continued Operations (JCO), Safety Basis Supplements, and Evaluation of the Safety of the Situation. JCOs provide a temporary change to the facility safety basis that would allow the facility to continue operating in view of a specific and unexpected situation, considering the safety significance of the situation and any compensatory measures being applied during this period. Safety Basis Supplements establish new temporary requirements to supplement the existing TSR. Evaluation of the Safety of the Situation is a qualitative assessment of relative risk of the situation and provides evidence to DOE for addition or removal of controls. All must be approved by DOE prior to implementation.

ISBC The ISBC SHALL include a description of the noncompliant condition, compensatory measures (as needed), and corrective actions required to restore the safety function. The guidance of DOE-G-424.1-1B, *Implementation Guide for Use in Addressing Unreviewed Safety Questions*, and WP 12-NS3009, *Interim Changes to the WIPP Safety Basis* will be used to establish and document an appropriate set of temporary hazard controls.

Approval Nuclear Waste Partnership LLC (NWP) SHALL evaluate a discrepant as-found condition to determine if the condition requires the preparation, development, and approval of an ISBC. The ISBC SHALL be submitted to the approval authority for approval.

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Section 2
Safety Limits

2.0 SAFETY LIMITS

As defined in 10 CFR 830.3, Safety Limits (SLs) are limits on process variables associated with those physical barriers (generally passive) that, if exceeded, could directly cause the failure of one or more barriers that prevent the uncontrolled release of radiological or other hazardous material. The safety analysis for the WIPP did not specify any single limit that, if exceeded, could directly cause the failure of a barrier that prevents the release of radiological or hazardous material. Therefore, there are no SLs.

As defined in 10 CFR 830.3, Limiting Control Settings are associated with SLs and SHALL be conservatively selected such that automatic or manual protective action will correct the abnormal situation before a SL is exceeded. No SLs have been identified for the WIPP; therefore, there are no Limiting Control Settings.

Section 3/4
Limiting Conditions for Operation
and
Surveillance Requirements

3.0 GENERAL LIMITING CONDITIONS FOR OPERATION

10 CFR 830.3 defines LCOs as the lowest functional capability or performance level of safety Structures, Systems, and Components (SSCs), their support systems required for normal safe operation of the facility, and Specific Administrative Controls (SACs).

LCO 3.0.1

LCOs SHALL be met during the MODES or other specified conditions in the applicability, except as provided in LCO 3.0.2.

LCO 3.0.2

Upon discovery of a failure to meet an LCO, the associated ACTIONS SHALL be met, except as provided in LCO 3.0.5 and LCO 3.0.6. If the LCO is restored or is no longer applicable before the specified Completion Time(s) expires, completion of the ACTION is not required, unless otherwise stated.

The Completion Time(s) for Required Action(s) are also applicable when a system or component is intentionally removed from service. Acceptable reasons for intentionally entering Required Action(s) for an LCO include, but are not limited to, performance of SRs, preventive maintenance, corrective maintenance, or investigation of operational problems.

LCO 3.0.3

When an LCO statement is not met and the associated ACTIONS are not met, or when an associated ACTION is not provided, the applicable PROCESS AREA SHALL be placed in a MODE or other specified condition in which the LCO is not applicable. If the LCO is applicable in all MODES, the applicable PROCESS AREA SHALL be placed in a SAFE CONFIGURATION. Activities SHALL be initiated IMMEDIATELY to place the applicable PROCESS AREA in a SAFE CONFIGURATION. The applicable PROCESS AREA SHALL be in a SAFE CONFIGURATION within 12 Hours.

Where corrective measures are completed that permit operation in accordance with the LCO or ACTIONS, completion of the ACTIONS required by LCO 3.0.3 are not required.

LCO 3.0.3 is applicable in all MODES. Exceptions to LCO 3.0.3 may be stated in the individual LCOs.

(continued)

3.0 General Limiting Conditions for Operation (continued)

LCO 3.0.4

When an LCO is not met, a MODE or other specified condition in the applicability SHALL not be entered, except when the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the applicability for an unlimited period of time. LCO 3.0.4 SHALL not prevent changes in MODES or other specified conditions in the applicability that are required to comply with ACTIONS or that are part of a shutdown of the AFFECTED PROCESS AREA(S).

Exceptions to LCO 3.0.4 are stated in the individual LCOs. When an individual LCO states that LCO 3.0.4 does not apply, it allows entry into MODES or other specified conditions in the applicability when the associated ACTIONS to be entered permit operation in the MODE or other specified condition for only a limited time.

LCO 3.0.5

Equipment removed from service or declared NOT OPERABLE to comply with ACTIONS may be returned to service under Administrative Control (AC) solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to LCO 3.0.2 for the system returned to service under AC to perform the testing required to demonstrate OPERABILITY.

LCO 3.0.6

When a support system is declared inoperable, the supported systems are also required to be declared inoperable. However, only the support system's ACTIONS are required to be entered, provided they reflect the supported system's degraded safety condition. This is an exception to LCO 3.0.2 for the supported system.

4.0 GENERAL SURVEILLANCE REQUIREMENTS

SR 4.0.1

SRs SHALL be met during the MODES or other specified conditions in the applicability for individual LCOs unless otherwise stated in the SR. Failure to meet a surveillance, whether such failure is experienced during the performance of the surveillance or between performances of the surveillance, SHALL be failure to meet the LCO, except as provided in SR 4.0.3. Surveillances do not have to be performed on NOT OPERABLE equipment or variables outside specified limits.

SR 4.0.2

Each SR SHALL be performed within the specified FREQUENCY. The specified FREQUENCY of each SR is met if the SR is performed within 1.25 times the interval specified in the FREQUENCY, as measured from the previous performance or as measured from the time a specified condition of the FREQUENCY is met, as identified in Table 1.3-1.

For FREQUENCIES specified as "once," the above interval extension does not apply.

Exceptions to this specification are stated in the individual specifications.

SR 4.0.3

Failure to perform a SR within 1.25 times the specified time interval (TSR violation) SHALL constitute a failure to meet the OPERABILITY requirements for the LCO. The LCO ACTIONS SHALL be entered at the time it is determined that the SR has not been performed or is not met, except as provided below.

If it is discovered that a surveillance was not performed within its specified FREQUENCY, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery (i.e., the actual time when the FSM or designee determines that an SR has not been met), up to 24 Hours or up to the limit of the specified FREQUENCY, whichever is less. This delay period is permitted to allow performance of the surveillance.

If the SR is not performed within the delay period, the LCO must IMMEDIATELY be declared not met, and the applicable Condition(s) must be entered.

When the SR is performed within the delay period and the surveillance is not met, the LCO must IMMEDIATELY be declared not met, and the applicable Condition(s) must be entered.

SR 4.0.4

Entry into a MODE or other specified condition SHALL not be made unless the SRs associated with the LCO have been performed within the stated surveillance interval or as otherwise specified. When an LCO is not met due to surveillances not having been met, entry into a MODE or other specified condition in the applicability SHALL only be made in accordance with LCO 3.0.4.

3/4.1 Fire Suppression Systems

3.1.1 WHB Fire Suppression System

LCO 3.1.1 The Fire Suppression System (FSS) for the WHB SHALL be OPERABLE. An OPERABLE FSS consists of the following elements:

- One unobstructed and undiverted flow path from Fire Water Storage Tank 25-D-001A to the applicable PROCESS AREA sprinklers.
- Two fire pumps (45-G-601 and 45-G-602) each with a capability to deliver greater than or equal to 490 gallons per minute (gpm) to the ROOM 108 riser at greater than or equal to 120 pounds per square inch gauge (psig).
- Fire pump auto-start capability at a set point greater than or equal to 125 psig.
- Fire Water Storage Tank 25-D-001A level indication of greater than or equal to 51 percent.
- Level indication for Fire Water Storage Tank loop 25F00601 (Level transmitter, 456-LT-006-001, and local indicator, 456-LI-006-001).

MODE Applicability WASTE HANDLING, WASTE STORAGE

PROCESS AREA Applicability CH BY, ROOM 108, WASTE SHAFT ACCESS AREA

----------NOTE 1 ----------
LCO 3.1.1 PROCESS AREA Applicability excludes the FCLR.

(continued)

3/4.1 Fire Suppression Systems (continued)

3.1.1 WHB Fire Suppression System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The Fire Water Storage Tank loop 25F00601 is NOT OPERABLE.	**----------NOTE----------** LCO 3.0.4 is not applicable. **----------**	
	A.1 VERIFY Fire Water Storage Tank level greater than or equal to 51 percent by visual verification of water overflowing Fire Water Storage Tank.	2 Hours **AND** every 12 Hours thereafter
	AND	
	A.2.1 Restore Fire Water Storage Tank loop (25F00601) to OPERABLE status.	92 Days
	OR	
	A.2.2 Place the AFFECTED PROCESS AREA(S) in STANDBY.	92 Days

(continued)

3/4.1 Fire Suppression Systems (continued)

3.1.1 WHB Fire Suppression System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One fire pump is NOT OPERABLE.	----------**NOTE**---------- LCO 3.0.4 is not applicable. ---------- B.1 Restore NOT OPERABLE fire pump to OPERABLE status. **OR** B.2.1 Implement the CBFO-approved Fire Pump Impairment Plan. **AND** B.2.2 Restore NOT OPERABLE fire pump to OPERABLE status.	 14 Days 14 days 92 Days

(continued)

3/4.1 Fire Suppression Systems (continued)

3.1.1 WHB Fire Suppression System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------NOTE---------- Condition C is not entered for FSS inoperability due to an inoperable Fire Water Tank level loop 25F00601. **----------** C. The FSS for the WHB is NOT OPERABLE in a PROCESS AREA(S). **OR** Required Actions and Completion Times of Condition B are not met. **OR** No OPERABLE fire pumps available.	**----------NOTE----------** LCO 3.0.4 is not applicable. **----------** C.1 Do not introduce new CLOSED Type B SHIPPING PACKAGES into AFFECTED PROCESS AREA(S). **AND** C.2 Stop hot work ACTIVITIES in WHB not related to restoration of FSS in AFFECTED PROCESS AREA(S). **AND** C.3 Establish a FIRE WATCH at the WASTE HANDLING ACTIVITY locations in AFFECTED PROCESS AREA(S). **AND** C.4 Remove liquid-fueled vehicle(s)/equipment from RH BAY **AND** C.5 Establish a ROVING FIRE WATCH in AFFECTED PROCESS AREA(S). **AND**	IMMEDIATELY 1 Hour 1 Hour 1 Hour 1 Hour **AND** Every 2 Hours thereafter

(continued)

3/4.1 Fire Suppression Systems (continued)

3.1.1 WHB Fire Suppression System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.6.1 Restore FSS to OPERABLE status.	31 Days
	OR	
	C.6.2 Place the AFFECTED PROCESS AREA(S) in STANDBY.	31 Days
	OR	
	C.6.3 Implement a RESPONSE PLAN.	31 Days

(continued)

3/4.1 Fire Suppression Systems (continued)

3.1.1 WHB Fire Suppression System (continued)

Surveillance Requirements

SURVEILLANCE REQUIREMENT			FREQUENCY
4.1.1.1	VERIFY that the level in the Fire Water Storage Tank is greater than or equal to 51 percent using the local level indicator (456-LI-006-001).		EACH SHIFT
4.1.1.2	Perform an automatic start test of each fire pump (45-G-601 and 45-G-602) to VERIFY that the pump starts at a pressure greater than or equal to 125 psig and runs for the prescribed runtime per NFPA 20 code of record (7 minutes for electric pump, 30 minutes for diesel pump).		WEEKLY
4.1.1.3	VERIFY that the diesel fire pump fuel tank (45-D-601) fuel level is greater than or equal to 12 inches.		WEEKLY
4.1.1.4	VERIFY that valves providing at least one unobstructed and undiverted flow path from Fire Water Storage Tank 25-D-001A to the applicable PROCESS AREA sprinklers are locked in the proper position.		MONTHLY
4.1.1.5	Open the Inspector's Test Valve associated with each riser as identified below and VERIFY water flow through the associated riser:		SEMI-ANNUALLY
	Riser	Inspector's Test Valve	
	CH BAY	FW-411-V-023 and FW-412-V-002	
	ROOM 108	FW-411-V-062	

(continued)

3/4.1 Fire Suppression Systems (continued)

3.1.1 WHB Fire Suppression System (continued)

Surveillance Requirements (continued)

SURVEILLANCE REQUIREMENT		FREQUENCY
4.1.1.6	Perform a Main Drain Test for the CH BAY and ROOM 108 risers to verify less than 10% reduction in pressure from the previous satisfactory test for that lineup.	ANNUALLY **AND** Upon any FSS alignment change
4.1.1.7	Perform a CALIBRATION on the level indicators and transmitter for the Fire Water Storage Tank (Level transmitter, 456-LT-006-001, and local indicator, 456-LI-006-001).	ANNUALLY
4.1.1.8	Perform a hydrant flow test for each fire pump (45-G-601 and 45-G-602) to VERIFY a flowrate of greater than or equal to 500 gpm while maintaining at least 141 psig residual pressure using hydrants #12 and #13.	ANNUALLY
4.1.1.9	Perform an internal visual inspection of the CH BAY and ROOM 108 risers to VERIFY components operate correctly, move freely, are in good condition, and fire suppression piping is free of excessive foreign material and unobstructed.	------**NOTE**------- SR 4.0.2 is not applicable. ---------- 5 YEARS

3/4.1 Fire Suppression System (continued)

3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System

LCO 3.1.2 The FSS on UNDERGROUND vehicles/equipment selected for use SHALL be OPERABLE.

An OPERABLE FSS consists of the following elements:

- Control Panel with functional status indicating light(s).
- Temperature detection elements.
- Adequately charged suppressant system.
- Distribution system to disperse the suppressant.
- Automatic engine cutoff capability.

MODE Applicability WASTE HANDLING and DISPOSAL

- When CH WASTE is present in the WASTE SHAFT STATION.
- When CH WASTE is present in the TRANSPORT PATH.
- When UNDERGROUND liquid-fueled vehicles/equipment having significant liquid combustible quantities are less than or equal to the minimum standoff distance from a CH WASTE FACE as specified in Table 3.1.2-1.

----------NOTE 1----------

Disabled (inoperable) vehicles/equipment in the TRANSPORT PATH or abandoned equipment in Panel 7, Room 6 per ETO-Z-400 are not required to have an OPERABLE Fire Suppression System.

----------NOTE 2 ----------

Vehicles/equipment outside the TRANSPORT PATH are not required to have an OPERABLE Fire Suppression System.

----------NOTE 3 ----------

During the transport of CH WASTE, vehicles/equipment in the TRANSPORT PATH that are located behind the CH WASTE Transport vehicle/equipment (area where the CH WASTE Transport vehicle/equipment has passed) are not required to have an OPERABLE Fire Suppression System.

PROCESS AREA Applicability UNDERGROUND

(continued)

3/4.1 Fire Suppression System (continued)

3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. FSS on UNDERGROUND vehicle or equipment that is in use is NOT OPERABLE.	A.1	ATTEND the vehicle/equipment with the NOT OPERABLE FSS.	IMMEDIATELY
	AND		
	A.2	Place vehicle/equipment in a SAFE CONFIGURATION.	IMMEDIATELY
	AND		
	A.3	Replace noncompliant vehicle/equipment with vehicle/equipment with an OPERABLE FSS.	4 Hours
B. Required Actions and Completion Times of Condition A are not met.	B.1	SUSPEND WASTE HANDLING ACTIVITIES not associated with the affected vehicle.	IMMEDIATELY
	AND		
	B.2	Restore compliance with the LCO.	IMMEDIATELY

(continued)

3/4.1 Fire Suppression System (continued)

3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Surveillance Requirements

SURVEILLANCE REQUIREMENT		FREQUENCY
4.1.2.1	VERIFY FSS electronic display panel green status LED is illuminated on the vehicles and equipment selected for use.	PRIOR TO USE
4.1.2.2	Perform a FUNCTIONAL TEST of the FSS controls for vehicles and equipment selected for use to VERIFY: • Control Panel with functional status indicating light(s). • Temperature detection elements. • Adequately charged suppressant system. • Distribution system to disperse the suppressant. • Automatic engine cutoff capability.	**----------NOTE----------** SR 4.0.2 is not applicable. **----------** SEMIANNUALLY

Table 3.1.2-1. Standoff Distances from WASTE FACE for Vehicles/Equipment Containing Liquid Combustibles

Liquid Combustible Capacity (gallons)	Minimum Standoff Distance (feet)
50	40
100	55
150	70
200	85
250	100
300	115
400	145
500	175

3/4.2 Confinement Ventilation Systems

3.2.1 CH WASTE Handling (WH) Confinement Ventilation System

LCO 3.2.1 The CH WH Confinement Ventilation System (CVS) SHALL be OPERABLE. An OPERABLE CH WH CVS consists of the following elements:

- One exhaust fan (41-B-816 or 41-B-817) IN SERVICE.
- One OPERABLE High-efficiency Particulate Air (HEPA) filter unit (41-B-814 or 41-B-815) IN SERVICE.
- Differential pressure across each IN SERVICE HEPA filter bank less than or equal to +3.90 inches w.g. and greater than or equal to +0.30 inches w.g. locally.
- IN SERVICE HEPA filter unit efficiency of greater than or equal to 99%.
- Differential pressure less than or equal to -0.04 inches w.g. in CH BAY with respect to ambient outside air pressure, locally.
- Differential pressure less than or equal to -0.04 inches w.g. in ROOM 108, with respect to ambient outside air pressure, locally.
- OPERABLE pressure differential instrumentation and CMR alarm indications as identified in Table 3.2.1-1 and Table 3.2.1-2.

MODE Applicability WASTE HANDLING, WASTE STORAGE

PROCESS AREA Applicability CH BAY, ROOM 108, and WASTE SHAFT ACCESS AREA (when WHB Door 140 is open)

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.1 CH WH Confinement Ventilation System (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------NOTE---------- Separate CONDITION entry is allowed for each NOT OPERABLE CMR alarm indication. **----------** A. CMR alarm indication for differential pressure across IN SERVICE HEPA filter bank NOT OPERABLE. **OR** CMR alarm indication for differential pressure in CH BAY is NOT OPERABLE. **OR** CMR alarm indication for differential pressure in ROOM 108 NOT OPERABLE.	**----------NOTE----------** LCO 3.0.4 is not applicable. **----------** A.1 VERIFY differential pressure for affected CMR instrument loop(s) at local gauge(s) is within acceptable range per Table 3.2.1-2. **AND** A.2 Restore affected CMR differential pressure instrument loop(s) to OPERABLE status.	1 Hour **AND** every 12 Hours thereafter 31 Days

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.1 CH WH Confinement Ventilation System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. The CH WH CVS is NOT OPERABLE in an applicable PROCESS AREA. **OR** IN SERVICE local gauge specified in Table 3.2.1-2 is NOT OPERABLE. **OR** Required Actions and Completion Times of Condition A are not met.	**----------NOTE----------** LCO 3.0.4 is not applicable. **----------** B.1 Do not introduce new CLOSED Type B SHIPPING PACKAGES into AFFECTED PROCESS AREA(S).	IMMEDIATELY
	AND	
	B.2 Stop hot work ACTIVITIES in AFFECTED PROCESS AREA(S) not related to restoration of CH WH CVS.	IMMEDIATELY
	AND	
	B.3 Establish a FIRE WATCH at the WASTE HANDLING ACTIVITY locations in AFFECTED PROCESS AREA(S).	1 Hour
	AND	
	B.4 Establish a ROVING FIRE WATCH at the WASTE STORAGE locations in AFFECTED PROCESS AREA(S).	1 Hour **AND** Every 6 Hours thereafter
	AND	
	B.5.1 Restore the CH WH CVS to OPERABLE status.	14 Days
	OR	
	B.5.2 Place the AFFECTED PROCESS AREA(S) in STANDBY.	14 Days

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.1 CH WH Confinement Ventilation System (continued)

Surveillance Requirements

	SURVEILLANCE REQUIREMENT	FREQUENCY
4.2.1.1	VERIFY differential pressure across each IN SERVICE HEPA filter bank is less than or equal to +3.90 inches w.g. and greater than or equal to +0.30 inches w.g. at differential pressure local gauges per Table 3.2.1-2.	DAILY
4.2.1.2	VERIFY differential pressure less than or equal to -0.04 inches w.g. in the CH BAY and ROOM 108 with respect to ambient outside air pressure at differential pressure local gauges per Table 3.2.1-2.	DAILY
4.2.1.3	VERIFY one CH WH CVS exhaust fan and one OPERABLE HEPA filter unit are IN SERVICE.	DAILY
4.2.1.4	VERIFY each HEPA filter bank of each IN SERVICE HEPA filter unit has an efficiency of greater than or equal to 99%.	**---------NOTE--------** SR 4.0.2 is not applicable. **----------** ANNUALLY
4.2.1.5	Perform a CALIBRATION on the pressure differential transmitters and instrumentation for the instrument loops listed in Table 3.2.1-1 and gauges listed in Table 3.2.1-2.	ANNUALLY
4.2.1.6	Perform a FUNCTIONAL TEST on the differential pressure alarm instrument loops listed in Table 3.2.1-1.	ANNUALLY

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.1 CH WH Confinement Ventilation System (continued)

Table 3.2.1-1. CH WH CVS, CMR Differential Pressure Instrumentation

Description	Loop	Transmitter	Applicable Alarm Set points
41-B-814, 1st HEPA Bank	41F05223	411-PDT-052-023	≤+3.93 inches w.g. (High) ≥+0.27 inches w.g. (Low)
41-B-814, 2nd HEPA Bank	41F05224	411-PDT-052-024	≤+3.93 inches w.g. (High) ≥+0.27 inches w.g. (Low)
41-B-815, 1st HEPA Bank	41F05230	411-PDT-052-030	≤+3.93 inches w.g. (High) ≥+0.27 inches w.g. (Low)
41-B-815, 2nd HEPA Bank	41F05231	411-PDT-052-031	≤+3.93 inches w.g. (High) ≥+0.27 inches w.g. (Low)
CH BAY	41F05926B	411-PDT-059-026B	≤-0.02 inches w.g.
ROOM 108	41F05926E	411-PDT-059-026E	≤-0.04 inches w.g.

Table 3.2.1-2. CH WH CVS, Local Differential Pressure Instrumentation

Description	Local Gauge	Surveillance Acceptable Range
41-B-814, 1st HEPA Bank	411-PDI-052-023B	≤ +3.90 inches w.g. (High) ≥ +0.30 inches w.g. (Low)
41-B-814, 2nd HEPA Bank	411-PDI-052-024B	≤ +3.90 inches w.g. (High) ≥ +0.30 inches w.g. (Low)
41-B-815, 1st HEPA Bank	411-PDI-052-030B	≤ +3.90 inches w.g. (High) ≥ +0.30 inches w.g. (Low)
41-B-815, 2nd HEPA Bank	411-PDI-052-031B	≤ +3.90 inches w.g. (High) ≥ +0.30 inches w.g. (Low)
CH BAY	411-PDI-059-026BB	≤ -0.04 inches w.g.
ROOM 108	411-PDI-059-026EB	≤ -0.04 inches w.g.

3/4.2 Confinement Ventilation Systems (continued)

3.2.2 HOT CELL COMPLEX Confinement Ventilation System (Deleted)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System

LCO 3.2.3 The Underground Ventilation Filtration System (UVFS) /Interim Ventilation System (IVS) SHALL be OPERABLE. An OPERABLE UVFS/IVS consists of the following elements:

- IN SERVICE alignment of UVFS/IVS exhaust fan(s) and OPERABLE HEPA filter unit complement in accordance with Table 3.2.3-1.
- Differential pressure across each IN SERVICE HEPA filter bank less than or equal to +3.89 inches w.g. and greater than or equal to +0.31 inches w.g. locally.
- IN SERVICE HEPA filter unit efficiency of greater than or equal to 99%.
- Differential pressure less than or equal to -0.09 inches w.g. across the 308 Bulkhead.
- Airflow into the ACTIVE ROOM while manned.
- OPERABLE pressure differential instrumentation and CMR alarm indications as identified in Table 3.2.3-2 and Table 3.2.3-3.

MODE Applicability WASTE HANDLING, DISPOSAL

PROCESS AREA Applicability UNDERGROUND

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CMR alarm indication for differential pressure across 308 Bulkhead NOT OPERABLE.	**----------NOTE----------** LCO 3.0.4 is not applicable. **----------**	
	A.1 ENSURE Supplemental Ventilation System fan is secured.	IMMEDIATELY
	AND	
	A.2.1 VERIFY differential pressure at 534-PDIT-160-528B local reading is less than or equal to -0.09 inches w.g. if UNDERGROUND is manned.	1 Hour **AND** every 4 Hours thereafter
	OR	
	A.2.2 VERIFY UVFS/IVS exhaust fan(s) is IN SERVICE in an acceptable exhaust fan alignment per Table 3.2.3-1 if the UNDERGROUND is unmanned.	1 Hour **AND** every 4 Hours thereafter
	AND	
	A.3 Restore CMR differential pressure instrument loop to OPERABLE status.	31 Days

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------NOTE---------- Separate Condition entry is allowed for each NOT OPERABLE CMR alarm indication. **----------** B. CMR alarm indication for differential pressure across IN SERVICE HEPA filter bank NOT OPERABLE.	**----------NOTE----------** LCO 3.0.4 is not applicable. **----------** B.1 VERIFY differential pressure for affected CMR instrument loop(s) at local gauge(s) is within acceptable range per Table 3.2.3-3. **AND** B.2 Restore affected CMR differential pressure instrument loop(s) to OPERABLE status.	1 Hour **AND** every 12 Hours thereafter 31 Days

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. No airflow into ACTIVE ROOM while manned.	C.1	Do not introduce new WASTE CONTAINERS into the UNDERGROUND.	IMMEDIATELY
	AND		
	C.2	ENSURE the Supplemental Ventilation System fan is secured.	IMMEDIATELY
	AND		
	C.3	Place the ACTIVE ROOM in SAFE CONFIGURATION.	2 Hours
	AND		
	C.4	Place WASTE CONTAINERS in SAFE CONFIGURATION.	2 Hours
	AND		
	C.5	ENSURE ACTIVE ROOM is not manned.	4 Hours

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
----------NOTE---------- Do not enter Condition D if no UVFS/IVS exhaust fans are IN SERVICE. Instead enter Condition E. **----------** D. UVFS/IVS is NOT OPERABLE: UVFS/IVS alignment not in accordance with Table 3.2.3-1. **OR** IN SERVICE HEPA filter unit differential pressure greater than +3.89 inches w.g. or less than or equal to +0.31 inches w.g. locally; **OR** IN SERVICE HEPA filter unit efficiency less than 99%; **OR** Differential pressure greater than -0.09 inches w.g. in the UNDERGROUND across the 308 Bulkhead; **OR** IN SERVICE local gauge specified in Table 3.2.3-3 is NOT OPERABLE. **OR** Required Actions and/or Completion Times for A.2.1, A.3, or B.2 not met.	D.1 Do not introduce new WASTE CONTAINERS into UNDERGROUND. **AND** D.2 ENSURE Supplemental Ventilation System fan is secured. **AND** D.3 Place UNDERGROUND WASTE CONTAINERS in SAFE CONFIGURATION. **AND** D.4 Place UNDERGROUND liquid-fueled vehicles/equipment within 200 feet of WASTE FACE in a SAFE CONFIGURATION. **AND** D.5.1 Restore the UVFS/IVS to OPERABLE status. **OR** D.5.2 Implement a RESPONSE PLAN.	IMMEDIATELY IMMEDIATELY 4 Hours 4 Hours 31 Days 31 Days

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. UVFS/IVS is NOT OPERABLE: No UVFS/IVS exhaust fans are IN SERVICE.	E.1	Do not introduce new WASTE CONTAINERS into UNDERGROUND.	IMMEDIATELY
	AND		
	E.2	ENSURE Supplemental Ventilation System fan is secured.	IMMEDIATELY
	AND		
	E.3	Place WASTE CONTAINERS in a SAFE CONFIGURATION.	IMMEDIATELY
	AND		
	E.4	Place UNDERGROUND vehicles/equipment in a SAFE CONFIGURATION.	IMMEDIATELY
	AND		
	E.5.1	Restore UVFS/IVS exhaust fan(s) alignment in accordance with Table 3.2.3-1.	31 Days
		OR	
	E.5.2	Implement a RESPONSE PLAN.	31 Days

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Surveillance Requirements

SURVEILLANCE REQUIREMENT		FREQUENCY
4.2.3.1	VERIFY differential pressure across each IN SERVICE HEPA filter bank less than or equal to +3.89 inches w.g. and greater than or equal to +0.31 inches w.g. at HEPA filter bank differential pressure local gauges listed in Table 3.2.3-3.	DAILY
4.2.3.2	VERIFY the IN SERVICE alignment for the UVFS/IVS exhaust fans and OPERABLE HEPA filter units complement is in accordance with Table 3.2.3-1.	DAILY
4.2.3.3	VERIFY airflow into ACTIVE ROOM.	Prior to ACTIVE ROOM entry EACH SHIFT **AND** Following change of exhaust fan alignment, while ACTIVE ROOM is manned. **AND** Following change of ventilation bulkhead alignment that can affect the airflow to the ACTIVE ROOM while manned.
4.2.3.4	VERIFY each HEPA filter bank of each IN SERVICE HEPA filter unit has an efficiency of greater than or equal to 99%.	---------**NOTE**-------- SR 4.0.2 is not applicable. ---------- ANNUALLY
4.2.3.5	Perform a CALIBRATION on each pressure differential transmitter and instrumentation for the instrument loops listed in Table 3.2.3-2 and gauges listed in Table 3.2.3-3.	ANNUALLY
4.2.3.6	Perform a FUNCTIONAL TEST on the differential pressure alarm instrument loops listed in Table 3.2.3-2.	ANNUALLY

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Table 3.2.3-1. Exhaust Fan and HEPA Filter Unit Alignments

Alignment	Exhaust Fans IN SERVICE	Required HEPA Filter Units
1	(41-B-860A, 41-B-860B, or 41-B-860C)[a]	41-B-856 and 41-B-857
2	(41-B-960A and 41-B-960B)[b]	41-B-956 and 41-B-957
3	(41-B-860A, 41-B-860B, or 41-B-860C)[a] and (41-B-960A or 41-B-960B)[b]	(41-B-856 and 41-B-857) and (41-B-956 or 41-B-957)
4	(41-B-860A, 41-B-860B, or 41-B-860C)[a, c] and (41-B-960A and 41-B-960B)[b, c]	(41-B-856 and 41-B-857) and (41-B-956 and 41-B-957)

Notes:

a Only one 860 Exhaust Fan may be in IN SERVICE at any time and it must be aligned with both HEPA Filter Units 41-B-856 and 41-B-857.

b Exhaust fan 41-B-960 A is aligned with HEPA Filter Unit 41-B-956 and exhaust fan 41-B-960B is aligned with HEPA filter unit 41-B-957.

c Alignment 4 is required for SVS operation.

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Table 3.2.3-2. UVFS/IVS, CMR Differential Pressure Instrumentation

Description	CMR Instrument Loop	Transmitter	Applicable Alarm Set points
41-B-856, 1st HEPA Bank	41F056015	413-PDT-056-015	≤+3.94 inches w.g.(High) ≥+0.26 inches w.g. (Low)
41-B-856, 2nd HEPA Bank	41F056005	413-PDT-056-005	≤+3.94 inches w.g.(High) ≥+0.26 inches w.g. (Low)
41-B-857, 1st HEPA Bank	41F056008	413-PDT-056-008	≤+3.94 inches w.g.(High) ≥+0.26 inches w.g. (Low)
41-B-857, 2nd HEPA Bank	41F056009	413-PDT-056-009	≤+3.94 inches w.g.(High) ≥+0.26 inches w.g. (Low)
41-B-956, 1st HEPA Bank	41F321006A	413-PDIT-321-006A	≤+3.94 inches w.g.(High) ≥+0.26 inches w.g. (Low)
41-B-956, 2nd HEPA Bank	41F321007A	413-PDIT-321-007A	≤+3.94 inches w.g.(High) ≥+0.26 inches w.g. (Low)
41-B-957, 1st HEPA Bank	41F321006B	413-PDIT-321-006B	≤+3.94 inches w.g.(High) ≥+0.26 inches w.g. (Low)
41-B-957, 2nd HEPA Bank	41F321007B	413-PDIT-321-007B	≤+3.94 inches w.g.(High) ≥+0.26 inches w.g. (Low)
308 Bulkhead	54A160528	534-PDIT-160-528B	≤-0.09 inches w.g.

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Table 3.2.3-3. UVFS/IVS, Local Differential Pressure Instrumentation

Description	Local Gauge	Surveillance Acceptable Range
41-B-856, 1st HEPA Bank	413-PDI-056-016	≤ +3.89 inches w.g.(High) ≥ +0.31 inches w.g. (Low)
41-B-856, 2nd HEPA Bank	413-PDI -056-017	≤ +3.89 inches w.g.(High) ≥ +0.31 inches w.g. (Low)
41-B-857, 1st HEPA Bank	413-PDI -056-018	≤ +3.89 inches w.g.(High) ≥ +0.31 inches w.g. (Low)
41-B-857, 2nd HEPA Bank	413-PDI-056-019	≤ +3.89 inches w.g.(High) ≥ +0.31 inches w.g. (Low)
41-B-956, 1st HEPA Bank	413-PDI-321-026	≤ +3.89 inches w.g.(High) ≥ +0.31 inches w.g. (Low)
41-B-956, 2nd HEPA Bank	413-PDI-321-027	≤ +3.89 inches w.g.(High) ≥ +0.31 inches w.g. (Low)
41-B-957, 1st HEPA Bank	413-PDI-321-028	≤ +3.89 inches w.g.(High) ≥ +0.31 inches w.g. (Low)
41-B-957, 2nd HEPA Bank	413-PDI-321-029	≤ +3.89 inches w.g.(High) ≥ +0.31 inches w.g. (Low)
308 Bulkhead	534-PDIT-160-528B	≤ -0.09 inches w.g.

3/4.2 Confinement Ventilation Systems (continued)

3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS

LCO 3.2.4 The UVFS/IVS SHALL be OPERABLE.

An OPERABLE UVFS/IVS includes the following elements:

- One UVFS exhaust fan (41-B-860A, 41-B-860-B, or 41-B-860C) IN SERVICE.
- Two IVS exhaust fans (41-B-960A and 41-B-960B) IN SERVICE.
- Differential pressure across the 309 Bulkhead greater than or equal to +0.14 inches w.g. locally.
- Airflow at WASTE SHAFT STATION is towards 308 Bulkhead.
- OPERABLE pressure differential instrumentation and CMR alarm indication as identified in Table 3.2.4-1 and Table 3.2.4-2.

MODE Applicability WASTE HANDLING (during DOWNLOADING)

PROCESS AREA Applicability WASTE SHAFT ACCESS AREA and UNDERGROUND

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CMR alarm indication for differential pressure across 309 Bulkhead NOT OPERABLE.	----------**NOTE**---------- LCO 3.0.4 is not applicable. ---------- A.1 VERIFY differential pressure for CMR instrument loop at local gauge per Table 3.2.4-2. **AND** A.2 Restore CMR differential pressure instrument loop to OPERABLE status.	Prior to each DOWNLOAD of WASTE CONTAINERS 31 Days

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Differential pressure across the 309 Bulkhead less than +0.14 inches w.g. locally. **OR** Airflow at WASTE SHAFT STATION is not towards 308 Bulkhead. **OR** Less than three exhaust fans IN SERVICE. **OR** IN SERVICE local gauge specified in Table 3.2.4-2 is NOT OPERABLE. **OR** Required Actions and Completion Times of Condition A are not met.	B.1 Do not introduce new WASTE CONTAINERS onto the Waste Shaft Conveyance. **AND** B.2 Remove WASTE CONTAINERS from the Waste Shaft Collar Room, the Waste Shaft Conveyance, and the WASTE SHAFT STATION.	IMMEDIATELY 4 Hours

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Surveillance Requirements

SURVEILLANCE REQUIREMENT		FREQUENCY
4.2.4.1	VERIFY one UVFS exhaust fan (41-B-860A, 41-B-860B, or 41-B-860C) and two IVS exhaust fans (41-B-960A and 41-B-960B) IN SERVICE.	Prior to first DOWNLOAD of WASTE CONTAINERS each day and after any UVFS/IVS reconfiguration
4.2.4.2	VERIFY differential pressure across the 309 Bulkhead greater than or equal to +0.14 inches w.g. at differential pressure local gauge per Table 3.2.4-2.	Prior to first DOWNLOAD of WASTE CONTAINERS each day, and after any UVFS/IVS reconfiguration or Bulkhead realignment (including a change in the operating status of any of the six small fans mounted on the 309 Bulkhead wall)
4.2.4.3	VERIFY airflow at WASTE SHAFT STATION is towards 308 Bulkhead.	Prior to each DOWNLOAD of WASTE CONTAINERS
4.2.4.4	Perform CALIBRATION on the pressure differential transmitter and instrumentation for the instrument loop listed in Table 3.2.4-1 and gauge listed in Table 3.2.4-2.	ANNUALLY
4.2.4.5	Perform a FUNCTIONAL TEST on the differential pressure alarm instrument loop listed in Table 3.2.4-1.	ANNUALLY

Table 3.2.4-1. 309 Bulkhead, CMR Differential Pressure Instrumentation

Description	Loop	Transmitter	Applicable Alarm Set points
309 Bulkhead	74H003001	534-PDT-003-001	≥+0.18 inches w.g.

(continued)

Table 3.2.4-2. 309 Bulkhead, Local Differential Pressure Instrumentation

Description	Local Gauge	Surveillance Acceptable Range
309 Bulkhead	534-PDI-003-001A	≥ +0.14 inches w.g.

3/4.2 Confinement Ventilation Systems (continued)

3.2.5 Battery Exhaust System

LCO 3.2.5 The WHB Battery Exhaust System Confinement Ventilation System (CVS) SHALL be OPERABLE. An OPERABLE Battery Exhaust System CVS consists of the following elements:

- One OPERABLE HEPA filter unit (41-B-834 or 41-B-979) IN SERVICE.
- Differential pressure across each IN SERVICE HEPA filter bank less than or equal to +3.92 inches w.g. and greater than or equal to +0.28 inches locally.
- IN SERVICE HEPA filter unit efficiency of greater than or equal to 99%.
- OPERABLE pressure differential instrumentation and CMR alarm indications as identified in Table 3.2.5-1 and Table 3.2.5-2.

MODE Applicability WASTE HANDLING MODE and WASTE STORAGE MODE when the Battery Exhaust System exhaust fans are IN SERVICE.

PROCESS AREA Applicability CH BAY, ROOM 108

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.5 Battery Exhaust System (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CMR alarm indication for differential pressure across IN SERVICE HEPA filter bank NOT OPERABLE.	**----------NOTE----------** LCO 3.0.4 is not applicable. **----------** A.1 VERIFY IN SERVICE HEPA filter bank differential pressure at local gauge is within acceptable range per Table 3.2.5-2. **AND** A.2 Restore affected CMR differential pressure instrument loop(s) to OPERABLE status.	1 Hour **AND** every 12 Hours thereafter 31 Days
B. The WHB Battery Exhaust System is NOT OPERABLE. **OR** IN SERVICE local gauge specified in Table 3.2.5-2 is NOT OPERABLE.	B.1 Secure operation of IN SERVICE battery exhaust fan (41-B-835 and/or 41-B-836).	IMMEDIATELY

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.5 Battery Exhaust System (continued)

Surveillance Requirements

SURVEILLANCE REQUIREMENT		FREQUENCY
4.2.5.1	VERIFY differential pressure across each IN SERVICE HEPA filter bank is less than or equal to +3.92 inches w.g. and greater than or equal to +0.28 inches w.g. at differential pressure local gauges per Table 3.2.5-2.	DAILY
4.2.5.2	VERIFY each HEPA filter bank of each IN SERVICE HEPA filter unit has an efficiency of greater than or equal to 99%.	---------**NOTE**-------- SR 4.0.2 is not applicable. ---------- ANNUALLY
4.2.5.3	Perform CALIBRATION on the pressure differential transmitters and instrumentation for the instrument loops listed in Table 3.2.5-1 and gauges listed in Table 3.2.5-2.	ANNUALLY
4.2.5.4	Perform a FUNCTIONAL TEST on the differential pressure alarm instrument loops listed in Table 3.2.5-1.	ANNUALLY

Table 3.2.5-1. Battery Exhaust System, CMR Differential Pressure Instrumentation

Description	CMR Instrument Loop	Transmitter	Applicable CMR Alarm Set points
41-B-834, 1st HEPA Bank	41F05207	411-PDT-052-007	≤+3.93 inches w.g. (High) ≥+0.27 inches w.g. (Low)
41-B-834, 2nd HEPA Bank	41F05208	411-PDT-052-008	≤+3.93 inches w.g. (High) ≥+0.27 inches w.g. (Low)
41-B-979, 1st HEPA Bank	41F05218	411-PDT-052-018	≤+3.93 inches w.g. (High) ≥+0.27 inches w.g. (Low)
41-B-979, 2nd HEPA Bank	41F05219	411-PDT-052-019	≤+3.93 inches w.g. (High) ≥+0.27 inches w.g. (Low)

(continued)

3/4.2 Confinement Ventilation Systems (continued)

3.2.5 Battery Exhaust System (continued)

Table 3.2.5-2. Battery Exhaust System, Local Differential Pressure Instrumentation

Description	Local Gauge	Surveillance Acceptable Range
41-B-834, 1st HEPA Bank	411-PDI-052-007B	≤+3.92 inches w.g. (High) ≥+0.28 inches w.g. (Low)
41-B-834, 2nd HEPA Bank	411-PDI-052-008B	≤+3.92 inches w.g. (High) ≥+0.28 inches w.g. (Low)
41-B-979, 1st HEPA Bank	411-PDI-052-018B	≤+3.92 inches w.g. (High) ≥+0.28 inches w.g. (Low)
41-B-979, 2nd HEPA Bank	411-PDI-052-019B	≤+3.92 inches w.g. (High) ≥+0.28 inches w.g. (Low)

3/4.3 Vehicle/Equipment Control

3.3.1 Vehicle Control in the OUTSIDE AREA (Deleted)

3/4.3 Vehicle/Equipment Control (continued)

3.3.2 Aboveground Liquid-fueled Vehicle/Equipment Prohibition

LCO 3.3.2 Liquid-fueled vehicles/equipment SHALL not be present.

MODE Applicability WASTE HANDLING, WASTE STORAGE

PROCESS AREA Applicability CH BAY, ROOM 108, WASTE SHAFT ACCESS AREA (when CH WASTE is present in a PROCESS AREA)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Liquid-fueled vehicle/ equipment is present in an applicable PROCESS AREA.	A.1 SUSPEND WASTE HANDLING ACTIVITIES.	IMMEDIATELY
	AND	
	A.2. Establish an ATTENDANT for the liquid-fuel vehicle/equipment.	IMMEDIATELY
	AND	
	A.3 Remove the liquid-fueled vehicle/equipment from the AFFECTED PROCESS AREA using an ATTENDANT.	IMMEDIATELY

Surveillance Requirements

SURVEILLANCE REQUIREMENT		FREQUENCY
4.3.2.1	VERIFY no liquid-fueled vehicles/equipment are in the CH BAY.	EACH SHIFT when CH WASTE is present
4.3.2.2	VERIFY no liquid-fueled vehicles/equipment are in ROOM 108.	EACH SHIFT when CH WASTE is present
4.3.2.3	VERIFY no liquid-fueled vehicles/equipment are in the WASTE SHAFT ACCESS AREA.	EACH SHIFT when CH WASTE is present

3/4.3 Vehicle/Equipment Control (continued)

3.3.3 Vehicle/Equipment Control in the SHAFT ACCESS AREA (Deleted)

3.3.4 Control of Propane-Powered Vehicles/Equipment (Deleted)

3/4.3 Vehicle/Equipment Control (continued)

3.3.5 UNDERGROUND Lube Trucks Operation

LCO 3.3.5 UNDERGROUND Lube Trucks SHALL be prohibited within:

- 200 feet of a CH WASTE FACE in an ACTIVE PANEL.

  AND

- The WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.

MODE Applicability WASTE HANDLING and DISPOSAL

PROCESS AREA Applicability UNDERGROUND

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. A Lube Truck is within 200 feet of a CH WASTE FACE in an ACTIVE PANEL. **OR** A Lube Truck is in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.	A.1 ATTEND the Lube Truck. **AND** A.2 Place any CH WASTE in the AFFECTED AREA in a SAFE CONFIGURATION. **AND** A.3 Remove the Lube Truck from the AFFECTED AREA.	IMMEDIATELY IMMEDIATELY 4 Hours

(continued)

3/4.3 Vehicle/Equipment Control (continued)

3.3.5 UNDERGROUND Lube Trucks Operation (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Actions and Completion Times of Condition A are not met.	B.1	ATTEND the Lube Truck when the UNDERGROUND is manned.	IMMEDIATELY
	AND		
	B.2	Place the Lube Truck in a SAFE CONFIGURATION.	IMMEDIATELY
	AND		
	B.3	Suspend maintenance ACTIVITIES in the AFFECTED AREA other than those related to Lube Truck repair.	IMMEDIATELY
	AND		
	B.4	Suspend Conveyance loading in the Waste Shaft Collar Room.	IMMEDIATELY
	AND		
	B.5	Remove the Lube Truck from the AFFECTED AREA.	14 Days

(continued)

3/4.3 Vehicle/Equipment Control (continued)

3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Surveillance Requirements

SURVEILLANCE REQUIREMENT		FREQUENCY
4.3.5.1	VERIFY that the Lube Truck is greater than 200 feet from a CH WASTE FACE in an ACTIVE PANEL.	EACH SHIFT when a Lube Truck is moved within the ACTIVE PANEL **OR** EACH SHIFT when the Lube Truck is located in the ACTIVE PANEL and CH WASTE is being emplaced.
4.3.5.2	VERIFY that the Lube Truck is not in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.	Prior to CH WASTE entering the WASTE SHAFT STATION

3/4.3 Vehicle/Equipment Control (continued)

3.3.6 Underground Waste Transport Path (Deleted)

3.3.7 Liquid-Fueled Vehicle/Equipment Control at a WASTE FACE (Deleted)

3/4.3 Vehicle/Equipment Control (continued)

3.3.8 Vehicle/Equipment Control

LCO 3.3.8 Vehicles/equipment SHALL be controlled as follows:

Liquid-fueled vehicles/equipment:

- ATTENDED in the WASTE SHAFT STATION when CH Waste is present in the WASTE SHAFT STATION.
- ATTENDED in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH.
- ATTENDED when within 25 feet from a CH WASTE FACE.
- Limited to no more than two liquid-fueled vehicles/equipment within 25 feet of a CH WASTE FACE.

Vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons:

- ATTENDED in the RH BAY when CH WASTE is present in the CH BAY.

MODE Applicability WASTE HANDLING, WASTE STORAGE, DISPOSAL

PROCESS AREA Applicability UNDERGROUND, CH BAY

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Liquid-fueled vehicle/equipment in the WASTE SHAFT STATION is not ATTENDED when CH WASTE is present in the WASTE SHAFT STATION.	A.1 Place the vehicle/equipment in a SAFE CONFIGURATION. **AND** A.2 ATTEND the affected liquid-fueled vehicles/equipment.	IMMEDIATELY 1 Hour
B. Liquid-fueled vehicle/equipment in the TRANSPORT PATH is not ATTENDED when CH WASTE is present in the TRANSPORT PATH.	B.1 Place the vehicle/equipment in a SAFE CONFIGURATION. **AND** B.2 ATTEND the affected liquid-fueled vehicle/equipment.	IMMEDIATELY 1 Hour

(continued)

3/4.3 Vehicle/Equipment Control (continued)

3.3.8 Vehicle/Equipment Control (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Liquid-fueled vehicle/equipment is not ATTENDED when less than 25 feet from a CH WASTE FACE.	C.1 Place the vehicle/equipment in a SAFE CONFIGURATION. **AND** C.2 ATTEND the affected liquid-fueled vehicle/equipment.	IMMEDIATELY 1 Hour
D. More than two liquid-fueled vehicles/equipment are within 25 feet of a CH WASTE FACE.	D.1 Move the excess vehicle/equipment to a distance greater than 25 feet from the CH WASTE FACE using an ATTENDANT.	IMMEDIATELY
E Vehicle(s)/equipment with liquid-combustible capacity ≥ 25 gallons are not ATTENDED in the RH BAY when CH WASTE is present in the CH BAY.	E.1 Place the affected vehicle/equipment that are not ATTENDED in a SAFE CONFIGURATION. **AND** E.2 ATTEND the affected vehicle/equipment.	IMMEDIATELY 1 Hour

(continued)

3/4.3 Vehicle/Equipment Control (continued)

3.3.8 Vehicle/Equipment Control (continued)

Surveillance Requirements

	SURVEILLANCE REQUIREMENT	FREQUENCY
4.3.8.1	VERIFY required ATTENDANT(S) is present for liquid-fueled vehicles/equipment in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.	Prior to CH WASTE entering the WASTE SHAFT STATION
4.3.8.2	VERIFY required ATTENDANT(S) is present for liquid-fueled vehicles/equipment in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH.	Prior to introduction of CH WASTE into the TRANSPORT PATH.
4.3.8.3	VERIFY liquid-fueled vehicles/equipment are ATTENDED when less than 25 feet from a CH WASTE FACE.	Upon entry into ACTIVE ROOM EACH SHIFT while UNDERGROUND is manned
4.3.8.4	VERIFY no more than two liquid-fueled vehicles/equipment are within 25 feet of a CH WASTE FACE.	Upon entry into ACTIVE ROOM EACH SHIFT while UNDERGROUND is manned

3/4.3 Vehicle/Equipment Control (continued)

3.3.8 Vehicle/Equipment Control (continued)

Surveillance Requirements

SURVEILLANCE REQUIREMENT		FREQUENCY
4.3.8.5	VERIFY vehicles/equipment with liquid-combustible capacity ≥ 25 gallons are ATTENDED in the RH BAY.	Prior to vehicles/equipment with liquid-combustible capacity ≥ 25 gallons entering the RH BAY when CH WASTE is present in the CH BAY **AND** EACH SHIFT when CH WASTE is present in the CH BAY

3/4.3 Vehicle/Equipment Control (continued)

3.3.9 Attendance of Areas ≤ 25 Feet of TRU WASTE CONTAINERS When Vehicle/Equipment are Present (Deleted)

3/4.4 Fuel Confinement

3.4.1 Fuel Confinement in the RH BAY (Deleted)

3.4.2 Fuel Barrier in the UNDERGROUND (Deleted)

3/4.5 Waste Handling

3.5.1 CH WASTE Handling (Deleted)

3.5.2 Waste Conveyance Operations (Deleted)

3.5.3 Waste Handling in the OUTSIDE AREA (Deleted)

3/4.6 Compressed Gas Cylinder Program

3.6.1 Storage of Compressed Gas Cylinders (Deleted)

3.6.2 Use of Compressed Gas Cylinders (Deleted)

3.6.3 Transport of Compressed Gas Cylinders (Deleted)

3/4.7 Suspect Container Response

3.7.1 Waste Acceptability Control

LCO 3.7.1 WASTE CONTAINERS SHALL be compliant with the WIPP Waste Acceptance Criteria (WAC).

MODE Applicability At all times

PROCESS AREA Applicability CH BAY, ROOM 108, RH BAY, HOT CELL COMPLEX, WASTE SHAFT ACCESS AREA, UNDERGROUND, OUTSIDE AREA

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Discrepancy between Shipment Manifest and Waste Data System (WDS).	A.1 Keep WASTE CONTAINER(S) in their CLOSED Type B SHIPPING PACKAGE. **AND** A.2 Restore compliance to WIPP WAC.	IMMEDIATELY 7 Days
B. WASTE CONTAINER(S) determined to be noncompliant through observable container configuration, structural defect, damage, degradation, or Radiological Work Permit (RWP) Limit exceedance.	B.1 Place WASTE CONTAINER(S) in a SAFE CONFIGURATION. **AND** B.2 Place accessible WASTE CONTAINER(S) in a WIPP WAC compliant overpack container.	IMMEDIATELY 48 Hours

(continued)

3/4.7 Suspect Container Response (continued)

3.7.1 Waste Acceptability Control (continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. WASTE CONTAINER(S) suspected of being noncompliant through observable indications of pressurization (past or present).	C.1 SUSPEND WASTE HANDLING ACTIVITIES in accessible AFFECTED AREA. **AND**	IMMEDIATELY
	C.2 Evacuate and post signage and/or erect barricades for the accessible AFFECTED AREA. **AND**	IMMEDIATELY
	C.3 Implement a RESPONSE PLAN.	10 Days
D. WASTE CONTAINER(S) received is NOT the WASTE CONTAINER(s) approved for shipment in accordance with WDS.	D.1 Place WASTE CONTAINER(S) in a SAFE CONFIGURATION. **AND**	IMMEDIATELY
	D.2 Resolve WASTE CONTAINER(S) discrepancy.	7 Days

(continued)

3/4.7 Suspect Container Response (continued)

3.7.1 Waste Acceptability Control (continued)

ACTIONS (continued)

E. Notification by a Generator Site of a WASTE CONTAINER(S) that can potentially result in internal energetic events such as fires, deflagrations/explosions, or other exothermic reactions; exceed WIPP WAC fissile mass and/or non-fissile mass limits; or exceed WIPP WAC PE-Ci limits.	E.1	Locate noncompliant WASTE CONTAINER(S).	IMMEDIATELY
	AND		
	E.2	SUSPEND WASTE HANDLING ACTIVITIES in accessible AFFECTED AREA.	IMMEDIATELY
	AND		
	E.3	Evacuate and post the accessible AFFECTED AREA.	IMMEDIATELY
	AND		
	E.4	Implement a RESPONSE PLAN.	10 Days
F. Required Action and/or Completion Times for Required Actions A.2, B.2, or D.2 cannot be met.	F.1	Implement a RESPONSE PLAN.	10 Days

(continued)

3/4.7 Suspect Container Response (continued)

3.7.1 Waste Acceptability Control (continued)

Surveillance Requirements

	SURVEILLANCE REQUIREMENT	FREQUENCY
4.7.1.1	Perform receipt inspection to determine if the Shipment Manifest is consistent with the WIPP WDS.	Upon Receipt
4.7.1.2	Perform the following inspections, through direct observation of accessible areas of WASTE CONTAINER(S): • No rust or corrosion that indicates wall thinning, pin holes, or a breach. • No visible split seams, tears, obvious holes, punctures (of any size), creases, broken welds, or cracks. • No payload container improperly closed. • No dents, scrapes, or scratches that could affect the structural integrity of the container. • No obvious discoloration, indicating leakage of material from the container. • No obvious damage or obstruction to vents. • No radiological contamination or direct radiation exposure rates exceeding the RWP limits as measured from accessible areas of the SHIPPING PACKAGE or WASTE CONTAINER(S) surfaces.	Upon removal of WASTE CONTAINER(S) from SHIPPING PACKAGE
4.7.1.3	Perform a direct observation of WASTE CONTAINER(S) that no evidence that the WASTE CONTAINER(S) is or has been pressurized.	Upon removal of WASTE CONTAINER(S) from SHIPPING PACKAGE
4.7.1.4	Perform a direct observation of the observable WASTE CONTAINER(s) identification label and compare with WIPP WDS to determine compliance with approved shipment.	Upon removal of WASTE CONTAINER(S) from SHIPPING PACKAGE

3/4.8 Waste Hoist System

3.8.1 Waste Hoist Brakes

LCO 3.8.1 The Waste Hoist Brakes SHALL be OPERABLE.

OPERABLE Waste Hoist Brakes consist of the following elements:

- Four OPERABLE brake units composed of calipers, springs, and brake pads greater than or equal to 0.5 inches thick.
- Two OPERABLE Emergency Dump Valves (SV-2 and SV-5).
- An OPERABLE Lilly Controller to include the fly-ball governor and associated contacts that will automatically set the brakes upon an over speed condition of less than or equal to 550 fpm.

MODE Applicability WASTE HANDLING during DOWNLOADING

PROCESS AREA Applicability WASTE SHAFT ACCESS AREA and UNDERGROUND

----------NOTE----------

If CH WASTE HANDLING ACTIVITIES are suspended in the WASTE SHAFT ACCESS AREA, RH WASTE HANDLING ACTIVITIES may continue in the WASTE SHAFT ACCESS AREA when transferring RH WASTE from the Transfer Cell to the FCLR.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Waste Hoist Brakes are NOT OPERABLE.	A.1	Suspend introduction of new CH or RH WASTE into Waste Shaft Collar.	IMMEDIATELY
	AND		
	A.2	Place WASTE in SAFE CONFIGURATION.	24 Hours

(continued)

3/4.8 Waste Hoist System (continued)

3.8.1 Waste Hoist Brakes (continued)

Surveillance Requirements

	SURVEILLANCE REQUIREMENT	FREQUENCY
4.8.1.1	Perform a FUNCTIONAL TEST to VERIFY an over speed condition, loss of electric power condition, and the emergency dump valves set all four Waste Hoist Brakes.	PRIOR TO USE
4.8.1.2	Perform FUNCTIONAL TEST of the Lilly Controller to ENSURE OPERABILITY of the over speed governors to lift the link between the contacts thereby removing electrical power to the hydraulic system.	WEEKLY
4.8.1.3	VERIFY the brake pad thickness is greater than or equal to 0.5 inch and the spring force as measured by the caliper piston travel distance is within 0.137 and 0.157 inch.	MONTHLY

Section 5
Administrative Controls

5.0 ADMINISTRATIVE CONTROLS

5.1 Purpose

The purpose of ACs is to state provisions relating to organization and management, procedures, record keeping, assessment, and reporting necessary to ensure safe operation of a facility. Two types of ACs are used in nuclear facilities at WIPP. The first type is termed SAC, which is an Administrative Control needed to prevent or mitigate an accident scenario; and the second type is termed Programmatic Administrative Controls (PACs) that commits the facility operator to establish, maintain, and implement one or more elements of a Safety Management Program (SMP).

The functions of SACs and PACs are as follows:

- SACs provide specific preventive or mitigative functions for accident scenarios identified in the WIPP DSA Chapter 3.0, where the safety function has importance similar to, or the same as, the safety function of a safety SSC.
- PACs are designed to provide broad programmatic support for SMPs supporting defense-in-depth, or worker safety.

5.2 Management Responsibilities

Lines of authority, responsibility, and communication SHALL be defined and established for the highest management levels, through intermediate levels, to and including the operating organization positions. The individuals who train the operating staff, carry out radiological control functions, or perform quality assurance functions may report to the Operations Manager; however, they SHALL have sufficient organizational freedom to ensure their independence from operating pressures.

5.2.1 Contractor Responsibilities

The NWP Operations Manager is responsible for overall safe operation of the WIPP facility. The Operations Manager SHALL delegate in writing the succession for this responsibility during any absences.

The Facility Shift Manager (FSM) is responsible for local command of WIPP operation. During any unavailability of the FSM at the WIPP facility, a qualified individual SHALL be designated to assume the management function. As part of this responsibility, the FSM SHALL ensure operation of the WIPP facility is in accordance with the approved safety basis (current DSA and TSRs).

The FSM has the authority to take emergency actions in accordance with Section 5.4.3.

5.2.2 Support Organizations

Organizations provide support functions and personnel necessary for WIPP Operations as described in Chapter 17.0 of the WIPP DSA. Chapter 17.0 of the WIPP DSA provides the information specified by the guidance in DOE-G-423.1-1B.

A list of facility support personnel by name, title, work, and home telephone number SHALL be available to the FSM. The list should include management, radiation safety, and technical support personnel.

5.0 Administrative Controls (continued)

5.3 Minimum Staffing

5.3.1 Minimum Operations Shift Complement

The available number of managers and operators with qualifications conforming to the requirements of DOE Order 426.2 SHALL be adequate to safely operate and support WIPP activities. Personnel fulfilling the FSM and CMR Operator positions will meet the qualification requirements for those positions. Abnormal conditions SHALL be considered in determining operator assignments. Management SHALL provide additional personnel, as necessary, to support other activities.

The minimum operations shift complement per shift for WIPP SHALL be one FSM, one CMR Operator, and one Facility Operations Roving Watch. The safety function for the FSM is to provide facility command and control. The CMR Operator provides continuous monitoring of facility conditions in the CMR (i.e., monitoring and responding to alarms and indications and communicating with ATTENDANTS). The Facility Operation Roving Watch provides the capability to meet, in a timely fashion, any Action Statement required by the TSR. Shaft Tenders SHALL be present when moving WASTE in the Waste Shaft Collar and WASTE SHAFT STATION to support SAC 5.5.6, Waste Conveyance Operations.

The supervisor availability will be described in facility procedures.

During a shift, to accommodate unexpected absences of on-duty shift crew members, the shift crew composition may be one less than the minimum requirements for not more than 2 Hours provided immediate action is taken to restore the shift crew composition to within the minimum requirements. This provision is not applicable at the time of shift turnover.

5.3.2 Control of Working Hours

NWP administrative procedures SHALL limit the working hours of staff who perform safety-related functions.

5.3.3 Procedures

Operations procedures SHALL provide sufficient direction to ensure that the WIPP facility is operated within its approved design basis. Topics covered include:

- Operating procedures for all MODEs of operation.
- Emergency Operating Procedures.
- Maintenance Requirements.
- Required surveillances.
- Emergency Plans.
- Fire Protection.
- Safety Management Program Implementation procedures.
- Administration.

Procedures associated with TSR compliance SHALL be developed, approved, revised, and controlled in accordance with Chapter 12.0 of the WIPP DSA.

5.0 Administrative Controls (continued)

5.3.4 Staff Qualifications and Training

5.3.4.1 Qualification

A program SHALL be established to ensure that identified staff meets established qualification requirements for their positions. This program SHALL adhere to the qualification requirements established in accordance with the Procedures and Training Program.

The following personnel that perform credited safety responses are qualified to recognize events and complete the response: FSM, CMR Operator, ATTENDANT, and Shaft Tenders.

5.3.4.2 Training

An initial training and retraining program for the identified staff SHALL be established and maintained. This program SHALL adhere to training requirements established in accordance with the Procedures and Training Program.

5.4 TSR Control

Proposed changes to the TSR SHALL be reviewed and approved by DOE prior to implementation.

5.4.1 Requirements for Deviation from TSRs

5.4.1.1 General Requirements

Written reports and oral notifications SHALL be submitted in accordance with DOE regulations regarding reporting requirements. These reports and notifications SHALL be prepared in accordance with approved procedures and SHALL be reviewed and approved by line management prior to submittal.

5.4.1.2 Response to TSR Violations

The following actions are required for response to a violation:

a. Notify the DOE of the violation in accordance with the occurrence reporting program; and

b. Prepare an Occurrence Report.

5.0 Administrative Controls (continued)

5.4.2 TSR Violations

Purpose

The purpose of this section is to establish the use and application of TSR violation criteria.

Background

WIPP is required to perform work in accordance with the safety basis and, in particular, with the hazard controls that ensure adequate protection of workers, the public, and the environment.

The WIPP TSRs establish the limits, controls, and related actions that establish the specific parameters and requisite actions for the safe operation of WIPP. The TSRs govern the work and the hazards identified in the DSA for the facility.

If WIPP violates a TSR, notification of DOE is required.

TSR Violation

Violations of a TSR occur as a result of the following criteria:

1. Failure to complete Required Actions within the specified Completion Time following failure to comply with a LCO.
2. Failure to perform a SR within the required FREQUENCY.
3. Failure to comply with a directive action SAC statement.
4. Programmatic breakdown of a PAC (or SMP by reference).

NOTE: Determination of a programmatic breakdown is determined by tracking and trending noncompliances and deviations, including KEs. A single non-compliance would not necessarily constitute a TSR violation. To qualify as a TSR violation, the failure to meet the intent of the referenced program is significant enough to render the DSA summary invalid.

Reporting

Violations SHALL be reported. TSR notification and reporting requirements are provided in AC 5.4.1, Requirements for Deviations from TSRs.

If evaluation of a potential PAC (or SMP by reference) issue does not constitute a programmatic violation, it could still constitute noncompliance with a hazard control.

Causal Analysis

A causal analysis in accordance with approved procedures SHALL be performed on all TSR violations to determine the causal factors and apparent causes.

Corrective Action Plan

A corrective action plan SHALL be developed to address the causal factors and apparent causes and define the corrective actions to prevent recurrence.

5.0 Administrative Controls (continued)

5.4.3 Conditions Outside TSR

Purpose The purpose of this section is to establish the use and application for conditions outside a TSR.

Background WIPP may take emergency actions that depart from an approved TSR when no actions consistent with the TSR are immediately apparent, and when these actions are needed to protect workers, the public, or the environment from imminent and significant harm.

Conditions Outside TSR Emergency actions that depart from an approved TSR may be taken when no actions consistent with the TSR are immediately apparent, and when these actions are needed to protect workers, the public, or the environment from imminent and significant harm. Such actions must be approved by a person in authority as designated in the TSR. This authority is delegated to the FSM.

In an emergency, if a situation develops that is not addressed by the TSR, the FSM SHALL take actions to correct or mitigate the situation. Also, the FSM may take actions that depart from a requirement in the TSRs provided that:

1. An emergency situation exists;
2. These actions are needed immediately to protect the workers, public, and environment from imminent and significant harm; and
3. No action consistent with the TSR can provide adequate or equivalent protection.

If emergency action is taken, both a verbal notification and a written report SHALL be made to the DOE as soon as practical. If, during normal operations, an off-normal condition occurs that is not addressed by the TSRs, the FSM SHALL place the facility in a SAFE CONFIGURATION. The FSM SHALL contact Nuclear Safety to perform a USQ review to determine whether subsequent action requires DOE approval. If DOE approval is required, an ISBC SHALL be developed by the contractor to address any additional actions to be taken and approved by the DOE.

5.4.4 Response Plans

The purpose of a RESPONSE PLAN is to ensure that additional analysis or administrative and management controls are in place when abnormal situations arise and when the PROCESS AREA is outside of normal operating limits defined by the TSR. The RESPONSE PLAN has two functions. The first function is to restore the PROCESS AREA to TSR compliance. The second function is to determine what further actions are required to ensure that the PROCESS AREA operates within the framework of the TSRs. RESPONSE PLANS are intended to provide personnel with the direction needed to safely achieve a stated endpoint. These plans, however, do not prohibit reliance upon operator training and experience in the correction of the condition for immediate mitigation of an unsafe or worsening condition.

5.0 Administrative Controls (continued)

5.4.4 Response Plans (continued)

The RESPONSE PLAN addresses the situation where a TSR cannot be met (e.g., due to equipment inoperability) and the PROCESS AREA must operate in continual TSR noncompliance (e.g., there is no MODE in which the noncompliant LCO or Administrative Control is not applicable). During the time that the TSR requirements are being restored, the PROCESS AREA operations SHALL be bounded by an approved RESPONSE PLAN.

The RESPONSE PLAN SHALL evaluate PROCESS AREA conditions to determine the risk to the PROCESS AREA and the public from the limited operations allowed in the applicable MODE. These plans will typically implement compensatory actions or surveillances to reduce risk.

RESPONSE PLAN actions should not be constrained by the Required Actions specified in the TSR. The RESPONSE PLAN may permit any activity required to establish or maintain a safe condition or to restore compliance with the LCO or Administrative Control.

Following review by the appropriate NWP organizations, the RESPONSE PLANS SHALL be approved by Operations Manager (or designee) before submittal to DOE and processed in accordance with TSR change procedures, including obtaining DOE approval. Upon DOE approval of the RESPONSE PLAN all future PROCESS AREA activities necessary to restore compliance with the associated LCO are required to be performed under the RESPONSE PLAN. DOE approval for closure or termination of the RESPONSE PLAN is not required once LCO compliance is restored.

5.5 Specific Administrative Controls

SACs provide a safety function equivalent to engineered controls that would be classified as Safety Class (SC) or Safety Significant (SS). SACs specifically credited in DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis,* Chapter 3.0, “Hazards and Accident Analysis, and Control Selection,” are provided in LCO format in Section 3/4: “Limiting Conditions for Operations and Surveillance Requirements,” or developed in the directive action format, below.

5.0 Administrative Controls (continued)

5.5.1 Pre-operational Checks of Vehicles/Equipment in Proximity to CH WASTE

SAC: PRIOR TO USE, Vehicle(s)/Equipment to be operated within 25 feet of a CH WASTE FACE, in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH, or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION, SHALL be inspected for the following attributes:

- Brake operation, as applicable.
- Steering, as applicable.
- No excessive leaks.
- Operating lights and horn, as applicable.
- Fluid levels are within operating range, as applicable.
- Cleanliness.

BASES: The safety function of the Pre-operational Checks of Vehicles/Equipment in proximity to CH WASTE is to prevent vehicle/equipment pool fires involving CH WASTE CONTAINERS by ENSURING vehicles/equipment operating near CH WASTE are checked for such conditions as braking, steering, leaks, and cleanliness prior to being permitted to operate near CH WASTE to reduce the likelihood of pool fire formation due to leaks and/or collisions.

The following are specific attributes of the pre-operational check of Vehicles/Equipment in Proximity to CH WASTE:

- Demonstrate brake operation by driving vehicle/equipment and bringing vehicle/equipment to stop with braking system.
- Demonstrate adequate steering operation, as applicable (demonstrated by turning vehicle both to left and right and VERIFY proper response).
- VERIFY no excessive leaks as indicated by visible flow of fluid under pressure, puddles beneath the equipment, or abnormal loss of hydraulic fluid.
- Demonstrate operating lights and horn, as applicable (VERIFY head lights, backup lights, brake lights, rear lights, caution/strobe lights, and horn operate when actuated).
- VERIFY fluid levels within operating range, as applicable.
- VERIFY acceptable cleanliness (minimal accumulation of oils/greases [oil sheen / dampness / droplets]).

5.0 Administrative Controls (continued)

5.5.1 Pre-operational Checks of Vehicles/Equipment in Proximity to CH WASTE (Continued)

The operation of vehicles/equipment at WIPP is required for transporting and emplacement of CH WASTE CONTAINERS as well as maintenance. These operations present the opportunity for radiological material release from vehicle/equipment fires resulting from exposure to liquid-combustibles and ignition sources.

The term “as applicable” is necessary as some vehicles/equipment may not have each feature and therefore, the feature would not be available to test. For instance, the roof bolter does not have a horn and therefore, testing the horn would not apply.

Pre-operational checks provide assurance that the vehicle and/or equipment is operating properly and has no obvious signs of degradation that could lead to its malfunction.

5.0 Administrative Controls (continued)

5.5.2 WASTE HANDLING Program—Pre-operational Checks of Surface WASTE HANDLING Vehicle/Equipment Inspections (Deleted)

5.0 Administrative Controls (continued)

5.5.3 TRU WASTE Outside the WHB

SAC: WASTE, excluding site-derived WASTE, in the OUTSIDE AREA SHALL be in CLOSED Type B SHIPPING PACKAGES.

Bases: The safety function of the TRU WASTE Outside the WHB control is to prevent the release of radiological material due to fires, explosions, collisions and/or Natural Phenomenon Hazard (NPH) events when WASTE (excluding site-derived WASTE) is located in the OUTSIDE AREA by reducing the likelihood for WASTE CONTAINERS to not be protected by a Type B SHIPPING PACKAGE when in the OUTSIDE AREA.

Type B SHIPPING PACKAGES are credited as an Initial Condition in the hazards analysis when WASTE is inside a CLOSED Type B SHIPPING PACKAGE. The WIPP WAC requires the WASTE received at WIPP to be in a Type B SHIPPING PACKAGE. RH and CH WASTE is received from WASTE generators in CLOSED Type B SHIPPING PACKAGES and not opened until positioned in the CH BAY, ROOM 108, or HOT CELL COMPLEX, as applicable. In the event that WASTE needs to be placed outside of the WHB, the WASTE CONTAINER is placed into a Type B SHIPPING PACKAGE and CLOSED prior to exiting the WHB. Site-derived WASTE is excluded because it is directly loaded in a Type A container and stored inside the WHB until disposal in the UNDERGROUND. Since WASTE is vulnerable while in the OUTSIDE AREA, controls are required to reduce the risk. Therefore, ACs are required to reduce the likelihood of occurrence, and the WASTE Outside the WHB control is designated as a SAC since there are no engineered means to interlock WHB access doors with WASTE CONTAINER position to prevent movement of WASTE CONTAINER outside the confines of the WHB. An operational procedure inspection VERIFIES on a routine basis that the SHIPPING PACKAGES meet the requirements in this SAC. A MONTHLY inspection will be completed to VERIFY the SHIPPING PACKAGES are CLOSED.

5.0 Administrative Controls (continued)

5.5.4 VEHICLE EXCLUSION ZONE (Deleted)

5.0 Administrative Controls (continued)

5.5.5 Fuel Tanker Prohibition

SAC: Fuel Tankers delivering fuel to the Surface Fuel Station Storage Tanks are prohibited from entering the WHB PARKING AREA UNIT.

Bases: The safety function of the Fuel Tanker Prohibition control is to prevent tanker truck pool fires involving WASTE by ENSURING that Fuel Tankers are precluded from the WHB PARKING AREA UNIT, thereby reducing the likelihood for a pool fire involving a fuel tanker.

The WIPP safety analysis identified the potential for fuel delivery fire events in the WHB PARKING AREA UNIT. These events could involve the WHB or could propagate to the WHB and involve radiological material contained in the WHB. Prohibiting Fuel Tankers from entering WHB PARKING AREA UNIT reduces the likelihood of fire events involving radiological material. This prohibition only applies to Fuel Tankers delivering fuel to the Surface Fuel Station Storage Tanks. The Prohibition does not apply to fuel containers and tanks that are used for moving fuel on site.

These operations present the opportunity for radiological material release due to vehicle/equipment fires resulting from the presence of liquid-combustibles and ignition sources and/or impacts to the containers. The use of Fuel Tankers is required by the activities at WIPP and no limited set of practical and reliable SSCs is available to prevent the occurrence of these events. Therefore, ACs are required to reduce the likelihood of occurrence and the Fuel Tanker Prohibition control is designated as a SAC, since engineered controls are not available to prevent occurrence of events requiring Safety Significant protection.

5.0 Administrative Controls (continued)

5.5.6 Waste Conveyance Operations

SAC: The Waste Shaft Conveyance SHALL:

- be present at the Waste Shaft Collar prior to moving WASTE into or out of the Waste Shaft Collar Room.
- move WASTE between the Waste Shaft Collar and the WASTE SHAFT STATION only when Doors 155 and 156 are closed.
- be present at the WASTE SHAFT STATION prior to bringing WASTE into the WASTE SHAFT STATION from the TRANSPORT PATH.
- remain at the WASTE SHAFT STATION until WASTE is removed from the Waste Conveyance and is moving away from the Waste Shaft.

Bases: The safety function of the Waste Conveyance Operations control is to prevent vehicles, equipment, and/or loads from dropping down an open Waste Shaft and impacting WASTE CONTAINERS by reducing the likelihood of vehicle/equipment drops down the shaft through requiring the presence of the conveyance when preparing to load or off-load, and requiring access to the shaft to be prevented when WASTE is being moved in the Waste Shaft.

The Waste Shaft Collar Room is accessed through Waste Shaft Access doors 155 and 156. If the Waste Shaft Conveyance is present (visually VERIFIED by top lander) at the Waste Shaft Collar prior to moving WASTE into the Waste Shaft Collar Room, it prevents the inadvertent drop of any WASTE down the Waste Shaft. It also prevents the inadvertent drop of objects capable of impacting WASTE on the Waste Shaft Conveyance. If doors 155 and 156 remain closed while the Waste Shaft Conveyance moves WASTE between the Waste Shaft Collar and the WASTE SHAFT STATION and the WASTE is removed from the Waste Shaft Conveyance, it prevents the inadvertent drop of any vehicle/equipment down the Waste Shaft from impacting WASTE.

If the Waste Shaft Conveyance remains present (visually VERIFIED by bottom lander) at the WASTE SHAFT STATION until WASTE is removed from the Waste Shaft Conveyance, placed on the Waste transporter and is moving away from the Waste Shaft, it prevents the inadvertent drop of any WASTE down the Waste Shaft. WASTE that remains on the Waste Shaft Conveyance and is not offloaded can be moved back to the Waste Shaft Collar Room.

Prior to bringing WASTE into the WASTE SHAFT STATION from the TRANSPORT PATH, the Waste Conveyance must be present at the WASTE SHAFT STATION. If the Waste Conveyance is at the WASTE SHAFT STATION, it will prevent inadvertently dropping the WASTE down the Waste Shaft. If the WASTE has not entered the TRANSPORT PATH, then the WASTE can be loaded back on the Waste Shaft Conveyance as long as the Waste Shaft Conveyance is at the WASTE SHAFT STATION before the WASTE transporter moves towards the Waste Shaft.

5.0 Administrative Controls (continued)

5.5.7 CH BAY Alternative Vehicle Barrier Provision

SAC: Liquid-fueled vehicles/equipment SHALL be prohibited within the WHB PARKING AREA UNIT unless the following conditions are met:

- Vehicle Barriers are installed as described in DF 6.12.

OR

- Liquid-fueled vehicles/equipment SHALL be ATTENDED when inside the exclusion zone footprint.

  AND

- Moving liquid-fueled vehicles/equipment in the WHB PARKING AREA UNIT SHALL be ATTENDED when the Vehicle Barriers are not fully installed.

Bases: The safety function of the CH BAY Alternative Barriers Provision control is to reduce the likelihood for release of radiological material from CH WASTE in the WHB due to impacts by vehicles and/or fires adjacent to the southwest wall of the CH BAY by maintaining control of liquid-fueled vehicles/equipment in and around the exclusion zone when the concrete Vehicle Barriers are not fully installed.

The area protected by the Vehicle Barriers is the southwest part of the CH BAY. The specific wall section, referred to hereinafter as the southwest wall, that is protected is that portion of the south exterior CH BAY wall starting at Airlock 100 running in a westerly direction approximately 85 feet to a point approximately 5 feet west of the CH BAY/TRUPACT Maintenance Facility (TMF) common wall. The exclusion zone is defined as the area within the placement of the Vehicle Barriers, at least 25 feet south of the CH BAY wall and from Airlock 100 to a point approximately 5 feet west of the CH BAY/TMF common wall. WIPP Drawing 24-Z-044-W1 shows the placement of the Vehicle Barriers when sections are not removed per this SAC.

This SAC requires the CH BAY Vehicle Barriers as shown in DSA Chapter 2.0, Figure 2.4-7 (note: Figure 2.4-7 shows nominal dimensions) to be in place, or if sections of the Vehicle Barriers are temporarily removed, all liquid-fueled vehicles/equipment inside the exclusion zone and all moving liquid-fueled vehicles in the WHB PARKING AREA UNIT must be ATTENDED.

CH BAY Vehicle Barriers (e.g., concrete barriers) are DFs described in Chapter 4.0, Section 4.4.14 of the DSA and as shown in DSA Chapter 2.0, Figure 2.4-7. The Vehicle Barriers, which form an exclusion zone between the CH BAY southwest wall and the Vehicle Barriers based on the placement of the Vehicle Barriers, prevent vehicles from crashing through the CH BAY wall and into the CH BAY where CH WASTE may be stored. Additionally, the Vehicle Barriers prevent combustible liquid-fueled vehicles/equipment from being in the exclusion zone which prevents a pool fire in the exclusion zone from impacting any WASTE that may be stored in the CH BAY. If the Vehicle Barriers are in place, the vehicles or equipment in the WHB PARKING AREA UNIT do not have to be ATTENDED.

5.0 Administrative Controls (continued)

5.5.7 CH BAY Alternative Vehicle Barrier Provision (continued)

To support maintenance and operational activities, it may be necessary to temporarily move single or multiple barrier units (i.e., one or more of the individual concrete barriers) to allow vehicles or equipment into the exclusion zone. Barrier sections that are not removed SHALL remain in place per the diagram in DSA, Chapter 2.0, Figure 2.4-7. When sections of the Vehicle Barrier DF are temporarily removed and vehicles/equipment enter the exclusion zone, the liquid-fueled vehicles/equipment in the exclusion zone SHALL be ATTENDED. This minimizes the potential for impacts with the southwest wall of the CH BAY and liquid combustible spills. If any portion of the Vehicle Barriers is not in place, any vehicle/equipment containing combustible liquids that is moving in the WHB PARKING AREA UNIT outside of the exclusion zone, SHALL also be ATTENDED. Vehicles or equipment, even if they contain combustible liquids, that are stationary outside the exclusion zone do not require an ATTENDANT.

If the barriers are moved per the allowances in this SAC, when the barriers are replaced, the Work Package will require verification that the barriers are installed correctly. The ISI program associated with the barriers as a DF will periodically VERIFY the location of the barriers. The operational procedure inspection and ISI Program along with normal Conduct of Operations and Maintenance and routine visual observation of the barriers is sufficient to ENSURE the barriers are not inadvertently removed or significantly damaged to the point that the safety function cannot be met. Additionally, a Monthly inspection will be performed to VERIFY the barriers were not subjected to significant damage or inadvertently moved.

5.5.8 Real-Time Monitoring for Exothermic Chemical Reaction of Non-Compliant Containers in Panel 6 and/or Panel 7, Room 7

SAC: Real-Time Monitoring for elevated airborne radioactive material levels in accordance with the WIPP Radiation Protection Program and provisions to alert workers SHALL be provided in the following areas when these applicable areas are occupied:

- Drift S-2180 and all areas south of drift S-2180.
- E-300 between S-2180 and the exhaust shaft.
- Areas determined to be within the exhaust path of Panel 6 and/or Panel 7, Room 7 following changes in ventilation configuration.

Bases: The safety function of the Real-Time Monitoring for Exothermic Chemical Reaction of Non-Compliant Containers in Panel 6 and/or Panel 7, Room 7 control is to mitigate the potential consequences of a radiological material release from an exothermic chemical reaction of non-compliant containers in Panel 6 and/or Panel 7, Room 7, by detecting and promptly alerting facility workers in the applicable areas of elevated airborne radiological activity levels outside of the Isolation Structures.

Panel 6 and Panel 7, Room 7, have non-compliant waste containers with the potential to result in an exothermic reaction similar to the one that occurred in February 2014. Real-time airborne monitoring for leakage from these areas is required as any radioactive material released in the closed panel or room may leak past the isolation structures such as bulkheads and barriers described in the DSA, Section 2.4.4.6.1. Real-time airborne monitoring as required by the WIPP Radiation Protection Program must be ensured to protect workers in these applicable areas whenever they are occupied.

5.0 Administrative Controls (continued)

5.5.8 Real-Time Monitoring for Exothermic Chemical Reaction of Non-Compliant Containers in Panel 6 and/or Panel 7, Room 7 (continued)

The areas included in this SAC are:

- Drift S-2180 and all areas south of drift S-2180.
- E-300 between S-2180 and the exhaust shaft.
- Areas determined to be within the exhaust path of Panel 6 and/or Panel 7, Room 7 following changes in ventilation configuration.

The Radiation Protection Program is responsible for providing appropriate monitoring of these areas along with notification to workers in the applicable area(s). These functions must be provided regardless of UNDERGROUND ventilation configuration or if ventilation is lost when the applicable area(s) are occupied or access is needed. The Program is expected to evaluate and expand monitoring to other potentially affected areas to implement the SAC.

The isolation structures, such as bulkheads and barriers (as described in Section 2.4.4.6.1) and stagnant ventilation conditions significantly reduce any driving force for air change from the isolated area, even in the event of a total ventilation system loss. Any release from an exothermic reaction in Panel 6 or Panel 7, Room 7 is expected to be a slow process based on the low pressurization, the indirect flow path, and the closure system which will only allow leakage where the closure system contacts the salt structure or through cracks in the salt structure.

Although a specific type of monitoring and alerting is not specified in this control as the type and location of the Real-Time Monitoring is expected to change as conditions in the UNDERGROUND change, the preferred method is Continuous Air Monitors that provide an alarm to the CMR. Regardless of the monitoring used, the Real-Time Monitoring must provide detection and be complemented by a prompt alert function for workers in the applicable areas. The Real-Time Monitoring will typically consist of, but is not limited to, any single method or a combination of the methods below as necessary to ensure the credited safety function of this Directive Action SAC:

- Continuous Air Monitors placed to monitor potential radiological releases from Panel 6 and Panel 7, Room 7 (including any potential radiological releases following panel closure that may not be directly observable) that alarm in the CMR and provide a local alarm.
- Temporary moveable Continuous Air Monitors that will provide a local alarm.
- Radiological Control Technician or Radiological Worker using a portable hand held monitor, including portable Continuous Air Monitors.
- Personal monitors with alarm function worn by workers in these areas as specified in the RWP. For groups of workers, at least one worker in visual contact of the others must wear a personal monitor with alarm function.

The monitoring equipment is maintained, calibrated, and tested on a frequency per the requirements of the WIPP Radiation Protection Program. Radiological Workers performing Real-Time Monitoring activities must be trained and qualified for performance of such activities and conduct the performance of such activities in accordance with approved procedures.

5.0 Administrative Controls (continued)

5.6 Programmatic Administrative Controls

PACs represent commitments to establish, implement, and maintain SMPs that are required to support the WIPP operations and are described below. These requirements are not specifically credited in the Hazard and Accident Analysis but are important contributors to defense-in-depth. In general, PACs provide broad programmatic support for SMPs supporting defense-in-depth and worker safety.

5.6.1 Safety Management Programs

This section contains commitments to SMPs. Although these SMPs are not specifically credited in the hazard or accident analysis for risk reduction, they are an important part of defense-in-depth. SMPs are part of an Integrated Safety Management System to ensure the health and safety of the public and workers, and protection of the environment. The cumulative effect of the programmatic details is important to facility safety and is an integral part of safe operations.

WIPP SMPs are described in DSA Chapters 6.0–18.0.

Safety Management Programs

As described in DOE-STD-3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis*, Key Elements (KEs) may be identified for SMPs. KEs are those that: (1) are specifically assumed to function for mitigated scenarios in the hazard evaluation, but not designated as an SAC; or, (2) are not specifically assumed to function for mitigated scenarios, but are recognized by facility management or DOE as an important capability warranting special emphasis. KEs are noted in these TSRs, and discussed in the SMP chapters of the WIPP DSA (Chapters 6.0–18.0).

TSR violations with regard to the KEs only occur in the event of a programmatic breakdown of the SMP. That is, a programmatic breakdown is determined by tracking and trending noncompliances and deviations. TSR violations of PACs are governed by TSR 5.4.2.

The SMP owners SHALL ENSURE the KEs and overall safety functions of an SMP are implemented and maintained. Management SHALL ENSURE facility-level assessments are performed according to WP 15-CA1004 as part of the continuous improvement process of the Integrated Safety Management System.

5.0 Administrative Controls (continued)

5.6.1 Safety Management Programs (continued)

SMPs for WIPP are, by chapter, as follows:

Chapter 6.0, Prevention of Inadvertent Criticality

The Prevention of Inadvertent Criticality Program describes the Nuclear Criticality Safety Program. WASTE accepted for disposal at the WIPP facility is required to be characterized and certified to meet the requirements of the WIPP WAC prior to being approved for shipment to the WIPP. Nuclear Criticality Safety Evaluations analyze the activities involved in the handling and disposal of WASTE and demonstrate criticality incredibility. The Nuclear Criticality Safety Evaluations for CH and RH WASTE are documented in the *Nuclear Criticality Safety Evaluation for Contact-handled Transuranic Waste at the Waste Isolation Pilot Plant* and the *Nuclear Criticality Safety Evaluation for Remote-handled Waste at the Waste Isolation Pilot Plant*, respectively. The Nuclear Criticality Safety Program meets the requirements of DOE Order 420.1C, *Facility Safety*, Chapter III, "Nuclear Criticality Safety."

Chapter 7.0, Radiation Protection

The Radiation Protection Program describes the organization and functional responsibilities for radiological control, documents the Radiation Protection Program structure, and defines the radiological control management systems necessary to implement the program in accordance with the requirements of 10 CFR 835. The program includes ALARA (As Low As Reasonably Achievable) practices, training, radiation monitoring, radiation exposure control, radiation protection instrumentation, and record keeping. The Radiation Protection Program includes specific program documents, and procedures developed and maintained to implement the program.

The KEs of this program ENSURE that programs and equipment are maintained to protect facility personnel from radiation involved with contamination and direct streaming. While the detailed aspects of the program will vary with the assessment of the hazards, the KEs will be in place as follows.

KE 7-1: Proper placement and operation of Continuous Air Monitors.

KE 7-2: Control access and entrance to RH Hot Cells.

KE 7-3: Contamination control to address potential upcasting from the UNDERGROUND.

Chapter 8.0, Hazardous Material Protection

The Hazardous Material Protection Program is established to protect human health and the environment by controlling chemical hazards in accordance with 10 CFR 851, W*orker Health and Safety Program*, and 29 CFR 1910.1200, *Hazard Communication*. The program defines the scope of chemicals covered and provides direction and references to analyze the hazards that are inherent in their storage and use. Aspects of the program include Hazard Communications, training, Hazardous Material Exposure Control, Hazardous Material Monitoring, instrumentation, and recordkeeping. It describes the processes and systems used for work performed by NWP and by subcontractors for their activities to control chemical hazards to protect personnel, the public, and the environment. The KE of the WIPP Hazardous Material Program is:

- **KE 8-1**: Establish provisions to monitor and control air quality to ensure underground workers are protected from volatile organic compounds (VOCs); protective measures include posting hazardous areas, establishing monitoring requirements, ensuring local ventilation, and requiring personnel protective equipment such as respiratory protection as needed.

5.0 Administrative Controls (continued)

5.6.1 Safety Management Programs (continued)

Chapter 9.0, Radioactive and Hazardous Waste Management

The Radioactive and Hazardous Waste Management Program is established to manage radioactive, mixed, and hazardous wastes that are generated as a result of operations pertaining to the mission or from recovery actions. The waste management programs and organizations, the sources of the site waste streams and characteristics, the waste management process, including the overall waste management policy/philosophy, and DF and ACs for the waste handling or treatment system for site-derived WASTE and site-generated waste are the significant aspects of this Program. Wastes generated during maintenance and operation of the facilities and equipment or from decontamination activities are managed in accordance with this Program. These wastes include radioactive and mixed waste as either the low-level or TRU WASTE with radiological material from the TRU waste handling and disposal process, as defined in the Hazardous Waste Facility Permit, and site-generated hazardous waste.

Chapter 10.0, The Initial Testing, In Service Surveillance, and Maintenance

The Initial Testing, IN SERVICE Surveillance, and Maintenance Programs present programs for:

> Demonstrating that testing is performed to ensure that safety significant SSCs and Design Features subject to degradation; other systems that perform important defense-in-depth functions; equipment relied on for the safe operation, safe shutdown of the nuclear facility, and for maintaining the facility in a safe shutdown condition as documented in the safety basis and safety support systems meet their functional requirements and performance criteria such that the WIPP operations have assurance SSCs fulfill normal and safety functions described in this DSA; and,
>
> ENSURING that maintenance activities are conducted, in accordance with DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*, to preserve and restore the availability, operability, and reliability of the WIPP SSCs important to the operation of the facility.

The following KEs apply to SSCs identified in accordance with DOE Order 433.1B. The KEs of this SMP are programs implemented to ENSURE appropriate initial and periodic verifications of the functionality of important SSCs, with long-term performance monitoring to assess the continuing functionality of the equipment as follows:

> **KE 10-1**: Development and implementation of ISI for DFs.
>
> **KE 10-2**: Testing, calibration, OPERABILITY, and preventive/corrective maintenance in accordance with applicable code requirements, manufacturer recommendations, established technical requirements, and engineering judgement consistent with tracking, trending, and failure history.
>
> **KE 10-3**: Tracking and trending of the performance and deficiencies of the equipment covered by KE 10-2 above.

5.0 Administrative Controls (continued)

5.6.1 Safety Management Programs (continued)

Chapter 11.0, Operational Safety

The Operational Safety Program provides safety through conduct of operations and fire protection programs. In accordance with regulatory requirements, the conduct of operations specifically focuses on the bases of operations such as management, organization, the institutional safety provisions, procedures, training, and human factors. Opportunities for improvements in Conduct of Operations as identified in the Accident Investigation Board Reports (March 2014, April 2014, and April 2015) and other sources were evaluated and incorporated into the program as appropriate.

The Fire Protection Program addresses both Fire Prevention and Fire Suppression. Major topics of the Fire Protection Program include: Fire Hazards, Fire Protection Program and Organization, Combustible Loading Program, Control of "Hot Work," Firefighting Capabilities, and Firefighting Readiness Assurance.

The Conduct of Operations Program addresses each of the salient features identified in DOE Order 422.1, *Conduct of Operations*.

The KEs of Operational Safety ENSURE that: 1) significant Fire Safety considerations from the Fire Hazards Analysis are addressed programmatically; 2) Hoisting and Rigging is treated programmatically; and, 3) all major aspects of mine safety assurance are explicitly covered programmatically as follows:

KE 11-1: Routine maintenance and inspection of non-waste handling vehicles in the UNDERGROUND for leaks and accumulation of combustible materials (fire protection).

KE 11-2: Formal Fire Protection Engineer combustible control inspections to include inspection criteria, specified frequency of inspections, documentation of identified issues, issue disposition, tracking and trending of issues, and performance metrics.

KE 11-3: OPERABILITY and testing of equipment (audible, visual) used for abnormal event communication/notification between workers (both aboveground and UNDERGROUND) and the CMR.

KE 11-4: Placement of fuel barrier of absorbent materials at the static WASTE FACE when waste emplacement or retrieval has not occurred for a period of 10 days.

5.0 Administrative Controls (continued)

5.6.1 Safety Management Programs (continued)

KE 11-5: Fire prevention/suppression controls include the following KEs:

- UNDERGROUND equipment is evaluated for fire risk in accordance with National Fire Protection Association (NFPA) 122. All equipment determined to pose an unacceptable fire risk in the NFPA 122 analysis will be protected with an automatic fire suppression system prior to use, unless alternate risk reduction measures are approved by DOE.
- Areas in the UNDERGROUND where there is an increased combustible loading (e.g., refueling station, maintenance shop, combustible storage area, maintenance offices, lunch room, oil storage area) will be protected by automatic fire suppression systems.
- Ignition sources (e.g., hot work, designated smoking areas, portable heaters, electrical equipment) are controlled in accordance with the WIPP Fire Protection Program and design control program.
- UNDERGROUND combustible materials are controlled in accordance with the WIPP Fire Protection Program (e.g., combustible control zone around personnel conveyances, combustible load permit process).

KE 11-6: Hoisting and Rigging Program which protects safety SSCs, waste packaging, and personnel from dropped loads.

KE 11-7: Mine entrance requirements impacting personnel safety (e.g., continuous air monitor operation, radiological conditions, ventilation capabilities, personnel training, personnel limits for IN SERVICE conveyances, back-up power).

KE 11-8: Mine evacuation requirements (e.g., unobstructed planned escape routes per the Life Safety Code and DOE approved Fire Protection (FP) Equivalency for NFPA 101, the Life Safety Code, and Alternative Egress Provisions (DOE 2016) mine egress markings, communications, Abnormal Operations Procedures).

KE 11-9: Equipment deficiency tracking (including equipment in reduced status) that identifies, tracks, and evaluates safety impacts and implements compensatory measures until equipment is returned to service.

KE 11-10: Ground control inspections are conducted routinely, and remedial actions performed for unstable ground conditions by qualified personnel.

KE 11-11: Maintenance and configuration management of ground control equipment.

KE 11-12: Procedures address the actions to be performed by operators in response to CMR notifications, annunciators, and other types of facility displays that indicate an abnormal condition.

KE 11-13: The TRANSPORT PATH will be inspected for hazardous conditions and obstructions prior to moving CH WASTE along the designated path.

KE 11-14: The TRANSPORT PATH will be identified by the use of flashing lights or by placement of physical indicators (e.g., temporary gates, traffic cones) when CH WASTE is present in the TRANSPORT PATH.

5.0 Administrative Controls (continued)

5.6.1 Safety Management Programs (continued)

Chapter 12.0, Procedures and Training

The Procedures and Training program provides the processes used to develop, verify, and validate the technical content of procedures and the WIPP training programs as well as the processes used to keep them current through feedback, periodic reviews, and continuous improvement processes. The ongoing implementation of these processes is a necessary part of safety assurance. Through their effective implementation, the WIPP facility is operated and maintained using established processes by personnel who are trained commensurate with their responsibilities. Training requirements for the WIPP staff conform to the requirements of DOE Order 426.2, *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*, or successor document.

The Procedures Program focuses on the Development and Maintenance of Procedures while the Training Program addresses the Development and Maintenance of Training as well as the Modification of Training Materials.

The Procedures and Training KEs ENSURE that the proven foundational aspects of high performing Procedures and Training organizations are explicitly institutionalized in the program. Additionally, KE 2 ENSURES that the unique aspects of WIPP as a DOE facility have comparably special treatment in the program.

KE 12-1: Preparation of procedures related to safe operation of the facility and/or safety SSCs with participation by end users and appropriate subject matter experts, verified to be technically correct, validated to be workable as written.

KE 12-2: Worker training and qualifications on responding to incidents (e.g., use of rescue equipment, assembly areas).

KE 12-3: Training and Qualification Programs are designed and developed to ensure personnel obtain initial requisite knowledge and skills resulting in abilities to effectively execute assigned duties during normal, abnormal, and emergency conditions. Continuing training is provided to maintain requisite knowledge and skills as warranted for changes such as emergent Evaluation of the Safety of the Situation documents. Personnel are not permitted to perform assigned duties independently until requisite training and qualification are complete.

Chapter 13.0, Human Factors – Deleted

5.0 Administrative Controls (continued)

5.6.1 Safety Management Programs (continued)

Chapter 14.0, Quality Assurance

Facility nuclear safety is ENSURED in part through implementation of a Quality Assurance Program based on 10 CFR 830, Subpart A requirements and other pertinent regulations, standards, and DOE Orders. The principal features of the Program include organization, quality improvement (including corrective measures), document control and records management for the WIPP work processes, and independent assessments. NWP applies a graded approach for the application of Quality Assurance (QA) requirements to WIPP items and activities in accordance with regulatory guidance. The graded-approach process determines the level of quality-related controls appropriate for each item or activity. In accordance with the graded approach, the highest level of quality controls is applied to nuclear safety–related items and services. The NWP QA Department independently verifies quality by measures such as procurement reviews, supplier qualification, assessments, and inspections.

The QA Key Element singles out Programmable Logic Controller related safety equipment to ENSURE password protection.

KE 14-1: Password protection of Safety Significant Programmable Logic Controllers.

Chapter 15.0, Emergency Preparedness Program

The Emergency Management Program provides an organized structure for response to the scope of emergencies identified at WIPP that meets the requirements of DOE Order 151.1C, *Comprehensive Emergency Management System*. The objective of the Program is to minimize the impact of emergency events on the health and safety of plant personnel, the general public, property, and the environment. The Emergency Management Program is implemented through emergency response procedures, and emergency management administrative procedures. In emergency events that could threaten human health or the environment, including hazardous material (radioactive and non-radioactive) or waste events, the plan, procedures, and standard operating guides are implemented.

The program addresses the Emergency Response Organization, Assessment Actions, Notification, Emergency Facilities and Equipment, Protective Actions, Training and Exercises, and Recovery and Reentry. Emergency Preparedness and Management enhancements are embodied in the KEs below:

KE 15-1: Hazards are identified and analyzed through a technical planning basis process to provide pre-determined protective actions and Protective Action Recommendations to protect workers and the public.

KE 15-2: Emergency plans and procedures provide the framework for actions to be taken by workers and responders.

KE 15-3: Emergency response capabilities (e.g., OPERABLE equipment, minimum staffing, Incident Command System, Emergency Operations Center) are identified and maintained to respond and protect workers, public, property, and environment.

KE 15-4: Emergency drills and exercises are planned and conducted to provide validation of plans, procedures, and response capabilities.

5.0 Administrative Controls (continued)

5.6.1 Safety Management Programs (continued)

Chapter 16.0, Provisions for Decontamination and Decommissioning – Deleted

Chapter 17.0, Management, Organization, and Institutional Safety Provisions

The Management, Organization, and Institutional Safety Provisions Program establishes the overall structure of the organizations and entities involved in safety-related functions, including key responsibilities and interfaces; and establishes the safety programs that promote safety consciousness and morale, including safety culture, Contractor Assurance, configuration control, occurrence reporting, and staffing and qualification. The organization structure is displayed in WIPP DSA Chapter 17.0, Figure 17.3-1, "Nuclear Waste Partnership LLC Organization Structure."

The Key Element of Chapter 17.0 restates the prime performance requirement for Configuration Management to ENSURE that the WIPP program maintains the following focus:

> **KE 17-1**: Configuration management of SSCs identified in accordance with DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities.*

Chapter 18.0, WIPP Waste Acceptance Criteria Compliance Program

The Waste Acceptance Criteria Compliance Program addresses the WIPP WAC Compliance process. The Hazards Analysis of this DSA uses selected WIPP WAC requirements as Initial Conditions in the analyses of postulated release scenarios to provide bounding radiological consequences to the onsite and offsite receptors. WIPP has a limited number of activities, which support WIPP WAC compliance given that Waste Containers are received as certified as meeting the WIPP WAC prior to shipment to WIPP. Waste Containers are restricted from being opened for examination of the contents or repackaging at WIPP. The chapter describes the National TRU Program and its measures that, although many are beyond the activities subject to this DSA, ENSURE compliance with the WIPP WAC.

5.0 Administrative Controls (continued)

5.6.1 Safety Management Programs (continued)

The KEs of Chapter 18.0 ENSURE that WIPP maintains it outreach efforts to the generator sites as follows:

KE 18-1: The WIPP management and operating (M&O) Contractor verifies each container is part of an approved waste stream with the enhanced Acceptable Knowledge process prior to authorizing shipment in WDS.

KE 18-2: The WIPP M&O Contractor reviews approved Waste Stream Profile Forms to verify the information provided is complete and accurate, and that the waste stream complies with Hazardous Waste Facility Permit (HWFP) Waste Analysis Plan (WAP) and the WIPP WAC (DOE/WIPP 02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*) prior to authorization for shipment.

KE 18-3: The WIPP M&O Contractor verifies the HWFP requirement for confirmation of certified waste prior to shipment to the WIPP from the DOE Sites.

KE 18-4: The WIPP M&O Contractor performs Generator Site Technical Reviews, which are reviews of DOE Sites' and Certified Programs' implementation of WIPP requirements (excluding DOE activities).

KE 18-5: The MAR statistics for waste certified for future shipment to WIPP are reviewed periodically by the WIPP M&O Contractor (no less frequently than annually) to ENSURE the values stated in the WIPP DSA, Chapter 3.0, Tables 3.4-1 and 3.4-2 (based on DOE-STD-5506 statistical analysis methodology) continue to provide conservative, unmitigated consequences in the Safety Analysis; further, each payload proposed for shipment to WIPP is additionally screened to ENSURE handling and emplacement of small groupings of containers will remain bounded by the Safety Analysis.

5.0 Administrative Controls (continued)

5.7 Reviews and Audits

This section describes the methods established to conduct independent reviews and audits of all activities associated with maintaining compliance with the TSR. These methods may include creating an organizational unit or a standing or ad hoc committee, or assigning individuals capable of conducting these reviews. Individual reviewers SHALL not review their own work or work over, which they have direct responsibility. Management SHALL specify the functions, organizational arrangement, responsibilities, appropriate qualifications of reviewers, and reporting requirements of each functional element or unit that contributes to these processes.

The goal of the review and assessment program is to provide a comprehensive program to provide senior level management with an assessment of facility operation and to recommend actions to improve nuclear safety and facility reliability. The program should include an assessment of the effectiveness of reviews conducted by facility staff. The goal of the independent oversight is to provide an outside look at day-to-day operations. The goal of the independent program is to VERIFY compliance with established NWP policies, programs, and procedures.

The Operations Manager SHALL ENSURE the performance of review activities affecting the safe operation of the WIPP to ensure that day-to-day activities are conducted in a safe manner. These reviews SHALL include, as a minimum, the following elements:

a. USQ determinations.
b. Proposed tests and experiments.
c. Procedures and programs (required by the TSRs).
d. Facility changes and modifications.
e. TSR changes.
f. Facility operation, maintenance, and testing.
g. Lessons learned and operations experience summary.
h. Other safety-related issues.

Reviews and audits of activities and programs affecting nuclear safety performed independently of WIPP staff should include these same items and in addition:

a. Conformance with TSRs.
b. Violations of codes, orders, and procedures that have safety and health significance.
c. Occurrence Reports.
d. Staff training, qualifications, and performance.
e. Quality Assurance Program adherence.
f. Unanticipated deficiencies of SSCs that could affect nuclear safety.
g. Significant unplanned radiological or toxic material releases.
h. Significant operating abnormalities.

5.0 Administrative Controls (continued)

5.8 Record Keeping

Records SHALL be kept of all information supporting implementation of the TSRs as follows:

a. MODE changes, TIME OF DECLARATION, planned and unplanned entry into LCO Conditions, entering and exiting ACTIONS, Completion Times of Required Actions, determination of AFFECTED AREA(S), and SAFE CONFIGURATION.

b. Maintenance activities, inspections, repairs, and replacements of SSCs specifically credited in the WIPP DSA.

c. Calibration of instruments required by a SR.

d. Completed SR packages.

Any records generated as part of the TSR process are handled in accordance with departmental Records Inventory and Disposition Schedules. Records Inventory and Disposition Schedules documentation includes record type, retention period, storage requirements, and location.

Section 6
Design Features

6.0 DESIGN FEATURES

Chapter 3.0 of the WIPP DSA identifies DFs for which credit is taken. DFs are those SSCs that are passive features of the facility that, if altered or degraded, would have a significant effect on safety. For each DF, the physical features and a summary description (Bases) of the DF safety function and key features are provided. TSR Section 1.3, "Frequency," applies to the surveillance intervals of each DF (e.g., text and Table 1.3-1).

Any changes to DFs that could affect the safe operation of the facility will be analyzed for safety implications and be appropriately approved prior to making such modifications through the NWP Configuration Management and USQ Programs.

WIPP has an established ISI Program as described in DSA Chapter 10.0, which provides KEs in Section 5.6, above. The Cognizant System Engineers develop the ISI requirements for those items to be inspected and the inspection frequencies based on the DF performance criteria. The appropriate ISI requirements and frequencies will be identified in WIPP procedures and the ISIs will be completed by qualified personnel. Deviations or changes to the ISIs will be subject to the Configuration Management process, including the USQ program.

The following DFs are credited in the WIPP DSA (DOE/WIPP 07-3372) as performing a safety function:

6.1 Waste Handling Building Structure
6.2 TRUDOCK 6-ton Cranes (Deleted)
6.3 Facility Pallet
6.4 UNDERGROUND Liquid-fueled WASTE HANDLING VEHICLES (Deleted)
6.5 RH BAY Design (Deleted)
6.6 Waste Hoist Support System
6.7 UNDERGROUND Fuel and Oil Storage Areas
6.8 RH Waste Casks
6.9 Type B SHIPPING PACKAGE
6.10 FCLR, CUR, and Transfer Cell Shielding
6.11 Isolation Structures for Segregating Non-compliant Containers in Panel 6 and Panel 7, Room 7
6.12 Vehicle Barriers

6.1 Waste Handling Building Structure

The structure of the WHB, including the CH BAY, ROOM 108, RH BAY, HOT CELL COMPLEX, and Waste Hoist Tower is of noncombustible construction and designed to withstand design basis NPH loading without collapse (i.e., tornado, tornado generated missile, earthquake, high wind, high wind generated missiles, and snow/ice loading on the roof). The concrete curbing is part of the building foundation that extends above grade. The route of vehicle/equipment to the waste shaft prevents a direct, unencumbered path to the waste shaft.

The structural design features of the TMF, Support Building, and Main Access Corridor are equivalent to the structural design features of the WHB and prevent damage to the WHB or WASTE in the WHB during a NPH event. As these buildings prevent damage to the WHB during NPH events, the structural design features of these three buildings must be protected. The structural design features of the, Support Building, TMF, and Main Access Corridor that will prevent damage to the WHB during a NPH event are specifically included in this Design Feature. The TRUDOCK Cranes are designed for the design basis earthquake.

6.0 Design Features (continued)

6.1 Waste Handling Building Structure (continued)

Bases: The safety function of the WHB structure, is to prevent the release of radiological materials due to building collapse with impact to WASTE CONTAINERS caused by NPH events (i.e., tornado, earthquake, high wind, tornado, wind/tornado generated missile, and snow/ice loading on the roof), propagating fires through the structure from externally initiated fires or through roof collapse from credible internal fire scenarios, or loss of confinement from vehicle/equipment drop down the Waste Shaft.

The WHB structure must also ensure that it does not contribute to the combustible loading in a manner that can propagate fires into the building to staged WASTE CONTAINERS. External to the south side of the WHB, curbs are credited to protect the external walls of the WHB from the potential for liquid fuel pools from entering the WHB. The WHB design layout must ensure that vehicles/equipment will not have a direct and unrestricted vehicle/equipment access to the Waste Shaft Collar (e.g., physical configuration of the CLR is depicted in DSA Chapter 2.0, Figure 2.4-4 between sections B.8 and E.10).

The WHB structure is designed to prevent structural failure or damage during and following natural phenomenon and fire events. The TRUDOCK Cranes are designed to prevent their collapse and drop to the CH BAY floor during a design basis earthquake. The WHB is constructed in accordance with the requirements of NFPA 220, Standards on Types of Building Construction, Type II construction. The roof design and construction of the WHB, including the CH BAY, ROOM 108, RH BAY, HOT CELL COMPLEX, and Waste Hoist Tower, prevent building collapse from snow/ice loading on the roof from impacting WASTE CONTAINERS outside a CLOSED Type B SHIPPING PACKAGE. The noncombustible materials (steel and concrete) used in the construction of the WHB and curbing minimize fire propagation into and within the WHB and provide a confinement barrier for radiological or hazardous material releases occurring inside the WHB caused by NPH events (i.e., tornado, earthquake, high wind, and snow/ice loading on the roof) and fire. The design of the CLR provides right angle access and limited straight line distance from the access point to the Shaft Entry Room access door. DSA Chapter 2.0, Figure 2.4-4 shows the limited size and the structure that prevent direct and unrestricted vehicle/ equipment access to the Waste Shaft Collar, preventing WASTE or vehicles/equipment from being dropped down the Waste Shaft. Right angle access to Shaft Entry Room after entering the CLR or FCLR, and a limited straight-line distance between the access point and Shaft Entry Room prevent significant vehicle acceleration that could lead to uncontrolled vehicle movements. Additionally, the Waste Conveyance Control described in DSA Section 4.5.7 (TSR SAC 5.5.6) ensures that Doors 155 and 156 are closed when WASTE is present in the WASTE SHAFT ACCESS AREA and the conveyance is not secured at the Waste Shaft Collar.

As the TMF, Support Building, and Main Access Corridor are contiguous to and attached to the WHB, failure of one or more of these buildings could result in damage to the WHB in a NPH event. Analysis has demonstrated that these buildings will not fail in a manner to degrade the ability for the WHB to perform its Safety Function. Therefore, damage to the WHB and any WASTE in the WHB is prevented in the postulated NPH events.

6.0 Design Features (continued)

6.2 TRUDOCK 6-ton Cranes (Deleted)

6.0 Design Features (continued)

6.3 Facility Pallet

The Facility Pallet has a stainless steel surface that provides a contiguous flame barrier preventing direct flame impingement on CH WASTE and has a robust construction, as depicted in DSA Chapter 2.0, Figure 2.6-23.

Bases: The safety function of the Facility Pallet is to prevent direct flame impingement on CH WASTE in a pool fire to mitigate a release of radiological material.

IN SERVICE Facility Pallets (see System Design Description (SDD) WH00) are noncombustible, fabricated-steel units. Facility Pallets are designed to accommodate the transport of CH WASTE assemblies, as discussed in DSA, Chapter 3.0, Table 3.3-8, to the UNDERGROUND. Facility Pallets have a rated load capacity of 25,000 pounds.

The Facility Pallet provides a noncombustible surface with no through hole penetrations that could result in direct flame impingement on CH WASTE surfaces. The Facility Pallet provides a stainless steel noncombustible surface, excluding eight three-inch diameter hold down holes. This feature creates a barrier between the WASTE and a burning pool fire that limits their exposure to flame and reduces the potential for lid ejection. Without lid ejection, the CH WASTE burns as confined material, which has a lower airborne release fraction than unconfined burning of material. Facility Pallet structural design is such that it supports the design capacity loading in a pool fire event. DSA Chapter 2.0, Figure 2.6-23 provides the overall dimensions of the Facility Pallet. The Facility Pallet provides the contiguous flame barrier and the internal structure provides the rated load capacity.

6.0 Design Features (continued)

6.4 UNDERGROUND Liquid-fueled WASTE HANDLING VEHICLES (Deleted)

6.5 RH BAY Design (Deleted)

6.0 Design Features (continued)

6.6 Waste Hoist Support System

The Waste Hoist Support System has robust noncombustible steel components and is designed to support the Waste Hoist and a maximum load conveyance under all normal, upset, and design basis NPH conditions.

Bases: The safety function of the Waste Hoist Support System is to prevent a radiological material release due to an uncontrolled Waste Conveyance movement that results in a loss of confinement, a fire, or an NPH initiated failure of the Waste Hoist Support System by establishing a basis for the low unmitigated likelihood assignments.

The Waste Hoist Support System includes the physical structure that fully supports the Waste Hoist and is designed to withstand design basis NPHs. The Waste Hoist support structure is capable of supporting static, dynamic, and seismic load combinations in accordance with the structural loading design requirements of SDD-UH00, Chapter III. The Waste Hoist Support System includes the physical structure that consists of four steel I-beam columns, mounted on a substantial concrete foundation, supporting four steel I-beam girders. The Waste Hoist Support System also includes the bedplate, friction drum, drum shaft, and six head ropes of the Waste Conveyance that are supported by the Waste Hoist support structure. The Waste Hoist support structure is constructed of noncombustible materials. The Waste Hoist support structure is interconnected with and enclosed by the WHB.

6.7 UNDERGROUND Fuel and Oil Storage Areas

The locations of the UNDERGROUND Fuel and Oil Storage Areas are at or north of the S-90 drift.

Bases: The safety function of the UNDERGROUND Fuel and Oil Storage Areas is to preclude or eliminate the flammable or combustible liquid hazard resulting in a pool fire or explosion at either storage location from affecting WASTE through the provision of a substantial separation distance.

Prevention of the involvement of the WASTE from a fire or explosion at the UNDERGROUND Fuel or Oil Storage is accomplished by physically separating the WASTE from the combustible liquid storage locations. The locations of the UNDERGROUND Fuel and Oil Storage Areas at or north of the S-90 drift prevents the involvement of WASTE should fires and/or explosions occur at these locations. This location provides a minimum separation distance of 300 feet, which serves to preclude fires and explosions in the UNDERGROUND Fuel and Oil Storage Areas from impacting the WASTE.

6.0 Design Features (continued)

6.8 RH Waste Casks

The RH Facility Cask and Light Weight Facility Cask (LWFC) are robust structures, comprised of two concentric steel cylinders, closed at both ends (i.e., shield valves are closed with the pins locking the shield valves in place), and have a lead filled annulus with nominal thickness of 4.75 and 2.0 inches, respectively.

Bases: The safety functions of the RH Facility Cask and LWFC are to mitigate worker exposure to a high radiation source by reducing the gamma and/or neutron surface dose rates through the provision of robust shielding and prevent the release of radiological material due to fires, impacts, or internal RH WASTE deflagrations due to their robust construction reducing the likelihood for release of radiological material.

The RH Facility Cask and LWFC provide shielding so the surface dose rate is less than or equal to 200 mrem per hour when the enclosed RH WASTE Canister has a dose rate of 7,000 or 100 rem per hour, respectively. Both Facility Casks consist of two concentric steel cylinders with the annulus between the cylinders filled with lead. The lead annulus is nominally 4.75 inches thick for the RH Facility Cask and nominally 2.0 inches thick for the LWFC. The RH Facility Cask and LWFC have an approximately 9-inch-thick steel motor-operated gate-type shield valves at each end. The closed Facility Cask/LWFC means that the shield valves are fully lowered with the locking pins engaged. The Facility Cask and LWFC are robust designs that can survive minor impacts.

6.9 Type B SHIPPING PACKAGE

The Type B SHIPPING PACKAGE is a robust structure designed, constructed, and assembled according to the requirements and specifications of 10 CFR 71 certified in accordance with 49 CFR 173.

Bases: The safety function of the Type B SHIPPING PACKAGE is to limit the release of radiological material from fires, payload deflagration, and/or collisions due to its robust construction and qualification under accident conditions, thereby mitigating the consequences of an event, and its installed shielding on the RH 72-B Packages reduces the likelihood for excessive gamma and/or neutron exposure to workers.

Type B SHIPPING PACKAGES are designed and constructed to the requirements presented in 10 CFR 71, *Packaging and Transportation of Radioactive Material*, and are certified in accordance with the requirements of 49 CFR 173, Subpart I, *Class 7 (Radioactive) Materials*. To meet the certification, the package design is required to successfully pass the criteria provided in 10 CFR 71.71, *Normal Conditions of Transport*, and 10 CFR 71.73, *Hypothetical Accident Conditions*, which include demonstration that no release of contents occurs after a 30-ft drop onto an unyielding surface 1 meter puncture bar drops, or a thermal exposure of 800ºC (1,475°F) for 30 minutes. Type B SHIPPING PACKAGES are not specifically designed nor constructed for mitigation of explosions from internal or external sources. However, the Type B SHIPPING PACKAGE is judged, due to its robust construction, to maintain confinement integrity when subjected to internal deflagrations. The WIPP WAC (DSA Section 4.5.8) is relied upon to preclude shipment of waste that could result in an internal container fire or deflagration.

6.0 Design Features (continued)

6.10 FCLR, CUR, and Transfer Cell Shielding

The FCLR, CUR, and Transfer Cell are robust structures constructed of concrete walls, floors, and ceilings, with shielded viewing windows to provide shielding such that the external dose rate is less than or equal to 200 mrem per hour when RH WASTE is inside the structure, but outside a CLOSED Type B SHIPPING PACKAGE, or outside a RH Facility Cask/LWFC.

Bases: The safety function of the FCLR, CUR, and Transfer Cell Shielding is to mitigate worker exposure to a high radiation source by providing permanent radiation shielding for when RH WASTE is not shielded by other SSCs (e.g., Type B SHIPPING PACKAGE, RH Facility Cask, or LWFC).

The FCLR, CUR, and Transfer Cell Shielding is credited as a passive DF in the hazards analysis to reduce the radiation from RH WASTE that is outside the CLOSED Type B SHIPPING PACKAGE until it is placed in the Facility Cask or LWFC. See the WIPP DSA Chapter 2.0 for actual dimensions of the concrete thickness for radiation shielding (DSA Chapter 2.0, Figure 2.4-6). The shielding is designed for an internal gamma surface dose rate of 400,000 rem per hour and for an internal neutron surface dose rate of 45 rem per hour.

6.11 Isolation Structures for Segregating Non-compliant Containers in Panel 6 and Panel 7, Room 7

Isolation structures (such as bulkheads and barriers described in Section 2.4.4.6) are robust noncombustible barrier systems designed to segregate non-compliant containers in Panel 6 and Panel 7, Room 7 from active areas of the UNDERGROUND.

Bases: The safety function of the isolation structures is to reduce the quantity of material that could be released from an exothermic chemical reaction within a CH WASTE CONTAINER located in Panel 6, or Panel 7, Room 7, by creating static conditions that resist transmission of particulate and allow for gravitational settling.

The segregation of non-compliant containers in Panel 6 and Panel 7, Room 7 reduces radiological dose to the Facility Worker by mitigating the consequences of any release of radiological material to acceptable levels by isolating air flow within the subject panel/room. The isolation structure consisting of isolation bulkhead or a substantial barrier and isolation bulkhead, for example, meet the requirements of the Hazardous Waste Facility Permit (HWFP).

6.12 Vehicle Barriers

The Vehicle Barriers are robust concrete barriers that are configured as depicted in DSA Chapter 2.0, Figure 2.4-7.

Bases: The safety function of the CH BAY Vehicle Barriers is to reduce the likelihood for release of radiological material from CH WASTE in the WHB due to impacts by vehicles and/or fires adjacent to the southwest wall of the CH BAY by providing a standoff distance from the CH BAY and substantial resistance to vehicular impacts.

Vehicle Barriers are a configured set of concrete barriers consisting of two continuous sections. The first section includes two rows of interconnected concrete barriers, installed approximately 5 feet west of the

CH BAY/TMF common wall extending south from the TMF exterior wall a minimum distance of 25 feet. The second section consists of one row of interconnected concrete barriers positioned a minimum of 25 feet south of the CH BAY exterior southwest wall extending west between Airlock 100 to a point approximately 5 feet west of the CH BAY/TMF common wall (approximately 85 feet in total length) to intersect with the double row barriers. An opening with a gap less than or equal to 3 feet at the intersection of the single barrier section and the two barrier section is permitted for fire department access. Vehicle barriers are assembled using robustly constructed commercially available, concrete barrier type traffic control devices of precast reinforced concrete in a standard shape. A concrete vehicle barrier is approximately 32 inches high, with a 24-inch base, in a variety of lengths, and weighs 400 pounds or more per lineal foot. The barrier contains links (typically steel loops) at the end of each barrier that allow multiple barriers to be connected in series using connectors (e.g., steel J-J hooks or pin-and-loop) provided by the barrier manufacturer. As noted above, multiple barriers are connected in series using the manufacturer's recommended connectors to form a configured vehicle barrier of the desired length a minimum distance of 25 feet from the exterior of the southwest wall of the CH BAY. WIPP Drawing 24-Z-044-W1 shows the placement of the Vehicle Barriers. The Vehicle Barriers prevent vehicles from crashing through the southwest CH BAY wall and into the CH BAY where CH WASTE may be staged, as well as precluding liquid-fueled vehicles/equipment from being in this area. An opening with a gap less than or equal to 3 feet is permitted between the north-south and east-west sections to permit access and placement of fire hose(s) by the fire department. The less than or equal to 3-foot gap is less than the width of liquid-fueled vehicles traversing this area and will protect the CH BAY southwest wall while providing the working space required by the fire department.

Appendix A
Bases

B3/4.0 General Application

B3.0 General Limiting Conditions for Operation

Bases

Background Summary:	LCOs 3.0.1 through 3.0.6 establish the general requirements applicable to all LCOs and apply at all times, unless otherwise stated. The general requirements contained in LCOs 3.0.1–3.0.6 provide overall rules to guide the use and application of the specific requirements of the LCOs in Section 3.0 of the TSRs. When exceptions to the general requirements contained in LCOs 3.0.1–3.0.6 are allowed, they are stated as notes in the individual LCO.
LCO 3.0.1	LCO 3.0.1 establishes the applicability statements within each LCO as the requirement for when conformance to the LCO is required to be met (i.e., when the facility is in the MODES or other specified conditions of the applicability statement of each LCO).
LCO 3.0.2	LCO 3.0.2 establishes that, upon discovery of a failure to meet an LCO, the associated ACTIONS SHALL be met. The Completion Time of each Required Action for an ACTION Condition is applicable from the TIME OF DECLARATION or other time as specified in the LCO. The Required Actions establish those remedial measures that must be taken within specified Completion Times when the requirements of an LCO are not met. This LCO establishes that: • Completion of the Required Actions within the specified Completion Times constitutes compliance with an LCO, and • Completion of the Required Actions is not required when an LCO is met within the specified Completion Time, unless otherwise specified. There are two basic types of ACTIONS. The first type of ACTION specifies a time limit in which the LCO SHALL be met or an additional ACTION is needed. This time limit is the Completion Time to restore a NOT OPERABLE system or component to OPERABLE status or to restore variables to within specified limits. If this type of ACTION is not completed within the specified Completion Time, the applicable PROCESS AREA may be required to be placed in an operating configuration in which the LCO is not applicable. Whether stated as an ACTION or not, restoration of NOT OPERABLE equipment or a condition to within limits is an ACTION that may always be considered on entering LCO ACTIONS.

(continued)

B3/4.0 General Application (continued)

B3.0 General Limiting Conditions for Operation (continued)

Bases (continued)

LCO 3.0.2 (continued)

Some LCO ACTIONS specify a completion time to initiate ACTION to place the applicable PROCESS AREA in a specified MODE or other safe condition. This wording allows operations a reasonable amount of time to determine what actions are necessary, to determine the correct course of action to safely perform the necessary actions, and to perform any necessary administrative functions associated with the actions. When completion times were not specified for completion of facility reconfiguration or MODE change to allow reasonable operational flexibility, the intent is not to delay placing the facility in a safe condition or MODE. Necessary actions should be completed in a minimum time frame and not extended for operational convenience.

The second type of ACTION specifies the remedial measures that permit continued operation of the facility without further restriction by the Completion Time of the ACTION. In this case, conformance to the ACTION provides an acceptable level of safety for continued operation.

Completion of ACTIONS is not required when an LCO is met or is no longer applicable within the associated Completion Times, unless otherwise stated in the individual LCO.

The nature of some ACTIONS for some Conditions necessitates that, once the Condition is entered, ACTIONS SHALL be completed even though the associated Conditions are resolved. The ACTIONS of the individual LCOs specify where this is the case.

The Completion Times of the ACTIONS are also applicable when a system or component is intentionally taken out of service. The reasons for intentionally relying on the ACTIONS include, but are not limited to, the performance of surveillances, preventive or corrective maintenance, or investigation of operational problems. ACTIONS for these reasons SHALL be performed in a manner that does not compromise safety.

When a change in MODE or other specified condition is required to comply with Required Actions, the facility may enter a MODE or other specified condition in which a new LCO becomes applicable. In this case, the Completion Times of the associated Required Action would apply from the point in time that the new LCO becomes applicable, and any Condition(s) are entered.

(continued)

B3/4.0 General Application (continued)

B3.0 General Limiting Conditions for Operation (continued)

Bases (continued)

LCO 3.0.3

LCO 3.0.3 establishes the ACTIONS that SHALL be implemented when an LCO is not met:

1. Associated ACTIONS and Completion Times are not met and no other condition applies.
2. The condition of the facility is not specifically addressed by the associated ACTIONS. This means that no combination of conditions stated in the ACTIONS corresponds exactly to the actual condition of the facility. Sometimes possible combinations of conditions are such that entering LCO 3.0.3 is warranted; in such cases, the ACTIONS specifically state a condition corresponding to such combinations and also that LCO 3.0.3 must be entered.

This LCO is intended to provide a "safe harbor" provision when either the ACTION cannot be complied with, or the ACTION cannot be complied with within the specified Completion Time when an LCO is not met. It also provides a default ACTION when the facility is in a condition that is indeterminate, or is not readily categorized into the specified limits of an LCO. Entry into LCO 3.0.3 and completion of the associated ACTIONS within the required Completion Time does not in and of itself constitute a violation of a TSR.

This LCO delineates the time limit to initiate the ACTION for placing the facility in a safe operating configuration when operation cannot be maintained within the limits for safe operation, as defined by the LCO and its ACTIONS. It is not an operational convenience that permits routine, voluntary removal of redundant or standby systems or components from service in lieu of other alternatives that would result in redundant or standby systems or components being OPERABLE.

(continued)

B3/4.0 General Application (continued)

B3.0 General Limiting Conditions for Operation (continued)

Bases (continued)

LCO 3.0.3 (continued)

Upon entry into LCO 3.0.3, activities SHALL be initiated IMMEDIATELY to prepare for a change in facility operation. The time limit specified to initiate actions permits the change to proceed in a controlled and orderly manner that is well within the capabilities of the facility. This reduces the potential for a facility upset that could challenge safety systems under operating configurations to which this LCO applies.

Change in facility operation required in accordance with LCO 3.0.3 may be orderly terminated and LCO 3.0.3 exited, if any of the following occurs:

- The LCO is now met.
- A Condition exists for which the ACTION has been performed.
- ACTIONS exist that do not have expired COMPLETION TIMES. These COMPLETION TIMES are applicable from the point in time that the Condition was initially entered and not from the time LCO 3.0.3 is exited.

LCO 3.0.3 requires actions to be taken IMMEDIATELY to initiate activities to place the facility in a SAFE CONFIGURATION and 12 Hours to complete the SAFE CONFIGURATION.

The exceptions to LCO 3.0.3 are provided in instances where requiring a facility change in accordance with LCO 3.0.3 would not provide appropriate remedial measures for the associated Condition of the facility. These exceptions are addressed in the individual LCOs.

LCO 3.0.4

LCO 3.0.4 establishes limitations on changes in MODES or other specified conditions in the applicability when an LCO is not met. It precludes placing the applicable PROCESS AREA in a different MODE or other specified condition when the following exists:

1. The requirements of an LCO in the MODE or other specified condition to be entered are not met.
2. Continued noncompliance with these requirements would result in requiring that the applicable PROCESS AREA be placed in a MODE or other specified condition in which the LCO does not apply with the ACTIONS.

(continued)

B3/4.0 General Application (continued)

B3.0 General Limiting Conditions for Operation (continued)

Bases (continued)

LCO 3.0.4 (continued)

Compliance with ACTIONS that permit continued operation of the applicable PROCESS AREA for an unlimited period of time in an applicable MODE or other specified condition provides an adequate level of safety for continued operation. This is without regard to the status of the applicable PROCESS AREA before or after the MODE change. Therefore, in such cases, entry into a MODE or other condition in the applicability may be made in accordance with the provisions of the ACTIONS. The provisions of this LCO SHALL not be interpreted as endorsing the failure to exercise the good practice of restoring systems or components to OPERABLE status before applicable PROCESS AREA is allowed to change MODES.

The provisions of LCO 3.0.4 SHALL not prevent changes in MODES or other specified conditions in the applicability that are required to comply with ACTIONS.

Exceptions to LCO 3.0.4 are stated in individual LCOs. Exceptions may apply to all the ACTIONS or to a specific ACTION of an LCO.

When changing MODES or other specified conditions while in a condition (in compliance with LCO 3.0.4 or where an exception to LCO 3.0.4 is stated) the ACTIONS define the remedial measures that apply. Surveillances do not have to be performed on the associated NOT OPERABLE equipment (or on variables outside the specified limits), as permitted by SR 4.0.1. Therefore, a change in MODE or other specified condition in this situation does not violate SR 4.0.1 or 4.0.4 for those surveillances that do not have to be performed because of the associated NOT OPERABLE equipment. However, SRs SHALL be met to demonstrate OPERABILITY before declaring the associated equipment OPERABLE (or variable within limits) and restoring compliance to the affected LCO.

LCO 3.0.5

LCO 3.0.5 establishes the allowance of restoring equipment to service under administrative/procedural controls when it has been removed from service or declared NOT OPERABLE to comply with ACTIONS. The sole purpose of this LCO is to provide an exception to LCO 3.0.2 to allow the performance of SRs to demonstrate the following:

1. OPERABILITY of the equipment being returned to service; or
2. OPERABILITY of other associated equipment.

(continued)

B3/4.0 General Application (continued)

B3.0 General Limiting Conditions for Operation (continued)

Bases (continued)

LCO 3.0.5 (continued)

An example of demonstrating the OPERABILITY of other equipment is taking a NOT OPERABLE channel or trip system out of the tripped condition to prevent the trip function from occurring during the performance of a SR on another channel in the other trip system. Another similar example of demonstrating the OPERABILITY of other equipment is taking a channel out of the tripped condition to permit the logic to function and indicating the appropriate response during performance of a SR on another channel in the same trip system.

LCO 3.0.6

LCO 3.0.6 establishes an exception to LCO 3.0.2 for support systems that have an LCO or ACTION statement specified in the TSR. This exception is necessary because LCO 3.0.2 requires that the Conditions and ACTIONS of the associated NOT OPERABLE supported system LCO be entered solely from the NOT OPERABILITY of the support system. This exception is justified because the ACTIONS that are required to ensure that the facility is maintained in a safe operating configuration are specified in the support system ACTIONS. These ACTIONS may include entering the supported system's Conditions and ACTIONS or may specify other ACTIONS.

When a support system is NOT OPERABLE and there is no LCO or Action Statement specified for it in the TSR, the effects on the supported system(s) operability is required to be evaluated and a formal declaration made. However, it is not necessary to enter into the supported system's Conditions and ACTIONS unless directed to do so by the support system's ACTIONS. The confusion and inconsistency of interpretation of requirements related to the entry into multiple Conditions and ACTIONS SHALL be eliminated by providing all actions that are necessary to be taken to ensure that the facility is maintained in a safe operating configuration in the support system's ACTIONS.

When a support system is NOT OPERABLE and there is no LCO specified for it, the impact of the degradation of the support system function on the supported systems' OPERABILITY SHALL be evaluated.

The degradation of the support system may or may not affect the OPERABILITY of the supported systems. OPERABILITY of the supported system SHALL depend on the intended function of the supported system and the level of support that the supported system provides. Unless otherwise justified (on determination that the supported system is NOT OPERABLE), the Conditions and ACTIONS of the supported system's LCO SHALL apply or other compensatory actions or requirements SHALL apply, as otherwise justified.

Administrative/procedural controls are to ENSURE the time the equipment is returned to service in conflict with the requirements of the ACTIONS is limited to the time absolutely necessary to perform the allowed SR. This LCO does not provide time to perform any other preventive or corrective maintenance.

B3/4.0 General Application (continued)

B4.0 General Surveillance Requirements

Bases

Background Summary	SRs 4.0.1 through 4.0.4 establish the general requirements applicable to all SRs and apply at all times, unless otherwise stated. The general requirements contained in LCOs 4.0.1–4.0.4 provide overall rules to guide the use and application of the specific requirements of the LCOs in Section 4.0 of the TSR. When exceptions to the general requirements contained in LCOs 4.0.1–4.0.4 are allowed, they are stated as notes in the individual LCO.
SR 4.0.1	SR 4.0.1 establishes that SRs must be met during the MODES or other specified conditions in the applicability statements for individual LCOs, unless otherwise stated in the individual SRs. This SR ensures that surveillances are performed to VERIFY the OPERABILITY of systems and components and those variables are within specified limits. Failure to meet a SR within the specified FREQUENCY, in accordance with SR 4.0.2, constitutes a failure to meet an LCO. Systems and components are assumed to be OPERABLE when the associated SRs have been met. Nothing in this SR, however, is to be construed as implying that systems or components are OPERABLE when: 1. The systems or components are known to be NOT OPERABLE, although still meeting the SRs; or 2. The requirements of the surveillance(s) are not met between required surveillance performances. Surveillances do not have to be performed when the applicable PROCESS AREA is in a MODE or other specified operating configuration for which the requirements of the associated LCO are not applicable, unless otherwise specified.

(continued)

B3/4.0 General Application (continued)

B4.0 General Surveillance Requirements (continued)

Bases (continued)

SR 4.0.1 (continued)

Surveillances, including surveillances invoked by ACTIONS, do not have to be performed on NOT OPERABLE equipment because the sole purpose of a surveillance is to determine OPERABILITY. If the equipment has been declared NOT OPERABLE and/or out-of-service, an OPERABILITY determination has already been made. ACTIONS because of the equipment being NOT OPERABLE define the remedial measures that apply. SRs have to be met in accordance with SR 4.0.2 before returning equipment to OPERABLE status.

Measurement devices used to demonstrate compliance with LCO SRs SHALL be calibrated to plant design, manufacturer's specifications, and/or industry standards as described in the Facility Calibration Program. SR results SHALL be documented in an auditable and traceable manner.

Upon completion of maintenance, appropriate post-maintenance testing is required to declare equipment OPERABLE. This includes meeting applicable SRs in accordance with SR 4.0.2. Post-maintenance testing may not be possible in the specified operating configuration in the applicability because the necessary facility parameters were not established.

In these situations, the equipment may be considered OPERABLE, provided that testing has been satisfactorily completed to the extent possible and that the equipment is not otherwise believed to be incapable of performing its function. This will allow operation to a specified operating configuration where other necessary post-maintenance tests can be completed.

SR that requires removal of equipment from service does not constitute failure to meet an LCO. Individual surveillance procedures SHALL describe appropriate limitations beyond which an out-of-tolerance condition would exist.

(continued)

B3/4.0 General Application (continued)

B4.0 General Surveillance Requirements (continued)

Bases (continued)

SR 4.0.2

SR 4.0.2 establishes the requirements for meeting the specified FREQUENCY for surveillances. Surveillance FREQUENCIES should be based on historical data, engineering or manufacturer's information or safety analysis to allow the longest reasonable time period between surveillances to ENSURE OPERABILITY. Failure to perform the SR within the specified FREQUENCIES may allow operation beyond the assumptions specified in the DSA.

SR 4.0.2 permits a 25% extension of the interval specified in the SR FREQUENCY. This SR is designed to facilitate SR scheduling in conditions where performance would represent an operational hardship or cause an unsafe transient. It allows consideration of facility operating conditions that may not be suitable for conducting the SR (e.g., transient states or other ongoing SRs or maintenance activities).

The 25% extension does not significantly degrade the reliability that results from performing the SR surveillance at its specified FREQUENCY. This is based on the recognition that the most probable result of any particular SR being performed is the VERIFICATION of conformance with the SRs. The exceptions to SR 4.0.2 are those SRs for which the 25% extension of the interval specified in the FREQUENCY does not apply. These exceptions are stated in the individual SRs.

An example of where SR 4.0.2 does not apply is a SR with a FREQUENCY of "in accordance with another DOE regulation." The requirements of regulations take precedence over the TSRs. The TSRs cannot, in and of itself, extend a test interval specified in the regulations. Therefore, there would be a Note: in the FREQUENCY stating, "SR 4.0.2 is not applicable."

The provisions of SR 4.0.2 are not intended to be used repeatedly merely as an operational convenience to extend SR intervals or periodic completion time intervals beyond those specified.

(continued)

B3/4.0 General Application (continued)

B4.0 General Surveillance Requirements (continued)

Bases (continued)

SR 4.0.3

SR 4.0.3 establishes the flexibility to defer declaring AFFECTED equipment NOT OPERABLE or an affected variable outside the specified limits when a surveillance has not been completed within the specified FREQUENCY. A delay period of up to 24 Hours applies from the time it is discovered that the surveillance has not been performed, in accordance with SR 4.0.2, and not at the time the specified FREQUENCY was not met.

To avoid subjecting the facility to unnecessary transients, upon discovery of a missed surveillance, 24 Hours or the time limit of the specified surveillance FREQUENCY, whichever is less, is allowed to complete the SR before taking the required ACTION of the LCO. This delay period provides an adequate time limit to complete missed SRs.

This delay period permits the completion of a surveillance before compliance with ACTIONS or other remedial measures would be required that may preclude completion of the surveillance. The basis for this delay period includes consideration of facility configuration, adequate planning, availability of personnel, the time required to perform the surveillance, the safety significance of the delay in completing the required surveillance, and the recognition that the most probable result of any particular surveillance being performed is the VERIFICATION of conformance with the SRs. When a surveillance with a FREQUENCY, based not on time intervals but on specified facility conditions or operational situations, is discovered not to have been performed when specified, SR 4.0.3 allows the full 24-Hour delay period in which to perform the SR.

The provisions of SR 4.0.3 also provide a time limit for completion of surveillances that become applicable as a consequence of changes imposed by ACTIONS.

Failure to comply with specified frequencies for SRs is expected to be an infrequent occurrence. Use of the delay period established by SR 4.0.3 is a flexibility that is not intended to be used as an operational convenience to extend surveillance intervals. This extension also does not preclude notification of a violation of SR 4.0.2.

(continued)

B3/4.0 General Application (continued)

B4.0 General Surveillance Requirements (continued)

Bases (continued)

SR 4.0.3 (continued)	This allows performance of SRs when the prerequisite conditions specified in a SR procedure require entry into the MODE or other specified operating configuration in the applicability Statements of the associated LCO prior to the performance or completion of a SR. A SR, which could not be performed until after entering the LCO applicability statements, would have its FREQUENCY specified such that it is not "due" until the specific operating configuration needed is met. Alternately, the SR may be stated in the form of a note as not required (to be met or performed) until a particular event, operating configuration, or time has been reached. If a SR is not completed within the allowed delay period, the equipment is considered NOT OPERABLE or the variable is considered outside the specified limits and the Completion Times of the ACTIONS for the applicable LCO conditions begin IMMEDIATELY on expiration of the delay period. If a SR is failed within the delay period, the equipment is NOT OPERABLE or the variable is outside the specified limits and the Completion Times of the ACTIONS for the applicable LCO conditions begin IMMEDIATELY upon the failure of the SR. Completion of the SR within the delay period allowed by this LCO, or within the Completion Time of the ACTIONS, restores compliance with SR 4.0.1.

(continued)

B3/4.0 General Application (continued)

B4.0 General Surveillance Requirements (continued)

Bases (continued)

SR 4.0.4	SR 4.0.4 establishes the requirement that all applicable SRs must be met before entry into a MODE or other specified operation configuration in the applicability statements. This SR ensures that system and component OPERABILITY requirements and variable limits are met before entry into a MODE or other specified operation configuration in the applicability statements for which these systems and components ensure safe operation of the facility. This SR applies to changes in MODES or other specified operation configuration in the applicability statements associated with the PROCESS AREA. The provisions of SR 4.0.4 SHALL not prevent changes in MODES or other specified operation configuration in the applicability statements that are required to comply with ACTIONS. The precise requirements for performance of SRs are specified such that exceptions to SR 4.0.4 are not necessary. The specific time frames and conditions necessary for meeting the SRs in accordance with the requirements of SR 4.0.4 are specified in the FREQUENCY, in the SR, or both.

B3/4.1 Fire Suppression Systems

B3.1.1 WHB Fire Suppression System

Bases

Background Summary

The WHB FSS (FP00) includes portions of the Water Distribution System (WD00), Fire Water Supply and Distribution System (FP01), and FSS (FP02). The WHB FSS includes the Fire Water Storage Tank, electric and diesel driven fire water pumps, distribution piping (from Fire Water Storage Tank to sprinkler heads), post indicating valves that are part of the Fire Water Supply and Distribution System, and associated sprinkler heads. The boundary of the WHB FSS includes the supply risers and distribution piping with sprinklers that provide fire suppression capability to the WHB. Three risers, one in ROOM 108, one in the CH BAY, and one in the RH BAY, supply the WHB. The RH BAY riser and associated piping and sprinklers are not credited in the safety analysis.

The fire water supply and distribution consists of a water tank, two fire pumps, a pressure maintenance jockey pump, and a loop yard piping distribution system. The Fire Water Supply System receives its normal water supply from an onsite, nominal 180,000-gallon aboveground Fire Water Storage Tank. This tank is configured to supply the fire pumps in parallel, flowing water into a common supply header shared by both fire pumps. Each of the process area sprinklers is provided an inspector's test valve that is located on the end of the branch line most remote from the sprinkler riser. For the ROOM 108 system, valve FW-411-V-062 is used. For the CH BAY two valves are provided: FW-411-V-023 and FW-412-V-002.

Fire water level instrumentation for the Fire Water Storage Tank, loop 25F00601 (Level transmitter, 456-LT-006-001, and local indicator, 456-LI-006-001) provide local indication. The instrument loop includes the level transmitter and local indicator. The local indication is available from the associated level indicating transmitter. The level indicating transmitter has been upgraded to support a SS classification.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

Background Summary (continued)

There are two fire pumps (electric-motor-driven and diesel-engine-driven) in the WHB FSS and both of these fire pumps are required to be OPERABLE for the FSS to be considered OPERABLE. The fire pumps are configured to start on demand via a drop in pressure from the fire water main. This drop in pressure may be activated by either the opening of a fire hydrant or by the activation of a sprinkler system. The fire pump starting sequence is the electric-motor-driven pump first and the diesel-engine-driven pump second. This start sequence saves wear on the diesel pump. Each pump is tested to VERIFY it can deliver greater than or equal to 490 gpm at greater than or equal to 120 psig at the most demanding riser (ROOM 108) to meet maximum sprinkler demand as confirmed per ETO-Z-229, *Fire Pump Discharge Required to Operate WHB 5th Floor Sprinkler System* (Ref. 2).

Operation of the two fire pumps and the jockey pump is controlled by distribution system pressure changes. The pumps are arranged for sequential operation. Under normal conditions, the jockey pump operates to maintain the designed system static pressure. The jockey pump starts when the system pressure falls to less than 140 psig and stops at greater than or equal to 150 psig (Ref. 3). The jockey pump is used to prevent the large fire pumps from experiencing an excessive number of starts for minor pressure fluctuations. The jockey pump does not serve a credited safety function and is not designated as SS.

Should there be a demand for fire water that exceeds the capacity of the jockey pump, the fire water demand will cause the system pressure to drop, which automatically starts a fire pump. Per NFPA 20, the electric fire pump is arranged to start automatically before the system pressure falls to less than 135 psig. The diesel fire pump is arranged to start automatically before the system pressure falls to less than 125 psig.

The fire water supply system piping configuration allows either fire pump to be removed from service without affecting the operation of the other fire pump. Additionally, the fire pumps can discharge through either pipeline exiting the pump house via the discharge piping cross-connect.

The diesel-driven pump must have enough diesel fuel to run for at least 90 minutes at 100% of the rated pump capacity. The 90-minute requirement is based on NFPA 13-1983 (code of record). This translates to a fuel level in the existing tank of 11 inches. The fuel level of greater than or equal to 12 inches conservatively accounts for errors in reading the fuel level (Ref. 4).

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

Background Summary (continued)	The WIPP WHB FSS design meets applicable DOE orders by compliance with applicable portions of NFPA 13-1983 (code of record) (Ref. 1). One exception in NFPA 13 compliance is pumping capability. NFPA 13 requires including firefighting hose capacity in addition to the FSS sprinkler requirements in determining the required pumping capacity. This LCO only considers the FSS sprinkler pumping capacity requirements that are needed to perform the credited Safety Function and not the additional firefighting hose capacity.
Application to Safety Analysis	The safety analysis (Ref. 5) identified events that credit the FSS to prevent small fires from becoming large fires in the CH BAY and ROOM 108 of the WHB. Fires analyzed included the following events: • Pool fires. • Vehicle collisions followed by fires. • Ordinary combustibles fires. • Propagating fire. Assumptions for the analyses included the following: • WASTE inside a CLOSED SHIPPING PACKAGE is protected from involvement in any fire event. • Site-derived WASTE in a CLOSED WASTE CONTAINER provides the same protection as a CH WASTE CONTAINER in a fire event. • The confinement provided by the Facility Cask/LWFC mitigates the consequences of any release of the confined RH WASTE in any fire event. The CH WASTE MAR is the primary contributor to dose for fire events. Fire events were determined to result in high consequences to UNDERGROUND facility worker or co-located workers with low consequences to the maximally exposed offsite individual (MOI). The FSS is credited for the reduction of risk to co-located workers. To accomplish this reduction, the FSS must be OPERABLE as described in the following section.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

LCO

The FSS for the WHB minimizes fire propagation and the growth of fires. This LCO requires that the WHB FSS SHALL be OPERABLE. An OPERABLE FSS consists of the following elements:

- One unobstructed flow path from Fire Water Storage Tank 25-D-001A to the applicable PROCESS AREA sprinklers. There is one Fire Water Storage Tank with a nominal capacity of 180,000 gallons. The Fire Water Storage Tank, 25-D-001A, is connected via existing piping to the WHB FSS. The CH BAY riser provides fire water to the CH BAY and the ROOM 108 riser provides fire water to ROOM 108, a portion of the CH BAY, and in the WASTE SHAFT ACCESS AREA (including the waste shaft tower). ETO-Z-229 (Ref. 2) analyzed possible flow paths from the Fire Water Storage Tank to the sprinkler heads and showed that if the fire pump meets the hydraulic requirements of the FSS SRs (which are based on the most hydraulically demanding of the flow paths) then the FSS can perform its safety function using any of the flow paths. The unobstructed and undiverted flow path to the PROCESS AREA sprinklers also includes the condition that all fire hydrants in the unobstructed and undiverted flow path are secured and not open to prevent pressure drop. Periodic VERIFICATION is made that the valves providing at least one unobstructed flow path from analyzed in ETO-Z-229 (Ref. 2) are locked in the proper position. In addition, a riser Main Drain Test VERIFIES flow to each of the required risers ANNUALLY and whenever system alignment is changed.
- Two fire pumps (45-G-601 and 45-G-602) with a capability to deliver greater than or equal to 490 gpm to the ROOM 108 riser at greater than or equal to 120 psig. Each of the two fire pumps is capable of supplying the required flow and pressure to the risers. Both the electric-driven fire pump 45-G-601 and diesel-driven fire pump 45-G-602 are designed to provide greater than or equal to 490 gpm to the ROOM 108 riser at greater than or equal to 120 psig. The ROOM 108 riser feeds the fifth floor of the Waste Hoist Tower which represents the most demanding design area for fire suppression. The 490 gpm and 120 psig requirements provide the design density suppression at each fifth floor sprinkler head (Ref. 2). This required capability is determined without accounting for firefighting hoses during fire fighter response. The system will be declared inoperable anytime a hydrant is open (e.g., during hydrant testing).

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

LCO (continued)

- Fire pump auto-start capability at a set point greater than or equal to 125 psig. The electric-motor-driven pump and the diesel-engine driven pump each have an auto-start capability based on pressure drop in the FSS. The set points for the individual pump auto-start pressure switches are calculated in ETO-Z-230 (Ref. 4) and set at greater than or equal to 125 psig in accordance with NFPA 20 (Ref. 8) to minimize pressure excursions.

- Fire Water Storage Tank 25-D-001A level indication of greater than or equal to 51 percent. A water supply capacity of at least 72,180 gallons is required. The 72,180 gallon requirement is based on the maximum water demand (at any pressure) of 802 gpm for 90 minutes (Ref. 7). The 802 gpm value is documented in WIPP 023, (Ref. 7), Table 7.2-1, "WIPP Major Surface Building Water Requirements." The 802 gpm comes from the hydraulic calculations for the Waste Hoist Tower 4th floor sprinkler systems and is the bounding flow rate for any of the credited FSS areas in the WHB. This flowrate value includes the 250 gpm hose flow requirement. The 90-minute requirement is based on NFPA 13-1983 (code of record) (Ref. 4). Fire Water Storage Tank 25-D-001A has a capacity of 180,000 gallons. The required level is 51 percent to account for instrument uncertainty and includes a 3-foot height above the tank bottom to the position of the vortex plate (Ref. 4).

- Level indicator for Fire Water Storage Tank, loop 25F00601 (local indicator, 456-LI-006-001). This level indicator is used to VERIFY that the level in the Fire Water Storage Tank is greater than or equal to 51 percent. The instrument loop includes the level transmitter and local indicator.

These elements provide assurance that the WHB FSS has sufficient capacity, capability, and readiness to perform its credited safety function.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

MODE Applicability	The events of concern involve the burning of WASTE in the WHB. CH WASTE is the primary contributor to dose for these fire events. CH WASTE may be present in a PROCESS AREA during WASTE HANDLING and WASTE STORAGE. During STANDBY, CH WASTE is not present or is in a CLOSED SHIPPING PACKAGE with site-derived WASTE in a CLOSED WASTE CONTAINER. Therefore, this requirement applies during WASTE HANDLING and WASTE STORAGE.
PROCESS AREA Applicability	The events of concern involve the burning of WASTE in the WHB. CH WASTE is the primary contributor to dose for WHB fire events; and therefore, the primary concern is a fire in the CH BAY, ROOM 108, WASTE SHAFT ACCESS AREA, or a fire propagating into the CH BAY, ROOM 108, or WASTE SHAFT ACCESS AREA when CH WASTE is present. Fires may propagate into the CH BAY, ROOM 108, or WASTE SHAFT ACCESS AREA from the RH BAY, TMF, Support Building, or OUTSIDE AREA. The FSS does not supply the HOT CELL COMPLEX and the doses from the burning of RH WASTE are relatively low as compared to CH WASTE. Therefore, the FSS applies to the CH BAY, ROOM 108, and WASTE SHAFT ACCESS AREA. NOTE 1 clarifies that the RH BAY sprinklers are not credited for fire suppression in the FCLR and therefore are excluded from the PROCESS AREA Applicability.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

ACTIONS

As permitted by LCO 3.0.4, an exception to its requirements is made for this LCO. The exception permits the PROCESS AREA in Condition A or B to change between WASTE HANDLING and WASTE STORAGE for administrative purposes provided the Required Actions and associated Completion Times for the Condition are met (i.e., no new Completion Time clock for each MODE change). The current Required Actions of the Condition do not require placement of the PROCESS AREA into a defined MODE but allow continued operation provided the Required Actions and Completion Times are met. This exemption is allowed because MODE changes that are of an administrative nature, (e.g., shift compliment) do not result in a reduced safety posture in that the LCO Required Actions and Completion Times are being met. Therefore, changes between WASTE HANDLING and WASTE STORAGE for administrative purposes do not inject any additional risk than was previously allowed. This exception is therefore, consistent with the text and intent of LCO 3.0.4.

A.1

In the event the FSS has become NOT OPERABLE due to an inoperable Fire Water Storage Tank level local indicator (indicator 456-LI-006-001), Condition A is entered.

With the Fire Water Storage Tank level local indicator loop NOT OPERABLE, the capability to determine the Fire Water Storage Tank level is still provided by visual verification of water overflowing the Fire Water Storage Tank. Therefore, visual verification method SHALL be used to VERIFY adequate Fire Water Storage Tank level exists within 2 Hours and every 12 Hours thereafter. If the local indicator indicates that adequate level is not available, Condition C is entered in addition to continuing the Required Actions of Condition A. A Completion Time of 2 Hours is required to provide adequate time to read the local tank level indicator or verify tank overflow conditions and minimize the time-at-risk. VERIFICATION every 12 Hours thereafter is adequate since any use of fire water from the tank would be known and managed and any leakage large enough to change water level quickly would be evident.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

A.2.1/A.2.2	With the compensatory action of Required Actions A.1 implemented, these Required Actions allow 92 Days to perform either Required Action A.2.1 or A.2.2. Required Action A.2.1 requires restoration of the FSS to OPERABLE status by restoring the Fire Water Storage Tank loop to OPERABLE status. Required Action A.2.2 requires the AFFECTED PROCESS AREA(S) to be placed in STANDBY so that the hazard no longer exists and the LCO no longer applies. A Completion Time of 92 Days is sufficient to perform either of these Required Actions while the facility is at minimal risk since Required Action A.1 ensures adequate fire water is available in the Fire Water Storage Tank. Also, LCO 3.3.2 prevents the introduction of any liquid-fueled vehicles/equipment into the CH BAY. The CVS for the WHB is also required to be OPERABLE which would mitigate any fire events, if they were to occur. All of these factors were considered to support the Completion Time of 92 Days.
B.1	In the event that one of the two fire pumps is NOT OPERABLE (and the other fire pump is OPERABLE), Condition B is entered. Note that if both fire pumps are NOT OPERABLE, Condition C is entered. Required Action B.1 is provided to address the inoperability of one fire pump. This required action must be completed in 14 days or implement the actions B.2.1 and B.2.2. Action B.1 requires the NOT OPERABLE pump to be restored to OPERABLE status. Successful performance of this Action removes the facility from the LCO Condition.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

B.2.1/B.2.2	In the event it is determined that Action B.1 cannot be accomplished within the 14 Day Completion Time, Action B.2.1 is provided to require that a CBFO-approved Fire Impairment Plan be implemented. To support the completion of the Action within 14 Days, it must be prepared and submitted to CBFO for approval. The plan must be implemented within 14 Days. The plan content should address the nature of the inoperability, the proposed actions to restore operability (including testing), the expected date for return to OPERABLE status, and risk reduction measures to be taken prior to repair that support the Completion Time of Required Action B.2.1. A Completion Time of 14 Days is sufficient time to assess the situation; correct minor pump inoperabilities; and develop, submit, gain CBFO-approval, and implement the plan. The 14 Day Completion Time is based upon having one OPERABLE fire pump available. Action B.2.2 requires the NOT OPERABLE fire pump to be restored to OPERABLE status within 92 Days after entering this condition. This limits the time at risk that the facility can operate with one OPERABLE fire pump. A Completion Time of 92 Days is sufficient time to restore the affected fire pump to OPERABLE in most situations. A Completion Time of 92 Days is allowed since one fire pump is OPERABLE and REQUIRED ACTION B.2.2 has been successfully completed. The impairment plan provides CBFO approval of the pump remaining inoperable for 92 Days and of the risk reduction measures imposed in the interim. If this Required Action cannot be completed, Condition C is entered.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

C.1	Condition C is entered in the event the FSS has become NOT OPERABLE or Required Actions and Completion Times of Condition B are not met, or no OPERABLE fire pumps are available. One exception is that Condition C is not entered for FSS inoperability due to inoperable Fire Water Storage Tank level loop, as noted in the LCO. In this case, Condition A is entered instead. This Required Action requires that the introduction of additional CLOSED Type B SHIPPING PACKAGES into the CH BAY or ROOM 108 is IMMEDIATELY prohibited. This prohibition limits the amount of MAR in the PROCESS AREA and eliminates the risk from movement of CLOSED Type B SHIPPING PACKAGES into the AFFECTED PROCESS AREA. This Condition allows waste handling and waste storage operations to continue with those packages already present in the PROCESS AREAS. The prohibition of additional CLOSED Type B SHIPPING PACKAGES prevents additional MAR from being introduced into the PROCESS AREA. This action limits the amount of MAR to the MAR already present when the Condition was entered. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to prevent introduction of additional MAR and ACTIVITIES associated with movement of CLOSED Type B SHIPPING PACKAGES.
C.2	With the FSS NOT OPERABLE, the capability to suppress fires is reduced or lost. Hot work ACTIVITIES are controlled in accordance with the Fire Protection Program and therefore, there may be hot work ACTIVITIES being conducted in the WHB. To reduce the potential for fire ignition while in this condition, hot work ACTIVITIES that are not related to restoration of the FSS in the AFFECTED PROCESS AREA(S) SHALL be stopped within 1 Hour. A Completion Time of 1 Hour is required to provide adequate time to safely secure the ACTIVITY and minimize the time-at-risk.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

C.3	Required Action C.3 requires a FIRE WATCH to be established within 1 Hour at each location in the AFFECTED PROCESS AREA(S) where WASTE HANDLING ACTIVITIES are being conducted. A FIRE WATCH provides for visual observation, identification, and reporting of actions or conditions that could initiate a fire, and prompt reporting of a fire to initiate emergency response should one occur. Training also allows for extinguishing incipient fires if safe to do so. This Required Action reduces the potential for fire initiation and incipient fire growth. WASTE HANDLING ACTIVITIES are allowed to continue during this Condition as there is low risk for a significant fire event to occur without observation with the FIRE WATCH in place. Combustible material loading is controlled by the Fire Protection Program and liquid-fueled vehicles and equipment are prohibited from being within the CH BAY or ROOM 108. A Completion Time of 1 Hour provides time to determine the WASTE HANDLING ACTIVITIES being performed and their locations, and to identify qualified individuals and their assignments to perform the required FIRE WATCH. The FIRE WATCH remains in place for the duration of this Condition.
C.4	This Required Action requires liquid-fueled vehicles/equipment to be removed from the RH BAY in 1 Hour. A fuel leak from a liquid-fueled vehicle/equipment that are in the RH BAY could potentially result in fuel running under the rollup door and into the CH BAY and result in a fire in the CH BAY. Removal of any liquid-fueled vehicles/equipment in the RH BAY prevents this possibility during the time the CH BAY FSS is NOT OPERABLE. A completion time of 1 Hour is required to provide adequate time to safely remove the liquid-fueled vehicles/equipment and minimize the time at risk.
C.5	This Required Action requires a ROVING FIRE WATCH to be established in the AFFECTED PROCESS AREA(S) within 1 Hour and complete a round every 2 Hours thereafter. The ROVING FIRE WATCH performs an inspection of AFFECTED AREAS for the purpose of making fire safety observations, notifying building occupants and the CMR of an emergency, and minimizing the potential for a fire to occur, and/or extinguishing incipient fires, thus compensating for the lack of an OPERABLE FSS. A Completion Time of 1 Hour is adequate to identify the AFFECTED AREA(S), identify required personnel, and establish the ROVING FIRE WATCH. The 2-Hour interval allows sufficient time to complete the previous inspection and is frequent enough to reduce the risk of a fire while the FSS is restored to OPERABLE status.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

C.6.1/C.6.2/C.6.3	With the compensatory actions of Required Actions C.1, C.2, C.3, C.4, and C.5 implemented, this Required Action allows 31 Days to perform either Required Action C.6.1, C.6.2, or C.6.3. Because the Required Actions are separated by an "OR", one of these Required Actions must be completed within 31 Days of entering the Condition. Successful performance of either Required Action removes the facility from the LCO Condition. Required Action C.6.1 requires restoration of the FSS to OPERABLE status in the AFFECTED AREA(S). Required Action C.6.2 requires the AFFECTED PROCESS AREA(S) to be placed in STANDBY so that the hazard no longer exists and the LCO no longer applies. This Action is completed by the removal of the MAR from the AFFECTED PROCESS AREA or placing it in a CLOSED SHIPPING PACKAGE. In the event it is determined that Required Actions C.6.1 or C.6.2 cannot be accomplished within the 31 Day Completion Time, Required Action C.6.3 is provided to require that a RESPONSE PLAN be implemented to address the Condition. To support the completion of this Required Action within 31 Days, the RESPONSE PLAN must be prepared, receive CBFO approval, and be implemented. All of these actions should be considered in achieving the required Completion Time of 31 Days. The plan content should specify, based on existing conditions, the detailed plan of action for restoring compliance with the LCO. Section 5.4.4 of this TSR discusses the use and content of RESPONSE PLANS. A Completion Time of 31 Days is sufficient to perform either of these Required Actions while risk of a fire is minimized by Required Actions C.1, C.2, C.3, C.4, C.5 and C.6. Also, LCO 3.3.2 prevents the introduction of any liquid-fueled vehicles/equipment into the CH BAY. The CVS for the WHB is also required to be OPERABLE (LCO 3.2.1) which would mitigate any fire events, if they were to occur. The LCO Required Actions address the requirement to stop all Hot Work and require FIRE WATCHES for all WASTE HANDLING ACTIVITIES in the AFFECTED PROCESS AREA in addition to a ROVING FIRE WATCH every 2 Hours. New CLOSED Type B SHIPPING PACKAGES are prohibited from the AFFECTED PROCESS AREAS. Combustible material loading is controlled by the Fire Protection Program and ignition sources in the WHB are limited. All of these factors were considered to support the Completion Time of 31 Days.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

Surveillance Requirements	
SR 4.1.1.1	VERIFICATION SHALL be made EACH SHIFT that the level in the Fire Water Storage Tank is greater than or equal to 51 percent using the local level indicator (local indicator, 456-LI-006-001). The 51 percent level accounts for instrument uncertainty (Ref. 4). This SR ensures a sufficient supply of fire water is available within the water distribution system for at least 90 minutes of usage. The Fire Water Storage Tank water level history demonstrates that it is stable with only gradual changes, well trended variations over time. Therefore, performance of this SR DAILY is sufficient to ensure adequate fire water supply. Failure to meet or perform this SR requires entry into Condition A.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.1.1.2	An automatic start test SHALL be performed WEEKLY on each of the two available fire pumps [45-G-601 (electric) and the 45-G-602 (diesel)]. This automatic start test is performed to verify that each fire pump automatically starts before system pressure decreases below the set point greater than or equal to 125 psig (Ref. 4) and runs for the prescribed run time per NFPA 20 code of record (7 minutes for the electric pump, 30 minutes for the diesel pump). To perform the test, a valve is opened down stream of each pump to reduce the system pressure until the pump automatically starts. The system pressure at which the pump starts and pump parameters during the run time, are recorded to complete the surveillance. During the pump run, observations are made periodically and adjustments are conducted per NFPA 25 and any abnormalities are recorded. This ENSURES that any pump maintenance issues are detected and provides assurance that the pump can run for 90 minutes if required. The pressure gauge used must be CALIBRATED and the readings must take instrument uncertainty into consideration. A minimum FREQUENCY of WEEKLY is required per NFPA 25 (Ref. 6). Failure to meet or perform this SR requires entry into Condition B if one fire pump is NOT OPERABLE and Condition C if both fire pumps are NOT OPERABLE.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.1.1.3	VERIFICATION SHALL be made WEEKLY that the diesel fire pump fuel tank (tank 45-D-601) fuel level is greater than or equal to 12 inches. The fuel level is checked by reading a dip stick. The VERIFICATION is performed to ensure that sufficient diesel fuel is available to operate the diesel-driven fire pump (45-G-602) for at least 90 minutes per the requirements of NFPA 13-1983 (code of record) (Ref. 1). The diesel-driven fire pump is normally shutdown and is operated periodically for testing per NFPA 25. The WEEKLY FREQUENCY has been determined to be adequate based upon operational experience and can be checked after the WEEKLY automatic pump start test. The level value of 12 inches conservatively accounts for errors in reading the fuel level (Ref. 4). Failure to meet or perform this SR renders the diesel fire pump (45-G-602) NOT OPERABLE and requires entry into Condition B (or Condition C if pump 45-G-601 is NOT OPERABLE).
SR 4.1.1.4	VERIFICATION SHALL be made MONTHLY, that the valves providing at least one unobstructed and undiverted flow path analyzed in ETO-Z-229 (Ref. 2) from Fire Water Storage Tank 25-D-001A to the applicable PROCESS AREA sprinklers are locked in the proper position providing assurance of an unobstructed and undiverted flow path of water supply to the sprinklers and that fire hydrants in the flow path are secured (i.e., not open). These valves must be locked in the proper position and fire hydrants in the flow path secured or entry into the applicable LCO condition is required as the systems will not be OPERABLE. VERIFICATION that these valves are in the proper position is made by visually VERIFYING that each of the valves are in the proper position and locked and that any fire hydrants in the flow path are secured during a walkdown of the system. The FREQUENCY of MONTHLY has been determined to be adequate based on NFPA 25 criteria for locked control valves and operational experience. Failure to meet or perform this SR requires entry into Condition C.
SR 4.1.1.5	The following Inspector's Test Valve(s) SHALL be opened SEMIANNUALLY for each credited WHB riser. The test is performed to VERIFY the flow of fire suppression water from the inspector's test connection orifice indicating that there is a flow path in the piping from the riser to the sprinklers. Each of the process area sprinklers is provided an inspector's test valve that is located on the end of the branch line most remote from the sprinkler riser. For the ROOM 108 system, valve FW-411-V-062 is used. For the CH BAY two valves are provided: FW-411-V-023 and FW-412-V-002. The SEMIANNUAL FREQUENCY meets the requirements of NFPA 25 (Ref. 6). Failure to meet or perform this SR requires entry into Condition C.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.1.1.6	A Main Drain Test for the CH BAY and ROOM 108 risers SHALL be performed ANNUALLY and upon any FSS alignment change affecting the flow path last verified by SR 4.1.1.4. If the flow path last verified by SR 4.1.1.4 is not affected by an FSS alignment change, no additional Main Drain Test is required except ANNUALLY. The Main Drain Test for each riser provides reasonable assurance that the supply side of the system is correctly aligned and free of obstructions and trending of the test results to allow monitoring for degradation of the water supply system. The Main Drain Test results must show less than 10 percent reduction of full flow pressure when compared to the original acceptance test or the previous satisfactory comparable test. The test is performed by fully opening the main drain valve (FW-411-V-003 for the CH BAY riser or FW-411-V-012 for the ROOM 108 riser) and measuring residual pressure at the riser (411-PI-003-001 for the CH BAY riser or 411-PI-003-003 for the ROOM 108 riser). Pressure variations are observed when flowing water through the 2-inch main drain valve at each riser. A fully or partially closed valve or other obstruction in the supply piping will cause an abnormally large drop in full flow pressure of the 2-inch main drain. Normal variations in pressure indicate that all valves in the flow path from the supply tank up to the sprinkler riser are open and that no other obstructions in the piping leading to the sprinkler riser exist. The FREQUENCY of ANNUALLY and upon any FSS alignment (when applicable) affecting the flow path last verified by SR 4.1.1.4 is based on NFPA 25 (Ref. 6). Failure to meet or perform this SR requires entry into Condition C.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

Surveillance Requirement (continued)

SR 4.1.1.7	A CALIBRATION on the level indicators and transmitter for the Fire Water Storage Tank (Level transmitter, 456-LT-006-001, and local indicator, 456-LI-006-001) SHALL be performed ANNUALLY. The CALIBRATION will include the level transmitter, level indicator in the CMR and local indicator. The CALIBRATION is performed by trained and qualified maintenance personnel. The FREQUENCY of ANNUALLY meets the CALIBRATION FREQUENCY assumed in the associated instrument uncertainty analysis. Failure to meet or perform this SR for the local indicator, 456-LI-006-001, requires entry into Condition A.
SR 4.1.1.8	VERIFICATION SHALL be made ANNUALLY that each of the two fire pumps (45-G-601 and 45-G-602) is capable of supplying greater than or equal to 500 gpm while maintaining at least 141 psig residual pressure using hydrants #12 and #13 (Ref. 4). Hydrant tests are completed by attaching a flow meter on one hydrant and a pressure gauge on another hydrant up stream. Water is flowed from the downstream hydrant and is measured. The residual pressure (pressure of the system when water is flowing) is taken from the pressure gauge on the upstream hydrant. This flow test is used to verify that the flowrate and pressure at the riser in ROOM 108 is greater than or equal to 490 gpm at 120 psig as determined by Ref. 4. The ANNUAL FREQUENCY has been determined to be adequate based on NFPA 25 criteria. Failure to meet or perform this SR requires entry into Condition B if one fire punp is NOT OPERABLE and Condition C if both fire pumps are NOT OPERABLE.
SR 4.1.1.9	Perform an internal visual inspection of the CH BAY and ROOM 108 risers. This surveillance performs a visual inspection every 5 YEARS of the internals (e.g., alarm valves, check valves, strainers, filters, orifices, and representative sample(s) of FSS piping) of the CH BAY and ROOM 108 risers. Visual inspections SHALL be performed and evaluated with approved vendor or site procedures that meet NFPA criteria. This SR VERIFIES components operate correctly, move freely, are in good condition, and fire suppression piping is free of excessive foreign material and unobstructed. A 5 YEAR FREQUENCY has been determined to be adequate based on NFPA criteria. The 25% extension allowed by SR 4.0.2 is not applicable to this FREQUENCY. Failure to meet or perform this SR requires entry into Condition C.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.1 WHB Fire Suppression System (continued)

Bases (continued)

References

1. NFPA 13, 1983, *Standard for the Installation of Sprinkler Systems*, 1983 Edition, National Fire Protection Association, Quincy, MA.

2. ETO-Z-229, Rev. 3, *Fire Pump Discharge Required to Operate WHB 5th Floor Sprinkler System*, Nuclear Waste Partnership LLC, Carlsbad, NM.

3. SDD FP00, *Fire Protection System (FP00) System Design Description (SDD)* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.

4. ETO-Z-230, Rev. 2, *WHB Operability Set Points*, Nuclear Waste Partnership LLC, Carlsbad, NM.

5. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

6. NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 2014 Edition, National Fire Protection Association, Quincy, MA.

7. DOE/WIPP-023, *Fire Hazard Analysis for the Waste Isolation Pilot Plant* (FHA) (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

8. NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, 1983 Edition, National Fire Protection Association, Quincy, MA.

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System

Bases

Background Summary

An automatic FSS required by the hazard evaluation completed per NFPA 122 is required on vehicles and equipment with a significant combustible liquid capacity operating in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION, in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH, and within the minimum standoff distance of a CH WASTE FACE (Ref. 1, 4) as specified in Table 3.1.2-1. Combustible liquids are considered to be fuel and hydraulic fluid.

The UNDERGROUND vehicles and equipment automatic FSS on vehicles/equipment required by the hazard evaluation completed per NFPA 122, provides a credited wet or dry chemical fire suppressant to suppress vehicle/equipment fires associated with fuel line leaks and engine compartment fires. Dry chemical fire suppressant systems may incorporate a liquid based cooling agent, but this feature is not credited for suppressing fires in the safety analysis.

The FSS is composed of an electric-powered sensor detection capability in expected fire locations on the vehicles/equipment. The FSS can be actuated manually. Once actuated, the FSS releases the fire suppressant to extinguish the fire. The fire suppressant is forced through the distribution network to the developing stage fire at high pressure. The system is equipped with a Control Panel that includes system status lights to indicate normal and trouble conditions, and a provision to test the status lights.

The FSS actuates automatically when the detection circuit activates due to heat generated by a fire source. The Control Panel interprets the sensor signal or operator activation and sends a signal to activate the release of the suppressant via pressure from the cylinders through the distribution system. The Control Panel includes a green status light that indicates that the system has not discharged and the detection circuit is functioning properly. The Control Panel is mounted such that the operator of the vehicle or equipment can see the system status indication. Additional description and requirements of the FSS are in the *Fire Hazards Analysis for the Waste Isolation Pilot Plant* (Ref. 2) and DSA Chapters 4.0 and 5.0 (Ref. 4).

The UNDERGROUND vehicle/equipment FSSs are installed by a qualified service technician or manufacturer's representative. The installer SHALL certify that the installation has been made in accordance with the approved plans, where required, and the manufacturer's design, installation, and maintenance manual.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

Background Summary (continued)	Dry chemical fire suppression systems for vehicles/equipment are designed in accordance with NFPA 17, Chapter 9, "Requirements for Pre-Engineered Systems" and for a liquid fire suppression system in accordance with NFPA 17A Annex B, "Systems for Protection of Mobile Equipment." Both FSSs are essentially equivalent in the level of protection credited in the safety analysis as evaluated in ETO-Z-403, *Evaluation of Using Ansul LVS Fire Suppression System in Lieu of a Dry Chemical Fire Suppression System* (Ref. 3). NFPA 17/17A defines a "Pre-Engineered System" as "those systems having predetermined flow rates, nozzle pressures, and quantities of extinguishing agent and having specific pipe size, maximum and minimum pipe lengths, flexible-hose specifications, number of fittings, and number and types of nozzles." The FSS on UNDERGROUND vehicle/equipment with a significant combustible liquid capacity that have a FSS required by the hazard analysis completed per NFPA 122 are fully Factory Mutual approved and/or Underwriters Laboratory listed and comply with the requirements for pre-engineered FSSs. The systems are installed and tested per NFPA 17/17A design to ensure that all required features (including detection, annunciation, automatic and manual actuation features) are incorporated into the vehicle FSS, and that they are designed and tested in accordance with requirements for pre-engineered FSSs. Both the dry and wet chemical fire suppression systems manufactured by Ansul and Amerex are FM approved through FM 5970, Approval Standard for Heavy Duty Mobile Equipment Protection Systems. NFPA 17 and NFPA 17A along with the manufacturers provide specific details for Inspection, Maintenance, and Recharging of the systems. Compliance with NFPA 17 and 17A requirements ensure that only system components referenced in the manufacturer's design, installation and maintenance manual or alternative suppliers' components that are listed for use with the specific extinguishing system shall be used.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

Application to Safety Analysis

The DSA (Ref. 4) identified the potential for pool fires in the WASTE SHAFT STATION, along the TRANSPORT PATH, and near a WASTE FACE. A pool fire resulting from a breached combustible liquid tank or a spill could impact the CH WASTE CONTAINERS and cause a release of airborne radiological materials. The safety analysis identified a potential for high radiological consequences to the Facility and co-located workers.

The DSA credits the FSS required by the hazard evaluation completed per NFPA 122 and installed per the NFPA 17/17A requirements on the vehicles or equipment to extinguish a vehicle or equipment fire in the developing stage before the fire can impact the CH WASTE CONTAINERS in the AFFECTED AREA. This action will prevent the radiological material release. A pool fire can result from vehicle/equipment fires, collisions/impacts, or from a fuel spill/leak in the presence of an ignition source. Activation of the vehicle/equipment FSS by the operator or automatic activation upon detection of a developing stage fire will extinguish the fire on the vehicle/equipment and may prevent a small pool fire associated with a leak from the vehicle/equipment before it grows and impacts the WASTE CONTAINERS. The credited control is the automatic activation of the FSS with operator activation a non-credited additional measure.

DOE-STD-5506-2007 describes the potential damage to WASTE CONTAINERS caused by non-engulfing pool fires and exposure fires (radiant heat exposure on one side of the WASTE CONTAINER). Exposure fires result only in damage to a container's seal (seal failure) and do not cause lid ejection. Seal failure is only possible if the container receives a sufficient radiant heat flux. Appendix C of the DOE Standard cites a conservative heat flux criterion of 15.9 kW/m^2 below which seal failure does not occur.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

Application to Safety Analysis (continued)

The minimum standoff distance from a CH WASTE FACE is a calculated distance intended to prevent significant damage to WASTE CONTAINERS from an (exposure) pool fire involving vehicles/equipment that have significant combustible liquids. The UNDERGROUND vehicle/equipment FSS is credited with reducing the likelihood of a fire involving the vehicle/equipment or combustible liquids that could impact the CH WASTE CONTAINERS and result in a radioactive material release.

The UNDERGROUND vehicles/equipment with a significant combustible liquid capacity that require an automatic FSS were determined by the hazard evaluation completed per the NFPA 122 requirements. WIPP-058 describes the methodology for developing liquid combustible limits for the vehicles that require a FSS based on the NFPA 122 hazards analysis. The UNDERGROUND vehicle/equipment FSS is credited with reducing the likelihood of a fire involving the vehicle/equipment or combustible liquids that could impact the CH WASTE CONTAINERS and result in a radioactive material release.

WIPP-058, Revision 2, *DSA Supporting Calculations, Fuel Spill, HEPA Filter Plugging, and Compartment Over Pressurization*, concludes that a liquid combustible spill, from a Lube Truck loaded to fluid capacity in a 16-foot drift, extends approximately 108 feet on each side of the spill. Additionally, a standoff distance of approximately 8 feet from the edge of the pool is sufficient to maintain the radiant heat flux to less than 15.9 kW/m^2 on the CH WASTE CONTAINERS. The distance for the safety analysis is conservatively established as 200 feet for the Lube Truck (LCO 3.3.5).

For vehicles/equipment with smaller quantities of liquid combustible, the minimum standoff distances are provided in ETO-Z-400, *Analysis of Fuel Spill Fires in the WIPP Underground* (Ref. 5) and specified in Table 3.1.2-1. ETO-Z-400 uses the methodology in WIPP-058 for calculating standoff distance. Table 3.1.2-1 provides the standoff distances as a function of the quantity of liquid combustible associated with the vehicles/equipment. Within these distances to a CH WASTE FACE, UNDERGROUND vehicles/equipment are required to have an automatic FSS. The values in Table 3.1.2-1 are conservatively calculated for UNDERGROUND vehicles/equipment that have a FSS required by the NFPA 122 analysis.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

Application to Safety Analysis (continued)

Therefore, any vehicle/equipment that contains significant combustible liquids (e.g., fuel or hydraulic fluid either singly or in combination) that can be within the minimum standoff distance as specified in Table 3.1.2-1 of a CH WASTE FACE, in the TRANSPORT PATH when CH WASTE is present, or in the WASTE SHAFT STATION when CH WASTE is present must have an OPERABLE Fire Suppression System.

To ensure the safety analysis is protected, credit is taken for the automatic FSS required per NFPA 122 requirements on vehicles and equipment, with a significant combustible liquid capacity, that are selected for use that will be operating less than or equal to the minimum standoff distance as specified in Table 3.1.2-1 from a CH WASTE FACE, in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH, or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. Selected for use means the vehicles/equipment that are designated each shift to be used for activities in the areas noted. Note that all vehicles/equipment may have a FSS, but only the vehicles within the AFFECTED AREAS noted in the MODE applicability statement must have an OPERABLE FSS.

If a vehicle/equipment does not have a FSS required based on the evaluation completed per the NFPA 122 requirements, the vehicle/equipment is not subject to this LCO.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

LCO

This LCO addresses the OPERABILITY requirements of the UNDERGROUND Vehicles and Equipment with a FSS required by the hazard evaluation completed per NFPA 122 on vehicles/equipment with significant combustible liquids and states:

The FSS on UNDERGROUND vehicles/equipment required by the hazard evaluation completed per NFPA 122 selected for use SHALL be OPERABLE. An OPERABLE FSS consists of the following elements:

- Control Panel with functional status indicating light(s).
- Temperature detection elements.
- Adequately charged suppressant system.
- Distribution system to disperse the suppressant.
- Automatic engine cutoff capability.

This LCO applies to any UNDERGROUND vehicle/equipment with an automatic FSS required by the evaluation completed per NFPA 122 that is within the minimum standoff distance as specified in Table 3.1.2-1.

The UNDERGROUND vehicle/equipment FSS is composed of the following components. The status lights (i.e., a green credited and red or yellow non-credited lights on the Control Panel) indicate the status of the system as being OPERABLE or NOT OPERABLE based on the Control Panel monitoring of the system. A heat sensor system (fire detection) that runs within significant fire hazard areas. The temperature detection elements measure the temperature and upon the elevated temperatures from a fire send a signal to the controller to discharge the suppressant.

The Control Panel interprets the heat detection signals, initiates discharge of the system, shuts down the vehicle engine, and performs diagnostic tests of the system to confirm the system is OPERABLE. The suppressant is a wet or dry chemical fire suppressant that is stored in a container and is dispersed through the pressurized system. The charged suppressant system ensures that upon receipt of a signal, the pressurized suppressant will flow through the distribution system to the fire location and extinguish the fire. The distribution system, essentially composed of piping or tubing, delivers the pressurized suppressant to the nozzles located at the hazard area. As the suppressant is being discharged, the Control Panel also sends a signal to shut off the engine to limit the amount of fuel that will be available for the fire.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

LCO (continued)

In both the dry and wet chemical systems, the suppressant is routed through piping or tubing to the fire source and is dispersed through nozzles at the fire location and there are no operator replaceable components and the operator cannot change the system control parameters.

Sensors are located in expected fire source locations to provide the necessary monitoring in areas of the engine compartment and other areas vulnerable to fire. The systems installed on WIPP UNDERGROUND vehicles/equipment are generally a linear detection cable run throughout the hazard area. The detection cables detect the heat from a fire and provide an input into the Control Panel. The Control Panel interprets the signal from the detection cable and initiates discharge activation. Relay timers provide a signal to shut down the engine when the controller initiates discharge of the suppressant. A suppression system status light indicates the system monitoring and actuation functions are OPERABLE.

The Amerex system has a gauge for indicating the status of the agent cylinder pressure, which allows the operator to quickly check if the system pressure is within the normal operating range. The pressure gauges are not connected to the inputs to the Control Panel. The calibration of the gauges is performed and verified in accordance with the manufacturers' guidelines.

The Ansul system relies on measurement of cylinder weight and volume of agent to determine whether the system is adequately charged with suppressant.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

MODE Applicability

CH WASTE is present in the UNDERGROUND during both WASTE HANDLING and DISPOSAL. In WASTE HANDLING, CH WASTE is moved from the Waste Conveyance at the WASTE SHAFT STATION along the TRANSPORT PATH to the ACTIVE CH WASTE DISPOSAL ROOM. WASTE HANDLING ACTIVITIES use WASTE HANDLING VEHICLES/EQUIPMENT with a combustible liquid capacity. The vehicles/equipment are susceptible to a vehicle fire or a fire resulting from fuel leaks and vehicle collisions.

This LCO is applicable at all times during WASTE HANDLING when CH WASTE is present in the WASTE SHAFT STATION; when CH WASTE is present in the TRANSPORT PATH; and when UNDERGROUND liquid-fueled vehicles/equipment having significant liquid combustible quantities are less than or equal to the minimum standoff distance from a CH WASTE FACE as specified in Table 3.1.2-1. It also applies to non-waste handling vehicles with a FSS required by the hazard evaluation completed per NFPA 122 that are less than or equal to the minimum standoff distance as specified in Table 3.1.2-1 of a CH WASTE FACE in the WASTE HANDLING MODE. In DISPOSAL MODE, the LCO is applicable when UNDERGROUND vehicles/equipment with a FSS required by the NFPA 122 hazards analysis are less than or equal to the minimum standoff distance as specified in Table 3.1.2-1 from a CH WASTE FACE.

MODE applicability is at all times in either WASTE HANDLING or DISPOSAL. Therefore, this LCO is applicable when the UNDERGROUND is in WASTE HANDLING or DISPOSAL.

There are three notes applicable to the MODES. The first note states “Disabled vehicles/equipment in the TRANSPORT PATH or abandoned equipment in Panel 7, Room 6 per ETO-Z-400 are not required to have an OPERABLE Fire Suppression System.” The second note states “When CH WASTE is present in the TRANSPORT PATH, vehicles/equipment outside the TRANSPORT PATH are not required to have an OPERABLE Fire Suppression System.” The third note states “During the transport of CH WASTE, vehicles/equipment in the TRANSPORT PATH that are located behind the CH WASTE Transport vehicle/equipment (area where the CH WASTE Transport vehicle/equipment has passed) are not required to have an OPERABLE Fire Suppression System.”

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

MODE Applicability (continued)

During the transportation of CH WASTE in the TRANSPORT PATH, disabled vehicles/equipment may be present in the TRANSPORT PATH. The disabled vehicles/equipment may contain combustible liquids. Any temporarily disabled vehicles/equipment that are in a SAFE CONFIGURATION in the TRANSPORT PATH do not present a fire ignition risk to the CH WASTE in the TRANSPORT PATH. Therefore, the presence of disabled vehicles/equipment in the TRANSPORT PATH during the movement of CH WASTE down the drift SHALL not be required to have an OPERABLE FSS. In this case, disabled means a vehicle/equipment that is incapable of moving under its own power due to either a mechanical or electrical fault on the vehicle/ equipment. Vehicles/equipment that are "Out of Service" (e.g., one example is a Preventative Maintenance that has not been completed) but otherwise are not disabled and are capable of moving under their own power SHALL have an OPERABLE FSS. A disabled vehicle does not require either an OPERABLE FSS or an ATTENDANT. Abandoned/disabled vehicles/equipment in Panel 7, Room 6 per ETO-Z-400 do not contain sufficient combustible liquids to affect CH WASTE at a WASTE FACE. Therefore, abandoned vehicles/equipment in Panel 7, Room 6 is not required to have an OPERABLE FSS and ATTENDANT when CH WASTE is being emplaced at the WASTE FACE.

Any vehicles outside of the TRANSPORT PATH are not required to have an OPERABLE FSS even if WASTE is present in the TRANSPORT PATH. Likewise, any vehicles/equipment in the TRANSPORT PATH that are located behind the CH WASTE Transport vehicle/equipment (area where the CH WASTE Transport vehicle/equipment has passed) are not required to have an OPERABLE FSS. The reason is that vehicles outside of the TRANSPORT PATH or located behind the CH WASTE Transport vehicle/equipment (area where the CH WASTE Transport vehicle/equipment has passed) do not present a significant fire risk to the WASTE that is present in the TRANSPORT PATH. All vehicles/equipment that contain combustible liquids that will be less than or equal to the minimum standoff distance as specified in Table 3.1.2-1 of a CH WASTE FACE SHALL have an OPERABLE FSS required by the hazard analysis completed per the NFPA 122 requirements.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

PROCESS AREA Applicability	The events identified in the safety analysis were located in the UNDERGROUND. WASTE HANDLING ACTIVITIES using WASTE HANDLING VEHICLES/EQUIPMENT with a combustible liquid capacity are conducted in the UNDERGROUND. Non-WASTE HANDLING ACTIVITIES using vehicles/equipment with a combustible liquid capacity could also be in close proximity to a CH WASTE FACE while in WASTE HANDLING or DISPOSAL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION or in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH. Therefore, this LCO only applies to the UNDERGROUND PROCESS AREA.
ACTIONS	
A.1	Prior to use of the vehicle/equipment, SR 4.1.2.1 must be completed which ensures that only vehicles/equipment with an OPERABLE FSS are chosen for use. However, it is possible for an OPERABLE FSS to become NOT OPERABLE during use. Therefore, the ACTIONS in Conditions A and B are applied to vehicles/equipment in which the green (credited) or red or yellow (non-credited) FSS status lights indicate the system may be NOT OPERABLE after the vehicle/equipment is placed in use. This ACTION requires that an ATTENDANT be assigned to the vehicle/equipment upon discovery that the FSS is NOT OPERABLE as indicated by the absence of the green status light (i.e., credited green status light is not illuminated or flashing and/or non-credited red or yellow status light is illuminated). The addition of the ATTENDANT will minimize the potential for vehicle/equipment impacts or collisions that could result in combustible liquid leaks and reduce the risk that a fire could impact the CH WASTE. The ATTENDANT will look for leaks or spills of the combustible liquids from a vehicle and identify potential ignition sources and potential collision conditions. A Completion Time of IMMEDIATELY limits the time a vehicle/equipment with an inoperable FSS poses an unmitigated fire risk to the CH WASTE. As is the case for all LCO conditions, the restoration of compliance with the LCO statement is preferred. The Required Action is taken along with the understood action of IMMEDIATELY, if possible, moving the vehicle/equipment with the inoperable FSS to greater than the minimum standoff distance as specified in Table 3.1.2-1 from the CH WASTE FACE.
A.2	Prior to use of the vehicle/equipment, SR 4.1.2.1 must be completed which ensures that only vehicles/equipment with an OPERABLE FSS are chosen for use. However, it is possible for an OPERABLE FSS to become NOT OPERABLE during use. Therefore, the ACTIONS in Conditions A and B are to be applied to vehicles/equipment in which the FSS status light(s) indicate the system may be NOT OPERABLE after the vehicle/equipment is placed in use.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

A.2 (continued)	LCO 3.1.2 defines the elements necessary for the Fire Suppression System required by the evaluation completed per the NFPA 122 requirements on UNDERGROUND vehicles/equipment with a combustible liquid capacity, to be considered OPERABLE. If any one or more of these elements are not met, the capability of the FSS to automatically detect and extinguish a fire is impaired and the UNDERGROUND vehicles/equipment FSS is considered NOT OPERABLE. Note that this Required Action applies to a FSS that is NOT OPERABLE even if the vehicle/equipment is otherwise OPERABLE. Note that in the options described below, the preferred option is to always move the vehicle/equipment with the inoperable FSS to greater than the minimum standoff distance, as specified in Table 3.1.2-1, from the CH WASTE FACE as this restores LCO compliance. If the FSS on non-WASTE HANDLING VEHICLES/EQUIPMENT is determined to be NOT OPERABLE, the affected vehicle/equipment must be placed in a SAFE CONFIGURATION IMMEDIATELY. This Required Action requires, with the presence and assistance of the ATTENDANT, moving an operable vehicle/equipment greater than or equal to the minimum standoff distance, as specified in Table 3.1.2-1, from a CH WASTE FACE or the WASTE SHAFT STATION IMMEDIATELY or the TRANSPORT PATH IMMEDIATELY as this will restore compliance with the LCO. If the vehicle/equipment with the NOT OPERABLE FSS is also inoperable (i.e., incapable of being moved under its own power), placing the vehicle/equipment in a SAFE CONFIGURATION may require shutting off the vehicle engine and taking other steps to minimize the potential for a fire or collision with the inoperable vehicle. If the engine is shut off while waiting for the ATTENDANT or for other reasons, this Required Action will allow restarting the vehicle to move it without completion of SR 4.1.2.1 immediately prior to starting the vehicle. This may include efforts to move the vehicle to greater than the minimum standoff distance, as specified in Table 3.1.2-1, from the CH WASTE FACE as this would restore LCO compliance. Other vehicles/equipment cannot be in the TRANSPORT PATH and other controls enforce this prohibition. This ensures that the vehicle/equipment with the NOT OPERABLE FSS is in a condition that significantly reduces the fire risk or the vehicle is at a distance where a fire involving the vehicle/equipment will not affect the CH WASTE.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

A.2 (continued)	If the FSS on the WASTE HANDLING VEHICLE/EQUIPMENT is determined to be NOT OPERABLE while transporting or emplacing CH WASTE, placing the vehicle/equipment in a SAFE CONFIGURATION may include maintaining the presence of the ATTENDANT and shutting off the vehicle/equipment engine and taking other steps to prevent a potential fire or collision with the vehicle. If the engine is shut off while waiting for the ATTENDANT or for other reasons, this Required Action will allow restarting the vehicle to move it. For WASTE HANDLING VEHICLES another option to placing the vehicle in a SAFE CONFIGURATION may include transferring the CH WASTE to a vehicle/equipment with an OPERABLE FSS from the vehicle/equipment with the inoperable FSS. The intent is to reduce the risk of a fire that could impact the CH WASTE from the vehicle with an inoperable FSS. This will allow moving the vehicle with the NOT OPERABLE FSS to greater than the minimum standoff distance as specified in Table 3.1.2-1 from a CH WASTE FACE or removal from the WASTE SHAFT STATION or from the TRANSPORT PATH, as applicable. Another option to ensure the vehicle will not present an increased fire risk may be that with the ATTENDANT to continue the transport for a short distance and place the CH WASTE in the WASTE FACE, and move the vehicle/equipment the minimum standoff distance as specified in Table 3.1.2-1 from the CH WASTE FACE. The fire risk is minimized with the ATTENDANT and the Facility Pallet through transition from the transporter to the waste handling forklift. Once removed from the Facility Pallet the risk is minimized with the ATTENDANT and the UVFS/IVS. The IMMEDIATE Completion Time limits the time fire events could impact the CH WASTE. The ACTION applies to any UNDERGROUND vehicles/equipment with a FSS in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION, when CH WASTE is present in the TRANSPORT PATH in the TRANSPORT PATH, and within the minimum standoff distance as specified in Table 3.1.2-1 from a CH WASTE FACE.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

A.3	This Required Action requires the vehicle/equipment with the NOT OPERABLE FSS to be replaced with a vehicle/equipment with an OPERABLE FSS. If the FSS becomes NOT OPERABLE during use, replacing the vehicle/equipment with the NOT OPERABLE FSS with a vehicle/equipment with an OPERABLE FSS minimizes the potential for fire events. Replacing the WASTE HANDLING VEHICLE/EQUIPMENT having a NOT OPERABLE FSS with a WASTE HANDLING VEHICLE/EQUIPMENT having an OPERABLE FSS will allow completion of one of the options in Required Action A.2. Specifically, it will allow moving the CH WASTE from the vehicle/equipment with the inoperable FSS to the replacement vehicle/equipment with the OPERABLE FSS, which will reduce the fire risk to the CH WASTE. Once the vehicle/equipment with the inoperable FSS is removed from the WASTE SHAFT STATION or from the TRANSPORT PATH, as applicable or is greater than the minimum standoff distance as specified in Table 3.1.2-1 from the CH WASTE FACE, LCO Compliance has been restored and Condition A can be exited. A Completion Time of 4 Hours provides adequate time to replace a vehicle/equipment with an OPERABLE FSS.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

B.1	This Required Action requires that if there is no vehicle/equipment with an OPERABLE FSS available for use (Actions for Condition A cannot be completed), WASTE HANDLING activities must be suspended except for those activities directly related to the affected vehicle. Selected activities such as moving the WASTE from the affected vehicle/equipment with the NOT OPERABLE FSS to another vehicle or moving the CH WASTE to the CH WASTE FACE and offloading the WASTE from the affected vehicle is allowed by this Required Action. SUSPENDING all other WASTE HANDLING ACTIVITIES minimizes the potential for a fire that could affect the CH WASTE. SUSPENDING WASTE HANDLING ACTIVITIES allows a minimum number of discrete steps to place the WASTE in a SAFE CONFIGURATION. If the Actions in A.3 cannot be completed in 4 Hours, the WASTE may still be on the Waste Transporter. This Action allows placing the WASTE at risk in a SAFE CONFIGURATION as part of the WASTE suspension activities. This may involve placing the CH WASTE in a SAFE CONFIGURATION, moving a WASTE HANDLING VEHICLE with an OPERABLE FSS to the NOT OPERABLE vehicle/equipment and moving the CH WASTE from the vehicle/equipment with the NOT OPERABLE FSS to a vehicle/equipment with an OPERABLE FSS. The intent is to minimize the fire risk to the WASTE. Note that LCO 3.3.8 will require the vehicle to be ATTENDED. This Action will continue until the FSS on a suitable vehicle/equipment is restored to an OPERABLE condition. A Completion Time of IMMEDIATELY ensures the potential for a vehicle or pool fire to impact the WASTE is minimized.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

ACTIONS (continued)

B.2	This Required Action requires restoration with LCO compliance. This action requires completion of any one of several actions. This may include moving the vehicle with the inoperable FSS to a distance greater than the minimum standoff distance as specified in Table 3.1.2-1 from the CH WASTE FACE or removing the vehicle from the WASTE SHAFT STATION or TRANSPORT PATH, as applicable. Alternatively, repairing the inoperable FSS will restore compliance with the LCO. Another action may involve moving any CH WASTE from an inoperable WASTE HANDLING VEHICLE to an OPERABLE WASTE HANDLING VEHICLE and moving the CH WASTE beyond the inoperable WASTE HANDLING VEHICLE toward the Active WASTE FACE for emplacement. The intent is to prevent a vehicle fire or a combustible liquid pool fire associated with a vehicle from impacting the WASTE and causing a seal failure or lid ejection. Any action that either restores the inoperable FSS to an OPERABLE status or moves the vehicle at least the minimum standoff distance as specified in Table 3.1.2-1 from the CH WASTE FACE, or removes the vehicle from the WASTE SHAFT STATION or TRANSPORT PATH, as applicable, restores compliance with the LCO. This Action will start IMMEDIATELY and continue until compliance with the LCO is restored. A Completion Time of IMMEDIATELY ensures the potential for a vehicle or pool fire to impact the WASTE is minimized.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

Surveillance Requirements

SR 4.1.2.1 This SR requires VERIFICATION that PRIOR TO USE of the vehicle/equipment selected for use that the FSS required by the evaluation completed per the NFPA 122 requirements on vehicles/equipment with a combustible liquid capacity is OPERABLE as evidenced by the Control Panel green status light. The VERIFICATION, which is performed PRIOR TO USE, VERIFIES the FSS monitoring and actuation functions are OPERABLE as indicted by the illumination of the green system status light and will function as expected in the event of a fire. This SR VERIFIES that the wet or dry chemical cylinder has not discharged and the system is OPERABLE based on the signals received and processed by the Control Panel. If all components of the FSS are OPERABLE as determined by the Control Panel inputs, the green status light is illuminated on either system. Note that the green status light is the only light that is credited to verify system operability. This complies with the manufacturer's recommendations and VERIFIES that the FSS, to include the credited green status light and Control Panel, on the selected vehicle is in an OPERABLE status. The manufacturer guidance in the operating manual is that this VERIFICATION be performed Daily. However, the VERIFICATION frequency has been amended to be performed prior to starting the vehicle for the first time on the shift in which the vehicle is selected for use. The TSR definition of PRIOR TO USE is "prior to the initial use of equipment/system each day or prior to each RH WASTE Handling evolution." If the equipment selected for use is used several times throughout a day or an RH evolution that requires multiple days to complete, the initial application of the surveillance is adequate for the balance of the day or the RH evolution," the surveillance (verification) is only applied the first time the vehicle is started during the evolution. Note that the RH WASTE HANDLING ACTIVITIES included in the TSR definition does not apply to this control as this control only applies to CH WASTE activities. A Completion Time of PRIOR TO USE ensures that the FSS on the vehicle/equipment is available to extinguish developing stage fires. Failure to meet or perform this SR requires entry into Condition A.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.1.2.2	This SR requires a FUNCTIONAL TEST of the vehicle/equipment FSS control system to VERIFY that the FSS is OPERABLE. This test SHALL be performed SEMIANNUALLY by a qualified fire systems technician. The test is normally performed in conjunction with the SEMIANNUAL maintenance completed on the FSS. The SEMIANNUAL FREQUENCY testing of this system is adequate based on the FSS manufacturer's recommendations and is per the requirements of NFPA 17/17A. As a minimum the test SHALL VERIFY the following components are OPERABLE: the Control Panel to include a green functioning status light, temperature detection (linear detectors) elements, an adequately charged suppressant system, a distribution system for dispersing the suppressant, and the automatic engine system cutoff. The testing of the FSS is in accordance with the NFPA 17/17A criteria and the manufacturer's recommendations. The FUNCTIONAL TEST VERIFIES the Control Panel is OPERABLE by checking that the Control Panel input and output signals are functional. The Control Panel is tested by inputting a signal into the controller that simulates the action of the inputs and outputs of the Control Panel. The FUNCTIONAL TEST verifies the Control Panel is operable by inputting various trip (e.g., high temperature and low pressure) and system status signals into the controller and obtaining the correct system response for the various system components as required by the system manufacturer. The FUNCTIONAL TEST VERIFIES the status lights are working correctly, the heat detection device will accurately detect a heat source based on the specific heat detection temperature for each vehicle/equipment and upon detection sends a signal to the system Control Panel to actuate the suppressant, that the discharge system is capable of distributing (e.g., is in the proper pressure range) the suppressant and a simulated signal is sent to automatically shut down the vehicle/equipment engine. In addition for the dry chemical system, an inspection to verify there is no evidence of caking of the Ansul System dry powder suppressant in the cylinder SHALL be completed. Failure to meet or perform this SR requires entry into Condition A.

(continued)

B3/4.1 Fire Suppression Systems (continued)

B3.1.2 UNDERGROUND Vehicles and Equipment with a Fire Suppression System (continued)

Bases (continued)

References

1. ETO-Z-157, *Fire Protection Engineering Determination of Underground Diesel Powered Equipment that Require Automatic Fire Suppression System Installation and Underground Equipment Evaluated as NOT Requiring Automatic Fire Suppression System Installation*, Rev. 2, Nuclear Waste Partnership, Carlsbad, NM.

2. WIPP-023, *Fire Hazard Analysis for the Waste Isolation Pilot Plant* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.

3. ETO-Z-403, *Evaluation of Using Ansul LVS Fire Suppression System in Lieu of a Dry Chemical Fire Suppression System*, Nuclear Waste Partnership LLC, Carlsbad, NM, May 2017.

4. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

5. ETO-Z-400, *Analysis of Fuel Spill Fires in the WIPP Underground*, Revision 2, Nuclear Waste Partnership LLC, Carlsbad, NM.

B3/4.2 Confinement Ventilation Systems

B3.2.1 CH WASTE Handling Confinement Ventilation System

Bases

Background Summary

The CH WH CVS exhaust system is designated as HV01 CVS (Ref. 1). The system is designed to maintain the CH BAY and ROOM 108 air space at a pressure that is negative with respect to the outside ambient air to ENSURE air from the CH BAY and ROOM 108 is filtered prior to being released to the outside environment.

Components used to control the negative differential pressures within the PROCESS AREAS of the WHB are the air supply fans, air ducts and dampers, exhaust fans, and a pressure control system, which maintain negative differential air pressure with respect to outside ambient air pressure in the CH BAY and ROOM 108.

Air is supplied to the CH BAY Area from one of two CH WH CVS air handling units. CH BAY and ROOM 108 air is exhausted by one of two exhaust fans that draw air through one of two parallel HEPA filter units.

Two CH WH CVS HEPA Filter Trains provide the air filtration function for exhaust air from CH BAY and ROOM 108. Each CH WH CVS HEPA Filter Train includes the air handling unit supply fan, HEPA filter unit, and an exhaust fan. Each HEPA filter unit consists of one moderate efficiency filter bank and two, in series, HEPA filter banks. The exhaust system is comprised of two exhaust fans and two HEPA filter units. Each HEPA filter unit is sized to support the air flow rate from one exhaust fan. The filter units are designated 41-B-814 and 41-B-815 and the exhaust fans are designated 41-B-816 and 41-B-817.

Each filter unit has an inlet and outlet electronically operated damper. A cross-connection is provided between the two exhaust trains located between the filter unit outlets and the exhaust fan inlets. An electronically operated isolation damper is provided in the cross-connection line (Ref. 1).

The system is normally aligned to run as two trains in a lead/lag control scheme with auto changeover on a loss of flow in the lead exhaust unit. Normally, exhaust fan 41-B-816 is aligned to draw through filter 41-B-814 as one exhaust train and exhaust fan 41-B-817 is aligned to draw through filter 41-B-815 as the second exhaust train. The cross-connection isolation damper is normally closed. Either exhaust fan can be aligned to draw from either HEPA filter unit (Ref. 1).

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

Background Summary (continued)	Pressure differential transmitters and alarms are provided to ENSURE that negative differential pressures are maintained within the CH BAY and ROOM 108 with respect to outside ambient air pressure. The differential pressure with respect to outside ambient air pressure is measured by a pressure differential transmitter located in the CH BAY and another pressure differential transmitter located in ROOM 108. The pressure differential transmitter at each location provides a signal to the CMS that provide a signal to the CMR. Within the CMR, the differential pressure values at each monitored location can be displayed on one or more CMR monitors. An audible alarm is sounded in the CMR if the differential pressure indication is outside the acceptable range. Additionally, the CMR monitor(s) display the source of the alarm via screen background changes for the affected pressure differential transmitter(s) location(s). Indication of differential pressure in the CH BAY and ROOM 108 is also provided by differential pressure local gauges. Likewise, pressure differential transmitters are used to indicate the differential pressures across each HEPA filter bank of the IN SERVICE HEPA filter units to ENSURE that exhaust air is being drawn through the HEPA filter units prior to release to the environment. The differential pressure across each HEPA filter bank of each HEPA filter unit is read by a pressure differential transmitter for each HEPA filter bank. The pressure differential transmitter for each HEPA filter bank provides a signal to the CMS where the differential pressure for each HEPA filter bank is displayed on one or more CMR monitors. Indication of differential pressure across each HEPA filter bank of each HEPA filter unit is also provided by pressure differential local gauges.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

Application to Safety Analysis

The DSA (Ref. 2) identified events involving pool fires, ordinary combustible material fires, and internal CH WASTE CONTAINER fires that could occur within the CH BAY, ROOM 108, and CLR. The CH WH CVS only draws air from the CLR when Door 140 is open to the CH BAY. Each of these events can release radiological material into the CH BAY atmosphere, which if left unfiltered could be released to the environment and affect co-located workers outside of the WHB. The hazard analysis identified a potential for high consequences to co-located workers.

Assumptions for the analysis (Ref. 6) include the following:

- An RH WASTE CONTAINER inside a Facility Cask/LWFC is protected from fires.
- Waste generator sites' compliance with the WIPP WAC.
- The WHB design (e.g., metal and concrete construction) minimizes the likelihood of ignition and/or propagation of fires.
- The WHB design wind velocity exceeds the basic wind velocity specified for the geographical location of the WIPP facility.
- The WHB design and construction can withstand the design-basis earthquake.
- Type B SHIPPING PACKAGES provide robust confinement of radiological materials.

Using a CH exhaust fan to draw the CH atmosphere through a HEPA filter with greater than or equal to 99% efficiency reduces the consequences to co-located workers. An IN SERVICE exhaust fan provides the required negative differential pressure with respect to outside atmospheric air pressure in the CH BAY and ROOM 108 to ENSURE all air is exhausted through an OPERABLE HEPA filter unit. The HEPA filter unit ENSURES that the exhaust air is filtered. Therefore, the operation of one CH WH CVS exhaust fan drawing through either exhaust HEPA filter unit is sufficient to provide the safety function assumed in the DSA.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

LCO

The LCO states:

The CH WH CVS SHALL be OPERABLE. An OPERABLE CH WH CVS consists of the following elements:

- One exhaust fan (41-B-816 or 41-B-817) IN SERVICE.
- One OPERABLE HEPA filter unit (41-B-814 or 41-B-815) IN SERVICE.
- Differential pressure across each IN SERVICE HEPA filter bank less than or equal to +3.90 inches w.g and greater than or equal to +0.30 inches w.g. locally.
- IN SERVICE HEPA filter unit efficiency of greater than or equal to 99%.
- Differential pressure less than or equal to -0.04 inches w.g. in CH BAY with respect to ambient outside air pressure, locally.
- Differential pressure less than or equal to -0.04 inches w.g. in ROOM 108, with respect to ambient outside air pressure locally.
- OPERABLE pressure differential instrumentation and CMR alarm indications as identified in Table 3.2.1-1 and Table 3.2.1.2.

This LCO addresses the OPERABILITY requirements for the CH WH CVS. This lowest functional capability is met by an operating CH WH CVS exhaust fan maintaining a negative pressure with respect to the environment and drawing CH BAY or ROOM 108 atmosphere through an OPERABLE HEPA filter before discharging to the environment.

The flow of air from the CH BAY or ROOM 108, through a HEPA filter, and exhausted, is sufficient to provide the assumed level of mitigation for pool fires, combustible material fires, and internal CH WASTE CONTAINER fires. Therefore, an OPERABLE CH WH CVS is satisfied by one operating exhaust fan aligned to and drawing air through an OPERABLE HEPA filter unit.

The system is normally aligned for operation with exhaust fan 41-B-816 drawing through filter 41-B-814 and exhaust fan 41-B-817 aligned for operation through filter 41-B-815. However, specific alignment of fan and filter is not essential to accomplish the safety function.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

LCO (continued)

The HEPA filter units (41-B-814 or 41-B-815) are considered OPERABLE when the differential pressure across each HEPA filter bank of each IN SERVICE HEPA filter unit measured locally is less than or equal to +3.90 inches w.g. and greater than or equal to +0.30 inches w.g., and each HEPA filter bank of each HEPA filter unit has been tested to ENSURE it is greater than or equal to 99% efficient.

The HEPA filter bank high value is based on a safety analysis differential pressure of less than +4.0 inches w.g. and applying calculated instrument loop uncertainty (Ref. 7), which gives a value of +3.90 inches w.g. The maximum differential pressure allowed ensures that the HEPA filter banks are functioning properly and that the HEPA filter unit banks are not clogged or damaged. Establishing a maximum differential pressure limit also prevents filter blowout that could release unfiltered air into the exhaust stream.

Likewise, the HEPA filter bank minimum differential pressure ensures that the HEPA filter banks are not being bypassed. This value is based on a safety analysis differential pressure of greater than +0.20 inches w.g. and applying calculated instrument loop uncertainty (Ref. 7). The instrument uncertainty for the pressure differential local gauges gives a value of +0.30 inches w.g. for the minimum differential pressure allowed.

The HEPA filter bank high CMR alarm is also based on a safety analysis differential pressure of less than +4.0 inches w.g. and applying calculated instrument loop uncertainty (Ref. 5), which gives a value of +3.93 inches w.g. The noted differential pressures values are indicated in the CMR on one or more monitors and audibly alarmed if outside the acceptable range.

Likewise, the HEPA filter bank minimum differential pressure CMR alarm ensures that the HEPA filter banks are not being bypassed. This is based on a safety analysis differential pressure of greater than +0.20 inches w.g. and applying calculated instrument loop uncertainty (Ref. 5), which gives a value of +0.27 inches w.g. The noted differential pressures values are indicated in the CMR on one or more monitors and audibly alarmed if outside the acceptable range.

Instrumentation for each differential pressure instrument loop in Table 3.2.1-1 and the pressure differential local gauges as indicated in Table 3.2.1-2 is CALIBRATED ANNUALLY to ENSURE its assumed accuracy. The values for alarm setpoints for the CMR instrumentation and the acceptable ranges for local pressure instrumentation in the tables may contain different numbers for the same instrument loop. This fact is based upon the applied uncertainties for each component of the loop may possess different values. However, each listed value supports OPERABILITY from the safety analysis.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

LCO (continued)

Each HEPA filter bank of each IN SERVICE HEPA filter unit is tested ANNUALLY in accordance with ASME N510 to provide filtration efficiency of greater than or equal to 99%. The in-place leak test described by ASME N510 is used to conduct a periodic surveillance to reconfirm the performance of the HEPA filtration system. The in-place leak test confirms the safety basis assumptions of filtration system efficiency greater than 99 percent. The in-place leak tests use a poly-dispersed aerosol test [0.3-0.7 microns aerodynamic equivalent diameter] and determines the system efficiency of each HEPA filter bank is greater than or equal to 99% accounting for the system components (i.e., gaskets, frame, housing, etc.) that are typically challenged. The test is performed under actual conditions and at operational airflow. For the HEPA filter unit to be considered OPERABLE with respect to efficiency, both filter banks in the unit must be greater than 99%.

CH WH CVS OPERABILITY requires that a differential pressure is maintained of less than or equal to -0.04 inches w.g. in the CH BAY and less than or equal to -0.04 inches w.g. in ROOM 108 with respect to outside ambient air pressure when read locally. This value is based on a safety analysis differential pressure of being less than outside ambient air pressure (i.e., -0.01 inches w.g.) and applying calculated instrument loop uncertainty for the CH BAY (Ref. 7), which gives a value of -0.04 inches w.g for the CH BAY. The instrument uncertainty value for ROOM 108 (Ref. 7) also gives a value of -0.04 inches w.g.

The CMR alarm values are also based upon the minimum value of -.01 inches w.g. and adjusted for loop uncertainties (Ref. 4). The alarm values listed in Table 3.2.1-1 used in the CMR are less than or equal to -.02 inches w.g. for the CH BAY and less than or equal to -0.04 inches w.g. for ROOM 108.

CH WH CVS OPERABILITY also requires that the pressure differential transmitters and instrument loops with associated instrumentation identified in Table 3.2.1-1 and Table 3.2.1-2 are CALIBRATED ANNUALLY to ENSURE assumed accuracy.

A FUNCTIONAL TEST is also performed ANNUALLY on the indicated differential pressure instrument loops to VERIFY that when the alarm set points are reached, an audible CMR alarm is sounded and visually displayed on one or more monitors.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

MODE Applicability	CH WASTE is brought into the CH BAY or ROOM 108 in CLOSED Type B SHIPPING PACKAGES. The Type B SHIPPING PACKAGES are opened and CH WASTE is removed, prepared, and transferred to the Waste Shaft Conveyance for disposal in the UNDERGROUND. Some CH WASTE may be stored in the CH BAY for a time period prior to transfer to the UNDERGROUND. This CH WASTE may be subject to fires, container drops, or impacts to CH WASTE CONTAINERS when the CH WASTE is outside the CLOSED Type B SHIPPING PACKAGES. Because CH WASTE is allowed to be outside of CLOSED Type B SHIPPING PACKAGES in the WASTE HANDLING and WASTE STORAGE MODES, this LCO is applicable to both MODEs. When all CH WASTE in the CH BAY or ROOM 108 is in a CLOSED Type B SHIPPING PACKAGES or all CH WASTE is removed from the CH BAY and ROOM 108, then CH exhaust ventilation is not required. If there is no CH WASTE in the CH BAY or ROOM 108, then there are no significant quantities of radiological material available to be involved in the assumed events. CH WASTE enclosed in CLOSED Type B SHIPPING PACKAGES is protected during any credible event. Therefore, the CH WH CVS is not required to be OPERABLE when the CH BAY and ROOM 108 are in STANDBY MODE.
PROCESS AREA Applicability	The events identified in the safety analysis were located in the CH BAY and/or ROOM 108 or the CLR. Therefore, this LCO applies to the CH BAY, ROOM 108, and the WASTE SHAFT ACCESS AREA (when WHB Door 140 is open). The CLR is part of the WASTE SHAFT ACCESS AREA and when Door 140 is open it is exhausted through the CH BAY.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

ACTIONS

A Note is provided to allow Condition A entry for each NOT OPERABLE CMR alarm indication because the instruments are independent of each other. This allows a separate Completion Time clock for each separate entry.

As permitted by LCO 3.0.4, an exception to its requirements is made for LCO Condition A. The exception permits the PROCESS AREA in Condition A to alternate from the WASTE HANDLING and WASTE STORAGE MODES for administrative purposes provided the Required Actions and associated Completion Times for the Condition are met (i.e., no new Completion Time clock for each MODE change). The current ACTIONS of the Condition do not require placement of the AFFECTED PROCESS AREA into a defined MODE but allow continued operation provided the Required Actions and Completion Times are met. MODE changes that are of an administrative nature, (e.g., shift compliment) do not result in a reduced safety posture in that the LCO allows continued operation for a limited time (i.e., 31 Days). Therefore, the movement between WASTE HANDLING and WASTE STORAGE MODES does not inject any additional risk than was previously allowed. This exception is therefore, consistent with the text and intent of LCO 3.0.4. As indicated in LCO 3.0.4, SR 4.0.4 is not applicable to the NOT OPERABLE equipment.

A.1

Condition A is entered for: (1) CMR alarm indication for differential pressure across an IN SERVICE HEPA filter bank being NOT OPERABLE; (2) CMR alarm indication for differential pressure in the CH BAY being NOT OPERABLE, or; (3) CMR alarm indication for differential pressure in ROOM 108 being NOT OPERABLE.

The Required Action requires VERIFICATION of the differential pressure for the affected HEPA filter bank instrument loop(s) that is NOT OPERABLE or for the affected instrument loop(s) for the differential pressure in the CH BAY or ROOM 108 that is NOT OPERABLE to be within the acceptable range as specified in Table 3.3.1-2 for the applicable local gauge(s) within 1 Hour and Every 12 Hours thereafter.

Local gauges provide accurate differential pressure indication for the affected instrument loop(s). Performance within 1 Hour and Every 12 Hours thereafter is adequate to confirm the differential pressures for the affected instrument loop(s) as HEPA filter bank differential pressures remain relatively stable over time and differential pressures in the WHB CH BAY and ROOM 108 remain relative stable as long as the ventilation system exhaust fans remain IN SERVICE.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

A.2	This Required Action requires restoration of the affected CMR differential pressure instrument loop(s) within 31 Days. The 31 Days Completion Time provides reasonable time for determination of the cause of the Condition and to complete efforts to restore the affected instrument loop(s) to OPERABLE status. A Completion Time of 31 Days may be necessary to identify the cause of the instrument loop(s) Condition, to obtain the necessary parts and/or components required to repair the instrument loop(s) and to perform the work to restore the instrument loop(s) OPERABILITY. A Completion Time of 31 Days is considered sufficient to restore the system while minimizing the time-at-risk by performance of differential pressure surveillances using local gauges and the Actions of A.1.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

B.1

Condition B is entered if the CH WH CVS is NOT OPERABLE in an applicable PROCESS AREA. LCO 3.2.1 defines seven elements that are necessary for the CH WH CVS to be considered OPERABLE. In the event that any one or more of these elements are not met, then the capability to of the CH WH CVS to filter potentially contaminated air during a fire or internal CH WASTE CONTAINER fire event is impaired and the CH WH CVS is considered NOT OPERABLE.

As permitted by LCO 3.0.4, an exception to its requirements is made for LCO Condition B. The exception permits the PROCESS AREA in Condition B to alternate from the WASTE HANDLING and WASTE STORAGE MODES for administrative purposes provided the Required Actions and associated Completion Times for the CONDITION are met (i.e., no new Completion Time clock for each MODE change). The current ACTIONS of the Condition do not require placement of the AFFECTED PROCESS AREA into a defined MODE but allow continued operation provided the Required Actions and Completion Times are met. MODE changes that are of an administrative nature, (e.g., shift compliment) do not result in a reduced safety posture in that the LCO allows continued operation for a limited time (i.e., 14 Days). Therefore, the movement between WASTE HANDLING and WASTE STORAGE MODES does not inject any additional risk than was previously allowed. This exception is therefore, consistent with the text and intent of LCO 3.0.4. As indicated in LCO 3.0.4, SR 4.0.4 is not applicable to the NOT OPERABLE equipment.

This Required Action requires that the introduction of additional CLOSED Type B SHIPPING PACKAGES into the CH BAY or ROOM 108 is IMMEDIATELY prohibited. This prohibition limits the amount of MAR in the PROCESS AREA and eliminates the risk from movement of CLOSED Type B SHIPPING PACKAGES into the AFFECTED PROCESS AREA. This Condition allows waste handling and waste storage operations to continue with those packages already present in the PROCESS AREAS. The prohibition of additional CLOSED Type B SHIPPING PACKAGES prevents additional MAR from being introduced into the PROCESS AREA. This action limits the amount of MAR to the MAR already present when the Condition was entered. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to prevent introduction of additional MAR and activities associated with movement of CLOSED Type B SHIPPING PACKAGES.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

B.2	The Required Action requires hot work ACTIVITIES not related to restoration of the CH WH CVS to be stopped in the AFFECTED PROCESS AREAS IMMEDIATELY. Hot work ACTIVITIES being conducted in the WHB have the potential to initiate a fire event. Therefore, if the CH WH CVS is NOT OPERABLE the risk of fires should be reduced. Stopping hot work ACTIVITIES reduces the likelihood of fire events. An exception is allowed for those hot work ACTIVITIES that could be necessary to restore the CH WH CVS to OPERABLE status. These specific hot work ACTIVITIES are allowed to continue as long as a FIRE WATCH is established and remains in place at the location that the hot work ACTIVITIES are being performed. A Completion Time of IMMEDIATELY initiates prompt and sustained action to stop hot work not related to restoration of the CH WH CVS and to properly secure the ACTIVITY and work area while minimizing the time-at-risk.
B.3	Required Action B.3 requires establishing a FIRE WATCH within 1 Hour at each location in the AFFECTED PROCESS AREAS where WASTE HANDLING ACTIVITIES are being conducted. A FIRE WATCH provides for visual observation, identification, and reporting of actions or conditions that could initiate a fire, and prompt reporting of a fire to initiate emergency response should one occur. Training also allows for extinguishing incipient fires if safe to do so. This Action reduces the potential for fire initiation and incipient fire growth. WASTE HANDLING ACTIVITIES are allowed to continue during this Condition as there is low risk for a significant fire event to occur without observation with the FIRE WATCH in place. Combustible material loading is controlled by the Fire Protection Program and liquid-fueled vehicles and equipment are prohibited from being within the CH BAY or ROOM 108. Ignition sources in the WHB are limited. Additionally, the WHB FSS is required to be OPERABLE during the WASTE HANDLING MODE (LCO 3.1.1). A Completion Time of 1 Hour provides time to determine the WASTE HANDLING ACTIVITIES being performed and their locations, and to identify qualified individuals and their assignments to perform the required FIRE WATCH. The FIRE WATCH remains in place for the duration of this Condition while WASTE HANDLING ACTIVITIES are being conducted.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

B.4	Required Action B.4 requires a ROVING FIRE WATCH to be established within 1 Hour and every 6 hours thereafter at each location in the AFFECTED PROCESS AREA(S) where WASTE STORAGE ACTIVITIES are being conducted. A ROVING FIRE WATCH provides for a roving inspection of AFFECTED AREAS for the purpose of making fire safety observations, notifying building occupants and the CMR of an emergency, minimizing the potential for a fire to occur, and/or extinguishing incipient fires. A ROVING FIRE WATCH may have other duties between inspections. This Action reduces the potential for fire initiation and incipient fire growth. WASTE STORAGE ACTIVITIES are allowed to continue during this Condition as there is low risk for a significant fire event to occur without observation with the ROVING FIRE WATCH in place. Combustible material loading is controlled by the Fire Protection Program and liquid-fueled vehicles and equipment are prohibited from being within the CH BAY or ROOM 108. Ignition sources in the WHB are limited. Additionally, the WHB FSS is required to be OPERABLE during the WASTE HANDLING and WASTE STORAGE MODES (LCO 3.1.1). An initial Completion Time of 1 Hour provides time to determine the WASTE STORAGE ACTIVITIES locations and to identify qualified individuals and their assignments to perform the required ROVING FIRE WATCH. Performance of a ROVING FIRE WATCH every 6 Hours thereafter provides verification that no excessive combustible material accumulation has occurred or other conditions that could potentially initiate a fire. The 6 Hours is based upon the lack of transient combustible loading increase for storage activities. In addition, WASTE HANDLING activities have a continuous FIRE WATCH.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

B.5.1/B.5.2

These Required Actions provide an equivalent level of compensatory measures to be implemented within 14 Days in the event that the CH WH CVS is NOT OPERABLE. Required Action B.5.1 requires restoration of the CH WH CVS to OPERABLE status within 14 Days and B.5.2 requires placing the AFFECTED PROCESS AREA(S) in STANDBY MODE within 14 Days.

Required Action B.5.1 requires the CH WH CVS to be restored to OPERABLE status within 14 Days. In the event that the CH WH CVS is NOT OPERABLE and Condition B was entered, Actions B.2 B.3, and B.4 have significantly reduced the potential for fire initiation in the AFFECTED PROCESS AREAS by stopping hot work ACTIVITIES, establishing a FIRE WATCH at locations where WASTE HANDLING ACTIVITIES are being performed, and establishing a ROVING FIRE WATCH at locations where WASTE STORAGE ACTIVITIES are being performed. Therefore, the risk of a large fire event is significantly reduced. The 14 Days allows Waste Containers that are outside of their CLOSED Type B SHIPPING PACKAGES and in the CH BAY or ROOM 108 to be transferred to the UNDERGROUND for storage.

Additionally, determination of the cause of the Condition and efforts to restore the CH WH CVS is required. A Completion Time of 14 Days may be necessary to identify the cause of the CH WH CVS Condition, to obtain the necessary parts and/or components required to repair the CH WH CVS and to perform the work to restore the CH WH CVS OPERABILITY. A Completion Time of 14 Days is considered sufficient to restore the system while minimizing the time-at-risk.

Required Action B.5.2 requires the AFFECTED PROCESS AREA(S) to be placed into STANDBY MODE within 14 Days from when the CH WH CVS was declared to be NOT OPERABLE and Condition B was entered. In this MODE, WASTE is not permitted to be present unless in a CLOSED SHIPPING PACKAGE. Site-derived WASTE (when present in the CH BAY or RH BAY) must be in a WASTE CONTAINER with the lid CLOSED. The Completion Time of 14 allows sufficient time to transfer Waste Containers that are outside of their CLOSED Type B SHIPPING PACKAGES and in the CH BAY or ROOM 108 to the UNDERGROUND for storage or to restore the CH WH CVS OPERABILITY.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

Surveillance Requirements

SR 4.2.1.1	The SR requires DAILY VERIFICATION that the differential pressure across each HEPA filter bank of each IN SERVICE HEPA filter unit is less than or equal to +3.90 inches w.g. and greater than or equal to +0.30 inches w.g. The SR is performed by reading the pressure differential local gauges specified in Table 3.2.1-2. VERIFICATION that the differential pressure across each HEPA filter bank of each IN SERVICE HEPA filter unit is within the specified acceptable range DAILY is adequate to demonstrate HEPA filter unit OPERABILITY. Failure to meet or perform this SR requires entry into Condition B.
SR 4.2.1.2	This SR requires DAILY VERIFICATION that the differential pressure in the CH BAY and ROOM 108 with respect to outside ambient air pressure is less than or equal to -0.04 inches w.g. The SR is performed by reading the pressure differential local gauge for the CH BAY and ROOM 108 as specified in Table 3.2.1-2. VERIFICATION of the differential pressure in the CH BAY and ROOM 108 with respect to outside ambient air pressure DAILY is adequate to demonstrate OPERABILITY. Failure to meet or perform this SR requires entry into Condition B.
SR 4.2.1.3	This SR requires DAILY VERIFICATION that one CH WH CVS exhaust fan and one OPERABLE HEPA filter unit are IN SERVICE. VERIFICATION is required to confirm that exhaust fan 41-B-816 or 41-B-817 is drawing through HEPA filter unit 41-B-814 or through HEPA filter unit 41-B-815. VERIFICATION of an exhaust fan and HEPA filter unit being IN SERVICE is performed by visual observation of the exhaust fan and HEPA filter unit status and alignment as indicated in the CMR by graphic visual display on the CMR monitors or local indications. DAILY VERIFICATION that the CH WH CVS exhaust fan and HEPA filter unit are properly aligned and IN SERVICE is adequate to demonstrate OPERABILITY. Failure to meet or perform this SR requires entry into Condition B.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.2.1.4	This SR requires VERIFICATION that each CH WH CVS HEPA filter bank of each IN SERVICE HEPA filter unit 41-B-814 and 41-B-815 to have a filtration efficiency of greater than or equal to 99% ANNUALLY. This is confirmed by an in-place leak test performed in accordance with ASME N510. The in-place leak tests use a poly-dispersed aerosol test (0.3-0.7 micron aerodynamic equivalent diameter) and determines the system efficiency accounting for the system components (i.e., gaskets, frame, housing, etc.) that are typically challenged. The test is performed under actual conditions and at operational airflow in accordance with ASME N510 guidance by qualified/trained individuals. The performance testing allows for correction and maintenance of the HEPA filter banks in the event that efficiency values are not a minimum of 99%. ANNUAL VERIFICATION of HEPA filter bank efficiency as recommended by ASME N510 is adequate to demonstrate that the HEPA filter unit is OPERABLE (Ref. 3) Failure to meet or perform this SR requires entry into Condition B. It is noted that the extension of SR 4.0.2 is not applicable to this SR. This SR is driven by a national standard that does not provide for a timeframe extension for performance of this SR.
SR 4.2.1.5	This SR requires that a CALIBRATION be performed on each pressure differential transmitter and applicable instrumentation for the instrument loop listed in Table 3.2.1-1 and the gauges as indicated in Table 3.2.1-2 ANNUALLY. Differential pressure instrumentation is stable and not typically subjected to adverse conditions that would cause it to lose accuracy. The ANNUAL FREQUENCY interval is based upon industry recommended standard CALIBRATION frequencies for this type of instrumentation. Failure to meet or perform this SR requires entry into Condition B.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.1 CH WASTE Handling Confinement Ventilation System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.2.1.6	This SR requires that an ANNUAL FUNCTIONAL TEST be performed on the differential pressure alarm instrument loops as indicated in Table 3.2.1-1. The ANNUAL differential pressure instrumentation loop FUNCTIONAL TEST consists of injection of a simulated or actual signal into the instrument loop, at the input of the pressure differential transmitter, to VERIFY OPERABILITY of the differential pressure instrumentation and audible CMR alarm and visual indication on one or more monitors if outside the acceptable range. The ANNUAL FREQUENCY is based upon industry recommended FUNCTIONAL TEST frequencies for this type of instrumentation. Failure to meet or perform this SR requires entry into Condition B.

References

1. SDD HV00, *Heating, Ventilation and Air Conditioning System System Design Description (SDD)* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.

2. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

3. ASME N510-2007, *Testing of Nuclear Air-Treatment Systems*, American Society of Mechanical Engineers, New York, NY.

4. WSRC-TR-94-0496, *WIPP Instrument Loop Setpoint Bases and Uncertainties Evaluations (U)*, Revision 0, September 1994.

5. ECO-13842, *Evaluation of Differential Pressure Instrumentation Loops for HEPA Filter Banks*, Nuclear Waste Partnership, Carlsbad, NM, December 2015.

6. WIPP-021, *Hazards Analysis for the Waste Isolation Pilot Plant Transuranic Waste Handling Safety Basis*, Revision 8, Nuclear Waste Partnership LLC, Carlsbad, NM.

7. Calc 16-007, *Room and HEPA Instrument Uncertainty*, Revision 2, Nuclear Waste Partnership LLC, Carlsbad, NM, April 2016.

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.2 HOT CELL COMPLEX Confinement Ventilation System (Deleted)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System

Bases

Background Summary

The Underground Ventilation System (UVS) is designated as VU00 (Ref. 1). The system is designed to maintain the UNDERGROUND disposal circuit air pressure negative with respect to the outside atmosphere ambient air pressure and to the construction and north air circuits to ENSURE air from the UNDERGROUND disposal circuit is filtered prior to being released to the outside environment.

The air drawn down the Air Intake Shaft, Salt Handling Shaft, and the Waste Shaft is split into four separate air streams serving the construction, north area, WASTE SHAFT STATION, and waste disposal areas. The air drawn down the Waste Shaft serves the WASTE SHAFT STATION operations and is exhausted directly to the Exhaust Shaft. The combined exhaust streams are drawn up the Exhaust Shaft, and discharged through the HEPA filtration units. The Supplemental Ventilation System, if used, exhausts construction and north circuit air out of the Salt Shaft. Air flow dampers and regulators provide the capability to adjust the air flow rates in any of the air flow streams.

The UVFS and IVS combined provide the UNDERGROUND filtration function for the UVS. The UVFS is comprised of three centrifugal exhaust fans, two identical HEPA filter units arranged in parallel, isolation dampers, and associated ductwork. Each HEPA filter unit has one series bank of moderate efficiency prefilters (roughing filters), one series bank high efficiency prefilters, and two series banks of HEPA filters.

The HEPA filter units are mounted in parallel between a common inlet plenum and common outlet plenum. The exhaust fans are designated 41-B-860A, 41-B-860B, and 41-B-860C and the HEPA filter units are designated 41-B-856 and 41-B-857. Any of the exhaust fans can draw air from both HEPA filter units and only one fan is operated at a time to provide the UNDERGROUND filtration function.

The IVS is comprised of two skid mounted centrifugal exhaust fans, and two skid mounded HEPA filter units, isolation dampers, and associated ductwork. The exhaust fans are designated 41-B-960A and 41-B-960B. The filter units are designated 41-B-956 and 41-B-957. Each IVS exhaust fan can draw air from only one HEPA filter unit. The flow through the 41-B-960A exhaust fan will be through 41-B-956 HEPA filter unit and the flow through the 41-B-960B exhaust fan will be through the 41-B-957 HEPA filter unit.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

Background Summary (continued)

Each UVFS and IVS filter unit has an inlet and outlet electronically operated isolation damper. A cross-connection is provided between the inlets and outlets of the two UVFS HEPA filter trains. Dampers can provide isolation of either UVFS HEPA filter train from the other. However, the UVFS HEPA filter units are normally required to both operate at the same time. The IVS HEPA filter trains have isolation dampers at their inlets and outlets. The IVS operates with both HEPA filter units at the same time with each HEPA filter unit served by an individual exhaust fan. (Ref. 1). Both the UVS and IVS isolation dampers are assumed to be in the proper position (i.e., open or closed) to allow UVFS/IVS filtration system operation and preclude HEPA filtration bypass. The UVFS/IVS both discharge exhaust air through a common discharge duct located downstream of the UVFS exhaust fans.

Differential pressure across the 308 Bulkhead is measured to ensure that negative air pressure is maintained in the exhaust drift to draw air to the Exhaust Shaft. The 308 Bulkhead is located in the exhaust drift in S-400 at E-300. The 308 Bulkhead differential pressure shows which way the air is flowing through the regulator in the bulkhead. A negative pressure indicates flow from E-140 towards E-300 and the Exhaust Shaft. A pressure differential indicator/transmitter at the 308 Bulkhead provides a signal to a CMR alarm panel. An audible alarm is sounded in the CMR if the differential pressure indication is outside the acceptable range. Indication of the differential pressure across the 308 Bulkhead is also provided by pressure differential local gauge.

Likewise, pressure differential transmitters are used to indicate the differential pressures across each HEPA filter bank of each IN SERVICE HEPA filter unit to ensure that exhaust air is being drawn through the HEPA filter units prior to release to the environment. The differential pressure across each HEPA filter bank of each HEPA filter unit is read by a pressure differential transmitter for each HEPA filter bank. The pressure differential transmitter for each HEPA filter bank provides a signal to the CMS through an instrument loop that provides a signal to the CMR where the differential pressure for each HEPA filter bank is displayed on one or more CMR monitors. An audible alarm is sounded if these values are outside the acceptable range. Indication of the differential pressure across each HEPA filter bank of each HEPA filter unit is also provided by pressure differential local gauges.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

Background Summary (continued)	A Supplemental Ventilation System provides supplemental ventilation to the uncontaminated areas of the UNDERGROUND. The UVFS and IVS can operate with or without the Supplemental Ventilation System in operation. If the Supplemental Ventilation System is in operation, the UVFS and IVS must operate with one UVFS exhaust fan IN SERVICE and both IVS exhaust fans IN SERVICE. This minimizes the risk of air reversing in the disposal circuit. Air reversal in the disposal circuit, from inoperability of the UVFS/IVS would cause a differential pressure alarm at the 308 Bulkhead and initiate immediate Supplemental Ventilation System shutdown.
Application to Safety Analysis	The DSA (Ref. 2) identified the potential for fires and internal WASTE CONTAINER fires or deflagration/overpressurizations within the UNDERGROUND. These events could cause a release of radiological material into the UNDERGROUND atmosphere, which if left unfiltered would be released to the environment and affect facility workers at the WASTE FACE and co-located workers outside the UNDERGROUND. The safety analysis identified a potential for high consequences to the facility workers and co-located workers. Assumptions for the analysis (Ref. 8) include the following: • An RH WASTE CONTAINER inside a Facility Cask/LWFC is protected from fires. • Waste generator sites' compliance with the WIPP WAC. • Configuration of Waste Shaft Access area reduces the likelihood for vehicle/ equipment drop down the shaft. • The Waste Hoist Support Structure design reduces the likelihood for failure of the waste shaft conveyance. • The salt construction of the UNDERGROUND provides no means for propagation of a fire. • UNDERGROUND Fuel and Oil Storage Areas are separate from WH and Storage Areas. The DSA assumes that using UVFS and/or IVS exhaust fan(s) to draw the UNDERGROUND atmosphere through a HEPA filter unit with greater than or equal to 99% efficiency reduces the consequences to co-located workers. An IN SERVICE exhaust fan and HEPA filter unit provides for all disposal circuit exhaust air to be filtered prior to release to the environment. The operation of one UVFS/IVS exhaust fan drawing air through any HEPA filter unit is sufficient to provide the safety function assumed in the DSA. Additionally, this LCO provides protection to facility workers at the WASTE FACE by ensuring airflow through an ACTIVE ROOM when manned to draw air across the WASTE FACE and away from the facility workers so that in the event of a release the facility worker is protected.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

LCO The UVFS /IVS SHALL be OPERABLE. An OPERABLE UVFS/IVS consists of the following elements:

- IN SERVICE alignment of UVFS/IVS exhaust fan(s) and OPERABLE HEPA filter unit complement in accordance with Table 3.2.3-1.
- Differential pressure across each IN SERVICE HEPA filter bank less than or equal to +3.89 inches w.g. and greater than or equal to +0.31 inches w.g. locally.
- IN SERVICE HEPA filter unit efficiency of greater than or equal to 99%.
- Differential pressure less than or equal to -0.09 inches w.g. across the 308 Bulkhead.
- Airflow into the ACTIVE ROOM while manned.
- OPERABLE pressure differential instrumentation and CMR alarm indications as identified in Table 3.2.3-2 and Table 3.2.3-3.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

LCO (continued)

This LCO addresses the OPERABILITY requirements for the UVFS/IVS. This lowest functional capability is met by an operating UVFS/IVS exhaust fan drawing air through an OPERABLE HEPA filter unit before discharging to the environment.

OPERABILITY of the UVFS/IVS requires that sufficient differential pressure is maintained in the Exhaust Drift and sufficient air flow is provided to the intake of ACTIVE ROOMS when manned. Table 3.2.3-1 identifies allowed UVFS/IVS exhaust fan and HEPA filter unit alignments that provide this required differential pressure. An IN SERVICE check of alignment of UVFS/IVS exhaust fan(s) and OPERABLE HEPA filter unit complement in accordance with Table 3.2.3-1 is required to demonstrate OPERABILITY. The flow of air from the UNDERGROUND through a HEPA filter unit and exhausted is sufficient to provide the assumed level of mitigation for pool fires, combustible material fires, and internal WASTE CONTAINER fires. Therefore, an OPERABLE UVFS/IVS is satisfied by one IN SERVICE exhaust fan aligned to and drawing air through an OPERABLE HEPA filter unit.

The UVFS exhaust fans can only draw exhaust air from the UVFS HEPA filter units and likewise, the IVS exhaust fans can only draw exhaust air from the IVS HEPA filter units. (Ref. 1). Acceptable exhaust fan alignments for the UVFS and IVS are identified in Table 3.2.3-1 and consist of the following alignments:

1. Only one UVFS exhaust fan (41-B-860A, 41-B-860B, or 41-B-860C) IN SERVICE at one time; or
2. Both of the IVS exhaust fans (41-B-960A and 41-B-960B) IN SERVICE; or
3. One UVFS exhaust fan (41-B-860A, 41-B-860B, or 41-B-860C) IN SERVICE with one IVS exhaust fan (41-B-960A or 41-B-960B) IN SERVICE at the same time, or
4. One UVFS exhaust fan (41-B-860A, 41-B-860B, or 41-B-860C) IN SERVICE with both IVS exhaust fans (41-B-960A and 41-B-960B) IN SERVICE at the same time.

Each UVFS exhaust fan draws from both HEPA filter units 41-B-856 and 41-B-857 while each IVS exhaust fan can draw from only one of the two HEPA filter units 41-B-956 or 41-B-957.

Table 3.2-3-1 identifies the various exhaust fan and filter alignments that provide the required ventilation flowrates for the various operations that are performed in the UNDERGROUND and provide flexibility to Operations in maintaining the needed air flow requirements and the differential pressure.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

LCO (continued)

The HEPA filter units (41-B-856, 41-B-857, 41-B-956, and 41-B-957) are considered OPERABLE when the differential pressure across each IN SERVICE HEPA filter bank is less than or equal to +3.89 inches w.g. and greater than or equal to +0.31 inches w.g. locally, and the HEPA filter unit has been tested to ENSURE it is greater than or equal to 99% efficient.

The HEPA filter bank high value is based on a safety analysis differential pressure of less than +4.0 inches w.g. and applying a calculated instrument loop uncertainty (Ref. 9). This gives a value of +3.89 inches w.g. The maximum differential pressure allowed ensures that the HEPA filter banks are functioning properly and that the HEPA filter unit banks are not clogged or damaged. Establishing a maximum differential pressure limit also prevents filter blowout that could release unfiltered air in the exhaust stream.

Likewise, the HEPA filter bank minimum differential pressure ensures that the HEPA filter banks are not being bypassed. This is based on a safety analysis differential pressure of greater than +0.20 inches w.g. and applying a calculated instrument loop uncertainty (Ref. 9). This gives a value of +0.31 inches w.g. for the minimum differential pressure allowed.

The HEPA filter bank high CMR alarm is also based on a safety analysis differential pressure of less than +4.0 inches w.g. and applying calculated instrument loop uncertainty (Ref. 6), which gives a value of +3.94 inches w.g. The noted differential pressures values are indicated in the CMR on one or more monitors and audibly alarmed if outside the acceptable range.

Likewise, the HEPA filter bank minimum differential pressure CMR alarm ensures that the HEPA filter banks are not being bypassed. This is based on a safety analysis differential pressure of greater than +0.20 inches w.g. and applying calculated instrument loop uncertainty (Ref. 6), which gives a value of +0.26 inches w.g. The noted differential pressures values are indicated in the CMR on one or more monitors and audibly alarmed if outside the acceptable range.

Each HEPA filter bank of each UVFS/IVS HEPA filter unit is tested ANNUALLY in accordance with ASME N510, *Testing of Nuclear Air-Treatment Systems,* or ASME N511, *In-Service Testing of Nuclear Air Treatment, Heating, Ventilating and Air-Conditioning Systems*, in accordance with the system code of record to provide filtration efficiency of greater than or equal to 99%. The in-place leak test described by ASME N510 or ASME N511 in accordance with the system code of record is used to conduct a periodic surveillance to reconfirm the performance of the HEPA filtration system. The in-place leak test confirms the safety basis assumptions of filtration system efficiency greater than 99 percent. The in-place leak tests use a poly-dispersed aerosol test (0.3–0.7 microns aerodynamic equivalent diameter) and determines the system efficiency of each HEPA filter bank is greater than or equal to 99% accounting for the system components (i.e., gaskets, frame, housing, etc.) that are typically challenged. The test is performed under actual conditions and at operational airflow.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

LCO (continued)

UVFS/IVS OPERABILITY requires that a negative differential pressure is maintained of less than or equal to -0.09 inches w.g. across the 308 Bulkhead, which represents the flow direction from E-140 to E-300. This value is based on a safety analysis differential pressure of being less than or equal to -0.05 inches w.g. and applying a calculated instrument loop uncertainty value (Ref. 5). This gives a value of -0.09 inches w.g. The audible alarm value set in the CMR is less than or equal to -0.09. Ventilation modeling (Ref. 7) confirms that maintaining negative differential pressure across the 308 Bulkhead is sufficient to ensure adequate UNDERGROUND ventilation.

UVFS/IVS OPERABILITY ensures that airflow is being drawn into the ACTIVE ROOM. This in turn provides assurance that the air is directed to the Disposal Room exhaust drift. This Disposal Room air pathway directs air away from facility workers working at the CH WASTE FACE in the event of a radiological release event.

Airflow over the Waste Containers is ensured if air is moving into the ACTIVE ROOM through the intake air drift. This flow direction combined with a negative pressure on the 308 Bulkhead confirms that all air in the disposal circuit is exhausted to E-300 and up the Exhaust Shaft and through the HEPA filters and the surface exhaust fans. The flow direction once confirmed as entering an ACTIVE ROOM through the intake air drift will travel over the Waste Containers. This is confirmed by ventilation modeling (Ref. 7) and by the fact that air will flow from high to low pressure. The qualitative verification of flow direction can be performed by a smoke test or an anemometer. The test can be in done accordance with the recommendations and techniques specified in ETO-Z-269, *Engineering Recommendations on how to Perform Air Flow Volume Readings in the WIPP Underground* (Ref. 10).

An ACTIVE ROOM is a room in a Disposal Panel that contains emplaced WASTE and is not a filled room, or has not been isolated. An ACTIVE PANEL has not been physically closed with a permanent or interim panel closure system that isolates the filled panel from the active portions of the disposal area. Panel closure removes the panel from active ventilation.

UVFS/IVS OPERABILITY also requires that the pressure differential transmitters and instrument loops with associated instrumentation identified in Table 3.2.3-2 and the local gauges identified Table 3.2.3-3 are CALIBRATED ANNUALLY.

A FUNCTIONAL TEST is also performed ANNUALLY on the indicated differential pressure instrument loops identified in Table 3.3.3-2 to VERIFY that when the alarm set points are reached, a CMR audible alarm is sounded and visually displayed on one or more monitors.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

MODE Applicability	WASTE is brought into the UNDERGROUND in CH and RH WASTE CONTAINERS. The CH and RH WASTE CONTAINERS could be subject to pool fires, combustible material fires, or internal WASTE CONTAINER fires while in transit in the UNDERGROUND or during long-term storage. Therefore, this LCO is applicable during WASTE HANDLING and DISPOSAL.
PROCESS AREA Applicability	The events identified in the safety analysis were located in the UNDERGROUND, which includes the Waste Shaft, WASTE SHAFT STATION, TRANSPORT PATH, and DISPOSAL ROOM(S).
ACTIONS	
A.1	Condition A is entered if the CMR alarm indication for differential pressure across the 308 Bulkhead is NOT OPERABLE. As permitted by LCO 3.0.4, an exception to its requirements is made for LCO Condition A. The exception permits the PROCESS AREA in Condition A to change from the DISPOSAL and WASTE HANDLING and back for administrative purposes provided the Required Actions and associated Completion Times for the Condition are met (i.e., no new Completion Time clock for each MODE change). The current ACTIONS of the Condition do not require placement of the PROCESS AREA into a defined MODE but allow continued operation provided the Required Actions and Completion Times are met. MODE changes that are of an administrative nature, (e.g., shift complement) do not result in a reduced safety posture in that the LCO allows continued operation for a limited time (i.e., 31 Days). Therefore, the movement between WASTE HANDLING and DISPOSAL MODES does not inject any additional risk than was previously allowed. This exception is therefore, consistent with the text and intent of LCO 3.0.4. As indicated in LCO 3.0.4, SR 4.0.4 is not applicable to the NOT OPERABLE equipment. This Required Action requires ENSURING that the Supplemental Ventilation System fan is secured IMMEDIATELY. This terminates power to the Supplemental Ventilation System fan and places the Supplemental Ventilation System in a SAFE CONFIGURATION. This prevents the misdirection of UNDERGROUND air in the event that negative differential pressure across the 308 Bulkhead is indeterminate. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to safely secure the Supplemental Ventilation System.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

A.2.1/A.2.2	These compensatory Required Actions provide an equivalent level of compensatory measures to be implemented within 1 Hour and every 4 Hours thereafter in the event that the instrument loop (54A160528) that provides indication of the differential pressure across 308 Bulkhead to the CMR is NOT OPERABLE. Both the Required Action A.2.1/A.2.2 provide confirmation that the UVFS/IVS is providing adequate ventilation to the UNDERGROUND and that the exhaust air from the UNDERGROUND is being drawn into the Exhaust Shaft and exhausted through the UVFS/IVS HEPA filter units. The A.2.1 Required Action requires VERIFICATION that the differential pressure across the 308 Bulkhead is less than or equal to -0.09 inches w.g. per the pressure differential transmitter (534-PDIT-160-528) local gauge within 1 Hour and every 4 Hours afterwards if the UNDERGROUND is manned until the CMR differential pressure monitor indication is restored. With consideration of calculated instrument loop uncertainties (Ref. 10), the value read locally SHALL be less than or equal to -0.09 inches w.g. This ACTION provides an alternate methodology to confirm that required negative differential pressure is being maintained across the 308 Bulkhead. An initial Completion Time of 1 Hour provides time to verify differential pressure locally. The 1 Hour time for completion is acceptable insofar as the negative differential pressure at the 308 Bulkhead is ensured by continued operation of the UVFS/IVS. Every 4 Hours thereafter is adequate to ensure that the necessary negative differential pressure is being maintained.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

A.2.1/A.2.2 (continued)	The A.2.2 Required Action requires VERIFICATION that UVFS/IVS exhaust fan(s) is/are IN SERVICE in an acceptable exhaust fan alignment per Table 3.2.3-1 to maintain the negative differential pressure across the 308 Bulkhead within 1 Hours and every 4 Hours thereafter if the UNDERGROUND is unmanned, until the CMR differential pressure monitor indication is restored. Acceptable exhaust fan alignments are as follows: 1. Only one UVFS exhaust fan (41-B-860A, 41-B-860B, or 41-B-860C) IN SERVICE at one time; 2. Both of the IVS exhaust fans (41-B-960A and 41-B-960B) IN SERVICE; or 3. One UVFS exhaust fan (41-B-860A, 41-B-860B, or 41-B-860C) IN SERVICE with one IVS exhaust fans (41-B-960A or 41-B-960B) IN SERVICE at the same time. 4. One UVFS exhaust fan (41-B-860A, 41-B-860B, or 41-B-860C) IN SERVICE with both IVS exhaust fans (41-B-960A and 41-B-960B) IN SERVICE at the same time. This provides alternate methodology to confirm that required negative differential pressure is being maintained across the 308 Bulkhead if the UNDERGROUND is unmanned. UNDERGROUND ventilation studies (Ref. 7) provide confirmation that requisite negative pressure is maintained across the 308 Bulkhead if the UVFS/IVS is IN SERVICE in an acceptable alignment. A Completion Time of 1 Hour provides for VERIFICATION via visual confirmation of CMR monitor indication of the current UVFS/IVS exhaust fan alignment and operational status. The 1 Hour time for completion is acceptable insofar as the negative differential pressure at the 308 Bulkhead is ensured by continued operation of the UVFS/IVS. Every 4 Hours thereafter is adequate to ENSURE that the necessary negative differential pressure is being maintained by the IN SERVICE exhaust fans.
A.3	This Required Action requires that instrument loop 54A160528, which provides for indication of the differential pressure cross 308 Bulkhead in the CMR, be restored within 31 Days. A Completion Time of 31 Days allows sufficient time to repair or CALIBRATE the differential pressure instrument loop to the CMR while minimizing the time at risk for not having real time display of the 308 Bulkhead differential pressure indicated in the CMR.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

Condition B SHALL be entered if the CMR alarm indication for differential pressure across an IN SERVICE HEPA filter bank is NOT OPERABLE. It is noted that separate Condition entry is allowed for each NOT OPERABLE CMR alarm indication.

As permitted by LCO 3.0.4, an exception to its requirements is made for this LCO Condition B. The exception permits the PROCESS AREA in Condition B to change from the DISPOSAL and WASTE HANDLING and back for administrative purposes provided the Required Actions and associated Completion Times for the Condition are met (i.e., no new Completion Time clock for each MODE change). The current ACTIONS of the Condition do not require placement of the PROCESS AREA into a defined MODE but allow continued operation provided the Required Actions and Completion Times are met. MODE changes that are of an administrative nature, (e.g., shift complement) do not result in a reduced safety posture in that the LCO allows continued operation for a limited time (i.e., 31 Days). Therefore, the movement between WASTE HANDLING and DISPOSAL MODES does not inject any additional risk than was previously allowed. This exception is, therefore, consistent with the text and intent of LCO 3.0.4. As indicated in LCO 3.0.4, SR 4.0.4 is not applicable to the NOT OPERABLE equipment.

B.1 This Required Action requires VERIFICATION of the differential pressure for the affected HEPA filter bank instrument loop(s) that is(are) NOT OPERABLE to be within the acceptable range as specified in Table 3.2.3-3 for the applicable local gauge(s) within 1 Hour and every 12 Hours thereafter.

Local gauges provide accurate differential pressure indication for the affected instrument loop(s). Performance within 1 Hour and every 12 Hours thereafter is adequate to confirm the differential pressures for the affected instrument loop(s) as HEPA filter bank differential pressures remain relatively stable over time.

B.2 This Required Action requires restoration of the affected CMR differential pressure instrument loop(s) within 31 Days. The 31 Days provides reasonable time for determination of the cause of the Condition and to complete efforts to restore the affected instrument loop(s) to OPERABLE status. A Completion Time of 31 Days may be necessary to identify the cause of the instrument loop(s) Condition, to obtain the necessary parts and/or components required to repair the instrument loop(s) and to perform the work to restore the instrument loop(s) OPERABILITY. A Completion Time of 31 Days is considered sufficient to restore the system while minimizing the time-at-risk by performance of differential pressure surveillances using local gauges in Action B.1.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

C.1	Condition C SHALL be entered if there is no airflow into the ACTIVE ROOM while manned. This Required Action requires that no new WASTE CONTAINERS be introduced into the UNDERGROUND IMMEDIATELY. This prohibition limits the amount of MAR in the UNDERGROUND and eliminates the risk from the need for additional movement CH and RH WASTE CONTAINERS in the TRANSPORT PATH to the ACTIVE ROOM. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to prevent introduction of new CH and RH WASTE CONTAINERS into the UNDERGROUND.
C.2	This Required Action requires ENSURING that the Supplemental Ventilation System fan is secured IMMEDIATELY. This terminates power to the Supplemental Ventilation System fan and places the Supplemental Ventilation System in a SAFE CONFIGURATION. This prevents the misdirection of UNDERGROUND air in the event that airflow into the ACTIVE ROOM is not being maintained. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to safely secure the Supplemental Ventilation System.
C.3	This Required Action requires placing the ACTIVE ROOM in a SAFE CONFIGURATION within 2 Hours. This requires placement of CH and RH WASTE CONTAINERS inside an ACTIVE ROOM in the least vulnerable location while minimizing time at risk for personnel inside the ACTIVE ROOM. A Completion Time of 2 Hours allows for safe placement of any vulnerable WASTE CONTAINERS within the ACTIVE ROOM that could be in process of unloading from a WASTE Transport Vehicle.
C.4	This Required Action requires placing WASTE CONTAINERS that are not stored within the ACTIVE ROOM in a SAFE CONFIGURATION within 2 Hours. This requires placement of CH and RH WASTE CONTAINERS that could be in transit in the TRANSPORT PATH in the least vulnerable location. This location could include the ACTIVE ROOM. A Completion Time of 2 Hours allows for safe placement of any vulnerable WASTE CONTAINERS.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

C.5	This Required Action requires ENSURING that the ACTIVE ROOM is not manned within 4 Hours. This ENSURES that no personnel remain in the ACTIVE ROOM until such time that positive air flow is restored into the ACTIVE ROOM. The Completion Time of 4 Hours allows for completion of Required Actions C.3 and C.4 and for safe personnel egress from the ACTIVE ROOM. The Required Action is judged to sufficiently reduce the risk from radiological exposure for personnel inside of ACTIVE ROOMS.
D.1	Condition D is entered if the UVFS/IVS is NOT OPERABLE. It is noted that Condition D SHALL not be entered if no UVFS/IVS exhaust fans are IN SERVICE. Condition E is to be entered to address this condition. UVFS/IVS OPERABILITY requires that the six elements of LCO 3.2.3 are met at all times except as allowed under the Required Actions for Condition A, Condition B, and Condition C. Failure to meet UVFS/IVS OPERABILITY prescribed elements, or Required Actions and/or Completion Times for Condition A.3 or B.2 are not met, entry into Condition D is required. This Required Action requires that no new WASTE CONTAINERS be introduced into the UNDERGROUND IMMEDIATELY. This prohibition limits the amount of MAR in the UNDERGROUND and eliminates the risk from the need for additional movement CH and RH WASTE CONTAINERS in the TRANSPORT PATH to the ACTIVE ROOM. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to prevent introduction of new CH and RH WASTE CONTAINERS into the UNDERGROUND.
D.2	This Required Action requires ENSURING that the Supplemental Ventilation System fan is secured IMMEDIATELY. This terminates power to the Supplemental Ventilation System fan and places the Supplemental Ventilation System in a SAFE CONFIGURATION. This prevents the misdirection of air in the UNDERGROUND. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to safely secure the Supplemental Ventilation System.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

D.3	This Required Action requires placing WASTE CONTAINERS that are either within the ACTIVE ROOM and/or in the TRANSPORT PATH in a SAFE CONFIGURATION within 4 Hours. This allows for safe placement of any vulnerable WASTE CONTAINERS within the ACTIVE ROOM that could be in process of unloading from a WASTE Transport Vehicle and for placement of CH and RH WASTE CONTAINERS that could be in transit in the TRANSPORT PATH in the least vulnerable location. A Completion Time of 4 Hours allows for safe placement of any vulnerable UNDERGROUND WASTE CONTAINERS.
D.4	This Required Action requires placing UNDERGROUND liquid-fueled vehicles/equipment within 200 feet of a WASTE FACE in a SAFE CONFIGURATION within 4 Hours. A Completion Time of 4 Hours allows for sufficient time to move liquid-fueled vehicles/equipment to greater than 200 feet of the WASTE FACE. This Required Action protects the WASTE FACE from pool fires due to liquid-fueled vehicles/equipment.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

D.5.1/D.5.2	These compensatory Required Actions provide an equivalent level of compensatory measures to be implemented within 31 Days if the UVFS/IVS is NOT OPERABLE or the Required Actions and/or Completion Times for Condition A.3 or B.3 are not met. Because the Required Actions are separated by an "OR", one of these Required Actions must be completed within 31 Days of entering the Condition. Successful performance of either Required Action removes the facility from the LCO Condition. Required Action D.5.1/D.5.2 requires the UVFS/IVS to be returned to OPERABLE status or the implementation of a CBFO-approved RESPONSE PLAN to address the NOT OPERABLE UVFS/IVS within 31 Days. The D.5.1 Required Action requires restoration of the UVFS/IVS to OPERABLE status within 31 Days. Efforts to restore the UVFS/IVS OPERABILITY will continue as the introduction of new WASTE CONTAINERS into the UNDERGROUND remains prohibited, the Supplemental Ventilation System remains secured, and WASTE CONTAINERS in the UNDERGROUND have been placed in a SAFE CONFIGURATION. Implementation of these Required Actions ENSURES that there is limited risk for WASTE CONTAINERS to be exposed to pool fires, combustible material fires, or internal WASTE CONTAINER fires that would require UVFS/IVS mitigation. Additionally, SAC 5.5.8, "Real Time Monitoring for Exothermic Chemical Reaction of Non-Compliant Containers in Panel 6 and/or Panel 7, Room 7" provides for real time monitoring for elevated airborne radioactive material levels from exothermic chemical reactions of non-compliant containers by detecting and promptly alerting facility workers that may be in the proximity during this time. A Completion Time of 31 Days may be necessary to identify the cause of the UVFS/IVS condition, to obtain the necessary parts and/or components required to repair the UVFS/IVS, and to perform the work to restore the UVFS/IVS OPERABILITY. The compensatory actions in place during the 31 Days to complete this Required Action are judged to sufficiently reduce the risk of an event requiring the safety function provided by the UVFS/IVS.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

D.5.1/D.5.2 (continued)	In the event it is determined that Required Actions D.5.1 cannot be accomplished within the 31 Day Completion Time, Required Action D.5.2 is provided to require that a CBFO-approved Response Plan be implemented to address the Condition. To support the completion of this Required Action within 31 Days, the RESPONSE PLAN must be prepared, approved by CBFO, and implemented. All of these actions should be considered in achieving the required Completion Time of 31 Days. The plan content should specify, based on existing conditions, the detailed plan of action for restoring compliance with the LCO. The planned actions may include new or revised procedures, work control documents, and/or Unreviewed Safety Question Evaluations. Section 5.4.4 of this TSR discusses the use and content of RESPONSE PLANS. This Required Action is judged to sufficiently reduce risk for personnel that may be required to enter the UNDERGROUND before the UVFS/IVS is restored to OPERABLE status.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

E.1	Condition E is entered if the UVFS/IVS is NOT OPERABLE due to no UVFS/IVS exhaust fans being IN SERVICE. This condition is considered to require more prompt action to place the UNDERGROUND WASTE CONTAINERS in a SAFE CONFIGURATION in the case that the UVFS/IVS exhaust fans are not providing constant air movement to support liquid-fueled vehicles/equipment use in the UNDERGROUND. Required Action E.1 requires that no new WASTE CONTAINERS be introduced into the UNDERGROUND IMMEDIATELY. This prohibition limits the amount of MAR in the UNDERGROUND and eliminates the risk from the need for additional movement CH and RH WASTE CONTAINERS in the TRANSPORT PATH to the ACTIVE ROOM. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to prevent introduction of new CH and RH WASTE CONTAINERS into the UNDERGROUND.
E.2	This Required Action requires ENSURING that the Supplemental Ventilation System fan is secured IMMEDIATELY. This terminates power to the Supplemental Ventilation System fan and places the Supplemental Ventilation System in a SAFE CONFIGURATION. This prevents the misdirection of air in the UNDERGROUND. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to safely secure the Supplemental Ventilation System.
E.3	This Required Action requires placing WASTE CONTAINERS that are either within the ACTIVE ROOM and/or in the TRANSPORT PATH in a SAFE CONFIGURATION IMMEDIATELY. This requires prompt and sustained action to place any vulnerable WASTE CONTAINERS within the ACTIVE ROOM or that could be in transit in the TRANSPORT PATH in the least vulnerable location. A Completion Time of IMMEDIATELY is required due to air quality concerns that could be present lacking constant UNDERGROUND ventilation and filtration.
E.4	The Required Action requires placing UNDERGROUND liquid-fueled vehicles/equipment in a SAFE CONFIGURATION IMMEDIATELY. This requires vehicles/equipment that are in use to be put in a least vulnerable location without delay and for the vehicle/equipment to then be shut off as soon as safe to do so. A Completion Time of IMMEDIATELY is required due to air quality concerns that could be present lacking constant UNDERGROUND ventilation and filtration.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

E.5.1/E.5.2

These compensatory Required Actions provide an equivalent level of compensatory measures to be implemented within 31 Days if no UVFS/IVS exhaust fans are IN SERVICE. Because the Required Actions are separated by an "OR", one of these Required Actions must be completed within 31 Days of entering the Condition. Successful performance of either Required Action removes the facility from the LCO Condition. Required Action E.5.1/E.5.2 requires the UVFS/IVS to be returned to OPERABLE status or the implementation of a CBFO-approved RESPONSE PLAN to address the NOT OPERABLE UVFS/IVS within 31 Days.

The E.5.1 Required Action requires restoration of the UVFS/IVS exhaust fan(s) alignment in accordance with Table 3.2.3-1 within 31 Days.

Efforts to restore the UVFS/IVS OPERABILITY will continue as the introduction of new WASTE CONTAINERS into the UNDERGROUND remains prohibited, the Supplemental Ventilation System remains secured, and WASTE CONTAINERS in the UNDERGROUND have been placed in a SAFE CONFIGURATION. Implementation of these Required Actions ENSURES that there is limited risk for WASTE CONTAINERS to be exposed to pool fires, combustible material fires, or internal WASTE CONTAINER fires that would require UVFS/IVS mitigation. Additionally, SAC 5.5.8, "Real Time Monitoring for Exothermic Chemical Reaction of Non-Compliant Containers in Panel 6 and/or Panel 7, Room 7" provides for real time monitoring for elevated airborne radioactive material levels from exothermic chemical reactions of non-compliant containers by detecting and promptly alerting facility workers that may be in the proximity during this time.

A Completion Time of 31 Days may be necessary to identify the cause of the UVFS/IVS condition, to obtain the necessary parts and/or components required to repair the UVFS/IVS, and to perform the work to restore the UVFS/IVS OPERABILITY. The compensatory actions in place during the 31 Days to complete this Required Action are judged to sufficiently reduce the risk of an event requiring the safety function provided by the UVFS/IVS.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

ACTIONS (continued)

E.5.1/E.5.2 (continued)	In the event it is determined that Required Actions E.5.1 cannot be accomplished within the 31 Day Completion Time, Required Action E.5.2 is provided to require that a CBFO-approved RESPONSE PLAN be implemented to address the Condition. To support the completion of this Required Action within 31 Days, the RESPONSE PLAN must be prepared, approved by CBFO, and implemented. All of these actions should be considered in achieving the required Completion Time of 31 Days. The plan content should specify, based on existing conditions, the detailed plan of action for restoring compliance with the LCO. The planned actions may include new or revised procedures, work control documents, and/or Unreviewed Safety Question Evaluations. Section 5.4.4 of this TSR discusses the use and content of RESPONSE PLANS. This Required Action is judged to sufficiently reduce risk for personnel that may be required to enter the UNDERGROUND before the UVFS/IVS is restored to OPERABLE status.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

Surveillance Requirements

SR 4.2.3.1	The SR requires DAILY VERIFICATION that the differential pressure across each HEPA filter bank of each IN SERVICE HEPA filter unit is less than or equal to +3.89 inches w.g. and greater than or equal to +0.31 inches w.g. The SR is performed by reading the HEPA filter bank pressure differential local gauges listed in Table 3.2.3-3. VERIFICATION that the differential pressure across each HEPA filter bank of each IN SERVICE HEPA filter unit is within the specified acceptable range DAILY is adequate to demonstrate HEPA filter unit OPERABILITY. Failure to meet or perform this SR requires entry into Condition D.
SR 4.2.3.2	This SR requires DAILY VERIFICATION that the IN SERVICE alignment and configuration of UVFS/IVS exhaust fan(s) and OPERABLE HEPA filter units' complement is in accordance with Table 3.2.3-1. This SR is performed by visual observation of exhaust fan and HEPA filter status and alignment as indicated in the CMR by graphic visual display on one or more CMR monitors or locally. VERIFICATION that the UVFS/IVS exhaust fans and HEPA filter units' complements are properly aligned and IN SERVICE in accordance with Table 3.2.3-1 DAILY is adequate to demonstrate OPERABILITY. Failure to meet or perform this SR requires entry into Condition D.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.2.3.3

This SR requires VERIFICATION of airflow direction into an ACTIVE ROOM prior to ACTIVE ROOM entry each shift and following any change of exhaust fan alignment when the ACTIVE ROOM is manned, and following any change of ventilation bulkhead alignment that can affect the airflow to the ACTIVE ROOM when manned. Indication of airflow direction into the ACTIVE ROOM is obtained manually via a simple smoke test or via a calibrated anemometer or smoke/aerosol test. The anemometer flowrate measurement or smoke/aerosol test is taken in the intake drift of the ACTIVE ROOM while standing directly outside of the ACTIVE ROOM. This SR is adequate to demonstrate that the UVFS/IVS is OPERABLE and IN SERVICE and providing airflow into the ACTIVE ROOM to allow facility workers safe entry and habitation of the room while work is being performed. The method can be in accordance with ETO-Z-269 (Ref. 10). For entries that are not related to waste handling activities, a simple smoke test indicating flow direction is also acceptable. Either of the methods is acceptable to support directional flow across the Active WASTE FACE to the exhaust drift.

The frequency of Prior to Active Room entry each shift, and following any changes to the exhaust fan alignment, or following changes of ventilation bulkhead configuration that can affect the flow to the Active Room is adequate to demonstrate that the UVFS/IVS is Operable and In Service, and providing airflow into the Active Room to allow facility workers safe entry and habitation of the room while performing work at the WASTE FACE. The “Prior to” frequency is typically completed at the start of the shift and once successfully completed will remain valid for the entire operating shift that it was performed in, similar to the TSR definition of “PRIOR TO USE.” Therefore, the Prior to Active Room entry each shift frequency allows the verification of directional flow once per shift based upon the other conditional performances if conditions change. If there are changes to the ventilation bulkhead alignment or the exhaust fan alignment during the shift, it could affect the air flow across the Active WASTE FACE. Each time there is a change in either the bulkhead alignment or the exhaust fan alignment, the flow test must be re-performed to verify the air flow is directed across the WASTE FACE.

Failure to meet or perform this SR requires entry into Condition C.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.2.3.4	This SR requires VERIFICATION that each IN SERVICE UVFS/IVS HEPA filter bank of each HEPA filter unit 41-B-856, 41-B-857, 41-B-956, and 41-B-957 has a filtration efficiency of greater than or equal to 99% ANNUALLY. This is confirmed by an in-place leak test performed in accordance with ASME N510 or ASME N511 in accordance with the system code of record. The in-place leak tests use a poly-dispersed aerosol test (0.3-0.7 micron aerodynamic equivalent diameter) and determines the system efficiency accounting for the system components (i.e., gaskets, frame, housing, etc.) that are typically challenged. The test is performed under actual conditions and at operational airflow in accordance with the applicable system code of record ASME N510 or ASME N511 guidance by qualified/trained individuals. The performance testing allows for correction and maintenance of the HEPA filter banks in the event that efficiency values are not a minimum of 99%. ANNUAL VERIFICATION of HEPA filter bank efficiency as recommended by ASME N510 ASME N511 in accordance with the system code of record is adequate to demonstrate that the HEPA filter unit is OPERABLE (Ref. 3). Failure to meet or perform this SR requires entry into Condition D. It is noted that the extension of SR 4.0.2 does not apply to this SR. This SR is driven by a national standard that does not provide for a timeframe extension for performance of this SR.
SR 4.2.3.5	This SR requires that a CALIBRATION be performed on the pressure differential transmitters and applicable instrumentation for the instrument loops listed in Table 3.2.3-2 and the gauges as listed in Table 3.2.3-3 ANNUALLY. Differential pressure instrumentation is stable and not typically subjected to adverse conditions that would cause it to lose accuracy. The ANNUAL FREQUENCY interval is based upon industry recommended standard CALIBRATION frequencies for this type of instrumentation. Failure to meet or perform this SR requires entry into Condition D.
SR 4.2.3.6	This SR requires that an ANNUAL FUNCTIONAL TEST be performed on the differential pressure alarm instrument loops as indicated in Table 3.2.3-2. The ANNUAL differential pressure instrumentation loop FUNCTIONAL TEST consists of injection of a simulated or actual signal into the instrument loop, at the input of the pressure differential transmitter, to VERIFY OPERABILITY of the differential pressure instrumentation and audible CMR alarm and visual indication on one or more monitors, if the values are outside the acceptable range. The ANNUAL FREQUENCY is based upon industry recommended FUNCTIONAL TEST frequencies for this type of instrumentation. Failure to meet or perform this SR requires entry into Condition D.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.3 UNDERGROUND Ventilation Filtration System/Interim Ventilation System (continued)

Bases (continued)

References

1. SDD VU00, *Underground Ventilation System Design Description (SDD)* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.

2. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

3. ASME N510-1989, *Testing of Nuclear Air-Treatment Systems*, American Society of Mechanical Engineers, New York, NY.

4. ASME N511-2007, In-Service Testing of Nuclear Air Treatment, Heating, Ventilating and Air-Conditioning Systems, American Society of Mechanical Engineers, New York, NY.

5. CALC-15-029, *Loop Accuracy for a New Pressure Transmitters at Bulkhead 308 Rev. 1*, Nuclear Waste Partnership LLC, Carlsbad, NM, February 2016.

6. ETO-K-224, Rev. 2, *Uncertainty of Instrumentation Loops for Differential Pressure Measurement Across HEPA Filter Banks*, Nuclear Waste Partnership LLC, Carlsbad, NM, April 2016.

7. Memorandum from Keith Wallace, Mine Ventilation Services, Inc., to Jill Farnsworth, Nuclear Waste Partnership, *Modeling UVFS/IVS Fan Configurations with Various NVPs and Upset Conditions*, April 13, 2016.

8. WIPP-021, *Hazards Analysis for the Waste Isolation Pilot Plant Transuranic Waste Handling Safety Basis*, Revision 8, Nuclear Waste Partnership LLC, Carlsbad, NM.

9. CALC-16-008, *Uncertainty of Mechanical Gauges for Differential Pressure Measurement across HEPA Filter Banks,* Revision 1, Nuclear Waste Partnership LLC, Carlsbad, NM, April 2016.

10. ETO-Z-269, *Engineering Recommendations on how to Perform Air Flow Volume Readings in the WIPP Underground*, Rev. 1, Waste Partnership LLC, Carlsbad, NM, March 2016.

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS

Bases

Background Summary

The Underground Ventilation System (UVS) is designated as VU00 (Ref. 1). The system is designed to exhaust UNDERGROUND air through surface fans and filters.

Air enters the UNDERGROUND through the Air Intake Shaft, Salt Handling Shaft, and Waste Shaft. The air drawn down the Waste Shaft serves the WASTE SHAFT STATION operation and is exhausted directly to the Exhaust Shaft. The combined exhaust streams are drawn up the Exhaust Shaft, and discharged through HEPA filtration units. The Supplemental Ventilation System, if used, exhausts construction circuit air out of the Salt Shaft. Air flow dampers and regulators provide the capability to adjust the air flow rates in strategic UNDERGROUND areas.

The UVS is required to maintain a pressure differential between the UNDERGROUND Waste Handling Areas and the non-Waste Handling Areas such that air flow is always toward the Waste Handling Areas. The Waste Handling Areas will always have lower pressure. For Waste Handling considerations, the differential pressure is measured across the 308 Bulkhead in S-400 at E-300 and 309 Bulkhead in S-400 at W-30.

Differential pressure is measured at the 309 Bulkhead prior to the first DOWNLOAD of WASTE CONTAINERS with the Waste Shaft Conveyance and after any UVFS/IVS reconfiguration. The 309 Bulkhead consists of two walls with a chamber in between. The differential pressure is measured from inside the chamber to the WASTE SHAFT STATION side. A positive pressure indicates airflow is moving from the bulkhead chamber to the WASTE SHAFT STATION side ensuring no air can pass from the WASTE SHAFT STATION side to W-30. This is important during WASTE CONTAINER handling in the Waste Shaft. Six small fans that are mounted on the 309 Bulkhead wall can be turned on to boost the internal pressure from the 309 Bulkhead chamber to the WASTE SHAFT STATION side. These fans may be used as needed to comply with the Bulkhead 309 differential pressure requirements. If they are unavailable and the differential pressure cannot be maintained, safety is assured by not conducting WASTE DOWNLOADING operations. Thus, the fans themselves are not part of the SS safety function.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

Background Summary (continued)	Validating the differential pressure from the 309 Bulkhead chamber to the Waste Shaft side ensures airflow leakage across this bulkhead is from the construction circuit (W-30) to the WASTE SHAFT STATION. Differential pressure at the 309 Bulkhead is measured to ensure that positive air pressure is maintained from W-30 to the WASTE SHAFT STATION. From there, differential pressure across the 308 Bulkhead is measured to ensure that differential pressure across the 308 Bulkhead is less than or equal to -0.09 inches w.g. to ensure flow is moving from the WASTE SHAFT STATION to the Exhaust Shaft. Pressure differential transmitters at the 309 Bulkhead provide a signal to the CMS that provides a signal to the CMR. Within the CMR, the differential pressure values can be displayed on one or more CMR monitors. An audible alarm is sounded in the CMR and indicated on one or more monitors if the differential pressure indication is outside the acceptable range. Additionally, the CMR monitor(s) display the source of the alarm via screen background changes for the affected pressure differential transmitter(s) location(s). Differential pressure across the 309 Bulkhead is also indicated by local gauges.
Application to Safety Analysis	The DSA (Ref. 2) identified the potential for combustible material fire events occurring at the WASTE SHAFT STATION within the UNDERGROUND. These events could cause a release of radiological material into the UNDERGROUND atmosphere, which if left unfiltered would be released to the environment and affect co-located workers outside the UNDERGROUND. The DSA assumes that using UVFS and/or IVS exhaust fan(s) to draw air from the WASTE SHAFT STATION to the Exhaust Shaft and through a HEPA filter unit with greater than or equal to 99% efficiency reduces the consequences to co-located workers. An IN SERVICE exhaust fan and HEPA filter unit provides the required negative differential pressure in the UNDERGROUND to ensure air from the WASTE SHAFT STATION is exhausted through an IN SERVICE HEPA filter unit. The HEPA filter unit ensures that the exhaust air is filtered. Therefore, the operation of three UVFS/IVS exhaust fans drawing through HEPA filter units is sufficient to provide the safety function assumed in the DSA. Ventilation studies, DN-3590-29, Revision 4, Memorandum, Keith Wallace, Mine Ventilation Services, Inc., to Jill Farnsworth, NWP, dated April 13, 2019, *Modeling UVFS/IVS Fan Configuration with Various NVPs and Upset Conditions* (Ref. 5), have been performed that indicate a potential for upcasting could occur during certain temperature gradients between the UNDERGROUND and the surface. The study concluded that the upcasting condition could be eliminated if the UVFS/IVS had three exhaust fans IN SERVICE and 308 Bulkhead differential pressure was in the acceptable range.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

LCO

The LCO states that UVFS/IVS SHALL be OPERABLE. An OPERABLE UVFS/IVS includes the following elements:

- One UVFS exhaust fan (41-B-860A, 41-860-B, or 41-B-860C) IN SERVICE.
- Two IVS exhaust fans (41-B-960A and 41B-960B) IN SERVICE.
- Differential pressure across the 309 Bulkhead greater than or equal to +0.14 inches w.g. locally.
- Airflow at WASTE SHAFT STATION is towards 308 Bulkhead.
- OPERABLE pressure differential instrumentation and CMR alarm indication as identified in Table 3.2.4-1 and Table 3.2.4-2.

This LCO addresses the requirements for the UVFS/IVS to perform its safety function during DOWNLOAD of WASTE CONTAINERS. These requirements are established to ensure that UNDERGROUND air is HEPA filtered prior to release from the UNDERGROUND and that air flow is provided at the Active WASTE FACE when the room is manned. The 309 Bulkhead OPERABILITY control is an additional requirement for the UVFS/IVS that is required to be available when WASTE HANDLING ACTIVITIES are being performed in the Waste Shaft area. Therefore, to support adequate control and mitigation of the potential for a release of radioactive material, the controls from LCO 3.2.3 and this section are required to be in place during DOWNLOADING. A separate control was established for the 309 Bulkhead OPERABILITY because of its conditional applicability, the different pressure requirements, and the requirement of three exhaust fans being IN SERVICE to address the potential upcasting condition in the Waste Shaft.

This lowest functional capability is met by all three operating UVFS/IVS exhaust fans maintaining a positive differential pressure across the 309 Bulkhead with respect to airflow from the bulkhead chamber towards the WASTE SHAFT STATION. All three UVFS/IVS exhaust fans being IN SERVICE is required to ENSURE that adequate differential pressure is maintained across the 308 Bulkhead (Ref. 5). The 308 Bulkhead negative differential pressure (LCO 3.2.3) ensures that air from the WASTE SHAFT STATION in S-400 is directed towards the Exhaust Drift with the UVFS/IVS drawing UNDERGROUND atmosphere through an OPERABLE HEPA filter before discharging to the environment.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

LCO (continued)

UVFS/IVS OPERABILITY requires that a differential pressure is maintained of greater than or equal to +0.18 inches w.g. as measured at the 309 Bulkhead and indicated in the CMR, which represents the flow direction from between the 309 Bulkhead walls to S-400. This value is based on a safety analysis differential pressure of being greater than or equal to +0.05 inches w.g. and applying a calculated instrument loop uncertainty (Ref. 3).

The pressure differential transmitter at the 309 Bulkhead provides a signal to the CMS that provides a signal to the CMR. Within the CMR, the differential pressure values can be displayed on one or more CMR monitors. An audible alarm is sounded in the CMR if the differential pressure indication is outside the acceptable range. Differential pressure across the 309 Bulkhead is also indicated by local gauges.

Likewise, UVFS/IVS OPERABILITY requires that a differential pressure is maintained of greater than or equal to +0.14 inches w.g. as measured at the 309 Bulkhead and displayed on a local gauge, which also represents the flow direction from between the 309 Bulkhead walls to S-400. This value is based on a safety analysis differential pressure of being greater than or equal to +0.05 inches w.g. and applying a calculated instrument loop uncertainty (Ref. 4). This gives a value of +0.14 inches w.g.

Airflow at the WASTE SHAFT STATION is required to be directed towards the 308 Bulkhead during DOWNLOADING The use of airflow direction to support the verification of 309 Bulkhead OPERABILITY was selected as detailed in the ventilation study (Ref. 5) to show that the air was HEPA filtered prior to being exhausted. The check is a simple verification to show movement of airflow towards Bulkhead 308 and not up the Waste Shaft.

UVFS/IVS OPERABILITY also requires that the pressure differential transmitter and instrument loop, with associated instrumentation identified in Table 3.2.4-1 and Table 3.2.4-2, are CALIBRATED ANNUALLY to ensure assumed accuracy with instrument loop uncertainties and that the correct values are input to the CMS and read on one or more CMR monitors.

A FUNCTIONAL TEST is also performed ANNUALLY on the differential pressure instrument loop indicated in Table 3.2.4-1 to VERIFY that when the alarm set points are reached, audible CMR alarms are sounded.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

MODE Applicability	WASTE is brought into the UNDERGROUND in CH and RH WASTE CONTAINERS that are loaded onto the Waste Shaft Conveyance. The CH and RH WASTE CONTAINERS could be subject to drops down the Waste Shaft or CH and RH WASTE CONTAINERS at the WASTE SHAFT STATION could be subject to loss of confinement events. These activities are performed while in the WASTE HANDLING MODE in the WASTE SHAFT ACCESS AREA and the UNDERGROUND. To define the limited time that the LCO is applicable, the MODE applicability has been modified to address DOWNLOADING activities. DOWNLOAD is defined as "The transfer of WASTE CONTAINERS from the Waste Shaft Collar Room to the WASTE SHAFT STATION via the Waste Shaft Conveyance or from the WASTE SHAFT STATION to the Waste Shaft Collar Room." Therefore, this LCO is applicable during the WASTE HANDLING MODE when WASTE CONTAINERS are in various areas listed in the definition of DOWNLOADING.
PROCESS AREA Applicability	The WASTE SHAFT ACCESS AREA and UNDERGROUND is the applicable PROCESS AREA.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

ACTIONS

A.1

Condition A is entered if the CMR alarm indication for differential pressure across the 309 Bulkhead is NOT OPERABLE.

As permitted by LCO 3.0.4, an exception to its requirements is made for LCO Condition A. The exception permits the PROCESS AREA in Condition A to alternate from the DISPOSAL and WASTE HANDLING for administrative purposes provided the Required Actions and associated Completion Times for the Condition are met (i.e., no new Completion Time clock for each MODE change). The current ACTIONS of the Condition do not require placement of the PROCESS AREA into a defined MODE but allow continued operation provided the Required Actions and Completion Times are met. MODE changes that are of an administrative nature, (e.g., shift complement) do not result in a reduced safety posture in that the LCO allows continued operation for a limited time (i.e., 14 Days). Therefore, the movement between WASTE HANDLING and DISPOSAL does not inject any additional risk than was previously allowed. This exception is therefore, consistent with the text and intent of LCO 3.0.4. As indicated in LCO 3.0.4, SR 4.0.4 is not applicable to the INOPERABLE equipment.

Required Action A.1 requires VERIFICATION of the differential pressure for the affected CMR instrument loop that is NOT OPERABLE at the local gauge is greater than or equal to +0.14 inches w.g. Prior to each DOWNLOAD of WASTE CONTAINERS. With consideration of calculated instrument loop uncertainties (Ref. 4), the value read locally SHALL be greater than or equal to +0.14 inches w.g.

DOWNLOADING is allowed to continue during this time as the positive differential pressure across the 309 Bulkhead is being confirmed via alternate methodology with use of a local differential pressure gauge before a DOWNLOAD can be performed.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

ACTIONS (continued)

A.2	Required Action A.2 requires restoration of instrument loop 74H003001 within 31 Days. The 31-Day Completion Time provides reasonable time for determination of the cause for the Condition and to complete efforts to restore the affected instrument loop to OPERABLE status. A Completion Time of 31 Days may be necessary to identify the cause of the instrument loop Condition, to obtain the necessary parts and/or components required to repair the instrument loop(s) and to perform the work to restore the instrument loop OPERABILITY. A Completion Time of 31 Days is considered sufficient to restore the system while minimizing the time-at-risk by performance of differential pressure surveillances using local gauges and the Actions of A.1.
B.1	Condition B is entered if the UVFS/IVS is NOT OPERABLE for safe DOWNLOAD of WASTE CONTAINERS. UVFS/IVS OPERABILITY for DOWNLOAD of WASTE CONTAINERS requires that the five elements of the LCO are met. If any of these elements are not met, then CONDITION B is entered, except as allowed under the Required Actions for Condition A. Required Action B.1 requires that no new WASTE CONTAINERS be placed onto the Waste Shaft Conveyance for DOWNLOAD to the WASTE SHAFT STATION IMMEDIATELY. Preventing the introduction of WASTE CONTAINERS onto the Waste Shaft Conveyance eliminates the hazard of an accidental drop of a WASTE CONTAINER down the Waste Shaft. A Completion Time of IMMEDIATELY initiates prompt and sustained actions to prevent loading of a WASTE CONTAINERS onto the Waste Shaft Conveyance. This Required Action works in conjunction with SAC 5.5.6, “Waste Conveyance Operations” to prevent a WASTE CONTAINER drop down the Waste Shaft should adequate UVFS/IVS mitigation not be available.
B.2	This Required Action requires removing WASTE CONTAINERS from the Waste Shaft Collar Room and/or the Waste Shaft Conveyance and the WASTE SHAFT STATION within 4 Hours. This removes the threat of WASTE CONTAINERS being dropped down the Waste Shaft when the UVFS/IVS is not maintaining adequate differential pressure across the 309 Bulkhead chamber towards the WASTE SHAFT STATION, when airflow at the WASTE SHAFT STATION is not towards the 308 Bulkhead, when less than three UVFS/IVS fans are not IN SERVICE, or if a pressure differential local gauge specified in Table 3.2.4-2 is NOT OPERABLE and while WASTE CONTAINERS are subject to WASTE SHAFT STATION events. A Completion Time of 4 Hours allows for safe placement of any vulnerable WASTE CONTAINERS until the required differential pressure across the 309 Bulkhead is restored.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

Surveillance Requirements

SR 4.2.4.1	This SR requires verification that one UVFS exhaust fan (41-B-860A, 41-B-860B, or 41-B-860C) and two UVFS exhaust fans (41-B-960A and 41-B-960B) are IN SERVICE prior to the first DOWNLOAD of WASTE CONTAINERS each day and after any UVFS/IVS reconfiguration. This SR, performed by visual observation of exhaust fan status as indicated in the CMR by graphic visual display on one or more CMR monitors. Prior to first DOWNLOAD of WASTE CONTAINERS each day and after any UVFS/IVS reconfiguration, is adequate to demonstrate that the minimum number of exhaust fans required to maintain the airflow from the WASTE SHAFT STATION towards the 308 Bulkhead are IN SERVICE when the potential for postulated accidents at the WASTE SHAFT STATION could occur and to demonstrate UVFS/IVS OPERABILITY. Failure to meet or perform this SR requires entry into Condition B.
SR 4.2.4.2	This SR requires VERIFICATION that the differential pressure across the 309 Bulkhead is greater than or equal to +0.14 inches w.g. prior to the first DOWNLOAD of WASTE CONTAINERS each day and after any UVFS/IVS reconfiguration or Bulkhead realignment. This SR is performed by reading the 534-PDT-003-001 A, local gauge at the 309 Bulkhead. VERIFICATION that the differential pressure across the 309 Bulkhead is greater than or equal to +0.14 inches w.g. prior to first DOWNLOAD of WASTE CONTAINERS each day and after any UVFS/IVS reconfiguration or Bulkhead realignment is adequate to demonstrate UVFS/IVS OPERABILITY. A change in the operating status of any of the six small fans mounted on the 309 Bulkhead wall is considered to be a reconfiguration of the UVFS/IVS. Failure to meet or perform this SR requires entry into Condition B.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.2.4.3	This SR requires VERIFICATION of airflow direction from the WASTE SHAFT STATION towards the 308 Bulkhead prior to each DOWNLOAD of WASTE CONTAINERS. Indication of airflow direction from the WASTE SHAFT STATION towards the 308 Bulkhead is obtained manually via smoke/aerosol test or via use of an anemometer with indication of airflow direction towards the 308 Bulkhead. The smoke/aerosol test is taken at the WASTE SHAFT STATION where the Waste Conveyance would rest to unload WASTE CONTAINERS at the bottom of the Waste Shaft. This is a limited scope simple activity and the Operators are trained on both the smoke and anemometer tests. Either the anemometer or the smoke test are simple to implement and the only requirement for the smoke test is to ensure that it flows in the right direction (i.e., from the WASTE SHAFT STATION toward Bulkhead 308) after it is released. Verification of airflow direction is required to be performed prior to each DOWNLOAD. Changes in the direction of Waste Shaft airflow are not expected to occur within the short duration of a DOWNLOAD activity. Prior to each DOWNLOAD of WASTE CONTAINERS ensures that the required airflow direction is being maintained while the WASTE SHAFT STATION is at risk with WASTE CONTAINERS present or in transit and that the UVFS/IVS is OPERABLE. Failure to meet or perform this SR requires entry into Condition B.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.4 309 Bulkhead OPERABILITY During DOWNLOAD of WASTE CONTAINERS (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.2.4.4	This SR requires that a CALIBRATION be performed on the pressure differential transmitter and applicable instrumentation for the instrument loop listed in Table 3.2.4-1 and the gauge as indicated in Table 3.2.4-2 ANNUALLY. Differential pressure instrumentation is stable and not typically subjected to adverse conditions that would cause it to lose accuracy. The ANNUAL FREQUENCY interval is based upon industry recommended standard CALIBRATION frequencies for this type of instrumentation. Failure to meet or perform this SR requires entry into Condition B.
SR 4.2.4.5	This SR requires that an ANNUAL FUNCTIONAL TEST be performed on the differential pressure alarm instrument loop as indicated in Table 3.2.4-1. The ANNUAL differential pressure instrumentation loop FUNCTIONAL TEST consists of injection of a simulated or actual signal into the instrument loop, at the input of the pressure differential transmitter, to VERIFY OPERABILITY of the differential pressure instrumentation and audible CMR alarm and visual indication on one or more monitors. The ANNUAL FREQUENCY is based upon industry recommended FUNCTIONAL TEST frequencies for this type of instrumentation. Failure to meet or perform this SR requires entry into Condition B.

References

1. SDD VU00, *Underground Ventilation System Design Description (SDD)* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.
2. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM
3. WSRC-TR-94-0496, Rev. 0, *WIPP Instrumentation Loop and Setpoint Bases and Uncertainties Evaluations (U),* Westinghouse Savannah River Company for U.S. Department of Energy, Waste Isolation Pilot Plant Carlsbad Field Office, Carlsbad, NM.
4. CALC 16-010, *Loop Uncertainty Accuracy for a New Differential Pressure Indicator at Bulkhead 309*, Revision 1, Waste Isolation Pilot Plant Carlsbad Field Office, Carlsbad, NM, April 2016.
5. DN-3590-29, Memorandum, Keith Wallace to Jill Farnsworth, NWP, *Modeling UVFS/IVS Fan Configuration with Various NVPs and Upset Conditions*, Revision 4, April 2016, Mine Ventilation Services, Inc., Clovis, CA.

B3/4.2 Confinement Ventilation Systems

B3.2.5 Battery Exhaust System

Bases

Background Summary

The WHB Battery Exhaust System provides for ventilation of hydrogen gas from the WHB Battery Charging Station and for HEPA filtration of exhaust from the TRUDOCK exhaust hoods and the TRUPACT-III exhaust hoods. Exhaust air from the TRUDOCK and TRUPACT-III exhaust hoods contain only minor levels of contamination during normal operations. However, the Battery Exhaust System could also cause exhaust air bypass of the CH WH CVS for radiological release events that could occur within the CH BAY or ROOM 108, which is the safety basis purpose of this LCO.

The Battery Charging Station that is located on the north side of the CH BAY has a separate exhaust system from the CH WH CVS. The Battery Exhaust System provides for the removal of hydrogen when battery charging is in progress in the WHB Battery Charging Station. Additionally, the TRUDOCK and TRUPACT-III exhaust hoods are connected to the Battery Exhaust System that provides HEPA filtration prior to exhaust to the environment.

The Battery Exhaust System includes two HEPA filter units (41-B-834 and 41-B-979) with two in series exhaust fans (41-B-835 and 41-B-836). HEPA filter unit 41-B-834 is aligned with exhaust fan 41-B-835 and HEPA filter unit 41-B-979 is aligned with exhaust fan 41-B-836. One exhaust fan and HEPA filter unit is on standby status. Each HEPA filter unit includes one bank of moderate efficiency filters and two banks of HEPA filters.

Pressure differential transmitters are used to indicate the differential pressure across each HEPA filter bank of the IN SERVICE HEPA filter units to ENSURE that exhaust air is being drawn through the HEPA filter units prior to release to the environment. The differential pressure across each HEPA filter bank of each HEPA filter unit is read by a pressure differential transmitter for each HEPA filter bank. The pressure differential transmitter for each HEPA filter bank provides a signal to the CMS where the differential pressure for each HEPA filter bank is displayed on one or more CMR monitors and audibly alarmed if outside the acceptable range. Indication of the differential pressure across each HEPA filter bank of each HEPA filter unit is also provided by pressure differential local gauges.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System (continued)

Bases (continued)

Application to Safety Analysis	The DSA (Ref. 1) identified events involving pool fires, ordinary combustible material fires, and internal CH WASTE CONTAINER fires that could occur within the CH BAY or ROOM 108. Each of these events can release radiological material into the CH BAY atmosphere, which if left unfiltered could be released to the environment and affect co-located workers outside of the WHB. The hazard analysis identified a potential for high consequences to co-located workers. The CH WH CVS provides for mitigation of these events. However, if the Battery Exhaust System is IN SERVICE during these events, there is potential that some of the radiological material released during the event could bypass the CH WH CVS by being drawn into the Battery Exhaust System. As such, the Battery Exhaust System provides mitigation for the same events for which the CH WH CVS is credited. Using a Battery Exhaust System exhaust fan to draw the CH atmosphere through a HEPA filter with greater than or equal to 99% efficiency reduces the consequences to co-located workers. An IN SERVICE exhaust fan ENSURES that all air that is drawn into the Battery Exhaust System is exhausted through an OPERABLE HEPA filter unit. The HEPA filter unit ENSURES that the exhaust air is filtered. Therefore, the operation of one Battery Exhaust System exhaust fan drawing air through a HEPA filter unit is sufficient to provide the safety function assumed in the DSA.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System (continued)

Bases (continued)

LCO

The LCO states:

The Battery Exhaust System SHALL be OPERABLE. An OPERABLE Battery Exhaust System consists of the following elements:

- One OPERABLE HEPA filter unit (41-B-834 or 41-B-979) IN SERVICE.
- Differential pressure across each IN SERVICE HEPA filter bank less than or equal to +3.92 inches w.g and greater than or equal to +0.28 inches w.g locally.
- IN SERVICE HEPA filter unit efficiency of greater than or equal to 99%.
- OPERABLE pressure differential instrumentation and CMR alarm indications as identified in Table 3.2.5-1 and Table 3.2.5-2.

This LCO addresses the OPERABILITY requirements for the Battery Exhaust System. This lowest functional capability is met by an OPERABLE HEPA filter unit being IN SERVICE when a battery exhaust fan(s) is IN SERVICE.

The flow of air from the WHB Battery Charging Station, the TRUDOCK exhaust hoods, and the TRUPACT-III exhaust hoods, through an OPERABLE HEPA filter unit before being exhausted, is sufficient to provide the assumed level of mitigation for pool fires, combustible material fires, and internal CH WASTE CONTAINER fires.

The Battery Exhaust System includes two HEPA filter units (41-B-834 and 41-B-979) with two in series exhaust fans (41-B-835 and 41-B-836). HEPA filter unit 41-B-834 is aligned with exhaust fan 41-B-835 and HEPA filter unit 41-B-979 is aligned with exhaust fan 41-B-836. One exhaust fan and HEPA filter unit is on standby status.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System (continued)

Bases (continued)

LCO (continued)

The HEPA filter units (41-B-834 or 41-B-979) are considered OPERABLE when the differential pressure across each IN SERVICE HEPA filter bank of each HEPA filter unit measured locally is less than or equal to +3.92 inches w.g. and greater than or equal to +0.28 inches w.g. and the HEPA filter bank of each HEPA filter unit has been tested to ENSURE it is greater than or equal to 99% efficient.

The HEPA filter bank high differential pressure value is based on a safety analysis differential pressure of less than +4.0 inches w.g. and applying calculated instrument loop uncertainty (Ref. 4), which gives a value of +3.92 inches w.g. The maximum differential pressure allowed ensures that the HEPA filter banks are functioning properly and that the HEPA filter unit banks are not clogged or damaged. Establishing a maximum differential pressure limit also prevents filter blowout that could release unfiltered air into the exhaust stream.

Likewise, the HEPA filter bank minimum differential pressure ensures that the HEPA filter banks are not being bypassed. This is based on a safety analysis differential pressure of greater than +0.20 inches w.g. and applying calculated instrument loop uncertainty (Ref. 4). The instrument uncertainty for the pressure differential local gauges gives a value of +0.28 inches w.g. for the minimum differential pressure allowed.

The HEPA filter high CMR alarm is also based on a safety analysis differential pressure of less than +4.0 inches w.g. and applying calculated instrument loop uncertainty (Ref. 3), which gives a value of +3.93 inches w.g. The noted differential pressures values are indicated in the CMR on one or more monitors and audibly alarmed if outside the acceptable range.

Likewise, the HEPA filter bank minimum differential pressure CMR alarm ensures that the HEPA filter banks are not being bypassed. This is based on a safety analysis differential pressure of greater than +0.20 inches w.g. and applying calculated instrument loop uncertainty (Ref. 3), which gives a value of +0.27 inches w.g. The noted differential pressures values are indicated in the CMR on one or more monitors and audibly alarmed if outside the acceptable range.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System

Bases (continued)

LCO (continued)

Each HEPA filter bank of each IN SERVICE HEPA filter unit is tested ANNUALLY in accordance with ASME N510 to provide filtration efficiency of greater than or equal to 99%. The in-place leak test described by ASME N510 is used to conduct a periodic surveillance to reconfirm the performance of the HEPA filtration system. The in-place leak test confirms the safety basis assumptions of filtration system efficiency greater than 99 percent. The in-place leak tests use a poly-dispersed aerosol test [0.3-0.7 microns aerodynamic equivalent diameter] and determines the system efficiency of each HEPA filter bank is greater than or equal to 99% accounting for the system components (i.e., gaskets, frame, housing, etc.) that are typically challenged. The test is performed under actual conditions and at operational airflow. For the HEPA filter unit to be considered OPERABLE with respect to efficiency, both HEPA filter banks in the unit must be greater than 99%.

Battery Exhaust System OPERABILITY also requires that the pressure differential instrumentation and CMR alarm indications as identified in Table 3.2.5-1, and Table 3.2.5-2 are CALIBRATED ANNUALLY to ENSURE assumed accuracy.

A FUNCTIONAL TEST is also performed ANNUALLY on the indicated differential pressure instrument loops in Table 3.2.5-1 to VERIFY that when the alarm set points are reached, an audible CMR alarm is sounded and visually displayed on one or more monitors.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System

Bases (continued)

MODE Applicability	CH WASTE is brought into the CH BAY or ROOM 108 in CLOSED Type B SHIPPING PACKAGES. The Type B SHIPPING PACKAGES are opened and CH WASTE is removed, prepared, and transferred to the Waste Shaft Conveyance for disposal in the UNDERGROUND. The TRUDOCK and TRUPACT-III exhaust systems are utilized during evacuation and opening of the Type B SHIPPING PACKAGES. Therefore, LCO 3.2.5 is applicable in the WASTE HANDLING MODE and WASTE STORAGE MODE when the Battery Exhaust System exhaust fans are In Service.
PROCESS AREA Applicability	The events identified in the safety analysis were located in the CH BAY and ROOM 108.
ACTIONS	As permitted by LCO 3.0.4, an exception to its requirements is made for this LCO Condition A. The exception permits the PROCESS AREA in Condition A to change from the WASTE HANDLING and WASTE STORAGE and back for administrative purposes provided the Required Actions and associated Completion Times for the CONDITION are met (i.e., no new Completion Time clock for each MODE change). The current ACTIONS of the Condition do not require placement of the AFFECTED PROCESS AREA into a defined MODE but allow continued operation provided the Required Actions and Completion Times are met. MODE changes that are of an administrative nature, (e.g., shift compliment) do not result in a reduced safety posture in that the LCO allows continued operation for a limited time (i.e., 31 Days). Therefore, the movement between WASTE HANDLING and STORAGE does not inject any additional risk than was previously allowed. This exception is therefore, consistent with the text and intent of LCO 3.0.4. As indicated in LCO 3.0.4, SR 4.0.4 is not applicable to the INOPERABLE equipment.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System

Bases (continued)

ACTIONS (continued)

A.1	Condition A is entered if a CMR alarm indication for differential pressure across an IN SERVICE HEPA filter bank is NOT OPERABLE. Table 3.2.5-1 provides identification of the instrument loop(s) that could be affected. This Required Action requires VERIFICATION of IN SERVICE HEPA filter bank differential pressure locally per Table 3.2.5-2 is less than or equal to +3.92 inches w.g. and greater than or equal to +0.28 inches w.g. within 1 Hour and every 12 Hours thereafter. This Required Action provides an alternate methodology to confirm continued OPERABILITY of the Battery Exhaust System relative to maintaining required minimum and maximum differential pressure across each HEPA filter bank of each HEPA filter unit in the event that the CMR alarm instrument loop is NOT OPERABLE. The local pressure differential gauges provide accurate and reliable indication of the differential pressure values across the HEPA filter banks with calibrated instrumentation. The initial frequency of within 1 Hour and every 12 Hours thereafter shows that the HEPA filter bank differential pressures are being maintained within the acceptable range of values during this time as the differential pressure values are relatively stable over time during normal operations.
A.2	This Required Action requires restoration of the affected CMR differential pressure instrument loop(s) within 31 Days. The 31 Days Completion Time provides reasonable time for determination of the cause for the Condition and to complete efforts to restore the affected instrument loop(s) to OPERABLE status. A Completion Time of 31 Days may be necessary to identify the cause of the instrument loop(s) Condition, to obtain the necessary parts and/or components required to repair the instrument loop(s) and to perform the work to restore the instrument loop(s) OPERABILITY. A Completion Time of 31 Days is considered sufficient to restore the system while minimizing the time-at-risk by performance of differential pressure surveillances using local gauges and the Actions of A.1.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System

Bases (continued)

ACTIONS (continued)

B.1	Condition B is entered if the WHB Battery Exhaust System is NOT OPERABLE or if a pressure differential local gauge specified in Table 3.2.5-2 is NOT OPERABLE. LCO 3.2.5 defines four elements that are necessary for the Battery Exhaust System to be considered OPERABLE. In the event that any one or more of these elements are not met, then the capability to of the Battery Exhaust System to filter potentially contaminated air during a fire or internal CH WASTE CONTAINER fire event is impaired and the Battery Exhaust Filtration System is considered NOT OPERABLE. This Required Action requires securing operation of the IN SERVICE battery exhaust fan (41-B-835 or 41-B-836) IMMEDIATELY. This action is required if any of the four elements required for the Battery Exhaust System to be considered OPERABLE are not met. Securing operation of the exhaust fan prevents use of HEPA filters that may not be operating within their prescribed differential pressure ranges or requisite HEPA filter efficiency, or if pressure differential local gauge or CMR alarm indications are NOT OPERABLE, thus preventing a potential release of contamination. Suspending operation of the exhaust fans IMMEDIATELY also prevents potential bypass of the CH WH CVS.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System

Bases (continued)

Surveillance Requirements

SR 4.2.5.1	The SR requires VERIFICATION that the differential pressure across each HEPA filter bank of each IN SERVICE HEPA filter unit is less than or equal to +3.92 inches w.g. and greater than or equal to +0.28 inches w.g. DAILY by reading the pressure differential local gauges as specified in Table 3.2.5-2. VERIFICATION that the differential pressure across each HEPA filter bank of each IN SERVICE HEPA filter unit is within the specified acceptable range DAILY is adequate to demonstrate HEPA filter unit OPERABILITY. Failure to meet or perform this SR requires entry into Condition B.
SR 4.2.5.2	This SR requires each Battery Exhaust System HEPA filter bank of each IN SERVICE HEPA filter unit 41-B-834 and 41-B-979 to have a filtration efficiency of greater than or equal to 99%. This is confirmed by an in-place leak test performed in accordance with ASME N510. The in-place leak tests use a poly-dispersed aerosol test (0.3-0.7 micron aerodynamic equivalent diameter) and determines the system efficiency accounting for the system components (i.e., gaskets, frame, housing, etc.) that are typically challenged. The test is performed under actual conditions and at operational airflow in accordance with ASME N510 guidance by qualified/trained individuals. The performance testing allows for the correction and maintenance of the HEPA filter banks in the event the efficiency values are not a minimum of 99%. ANNUAL VERIFICATION of HEPA filter unit efficiency as recommended by ASME N510 is adequate to demonstrate that the HEPA filter unit is OPERABLE (Ref. 2). Failure to meet or perform this SR requires entry into Condition B. It is noted that the extension of SR 4.0.2 does not apply to this SR. This SR is driven by a national standard that does not provide for a timeframe extension for performance of this SR.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.2.5.3	This SR requires that a CALIBRATION be performed on each pressure differential transmitter and applicable instrumentation listed in Table 3.2.5-1 and the gauges as indicated in Table 3.2.5-2 ANNUALLY. Differential pressure instrumentation is stable and not typically subjected to adverse conditions that would cause it to lose accuracy. The ANNUAL FREQUENCY interval is based upon industry recommended standard CALIBRATION frequencies for this type of instrumentation. Failure to meet or perform this SR requires entry into Condition B.
SR 4.2.5.4	This SR requires that an ANNUAL FUNCTIONAL TEST be performed on the differential pressure alarm instrument loops as indicated in Table 3.2.5-1. The ANNUAL differential pressure CMR instrumentation loop FUNCTIONAL TEST consists of injection of a simulated or actual signal into the instrument loop, at the input of the pressure differential transmitter, to VERIFY OPERABILITY of the differential pressure instrumentation and audible CMR alarm and visual indication on one or more monitors if outside the acceptable range. The ANNUAL FREQUENCY is based upon industry recommended FUNCTIONAL TEST frequencies for this type of instrumentation. Failure to meet or perform this SR requires entry into Condition B.

(continued)

B3/4.2 Confinement Ventilation Systems (continued)

B3.2.5 Battery Exhaust System (continued)

Bases (continued)

References

1. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.
2. ASME N510-2007, *Testing of Nuclear Air-Treatment Systems*, American Society of Mechanical Engineers, New York, NY.
3. ECO-13842, *Evaluation of Differential Pressure Instrumentation Loops for HEPA Filter Banks*, Nuclear Waste Partnership, Carlsbad, NM, December 2015.
4. Calc-16-007, *Room and HEPA Instrument Uncertainty*, Revision 2, Nuclear Waste Partnership LLC, Carlsbad, NM, April 2016.

B3/4.3 Vehicle/Equipment Control

B3.3.1 Vehicle/Equipment Control in the OUTSIDE AREA (Deleted)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.2 Aboveground Liquid-fueled Vehicle/Equipment Prohibition

Bases

Background Summary

The CH BAY is a large bay containing two TRUDOCKs for unloading Type B SHIPPING PACKAGES, storage area for CH WASTE, electric vehicles, and other equipment required for CH WASTE processing. ROOM 108 is a large room containing a Bolting Station, a Payload Transfer Station for removing Standard Large Box 2 from the TRUPACT-III, pallet dispensing station, Facility Transfer Vehicles, and other equipment required for CH WASTE processing.

CH WASTE is brought into the CH BAY or ROOM 108 in a CLOSED Type B SHIPPING PACKAGE using electric powered vehicles/equipment. A TRUPACT-II or HalfPACT SHIPPING PACKAGE is placed in the TRUDOCK in the CH BAY while the TRUPACT-III is placed in the TRUPACT-III Bolting Station in ROOM 108. While in the CLOSED Type B SHIPPING PACKAGES, the CH WASTE is not subject to damage from a fire or impact. The CH WASTE is removed from the CLOSED Type B SHIPPING PACKAGES in the CH BAY and/or ROOM 108. From there CH WASTE is transferred to the WASTE SHAFT ACCESS AREA or temporarily stored in the CH BAY. When no longer in a CLOSED Type B SHIPPING PACKAGE, the WASTE CONTAINER may be impacted by fire and result in a release of the radiological material.

The WASTE SHAFT ACCESS AREA is an area in the WHB where WASTE is prepared for and moved to the Waste Shaft for transfer to the UNDERGROUND. The area has the ability to be entered from the FCLR, which is used to load RH WASTE CONTAINERS into the Facility Cask/LWFC or the CLR for CH WASTE activities. The CLR serves as an airlock between the CH BAY and the Waste Shaft Collar Room and contains the Conveyance Loading Car and necessary equipment to load the WASTE CONTAINERS onto the Waste Shaft Conveyance. The CLR can also be entered on the north side of the Room through a set of doors (159) that is used by Hoisting and Mining for material handling to and from the UNDERGROUND.

Battery-powered vehicles operating in the WHB are used to reduce the potential for fires that could impact the CH WASTE and result in a radiological material release.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.2 Aboveground Liquid-fueled Vehicle/Equipment Prohibition (continued)

Bases (continued)

Background Summary (continued)	WHB FSS (LCO 3.1.1) requires the FSS to be OPERABLE when CH WASTE is present in the CH BAY and ROOM 108. CH WH CVS (LCO 3.2.1) is also required to be OPERABLE for mitigation of fires in the CH BAY or ROOM 108.
Application to Safety Analysis	The DSA (Ref. 1) identified fire events that could result from the operation of liquid-fueled vehicles/equipment in the CH BAY, ROOM 108, and WASTE SHAFT ACCESS AREA. Liquid-fueled vehicles/equipment present sources of ignition and fuel. Assumptions for the analyses included the following: • CH WASTE inside a CLOSED Type B SHIPPING PACKAGE is protected from involvement in any fire event. • Site-derived WASTE in a CLOSED WASTE CONTAINER provides the same protection as a CH WASTE CONTAINER in a fire event. • The confinement provided by the Facility Cask/LWFC mitigates the consequences of any release of the confined RH WASTE in any fire event. Note that there is no prohibition on using electric powered vehicles/equipment, including those with hydraulic fluid, in these areas even when CH WASTE is present. Although the WHB FSS (See LCO 3.1.1) and the WHB CVS (LCO 3.2.1) are required to be OPERABLE, additional controls are necessary to protect the CH WASTE from a potential liquid-fueled vehicle/equipment pool fire. Per the Fire Hazards Analysis (Ref. 2), the WHB FSS may not fully prevent a vehicle fire from impacting the CH WASTE. Prohibiting the presence of liquid-fueled vehicles/equipment in the CH BAY, ROOM 108, and the WASTE SHAFT ACCESS AREA when CH WASTE is present is credited with reducing the frequency of fires and vehicle/equipment collisions that could result in a pool fire.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.2 Aboveground Liquid-fueled Vehicle/Equipment Prohibition (continued)

Bases (continued)

LCO

This LCO addresses the aboveground liquid-fueled vehicle/equipment prohibition and states:

Liquid-fueled Vehicles/Equipment SHALL not be present.

Vehicles/equipment SHALL not be present in the CH BAY, ROOM 108, or the WASTE SHAFT ACCESS AREA when CH WASTE is present. This control is based on the following elements identified in the DSA:

- Liquid-fueled vehicles/equipment SHALL not be present in the CH BAY and/or ROOM 108 when CH WASTE is present in these areas and not in a CLOSED Type B SHIPPING PACKAGE.

- Liquid-fueled vehicles/equipment SHALL not be present in the WASTE SHAFT ACCESS AREA when CH WASTE is present in the WASTE SHAFT ACCESS AREA.

The presence of liquid-fueled vehicles/equipment in the CH BAY, ROOM 108, or the WASTE SHAFT ACCESS AREA has the potential to initiate or be involved in fire and/or collision/impact events. Prohibiting liquid-fueled vehicles/equipment from being present in the CH BAY, ROOM 108, and/or the WASTE SHAFT ACCESS AREA ENSURES there is no fuel available for a pool fire when CH WASTE is present, and reduces the potential for pool fires that could impact any WASTE CONTAINERS that may be present.

This LCO does not apply to electric vehicles/equipment that may contain hydraulic fluid.

This LCO is applicable only when CH WASTE is present in the applicable PROCESS AREAS during the applicable MODES. This clarification allows liquid-fueled vehicles/equipment to be used to download equipment, materials, and supplies while RH WASTE is present in the FCLR. RH WASTE in the FCLR is inside the RH Facility Cask/LWFC which mitigates radiological consequences from analyzed events. Liquid-fueled vehicles are allowed in the CLR when RH WASTE is present in the FCLR because the confinement provided by the RH Facility Cask/LWFC mitigates the consequences of any release of the confined RH WASTE in any fire event.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.2 Aboveground Liquid-fueled Vehicle/Equipment Prohibition (continued)

Bases (continued)

MODE Applicability	WASTE inside an opened Type B SHIPPING PACKAGE or outside the SHIPPING PACKAGE is susceptible to fire events. CH WASTE outside of a Type B SHIPPING PACKAGE can be in the CH BAY and ROOM 108, during WASTE HANDLING and WASTE STORAGE. CH WASTE can be in the WASTE SHAFT ACCESS AREA during WASTE HANDLING. Fires in the applicable PROCESS AREAS can impact the CH WASTE outside the Type B SHIPPING PACKAGE resulting in the release of radiological material. It is possible for each of the three AFFECTED PROCESS AREAS to be in different MODES. WASTE is not outside its SHIPPING PACKAGE during STANDBY and therefore is not affected by fires during this MODE. Therefore, this LCO is applicable during WASTE HANDLING and WASTE STORAGE in the applicable PROCESS AREAS only. This LCO does not apply to electric vehicles/equipment that may contain hydraulic and lubrication fluids that could be involved in a pool fire. Hydraulic and lubrication fluids have a significantly higher flash point than diesel. Without an engine being present, the high temperature ignition source is removed from the event. This vulnerability is additionally mitigated with the SS WHB FSS.
PROCESS AREA Applicability	CH WASTE may be in the CH BAY, ROOM 108, and the WASTE SHAFT ACCESS AREA in sufficient quantities to adversely affect co-located workers if released due to a fire. Therefore, this LCO is applicable to the CH BAY, ROOM 108, and the WASTE SHAFT ACCESS AREA.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.2 Aboveground Liquid-fueled Vehicle/Equipment Prohibition (continued)

Bases (continued)

ACTIONS

A.1	In the event that liquid-fueled vehicles/equipment are present in the CH BAY or ROOM 108 or the WASTE SHAFT ACCESS AREA, WASTE HANDLING ACTIVITIES SHALL be suspended IMMEDIATELY. WASTE HANDLING ACTIVITIES are suspended in the AFFECTED PROCESS AREA to prevent ongoing WASTE HANDLING ACTIVITIES from increasing the risk of fire involving the liquid-fueled vehicle/equipment. Suspending the WASTE HANDLING ACTIVITIES will reduce the potential for impacts that could cause pool fire events. Suspending WASTE HANDLING ACTIVITIES permits placement of CH WASTE in a SAFE CONFIGURATION, reduces the potential for ignition sources, and permits attention to be focused on removing the liquid-fueled vehicles/equipment. A Completion Time of IMMEDIATELY is required to safely SUSPEND WASTE HANDLING ACTIVITIES and minimizes the time-at-risk.
A.2	This Required Action requires that an ATTENDANT be IMMEDIATELY established for the liquid-fuel vehicle/equipment. The ATTENDANT should primarily focus on the liquid-fueled vehicles/equipment to ENSURE that fuel or other combustible liquids are not leaking and that ignition sources are not present that could lead to a fire involving the vehicle/equipment or any leaking combustible liquids. A Completion Time of IMMEDIATELY is required to provide an ATTENDANT for the liquid-fueled vehicles/equipment without delay to minimize the time at risk for a potential pool fire event.
A.3	This Required Action removes the liquid-fueled vehicle/equipment from the AFFECTED PROCESS AREA using an ATTENDANT, IMMEDIATELY. This action will eliminate the potential for a pool fire that could affect the CH WASTE, and restore compliance with the LCO. A Completion Time of IMMEDIATELY allows safe removal of the vehicle/equipment from the AFFECTED PROCESS AREA while minimizing the time at risk. Because the removal of the offending vehicle maybe through other PROCESS AREAS with ongoing WASTE HANDLING ACTIVITIES, the removal is required to be ATTENDED until outside any applicable PROCESS AREA. The performance of Required Actions A.1 and A.2 serve to further reduce the risk of a fire during the time it takes to remove the liquid-fueled vehicle/equipment from the AFFECTED PROCESS AREA.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.2 Aboveground Liquid-fueled Vehicle/Equipment Prohibition (continued)

Bases (continued)

Surveillance Requirements

SR 4.3.2.1	This SR requires visual VERIFICATION EACH SHIFT when CH WASTE is present that liquid-fueled vehicles/equipment are not present in the CH BAY. Based on operational experience, a FREQUENCY of EACH SHIFT when CH WASTE is present is sufficient to VERIFY that the vehicles/equipment selected for use during that shift are not liquid-fueled; and to prevent liquid-fueled vehicles/equipment from being present when CH WASTE is present and not in a CLOSED Type B SHIPPING PACKAGE(S). Failure to meet or perform this SR requires entry into Condition A.
SR 4.3.2.2	This SR requires visual VERIFICATION EACH SHIFT when CH WASTE is present that liquid-fueled vehicles/equipment are not present in ROOM 108. Based on operational experience, a FREQUENCY of EACH SHIFT when CH WASTE is present is sufficient to VERIFY that the vehicles/equipment selected for use during that shift are not liquid-fueled and to prevent liquid-fueled vehicles/equipment from being present when CH WASTE is present and not in a CLOSED Type B SHIPPING PACKAGE(S). Failure to meet or perform this SR requires entry into Condition A.
SR 4.3.2.3	This SR requires visual VERIFICATION EACH SHIFT, when CH WASTE is present in this PROCESS AREA, that liquid-fueled vehicles/equipment are not present in the WASTE SHAFT ACCESS AREA. Based on operational experience, a FREQUENCY of EACH SHIFT when CH WASTE is present is sufficient to VERIFY that the vehicles/equipment selected for use during that shift are not liquid-fueled and to prevent vehicles/equipment from being present when CH WASTE is present and not in a CLOSED Type B SHIPPING PACKAGE(S). Failure to meet or perform this SR requires entry into Condition A.

References

1. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision) U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

2. WIPP-023, *Fire Hazards Analysis for the Waste Isolation Pilot Plant* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.3 Vehicle/Equipment Control in the SHAFT ACCESS AREA (Deleted)

B3.3.4 Control of Propane-Powered Vehicles/Equipment (Deleted)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation

Bases

Background Summary

CH WASTE is delivered to the UNDERGROUND by use of the Waste Shaft Conveyance. CH WASTE is introduced into the WASTE SHAFT STATION during DOWNLOADING operations. The CH WASTE is transported using liquid-fueled vehicles via a TRANSPORT PATH to a designated offloading location. CH WASTE may also be brought to the WASTE SHAFT STATION from the WASTE FACE to be returned to the surface (uploading).

UNDERGROUND vehicles/equipment require services such as lubrication, replenishing the hydraulic fluid, or refueling to operate. It is difficult to bring some of this equipment to the Maintenance Area for these services. Therefore, an UNDERGROUND Lube Truck is used as a mobile fueling, lubrication, or hydraulic fluid replenishment source for many of the UNDERGROUND vehicles/equipment. The vehicles/equipment that are serviced by the Lube Trucks include the WASTE HANDLING EQUIPMENT, the mining operations equipment, and the general purpose vehicles and equipment.

There are two Lube Trucks used in the UNDERGROUND to supply fuel, hydraulic fluids, and lubricating products to the UNDERGROUND equipment. Each Lube Truck contains a large quantity (approximately 534 gallons) of combustible liquids per calculation WIPP-058 (Ref. 1).

There is no prohibition against the UNDERGROUND Lube Truck entering an ACTIVE ROOM that only contains RH WASTE. This is because the Facility Cask/LWFC protects the RH WASTE container from a potential fire until the RH WASTE is emplaced in the walls. When the RH WASTE is placed in the boreholes, the RH WASTE is high enough off the floor that it will not be impacted by a pool fire. As the RH WASTE is in the Facility Cask, the LWFC, or the borehole, RH WASTE is excluded from this LCO.

The hazard analysis determined that the Lube Truck presented a significant fire risk to the CH WASTE and that because of the fire hazards, controls are necessary to prevent the Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

Application to Safety Analysis

This control ensures an UNDERGROUND Lube Truck will be at least 200 feet from a CH WASTE FACE in an ACTIVE PANEL and not in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.

The DSA (Ref. 2) identified fire events in the UNDERGROUND that could impact the CH WASTE resulting in a breach of the CH WASTE Container and an airborne radiological material release. Fuel pool fires in proximity to CH WASTE involving the Lube Trucks were analyzed and determined to result in high consequences to facility workers and co-located workers and low consequences to the MOI. Prohibiting the UNDERGROUND Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION (Ref. 2) provides a safe stand-off distance in the event of a fire but it does not eliminate the potential for fire as there are other potential fire scenarios that could impact the CH WASTE in the AFFECTED AREA.

Prohibiting the Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or within the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION was credited with reducing the likelihood of a fire event involving the CH WASTE. Prohibiting the Lube Truck from being in the AFFECTED AREAS removes the potential for collisions with the Lube Truck or leaks from the Lube Truck tanks, which could result in the release of combustible liquid and an exposure of the combustible liquids to ignition sources. Prohibiting the Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION establishes a safe stand-off distance such that a fire involving the Lube Truck will not impact the CH WASTE and reduces the likelihood of consequences to the workers and MOI.

The intent is to prevent the Lube Truck from being within 200 feet of a CH WASTE FACE and from in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. However, as this is an AC, it is vulnerable to human error such that the Lube Truck could inadvertently be introduced into the AFFECTED AREA when CH WASTE is present. However, if the Lube Truck is inadvertently introduced into these areas, this event in and of itself does not create an adverse event as it will take a collision or a combustible liquid spill and an ignition source to initiate the fire or a fire involving the Lube Truck engine or other components. Removal of the Lube Truck as rapidly as possible is required to ensure that a fire involving the Lube Truck does not occur and to restore compliance with the LCO.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

Application to Safety Analysis (continued)	The use of the UNDERGROUND Lube Truck is required by the activities at WIPP and no limited set of practical and reliable SSCs is available to prevent the Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. Therefore, ACs are required to prohibit the Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL and in the WASTE SHAFT STATION when CH WASTE is present. The control is designated as a SAC since engineered controls are not available to prevent occurrence of events requiring SS protection. If a panel has been closed (i.e., there is a closure barrier), entry into the panel is prevented. The closure barrier can be either of the types described in Section 2.4.4.6 or 2.4.4.6.1. The barrier on the closed panel ensures that the WASTE FACE is at least 200 feet from the drift where the Lube Truck could be located. Based on their construction and the distances from a CH WASTE FACE, the barriers are qualitatively judged to protect the WASTE FACE from operational events such as fires and vehicle collisions. The closure barriers are substantial and robust barriers that prevent entry into the closed panel. Therefore, this LCO does not apply to a closed panel with an installed closure barrier. Vehicles/equipment that contain combustible liquids (e.g., fuel and/or hydraulic fluid) have the potential to significantly impact the CH WASTE if a fire occurs on or around the vehicle or from a pool fire involving leaked or spilled combustible liquids. LCO 3.3.8 establishes the requirements for vehicles containing combustible liquids to be ATTENDED. The TRANSPORT PATH related controls (includes LCOs 3.1.2 and 3.3.8 and SAC 5.5.1) limit the potential for a fire external to the CH WASTE Container to negatively impact the CH WASTE.
LCO	This LCO addresses the requirement to prohibit the Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. Specifically, the LCO addresses the following elements: An UNDERGROUND Lube Truck SHALL be prohibited within: • 200 feet of a CH WASTE FACE in an ACTIVE PANEL. **AND** • The WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.

LCO (continued)

Prohibiting the Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION ensures a safe stand-off distance such that a fire involving a Lube Truck will not involve the CH WASTE. Each Lube Truck has a capacity of approximately 534 gallons of combustible liquids.

WIPP-058, Revision 2, *DSA Supporting Calculations, Fuel Spill, HEPA Filter Plugging, and Compartment Over Pressurization*, concludes that a liquid combustible spill, from a Lube Truck loaded to fluid capacity in a 16-foot drift, extends approximately 108 feet on each side of the spill. Additionally, a standoff distance of approximately 8 feet from the edge of the pool is sufficient to maintain the radiant heat flux to less than 15.9 kW/m^2 on the CH WASTE CONTAINERS. The total standoff distance of approximately 116 feet would be sufficient to include the pool size and radiant heat flux exposure. The distance for the safety analysis is conservatively established as 200 feet for the Lube Truck (Ref. 2). This was conservatively set at 200 feet for the stand-off distance. Therefore, the lowest functional capability of this control is met by prohibiting a Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL. To protect the safety analysis, a Lube Truck is not allowed in the WASTE SHAFT STATION when CH WASTE is present at the WASTE SHAFT STATION (Ref. 2). If CH WASTE is not present, the Lube Truck may enter the WASTE SHAFT STATION. To ENSURE the Lube Truck is not in the WASTE SHAFT STATION when CH WASTE is present, the Lube Truck SHALL be prohibited in the WASTE SHAFT STATION.

There is no prohibition against an UNDERGROUND Lube Truck entering an ACTIVE ROOM that only contains RH WASTE. This is because the Facility Cask/LWFC protects the RH WASTE container from a potential fire until the RH WASTE is entombed in the walls. When the RH WASTE is placed in the boreholes, the RH WASTE is high enough off the floor that it will not be impacted by a pool fire. Therefore, this LCO only applies to the Lube Truck when within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

MODE Applicability	CH WASTE is present in the UNDERGROUND during WASTE HANDLING and DISPOSAL. Fires involving a Lube Truck which could impact the CH WASTE could occur during either of these MODES. The Lube Truck will operate in the UNDERGROUND during both MODES. While the likelihood of a fire event is reduced when there are no WASTE HANDLING ACTIVITIES, other activities involving a Lube Truck could result in collisions and/or ignition sources. Therefore, at all times the prohibition on the Lube Truck being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or being in the WASTE SHAFT STATION when CH WASTE is present must be applied in all UNDERGROUND MODES.
PROCESS AREA Applicability	The events identified in the safety analysis were located in an ACTIVE ROOM when CH WASTE is present or in the WASTE SHAFT STATION when CH WASTE is present in the UNDERGROUND. CH WASTE is available and susceptible to fires in the UNDERGROUND. Therefore, this LCO only applies to the UNDERGROUND. As noted in the LCO bases, RH WASTE handling is not impacted by this LCO. Note that the AFFECTED AREAS are within 200 feet of a CH WASTE FACE in an ACTIVE PANEL and in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

ACTIONS

A.1	LCO 3.3.5 defines the requirement to prohibit a Lube Truck from being within 200 feet of a CH WASTE FACE in an ACTIVE PANEL and in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. However, this is an administrative control and is vulnerable to inadvertent personnel errors by which a Lube Truck could be positioned within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present. To ENSURE a Lube Truck is not in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION, a Lube Truck SHALL be kept outside of these zones. This ACTION requires that an ATTENDANT be assigned to the Lube Truck IMMEDIATELY upon discovery that it is within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. The addition of the ATTENDANT will minimize the potential for Lube Truck impacts or collisions that could result in combustible liquid leaks and reduce the risk that a fire could impact the CH WASTE. The ATTENDANT will look for leaks or spills of the combustible liquids from a Lube Truck and identify potential ignition sources and potential collision conditions. A Completion Time of IMMEDIATELY limits the time a Lube Truck poses an unmitigated fire risk to the CH WASTE. As is the case for all LCO conditions, the restoration of compliance with the LCO statement is preferred. The Required Action is taken along with the understood action of IMMEDIATELY, if possible, removing the Lube Truck from the AFFECTED AREA.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

ACTIONS (continued)

A.2	This Required Action requires placing the CH WASTE in the AFFECTED AREA in a SAFE CONFIGURATION IMMEDIATELY. Placing the CH WASTE in a SAFE CONFIGURATION may require moving the CH WASTE from the WASTE SHAFT STATION or from any point on the TRANSPORT PATH past a Lube Truck to an ACTIVE ROOM. It may also involve taking a different route in the UNDERGROUND to move the CH WASTE to the ACTIVE ROOM. Additionally, it may include returning the CH WASTE to the Waste Shaft Collar. Any of these ACTIONS will place the CH WASTE in a SAFE CONFIGURATION thereby reducing the potential for fires or other accidents that could impact the CH WASTE and restore LCO Compliance. Leaving the CH WASTE where it is may not be the most SAFE CONFIGURATION possible for the WASTE. A decision must be made as to whether the risk associated with leaving the CH WASTE as and where it is or the short-term risk of continuing to move the CH WASTE to an ACTIVE ROOM or returning it to the Waste Shaft Collar is acceptable. If these risks are acceptable when compared to the long-term reduced risk associated with placing the CH WASTE in the most SAFE CONFIGURATION possible and exiting the LCO, one of the options listed above should be completed. Placing the CH WASTE in a SAFE CONFIGURATION ENSURES that a fire involving a Lube Truck or the combustible liquids on a Lube Truck will not impact the CH WASTE Containers and cause a radiological material release. The completion time of IMMEDIATELY is sufficient to ENSURE the CH WASTE is placed in a SAFE CONFIGURATION as quickly as possible and LCO Compliance is restored.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

ACTIONS (continued)

A.3	This Required Action requires a Lube Truck be removed from the AFFECTED AREA within 4 Hours. A Lube Truck is not permitted to be within 200 feet of a CH WASTE FACE in an ACTIVE PANEL at any time or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. Note that the Lube Truck can be in the WASTE SHAFT STATION in any MODE except when CH WASTE is present. If a Lube Truck is in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION, the Lube Truck must be moved outside the WASTE SHAFT STATION before any CH WASTE on the Waste Conveyance can be transported from the shaft collar to the WASTE SHAFT STATION or CH WASTE is brought into the WASTE SHAFT STATION (e.g., uploading) from the TRANSPORT PATH. While the presence of a Lube Truck in and of itself does not cause an adverse event, within 4 Hours the Lube Truck SHALL be removed beyond 200 feet from the AFFECTED AREA to reduce the fire risk. Removing the Lube Truck at least 200 feet from the AFFECTED AREA restores compliance with the LCO. Removing the Lube Truck within 4 Hours limits the time at risk to an acceptable level and allows the time to identify any barriers to removal of the Lube Truck. The 4 Hours limit is sufficient to assign an ATTENDANT and remove a functional Lube Truck from the AFFECTED AREA.
B.1	This Required Action is entered when the ACTIONS or Completion Times of Condition A are not met. The Required Action is to ENSURE that a Lube Truck is and remains ATTENDED when the UNDERGROUND is manned, especially if it will be in the AFFECTED AREA for more than 4 Hours and on each shift thereafter that the Lube Truck remains in the AFFECTED AREA. An ATTENDANT is required to be assigned to the Lube Truck by ACTION A.1 who SHALL perform the duties outlined in that ACTION. This ACTION will ENSURE that the ATTENDANT remains assigned to a Lube Truck until the Lube Truck can be removed from the AFFECTED AREA. If the UNDERGROUND is not manned, an ATTENDANT is not required to be maintained on the Lube Truck if it remains in the AFFECTED AREA during the shifts when personnel are not in the UNDERGROUND, and Required Actions B.2, B.3, and B.4 have been completed and the Lube Truck is in a SAFE CONFIGURATION. A Completion Time of IMMEDIATELY is required to limit the time a Lube Truck poses a potential fire risk to the CH WASTE.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

ACTIONS (continued)

B.2	If the Actions or Completion Times of Condition A are not met, i.e., a Lube Truck will remain in the AFFECTED AREA for more than 4 Hours, this Required Action requires that a Lube Truck in the AFFECTED AREA be placed in a SAFE CONFIGURATION IMMEDIATELY, unless precluded by the exceptions below. Placing the Lube Truck in a SAFE CONFIGURATION as a minimum includes, but is not limited to, ensuring the vehicle is stopped, the engine is shutdown, the engine and other hot components have cooled down, a VERIFICATION of the fire suppression operability has been completed (i.e., green status light on FSS Control Panel is illuminated), and a check for obvious combustible liquid leaks has been completed to limit the potential for a fire involving the Lube Truck. IMMEDIATELY placing the Lube Truck in a SAFE CONFIGURATION will minimize the fire risk to the CH WASTE in the AFFECTED AREA. A Completion Time of IMMEDIATELY is sufficient to initiate ACTIONS to place the Lube Truck in a SAFE CONFIGURATION. It is recognized that actions may be ongoing or initiated to repair or remove the Lube Truck from the AFFECTED AREA. If activities to repair or remove the Lube Truck from the AFFECTED AREA are ongoing, resumed, or started, the Lube Truck does not have to be placed in or can be removed from the SAFE CONFIGURATION to allow removal of the Lube Truck from the AFFECTED AREA to restore LCO compliance. This action does not prevent starting or completing maintenance on the Lube Truck, even if it removes the Lube Truck from a SAFE CONFIGURATION, as it may be necessary to repair an inoperable Lube Truck before the Lube Truck can be moved from the AFFECTED AREA.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

ACTIONS (continued)

B.3	If the Actions or Completion Times of Condition A are not met, i.e., a Lube Truck will remain in the AFFECTED AREA for more than 4 Hours, this Required Action requires Maintenance ACTIVITIES in the AFFECTED AREA be suspended IMMEDIATELY if the Lube Truck is within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. Maintenance ACTIVITIES in the AFFECTED AREA have the potential to initiate a fire event or provide additional fuel to the fire. Maintenance activities include those activities that can increase the potential for a fire near the CH WASTE and include, but are not limited to, the following examples: cutting, grinding, welding, lubricating or fueling vehicles/equipment, painting, mining activities (e.g., bolting), and equipment repair or preventative maintenance. Therefore, if a Lube Truck is in the AFFECTED AREA for more than 4 Hours when CH WASTE is present in the WASTE SHAFT STATION, the risk of fires must be reduced. Suspending Maintenance ACTIVITIES reduces the likelihood of fire events involving a Lube Truck that is within 200 feet of a CH WASTE FACE or in the WASTE SHAFT STATION impacting the CH WASTE. IMMEDIATELY stopping Maintenance ACTIVITIES is necessary to minimize the risk. A Completion Time of IMMEDIATELY is sufficient to suspend Maintenance ACTIVITIES in the AFFECTED AREA. This Required Action does not prevent starting or completing maintenance on the Lube Truck as it may be necessary to repair an inoperable Lube Truck or complete activities to otherwise move (e.g., tow) the Lube Truck before the Lube Truck can be moved from the AFFECTED AREA. Other Maintenance ACTIVITIES, e.g., checking the roof or bolting activities, that are required to allow safe and unrestricted access for maintenance on a Lube Truck are permitted under this Required Action. Other Maintenance ACTIVITIES in the UNDERGROUND and/or both AFFECTED AREAS do not have to be suspended if these Maintenance ACTIVITIES would or do not affect a Lube Truck that is within 200 feet of CH WASTE. Only those in the AFFECTED AREA where a Lube Truck is within 200 feet of CH WASTE must be suspended.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

ACTIONS (continued)

B.4	This Required Action requires the suspension of Waste Conveyance loading activities at the Waste Shaft Collar Room if the Required Actions and/or Completion Times of Condition A are not met, i.e., a Lube Truck will be in the AFFECTED AREA longer than 4 Hours. To ENSURE CH WASTE is not brought into the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION, bringing CH WASTE into the WASTE SHAFT STATION SHALL be suspended. In the event that the Required Actions and Completion Times of Condition A.3 cannot be met, additional CH WASTE must not be brought into the WASTE SHAFT STATION as this will increase the MAR at risk in the AFFECTED AREA or the UNDERGROUND. Therefore, to prevent bringing additional CH WASTE to the WASTE SHAFT STATION, the loading of CH WASTE onto the Waste Conveyance in the Waste Shaft Collar Room SHALL be suspended IMMEDIATELY. Suspending the loading of CH WASTE onto the Waste Conveyance IMMEDIATELY in the Waste Shaft Collar Room will prevent the introduction of additional CH WASTE into the AFFECTED AREA and prevent additional MAR from being placed at risk in the UNDERGROUND. RH WASTE handling may continue as the RH WASTE is protected by the Facility Cask/LWFC and is not affected by this LCO.
B.5	This Required Action requires restoration of compliance with the LCO by removing a Lube Truck that is within 200 feet of a CH WASTE FACE in an ACTIVE PANEL or in the WASTE SHAFT STATION if CH WASTE is present in the WASTE SHAFT STATION. If the Completion Times of Condition A cannot be met, it will generally indicate that there is a problem with a Lube Truck that will prevent it from being moved under its own power. Therefore, time must be allowed to determine the cause and repair the Lube Truck or make other arrangements (e.g., towing) that will allow removal of the Lube Truck from the AFFECTED AREA. The ACTIONS required by B.1 through B.4 above will place the CH WASTE and the Lube Truck, as necessary, in a SAFE CONFIGURATION and minimize the fire and collision risk associated with a Lube Truck to the lowest level possible while a Lube Truck is in the AFFECTED AREA. A Completion Time of 14 Days is sufficient time to develop and implement the ACTIONS to remove a Lube Truck from the AFFECTED AREA and restore compliance with the LCO.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

Surveillance Requirements

SR 4.3.5.1 This SR verifies that when a Lube Truck is present in an ACTIVE PANEL a visual observation will confirm that the Lube Truck is further than 200 feet from a CH WASTE FACE in the ACTIVE PANEL. There is a potential that a Lube Truck could remain in the ACTIVE PANEL after a shift is over. This SR SHALL be completed once per each Shift when a Lube Truck is moved within the ACTIVE PANEL or once per each Shift when a Lube Truck is located in the ACTIVE PANEL and CH WASTE is being emplaced. The surveillance is performed only when the UNDERGROUND is manned and operational. Operator training and experience is sufficient to ensure a Lube Truck will not be positioned within 200 feet of a CH WASTE FACE. The once per Shift will ENSURE the operator verifies that a Lube Truck is not within 200 feet of the Active CH WASTE FACE. This will prevent a fire involving a Lube Truck or the combustible liquids on a Lube Truck from impacting the CH WASTE in an ACTIVE PANEL. The Frequency of once per shift when the Lube Truck is moved or CH Waste is being emplaced in the ACTIVE PANEL is adequate based on operator training and experience. Failure to meet or perform this SR requires entry into Condition A.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.5 UNDERGROUND Lube Trucks Operation (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.3.5.2

This SR VERIFIES that a Lube Truck is not present in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. Prior to CH WASTE entering the WASTE SHAFT STATION. This SR will visually verify that a Lube Truck is not in these zones. This ensures that a Lube Truck will not in the WASTE SHAFT STATION when CH WASTE is present in or being bought into the WASTE SHAFT STATION.

The surveillance will be performed Prior to CH WASTE entering these zones. Performance of the surveillance each time Prior to these activities will allow a Lube Truck into the WASTE SHAFT STATION or the TRANSPORT PATH to support operations if there is no CH WASTE present in or being introduced into these zones.

As a Lube Truck can enter into the WASTE SHAFT STATION when the UNDERGROUND is in the WASTE HANDLING MODE, there is a requirement to ENSURE a Lube Truck will not be in the WASTE SHAFT STATION when CH WASTE is being brought to or is in the WASTE SHAFT STATION.

ENSURING the Lube Truck is not in the WASTE SHAFT STATION protects the requirement to prevent the Lube Truck from being within this zone when CH WASTE is present. The VERIFICATION prior to CH WASTE entering the WASTE SHAFT STATION that a Lube Truck is not in these zones is sufficient to ensure a fire involving a Lube Truck, or the combustible liquids on a Lube Truck that could impact the CH WASTE is prevented. The SR frequency is adequate based on operator training and experience. The WASTE SHAFT STATION surveillance frequency of Prior to CH WASTE entering the WASTE SHAFT STATION has been determined to be adequate based on operational experience. Failure to meet or perform this SR requires entry into Condition A.

References

1. WIPP-058, *DSA Supporting Calculations, Fuel Spill, HEPA Filter Plugging, and Fire Compartment Over-Pressurization*, Revision 2.

2. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.6 Underground Waste Transport Path (Deleted)

B3.3.7 Liquid-Fueled Vehicle/Equipment Control at a WASTE FACE (Deleted)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control

Bases

Background Summary	Liquid-fueled vehicles/equipment are required to perform various activities in the UNDERGROUND. Additionally, vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons are required to perform various activities in the RH BAY. These activities must be controlled to reduce the likelihood of collision events. Collision events can result in pool fires (i.e., leaks, impact with leak) and collisions resulting in loss of confinement and release of radioactive material. Pool fires may breach the WASTE CONTAINER(S) leading to a loss of confinement and a release of radioactive material in the UNDERGROUND or CH BAY. To protect against a pool fire in the UNDERGROUND involving CH WASTE, liquid-fueled vehicles/equipment SHALL be ATTENDED when moving CH WASTE or when near enough to CH WASTE that a fire at the vehicle/equipment could cause a release of radioactive material. To protect against a pool fire in the RH BAY that could potentially weaken WHB structural steel columns resulting in a building collapse and release of radiological material from CH WASTE, vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons SHALL be ATTENDED (Ref. 2). When vehicles/equipment are ATTENDED, the risk of fire or impacts to CH WASTE is reduced. This LCO ensures liquid-fueled vehicles/equipment are ATTENDED during periods when a risk of a pool fire that could affect CH WASTE exists.
Application to Safety Analysis	The safety analysis (Ref. 2) identified pool fires and impacts (collisions) that could result in pool fires in the UNDERGROUND and RH BAY as significant accident scenarios that could result in a release of radiological material. The CH WASTE MAR is the primary contributor to dose for fire events. The consequences of these events were determined to be high to the facility worker and high to co-located workers. Assumptions for the analysis include the following: • The confinement provided by the Facility Cask/LWFC mitigates the consequences of any release of the confined RH WASTE in any fire event. • An RH Borehole's physical construction prevents accumulation of flammable liquids.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control (continued)

Bases (continued)

Application to Safety Analysis (continued)	To reduce the likelihood and consequences of pool fires caused by leaks or collision events, liquid-fueled vehicles/equipment operating in the UNDERGROUND must be controlled by requiring an ATTENDANT at specified times and by limiting the number of liquid-fueled vehicles/equipment within 25 feet of a WASTE FACE. To reduce the likelihood and consequences of pool fires caused by leaks or collision events in the RH BAY, vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons must be ATTENDED while in the RH BAY when CH WASTE is present in the CH BAY.
LCO	This LCO requires that Vehicles/equipment SHALL be controlled as follows: Liquid-fueled vehicles/equipment: • ATTENDED in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION. • ATTENDED in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH • ATTENDED when less than 25 feet from a CH WASTE FACE. • No more than two liquid-fueled vehicles/equipment within 25 feet of a CH WASTE FACE. Vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons: • ATTENDED in the RH BAY when CH WASTE is present in the CH BAY.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control (continued)

Bases (continued)

LCO (continued)

In the above situations when an ATTENDANT is required, each vehicle/equipment that is not in a SAFE CONFIGURATION (e.g., does not have its parking brake set and engine turned off) SHALL have one dedicated ATTENDANT. When a vehicle/equipment that requires an ATTENDANT passes or moves within 25 feet of one or more liquid-fueled vehicles/equipment that are in a SAFE CONFIGURATION, the dedicated ATTENDANT of the liquid-fueled vehicles/equipment with its engine running may also act as the ATTENDANT of the liquid-fueled vehicles/equipment that are in a SAFE CONFIGURATION in these situations. An ATTENDANT SHALL not ATTEND more than one vehicle/equipment that has its engine running.

To protect against a fire in the UNDERGROUND involving CH WASTE, liquid-fueled vehicles/equipment SHALL be ATTENDED when moving CH WASTE or when near enough to CH WASTE that a fire at the vehicles/equipment could cause a release of radiological material. This is achieved by the first four bulleted controls listed in the LCO.

To protect against a pool fire in the RH BAY that affects CH WASTE due to the weakening of WHB structural steel columns, vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons SHALL be ATTENDED in the RH BAY when CH WASTE is present in the CH BAY. This is achieved by the fifth control listed in the LCO.

The first bullet states that liquid-fueled vehicles/equipment in the WASTE SHAFT STATION SHALL be ATTENDED when CH WASTE is present in the WASTE SHAFT STATION. Attendance of liquid-fueled vehicles/equipment in the WASTE SHAFT STATION when CH WASTE is present in the WASTE SHAFT STATION reduces the probability of collisions and/or leaks that may result in a pool fire. Attendance of liquid-fueled vehicles/equipment also provides assurance that reasonable mitigative action is taken and UG facility workers are notified in the event of a need to take precautions such as evacuation.

The second bullet states that liquid-fueled vehicles/equipment SHALL be ATTENDED in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH. Attendance of liquid-fueled vehicles/equipment in the TRANSPORT PATH when CH WASTE is present in the TRANSPORT PATH reduces the probability of collisions and/or leaks that may result in a pool fire. Attendance of liquid-fueled vehicles/equipment also provides assurance that reasonable mitigative action is taken and UG facility workers are notified in the event of a need to take precautions such as evacuation.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control (continued)

Bases (continued)

LCO (continued)	The third bullet states that liquid-fueled vehicles/equipment SHALL be ATTENDED when less than 25 feet from a CH WASTE FACE. ATTENDANCE of liquid-fueled vehicles/equipment within 25 feet of a CH WASTE FACE reduces the probability of collisions that may result in a pool fire. Attendance of liquid-fueled vehicles/equipment also provides assurance that reasonable mitigative action is taken and UG facility workers are notified in the event of a need to take precautions such as evacuation. When vehicles/equipment is ATTENDED, the risk of pool fires affecting WASTE is reduced. This control ENSURES all liquid-fueled vehicles/equipment are ATTENDED when within 25 feet of a WASTE FACE. The fourth bullet states that no more than two liquid-fueled vehicles/equipment SHALL be present within 25 feet of a CH WASTE FACE. Limiting the number of liquid-fueled vehicles/equipment within 25 feet of a CH WASTE FACE to no more than two prevents excessive vehicle/equipment congestion in this limited area, thus, reducing the probability of collisions that may result in a pool fire. If more than two vehicles/equipment, even if ATTENDED, are within 25 feet of a CH WASTE FACE, there is an increased likelihood of a collision with pool fire that could breach a WASTE CONTAINER resulting in a radiological material release. The fifth item states that vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons in the RH BAY SHALL be ATTENDED when CH WASTE is present in the CH BAY. If CH WASTE is present in the CH BAY, the potential exists for a pool fire in the RH BAY to weaken the structural steel columns of the WHB causing a building collapse resulting in a release of radioactive material from CH WASTE present in the CH BAY. The probability of a pool fire in the RH BAY is reduced by ATTENDANCE of the vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons in the RH BAY. Vehicles/equipment that are emptied of combustible liquids to a residual level do not require an ATTENDANT when in the RH BAY.
MODE Applicability	WASTE is present in the UNDERGROUND during WASTE HANDLING and DISPOSAL. WASTE may be present in the CH BAY during WASTE HANDLING and WASTE STORAGE. Therefore, these controls must apply in WASTE HANDLING, WASTE STORAGE, and DISPOSAL to protect WASTE.
PROCESS AREA Applicability	This LCO applies to the UNDERGROUND and the CH BAY because these areas contain CH WASTE that could be impacted by a pool fire.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control (continued)

Bases (continued)

ACTIONS

A.1	In the event a liquid-fueled vehicle/equipment in the WASTE SHAFT STATION is not ATTENDED when CH WASTE is present in the WASTE SHAFT STATION, Condition A is entered. Required Action A.1 requires the affected liquid-fueled vehicles/equipment in the WASTE SHAFT STATION to be placed in a SAFE CONFIGURATION (e.g., stopped and the parking brake set if installed) and engine turned off, or other actions as determined by the FSM) IMMEDIATELY. This reduces the risk of collisions that may lead to a pool fire while Required Action A.2 is being accomplished. The Completion Time of IMMEDIATELY is needed to minimize the time at risk.
A.2	This Required Action requires the affected liquid-fueled vehicles/equipment to be ATTENDED within 1 Hour. Completion of this Required Action brings the affected vehicle/equipment back within compliance with the LCO. The Completion Time of 1 Hour is sufficient to ENSURE the vehicle/equipment is ATTENDED while limiting the time at risk.
B.1	In the event a liquid-fueled vehicle/equipment in the TRANSPORT PATH is not ATTENDED when CH WASTE is present in the TRANSPORT PATH, Condition B is entered. Required Action B.1 requires the affected liquid-fueled vehicle/equipment to be placed in a SAFE CONFIGURATION (e.g., stopped and the parking brake set (if installed) and engine turned off, or other actions as determined by the FSM) IMMEDIATELY. This reduces the risk of collisions that may lead to a pool fire while Required Action B.2 is being accomplished. The Completion Time of IMMEDIATELY is needed to minimize the time at risk.
B.2	This Required Action requires the affected liquid-fueled vehicle/equipment to be ATTENDED within 1 Hour. Completion of this Required Action brings the affected vehicle/equipment back within compliance with the LCO. The Completion Time of 1 Hour is sufficient to ensure the vehicle/equipment is ATTENDED while limiting the time at risk.

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control (continued)

Bases (continued)

ACTIONS

C.1	In the event liquid-fueled vehicle/equipment is not ATTENDED in an ACTIVE PANEL when less than 25 feet from a CH WASTE FACE, Condition C is entered. Required Action C.1 requires all vehicles/equipment within 25 feet of a CH WASTE FACE to be placed in a SAFE CONFIGURATION (e.g., stopped and the parking brake set (if installed) and engine turned off, or other actions as determined by the FSM) IMMEDIATELY. This reduces the risk of collisions that may lead to a pool fire while Required Action C.2 is being accomplished. The Completion Time of IMMEDIATELY is needed to minimize the time at risk.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control (continued)

Bases (continued)

ACTIONS (continued)

C.2	This Required Action requires the affected liquid-fueled vehicle/equipment to be ATTENDED within 1 Hour. Completion of this Required Action brings the affected vehicle/equipment back within compliance with the LCO. The Completion Time of 1 Hour is sufficient to ensure the vehicle/equipment is ATTENDED while limiting the time at risk.
D.1	In the event more than two liquid-fueled vehicles/equipment are within 25 feet of a CH WASTE FACE, Condition D is entered. The safety analysis assumes that two ATTENDED UNDERGROUND vehicles/equipment may be within 25 feet of a CH WASTE FACE. If more than two vehicles/equipment, even if ATTENDED, are within 25 feet of a CH WASTE FACE, there is an increased likelihood of a fire or impact that could breach a WASTE CONTAINER resulting in a radiological material release. Required Action D.1 requires the excess vehicles/equipment to be moved a distance greater than 25 feet from the CH WASTE FACE IMMEDIATELY using an ATTENDANT. The use of an ATTENDANT reduces the risk of collisions that may lead to a pool fire while the excess vehicles/equipment are being removed. Completion of this Required Action brings the affected vehicles/equipment back within compliance with the LCO. The Completion Time of IMMEDIATELY is needed to minimize the time at risk.
E.1	In the event a vehicle(s)/equipment with liquid-combustible capacity greater than or equal to 25 gallons in the RH BAY is not ATTENDED when CH WASTE is present in the CH BAY, Condition E is entered. Required Action E.1 requires the affected vehicle(s)/equipment that are not ATTENDED to be placed in a SAFE CONFIGURATION (e.g., stopped and the parking brake set [if installed] and engine turned off, or other actions as determined by the FSM) IMMEDIATELY. This reduces the risk of collisions that may lead to a pool fire while Required Action E.2 is being accomplished. The Completion Time of IMMEDIATELY is needed to minimize the time at risk.
E.2	This Required Action requires the affected vehicle(s)/equipment to be ATTENDED within 1 Hour. Completion of this Required Action brings the affected vehicle(s)/equipment back within compliance with the LCO. The Completion Time of 1 Hour is sufficient to ENSURE the vehicle(s)/equipment is ATTENDED while limiting the time at risk.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control (continued)

Bases (continued)

Surveillance Requirements

SR 4.3.8.1	This SR requires VERIFICATION be made prior to CH WASTE entering the WASTE SHAFT STATION that the required ATTENDANT(S) be present for liquid-fueled vehicles/equipment in the WASTE SHAFT STATION. The FREQUENCY of "Prior to CH WASTE entering the WASTE SHAFT STATION" requires an ATTENDANT to be present before the CH WASTE is moved onto the Waste Shaft Conveyance to DOWNLOAD or, if returning WASTE to the surface, prior to entering the WASTE SHAFT STATION from the TRANSPORT PATH, thus ENSURING the liquid-fueled vehicles/equipment is ATTENDED in compliance with this LCO requirement. Failure to meet or perform this SR requires entry into Condition A.
SR 4.3.8.2	This SR requires VERIFICATION be made prior to introduction of CH WASTE into the TRANSPORT PATH, that the required ATTENDANT(S) be present. The FREQUENCY of "Prior to introduction of CH WASTE into the TRANSPORT PATH" requires an ATTENDANT to be present with any liquid-fueled vehicle in the TRANSPORT PATH, thus ensuring the liquid-fueled vehicles/equipment in the TRANSPORT PATH is ATTENDED in compliance with this LCO requirement. Failure to meet or perform this SR requires entry into Condition B.

(continued)

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.8 Vehicle/Equipment Control (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.3.8.3	This SR requires VERIFICATION be made upon entry into an ACTIVE ROOM EACH SHIFT, while the UNDERGROUND is manned, that liquid-fueled vehicles/equipment are ATTENDED when less than 25 feet from a CH WASTE FACE. Based on operational experience a FREQUENCY of upon entry into an ACTIVE ROOM EACH SHIFT while UNDERGROUND is manned is sufficient to ensure compliance with this LCO requirement. This SR is not required when the UNDERGROUND is not manned. Failure to meet or perform this SR requires entry into Condition C.
SR 4.3.8.4	This SR requires VERIFICATION be made upon entry into an ACTIVE ROOM EACH SHIFT while the UNDERGROUND is manned that no more than two liquid-fueled vehicles/equipment are within 25 feet of a CH WASTE FACE. Based on operational experience, a FREQUENCY of upon entry into an ACTIVE ROOM EACH SHIFT while the UNDERGROUND is manned is sufficient to ensure compliance with this LCO requirement. This SR is not required when the UNDERGROUND is not manned. Failure to meet or perform this SR requires entry into Condition D.
SR 4.3.8.5	This SR requires VERIFICATION be made that the required ATTENDANT(S) be present for vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons in the RH BAY. This VERIFICATION SHALL be performed prior to vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons entering the RH BAY when CH WASTE is present in the CH BAY. This conditional FREQUENCY requires an ATTENDANT to be present before the vehicles/equipment with liquid-combustible capacity greater than or equal to 25 gallons enters the RH BAY. Additionally, this VERIFICATION SHALL be performed EACH SHIFT when CH WASTE is present in the CH BAY to ensure proper shift turn over for the required ATTENDANT(S). Failure to meet or perform this SR requires entry into Condition E.

References

1. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

2. WIPP-058, *DSA Supporting Calculations, Fuel Spill, HEPA Filter Plugging, and Fire Compartment Over-Pressurization*, Revision 2, Nuclear Waste Partnership LLC, Carlsbad, NM, February 2016.

B3/4.3 Vehicle/Equipment Control (continued)

B3.3.9 Attendance of Areas ≤ 25 Feet of TRU WASTE CONTAINERS When Vehicle/Equipment are Present (Deleted)

B3/4.4 Fuel Confinement

B3.4.1 Fuel Confinement in the RH BAY (Deleted)

B3.4.2 Fuel Barrier in the UNDERGROUND (Deleted)

B3/4.5 Waste Handling

B3.5.1 CH WASTE Handling (Deleted)

B3.5.2 Waste Conveyance Operations (Deleted)

B3.5.3 Waste Handling in the OUTSIDE AREA (Deleted)

B3/4.6 Compressed Gas Cylinder Program

B3.6.1 Storage of Compressed Gas Cylinders (Deleted)

B3.6.2 Use of Compressed Gas Cylinders (Deleted)

B3.6.3 Transport of Compressed Gas Cylinders (Deleted)

B3/4.7 SUSPECT Container Response

B3.7.1 Waste Acceptability Control

Bases

Background Summary

The WIPP WAC (Ref. 1) includes requirements regarding waste forms and packaging. The allowed packaging provides confinement to resist adverse events (e.g., impacts, package compatibility with the waste, package integrity at increased temperature). The allowed waste forms prohibit incompatible and reactive materials (e.g., pyrophorics, oxidizers, water reactive chemicals, exothermic chemical reactions). Limiting flammable gas and volatile organic compound concentrations in the innermost confinement layer reduces the likelihood of formation of combustible or flammable atmospheres within each container. Limiting curie content protects assumptions regarding the quantity of radiological material involved in an event and therefore, the consequences of such events.

WIPP receives WASTE from generator sites that is characterized and certified to meet the WIPP WAC prior to shipment. The WIPP receives WASTE in CLOSED Type B SHIPPING PACKAGES, moves the CLOSED Type B SHIPPING PACKAGES into the WHB, opens the Type B SHIPPING PACKAGES, unloads the WASTE CONTAINERS, and moves the WASTE CONTAINERS to the UNDERGROUND for disposal. WIPP does not open or modify the contents of WASTE CONTAINERS received from generator sites. Therefore, the WIPP WAC is an Initial Condition to the hazard and accident analyses.

WIPP is responsible for VERIFYING that the labels on containers, as received, are in agreement with the shipping documents. The WIPP has no means to VERIFY the stated contents. Therefore, errors in the generation of a Type B SHIPPING PACKAGE, either in actual or stated contents, can result in a suspect container being received and disposed.

On occasion, WIPP receives a WASTE CONTAINER that has physical characteristics (e.g., surface contamination, container degradation, bulging), or documentation inconsistencies that cause the container to be considered suspect. Additionally, WIPP may receive notification from the waste generator that a container is suspect, potentially not compliant with the WIPP WAC. Waste Acceptability Control (LCO 3.7.1) allows for WIPP to take pre-determined actions for certain analyzed container conditions to reduce the likelihood for a hazardous event involving the suspect container. Waste Acceptability Control does not replace or circumvent the USQ process for determining if a Potential for Inadequate Safety Analysis (PISA) exists.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

Application to Safety Analysis

This LCO protects the requirements for the receiving of WASTE at WIPP. The DSA (Ref. 2) assumes that WASTE transported to WIPP is in compliance with the requirements in the DOE approved WIPP WAC.

The hazard analysis (Ref. 3) credits the WIPP WAC requirements as Initial Conditions or the starting point for postulating hazardous events as follows:

- CH and RH WASTE CONTAINERS subject to waste stream certification requirements [compliance with the WIPP WAC, the Contact-handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC) (Ref. 4), the Transuranic Package Transporter Model III TRU Waste Authorized Methods for Payload Control (TRUPACT-III TRAMPAC) (Ref. 5), and the Remote-Handled Transuranic Waste Authorized Methods for Payload Control (RH-TRAMPAC) (Ref. 6)].

- WASTE CONTAINER inventories are in compliance with the plutonium-239 equivalent curies (PE-Ci) limits and fissile gram equivalent limits, which are calculated by the generator facility for comparison with the WIPP WAC.

- Generator sites-supplied WASTE CONTAINER inventories are in compliance with WIPP WAC and reduce the likelihood of WASTE CONTAINER fires by prohibiting ignitable and corrosive material and non-radiological pyrophoric material in the waste, and limit radiological pyrophorics to less than 1% by weight, by prohibiting known incompatible chemicals (e.g., reactive) in the waste, and by installing vents in the WASTE CONTAINERS, which reduces hydrogen buildup in WASTE CONTAINERS.

- The WIPP WAC applies to generator sites that ship waste to the WIPP facility for disposal and identifies fissile mass limits, special reflector/moderator mass limits, WASTE CONTAINER types, and waste characteristics that have been approved for disposal at WIPP. The fissile mass limits in the WIPP WAC are derived from the CH and RH Nuclear Criticality Safety Evaluations (WIPP-016 (Ref. 7) and WIPP-020 (Ref. 8)) identified fissile mass limits and are specific to the WIPP waste handling, storage, and disposal configurations.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

Application to Safety Analysis (continued)

- Generator sites supplied WASTE CONTAINERS are assumed to be compliant with packaging requirements (of sound integrity, noncombustible, vented, and closed) in accordance with the WIPP WAC and the Hazardous Waste Facility Permit (Ref. 9). This is significant since packaged material will burn in a confined manner and material ejected from a container would burn in an unconfined manner. Additionally, WASTE CONTAINERS from the generator sites are certified free of surface contamination above 10 CFR 835, Appendix D limits upon shipment.

- RH WASTE canisters are shipped in specially designed Type B RH SHIPPING PACKAGES. The Type B RH SHIPPING PACKAGE is designed to provide shielding and minimize radiation exposure from the RH WASTE.

- CH and RH WASTE CONTAINERS are shipped to WIPP in Nuclear Regulatory Commission Certified CLOSED Type B SHIPPING PACKAGES, which protect their inner containers from releasing their radiological inventory when they are in the WHB PARKING AREA UNIT. CLOSED Type B SHIPPING PACKAGES prevent release of radiological material. Type B SHIPPING PACKAGE external surfaces are required to measure a dose rate equal to or less than 200 mrem per hour.

The Central Characterization Program (CCP) or another CBFO approved program is tasked with characterizing WASTE on behalf of the waste generator sites to obtain information to satisfy the WIPP WAC before WASTE CONTAINERS have been certified for disposition at WIPP. Characterization at the generator sites includes compilation of Acceptable Knowledge (AK) into an auditable record, radiography and/or Visual Examination (VE), flammable gas analysis, and Non-Destructive Assay (NDA) and/or radiochemistry. This work is conducted in accordance with the CBFO, Quality Assurance Program Document, the WIPP Quality Assurance Program Description (WP 13-1), and the CBFO NWP Quality Assurance CCP Transuranic Waste Characterization Project Plan (QAPPD, CCP-PO-001) (or equivalent approved plan if CCP is not responsible for the work).

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

Application to Safety Analysis (continued)	The actual WASTE CONTAINER contents cannot be VERIFIED at WIPP. Upon receipt of WASTE at WIPP the shipping manifests are examined to VERIFY their compliance with the WIPP WDS. After WASTE is received and manifests are compared with WDS data entries for consistency at WIPP, the Type B SHIPPING PACKAGES are unloaded; WASTE CONTAINERS are removed from their Type B SHIPPING PACKAGES and moved to the UNDERGROUND for disposal. WASTE CONTAINERS are not opened at WIPP. Therefore, WASTE characteristics are the basis for the analysis of all event types that may occur. LCO 3.7.1 defines the ACTIONS to evaluate and respond to a suspect WASTE CONTAINER identified to be noncompliant with the WIPP WAC.
LCO	The LCO states that, WASTE CONTAINERS SHALL be compliant with the WIPP WAC. LCO 3.7.1 requires that WASTE be compliant with the WIPP WAC prior to acceptance at WIPP. This is implemented by the SRs to determine that the Shipping Manifest is consistent with the WIPP WDS at the time the WASTE is received at the WIPP security portal. A WASTE generator site could discover that a mischaracterized WASTE CONTAINER was inadvertently shipped to WIPP. If this happens, the generator site is required to notify WIPP of the condition. WIPP may identify discrepancies in the shipper paperwork and the certification data that may indicate that a suspect WASTE CONTAINER was received at WIPP. WASTE CONTAINER integrity issues may be discovered during or after WASTE CONTAINER receipt, processing, and disposal by WIPP. WIPP is then responsible for determining the location of that WASTE CONTAINER and ensuring the safety of personnel and environment until such time as the final disposition of the subject container can be determined. The ACTIONS associated with the LCO provide for a disciplined response in the event that a noncompliant WASTE CONTAINER is identified. Entry into the LCO does not replace or circumvent the USQ process for determining if a PISA exists. A noncompliant determination requires entry into the LCO. Independently, the USQ process and PISA evaluation is determined. The DSA evaluates deflagrations/over pressurizations in unique and representative events and prescribes controls. Indication of pressurization may not result in a PISA. For these instances, the RESPONSE PLAN describing the planned action to be taken to comply with the LCO is required.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

MODE Applicability	WASTE is received at the WIPP site and transported to the UNDERGROUND for long-term disposition. Therefore, this LCO is applicable in all MODES corresponding to PROCESS AREAS, as defined in Table 1.2-2. In addition, The OUTSIDE AREA does not have any defined MODE and is applicable is at all times after WASTE receipt at WIPP.
PROCESS AREA Applicability	The PROCESS AREAS that house WASTE CONTAINERS include the CH BAY, RH BAY, ROOM 108, HOT CELL COMPLEX, WASTE SHAFT ACCESS AREA, OUTSIDE AREA, and UNDERGROUND. A suspect WASTE CONTAINER could be identified at any point during WASTE HANDLING and WASTE STORAGE ACTIVITIES. The storage of WASTE, in a CLOSED Type B SHIPPING PACKAGES, is permitted in the OUTSIDE AREA. A noncompliant WASTE CONTAINER could be identified when stored in the OUTSIDE AREA.
ACTIONS	
A.1	In the event the Shipping Manifest is found to be discrepant with the WDS, Condition A is entered. The WDS entries are established and approved prior to shipment and must match the approved manifest upon arrival. Since the Shipping Manifest is examined prior to removal of any WASTE CONTAINER(S), any inconsistencies with the WDS will keep the waste in its CLOSED Type B SHIPPING PACKAGE until the noncompliance can be dispositioned. The CLOSED Type B SHIPPING PACKAGE is designed and credited to protect personnel and the environment from release of the radiological material it contains.
A.2	The Shipping Manifest may be discrepant for a number of reasons. Minor discrepancies could include paperwork errors and could be corrected quickly. Experience at WIPP has shown that rectifying discrepancies with the Shipping Manifest and restoring compliance with WIPP WAC within the Completion Time of 7 Days provides adequate time to contact the CCP or another CBFO approved organization to resolve the noncompliant items and return a suspect container to a WIPP WAC compliant state, while minimizing risk. Should the noncompliant items not be readily rectified, a RESPONSE PLAN is developed in accordance with Required Action F.1.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

ACTIONS (continued)

B.1	In the event that a WASTE CONTAINER(S) is determined to be noncompliant through observable configuration, damage, or degradation, Condition B is entered. WIPP completes a series of checks upon WASTE processing to VERIFY container integrity after receipt. Although WASTE CONTAINER integrity issues may be discovered during processing or disposal of WASTE, suspect WASTE CONTAINER(S) may be identified after the WASTE is emplaced. Identifying the suspect WASTE CONTAINER IMMEDIATELY upon removal of WASTE CONTAINER(S) from its SHIPPING PACKAGE supports the disposition and resolution of the noncompliant WASTE CONTAINER. This Required Action requires accessible WASTE CONTAINER(S) with improper configuration, structural defects, damage, or degradation to be placed in a SAFE CONFIGURATION IMMEDIATELY, thereby reducing the potential for fires or other accidents that could impact the CH WASTE.
B.2	Required Action B.2 requires accessible WASTE CONTAINER(S) with structural defects, damage, or degradation to be overpacked in a WIPP WAC compliant WASTE CONTAINER within 48 Hours of entering in Condition B. WIPP does not open or modify WASTE CONTAINERS received from generator sites. However, overpacking noncompliant containers is an allowed ACTIVITY in the DSA. Based on operational experience, the 48 Hours allotted to complete an overpack ACTIVITY is needed for disassembly of the payload, dunnage adjustments, modifying the WDS with new entries, documentation and approvals, and therefore minimizes risk. WASTE CONTAINERS are visually inspected for proper configuration, physical damage (e.g., severe rusting, apparent structural defects, etc.) and leakage to ENSURE they are in good condition prior to storage. WASTE CONTAINERS are also checked for external surface contamination and direct radiological dose. WIPP may initiate local decontamination on containers above the WIPP WAC limits, in good condition, and free of leakage. External surface contamination or radiation dose rates in excess of RWP limits are controlled in accordance with established operational and radiological control procedures. Should the noncompliant items not be readily rectified, a RESPONSE PLAN is developed in accordance with Required Action F.1.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

ACTIONS (continued)

C.1	In the event that a WASTE CONTAINER(S) is suspected of being noncompliant through observable indications of pressurization (past or present), Condition C is entered. Evidence that a WASTE CONTAINER(S) has been under pressure and has experienced pressure relief or indications that a WASTE CONTAINER(S) is pressurized, requires immediate attention to protect workers from a potentially imminent event. Pressurization can be indicated by a fairly uniform expansion of the sidewalls, bottom or top. Past pressurization can be indicated by a notable outward deflection of the bottom or top and/or material discharge from the container. Warping of surfaces is also an indication the container has experienced pressurization. Required Action C.1 requires WASTE HANDLING ACTIVITIES to be suspended IMMEDIATELY. SUSPENDING WASTE HANDLING ACTIVITIES IMMEDIATELY due to the potential hazards also minimizes risk. Once compensatory measures are determined by the FSM then this action no longer applies.
C.2	Required Action C.2 requires evacuation of the accessible AFFECTED AREA IMMEDIATELY and limiting access to the area where the WASTE CONTAINER(S) are stored by posting signage and/or erecting barricades. Due to the potential hazard that exists, the FSM SHALL determine the AFFECTED AREA and place signage and/or erect barricades to prevent access to the accessible AFFECTED AREA. The Completion Time of IMMEDIATELY is required to evacuate, and limit access to the accessible AFFECTED AREA to minimize risk. The FSM SHALL contact Nuclear Safety to enter the USQ process to determine whether subsequent action requires DOE approval.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

ACTIONS (continued)

C.3

Required Action C.1 requires WIPP to SUSPEND WASTE HANDLING ACTIVITIES in accessible AFFECTED AREA and Required Action C.2 requires evacuating personnel from the accessible AFFECTED AREA and restricting access to that area.

Once the nature of the suspect container is understood, a CBFO-approved RESPONSE PLAN SHALL be implemented within 10 Days of entry into Condition C. To support the completion of this Required Action within 10 Days, the RESPONSE PLAN must be prepared and submitted to CBFO for approval. Following CBFO approval, the plan must be implemented. All of these actions should be considered in achieving the required Completion Time of 10 Days. Since IMMEDIATE action is taken in C.1 and C.2 to SUSPEND WASTE HANDLING ACTIVITIES in the accessible AFFECTED AREA and to evacuate and post the AFFECTED AREA respectively, a 10 Day Completion Time is deemed adequate to minimize the risk. The RESPONSE PLAN SHALL provide an evaluation of the available information on the suspect WASTE CONTAINER and SHALL include the appropriate actions to disposition the suspect WASTE CONTAINER(S).

Required Action C.3 implements the NWP/DOE approved RESPONSE PLAN which contains adequate direction and compensatory measures to resolve the WASTE CONTAINER noncompliance. Depending on the hazards of concern, acceptable compensatory measures include container overpacking or other containment such as a CLOSED Type B SHIPPING PACKAGE, isolation through physical location, or similar protective measures specified in DOE STD-5506 for WASTE CONTAINER(S). The plan content should specify, based on existing conditions, the detailed plan of action for restoring compliance with the LCO. Section 5.4.4 of this TSR discusses the use and content of RESPONSE PLANS.

Required Action C.3 does not replace or circumvent the USQ process for determining if a PISA exists. A positive PISA determination will still require entry into LCO 3.7.1 for a suspect noncompliant WASTE CONTAINER(S). Because the safety analysis evaluates deflagrations/over pressurizations in bounding events and prescribes controls, indication of pressurization may not result in a PISA USQ. For these instances, the RESPONSE PLAN describing the planned action to be taken to comply with TSR requirements is required.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

ACTIONS (continued)

D.1	If after opening the SHIPPING PACKAGE, it is found that the WASTE CONTAINERS inside the SHIPPING PACKAGE are not the containers that were to be shipped per the shipping manifest and the WDS system, the incorrectly shipped WASTE CONTAINERS must be placed in a SAFE CONFIGURATION. This may include moving the WASTE CONTAINERS to a storage location in the CH BAY and holding the containers in storage until the discrepancy with the shipping manifest and the WDS has been resolved. The Completion Time of IMMEDIATELY to place the undetermined SHIPPING CONTAINERS in a SAFE CONFIGURATION minimizes the risk associated with these containers. The IMMEDIATE Completion Time is sufficient to ENSURE the suspect containers are isolated and placed in a SAFE CONFIGURATION to limit the risk of storing unauthorized containers in the UNDERGROUND.
D.2	The discrepancy between the WASTE CONTAINER(S) received and the WDS must be resolved to determine the disposition of the WASTE CONTAINER(S). Resolution of the discrepancy will determine if the WASTE CONTAINER(S) can be emplaced in the WIPP UNDERGROUND or returned to the WASTE Shipper. A Completion Time of 7 days is sufficient to research the WDS, the shipping manifest, and if necessary contact the shipper for additional details or confirmation of the materials in the containers. The 7 days will allow sufficient time to resolve the discrepancy while minimizing the risk associated temporary storage of the containers. Entry into Condition F.1 is required if Action D.2 cannot be completed with 7 days. After the resolution of the discrepancy, a decision will be made as to the disposition of the WASTE CONTAINERS (i.e., to emplace in the UNDERGROUND or return to the shipper). The actual activities to disposition the containers may occur after the 7-day period allotted to resolve the paperwork discrepancy. Should the noncompliant items not be readily rectified, a RESPONSE PLAN is developed in accordance with Required Action F.1.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

ACTIONS (continued)

E.1	In the event a generator site notifies WIPP of a noncompliant WASTE CONTAINER(S) that can potentially result in internal fires, deflagrations/ explosions, or other exothermic reactions, Condition E is entered. WIPP assumes that the container is pressurized or the material inside the suspect WASTE CONTAINER(S) is reactive. Under this ACTION, WIPP also assumes the potential for internal energetic events such as fires, deflagrations/explosions, exothermic reactions, criticality, or MAR greater than the WIPP WAC allowable limits cannot be ruled out based on the generator site's initial notification or when no additional information regarding the noncompliant container is available. This situation requires immediate attention to protect workers from a potentially imminent event. The WDS database records the location of each WASTE CONTAINER entering the WIPP Site. Required Action E.1 requires that the suspect WASTE CONTAINER(S) be located IMMEDIATELY. The Completion Time of IMMEDIATELY is required to locate the hazardous WASTE CONTAINER to minimize risk.
E.2	Once the noncompliant containers are located, Required Action E.2 requires WASTE HANDLING ACTIVITIES to be suspended IMMEDIATELY. SUSPENDING WASTE HANDLING ACTIVITIES IMMEDIATELY due to the potential hazards also minimizes risk. Once compensatory measures are determined by the FSM then this action no longer applies.
E.3	Once the noncompliant containers are located, Required Action E.3 requires evacuation and restricting access to the AFFECTED AREA IMMEDIATELY. Due to the potential hazard that exists, the FSM SHALL place the accessible AFFECTED AREA in a SAFE CONFIGURATION. The Completion Time of IMMEDIATELY is required to evacuate, limit access, and place the accessible AFFECTED AREA in a SAFE CONFIGURATION to minimize risk. The FSM SHALL contact Nuclear Safety to enter the USQ process to determine whether subsequent action requires DOE approval.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

ACTIONS (continued)

E.4

Once the nature of the noncompliance is understood, a CBFO-approved RESPONSE PLAN SHALL be implemented within 10 Days of entry into Condition E. To support the completion of this Required Action within 10 Days, the RESPONSE PLAN must be prepared and submitted to CBFO for approval. Following CBFO approval, the plan must then be implemented. All of these actions should be considered in achieving the required Completion Time of 10 Days. Since IMMEDIATE action is taken in Required Action E.1, E.2, and E.3 to place the noncompliant WASTE CONTAINER(S) in a SAFE CONFIGURATION, the 10 Day Completion Time is deemed adequate to minimize risk. The RESPONSE PLAN SHALL provide an evaluation of the available information on the noncompliant WASTE CONTAINER and SHALL include the appropriate actions to disposition the noncompliant WASTE CONTAINER(S).

Required Action E.4 implements the NWP/DOE approved RESPONSE PLAN which contains adequate direction and compensatory measures to resolve the WASTE CONTAINER noncompliance. Depending on the hazards of concern, acceptable compensatory measures include container overpacking or other containment such as a CLOSED Type B SHIPPING PACKAGE, isolation through physical location, or similar protective measures specified in DOE STD-5506 for WASTE CONTAINER(S). The plan content should specify, based on existing conditions, the detailed plan of action for restoring compliance with the LCO. Section 5.4.4 of this TSR discusses the use and content of RESPONSE PLANS.

If the noncompliant WASTE CONTAINER(S) is already emplaced in the UNDERGROUND, compensatory measures might include retrieving the noncompliant container(s) or installing Bulkheads to isolate them.

Required Action E.4 does not replace or circumvent the USQ process for determining if a PISA exists. A positive PISA determination will still require entry into LCO 3.7.1 for a noncompliant WASTE CONTAINER(S). Because the safety analysis evaluates some WIPP WAC noncompliances in bounding events and prescribes controls, notification of a noncompliance may not result in a PISA USQ. For these instances, the RESPONSE PLAN describing the planned action to be taken to comply with TSR requirements is required.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

ACTIONS (continued)

F.1	In the event that Required Action A.2, B.2, or D.2 cannot be met or completed within the Completion Time, then a CBFO-approved RESPONSE PLAN SHALL be implemented within 10 Days of entry into Condition F. To support the completion of this Required Action within 10 Days, the RESPONSE PLAN must be prepared and submitted to CBFO for approval. Following CBFO approval, the plan must then be implemented. All of these actions should be considered in achieving the required Completion Time of 10 Days. The RESPONSE PLAN SHALL provide an evaluation of the available information on the noncompliant WASTE CONTAINER. The RESPONSE PLAN SHALL include the appropriate actions to disposition the suspect WASTE CONTAINER(S), including shipping the CLOSED Type B SHIPPING PACKAGE back to the generator site. In the event an overpack was required for a Standard Large Box 2 or 10-Drum Overpack, a RESPONSE PLAN would identify the disposition paths, since no standard overpacks for these containers are identified in the WIPP WAC. The RESPONSE PLAN provides an evaluation of the available information and method chosen to overpack or disposition (by other means) the degraded noncompliant WASTE CONTAINER(S). The plan content should specify, based on existing conditions, the detailed plan of action for restoring compliance with the LCO. Section 5.4.4 of this TSR discusses the use and content of RESPONSE PLANS.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

Surveillance Requirements

SR 4.7.1.1 SR 4.7.1.1 determines if the Shipping Manifest is consistent with the WIPP WDS. Upon receipt, each SHIPPING PACKAGE manifest SHALL be inspected to VERIFY it meets the attributes of the LCO. Failure to meet or perform this SR requires entry into Condition A.

SR 4.7.1.2 SR 4.7.1.2 determines if there is obvious damage or degradation to any of the accessible WASTE CONTAINER(S). Obviously degraded means clearly visible and potentially significant defects in the container or container surface.

Rust or corrosion is assessed in terms of its type, extent, and location. Pitting, pocking, flaking, or dark coloration characterizes potentially significant rust or corrosion. This includes the extent of the WASTE CONTAINER surface area covered, thickness, and if it occurs in large flakes or built-up (caked) areas. Rusted containers may not be accepted if rust is present in caked layers or deposits, or rust is present in the form of deep metal flaking, or built-up areas of corrosion products. Wall thinning, pinholes, and breaches can be a result of rust/corrosion.

In addition, the location of rust should be evaluated for noncompliance; for example, on a drum: top lid; filter region; locking chine (fastener ring); top one-third, above the second rolling hoop; middle one-third, between the first and second rolling hoops; bottom one-third, below the second rolling hoop; and on the bottom.

WASTE CONTAINER(S) may still be considered acceptable if the signs of rust show up as some discoloration on the container, or if rubbed would produce fine grit or dust or minor flaking (such that wall thinning does not occur).

WASTE CONTAINER(S) with obvious leaks, holes or openings, cracks, deep crevices, creases, tears, broken welds, sharp edges or pits, are either breached or on the verge of being breached are considered WIPP WAC noncompliant. Warpage could cause the container to be unstable or prevent it from fitting properly on the payload pallet.

Visible parts of the fastener and chine, if applicable, are examined for damage or excessive corrosion. Alignment of the fastener is observed to the extent possible to ENSURE that it is in firm contact around the entire lid and the container will not open during transport.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.7.1.2 (continued)	Deep gouges, scratches, or abrasions over wide areas are not acceptable. If top and bottom surfaces are not parallel, this would indicate that the container is warped. Dents should be less than 1/4 inch deep by 3 inches long and between 1/2 inch to 6 inches wide. All other dents must be examined to determine impact of structural integrity. Discoloration which would indicate leakage or other evidence of leakage of material from the WASTE CONTAINER(S), containers with evidence of leakage near vents, top lid fittings, bottom fittings, welds, seams, and intersections of one or more metal sheets or plates must be considered noncompliant. Outer containers that have visible and accessible vent ports and/or filter(s) (e.g., standard waste box, ten-drum overpack, standard large box 2) will be inspected for obvious damage, pluggage/blockage/obstruction to vent ports and/or filter(s). Inspection will also ensure a minimum number of vents/filters appear open for venting. No radiological contamination or direct radiation dose rates exceeding the RWP limits as measured from accessible areas of the SHIPPING PACKAGE or WASTE CONTAINER(S) surfaces. Failure to meet or perform this SR requires entry into Condition B.
SR 4.7.1.3	SR 4.7.1.3 determines if there is evidence that the WASTE CONTAINER(S) has been or is pressurized. Pressurization can be indicated by a fairly uniform expansion of the sidewalls, bottom or top (bulging). Past pressurization can be indicated by a notable outward deflection of the bottom or top or material discharge from the lid. A bulging WASTE CONTAINER(S) is WIPP WAC noncompliant. In the case of a drum, bulging is indicated by: • A fairly uniform expansion of the sidewalls, bottom, or top, either the top or bottom surface protrudes beyond the planar surface of the top or bottom ring, • A protrusion of the side wall beyond a line connecting the peaks of the surrounding rolling hoops or a line between a surrounding rolling hoop and the bottom or top ring, or • Expansion of the sidewall such that it deforms any portion of a rolling hoop. Failure to meet or perform this SR requires entry into Condition C.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.7.1.4	SR 4.7.1.4 requires that for any WASTE CONTAINER with an observable identification label, a visual observation SHALL be completed of the label and the identification number on the label compared to the WIPP WDS. This will ensure that the containers received are the correct ones as identified in the WIPP WDS or are suspect containers that do not agree with the WIPP WDS. The observation of the identification label will be completed after the WASTE CONTAINERS are removed from the SHIPPING PACKAGE and the inspections required by SRs 4.7.1.2 and 4.7.1.3 are completed. The identification can only be completed after the container is removed from the SHIPPING PACKAGE as the identification label typically cannot be seen when the containers are in the SHIPPING PACKAGE. Failure to complete this SR or if the identification label information does not match the WIPP WDS requires entry into Condition D.

(continued)

B3/4.7 Suspect Container Response (continued)

B3.7.1 Waste Acceptability Control (continued)

Bases (continued)

References

1 DOE/WIPP 02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

2 DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

3 WIPP-021, *Hazards Analysis for the Waste Isolation Pilot Plant Transuranic Waste Handling Safety Basis,* Revision 8, Nuclear Waste Partnership, Carlsbad, NM.

4 CCP-PO-003, *Contact-handled Transuranic Waste Authorized Methods for Payload Control* (CCP CH-TRAMPAC) (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

5 CCP-PO-050, *CCP TRUPACT-III TRU Waste Authorized Methods for Payload Control* (CCP TRUPACT-III TRAMPAC), (current revision), Washington TRU Solutions LLC, Carlsbad, NM.

6 CCP-PO-505, *CCP Remote-Handled Transuranic Waste Authorized Methods for Payload Control* (CCP RH-TRAMPAC): (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

7 WIPP-016, *Nuclear Criticality Safety Evaluation for Contact-Handled Transuranic Waste at the Waste Isolation Pilot Plant* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.

8 WIPP-020, *Nuclear Criticality Safety Evaluation for Remote-Handled Waste at the Waste Isolation Pilot Plant* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.

9 Waste Isolation Pilot Plant Hazardous Waste Facility Permit, NM4890139088-TSDF (current revision), New Mexico Environment Department, Santa Fe, NM.

B3/4.8 Waste Hoist System

B3.8.1 Waste Hoist Brakes

Bases

Background Summary

WASTE is transported up and down the Waste Shaft on the Waste Conveyance using the Waste Hoist. The Waste Hoist Brakes are used to prevent an uncontrolled Waste Conveyance movement in the Waste Shaft and to ensure the Waste Conveyance remains securely in the correct position at the Waste Collar and at the WASTE SHAFT STATION.

The primary safety function of the Waste Hoist Brakes is to prevent an uncontrolled movement of the Waste Conveyance. The Waste Hoist Brakes work in conjunction with the Waste Hoist System to control movement of the conveyance up and down the Waste Shaft. The Waste Hoist, described in SDD UH00, *Underground Hoisting System Design Description* (Ref. 1), has four independent brake units. There are two brake units mounted approximately 180° apart on each braking disc of the hoist wheel. The Waste Hoist Brakes are designed so that any two OPERABLE brake units can stop a fully loaded conveyance. The brakes (four, total) are spring set, and are released by applying hydraulic pressure. The brakes are normally in the applied (set) position, i.e., there is no hydraulic pressure and the springs hold the brake pads against the disc. The brakes are released when transporting WASTE (during DOWNLOADING), personnel, or equipment within the Waste Shaft.

The brakes are automatically applied upon a loss of hydraulic pressure resulting from a loss of electric power or when the conveyance is in an over speed condition. If the brakes are not applied after a failure of any of the brake components when the Waste Conveyance is loaded with WASTE, the conveyance could continue to move in an uncontrolled manner (e.g., over speed or impact the retarder beam at the top or bottom of the shaft).

The Waste Hoist Brakes are described in the SDD (Ref. 1) and in Chapters 4.0 and 5.0 of the WIPP DSA (Ref. 2). Chapters 4.0 and 5.0 describe the control system and Hoist Brake operation that prevents an uncontrolled descent of the Waste Conveyance.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

Application to Safety Analysis

The DSA (Ref. 2) identified the potential for uncontrolled movement of the Waste Conveyance in the Waste Shaft to result in an impact/collision that could cause a breach of the WASTE payload on the conveyance and an airborne radiological material release. The DSA (Ref. 2) credits the Waste Hoist Brakes to prevent the uncontrolled movement of the Waste Shaft Conveyance which could lead to damaged WASTE CONTAINERS and a radiological material release. In this case, the uncontrolled conveyance movement results in an impact with the shaft floor, shaft or hoist structure, or other components that results in significant damage to the WASTE CONTAINERS.

The unmitigated consequences for the event were determined to be high for the facility worker and the co-located worker, and low for the MOI.

Assumptions for the analyses include the following:

- As a prerequisite to operation, the Waste Hoist Brakes are inspected as required by 30 CFR 57, "Safety and Health Standards–Underground Metal and Nonmetal Mines," Subpart R, "Personnel Hoisting'" (Ref. 3). The design, operation, and maintenance of the Waste Hoist meet or exceed the criteria specified by 30 CFR 57.
- The Waste Hoist Brakes operate as designed and do not result in uncontrolled movement of the Waste Shaft Conveyance.

The Waste Hoist Brakes are composed of many components. However, not all the components are required to ensure OPERABILITY of the brakes to prevent a radiological material release. WIPP DSA Chapters 4.0 and 5.0 identify and define those components and functions of the Waste Hoist Brakes that are required to prevent a potential radiological material release from an uncontrolled or over speed impact of the Waste Conveyance loaded with WASTE.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

LCO

This LCO addresses the OPERABILITY requirements of the Waste Hoist Brakes.

The Waste Hoist Brakes SHALL be OPERABLE. OPERABLE Waste Hoist Brakes consist of the following elements:

- Four OPERABLE brake units composed of calipers, springs, and brake pads greater than or equal to 0.5 inches thick.
- Two OPERABLE Emergency Dump Valves (SV-2 and SV-5).
- An OPERABLE Lilly Controller to include the fly-ball governor and associated contacts that will automatically set the brakes upon an over speed condition of less than or equal to 550 fpm.

An OPERABLE brake unit consists of two modules that, when automatically applied, engage the brakes on a loss of power or over speed condition. There are four brake units but only two are required to stop the conveyance as shown in ETO-H-228 (Ref. 4) and the supporting calculation 15-017 (attached to the ETO). Although only two brake units are required to stop a fully loaded conveyance, all four brake units SHALL be OPERABLE. Requiring all four brake units to be OPERABLE is acceptable as MSHA regulations require all four brake units be OPERABLE before the Waste Conveyance can be used and all four brake units are tested and VERIFIED to be OPERABLE before the Waste Hoist can be used to transport TRU WASTE.

An OPERABLE brake unit consists of calipers that move the brake pads, the springs that apply the force (approximately 37,000 pounds) to set the brakes, and brake pads that are a minimum of 0.5 inch thick. To apply the brake pads, the caliper pistons travel from 0.137 to 0.157 inch.

Both of the emergency dump valves, SV-2 and SV-5, are required to be OPERABLE. The dump valves, which are designed to fail open, are closed when energized to allow the hydraulic system to apply pressure on the calipers to relieve brake springs pressure. When de-energized the dump valves open to drain the hydraulic fluid to the reservoir. When the dump valves de-energize, the hydraulic pressure is released from the caliper pistons allowing the springs to apply the required pressure (approximately 37,000 pounds) to the brake pads.

The waste hoist brake units and emergency dump valves are physically connected such that they are always aligned. There are no means to change the alignment without physically disconnecting and reconnecting components. All four brake units have to operate as do both dump valves or the waste hoist cannot move the conveyance, if any of the components do not work the hoist drum cannot rotate.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

LCO (continued)

A Lilly Controller interrupts electric power to the control circuit and causes the dump valves to de-energize and open. An OPERABLE Lilly Controller measures the conveyance travel speed and upon reaching an over speed condition, the fly ball governor in the Lilly Controller lifts the bar between two electrical contacts. Lifting the bar between the contacts removes electrical power from the system causing the emergency dump valves to open.

The manufacturer recommends that the brake unit pads be at least 0.5 inches thick to ensure adequate pressure and piston travel such that a minimum of two OPERABLE brake units will stop the maximally loaded Waste Conveyance. However, all four brake units are required to be OPERABLE.

The SDD (Ref. 1), Chapter 3, Section 2.2.1.1 states that the operating speed of the Waste Conveyance is 500 fpm. With an over speed allowance of 10%, the OPERABILITY limit for the over speed controller will be less than or equal to 550 fpm. It is recognized that WIPP normally does not operate a fully loaded Waste Conveyance at 500 fpm. Additionally, the pre-operational test of the over speed controller is done at a slower speed than the 550 fpm limit. ETO-H-228 (Ref. 4) documents that two Waste Hoist Brake Units will stop the conveyance within a 30 foot travel distance at speeds of 550 and 600 fpm. The FUNCTIONAL TEST of the over speed controller at a lower speed demonstrates that the over speed controller is OPERABLE and will stop a fully loaded conveyance at speeds less than the maximum design speed. The PRIOR TO USE FUNCTIONAL TEST and the ETO verification adequately demonstrate that the LCO OPERABILITY requirement is VERIFIED and protected.

This LCO requires the Waste Hoist Brakes to be OPERABLE prior to loading and transporting WASTE on the Waste Conveyance. Controls that ensure the OPERABILITY of the Waste Hoist Brakes are necessary to prevent an uncontrolled movement of the loaded Waste Shaft Conveyance to avoid impacts that could damage the WASTE CONTAINERS with a subsequent radiological material release. The Waste Hoist Brakes depend upon the design of the Waste Hoist Support Structure, the Waste Hoist systems in the Waste Shaft, and all shaft furnishings to be available to perform their safety function such that application of the brakes will stop the Waste Conveyance. For the Waste Hoist System to be capable of meeting its intended safety function, the Waste Hoist Brakes must be OPERABLE. The OPERABILITY of the Waste Hoist Brakes represents the lowest functional capability of the system.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

LCO (continued)	There are manually activated E-stop buttons that will stop the hoist if activated by an operator. However, as this requires an operator action, the E-stop buttons are not credited as a control. Note that the Nuclear Safety definition of the OPERABLE Waste Hoist Brakes may not be the same as the MSHA requirements. The MSHA requirements focus on personnel safety while the nuclear safety requirements are intended to prevent a radiological material release that could harm personnel or the environment.
MODE Applicability	The events of concern involve uncontrolled movement of the Waste Shaft Conveyance that could result in damage to the WASTE CONTAINERS leading to a loss of confinement and a radiological material release. Although the WASTE Shaft Conveyance can be used at times when WASTE is not present on the conveyance, this LCO is only applicable in the WASTE HANDLING during DOWNLOADING CH or RH WASTE. CH or RH WASTE may be present in the WASTE SHAFT ACCESS AREA during WASTE HANDLING. Per the note in the LCO, there are times when RH WASTE can be present on the RH side of the WASTE SHAFT ACCESS AREA (e.g., FCLR) and RH WASTE activities can be occurring in the WASTE SHAFT ACCESS AREA when the Waste Hoist Brakes are NOT OPERABLE.
PROCESS AREA Applicability	WASTE may be present in the CLR, the FCLR, the Waste Shaft Collar Room, the Waste Shaft, and the WASTE SHAFT STATION during WASTE HANDLING. This LCO is primarily applicable during DOWNLOADING. Therefore, the LCO applies while WASTE is on the Waste Shaft Conveyance or from the time WASTE is placed on the conveyance until it is removed. The WASTE SHAFT ACCESS AREA is an area in the WHB that includes the FCLR, CLR, and the Waste Shaft Collar Room. The UNDERGROUND specifically the Waste Shaft and the WASTE SHAFT STATION are the other AFFECTED AREAS. Therefore, this LCO is applicable to the WASTE SHAFT ACCESS AREA, Waste Shaft, and the WASTE SHAFT STATION during WASTE HANDLING while DOWNLOADING.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

ACTIONS

A.1

LCO 3.8.1 defines the necessary elements for the Waste Hoist Brakes to be OPERABLE. In the event the Waste Hoist Brakes are declared NOT OPERABLE, WASTE cannot be moved onto the Waste Conveyance. To avoid the potential to bring additional WASTE into the Waste Shaft Collar and place it on the Waste Conveyance or create conditions where the WASTE could inadvertently fall down the Waste Shaft, additional WASTE must not be brought into the Waste Shaft Collar. This Action requires IMMEDIATE Actions be taken to prevent introduction of additional waste into the Waste Shaft Collar.

Suspending the introduction of additional or new WASTE into the Waste Shaft Collar will limit the MAR that could be available in an accident involving the Waste Shaft or the Waste Shaft Conveyance. A Completion Time of IMMEDIATELY ENSURES additional MAR is not introduced into the Waste Shaft Collar.

Note that RH WASTE may be in the FCLR and CH WASTE may be in the CLR but this WASTE must be in a SAFE CONFIGURATION applicable to these rooms and remain outside of the Waste Shaft Collar.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

ACTIONS (continued)

A.2

This Required Action requires that any WASTE on the Waste Conveyance be placed in a SAFE CONFIGURATION. If the loaded Waste Conveyance is at the Waste Shaft Collar, the WASTE must be removed from the Waste Conveyance and moved to the FCLR or CLR as appropriate and placed in a SAFE CONFIGURATION approved for those areas. If the loaded Waste Conveyance is at the WASTE SHAFT STATION, the WASTE must be removed from the Waste Conveyance.

A situation could arise where a non-credited or credited component of the Waste Hoist Brakes (e.g., motor, hydraulic pump, etc.) could fail as WASTE is being DOWNLOADED. The Brakes could still set leaving the loaded Waste Conveyance suspended in the Waste Shaft. If a non-credited component fails, then the Brakes are still fully OPERABLE and entry into this LCO is not required. If a credited component fails, entry into the LCO and this Action is required.

Regardless of the reason for the failure, if the loaded Waste Conveyance is stopped while it is traveling in the shaft, the WASTE is not in the most SAFE CONFIGURATION possible. The situation must be evaluated by operations to determine how to place the WASTE in the most SAFE CONFIGURATION possible.

If it is possible to safely lower the Waste Conveyance to the WASTE SHAFT STATION, then Actions must be taken to complete DOWNLOADING. Once at the WASTE SHAFT STATION, the WASTE will be removed from the Waste Conveyance restoring compliance with the LCO. This is the preferred action as it will place the WASTE in the most SAFE CONFIGURATION.

The evaluation may determine that actions to place the WASTE in the most SAFE CONFIGURATION possible is to return the WASTE to the Waste Collar and unload the conveyance, which will restore compliance with the LCO. This will depend upon several factors including how close the conveyance is to the Waste Collar.

Depending upon the location of the conveyance and the components that failed, the safest condition may be to leave the WASTE suspended in the shaft until the brakes are returned to an OPERABLE status. This situation is expected to occur only if the Waste Hoist Brakes fail in such a manner that the hoist cannot be moved up or down the shaft in a safe and controlled manner (e.g., if the brakes are released to move the conveyance, there is a high probability that the brakes could not be reapplied to safely stop the conveyance). This is the least preferred

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

ACTIONS (continued)

A.2 (continued)	option, but may be necessary to ensure the WASTE is in the most SAFE CONFIGURATION possible until the Waste Hoist Brakes are restored to an OPERABLE status. The Completion Time of 24 Hours is sufficient to remove any WASTE from the Waste Conveyance if the conveyance is at the Waste Shaft Collar or the WASTE SHAFT STATION. Additionally, it is sufficient time to determine if the Waste Conveyance can be safely lowered to the WASTE SHAFT STATION or returned to the Waste Shaft Collar if some component on the Waste Hoist Brakes fails while the loaded conveyance is traveling up or down the Waste Shaft. As is the case for all LCO conditions, the restoration of compliance with the LCO statement is preferred and placing the TRU WASTE in a SAFE CONFIGURATION does this. However, the Required Action is taken along with the understood action of IMMEDIATELY returning the Waste Hoist or Waste Hoist Brakes to an OPERABLE condition.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

Surveillance Requirements

SR 4.8.1.1 This SR requires VERIFICATION that PRIOR TO USE of the Waste Shaft Conveyance a FUNCTIONAL TEST as defined in the applicable sections of Chapter G of the SDD (Ref. 1) has been completed. This FUNCTIONAL TEST is completed as part of the Pre-operational test of the Waste Hoist Brakes that is performed PRIOR TO USE of the Waste Shaft Conveyance for DOWNLOADING. This FUNCTIONAL TEST is different than the WEEKLY FUNCTIONAL TEST required by SR 4.8.1.2. The FUNCTIONAL TEST required by this SR VERIFIES that the Waste Hoist Brakes are operational and that upon an over speed condition or loss of electric power condition, the emergency dump valves alone will set all four Waste Hoist Brakes. Stated another way, the SR VERIFIES the over speed and loss of power signals de-energize the emergency dump valves such that the brakes set. The over speed control tested is the Lilly Controller. The Lilly Controller is FUNCTIONALLY TESTED when the Waste Conveyance is moving by having the electronic process controller put the hoist is a limited over speed condition. This test VERIFIES that the governors on the Lilly Controller detect the over speed condition and set the brakes through the governor action of lifting the connector between two contacts interrupting the electrical supply to the hydraulic pumps and emergency dump valves. (Note that this is a test of the over speed control when the hoist is moving and is not the same as the test required in SR 4.8.1.2 in which the hoist is not moving.) The over speed test will be conducted at a speed slower than 550 fpm. However as noted in the LCO Bases above, this verifies OPERABILITY of the Lilly Controller over speed function and along with Reference 4 demonstrates that the over speed control will stop the Waste Conveyance at a speed of less than or equal to 550 fpm if required. The FUNCTIONAL TEST VERIFIES OPERABILITY of the emergency dump valves SV-2 and SV-5 by interrupting electrical power to the valves such that only the emergency dump valves open on a loss of electrical power and relieve the hydraulic pressure which sets the brakes. This SR requires a specific test to verify that the emergency dump valves open and set the brakes. VERIFICATION that the brakes set due to either an over speed or loss of electrical power condition and upon activation of an emergency dump valve is required. As the Brake Set Light illuminates when the brakes set during these FUNCTIONAL TESTS, this VERIFIES that the brakes set and that the Brake Set Light is OPERABLE. The FUNCTIONAL TEST SHALL be completed PRIOR TO USE and VERIFIES the Waste Hoist Brakes are OPERABLE. The PRIOR TO USE FREQUENCY is based on operational experience that demonstrates that VERIFICATION of Waste Hoist Brakes OPERABILITY is adequate to ensure that the brakes will fulfill their safety function. Failure to meet or perform this SR requires entry into Condition A.

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B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.8.1.1 (continued)	To ensure the brakes will stop a maximally loaded conveyance, during the pre-operational tests, a 2000 amp current is applied to the Waste Hoist motor, which is more than 150% of the design load, while the brakes are set. The brakes are verified to prevent movement of the hoist against the torque supplied by the motors at this amperage loading and the Brake Set light is also verified to be lit when in this condition. This is not a requirement for the Waste Hoist Brakes to be determined OPERABLE but is an important function that demonstrates the brakes when set will hold against a force that is over 150% of the design load of the brakes.
SR 4.8.1.2	This SR requires a WEEKLY FUNCTIONAL TEST of Lilly Controller operation. The FUNCTIONAL TEST confirms that the Lilly Controller and fly-ball governors are working correctly. Specifically it will VERIFY the functionality and OPERABILITY of the governor as this is a manual check for binding, free movement, and that the parts are lubricated. The test VERIFIES the mechanical linkages associated with the governors lift the link between two electrical contacts and interrupts the electrical control power and causes the brakes to set as indicated by the Brake Set light illuminating. This test is different than the pre-operational test, in that in this WEEKLY test, the conveyance is not moving. Instead the hoist is operated to move the conveyance such that in the first part of the test, the roller is on the retarding cam in the Lilly Controller and stopping the hoist. The second part of the test requires moving the conveyance to an intermediate point such that the rollers are not on the retarding cam and stopping the hoist. In each location, the fly-ball arms on one of the governors are lifted manually to ensure that the governors and associated mechanical links work correctly (e.g., work smoothly without binding, and lift the link) and set the brakes in an over speed condition. One governor is tested at each location so that both governors are tested. Manually lifting the fly-balls on the governor allows visual verification that the over speed switch opens (i.e., link between the contacts is physically removed from between the contacts). Additionally, the test verifies that the brakes set. Personnel can hear the brakes set. The WEEKLY FREQUENCY is based on operating experience and the manufacturer's recommendation and is sufficient to ensure the Lilly Controller and governors remain operational. Failure to meet or perform this SR requires entry into Condition A.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

Surveillance Requirements (continued)

SR 4.8.1.3

This SR requires MONTHLY VERIFICATION of the Waste Hoist Brake pad thickness and spring tension. This surveillance, which is completed on each of the four brake units (eight modules), VERIFIES that the brake pad thickness is greater than or equal to 0.5 inch thick and the spring tension is VERIFIED by a caliper piston travel distance of 0.137 to 0.157 inch to ensure the brakes are OPERABLE. The brake pads when received from the manufacturer are approximately 1 inch. If the pad thickness is less than or equal to 0.5 inch, the pads are not thick enough to ensure proper pad adjustment to allow the required piston travel of 0.137 to 0.157 inch. To VERIFY the pads are held firmly against the disc, the brake hydraulic pressure is raised to 1882 to 1892 psig and an attempt is made to manually move the brake pads. If the brake pads do not move, the brake pads are within tolerance and the SR has been met. If the pads move, the SR has not been met. The pads are measured to VERIFY they are a minimum 0.5 inch thick.

The current springs, supplied by the brake manufacturer, have a force of at least 37,000 pounds (Ref. 5). The brake force cannot be measured directly by WIPP personnel. The force is VERIFIED indirectly by a measurement of the caliper piston travel distance, which VERIFIES the springs are in the normal force range (minimum of 37,000 pounds). During each piston movement a measurement of the caliper travel distance for all 8 calipers is made. If the piston movement is 0.137 to 0.157 inch, the spring force is at least 37,000 pounds and is sufficient to hold the brake pads against the disc and stop the conveyance upon demand. The brake piston travel is measured at a brake hydraulic pressure in the range of 2,002 to 2,012 psig.

The MONTHLY FREQUENCY is sufficient to VERIFY the brake pad thickness and the spring tension will stop the Waste Conveyance upon demand in all normal and emergency stop conditions. This FREQUENCY is based on operational experience and the manufacturer’s recommendations. Failure to meet or perform this SR requires entry into Condition A.

(continued)

B3/4.8 Waste Hoist System (continued)

B3.8.1 Waste Hoist Brakes (continued)

Bases (continued)

References

1. SDD UH00, *Underground Hoisting System Design Description* (current revision), Nuclear Waste Partnership LLC, Carlsbad, NM.

2. DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis* (current revision), U.S. Department of Energy, Carlsbad Field Office, Carlsbad, NM.

3. 30 CFR 57, "Safety and Health Standards – Underground Metal and Nonmetal Mines, Subpart R 'Personnel Hoisting,'" *Code of Federal Regulations*.

4. ETO-H-228, *Evaluation of the Stopping Distance of a Descending Waste Shaft Conveyance Utilizing Two Brake Units*, Nuclear Waste Partnership LLC, Carlsbad, NM, October 2015.

5. Brake Manufacturer's manual M1128, *Installation, Operating, and Maintenance Instructions for Disc Brake Caliper Type VS MK2*, Issue 2, March 2001.