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United States Government **Department of Energy**

memorandum

Carlsbad Field Office
Carlsbad, New Mexico 88221

DATE: November 10, 2020

REPLY TO ATTN OF: CBFO:OWIPP:CN:TS:20-0509:UFC 1410.00

SUBJECT: Interim Change Notice #1 to DOE/WIPP-16-3565, Revision 1, *Safety Evaluation Report Addendum for Annual Update of Waste Isolation Pilot Plant Document Safety Analysis DOE/WIPP-07-3372, Revision 6, and Technical Safety Requirements DOE/WIPP-07-3373, Revision 6*

TO: All CBFO Staff

Interim Change Notice (ICN) #1 to DOE/WIPP-16-3565, Revision 1, *Safety Evaluation Report Addendum for Annual Update of Waste Isolation Pilot Plant Document Safety Analysis DOE/WIPP-07-3372, Revision 6, and Technical Safety Requirements DOE/WIPP-07-3373, Revision 6,* is effective immediately. This ICN is necessary to address the following editorial revisions:

- Page 1 (cover page): Change “DOE/WIPP 07-3732” to “DOE/WIPP-07-3372” in the title of the document.
- Page 1 (cover page): Change “DOE/WIPP 07-3733” to “DOE/WIPP-07-3373” in the title of the document.
- Page 49: Change the word “Waist” to “Waste” in the title of section 9.2.12. so that it now reads, “9.2.12. LCO 3.8.1 Waste Hoist Brakes”.

If you have any questions, please contact me via email at Charles.Neill@cbfo.doe.gov.

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Charles Neill, Director
CBFO Safety Programs Division

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DOE/WIPP-16-3565, Rev. 1
CBFO M&RC
*ED denotes electronic distribution

Safety Evaluation Report Addendum for

Annual Update

of

Waste Isolation Pilot Plant

Document Safety Analysis

DOE/WIPP 07-3732, Revision 6

and

Technical Safety Requirements

DOE/WIPP 07-3733, Revision 6

DOE/WIPP 16-3565

Revision 1

Authority Approval

Prepared by:

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Charles Neill, Nuclear Safety Specialist, Team Leader
Safety Programs Division

2/22/18
Date:

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2/23/18
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James Hutton, Deputy Assistant Secretary for Safety, Security, and Quality Programs, Office of Environmental Management

2/22/18
Date:

Approval by:

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Jeffrey Carswell, Deputy Manager Carlsbad Field Office, SBAA

2/26/2018
Date:

EXECUTIVE SUMMARY

This Safety Evaluation Report (SER) addendum documents the U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) and Office of Environmental Management (DOE-EM) technical review and approval of the Waste Isolation Pilot Plant (WIPP) annual update to the Safety Basis (SB) consisting of DOE/WIPP 07-3372, *Waste Isolation Pilot Plant Documented Safety Analysis, Revision 6* and DOE/WIPP 07-3373*, Waste Isolation Pilot Plant Technical Safety Requirements, Revision 6.* The SER addendum was prepared in accordance with DOE-STD-1104-2016, *Review and Approval of Nuclear Facility Safety Basis and Design Safety Basis Documents.* This SER addendum applies DOE-STD-1104-2016 to evaluate the Revision 6 SB documents as an annual update to the currently DOE approved SB for compliance with DOE-STD-3009-2014. This SER does not replace the previously approved SER for DSA/TSR Rev 5b but serves as an addendum to document the approval of changes proposed in DSA/TSR Rev 6.

This SER addendum evaluated the original submittal of DSA/TSR Revision 6 with incorporated DOE approved Page Changes 001, 002, and 003 to DSA/TSR Revision 5b. The final version of the DSA/TSR with directed page changes incorporated has been reviewed and approved by this SER addendum. This final DSA/TSR, as approved for implementation, will be annotated as Revision 6a.

As part of the annual update submittal, the following significant proposed changes impacting the TSR control set were implemented:

- Removal of the Vehicle Exclusion Zone (VEZ) Specific Administrative Control and introduction of two additional KEs 11-13 and 11-14 supporting Transport Path operational controls.
- Allowance of Waste Control Specialists Pipe Overpack Containers (POCs) as the calculated hazards analysis consequences have been evaluated to be bounded by previously analyzed and DOE approved accident analysis.
- Modification of the Liquid-Fueled Vehicle Standoff distance to a tiered approach based on combustible liquid capacities.
- Allowance of trained and qualified radiological worker to perform hand-held air monitoring to satisfy SAC 5.5.8.
- Removal of Central Monitoring Room (CMR) Fire Water Level alarm from Safety Significant control set and associated modification to the LCO actions for an alternate method of fire water tank level verification with a more frequent surveillance frequency.

<u>Restrictions</u>

The following restrictions from DSA/TSR Revision 5b remain in place:

- Prohibition on receipt of certain POCs and all CCOs until issues discussed in SER Revision 5b section 3.3.5 are resolved.
- Prohibition on RH waste receipt and emplacement.

Conditions of Approval

The SBRT identified conditions of approval that included directed page changes affecting various sections in the DSA and TSR to address a few issues noted by the SBRT. These directed changes are specifically identified in the SER addendum Section 11 and included in Enclosure 1. DSA/TSR Revision 6a, incorporating the direct changes, will be re-transmitted to CBFO for information and is approved for implementation.

Conclusions

In summary, the DSA/TSR Revision 6 annual update adequately addresses required Safety Basis changes stemming from the USQ process, operational efficiencies, and Retained for Future Revision (RFR) comments from DSA/TSR Revision 5b COA. The DSA/TSR annual update has undergone an appropriate review in accordance with DOE-STD-1104-2016 and is concluded to provide an acceptable basis for continued operation of the WIPP facility, ensuring the nuclear facility can be operated safely with respect to the workers, the public, and the environment.

1.0 INTRODUCTION

1.1. PURPOSE

As required by *Code of Federal Regulations* Title 10, Part 830 (10 CFR 830), "Nuclear Safety Management," the purpose of this Safety Evaluation Report (SER) is for U.S. Department of Energy (DOE) to document that (1) the safety basis has been developed in a manner that provides reasonable assurance of adequate protection of workers, the public, and the environment from adverse consequences, taking into account the work to be performed and the associated hazards for the Waste Isolation Pilot Plant (WIPP), a Hazard Category 2 DOE nonreactor nuclear facility, (2) the extent to which the contractor has satisfied the requirements of Subpart B of 10 CFR 830, and (3) the basis for approval by DOE of the safety basis for the facility, including any conditions for approval. The safety basis consists of DOE/WIPP 07-3372, Revision 6, *WIPP Documented Safety Analysis* (DSA) and DOE/WIPP 07-3373, Revision 6, *WIPP Technical Safety Requirements* (TSR). DSA/TSR Revision 6 was formally transmitted to CBFO for approval by transmittal letter AA:17:01149, Subject: Submittal of the Waste Isolation Pilot Plant Documented Safety Analysis and Technical Safety Requirements Revision 6, dated December 12, 2017, from Mr. Bruce C Covert. Project Manager, Nuclear Waste Partnership LLC (NWP), to Mr. Todd Shrader, Manager, Carlsbad Field Office (CBFO). The results of the hazard analysis and the supporting scoping calculations are presented in supporting documents that are incorporated into the DSA by reference and are thus also considered to be a part of the safety basis. The document revisions were prepared in accordance with 10 CFR 830 Subpart B requirements, applying the safe harbor methodology specified in DOE-STD-3009-2014, *Preparation of Nonreactor Nuclear Facility Documented Safety Analysis*.
This SER documents the required review of the complete DSA/TSR Revision 6 annual update submittal in accordance with DOE-STD-1104-2016, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*. This SER does not replace the previously approved SER for DSA/TSR Rev 5b but serves as an addendum to document the approval of changes proposed in DSA/TSR Rev 6. Thus, it provides the DOE Safety Basis Approval Authority (SBAA) with the documented bases for approving changes to those safety basis

documents to support the annual update of the Safety Basis at WIPP, ensuring the nuclear facility continues to be operated safely with respect to the workers, the public, and the environment.

1.2. WIPP DOCUMENTED SAFETY ANALYSIS HISTORY AND APPROACH

This SER evaluates the DSA and TSR, Revision 6, documents as an annual update to the safety basis, including updating hazard and accident analyses and changes to the control set in the TSR based on operations experiences under DSA and TSR Revision 5b.
The DSA and TSR, Revision 5b, was developed to support the restart of waste receipt and emplacement at WIPP following suspension of these activities since the February 2014 accidents. The WIPP M&O contractor, NWP, completed a DOE Readiness Assessment and all subsequent pre-start activities successfully and resumed waste emplacement operations on April 7, 2017.

2.0 REVIEW PROCESS

The DOE safety document review process is documented in CBFO Letter CBFO:SPD:BN:BA: 17-1612:UFC 2300.00 from Brent Nielsen, Safety Programs Division Director to Distribution, dated August 01, 2017; Subject: DOE/CBFO Safety Basis Document Review Plan for Annual Update to WIPP 07-3372 Revision 6, Documented Safety Analysis and WIPP 07-3373 Revision 6, Technical Safety Requirements. This plan implements applicable requirements of CBFO Management Procedure (MP) 4.11, *Safety Basis Review Procedure*, Revision 6.

The same review process was utilized from DSA/TSR Rev 5b. The intent again was for the Safety Basis Review Team (SBRT) to provide in-process review during the M&O contractor's DSA and TSR development and thereby help ensure the final product meets DOE expectations. The SBRT membership and supporting subject matter experts (SMEs) identified in the plan were drawn from CBFO and DOE-EM resources in part to ensure knowledgeable expertise, including working familiarity with the applicable requirements and the WIPP facility. The review process was again broken into three phases:

Phase 1 <u>In-process review</u> – As each DSA/TSR chapter/section was reviewed, the designated DOE point of contact engaged with NWP to provide real-time comments/resolution. The DOE SME provided immediate resolution to any issues. Comments generated during this phase were informal. DOE internally tracked issues to resolution, but NWP was not expected to formally respond to comments. Once NWP and DOE were satisfied that all DOE informal comments had been resolved, NWP designated the DSA/TSR annual update as a high quality draft and submitted the document to DOE for formal review.

Phase 2 <u>Formal review</u> – This phase began upon NWPs designation of the DSA/TSR annual update as a high quality draft. This review consisted of verification that the document(s) met DOE requirements and standards, USQDs requiring SB updates, and the committed changes agreed upon with CBFO during the previous DSA/TSR Rev 5b approval have been incorporated. These committed changes are documented in the approval letter for DSA/TSR Rev 5b as "RFR" and were further refined by CBFO for inclusion into this annual update. Issues/comments generated during this phase were formal and documented by the associated DOE SBRT member in accordance with CBFO MP 4.11. DOE forwarded these comments/issues to NWP. NWP tracked, resolved, and formally responded to

comments. During this phase, copies of the high quality draft were additionally provided to DOE-HQ for independent, external review. Comments from external reviewers forwarded to the SBRT Lead were evaluated for inclusion in the current DSA or for inclusion in a future revision to the Safety Basis. Comments that were to be resolved in the current DSA were forwarded to NWP for formal response. This phase ends upon formal resolution of all comments.

Phase 3 DOE approval – This phase addresses preparation of the SER, which began in parallel with Phase 2 and was finalized after the DSA/TSR was formally transmitted by NWP. The SBRT alone was responsible for the final development of the SER, based on review of the submitted documents, again with support from SMEs as needed. Phases 1 and 2 were planned to minimize the need for further comments in Phase 3, although some issues not fully resolved in Phase 2 were continued for resolution in Phase 3. These final comment resolutions resulted in the contractor's final submittal of DSA/TSR Revision 6 on December 12, 2017.

Checklists provided in the plan help ensure both the completeness of the review and the appropriate focus on applicable DOE requirements for the DSA, TSRs, "shall" statements from DOE-STD-3009-2014, and the SER.

The "in-process review" of draft documents as they were developed allowed for early engagement of the SBRT and provided an opportunity to resolve disagreements in a timely fashion. The final DSA and TSRs reflect the results of extensive comment dispositions and interactions between NWP and DOE. External reviewers contributed to this process, but the bases for closing their comments were ultimately determined by the SBRT.
The plan includes features to maintain appropriate independence in the SER preparation process, beginning with NWP responsibility for preparing the documents and the chosen comment resolution approaches. The SBRT Leads for the SER were not directly involved in the in-process review. Each SER input was checked by an SBRT member not involved in the preparation of that section or the corresponding in-process review. Once the SER was developed, an independent DOE external review of the SER was conducted by an off-site, recognized nuclear safety expert. The associated final SER and NWP safety basis documents were also presented to a DOE-EM senior advisory board for concurrence; the DOE-EM review involved a panel with a broad charter to question the SBRT on the review and the bases for its conclusions. Upon DOE-EM concurrence, the completed SER was presented to the CBFO Safety Basis Approval Authority (SBAA) for approval.

3.0 BASE INFORMATION

This SER section provides a synopsis of changes to descriptions of, and rational for, WIPP Site characterization, as well as, major site, facility, and operational process features. The SBRT review provides a facility-specific context for the SER bases of approval and presents an elementary picture of any changes to the operational envelope as documented in DSA Revision 6.

The following DOE requirement and guideline documents constitute the principal regulatory/requirements bases framework under which, NWP prepared the WIPP DSA/TSR, Revision 6:

- 10 CFR 830, *Nuclear Safety Management.*
- DOE O 420.1C, *Facility Safety.*

- DOE-STD-3009-2014, *Preparation Of Nonreactor Nuclear Facility Documented Safety Analysis*.
- DOE-STD-5506-2007, *Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities.*
- DOE-STD-1104-2016, *Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents*.
- DOE-STD-1186-2004, *Specific Administrative Controls.*
- DOE-STD-1027-92, Change Notice 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*.
- DOE G 420.1-1A, *Nonreactor Nuclear Safety Design Guide for use with DOE O 420.1C, Facility Safety.*
- DOE G 423.1-1B, *Implementation Guide For Use In Developing Technical Safety Requirements.*

The base information is presented in Chapters 1 and 2 of the DSA Document.

3.1 SITE CHARACTERISTICS

The SBRT review the specific proposed changes to Chapter 1 finds Section 1.3.1.1 revised to eliminate mention of an agreement with Magnum Minerals LLC regarding removal of salt from the surface stockpile. This change was appropriate as the 2014 events terminated previous agreements.

The SBRT review of Sections 1.4.1.2 and 1.5.2 finds reference to a 1 million-year return period for the design basis tornado removed. The SBRT concludes the change is appropriate as the DSA hazards analysis uses a frequency of "unlikely" (10^{-2}/year – 10^{-4}/year) for a design basis tornado, which bounds the Fujita design basis tornado (DBT) frequency previously described in the DSA.

Section 1.5.1 on earthquakes is unchanged from DSA Revision 5b. The SER for Revision 5b has a discussion on the dated methodology for determining the design basis ground motion, but that the design value used is conservative. The discussion also addresses induced seismicity. The SBRT finds no new information to suggest that the WIPP seismic hazard has changed, so the review in the Revision 5b SER is not repeated here. The DSA discussion of design basis ground motion will be updated when the Permanent Ventilation System (PVS) major modification is incorporated into the DSA.

The SBRT review of new calculation WIPP-065, *Processing and Validation of the WIPP 2014 and 2015 MACCS2 Meteorological Data Files*, Rev. 0, dated March 22, 2017 finds this calculation explains how meteorological data from 2014 and 2015 were used to recalculate accident consequences using the most recent meteorological data. WIPP-002, *Documented Safety Analysis Unit Dose Consequence*, Rev. 4, uses the 2014 and 2015 data in its calculations. Tables 4-1 and 4-2 in WIPP-002, Rev 4, confirm that doses to the CW and the MOI are lower than the doses calculated using the 2005-2010 data. Therefore, the accident consequences in DSA Revision 5b are bounding and Revision 6 was not modified to reflect these new analyses.

The SBRT reviewed all other proposed changes made to Chapter 1 and finds them to be minor in nature and are incorporated to clarify intent of the text.

The SBRT review of the SER for DSA/TSR Revision 5 (DOE/WIPP 16-3565 Revision 0) finds the previous conclusions that state, “DSA Revision 5a, Chapter 1, provides the required site description and characteristics consistent with the original design basis on which operation of the facility was approved.” The SBRT finds the above conclusions regarding WIPP DSA Revision 5 continue to apply to DSA Revision 6, Chapter 1.

The SBRT concludes that Revision 6, Chapter 1 is acceptable as submitted.

3.2 FACILITY DESCRIPTION

The SBRT review of DSA Revision 6, Chapter 2 proposed changes finds Chapter 2 was updated to reflect widespread changes in terminology and facility status needed to accurately provide a thorough description of the WIPP facilities. Those widespread proposed changes in terminology and facility status included the following:

- a chapter-wide change in terminology from “shipping containers” to “shipping packages;”
- a chapter wide change in terminology from “Facility Cask” to “RH Waste Cask” to mean either facility cask or light-weight facility cask
- a chapter wide change in terminology from Waste Hoist Support “Structure” to “System”
- a chapter wide change in terminology from isolation “bulkheads” to “structures”
- incorporating text into Chapter 2 describing the Underground Supplemental Ventilation System (SVS) as operational per approved DSA Revision 5b Page Change 002 (implemented November 7, 2017 after DSA Revision 6 submittal) and providing further detail of its operation in text and figures;
- incorporating additional descriptive detail into the discussion of the IVS electrical power source, Waste Hoist Support System, Waste Hoist Brakes;
- description of the November 6, 2016 roof fall in Panel 7, Room 4 and changes resulting from the abandonment of the mine south of S-2520.
- Change to Figure 2.4-1 to correct the area illustrated as the PAU.
- Change to Figure 2.4-7 to provide clarification on vehicle barrier spacing measurements and removal of the note “for information purposes only”.
- Change to Figure 2.4-8 to accurately show location of pallet stands in the WHB.

The SBRT finds that no description of Panel 7, Room 6 conditions are described. As PISA P26-011 Revision 1 and ESS-2106-02 addressed abandoned vehicles in the room, a description of source term and equipment should be included in the DSA descriptions. This will be addressed in a direct page change.

Section 2.3.1 and 2.5 were changed to highlight and make clear that Revision 6 continues to not authorize the disposal of RH waste or the receipt and processing of TRUPACT-III shipping packages. The SBRT concludes the above changes are minor in nature and only serve to clarify intent.

The SBRT review of other specific proposed changes to Chapter 2 finds Section 2.4.1.3 was changed to add description of the operation of the WHB FSS cross-connect between the Room 108 riser and the CH-Bay riser. The SBRT walked-down the system and confirmed the connections and flow directions and finds the added description to be correct.

Section 2.6.3.1.1 was revised to add a description of the drop lugs on the 6-ton cranes. The SBRT finds the change to be appropriate as it aligns with the revision to the backfit analysis BF1010 Rev1.

Section 2.6.3.1.2 clarifies the description of the TRUDOCK vent hood exhaust system flow path through the Battery Exhaust System HEPA filters. The SBRT finds the change to be appropriate as it adds further description of the exhaust path of the TRUDOCK vent hood exhaust system supporting LCO 3.2.5.

Section 2.6.3.1.13 edits the dimension descriptions of the Facility Transfer Vehicle and Yard Transfer Vehicle. The SBRT finds the change to be appropriate as the change in description of dimensions has no impact to the hazards analysis.

Section 2.6.3.2.2 discussion of the underground contact-handled waste equipment removes some specificity from the forklift descriptions, including the flammable liquid tank sizes. The SBRT finds the change to be appropriate as tank sizes vary among manufactures and capacities of UG liquid-fueled vehicles requiring FSS are documented in ETO-Z-157 per NFPA 122.

Section 2.6.4.6 removes reference to the Vehicle Exclusion Zone and makes minor updates to the description of the process of transporting waste in the transport path utilizing both a transporter and forklifts. The SBRT finds the change to be appropriate as later described in section 5 of this SER.

Section 2.7.3.2 description of confinement systems now allows use of ANSI/ASME N511-2007 standard, in addition to the ANSI/ASME N510 standard on testing HEPA filter banks. The SBRT finds the change to be appropriate as the added standard will address the newer IVS code of record filter bank testing requirements whereas the code of record for the UVFS filter testing is N510-1989.

Section 2.7.3.8 added a description of the disabled 700 fans and a requirement for DOE approval for their restart. The SBRT finds the change to be appropriate as proposed facility operations leading to unfiltered releases would be a positive USQD and require DOE approval.

Section 2.8.1 was modified in Revision 6 to explain that the locations of Panel 6 and Panel 7, Rm 7, CAMs will be reassessed as sections of the underground are isolated. Description of radiological monitoring methods was added to clarify SAC requirements and the ability for Radiological Workers to use a potable handheld monitor was added as a method for radiological monitoring of exothermic reactions in Panel 6 and Panel 7, Room 7. The SBRT finds the change to be appropriate as later described in Section 6.0 of this SER.

Section 2.8.2 has been updated to correctly remove identifying the PPA gravel and paved area as a Design Feature. The section was also revised to identify six, rather than four, subsystems, as contained in the Fire Protection System Design Description. The SBRT finds the wording “UG Areas” from description of the Water-based FSS must be removed as no water based system is installed in the UG. This issue will be resolved by directed page change. One of the subsystems, the Special Hazard Fire Suppression System, updates the description of the underground suppression systems. Figure 2.8-1 has been added to show the layout of the WHB fire suppression system. The SBRT finds the change to be appropriate as it corrected inconsistences between Chapter 2 and the Hazards Analysis and Chapter 2 and the Fire Protection System SDD.

Section 2.9.3 on plant monitoring and communications systems was enhanced in Revision 6 to include an operational description of the underground wireless notification system. The SBRT

finds the change to be appropriate as the underground wireless notification system was a key improvement to the Fire Protection SMP identified in the DSA/TSR Revision 5 SER.

Section 2.10.1 was modified to eliminate specific mention of storage for fire water from auxiliary systems. The SBRT finds the change to be appropriate as fire water is stored within the Fire Water Supply and Distribution system described in Section 2.8.2.1.

The SBRT verified the DSA Chapter 2 WIPP system/equipment descriptions accurately portray current facility operations and equipment. The SBRT concludes that Revision 6, Chapter 2 is acceptable as submitted.

3.3 CONCLUSION

Other than the one identified issue to be resolved by the directed page change, the SBRT concludes that DSA Chapters 1 and 2 provide sufficient base information in terms of facility and waste operation descriptions to support identification of the hazards and the selection of controls relied on for public, worker, and environmental protection. Specifically, adequate correlation is established between the physical facility and its description in the DSA, and the information presented is sufficient to support both the safety analysis and the development of an effective set of TSR controls. Any remaining inadequacies in the base information are sufficiently minor and can be resolved in a future revision of the DSA or TSRs.

4.0 HAZARD AND ACCIDENT ANALYSIS

4.1 INTRODUCTION

In accordance with DOE-STD-1104-2016, this section of the SER focuses on the Chapter 3.0 *Hazard and Accident Analysis, and Control Selection* of DSA Revision 6. Specifically, this *Hazard and Accident Analysis* section of the SER focuses on the changes introduced by DSA Revision 6 into hazard evaluation methodology and techniques described in Revision 5b Chapter 3.0 and in the supporting calculation document, WIPP-021, Revision 6 used to identify controls.

The changes introduced into the Chapter 3.0, *Hazard and Accident Analysis, and Control Selection* of DSA Revision 6 by the revising process has resulted in substantial proposed changes requiring focused SBRT attention to meet DOE review requirements and support approval of the Documented Safety Analysis document. Much of the change to the text of DSA Chapter 3.0 is less impactive (i.e. editorial, renaming and/or clarifying) in nature requiring less attention by the SBRT.

DOE-STD-5506-2007 provides analytical assumptions, methods, and hazard controls used when developing safety basis documents for TRU waste facilities in the DOE Complex. The Standard also provides supplemental technical information to DOE-STD-3009-2014 safe harbor methodology specific to TRU waste operations, so that contractors can formulate, implement, and maintain safety bases for TRU waste operations consistently and compliant with 10 CFR Part 830, *Nuclear Safety Management*, Subpart B, *Safety Basis Requirements*. DOE- STD-3009-2014 was issued after DOE-STD-5506-2007. Since DOE-STD-3009 a safe harbor methodology, any newer guidance or requirements it provides take precedence over DOE-STD-5506-2007.

The Hazard and Accident Analysis section of DOE/WIPP 16-3565 Revision 0 (the SER for

DSA/TSR Revision 5b) provided an overall summary of the hazards and accident analysis methodology, assumptions, and results reported in DSA Revision 5b. Those results derived the need for, and the safety classification of, preventive and mitigative controls to be addressed in TSR Revision 5b.

Because this SER focuses on the proposed changes incorporated into Chapter 3.0 by Revision 6, the SBRT focus is on any impact the Revision 6 changes will have on the:

- adequacy of the hazard and accident analyses provided in Chapter 3.0 of the DSA, and
- it containing sufficient information with appropriate references to supporting details, and the completeness of the hazards and accident analysis and the consistency of the logic used throughout the analysis process.

The SBRT review of DSA Section 3.1 finds that the change to the statement of purpose is appropriate as it directly reflects the requirements of DOE-STD-3009-2014.

The SBRT review of proposed changes made to DSA Sections 3.3 and 3.4 finds them to be minor in nature and only serves to clarify the intent of the text in accordance to DOE-STD-3009-2014.

4.2 HAZARD IDENTIFICATION

The SBRT technical review of the adequacy of hazard identification process description and evaluation process description focused on changes introduced by DSA Revision 6 to information presented in DSA Sections 3.3.1.1 and 3.3.1.2. The SBRT review of the adequacy of hazard identification process description finds that only minor and clarifying changes are introduced by the contractor into DSA Sections 3.3.1.1.X by Revision 6.

The SBRT reviewed WIPP-007, Revision 6, *Hazard Identification Summary Report for WIPP and Carlsbad, NM Operations*, and finds WIPP-007 remains comprehensive and identifies the energy sources or processes that might contribute to the generation or uncontrolled release of radioactive and other hazardous materials.

The SBRT review of the adequacy of hazard evaluation process description finds that only minor and clarifying changes were introduced by the contractor into DSA Sections 3.3.1.2.X by Revision 6.

Overall the minimal changes introduced by Revision 6 with respect to hazard identification and evaluation process descriptions, the SBRT concludes that hazard identification process is consistent with DOE-STD-3009-2014 and meets the following expectation:

- The hazard analysis includes hazard identification that provide a systematic identification of both natural and man-made hazards associated with the facility, in type, quantity, and form of radioactive and other hazardous materials.

The SBRT finds the chemical screening process applied is consistent with DOE-STD-3009-2014 requirements.

The SBRT concludes the hazard identification, DSA Sections 3.3.1.X, remain comprehensive and describe a systematic process by which facility hazards are identified, recorded, and screened.

The SBRT technical review of the adequacy of hazard identification results focused on changes introduced by DSA Revision 6 to information presented in DSA Sections 3.3.2.1. The SBRT finds Table 3.3-5 was revised to add roof falls to the list of potential energy sources. The SBRT concludes the change to be appropriate as WIPP-007, Revision 6, identifies roof falls in Attachment 1, Hazard Identification Tables.

4.3 HAZARD CATEGORIZATION OF THE WIPP FACILITY

The SBRT review of DSA Section 3.3.2.2 finds that no changes to facility and/or program descriptions were proposed in Revision 6 which would change the hazard categorization of the WIPP facility.

The SBRT finds the facility categorization was determined by application of DOE-STD-1027-92, Change Notice 1. Based on the lowest single waste container inventory limit of 80 plutonium-239 equivalent curies (PE-Ci), the WIPP radiological inventory exceeds the DOE-STD-1027-92 plutonium-239 threshold quantity for nuclear Hazard Category 2. The SBRT concludes the WIPP facility remains classified as a DOE Hazard Category 2 nonreactor nuclear facility.

4.4 HAZARD EVALUATION

The unmitigated hazard evaluation credits specific Initial Conditions (ICs) to estimate likelihood and consequences. Initial conditions are summarized in DSA Section 3.3.2.3. The identified ICs are protected with appropriate TSR controls. The SBRT concluded that credit taken for initial conditions in the unmitigated hazard evaluation in WIPP-021 met the applicable requirements and that the initial conditions were evaluated for safety classification and included as required in TSRs.

The SBRT review of the proposed changes to the hazard evaluation results in DSA Section 3.3.2.3.X finds most changes are minor (ie. editorial, renaming for consistency with Chapter 2, and/or clarifying text) in nature requiring less attention by the SBRT. The SBRT identified six significant changes introduced into the document by Revision 6. Those six significant changes were further evaluated and are reported below.

1. Splitting of Hazard Analysis fire events

   Hazard Evaluation Event (of DSA Revision 5b) CH-UG-01-001a (Single liquid-fueled vehicle fuel/hydraulic fluid leak with pool fire during waste transport involving CH Waste resulting in release of radiological material.) was split into two separate events in DSA Revision 6.

   (1) Event CH-UG-01-001a1 (Single liquid-fueled vehicle (i.e., waste transporter) fuel/hydraulic fluid leak with pool fire during waste transport involving CH Waste resulting in release of radiological material.)

   (2) Event CH-UG-01-001a2 (Single liquid-fueled vehicle (e.g., forklift) fuel/hydraulic fluid leak with pool fire during Waste transport involving CH Waste resulting in release of radiological material.).

   The SBRT review of the current practice for transporting waste in contaminated areas in Panel 7 finds the following: the Transporter moves up to four waste assemblies (or

equivalent) on a facility pallet from the Waste Shaft Station to the E-140/S-2520 intersection using an established Vehicle Exclusion Zone (VEZ) and an Attendant and stops. A 6-Ton forklift with an Attendant then removes up to two waste assemblies from the facility pallet and transports the waste through the Radiological Buffer Area (RBA) to the S-2520/W-170 intersection, which is the transition point between the RBA and Contamination Area (CA). The forklift then transfers the waste to a second forklift on the CA side (panel 7 side). A second VEZ is then established in the High Contamination Area (HCA) and the waste is transported to the Waste Face with an Attendant at which time the VEZ is removed. The waste is emplaced and the empty forklift is backed away from the Waste Face with the Attendant who remains with the forklift.

The SBRT review of the current *Hazards Analysis for the WIPP Safety Basis*, WIPP-021 Rev 6 finds the facility pallet is credited to mitigate consequence to CW from pool fires initiated by leaks for accident events in the VEZ. The Hazard Analysis assumes the waste remains on the facility pallet on the Waste Transporter from the Waste Shaft all the way to the opening of the active room before it is offloaded for emplacement. A VEZ is also maintained during transport and waste is attended while handled by liquid fueled vehicles.

The SBRT review of the proposed change to DSA Section 2.6.4.7 description finds the revised description of waste transport activities now accurately describes a waste transfer from the facility pallet to the forklift (without the pallet) can occur at the contaminated zone /radiation buffer area boundary. The distance traveled without the use of the facility pallet can be several hundred feet. USQ Determination D17-088 concluded PISA P17-013 did not involve an Unreviewed Safety Question but required a safety basis change to descriptions in Chapter 3 and the Hazards Analysis.

The SBRT review of the proposed changes to The Hazards Analysis event descriptions in DSA Section 3.3.2.3 finds an expanded discussion of when the facility pallet is not used and to explain that related events are bounded by leaks at the waste face. The SBRT review of the proposed changes to WIPP-021, to split the UG vehicle/equipment pool fire events, finds it clarifies when the facility pallet is being credited when transporting waste in the Transport Path (CH/RH-UG-01-001a1). The Underground Ventilation System is now the mitigative control for when waste is transported by forklift without a pallet to the waste face (CH/RH-UG-01-001a2). The SBRT finds this control selection appropriate as the upwind facility workers (FW) are adequately protected by the safety function of the UVS (directional airflow away from workers), The SBRT also finds the discussion in DSA Section 4.5.3 regarding the safety function of notification to all UG FW in the event an adverse condition occurs was expanded to ensure clarity of performance criteria and performance evaluation relating to the functional requirements of notification for the specific administrative control of Attendance of Liquid-fueled Vehicles in the Underground. The Attendant notification safety function adequately protects FW working in the area between the waste being transported and the Waste Face.

The SBRT concludes that the above change is appropriate as it meets DOE-STD-3009-2014 methodology for hazard identification and hierarchy of controls selection.

Hazard Evaluation Event (of DSA Revision 5b) CH-WHB-02-001a (Ordinary

combustible fire occurs following a collision involving an electric vehicle resulting in release of radiological material) was split into two separate events in DSA Revision 6. The two resulting events added into DSA Revision 6 are:

(1) Event CH-WHB-02-001a1 (Ordinary combustible fire occurs in CLR following a collision involving an electric vehicle resulting in release of radiological material.) and

(2) Event CH-WHB-02-001a2 (Ordinary combustible fire occurs in CH Bay following a collision involving an electric vehicle resulting in release of radiological material.)

DOE/WIPP 16-3565 Revision 0 (the SER for DSA/TSR Revision 5b) explains DOE 's reasoning that allows the contractor to incorporate text in DSA Revision 6 splitting Event CH-UG-02-001a into two separate events. Table 3.3-2 "Summary of Risk Outlier Events" of the SER for Revision 5b states,

> "An ordinary combustible fire adjacent to waste containers in the WHB Waste Collar Area after vehicle collision (hazard event CH-WHB-02-001a) is postulated as anticipated with co-located worker unmitigated consequences of 85 rem (moderate) and qualitatively assessed low consequences to facility workers and the public. For this event, the WHB FSS is credited as a preventive control. The corresponding mitigated event is unlikely with moderate consequences to co-located workers and Risk Class II.
>
> Basis for Adequate Protection: The concern is limited to the case where the fire occurs in the Conveyance Loading Room (CLR) after Door 140 is closed; otherwise, the CH Waste Handling Confinement Ventilation System would provide filtration, reducing consequences to low and Risk Class III. Although the dose is in the middle of the moderate consequence bin, both the nature of the operations being conducted in the small room and the combustible control requirements of SMP Key Element 11-2 limit the presence of ordinary combustibles in the Waste Shaft Access Area. Further, the WHB FSS covers this area and risk dominant results are only possible if its failure is assumed. Finally, ignition probability is limited per Key Element 11-5, the outside doors are closed impeding release to the outside prior to settling, and the CH waste pallet is only in this area for a limited period of time (minutes). In the event that CH Waste could not be immediately downloaded, it would be returned to the CH Bay. Additionally, the emergency response program addresses protection of the co-located workers (Key Element 15-3)."

The SBRT finds the SER for DSA Revision 5b approval bases provides the justification for splitting CH-WHB-02-001a (*combustible fire in WHB following electric vehicle collision*) into two Revision 6 events CH-WHB-02-001a1 and CH-WHB-001a2 (*combustible fires in the Conveyance Loading Room [CLR]* and *contact-handled [CH] Bays*) of DSA Revision 6.

The SBRT concludes that the above change is appropriate as it meets DOE-STD-3009-2014 hazard identification methodology.

2. Number of events

Revision 6 changes number 1 above account for an increase of two in the number of unique and representative radiological events documented in the DSA. While the number of events remained 641, the number of unique and representative radiological events increased by two to 169. The number of Risk Class I or II events increased by two to 49 by the splitting of previous event CH-WHB-02-001a (combustible fire in WHB following electric vehicle collision) into events CH-WHB-02- 001a1 and CH-WHB-001a2 (combustible fires in the Conveyance Loading Room [CLR] and contact-handled [CH] Bays) and the splitting of previous event CH-UG-01-001a (pool fire in Transport Path) into events on the Transporter and events on other vehicles). The addition of the new/changed event numbers results in editorial changes throughout.

3. WCS POC Combustibles allowance

WIPP DSA Rev 5b prohibited receipt of these suspect waste streams and POCs and CCOs through the WIPP WAC until resolutions in the DOE complex are determined and the applicable analysis incorporated into the DSA and the WIPP WAC.

The waste contained within the POCs is comprised of chemically compatible heterogeneous debris, solidified inorganics, and salt waste from WIPP WAC approved waste streams. The construction and condition of the SWBs and POCs are WAC compliant.

The SBRT review of USQ Determination D17-125, Revision 1, ”Evaluation of Receipt and Permanent Disposal of Waste Control Specialists Pipe Overpack Containers (POCs) with Combustible Loading” finds information demonstrated by ETO-Z-444, Revision 1, to support the proposed changes to the WIPP WAC initial conditions introduced into DSA Revision 6.

USQ Determination D17-125 Revision 1 evaluates the receipt and permanent disposal at WIPP of POCs with combustible loading from Waste Control Specialists (WCS). The POCs are over-packed in Standard Waste Boxes (SWBs) for shipment to WIPP. There are 9 SWBs from WCS that contain the 55-Gallon Drums and POCs containing combustible materials. Although the DSA and WAC prohibit combustibles in POCs, ETO-Z-444, Rev.1 has evaluated the shipments as direct loaded SWBs and determined that events involving these containers are bounded by the existing accident analysis on the basis of Material at Risk (MAR) and waste composition.

The Waste Acceptance Criteria (WAC) prohibits packing combustible materials in POCs with the exception of radiological control materials and packaging materials normally used to load these types of containers. The WAC prohibited combustible materials because recent DOE tests have indicated a potential for higher damage ratios (DRs) for POCs involved in pool fires than recommended in DOE STD-5506. The shipment of POCs overpacked in SWBs is evaluated as if the POCs have a DR=1. SWBs with direct loaded combustibles is a configuration that has been previously evaluated in the DSA. Additionally the WAC does not prohibit combustibles in SWB’s.

ETO-Z-444, Rev.1 evaluates the over-packed POCs as direct loaded waste in SWBs, which lowers the allowable MAR limit to 560 PE-Ci from the 1800 PE-Ci limit for the POC. While the MAR limit is lower for the SWB, the DR is significantly higher for direct loaded SWBs compared to POCs (in accordance with DOE STD-5506).

The maximum loaded WCS SWB has approximately 86.7 PE-Ci inside of 1 POC. The sum of the 4 highest MAR SWBs is approximately 264.8 PE-Ci and the sum of all 9 is 397.2, which is significantly below the MAR of 762.4 PE-Ci for a single facility pallet event such as CH-UG-1-001a, and below the maximum direct loading limit for a single SWB of 560 PE-Ci. Additionally, ETO-Z-444, Rev.1, also addresses multiple direct loaded SWB events as well as array events which involve pool fires which are also bounding for the MAR in consideration.

ETO-Z-444, Rev.1, taking no credit for any the containment afforded by the POCs (DR=1), concludes that the MAR loading of these POCs into the SWBs does not exceed the MAR maximum loading of the SWB analyzed in the DSA. Therefore, the consequences of events, specifically pool fires involving the combustible material POCs and treated as direct loaded SWB waste, are bounded by any of the pool fire events analyzed in the WIPP accident analysis.

DSA Rev. 5b Section 3.3.1.2.3 credits the Waste Acceptance Criteria (WAC) as an Initial Condition (IC) and Safety Significant (SS) control. The WIPP WAC is an Administrative Control (AC) credited with reducing risk to both the Facility Worker (FW) and the Co-located Worker (CW). Compliance with the WIPP WAC reduces both the likelihood and consequences of adverse events. The WIPP WAC provides assurance that waste meets specific criteria for the containers and their contents. The container provides resistance to adverse events (e.g., drops). WIPP WAC requirements limit radionuclide composition, quantities of liquids, constituencies of contents, combinations of materials which are relied upon when determining consequences from upsets to the containers.

The SBRT concludes that the above change is appropriate as it has adequately demonstrated to be bounded by previously analyzed and accepted accident consequences.

4. Ground Control assumption

The SBRT review of DSA Section 3.3.2.3 assumptions finds the relevant credited Initial Conditions, made during the evaluation of events, documented. The SBRT finds the proposed changes resulting from Revision 6 resulted in one assumption being added to the assumptions listed in DSA Section 3.3.2.3. The main point of the added assumption is, “Waste is not permitted to be transferred through, staged in, or have emplacement activities performed in UG areas where ground conditions are unstable as determined by the Ground Control Program” Justification is documented in the assumption by text referencing controls established for Ground Control, emplacement of TRU Waste in UG Disposal Rooms, and Abandonment of Vehicles in the UG intended to support the main point. The SBRT finds the assumption description of roof falls occurring in inactive UG areas is unclear to whether this includes inactive areas of a disposal panel. NWP confirmed that a disposal panel is not an inactive area. This will be addressed through a directed page change.

The SBRT concludes that the above change is appropriate as MSHA requirements require that stability of the underground work areas be assessed and approved prior to

conducting underground actives. The Ground Control Program SMP provides further assurance that waste is not permitted to be transferred through, staged, or emplaced in UG areas where ground conditions are unstable.

5. Description of Underground flammable gas explosion

The SBRT review of Section 3.3.2.3 text, which addresses the potential for flammable gas explosion in the UG, finds a proposed change to address the risk of flammable gas explosion at UG battery charging stations. The following justification was provided, "a hydrogen explosion in the UG due to battery charging was judged to have Low consequences (CH/RH-UG-05-004a)." Additionally, the consequences of the panel deflagration CH/RH-UG-05-005a bound the charging station hydrogen explosion.

The SBRT concludes that the above proposed change is appropriate as the text only clarifies the consequences of a hydrogen gas explosion at a battery charging station in the UG as evaluated in the previously approved WIPP-021 Revision 6 hazards analysis.

6. Attendant notification function clarification

The SBRT review of DSA Section 3.3.2.3 *Results of Hazard Evaluation-Underground Fire Event Descriptions* of DRAFT DSA Revision 6 (HQD 23 October 2017), finds the role of the "Attendant" was not systematically documented in ten event descriptions.

In the UG a facility worker may be unaware that an event has occurred. Therefore, the WIPP DSA, institutes a control regarding an Attendant to ensure observation of an event at its location who notifies UG personnel via communication with the Central Monitoring Room (CMR) and other UG communication systems to minimize UG facility worker consequences. For events from WIPP-021 that resulted in an unmitigated risk ranking of either Risk Class I or Risk Class II to the facility worker, co-located worker, or MOI, the SBRT identified in DSA Chapter 3.0 ten UG Fire Event descriptions for which, the explanation for the role in mitigating accident consequence of the "Attendant" was not correctly documented in DRAFT Revision 6.

Those ten UG event descriptions documented in DSA Section 3.3.2.3, in which the role of the "Attendant" is credited but not accurately explained, are listed below:

- *Pool Fire in a Waste Disposal Room (*Events CH/RH-UG-01-001a (CH or RH) and CH-UG-01-003a2 (CH only)*)*
- *Vehicle Collision with Pool Fire in a Waste Disposal Room* (Events CH/RH-UG-01-004a (CH and RH) and CH-UG-01-003a1 (CH only))
- Lube Truck Pool Fire in the Transport Path (Event CH/RH-UG-01-007a4)
- Ordinary Combustible Fire in the Transport Path (Event CH/RH-UG-02-002a2)
- Pool Fire at the Waste Shaft Station (Event CH-UG-01-002a3)
- Lube Truck Collision with Pool Fire in the Waste Shaft Station (Event CH/RH-UG-01-007a5)
- Lube Truck Pool Fire in the Waste Shaft Station (Event CH/RH-UG-01-007a6)
- Ordinary Combustible Fire at the Waste Shaft Station (Event CH/RH-UG-02-002a3)

Because of SBRT review comments addressed by the contractor, the description of the role in mitigating accident consequence of the “Attendant” in the ten listed UG event descriptions were corrected.

Surface facilities (i.e. CH Bay, Room 108, RH Bay, Hot Cell Complex, and Waste Hoist Tower) are generally open areas with multiple egress points that permit facility workers to observe conditions and promptly evacuate the area, no credited role for an Attendant (notification) is established for event descriptions in those open areas.

In summary, the SBRT concludes that the hazard analysis including the proposed changes:

- Evaluates all activities for which approval is sought;
- Is consistent in approach with safe harbor methodologies from DOE-STD-3009-2014 and DOE-STD-5506-2007;
- Appropriately applies screening of standard industrial hazards and chemical hazards consistent with DOE-STD-3009 requirements;
- Uses methodology to determine the MAR for hazards and accident analysis that is clearly defined, compliant with DOE-STD-5506 requirements, and affords sufficient margin to minimize the risk of Potential Inadequacies in the Safety Analysis;
- Identifies preventive and mitigative hazard controls for the spectrum of hazards evaluated;
- Evaluates normal, abnormal, and accident conditions, including natural phenomena and man-made external events that can affect the facility, and identifies the energy sources or processes that might contribute to the generation or uncontrolled release of radioactive and other hazardous materials; and
- Clearly characterizes hazard analysis results in terms of public safety, defense-in-depth, co-located worker safety, facility worker safety, and environmental protection

4.5 HAZARD EVALUATION CONTROL SELECTION

The SBRT review of the proposed changes to the hazard evaluation control selection in DSA Sections 3.3.2.4, 3.3.2.5, and 3.3.2.6 finds most changes are minor (i.e. editorial, renaming for consistency with Chapter 2, and/or clarifying text) in nature requiring less attention by the SBRT. The SBRT identified one significant change introduced into the document by Revision 6. This change is evaluated and reported in detail below.

The SBRT review of DSA Section 3.3.2.4 finds a proposed change to expand the Vehicle Exclusion Zone (VEZ) to the entire waste transport path and removal of the lead and lag escort requirement. The change supports more efficient use of personnel for waste emplacement activities. The SBRT finds the Vehicle Exclusion Zone (VEZ) terminology and associated Specific Administrative Control removed from DSA Revision 6 Table 3.3-10 and two new proposed Transport Path Key Elements (KEs) 11-13 and 11-14 introduced to support Transport Path programmatic administrative controls.

The SBRT review of DSA Section 3.3.2.3 finds the proposed hazard control change supported by the hazard evaluation as follows, “Six events (CH/RH-UG-01-002a1, CH/RH-UG-01-002a2, CH/RH-UG-01-007a3, CH/RH-UG-01-007a4, CH-UG-01-001a, and CH-UG-01-002a1) involve the transport of CH Waste along a Transport Path. Preventive and mitigative credited controls (UG Vehicle Automatic Fire Suppression, Pre-op checks, and Attendant) reduce all receptor risks for each of these events to Risk Bin III or IV.” The SBRT finds removal of a fourth credited administrative control (VEZ) to be appropriate as it adds little risk reduction and is less robust

than the other selected controls. The SBRT concludes this reduction in selected credited controls continues to meet DOE-STD-3009-2014 methodology.

Additionally, the two new key elements are incorporated in Revision 6 of DSA Chapter 11:

> KE 11-13: The Transport Path will be inspected for hazardous conditions and obstructions prior to moving CH Waste along the designated path and
>
> 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.

Key Elements 11-13 and 11-14, are not specifically identified in the hazards analysis; however, facility management determined they provide defense-in-depth capabilities during UG waste handling, thus are elevated to SMP KEs. The SBRT finds these KEs appropriate as they sufficiently augment the credited controls for UG waste handling activities within the Transport Path and provide for a more robust safety envelope addressing UG vehicle collisions and combustible fluid leaks. Given the UG waste handling collision scenarios are all considered mitigated Risk Class III, these KEs were not elevated to TSR level controls.

The SBRT finds control selection in Revision 6 is based upon the principles stated in DOE-STD-3009-2014, Section 3.3, which gives preference to passive engineered safety features over active ones, engineered safety features over ACs or SACs, and preventive over mitigative controls. Controls are selected based upon the judged effectiveness and relative reliability of the selected control(s) to accomplish the defined safety function. Additional controls are added if the effectiveness or relative reliability of the selected control(s) was deemed inadequate to reduce the risk to an acceptable level. Safety SSCs and SACs were identified to prevent and/or mitigate worker and public risk by applying the preferred and alternate controls listed in DOE-STD-5506-2007 for each accident type. When these controls were not available for selection, an alternative control was selected based on the specified control functions in the standard. Safety significant controls were selected in accordance with the requirements and guidance in DOE-STD-3009-2014, augmented with the application of using risk rankings as required by DOE-STD-5506-2007. 14 safety significant SSCs (with 19 different credited functions), and 10 SACs (with 14 credited functions) were credited in the hazard evaluation to reduce the co-located worker or public risk ranking of the 49 bounding scenarios. These credited controls are summarized in DSA Table 3.3-10, Credited Control Summary.

The SBRT concludes that DSA Revision 6 continues to identify safety significant SSCs, SACs, and associated TSRs needed for preventing and/or mitigating events that may cause worker fatalities or serious injuries. Revision 6 continue to identify events that may potentially exceed the worker/co-located worker radiological consequence thresholds or the applicable “significant” public and co-located worker toxicological thresholds. The logic of Revision 6 behind assessing the hazard evaluation results in terms of safety significant SSCs, SACs, and designation of TSRs is understandable and internally consistent. Based on the information provided, including DSA Revision 6 Chapter 3 and the supporting documents, the selected controls are assessed as effective in providing the degree of prevention or mitigation for which they are being credited.

4.6 ACCIDENT ANALYSIS

The SBRT review of the accident analysis in DSA Section 3.4 finds many of the changes are minor (i.e. editorial, renaming for consistency with Chapter 2, and/or clarifying text) in nature

requiring less attention by the SBRT. The SBRT identified one change of greater significance that was introduced into the document by Revision 6. This change is evaluated and reported in detail below.

Key Element 18-5 requires that the Material at Risk (MAR) statistics for waste certified for future shipment to WIPP are reviewed periodically by NWP (no less frequently than annually) to ensure the values stated in DSA Tables 3.4-1 and 3.4-2 continue to provide conservative unmitigated consequences in the Safety Analysis. While performing the annual evaluation, a statistical increase to the mean and 95th percentile for both WIPP and SRS CNS waste for SWB-OP's was identified.

The Unreviewed Safety Question Determination (USQD) D017-076 specifically evaluates the impact of the increased statistical mean and 95th percentile values identified in the annual MAR statistical update for Certified Not Shipped (CNS) waste for Savannah River Site (SRS) Standard Waste Box (SWB) Overpacks (OP). The MAR statistics in Tables 3.4-1 and 3.4-2 are based on a conservative subset of DOE Complex waste awaiting to be disposed at WIPP. This distinctly high MAR subset is chosen as the primary means of ensuring that actual shipments and subsequent waste emplacements will pose accident risks bounded by the analysis in a manner consistent with the MAR methodology.

The identified statistical increase is due to 48 SRS CNS waste containers with above average Plutonium Equivalent Curie (PE-Ci) loadings. Although all containers are compliant with the Waste Acceptance Criteria (WAC) and well below the maximum PE-Ci loading limits, this population increases the stated statistical limits. The bounding mean value as stated in DSA Table 3.4-2 for SWB-OP's is 154 PE-Ci with a 95th Percentile of 603 PE-Ci. The new mean and 95th Percentile as calculated in the 2017 SRS summary of statistical parameters for comparison and evaluation is 159.76 PE-Ci and 618.45 PE-Ci respectively.

The new increased mean and 95th Percentile were substituted in calculations where the SWB-OP was the bounding container for each accident event (WIPP-021). For the unmitigated analyses described in the DSA, increases over the previous consequences were less than approximately 20 rem to the Co- located Worker (CW) and less than 0.09 rem for the Maximally Exposed Off-Site Individual (MOI).

These events were re-evaluated using the actual waste composition and form as recorded in Waste Data System (WDS) for the 48 CNS SRS SWB-OP containers. Results indicated that the unmitigated consequences for the representative events described in the DSA were generally well below the previous bounding events with some exceptions. The higher-consequence results were less than approximately 0.1 rem to the CW and less than 0.001 rem to the MOI.

The SBRT finds the resulting waste form specific statistical MAR increase in consequence to be sufficiently small to not warrant updating DSA Revision 6 Tables 3.4-1 and 3.4-2 to reflect the diminutive results. However, to ensure the values stated in Tables 3.4-1 and 3.4-2 continue to provide conservative unmitigated consequences in the Safety Analysis, the SBRT reaffirms that future KE 18-5 statistical MAR reviews must be conducted no less frequently than annually. This continues to ensure that future revisions of Tables 3.4-1 and 3.4-2 will be produced as necessary to continue ensuring the values of the tables provide conservative unmitigated consequences in the Safety Analysis.

In summary, the SBRT reached the following conclusions regarding the accident analysis of Design/Evaluation Basis Accidents:

- In DSA Revision 6, accident analysis is performed for an adequate set of design/evaluation basis accidents having unmitigated offsite consequences that have the potential to challenge the Evaluation Guideline. Only one fire and one shaft drop EBA slightly exceeded 5 rem to the MOI.
- The accident analysis methodology is clearly identified and appropriate, including identification of initial conditions and assumptions.
- The technical basis for source term values is provided, valid, and appropriate for the physical situation being analyzed, for the EBA presented in DSA Revision 6 Section 3.4.3 of the accident analysis, as well as in scoping calculations to estimate the dose to the co- located worker and MOI to assign qualitative consequence levels for the hazard evaluation in WIPP-021 and summarized in DSA Revision 6 Section 3.3. The scoping dose calculations provided adequate technical justifications for parameters that were not provided in, or departed from, the default or bounding values described in DOE-STD- 3009-2014, DOE-HDBK-3010-94, and DOE-STD-5506-2007. Supporting calculations and technical documents are identified, and were reviewed for critical aspects of safety controls, including ICs, where appropriate.

4.7 PLANNED DESIGN AND OPERATIONAL IMPROVEMENTS

The SBRT technical review of DSA Revision 6 Section 3.6, and finds the following improvement options:

- "Installation of protective fire barrier (e.g., fire retardant insulation, curbing) for WHB steel support columns located near CH/RH Bay roll-up door, as required" and
- "Installation of CAMS at the entrance and exit of Panel 6 and 7 (total of four CAMs) that communicate with the CMR"

were deleted from DRAFT DSA Revision 6 (HQD 3 August 2017).

The SBRT reviewed the Revision 5 SER and finds that LCO 3.3.8 was established as a compensatory measure to "ATTENDED in the RH BAY when having liquid-combustible capacity greater than or equal to 25 gallons and CH WASTE is present in the CH BAY." to protect waste present in the CH Bay from being impacted by a pool fire event caused by an accident involving a vehicles/equipment in the RH Bay until the planned improvement is installed. The improvement when implemented will provide a physical engineered barrier to protect the subject WHB steel support columns. The SBRT finds the physical barrier is needed and superior to a administrative control. Thus, the following text "*Installation of protective fire barrier (e.g., fire retardant insulation, curbing) for WHB steel support columns located near CH/RH Bay roll-up door, as required*." was reinstated per SBRT comment resolutions in DSA Revision 6 Section 3.6 as a Planned Design and Operational Safety Improvement. The SBRT confirmed that the above subject text was added back into DSA Revision 6. As this improvement has not been acted on for 18 months, the SBRT proposes a COA to develop a workable timeframe and path forward to achieve the improvement thereby meeting the hierarchy of controls requirements of DOE-STD-3009-2014, passive engineered over administrative controls.

The SBRT reviewed the Revision 5 SER and finds that the improvement implements SAC 5.5.8 preferred monitoring method and provides prompt notification to the CMR. The SBRT reviewed the current status of installed CAMs supporting SAC 5.5.8 and finds that the CMR alarm notification function is routinely out of service and other TSR approved methods are being utilized to provide the necessary monitoring function. The SBRT reviewed the maintenance logs (history) and finds the frequency of the CAMs being placed out of service is multiple times a month. This is counter to the expectations of the Revision 5b SER. The SBRT concludes that proposed removal of the improvement is appropriate as the CAMs are installed. However, the

SBRT proposes a COA to structure current SAC 5.5.8 into a LCO style SAC to provide completion times for restoring CAMs to service in a timely manner to emphasize the preferred monitoring method of CAMs communicating to the CMR.

4.8 CONCLUSION

Through its review of hazard and accident analysis presented in DSA Revision 6, the SBRT finds that the safety basis of Revision 6 remains comprehensive relative to hazards presented and is based on a consistent, substantiated logic. Because the changes incorporate into DSA Chapter 3.0 by Revision 6 have not substantially impacted the prior hazard and accident analysis of Revision 5b, this SBRT concludes the prior DOE conclusion regarding DSA Revision 5b Hazard and Accident Analysis remains valid.

5.0 SAFETY STRUCTURES, SYSTEMS, AND COMPONENTS (SSCs)

5.1 SAFETY CLASS SSCs

The SBRT review of DSA Section 4.3 finds the proposed changes to the description of number of events requiring consideration of Safety Class (SC) controls was revised to be consistent with DSA Chapter 3. From DSA Chapter 3, there are two hazard scenarios that challenge the Evaluation Guideline (EG) for MOI: Large Pool Fire in Waste Shaft (CH/RH-UG-01-005a1) and Loss of Confinement at the Waste Shaft Station Due to Drop of Vehicle/Equipment from the Waste Collar (CH/RH-UG-10-005a). The MOI doses were 7.3 rem for event CH/RH-UG-01-005a1 and 5.3 rem for event CH/RH-UG-10-005a.

The SBRT compared the Moderate consequence threshold of 5.0 rem, to the dose consequences for the scenarios and concludes, based on the conservatively calculated results, that no Safety Class controls are required.

5.2 SAFETY SIGNIFICANT SSCs

The SBRT review of DSA Section 4.4 finds most proposed changes are minor (i.e. editorial and/or clarifying text) in nature requiring less attention by the SBRT. The SBRT identified the following significant changes to Summary of Safety Significant Controls, Table 4.4-1, introduced into the document by Revision 6.

Underground Vehicle/Equipment Fire Suppression Systems (Section 4.4.2)

- Further consistency changes for wet and dry AFSS code requirement descriptions NFPA 17/17A.
- Split event CH-UG-01-001a into 001a1 and 001a2

Waste Handling Building Fire Suppression System (Section 4.4.3)

- Split event CH-WHB-02-001a into two distinct events 001a1 and 001a2.

Underground Ventilation Filtration System (Section 4.4.5)

- Split event CH-UG-01-001a into 001a1 and 001a2 were only 001a2 now credits UVFS.
- Removal of disposal room airflow verification from Performance Criteria.

Contact-Handled Waste Handling Confinement Ventilation System (Section 4.4.6)

- Split event CH-WHB-02-001a into two distinct events 001a1 and 001a2 were only 001a2 credits the WHB CVS.

The SBRT finds the above changes appropriate as the changes are consistent with the changes made in the hazards analysis of Chapter 3 with the exception of removal of airflow verification from the performance criteria. DOE finds the airflow verification criteria supports the functional requirement of verifying that all air-flow from the disposal circuit is HEPA filtered. This will be addressed through directed page change to restore the performance criteria to the UVFS.

Safety Significant SSCs descriptions and performance evaluations

The SBRT review of the proposed changes to the SSC descriptions and performance evaluations in DSA Section 4.4.X finds the following five significant changes introduced into the document by Revision 6.

1. Waste Handling Building Structure (4.4.1)

   Proposed change to Table 4.4.1-2 adds a description of the TRUDOCK crane drop lugs supporting the safety function of the WHB to not collapse following a Design Basis Earthquake (DBE). The SBRT reviewed the backfit analysis, 09-BF1010 Revision 1 and finds the drop lugs are identified as key components for performing the seismic safety function. The backfit analysis also documents the vulnerability of the inspection and maintenance procedures regarding the drop lugs.

   SBRT concludes the proposed change to be appropriate as the added text in the performance evaluation, Table 4.4.1-2, clarifies that the TRUDOCK drop lugs are included in the seismic qualification, periodic inspections, and maintenance of the TRUDOCK cranes within the WHB.

2. Underground Vehicle/Equipment Fire Suppression Systems (4.4.2)

   Proposed change to Section 4.4.2 incorporates Chapter 3 removal of the VEZ and removal of the 200-foot exclusion zone replaced by a graded/tiered minimum standoff distance. The SBRT reviewed the calculation ETO-Z-400 Revision 2 for the derivation of the proposed minimum standoff distances and finds the calculation to be conservative in the approach and the assumptions appropriately justified to sufficiently support the values presented in new Table 4.4.2-1.

   Table 4.4.2-1. Vehicles/Equipment Standoff Distances from Waste Face

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

   The SBRT review of proposed changes to the UG vehicle FSS system descriptions, DSA Section 4.4.2.2, finds that the changes appropriately incorporate the above described

minimum standoff distances. The SBRT further finds additional clarification regarding the applicability of the proposed standoff distance control to exclude abandoned equipment in Panel7, Room 6 as they do not require an operable AFSS or Attendant. The SBRT finds the applicability statement appropriate as the configuration of the abandoned equipment was evaluated in ESS 2016-02 and approved by CBFO SER letter 16-0057 on December 21, 2016.

The SBRT review of other proposed changes throughout the remainder of DSA Section 4.4.2, including Table 4.4.2-3, finds the changes to either only incorporate the above identified significant changes or provide consistency or clarification of components and operation of the UG vehicle automatic fire suppression system as defined in DSA Chapter 2 of Revision 6.

The SBRT concludes the proposed changes to DSA Section 4.4.2 to be appropriate as they are consistent with the logic presented in the hazard and accident analysis, are defined with clearly identified essential components, are defined with clear functional requirements and performance criteria, and that the performance evaluation demonstrates the performance criteria can be met for the postulated accident event in which they are credited.

3. Waste Handling Building Fire Suppression Systems (4.4.3)

Proposed change to Section 4.4.3 incorporates added clarification describing the non-SS PLC and level CMR alarm indication and the SS fire water level local gauge and transmitter. The change proposed also describes a proposed alternate method of fire water level measurement by overflowing the tank when the level indication is not operable.

The SBRT review of proposed changes to Table 4.4.3-2 finds the following statement, “there are no valves from the riser to the sprinkler heads to obstruct flow,” has been removed from the performance evaluation. The SBRT concludes this proposed change is appropriate as it addresses the specified safety basis changes documented in USQ Determination 16-075 Revision 1 from PISA Determination P16-004, Revision 2.

The SBRT finds other proposed changes to the fire water level system, in DSA Section 4.4.3.X, and concludes they are appropriate as they clarify the fire water flow path requirements (unobstructed and undiverted), clarify which components of the system are credited in the hazards analysis (local gauge and transmitter) of DSA Chapter 3, and give empirical evidence of water level within the fire water storage tank by direct observation of overflowing the tank when local level indication is not operable.

4. Facility Pallet (4.4.4)

The SBRT review of proposed changes to the Facility pallet in DSA Section 4.4.4.X finds clarification of pallet material construction. The SBRT concludes this proposed change is appropriate as it provides the added clarification to the system description from the performance evaluation that the top surface is type 304 stainless steel with the remainder of the facility pallet being carbon steel as documented in drawing 41-D-011-W1.

5. Underground Ventilation System (4.4.5)

The SBRT review of proposed changes to DSA Section 4.4.5.X finds they flow down from DSA Chapter 2 Revision 6 changes previously discussed with the exception of the following.

DSA Table 4.4.5-2 was modified to provide clarification that the TSR setpoint for the 308 Bulkhead (BH) was derived from the Mine Ventilation Report, not the SDDs, and that the Mine Ventilation Report evaluated excessive leakage through exhaust path bulkheads and confirmed no impact to the safety function of the UVS provided the stated performance criteria is met. DSA Table 4.4.5-2 was also modified to clarify that the 308 BH differential pressure instrument loop including the panel and alarms in the CMR are classified SS.

The SBRT concludes the proposed changes to the UVS are appropriate as they correctly clarify the bases for the TSR BH 308 setpoint of -0.05 w.g. to comply with DOE-STD-3009-2014 requirements and clarify system component safety significant designations.

The SBRT review of other proposed changes to DSA Section 4.4.X finds the changes are minor (i.e. renaming for consistency, clarifying intent/text, or flow down of changes from previous chapters) in nature and concludes they are appropriate.

5.3 CONCLUSION

The SBRT concludes that the DSA with the proposed changes continue to provide an adequate basis to demonstrate the capabilities and sufficiency of WIPP safety SSCs credited in the hazards evaluation. SSC vulnerabilities continue to be identified and adequate compensatory measures established to ensure the required SSC safety functions are met.

6.0 SPECIFIC ADMINISTRATIVE CONTROLS

The SBRT review of the proposed changes to the Specific Administrative Control (SAC) set finds majority of the changes to be minor (i.e. editorial, flow down of changes from chapter 3 previously identified, or clarification of text/intent) in nature with the exception of the following.

The SBRT review of changes to DSA Section 4.5.3, *Attendance of Liquid-fueled Vehicles/Equipment in the Underground,* finds additional description of the notification function for the attendant added to the performance evaluation Table 4.5.3-3. The SBRT finds this added description clarifies that the attendant communicates with the CMR to notify all underground facility workers. This notification function requires use of any one of the underground communications systems. The SBRT finds that these communications systems are protected through Key Elements 11-3 and 11-8 in the SMPs and MSHA requirement 30 CFR 57.20032 as a condition for inhabiting the underground. The SBRT concludes the proposed change is appropriate and further clarifies the performance of the notification function of the attendant.

The SBRT review of changes to DSA Section 4.5.5, *Underground Lube Truck Operations*, finds that the Lube Truck Exclusion Zone has been resized to only include the Waste Shaft Station. The SBRT finds the Lube Truck Exclusion Zone wording to be replaced with Waste Shaft Station throughout the section. The SBRT concludes the proposed change is appropriate as it is supported by ETO-Z-400 analysis which shows that the conservatively calculated lube truck standoff distance requirement of 83.6 ft. is met within the dimensional confines of the Waste Shaft Station, 110 ft. (S-400 to E-140 intersection).

The SBRT review of DSA Section 4.5.11, Real-time Monitoring for Exothermic Chemical Reactions of Non-Compliant Containers in Panel 6 and/or Panel 7, finds that the role of the radiological worker in the UG has been changed to include being trained and qualified to operate a hand-held monitor for monitoring for releases from Panel 6 and Panel 7, Room 7. The SBRT concludes the proposed change is appropriate as it provides for another sufficient means to monitor releases when the preferred method of CAMs is not available.

6.1 CONCLUSION

The SBRT concludes that the WIPP DSA continues to provide an adequate basis to demonstrate the sufficiency of SACs credited in the hazards evaluation. The SBRT also concludes that each SAC continues to demonstrate it performs when needed and within the timeframe necessary to ensure SSC safety functions are met.

7.0 DERIVATION OF TECHNICAL SAFETY REQUIREMENTS

For DSA Revision 6, the SBRT review of the adequacy of the Derivation of TSRs for the hazard controls required by the hazard evaluation in DSA Chapter 3.0 and further described and developed in DSA Chapter 4.0 focused on the information presented in DSA Chapter 5.0 *Derivation of Technical Safety Requirements*.

The SBRT evaluation of the proposed changes finds much of the change to be less impactive (i.e. editorial, renaming and/or clarifying) in nature requiring less attention by the SBRT. The SBRT identified changes to DSA Chapter 5.0 of greater significance that received further SBRT evaluation as reported in this section of the SER.

Overall, the SBRT gave consideration to the following elements consistent with expectations of DOE STD 1104-2014, and DOE STD 3009-2014:

- TSRs are identified to ensure adequate protection of workers, the public, and the environment.
- The bases for deriving TSRs are identified and described in the hazard analysis and safety SSC chapters (which include SACs) and are consistent with the logic and assumptions presented in the analysis.
- The bases for deriving safety limits, LCS, LCOs, surveillance requirements, and administrative controls are provided as appropriate.
- The facility modes are defined and those associated with TSRs are consistent with the hazard analysis and accident analysis.
- The process for maintaining the TSRs current at all times and for controlling changes is defined.

The credited controls identified in the hazard analysis from DSA Chapter 3.0 and further described and developed in DSA Chapter 4.0 were evaluated in DSA Chapter 5.0. SBRT review of Chapter 5.0 addressed consistency between the chapters, the placement and categorization of the controls in the facility TSR document, and the control development to ensure its defined safety function; control development includes such aspects as defining conditions, required actions, and surveillance requirements.

The SBRT review of Section 5.3 finds a listing of credited controls that are based upon the results of the hazard and accident analysis in DSA Chapter 3 and the further description and

development of controls in DSA Chapter 4. The listing specifically identifies the controls credited for various analyzed events in the hazard evaluation and the safety function of each control. The operability requirements for SSCs are detailed to support their inclusion in the TSR.

The below table provides a listing of controls (SSCs and ACs) along with the applicable hazard analysis event(s), and the associated TSR control (LCO, SAC, DF) documented in Table 5.3-1 and their placement in the TSRs.

Table 5.3-1: Summary of Technical Safety Requirement Controls DSA/TSR Revision 6

Control	Applicable Hazard Analysis Event(s)	Associated TSR Control (e.g., LCO, SAC, DF)
Waste Handling Building (WHB) Fire Suppression System (FSS)	External fire Ordinary combustible fire Pool fire (impact) Pool fire (no impact)	LCO 3.1.1
Underground (UG) Vehicle/Equipment FSSs	Pool fire (impact) Pool fire (no impact)	LCO 3.1.2
Contact-Handled (CH) Waste Handling (WH) Confinement Ventilation System (CVS)	Internal container fire Ordinary combustible fire	LCO 3.2.1
UG Ventilation Filtration System (UVFS)/Interim Ventilation System (IVS)	Internal container deflagration/overpressurization Ordinary combustible fire Pool fire (no impact) Loss of Confinement	LCO 3.2.2 – Deleted previously in DSA Rev 5b LCO 3.2.3
309 Bulkhead Operability during Download of Waste Containers	Ordinary combustible fire	LCO 3.2.4
Battery Exhaust Filtration System	Vehicle collision with fire Ordinary combustible material fire Internal CH Waste Container fire	LCO 3.2.5

Control	Applicable Hazard Analysis Event(s)	Associated TSR Control (e.g., LCO, SAC, DF)
Aboveground Liquid-fueled Vehicle/ Equipment Prohibition	Pool fire (impact) Pool fire (no impact)	LCO 3.3.1 – Deleted previously in DSA Rev 5b LCO 3.3.2 (combined LCOs 3.3.2 and 3.3.3 previously in DSA Rev 5b)
UG Lube Truck Operations	Pool fire (impact) Pool fire (no impact)	LCO 3.3.4 – Deleted previously in DSA Rev 5b LCO 3.3.5 LCO 3.3.6 – Deleted previously in DSA Rev 5b LCO 3.3.7 – Deleted previously in DSA Rev 5b
Liquid-fueled Vehicle/Equipment, combines from Chapter 4.0: Limit of Two Liquid-fueled Vehicles/ Equipment within 25 feet of CH Waste Face Attendance of Liquid-fueled Vehicles/ Equipment in the UG Attendance of Vehicles/Equipment in the RH Bay	Pool fire (impact) Pool fire (no impact)	LCO 3.3.8

Control	Applicable Hazard Analysis Event(s)	Associated TSR Control (e.g., LCO, SAC, DF)
Fuel Confinement	Deleted	LCO 3.4.1 – Deleted previously in DSA Rev 5b LCO 3.4.2 – Deleted previously in DSA Rev 5b
Waste Handling	Deleted	LCO 3.5.1 – Deleted previously in DSA Rev 5b LCO 3.5.2 – Deleted previously in DSA Rev 5b LCO 3.5.3 – Deleted previously in DSA Rev 5b
Compressed Gas Cylinder Program	Deleted	LCO 3.6.1 – Deleted previously in DSA Rev 5b LCO 3.6.2 – Deleted previously in DSA Rev 5b LCO 3.6.3 – Deleted previously in DSA Rev 5b
WIPP Waste Acceptability Control	All event types	LCO 3.7.1
Waste Hoist Brakes	Impact	LCO 3.8.1
Pre-operational Checks of Vehicle(s)/Equipment in Proximity to CH Waste	Pool fire (impact) Pool fire (no impact)	SAC 5.5.1

Control	Applicable Hazard Analysis Event(s)	Associated TSR Control (e.g., LCO, SAC, DF)
Waste Handling Program – Pre-inspections of Surface Waste Handling Vehicle/Equipment	Deleted	SAC 5.5.2 – Deleted previously in DSA Rev 5b
Transuranic (TRU) Waste Outside the WHB	External fire Impact Impact with fire Internal container deflagration Internal container fire Ordinary combustible fire Pool fire	SAC 5.5.3
Fuel Tanker Prohibition	Pool fire	SAC 5.5.5
Waste Conveyance Operations	Impact Pool fire (impact)	SAC 5.5.6
CH Bay Alternative Vehicle Barrier Provision	External fire Impact with fire Pool fire (impact)	SAC 5.5.7
Real-Time Monitoring at Panel 6 and Panel 7 Isolation Bulkheads	Internal container deflagration / exothermic chemical reaction	SAC 5.5.8

Control	Applicable Hazard Analysis Event(s)	Associated TSR Control (e.g., LCO, SAC, DF)
WHB Structure High wind / tornado Non-combustible construction Roof loading Seismic Waste Shaft Access	External fire Loss of confinement Impact Impact with fire Pool fire (impact) External – Range fire Natural Phenomenon Hazards (NPHs) – High wind, tornado, lightning, snow, ice, seismic	DF 6.1
TRUPACT-II Unloading Dock (TRUDOCK) 6-ton Cranes	Deleted	DF 6.2 – Deleted previously in DSA Rev 5b
Facility Pallet	Pool fire (no impact)	DF 6.3
UG Liquid-fueled Waste Handling Vehicles	Deleted	DF 6.4 – Deleted previously in DSA Rev 5b
Remote-Handled (RH) Bay Design	Deleted	DF 6.5 –Deleted previously in DSA Rev 5b
Waste Hoist Support Structure	Impact NPH Fire	DF 6.6
UG Fuel and Oil Storage Areas	Explosive impact Pool fire	DF 6.7

Control	Applicable Hazard Analysis Event(s)	Associated TSR Control (e.g., LCO, SAC, DF)
RH Waste Casks	Direct exposure Pool fire (impact) Pool fire (no impact) Impact NPH Internal deflagration Ordinary combustible fire	DF 6.8
Type B Shipping Package	All event types	DF 6.9
Facility Cask Loading Room (FCLR), Cask Unloading Room (CUR), and Transfer Cell Shielding	Direct exposure	DF 6.10
Panel 6, and Panel 7, Room 7 Bulkheads	Internal container deflagration/ exothermic chemical reaction	DF 6.11
Vehicle Barriers	External fire Impact with fire Pool fire (impact)	DF 6.12

The SBRT finds the title for SAC 5.5.8 has not been update in the above Table to be consistent with other DSA Chapter changes. This will be corrected through a directed page change.

Other than the identified issue above, the information in DSA Revision 6 Chapter 5 demonstrates that the selected controls comply with 10 CFR 830.205. The SBRT also consulted DOE Guide 423.1-1B, *Implementation Guide for Use in Developing Technical Safety Requirements* in evaluating the Derivation of TSRs in DSA Revision 6. The SBRT finds the presentation of the chapter in the WIPP DSA is in accordance with the outline in DOE STD 3009-2014.

7.1 DERIVATION OF PROCESS AREAS

The SBRT review of Section 5.4.1 finds the derivation and development of the process areas based on the locations of the Facility where operations are performed and with consideration for the postulated hazard analysis events. The SBRT finds no proposed technical changes to the process area definitions or descriptions and concludes that the various process areas are adequately described and are appropriate for use in designating LCO applicability, and the

editorial changes introduced do not substantially impact the derivation and development of the Process Areas of the Facility.

7.2 DERIVATION OF FACILITY MODES

The SBRT review of Section 5.4.2 finds the facility modes of operation to be unchanged from the previous approved DSA. The SBRT review of changes to previous DSA chapters finds no change appropriate and the derivation of Facility Modes is adequate to describe the various process modes, is consistent with the operations and hazards described Chapters 2.0 and analyses of Chapter 3.0, and is appropriate for use in controlling LCO applicability.

7.3 TSR DERIVATIONS

The following listing includes coverage of all WIPP LCO TSR controls identified in DSA Chapter 5, Revision 6. The SBRT evaluated the changes made to the derivation of each LCO to determine correctness of each change. Additionally, each change was evaluated with respect to alignment with the overall changes made to the DSA/TSR by Revision 6

For each LCO control having been significantly modified and listed below: (1) the changes made to the text explaining the control derivation is identified using redline markup text, and (2) corresponding changes made to the TSR Revision 6 documentation of those LCO controls was identified by the SBRT with explanations of those changes also listed below.

LCO 3.1.1 – The SBRT finds substantial revisions were made to the control description for *Waste Handling Building (WHB) Fire Suppression System (FSS)* (LCO 3.1.1) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. As listed below by redline markup text:

- A fire water level instrumentation for the Fire Water Storage Tank, loop 25F00601 (Level transmitter, 456-LT-006-001, ~~CMR indicator, AK0601~~ and Local indicator, 456-LI-006-001) provides an indication ~~in the central monitoring room (CMR) and~~ locally. The instrument loop includes the level transmitter~~, level indicator in the CMR~~ and local indicator. To support the backfit analysis results for the CMS and associated instrumentation vulnerabilities, the requirement for local indication was implemented in the system design. The local SS indication ~~is used to assist in addressing~~ addressed the vulnerabilities ~~in the~~ and replaced the CMS ~~with respect to satisfying the~~ in providing a SS ~~classification of the equipment~~ indication of Fire Water Storage Tank level. The local indication is available from the associated level indicating transmitter. The level indicating transmitter has been upgraded to support a SS classification. (Change to Control Description)
- One unobstructed and undiverted flow path from Tank 25-D-001A to the applicable Process Area sprinklers. (Change to LCO's first bullet)
- The fire water distribution system is required to have greater than or equal to 72,180 gallons of water available for 90 minutes of fire protection. This SR verifies Each Shift ~~Daily~~ 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 (ETO-Z-230, Rev. 2). 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. ~~In addition, this level is checked Each Shift using the CMR indication per SR 4.1.1.1.~~ Therefore, performance of this SR ~~Daily~~ Each Shift is sufficient to ensure adequate fire water supply. (Text from SR 4.1.1.1)

The SBRT identified changes in WIPP TSR Revision 6 that correspond to the above listed changes to the derivation of LCO 3.1.1 in Chapter 5.0 DSA Revision 6. and support incorporation of the changes into the TSR. The TSR changes are as follows:

- "The deletion of the CMR indicator AK0601 from LCO 3.1.1." That deletion, which resulted in the LCO's Fire Water Storage Tank (FWST) level indication being provided only by the local loop level transmitter and local indicator, was made to in TSR Revision 6 to the Control Description of TSR LCO 3.1.1 WHB Fire Suppression System. This change resulted in deleting the operability of the CMR indicator from Condition A and replacing it with the local loop's operability; changing Required Action A.1 from verifying FWST level being greater than or equal to 51% from using the local indictor to "…visual verification of water overflowing Fire Water Storage Tank."
- The addition of "and undiverted" was made to the LCO's first bullet which addresses the FSS flowpath from the fire water storage tank to the process area sprinklers. This change is appropriate as it addresses the potential for an open fire hydrant and/or damage within the flowpath impacting the WHB FSS hydraulic needs. The change is also incorporated into bases for the LCO's first bullet and SR.4.1.1.5.
- The frequency for Revision 6 SR 4.1.1.1 (SR 4.1.1.2 in Revision 5b) was changed from "Daily" to "Each Shift". This a more conservative surveillance frequency.

LCO 3.1.2 – The SBRT finds substantial revisions were made to the control description for the *Underground Vehicle/Equipment FSS* (LCO 3.1.2) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. As listed below by redline markup text:

- Control Description: The automatic FSSs on UG vehicles/equipment required by the hazard evaluation completed per NFPA 122 and selected for use in the Waste Shaft Station when CH Waste is present, ~~in the VEZ,~~ when ~~transporting~~ CH Waste is present ~~between~~ in the ~~VEZ~~ Transport Path, and ~~the Waste Face, and~~ when UG liquid-fueled vehicles/equipment is operated ~~less than or equal to 200 feet of~~ within the minimum standoff distance from ~~the~~ a CH Waste Face as specified in Table 5.5.2-1 shall be Operable. The minimum standoff distances specified in Table 5.5.2-1 are provided from ETO-Z-400, *Analysis of Fuel Spill Fires in the WIPP Underground*.
- To the Control description added Table 5.5.2-1 Vehicle/Equipment Standoff Distances from Waste Face
- To the Control description added the following, For vehicles/equipment with various quantities of liquid combustible, the minimum standoff distances are provided in ETO-Z-400, *Analysis of Fuel Spill Fires in the WIPP Underground* and specified in Table 5.5.2-1. ETO-Z-400 uses the methodology in WIPP-058 for calculating standoff distance. Table 5.5.2-1 provides the standoff distances as a function of the quantity of liquid combustible associated with the vehicles/equipment. Within these distances of a CH

Waste Face, Underground vehicles/equipment are required to have an automatic FSS. The values in Table 5.5.2-1 are conservatively calculated. In addition, 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 are not required to have an Operable FSS and Attendant.

The SBRT identified the changes in WIPP TSR Revision 6 that correspond to the above listed changes to the derivation of LCO 3.1.2 in Chapter 5.0 DSA Revision and support incorporation of the changes into the TSR. The TSR changes are as follows:

- The following substantial changes were made to LCO 3.1.2: (1) added “having significant liquid combustible quantities” and replaced ”200 feet” with “minimum standoff distance”; (2) replaced “Vehicle Exclusion Zone” with “Transport Path” to align with changes made to ETO-Z-400; and (3) Added Table 3.1.2-1, *Standoff Distances from Waste Face for Vehicles Containing Liquid Combustibles,* which provides minimum standoff distances (feet) for specific combustible liquid capacities (gallons) to align with WIPP-058.
- Mode Applicability first two bullets – deleted Vehicle Exclusion Zone to align with DSA chapters 3, 4, and 5.

LCO 3.2.1 – The SBRT finds no substantial revisions were made to the control description for the *CH Waste Handling Confinement Ventilation System* (LCO 3.2.1) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6.

LCO 3.2.3– The SBRT finds no substantial revisions were made to the control description for the *Underground Ventilation Filtration System/Interim Ventilation System* (LCO 3.2.3) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6.

LCO 3.2.4 – The SBRT finds substantial revisions were made to the control description for the *309 Bulkhead Operability During Download of Waste Containers* (LCO 3.2.4) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. As listed below by redline markup text:

- Exhaust Fan Alignment (SR 4.2.4.1): Verification of UVFS/IVS exhaust fan alignment such that ~~all three~~ one 860 exhaust fan and two 960 exhaust fans are In Service at one time is performed to confirm UVFS/IVS Operability during Download of Waste Containers to the Waste Shaft or from the Waste Shaft Station to the Waste Shaft Collar Room. The surveillance is performed by visual observation of exhaust fan status as indicated in the CMR by graphic visual display on one or more CMR monitors. This SR requires one UVFS exhaust fan (41-B-860A, 41-860-B, or 41-B-860C) and two IVS exhaust fans (41-B-960A and 41B-960B) to be verified as being In Service prior to ~~each~~ the first Download of Waste Containers each day and after any UVFS/IVS reconfiguration.

- ~~All three~~ Three UVFS/IVS exhaust fans being In Service ensures sufficient draw of air from the Waste Shaft Station towards the 308 Bulkhead such that this air is directed to

the Exhaust Drift and HEPA filtered prior to release to the environment. This ensures that no air would be released unfiltered up the Waste Shaft should a radioactive release event occur at the Waste Shaft Station during Download of Waste Containers. Verification prior to ~~each~~ the first Download of Waste Containers each day and after any UVFS/IVS reconfiguration ensures that air is being drawn from the Waste Shaft Station towards the 308 Bulkhead when the Waste Shaft Station area is most at risk and is adequate to support the short duration activity of Downloading Waste Containers.

The SBRT identified the changes in WIPP TSR Revision 6 that correspond to the above listed changes to the derivation of LCO 3.2.4 in Chapter 5.0 DSA Revision and support incorporation of the changes into the TSR. The TSR changes are as follows:

- Substantial changes were made to SR 4.2.4.1 and 4.2.4.2. The SR frequency of SR 4.2.4.1 frequency previously stated "Prior to each Download of Waste Containers" has been changed to "Prior to first Download of Waste Containers each day and after any UVS/IVS reconfiguration." The SR frequency of SR 4.2.4.2 previously stated "Prior to each Download of Waste Containers" has been changed to "Prior to first Download of Waste Containers each day and after any UVS/IVS reconfiguration or Bulkhead reconfiguration (including a change in the operating status of any of the six small fans mounted on the 309 Bulkhead wall)." These changes are considered appropriate given UVS/IVS fan configuration and Bulkhead configuration, including the status of the Bulkhead's mounted fans, impact the 309 Bulkhead differential pressure. The SBRT finds the bases was also changed to address these changes along with the VEZ deletion.

LCO 3.2.5 – The SBRT finds no substantial revisions were made to the control description for the *Battery Exhaust Filtration System* (LCO 3.2.5) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6.

LCO 3.3.2 – The SBRT finds substantial revisions were made to the control description for the *Aboveground Liquid-Fueled Vehicle/Equipment Prohibition* (LCO 3.3.2) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. As listed below by redline markup text:

- 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 is sufficient to verify that the vehicles/equipment selected for use during that shift are not liquid-fueled; and to prevent liquid-filled vehicles/equipment from being present when CH Waste is present and is not in a Closed Type B Shipping Package.

The SBRT identified the changes in WIPP TSR Revision 6 that correspond to the above listed changes to the derivation of LCO 3.3.2 in Chapter 5.0 DSA Revision and support incorporation of the changes into the TSR. The TSR changes are as follows:

The only substantial change made to LCO 3.3.2 was the addition of "when CH Waste is present" after to the previous wording "Each Shift" for the frequency for SR 4.3.2.1, 4.3.2.1, and

4.3.2.3. This change is appropriate given the LCO's process area applicability includes such wording. The change was also made to the bases.

LCO 3.3.5 – The SBRT finds substantial revisions were made to the control description for the *Underground Lube Trucks Operation* (LCO 3.3.5) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. As listed below by redline markup text:

- There are no SSCs that will prevent a Lube Truck from being in the Waste Shaft Station when CH Waste is present. This SAC prohibits a Lube Truck from being in in the ~~Lube Truck Exclusion Zone~~ Waste Shaft Station when CH Waste is present, or being Downloaded. Note that if the UG is still in the Waste Handling Mode and there is no CH Waste in the ~~Lube Truck Exclusion Zone~~ Waste Shaft Station, a Lube Truck can enter ~~the Lube Truck Exclusion Zone or~~ the Waste Shaft Station as CH Waste would not be at risk from a fire involving the Lube Truck or the combustible liquids.
- This SR verifies that ~~Once per~~ Each Shift when a Lube Truck ~~Entry into~~ is moved within an Active Panel or Each Shift when the Lube Truck is located in the Active Panel and CH Waste is being emplaced, a visual observation will confirm that the Lube Truck is greater than 200 feet from ~~the~~ a CH Waste Face. ~~There is a potential that a Lube Truck could remain in the Active Panel after a shift is over. This SR shall be completed Each Shift when a Lube Truck is located in or remains in the Active Panel over multiple shifts to verify the Lube Truck is at least 200 feet from the CH Waste Face.~~
- The surveillance, performed only when the UG is manned and operational, will ensure each ~~time~~ Shift a Lube Truck ~~enters into~~ is in the Active Panel and moved within the Active Panel or located in the Active Panel ~~or remains in the Active Panel over a shift~~ when CH Waste is being emplaced that a Lube Truck will not be within 200 feet of ~~the~~ a CH Waste Face in the Active Panel. Operator training and experience are sufficient to ensure a Lube Truck will not be positioned within 200 feet of ~~the~~ a CH Waste Face. The ~~Once per Entry into~~ surveillance frequency of Each Shift a Lube Truck is in the Active Panel and ~~the Once per Shift if a Lube Truck remains~~ moved within the Active Panel or located in the Active Panel ~~over multiple shifts~~ when CH Waste is being emplaced will ensure the operator verifies that a Lube Truck is not within the 200 feet demarcation line from ~~the~~ a CH Waste Face, (i.e., the Lube Truck is at least 200 feet from the a Waste Face in an Active Panel). This will prevent a fire involving a Lube Truck or the combustible liquids from impacting the CH Waste in the Active Room. The Frequency of ~~of Once per Each Entry into the Active Panel and thereafter Once per~~ "Each Shift ~~if~~ a Lube Truck ~~remains~~ is in the Active Panel and is moved within the Active Panel ~~over multiple shifts~~ or located in the Active Panel when CH Waste is being emplaced"- is adequate based on operator training and experience. (SR 4.3.5.1)
- This SR verifies that a Lube Truck is not ~~present in the Lube Truck Exclusion Zone Prior to CH Waste entering the Lube Truck Exclusion Zone. This SR will visually verify that a Lube Truck is not in the Lube Truck Exclusion Zone.~~in the Waste Shaft Station when CH Waste is present. This ensures that a Lube Truck ~~will be at least 200 feet from~~ is not present in the Waste Shaft Station when CH Waste is present in, or is being brought into the Waste Shaft Station. The surveillance will be performed prior to CH Waste entering the ~~Lube Truck Exclusion Zone~~Waste Shaft Station via either downloading from the Waste Shaft Collar or uploading CH Waste. Performance of the surveillance prior to

~~these activities~~CH Waste entering the Waste Shaft Station will allow a Lube Truck into the ~~Lube Truck Exclusion Zone~~Waste Shaft Station to support operations if there is no CH Waste present in or being introduced ~~into the Lube Truck Exclusion Zone.~~. As a Lube Truck can enter into the ~~Lube Truck Exclusion Zone~~Waste Shaft Station when the UG is in the Waste Handling Mode, there is a requirement to ensure a Lube Truck will not be in the ~~Lube Truck Exclusion Zone~~Waste Shaft Station when CH Waste is being brought ~~to or~~ into the ~~Lube Truck Exclusion Zone~~.Waste Shaft Station. Ensuring the Lube Truck is not in the ~~Lube Truck Exclusion Zone~~Waste Shaft Station protects the requirement to prevent the Lube Truck from being ~~within 200 feet of~~in the Waste Shaft Station when CH Waste is present in the Waste Shaft Station. The verification Prior to CH Waste entering the ~~Lube Truck Exclusion Zone that a Lube Truck is not in the Lube Truck Exclusion Zone~~Waste Shaft Station, 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 Frequency of "Prior to CH Waste entering the ~~Lube Truck Exclusion Zone~~Waste Shaft Station" has been determined to be adequate based on operational experience. (SR 4.3.5.2)

The SBRT identified the changes in WIPP TSR Revision 6 that correspond to the above listed changes to the derivation of LCO 3.3.5 in Chapter 5.0 DSA Revision and support incorporation of the changes into the TSR. The TSR changes are as follows:

The following substantial changes were made to LCO 3.3.5:

- The LCO's second bullet – replaced Lube Truck Exclusion Zone with Waste Shaft Station to align with DSA chapters 3, 4, and 5 changes. This change was incorporated throughout the bases.
- Condition A – replaced Lube Truck Exclusion Zone with Waste Shaft Station to align with DSA chapters 3, 4, and 5 changes. This change was incorporated throughout the bases.
- SR 4.3.5.1 – Revision 5b wording from:

  Once per Lube Truck entry into the ACTIVE PANEL
  AND
  EACH SHIFT when a Lube Truck is located within the ACTIVE PANEL

  To Revision 6 wording:

  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.

The SBRT concludes these changes are appropriate as they provide more specific criteria than previous wording. Per NWP and SBRT discussions, the first bullet includes the requirement to perform the SR upon a lube truck's entry into the active panel.

The SBRT finds SR 4.3.5.2 deleted reference to the Lube Truck Exclusion Zone and "all areas between Bulkhead 310 and Bulkhead 415" to align with DSA chapters 3, 4, and 5. The SBRT finds this change was also incorporated throughout the bases. The bases was changed to incorporate changes made to WIPP-058, Revision 2, DSA Supporting Calculations, Fuel Spill, HEPA Filter Plugging, and Compartment Over Pressurization. The SBRT concludes these changes are appropriate as the changes align with changes made to DSA chapters 3 and 4.

LCO 3.3.8 – The SBRT finds substantial revisions were made to the control description for the *Vehicle/Equipment Control* (LCO 3.3.8) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. As listed below by redline markup text:

- Control Description: Vehicles/equipment shall be controlled as follows:

  Liquid fueled vehicles/equipment:
  - Attended in the Waste Shaft Station when transporting CH Waste to or from the

  ~~VEZ~~ Transport Path.
  - Attended in the Transport Path when ~~transporting~~ CH Waste is present ~~between the VEZ and the CH Waste Face~~.
  - Attended when less than 25 feet from ~~the~~ a CH Waste Face.
  - No more than two liquid-fueled vehicles/equipment within 25 feet of ~~the~~ 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.

The SBRT identified the changes in WIPP TSR Revision 6 that correspond to the above listed changes to the derivation of LCO 3.3.8 in DSA Chapter 5.0 which support incorporation of the changes into the TSR. The TSR changes are as follows:

Substantial changes were made throughout the LCO to reflect the deletion of the Vehicle Exclusion Zone (VEZ) to align with changes made to DSA chapters 3, 4, and 5. The frequency for SR 4.3.8.2 was changed to “Prior to introduction of CH Waste into the TRANSPORT PATH” to reflect the VEZ deletion. Changes were also made to SRs 4.3.8.3 and 4.3.8.4 to clarify that the SRs are to be performed upon entry into an active room.

The SBRT concludes each of these changes are appropriate as they align with the VEZ deletion change and provide additional clarity of applicable area. The SBRT finds these changes were also incorporated throughout the bases.

LCO 3.7.1 – The SBRT finds no substantial revisions were made to the control description for the *Waste Acceptance Control* (LCO 3.7.1) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6.

LCO 3.8.1 – The SBRT finds no substantial revisions were made to the control description for the *Waste Hoist Brakes* (LCO 3.8.1) in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6.

7.4 DERIVATION OF DIRECTIVE ACTIONS SACs

The following listing includes coverage of all WIPP SAC TSR controls identified in DSA Chapter 5, Revision 6. The SBRT evaluated the changes made to the derivation of each SAC to determine correctness of each change. Additionally, each change was evaluated with respect to alignment with the overall changes made to the DSA/TSR by Revision 6

For each SAC control having been significantly modified and listed below: (1) the changes made to the text explaining the control derivation is identified using redline markup text, and (2) corresponding changes made to the TSR Revision 6 documentation of those SAC controls was identified by the SBRT with explanations of those changes also listed below.

SAC 5.5.1 – The SBRT finds substantial revisions were made to the control description for the *Pre-Operational Checks of Vehicles/Equipment in Proximity to CH Waste* in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. As listed below by redline markup text:

- Control Description: Prior to Use, Vehicle(s)/Equipment to be operated within 25 feet of ~~the~~ a CH Waste Face, in the ~~Vehicle Exclusion Zone~~ Transport Path when CH Waste is ~~being transported~~ present, or in the Waste Shaft Station when CH Waste is present, 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.

For SAC 5.5.1, the SBRT finds that the only substantial change was the deletion of the *Vehicle Exclusion Zone* text and addition of *Transport Path* in the TSR Revision 6 text to align with DSA chapters 3 and 4.

SAC 5.5.3 – The SBRT finds no substantial revisions were made to the control description for the *TRU Waste Outside the WHB* in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6.

SAC 5.5.4 – The SBRT finds SAC 5.5.4, *Vehicle Exclusion Zone,* was deleted in DSA/TSR Revision 6 (both DSA Chapter 5.0 and TSR Section 3/4) to align with changes made to DSA Chapters 3 hazards evaluation control selection and Chapter 4.

SAC 5.5.5 – The SBRT finds no substantial revisions were made to the control description for the Fuel *Tanker Prohibition the WHB* in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6.

SAC 5.5.6 – The SBRT finds substantial revisions were made to the control description for the *Waste Conveyance Operations* in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. As listed below by redline markup text:

- Control Description: The Waste Shaft Conveyance shall:
  - Be present at the Waste Shaft Collar prior to moving CH Waste into or out of the Waste Shaft Collar Room.
  - Move CH 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 CH Waste into the Waste Shaft Station, from the ~~VEZ~~ Transport Path.
  - Remain at the Waste Shaft Station until the CH Waste is removed from the Waste Conveyance and is moving away from the Waste Shaft.

The SBRT finds that the only substantial change was the deletion of the *Vehicle Exclusion Zone* text and addition of *Transport Path* in the TSR Revision 6 text to align with DSA Chapters 3 and 4. The SBRT concludes this change is appropriate.

SAC 5.5.7 – The SBRT finds no substantial revisions were made to the control description for the *CH Bay Alternative Vehicle Barrier Provision* in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6.

SAC 5.5.8 – The SBRT finds one substantial revision was made to the control description for the *Real Time Monitoring at Panel 6 and Panel 7 Bulkheads* in Chapter 5.0 *Derivation of Technical Safety Requirements* of DSA Revision 6. The SBRT finds the proposed change is the addition for the allowance for a trained and qualified radiological worker to conduct airborne contamination surveys using a hand held monitor. The SBRT concludes this change is acceptable as it provides for another sufficient alternate means of meeting the SAC.

7.5 DESIGN FEATURES

The SBRT review of Section 5.7 finds the proposed changes are not impactive to the DFs safety function or how the safety function is provided. The SBRT concludes the proposed changes in Section 5.7.X are appropriate as the proposed changes align with changes proposed in DSA Chapter 2 descriptions.

7.6 CONCLUSIONS

The SBRT finds DSA Chapter 5.0 continues to support and provide the information necessary for the derivation of the technical safety requirement (TSR) document required by 10 CFR 830.205. The chapter provides sufficient basis to derive the TSR controls for credited SSCs (active and passive), SACs, and administrative programs from Chapter 4 necessary to perform the required safety functions. The SBRT determined that the control discussion was consistent with the accident analyses and supports the intent of the guidance in DOE-STD-3009 for this chapter content. The TSRs are identified that ensure adequate protection of workers, the public, and the environment and are available as detailed in the hazard analysis. The bases for deriving TSRs are identified and described in the hazard analysis and safety SSC chapters (which include SACs) and are consistent with the logic and assumptions presented in the analysis. The bases for deriving LCOs, surveillance requirements, and SACs are provided as appropriate. The facility modes are defined and those associated with TSRs are consistent with the hazard analysis and accident analysis.

8.0 SAFETY MANAGEMENT PROGRAMS

The SBRT review of the adequacy of annual update to the Safety Management Programs (SMPs) focuses on changes to the information presented in DSA Revision 6 Chapters 6, 7, 8, 9, 10, 11, 12, 14, 15, 17, and 18.

All the SMP chapters with the exclusion of Chapter 18 contain Key Attributes (KAs) from the previously approved DSA revision 5b. The SBRT finds KAs are important components of individual SMP, and concludes KA non-compliances should be tracked and trended as part of the SMP health process and programmatic breakdowns associated with KA or KE non-compliances warrants TSR Violation categorization.

8.1 DSA SMP, Chapter 6.0 – Prevention of Inadvertent Criticality

The SBRT review of DSA Section 6.0, Prevention of Inadvertent Criticality and finds no significant changes proposed. Proposed changes consist of updating procedure names and terminology to be consistent with other DSA chapters. The SBRT finds DSA Chapter 18 specifically addresses actions being taken to ensure shipments of waste to WIPP comply with the WAC criticality requirements. No changes have been made to previously approved Nuclear Criticality Safety Evaluations (NCSEs) which analyze the activities involved in the handling and disposal of WASTE and demonstrate criticality incredibility. The SBRT reviewed proposed changes in the implementing procedure WP 12-NS.04, Revision 6 and finds no significant changes proposed. The SBRT concludes the Nuclear Criticality Safety Program continues to meet the requirements of DOE Order 420.1C, *Facility Safety*, Chapter III, "Nuclear Criticality Safety."

8.2 DSA SMP, Chapter 7.0 – Radiation Protection

The SBRT review of DSA Section 7.0, Radiation Protection finds one substantial change was to delete "During SVS operation, a CAM will be operational at the bottom of the salt hoist." The SBRT concludes that the proposed change is appropriate as a Continuous Air Monitor is not required from the hazards evaluation presented in Chapter 3, but highly recommends that NWP continues to place a means of monitoring (e.g. portable air sampler), controlled under the Radiation Protection Program, for airborne radioactivity at the bottom of the salt shaft during SVS operations as a definitive means to document an unfiltered release had not occurred following an event.

8.3 DSA SMP, Chapter 8.0 – Hazardous Material Protection

The SBRT review of DSA Section 8.0 finds no technical nor substantive changes made to Chapter 8 in revision 6, aside from deleting the irrelevant reference to WIPP 0-21.

8.4 DSA SMP, Chapter 9.0 – Radioactive and Hazardous Waste Management

The SBRT review of the only substantive proposed change to DSA Section 9.0 finds the added reference to WP 5-WH1836, *Underground Site-derived Mixed Waste Handling.* The SBRT concludes the proposed change is appropriate as the procedure provides a more complete representation of the overall site derived waste process and associated implementation documentation.

8.5 DSA SMP, Chapter 10.0 – Initial Testing, In Service Surveillance, and Maintenance

The SBRT review of DSA Section 10.0 finds no technical nor substantive proposed changes to SMP description or Key Attributes or Key Elements.

8.6 DSA SMP, Chapter 11.0 – Operational Safety Program

The SBRT review of DSA Section 11.0 finds the reference to the Salt Haul Truck and Radiological Release Accident Investigation Board Report opportunities for improvement in the Conduct of Operations and Fire Protection Programs was appropriately removed in Revision 6. The SBRT review of other substantive proposed changes finds the following proposed changes to Key Elements:

- KE 11-5: a change was made to this KE which stated that all UG posing an unacceptable risk in the NFPA 122 analysis will be protected with an automatic FSS prior to use, "unless alternate risk reduction measures are approved by DOE." The

SBRT finds, as NFPA is a DOE Order 420.1 invoked consensus standard, such approval must be administered by either the exemption or equivalency process which becomes a component of the DOE approved safety basis.

- KE 11-8: added reference to the fire equivalency. The SBRT finds including the DOE approved FP equivalency in the SMP chapter, the equivalency becomes a component of the DOE approved safety basis.

- Addition of KE 11-13: The Transport Path will be inspected for hazardous conditions and obstructions prior to moving CH Waste along the designated path

- Addition of 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.

The SBRT finds Key Elements 11-13 and 11-14, are not specifically identified in the hazards analysis; however, the SBRT agrees that they provide important elements of controlled operations during UG waste handling and are elevated attributes to SMP KEs in lieu of the Vehicle Exclusion Zone of DSA Revision 5b.

The SBRT review of DSA Section 11.4.2 finds the proposed removal of ML-1 classification from the FPP programmatic elements. The SBRT concludes the proposed change is appropriate as assigning ML-1 classification to all UG vehicles would be inappropriate as not all UG vehicles are utilized near or for waste emplacements. The SBRT also finds the proposed removal of the Qualified Supplier List (QSL) from the FPP programmatic elements and similarly concludes the change to be appropriate as only the ML-1 classification requires the vendor to be on a QSL.

The SBRT concludes the proposed changes to Section 11.0 are appropriate as the proposed KEs sufficiently augment the credited controls for UG waste handling and provide for a more robust safety envelope addressing UG vehicle collisions and combustible fluid leaks during waste handling and, given the UG waste handling collision scenarios are all consider mitigated Risk Class III, these KEs were not required as credited TSR level controls.

8.7 DSA SMP, Chapter 12.0 – Procedures and Training

The SBRT review of DSA Section 12.0 finds no technical nor substantive changes made in revision 6.

8.8 DSA SMP, Chapter 13.0 – Human Factors – Deleted

DSA Chapter 13 Revision 5b was determined not to be required based on DOE-STD-3009-2014 criteria and was deleted. The SBRT concludes this deletion continued to be appropriate since the Operational Safety (Conduct of Operations) and Procedures and Training SMPs adequately address human factors.

8.9 DSA SMP, Chapter 14.0 – Quality Assurance

The SBRT review of DSA Section 14.0 finds no technical nor substantive changes made to Chapter 14 in revision 6.

8.10 DSA SMP, Chapter 15.0 – Emergency Preparedness Program

The SBRT review of DSA Section 15.0 finds no technical nor substantive changes in revision 6, aside from numerous procedure reference updates,

8.11 DSA SMP, Chapter 16.0 – Provisions for Decontamination and Decommissioning - Deleted

DSA Chapter 16 Revision 5b was determined not to be required based on DOE-STD-3009-2014 criteria and was deleted. The SBRT concludes this continued deletion was appropriate given WIPP's life-cycle and on-going mission.

8.12 DSA SMP, Chapter 17.0 – Management, Organization, and Institutional Safety Provisions

The SBRT review of DSA Section 17.0 finds KA 17-13 was deleted. The SBRT finds the KA addressed document control per DOE O 422.1. The SBRT concludes the proposed deletion appropriate as compliance with the Order is sufficiently addressed via KA 11-1.

The SBRT review of DSA Section 17.3.2 finds Packaging and Information Systems, Transportation Management, and TRAMPAC Support were added to the National TRU Program Manager's roles and responsibilities. The SBRT discussed the proposed change with NTP management and concludes the change appropriate as the change provides clarification of roles and responsibilities already undertaken by NTP management and is consistent with responsibilities outlined in Section 2.2 of the WIPP WAC.

8.13 DSA SMP, Chapter 18.0 – Waste Acceptance Criteria Compliance

The SBRT review of DSA Section 18.0, Waste Acceptance Criteria Compliance Program, finds it to continue to reflect the importance placed on the WIPP Waste Acceptance Criteria (WAC) as several elements of the WAC are identified as initial conditions in the DSA's Hazards Analysis. These initial conditions are relied upon in establishing bounding unmitigated event frequency and radiological consequences to workers and the public. The SBRT finds the proposed changes to DSA Chapter 18, to substantially impact the current WAC as supported by the gap analysis received from NWP by letter CO:18:02907, dated January 25, 2018, from M.P. Gonzales, NWP Contracts Manager, to C. Gadbury, CBFO Contracting Officer's Representative, Subject: Submittal of Impact Assessment of Documented Safety Analysis/Technical Safety Requirements revision Six to the Waste Acceptance Criteria. Due to Certified Program re-certification activities currently in process at generator sites, no change to Chapter 18 is authorized at this time as the changes would require WAC revision causing re-certification process delays. This will be handled through directed page change to restore the text to Chapter 18 to DSA Revision 5b.

8.14 CONCLUSIONS

The SBRT concludes the DSA SMP Chapters proposed changes continue to contain sufficient descriptions of program documents and program implementing procedures to provide for the safe operation of the facility.

9.0 TECHNICAL SAFETY REQUIREMENTS

The SBRT technical review of the adequacy of annual update to the Technical Safety Requirements (TSR) focused on changes to the information presented in TSR Revision 6.

9.1 USE AND APPLICATION; SAFETY LIMITS

The SBRT review of the substantial changes to the definitions, TSR Section 1.1, finds clarification of the boundaries of an active room; deletion of the LUBE TRUCK EXCLUSION ZONE and vehicle exclusion zone (VEZ); and modifying the downloading definition to align with the VEZ deletion. The SBRT concludes these proposed changes are appropriate as they align with DSA chapters 3, 4, and 5 changes.

The SBRT review of the proposed changes to TSR Table 1.3 identified two substantial to Surveillance Requirement Frequency, including changing the Each Shift from 12 hours to "Once per Shift" and N/Aing the associated grace period along with changing Daily from 24 hours to "Once per day" and N/Aing the associated grace period. In order to help clarify the Each Shift Change, Note 2 "Each Shift means that the surveillance is required to be performed once anytime during that shift. Exceptions are stated in specific LCOs." was added to the Table. Per discussion between NWP and the SBRT, "Once per Shift" means at least once during a facility operations shift which currently run from day one 0700 to 1900 and 1900 to day two 0700. Failure to perform a TSR SR with an assigned frequency of "Once per Shift" during each of these defined shifts constitutes a TSR violation. Per discussion between NWP and the SBRT, "Once per day" means at least once per calendar day. Failure to perform a TSR SR with an assigned frequency of "Once per day" during each calendar day constitutes a TSR violation. The SBRT concludes the proposed changes are appropriate as they enhance the understanding of the surveillance frequency requirements.

9.2 LIMITING CONDITIONS OF OPERATIONS (LCOS) AND SURVEILLANCE REQUIREMENTS (SRS)

9.2.1. LCO 3.0 General Limiting Conditions For Operations

The SBRT finds there were no changes made to LCO 3.0 in Revision 6.

9.2.2. LCO 3.1.1 WHB Fire Suppression System

The SBRT review of LCO 3.1.1 identified five proposed changes in the LCO Actions, Surveillances, and bases, in Revision 6.

1. The SBRT review of the addition of "and undiverted" to the LCO's first bullet which addresses the FSS flowpath from the fire water storage tank to the process area sprinklers. The SBRT finds this change is appropriate as it addresses the potential for an open fire hydrant and/or damage within the flowpath impacting the WHB FSS hydraulic needs. The SBRT finds the change is also incorporated into bases for the LCO's first bullet and SR.4.1.1.5. The SBRT review of the bases also finds a statement was also changed to delete the "There are no valves that could obstruct flow between the risers and the sprinkler heads." statement as a result of USQ Determination 16-075 Revision 1 from PISA Determination P16-004, Revision 2. The SBRT concludes this change is also appropriate.

2. The SBRT review of the deletion of the CMR indicator AK0601 from the LCO finds the LCO's Fire Water Storage Tank (FWST) level indication being provided only by the local loop 25F00601 (level transmitter 456-LT-006-001 and local indicator 456-LI-006-001). This change resulted in the following LCO changes:

- deleting the operability of the CMR indicator from Condition A and replacing it with the local loop's operability
- changing Required Action A.1 from verifying FWST level being greater than or equal to 51% from using the local indictor to "…visual verification of water overflowing Fire Water Storage Tank."
- deleting Revision 5b's SR 4.1.1.1 (FWST level in the CMR) and renumbering subsequent existing SRs
- changing the frequency for Revision 6 SR 4.1.1.1 (SR 4.1.1.2 in Revision 5b) from daily to Each Shift; and deleting the CMR indicator from Revision 6's SR 4.1.1.7.

The SBRT concludes these proposed changes are appropriate given the CMR indicator and associated instrumentation were not categorized as a safety significant (SS) SSC in the DSA Chapter 3 hazards evaluation, loop 25F00601 is categorized as a SS SSC, and overflowing the FWST provides empirical evidence the tank's level is greater than or equal to 51%, The SBRT also finds these changes were incorporated throughout the bases.

3. The SBRT review of the addition of "Note 1: PROCESS AREA Applicability excludes the FCLR." Finds this change appropriate as the hazards analysis does not credit the WHB FSS for a fire in the FCLR. The SBRT finds this change was also incorporated in the bases.

4. The SBRT review of the inclusion of "A or" to Condition C's statement "Required Actions and Completion Times of B are not met" finds this conflicts with the completion times of Condition C of 31 Days. The SBRT discussed the proposed change with NWP and the added text was removed. The SBRT verified the proposed change was removed in the final submitted TSR.

5. The SBRT review of the bases for SR 4.1.1.7 finds the proposed change to provide clarification that a main drain test is not required to be performed if FSS alignment changes do no impact the flowpath. The SBRT concludes this proposed change to be appropriate as the re-verification of flowpath is not required if no change in system alignment has occurred.

9.2.3. LCO 3.1.2 Underground Vehicles and Equipment with a Fire Suppression System

The SBRT review of LCO 3.1.2 identified six proposed changes in the LCO Actions, Surveillances, and bases, in Revision 6.

1. Mode Applicability first two bullets – deleted Vehicle Exclusion Zone to align with DSA chapters 3, 4, and 5. This change was incorporated throughout the bases.

2. Mode Applicability bullet three – added "having significant liquid combustible quantities" and replaced 200 feet with minimum standoff distance to align with changes made to ETO-Z-400. This change was incorporated throughout the bases.

3. Note 1 and Note 2– replaced Vehicle Exclusion Zone with Transport Path. This change was incorporated in the bases.

4. Added Note 3 - During the transport of CH WASTE, vehicles/equipment in the TRANSPORT PATH but upstream of the transport vehicle are not required to have an OPERABLE Fire Suppression System. This change provides clarity regarding the LCO applicability.

5. Added TSR Table 3.1.2-1, *Standoff Distances from Waste Face for Vehicles Containing Liquid Combustibles,* which provides minimum standoff distances (feet) for specific combustible liquid capacities (gallons) to align with ETO-Z-400.

6. Additional changes to the bases included:
   - Inclusion of a wet suppression systems
   - Clarification regarding the dry chemical FSS' supplemental non-credited wet cooling agent for larger pieces of equipment
   - The NFPA codes associated with the dry chemical and liquid FSS designs
   - Discussion regarding the lack of disabled vehicles to contain sufficient combustible liquids to affect CH Waste at the waste face per ETO-Z-400, thus not requiring to have an operable FSS.
   - Discussion regarding the suppressant flowpath, lack of operator replaceable components, and the inability for the operator to change system control parameters for both the dry and wet chemical systems.

The SBRT concludes the above identified changes are appropriate as they incorporate proposed changes from Chapter 3, 4, and 5 of Revision 6.

9.2.4. LCO 3.2.1 CH Waste Handling (WH) Confinement Ventilation System

The SBRT review of LCO 3.1.2 identified one proposed change in the LCO Actions, Surveillances, and bases, in Revision 6.

The SBRT finds the bases for SR 4.2.1.3 was changed to include use of local indications to verify exhaust fan and HEPA filter status in addition to Revision 5b's method of using the CMR monitor. The SBRT concludes the proposed change is appropriate given the effectiveness of in-field validation.

9.2.5. LCO 3.2.3 Underground Ventilation Filtration System/Interim Ventilation System

The SBRT review of LCO 3.2.3 identified two proposed changes in the LCO Actions, Surveillances, and bases, in Revision 6.

1. The SBRT finds the only substantial change to the LCO was the deletion of revision 5b's Note 3 which prohibited the use of the 700 fans. The SBRT concludes this proposed change is appropriate given DSA Chapter 2 includes this prohibition.

2. The SBRT review of the LCO's bases finds the addition of ASME N511 to ASME N510 as means to conduct annual filtration efficiency testing per the

code of record. The SBRT concludes this proposed change is appropriate as the N511 standard was added to the performance evaluation in Chapter 4. This is further supported by DOE O 413.3B's statement "The Code of Record shall serve as the management tool and source for the set of requirements that are used to design, construct, operate and decommission nuclear facilities over their lifespan."

9.2.6. LCO 3.2.4 309 Bulkhead Operability During Download of Waste Containers

The SBRT review of LCO 3.2.4 identified two proposed changes in the Surveillances and bases, in Revision 6.

The SBRT review of the substantial changes finds proposed changes made to SR 4.2.4.1 and 4.2.4.2. SR 4.2.4.1's SR frequency previously stated "Prior to each Download of Waste Containers" has been changed to "Prior to first Download of Waste Containers each day and after any UVS/IVS reconfiguration."

SR 4.2.4.2's SR frequency previously stated "Prior to each Download of Waste Containers" has been changed to "Prior to first Download of Waste Containers each day and after any UVS/IVS reconfiguration or Bulkhead reconfiguration (including a change in the operating status of any of the six small fans mounted on the 309 Bulkhead wall)."

The SBRT concludes these changes are appropriate given UVS/IVS fan configuration and Bulkhead configuration, including the status of the Bulkhead's mounted fans, impact the 309 Bulkhead differential pressure, The SBRT also finds the bases was changed to address these changes along with the VEZ deletion to be consistent with DSA Chapter 4 and 5.

9.2.7. LCO 3.2.5 Battery Exhaust Filtration System

The SBRT review of LCO 3.2.5 finds there were no substantial proposed changes in Revision 6.

9.2.8. LCO 3.3.2 Aboveground Liquid-fueled Vehicle/Equipment Prohibition

The SBRT review of LCO 3.2.3 identified one substantial proposed changes in the LCO Actions, Surveillances, and bases, in Revision 6. The SBRT finds the addition of "when CH Waste is present" after the previous wording "Each Shift" for the frequency for SR 4.3.2.1, 4.3.2.1, and 4.3.2.3. The SBRT concludes this proposed change is appropriate given the LCO's process area applicability includes such wording. The SBRT also finds the change was also made to the bases.

9.2.9. LCO 3.3.5 Underground Lube Trucks Operation

The SBRT review of LCO 3.3.5 identified three substantial proposed changes in the LCO Actions, Surveillances, and bases, in Revision 6.

1 The SBRT finds the LCO replaced "Lube Truck Exclusion Zone" with "Waste Shaft Station." The SBRT concludes this change is appropriate as it aligns with DSA Chapters 3, 4, and 5 changes. The SBRT finds this change was also incorporated throughout the bases and surveillances.

2 The SBRT finds SR 4.3.5.1 wording proposed changes from:

- Once per Lube Truck entry into the ACTIVE PANEL
  AND
- EACH SHIFT when a Lube Truck is located within the ACTIVE PANEL

To Revision 6 wording:

- 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.

The SBRT concludes these changes are appropriate given they provide more specific criteria than previous wording. Per NWP and SBRT discussions, the first bullet includes the requirement to perform the SR upon a lube truck's entry into the active panel.

3. The bases was changed to incorporate changes made to WIPP-058, Revision 2, *DSA Supporting Calculations, Fuel Spill, HEPA Filter Plugging, and Compartment Over Pressurization,* and to align with changes made to DSA Chapters 3, 4, and 5. The SBRT concludes this proposed change is appropriate as ETO-Z-400 now provides for the technical basis for the standoff distance from DSA Chapter 4.

9.2.10. LCO 3.3.8 Vehicle/Equipment Control

The SBRT review of the substantial changes made throughout the LCO finds the proposed changes reflect the deletion of the Vehicle Exclusion Zone (VEZ) to align with changes made to DSA chapters 3, 4, and 5. The SBRT also finds the frequency for SR 4.3.8.2 was changed to "Prior to introduction of CH Waste into the TRANSPORT PATH" to also reflect the VEZ deletion. The SBRT identified changes were also made to SRs 4.3.8.3 and 4.3.8.4 to clarify that the SRs are to be performed upon entry into an active room. The SBRT concludes each of these changes is appropriate given the VEZ deletion and additional clarity. The SBRT also finds these changes were incorporated throughout the bases.

9.2.11. LCO 3.7.1 Waste Acceptance Control

The SBRT review of LCO 3.7.1 finds there were no proposed changes to LCO 3.7.1. However, the SBRT finds one proposed change was made to the associated basis. The following statement was added to the Action D.2 bases, "Entry into Condition F.1 is required if Action D.2 cannot be completed with 7 days." The SBRT concludes this change is appropriate as it provides clarification regarding Condition entry requirements previously approved in the bases of Action F.1.

9.2.12. LCO 3.8.1 Waist Hoist Brakes

The SBRT review of LCO 3.8.1 finds there were no proposed changes made to LCO 3.8.1. However, the SBRT finds one proposed change to the associated bases which addressed the brake unit and dump valve physical connections and alignment along with the need for all four brake units and both dump valves to operate in order for the hoist

drum to rotate. The SBRT concludes this change is appropriate as it provides additional information regarding the system's operations as described in DSA Chapter 2.

9.3 ADMINISTRATIVE CONTROLS

Section 5 of the TSR contains the administrative controls for the Facility. The administrative controls described in this section are consistent with DSA Chapter 5 and those provided in DOE guidance. The SBRT review of AC 5.1, 5.2, 5.3 finds there were no proposed changes in Revision 6.

9.3.1. TSR Control (AC 5.4)

The SBRT review of TSR Section 5.4.2, finds a proposed change to *TSR Violations*, Causal Analysis. The SBRT finds "…root cause…" changed to"…causal analysis in accordance with approved procedures…". The SBRT concludes this change is appropriate and provides the ability to apply the graded approach to causal analysis associated with TSR Violation as allowed by DOE G 423.1-1B.

9.3.2. Specific Administrative Controls (AC 5.5)

The SBRT review of the Specific Administrative Control TSR Section 5.5 identified a number of proposed changes. The SBRT review of all SACs is given below:

SAC 5.5.1: Pre-Operational Checks of Vehicles/Equipment in Proximity to CH Waste
The SBRT review of the only substantial change finds the deletion of the Vehicle Exclusion Zone and addition of Transport Path. The SBRT concludes the change is appropriate as it aligns with the proposed changes in DSA Chapters 3, 4, and 5.

SAC 5.5.3: TRU Waste Outside the WHB
The SBRT review finds there are no proposed changes to AC 5.5.3.

SAC 5.5.4: Vehicle Exclusion Zone
The SBRT review of proposed changes to AC 5.5.4 finds the SAC deleted. The SBRT concludes this proposed change is appropriate as it aligns with proposed changes made to DSA Chapters 3, 4, and 5.

SAC 5.5.5: Fuel Tanker Prohibition
The SBRT review finds there are no proposed changes to AC 5.5.5.

SAC 5.5.6: Waste Conveyance Operations
The SBRT review of AC 5.5.6 finds proposed changes to align with the VEZ deletion and addition of Transport Path. The SBRT concludes the proposed change is appropriate as it aligns with DSA Chapters 3, 4, and 5.

SAC 5.5.7: CH Bay Alternative Vehicle Barrier Provision
The SBRT review finds there are no proposed to AC 5.5.7.

SAC 5.5.8: Real Time Monitoring at panel 6 and Panel 7 Isolation Bulkheads
Although not considered a significant technical change, the SBRT denotes the SAC's title was changed from "Real-Time Monitoring at Panel 6 and Panel 7 Isolation Bulkheads" to "Real-Time Monitoring for Exothermic Chemical Reaction of Non-

Compliant Containers in Panel 6 and/or Panel 7, Room 7." The SBRT concludes the proposed change is appropriate as it clearly identifies the SAC function as the isolation bulkheads for Panel 6 and Panel 7, Room 7 are no longer accessible.

The SBRT review of the only significant change to AC 5.5.8 finds the addition for the allowance for a trained and qualified radiological worker to conduct airborne contamination surveys using a hand held monitor. The SBRT concludes the proposed change is acceptable. However, the SBRT recommends the implementation of this revised control be a focus of the IVR.

As in SER for Revision 5b, the SBRT denotes the preferred method of Real-Time monitoring is continuous air monitors (CAMs) that provide an alarm to the CMR. However, the functionality of the CAMs and CMR alarm is frequently lost and NWP relies upon other protective methods identified in the SAC that do not provide the desired ability of remote notification. It is the SBRT's expectation that NWP place a higher emphasis on maintaining the CAMs and the CMR alarm functional and in-service.

From table 4.5.11-1: Although there are CAMs near Panel 6 and Panel 7 that annunciate locally and communicate with the CMR, their adequacy to achieve SS functions has not been fully verified as sufficiently reliable. Until such time as these upgrades are completed, a SAC is established to ensure that Real-Time Monitoring is provided with a capability to promptly alert all affected workers using available and approved monitoring techniques (including CAMs) in accordance with the DOE approved WIPP RPP.

9.3.3. Programmatic Administrative Controls (AC 5.6)

The SBRT review of the only significant proposed change finds and requirements listed in KE 11-8 and the addition of KEs 11-13 and 11-14 which are discussed in the SMP section of this SER.

9.3.4. Reviews and Audits

The SBRT review finds there are no proposed to AC 5.7

9.3.5. Record Keeping

The SBRT review finds there are no proposed to AC 5.8

9.4 DESIGN FEATURES

The SBRT review of the Design Features (DFs) finds only proposed title and editorial changes for the following DFs.

- The title for DF 6.6 was changed from Waste Hoist Support Structure to Waste Hoist Support System along with clarification regarding which components were within the Support System's boundaries.

- The title for DF 6.8 was changed from Facility Casks to RH Waste Casks.

- The title for DF 6.11 was changed from Panel 6 and Panel 7, Room 7, Bulkheads to Isolation Structures for Segregating Non-compliant Containers in Panel 6 and Panel 7,

Room 7. The SBRT finds additional clarification and editorial changes were made to DF 6.11.

The SBRT concludes these changes are appropriate as they are consistent with other proposed changes in DSA Chapter 2 description and the proposed changes do not impact the DF's safety function or how the safety function was provided.

10.0 DSA REVISION 5b RETAIN FOR FUTURE REVISION (RFR) COMMENTS AND USQDs

10.1 RFR COMMENTS

The SBRT review of the following DSA Rev 5b RFR comments finds all have been incorporated and considered closed by this Revision 6.

RFR Comment #s:

136	172	456	807	1059	1118	1148
139	184	457	969	1060	1120	1149
148	307	514	977	1061	1129	1151
149	333	535	983	1062	1130	1154
150	336	542	987	1063	1131	1155
152	396	552	997	1064	1132	1156
166	429	720	1047	1095	1133	1157
167	431	740	1048	1111	1135	1158

The SBRT concludes all RFR comments within the NWP and CBFO agreed upon scope of DSA Revision 6 annual update, as documented in the SBRT review plan, have been addressed leaving the following comments to be addressed in DSA Revision 7.

132	768	1152
648	769	1153
763	771	
764	772	
765	818	
766	922	
767	1051	

10.2 USQ DETERMINATION INCORPORATION

The SBRT review of the USQD annual report submittal finds all post DSA Rev 5b USQDs requiring safety basis change were incorporated into Revision 6. The USQDs requiring safety basis changes are identified in the Executive Summary of the DSA. The SBRT concludes that the WIPP Safety Basis documents continue to be sufficiently updated with identified required changes from the USQ process to provide reasonable assurance and adequate protection of workers, the public, and the environment.

11.0 CONDITIONS OF APPROVAL

The SBRT identified conditions of approval (COAs) that include directed page changes affecting various sections of the DSA and TSR. These directed changes as identified in Enclosure 1, shall be made to the WIPP DSA Revision, WIPP TSR Revision 6, and WIPP-021 hazards analysis Revision 8, prior to issuance of the controlled documents. These changes address the few issues noted by the SBRT that must be corrected in the final submittal. In summary these issues include

- CAM availability for SAC 5.5.8;

  DSA revision 5b identified a directed action specific administrative control (SAC) for real-time monitoring at Panel 6 and Panel 7 Room 7 isolation bulkheads to mitigate the consequences associated with a potential release from non-WIPP WAC compliant waste containers emplaced upstream of the bulkheads. While identifying a suite of alternate acceptable implementation means, the TSR stated the preferred method was Continuous Air Monitors which provided an alarm to the CMR which resulted in notification for personnel to evacuate the affected area. The DOE SER acknowledged the preferred method. However, since implementation of revision 5b, this preferred system had been repeatedly out of service (exceeding 30 days at least twice) and NWP has operated under the alternate means in lieu of promptly returning the preferred method to service. Given the DOE approved preferred method to implement AC 5.5.8 has not been effectively implemented, the following is provided as a condition of approval for DSA/TSR revision 6.

COA 1:"NWP will either,

(1) provide a technical basis for the appropriate level of control and protection being afforded by safety management program controls thus relieving the need for TSR level control.

-or-

(2) implement an LCO style SAC identifying the CAM to CMR alarm as the credited safety significant means for real-time monitoring at Panel 6 and Panel 7 Room 7 isolation bulkheads. If the LCO style SAC option is taken, required actions to be taken upon discovery of a not-operable system will include immediate evacuation of the affected area and restoration of the credited function or implementation of a DOE approved response plan within 30 days. Revision 5b identified alternate means should be considered as potential required actions utilized OR logic with a prior to entry completion time.

within six months of approval of this DSA/TSR revision 6.

- Fire Barrier for WHB columns;

  DSA Revision 5b identified a planned operational improvement to provide a design feature to address the WHB structure failure risk associated with a WHB pool fire and provided a short term compensatory measure in the form of an LCO style SAC control addressing the attendance of liquid fueled vehicles with the capacity of greater than 25 gallons in the RH Bay while waste was in the CH Bay. The DOE SER acknowledged the sufficiency of the short term administrative control pending implementation of a

passive design feature to protect the column. Given NWP has not taken any substantive effort to address this planned operational improvement, the following is provided as a condition of approval for DSA/TSR revision 6.

COA 2:"NWP will place an operable passive design feature into service which prevents WHB structural failure associated with a fire associated with liquid fueled vehicles in the RH bay within six months of approval of this DSA/TSR revision," thereby meeting the hierarchy of controls requirements of DOE-STD-3009-2014, passive engineered over administrative controls.

- Outstanding RFR comments from Revision 5b;

COA 3: "NWP will address remaining RFR comments from SER section 10.0 in next DSA/TSR revision.

- DOE directed changes;
  - Correct WIPP-021 Revision 8 event CH/RH-OA-06-001a showing the correct event frequency.
  - Correct DSA Table 5.3-1 to show correct Title for SAC 5.5.8
  - Remove "UG Areas" wording from description of Water-based FSS in DSA Section 2.8.2.2
  - Description of abandoned Panel 7 Room 6 source terms added to DSA Section 2.4.4.3.
  - Clarification of UG inactive areas in Assumption 7 of DSA Section 3.3.2.3.
  - Restore airflow verification for performance criteria for UFVS in DSA Table 4.4-1
  - Restore all of Chapter 18 text to previous Rev 5b text.

COA 4: "Revision 6a of the DSA/TSR incorporating these directed changes will be retransmitted to CBFO for information prior to implementation and is approved for implementation.

12.0 RECORDS

Review of the WIPP DSA/TSR annual update is conducted in accordance with the requirements of DOE-STD-1104-1026 and the provisions of CBFO Management Procedure (MP) 4.11 Revision 6. Records generated by this procedure are maintained in compliance with current requirements identified in CBFO records management procedure MP 4.9, Revision 6. The Safety Basis Document Review Plan was developed to aid in managing and conducting the DOE review. In accordance with MP 4.11, Revision 6, the records generated and maintained during the DOE review of the submitted DSA and TSR, Revision 6 are identified below:

- CBFO Memorandum 17-1612: from Brent Nielsen to Distribution, dated August 01, 2017, Subject DOE/CBFO Safety Basis Document Review Plan for Annual Update to WIPP 07-3372 Revision 6, Documented Safety Analysis and WIPP 07-3373 Revision 6, Technical Safety Requirements.
- Completed CBFO Form 4.11-1, “Qualification of SB Review Team”
- Completed CBFO Form 4.11-2, “SB Document Review Record”
- DOE/WIPP 16-3565, Revision 1, “Safety Evaluation Report”
- The Safety Basis Documents being approved:
    - DOE/WIPP 07-3372, WIPP Documented Safety Analysis, Revision 6
    - DOE/WIPP 07-3373, WIPP Technical Safety Requirements, Revision 6

The SER is reviewed by management, in accordance with CBFO MP 4.2, Document Reviews, as the SER is a controlled CBFO document. The purpose of the MP 4.2 review of the SER is to ensure the preparation of the document is consistent with established processes for producing CBFO controlled documents and to consider aspects such as programmatic and strategic planning, regulatory compliance, cost, etc. impacts. References within the SER have been reviewed and determined to be complete and accurate enough to identify necessary information during future revision.