SAFETY EVALUATION REPORT (SER)

Basis for Interim Operation (BIO) and Technical Safety Requirements (TSRs) for the Decontamination and Volume Reduction (DVRS) Glovebox in Support of the Quick-to-WIPP Project

Technical Area 54-412

ABD-WFM-009, Rev. 0 April 8, 2004

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U. S. Department of Energy
National Nuclear Security Administration (NNSA)
Los Alamos Site Office (LASO)

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Lee Knoell, Safety Analyst, ADC, June 8, 2004

SIGNATURE PAGE

6/8/04

Lee Knoell, NNSA/LASO — Date
Safety Analyst
Concur

6/8/04

Christopher M. Steele — Date
Safety Analyst
Senior Authorization Basis Manager (SABM)
Senior Technical Safety Manager (STSM)

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Executive Summary

This Safety Evaluation Report (SER) summarizes the basis upon which the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA) approves the Basis for Interim Operations (BIO) and the attached Technical Safety Requirements (TSRs) for Technical Area 54-412/433 (TA-54-412/433) Decontamination and Volume Reduction (DVRS) Facility Glovebox in support of the Quick-to-WIPP Project at the Los Alamos National Laboratory (LANL). This SER follows the requirements set forth under 10CFR830.3 for SERs, which states that the SER must be detailed enough to ***"document:***

1) ***The sufficiency of the documented safety analysis for a hazard category 1, 2, or 3 DOE nuclear facility;***

2) ***The extent to which a contractor has satisfied the requirements of Subpart B of this part; and***

3) ***The basis for approval by DOE of the safety basis for the facility, including and conditions for approval."***

Further CFR requirements for approval of DSAs are stated in 10CFR830, Appendix A F.3. which states:

"Because DOE has ultimate responsibility for the safety of its facilities, DOE will review each documented safety analysis to determine whether the rigor and detail of the documented safety analysis are appropriate for the complexity and hazards expected at the nuclear facility. In particular, DOE will evaluate the documented safety analysis by considering the extent to which the documented safety analysis

(1) Satisfies the provisions of the methodology used to prepare the documented safety analysis and

(2) Adequately addresses the criteria set forth in 10 CFR 830.204(b). DOE will prepare a Safety Evaluation Report to document the results of its review of the documented safety analysis. A documented safety analysis must contain any conditions or changes required by DOE."

The requirements under 10 CFR 830.204(b) for an approvable DSA are quite detailed. Requirements for writing a defensible SER for a Safety Basis are further delineated in DOE-STD-1104 CN2 ***"REVIEW AND APPROVAL OF NUCLEAR FACILITY SAFETY BASIS DOCUMENTS (DOCUMENTED SAFETY ANALYSES AND TECHNICAL SAFETY REQUIREMENTS)".*** It has been noted that there are varying levels of understanding with regard to use of Conditions for (or of) Approval (COA) in a SER. Examples include personnel believing that a COA is not part of the Safety Basis, personnel stating that COA should not be used in a SER, or personnel stating that a COA is not a requirement. As mentioned previously, 10CFR830 Subpart B specifically mentions Conditions for Approval. In order to further clarify this it is noted in this SER that DOE-STD-1104 also supplies additional definition for a COA as follows:

- "*The Safety Evaluation Report (SER) is primarily a management document that provides the approval authority the basis for the extent and detail of the review of the DSA and TSRs* ***and the basis for and any conditions of approval...***, and

- *"If the SER imposes a* ***condition of approval*** *(e.g., additional compensatory measures, alterations of stated commitments, etc.) on the facility safety basis documented in the DSA and*

TSRs, then the SER necessarily modifies that facility safety basis. In such cases, conditions cited in the SER become part of the facility safety basis. Therefore, a facility safety basis is composed of an approved DSA and TSRs modified as necessary by the SER to reflect DOE-imposed conditions of authorization. The SER or specification of conditions in the SER not currently in place in these documents should identify an expected schedule for completion."

It should be noted that where there are differences between the DSA/TSRs and this SER, the SER is the overriding document.

The Documented Safety Analysis (DSA) being approved in this SER is a BIO, developed in accordance with DOE-STD-3011-2002, for repackaging operations at the DVRS Facility, involving Nuclear Hazard Category 2 inventory of nuclear material, in support of the "Quick to WIPP" (Waste Isolation Pilot Project). Based upon 10CFR830 Subpart B, associated guides, and the invoked safe harbor (DOE-STD-3011) significant gradation in the rigor of the approach to both the DSA and Technical Safety Requirements (TSRs) is appropriate.

In accordance with 10CFR830 Subpart B, a BIO is intended to provide a compliant safety basis for a moderately short duration activity of which the operations at DVRS represent. Per this SER the time frame for the glovebox operations at DVRS will be limited to five (5) months (150 calendar days) or less from the date NNSA formally releases DVRS for operations.

The BIO and TSRs approved by this SER replace for the 5-month (150 Calendar days) duration listed in the SER:

- The DVRS Hazards Analysis dated May 9, 2002, and
- The DVRS Phase 2b Technical Defense Report (REPORT-SWO-029, R.0).

Upon completion of the TRU repackaging operations covered by the BIO and TSRs and the decontamination of the facility, the above documents will be the governing safety basis documents again.

Technical Evaluation of Quality Issues.

In its review of the DVRS Glovebox BIO and TSRs, the Safety Authorization Basis Team (SABT) reviewers noted several quality issues listed below that required addressing before approval of the BIO and TSRs could be granted. Other issues were discovered and are included in the NNSA's review comments.

1. NNSA review of ASCG report coupled with NNSA consideration of potential unknowns affecting building response yielded that the report states use of UBC 1997 methodology will not reflect site-specific values due to existing trenches and fill because the facility was built over filled in pits, etc. This is important information that should have been questioned by the LANL production and review process prior to coming to NNSA. This should have also been addressed prior to building the facility as a Hazard Category 2 Nuclear Facility. The effect of trenches and fill were not taken into account in the evaluation or in terms of this effect on the building response spectra in a seismic event. The ASCG report uses the 1997 Uniform Building Codes (UBC) vice the now required DOE-S-1020-2002 International Building Codes (IBC) requirements. The ASCG report indicates that there may be differential movement issues extant between the inner building 433 facility and the outer building 412

facility as well as between the stack and building 412 as well as between the safety class air exhaust system, Fire protection system, safety class Diesel Gen, etc and building 412 that may not have been evaluated for wind and seismic loads. Pg 4-13 does cover this vulnerability for ducts but not for the other things like cabling, etc. An additional unknown was the size and content of the pits. This data would be necessary to evaluate the effects of building the facility over the pits but is not available. The NNSA technical concerns lead to LANL FWO-DECS personnel evaluating the facility against the ASCG report and the DOE-STD-1020-2002 IBC requirements (see Attachments) as well as consideration of the pits over which the facility is built in terms of effects on building response during a seismic event. In short, FWO-DECS personnel could not defend that the DVRS facility would perform to any specific Performance Category for natural phenomenon hazards (NPH) (See Salmon Report dated May 28, 2004 attached). The Salmon Report estimated that the relative risk of building 412 for NPH compared to PC-2 requirements could be nonconservative by an order of magnitude (factor of 9 to 12) and the relative risk for building 433 was 2 to 3. This facility was originally designed circa 2000 to be operated as a long-term Nuclear Hazard Category 2 Facility. However, the failure to adequately consider the site on which it was built in terms of seismic design is a major impediment for it to ever operating long-term as a Hazard Category 2 facility and is and negative indicator relative to the health of the nuclear design process. A DNFSB letter to the NNSA Administrator dated May, 27, 2004 states **"At some point, DVRS will likely need to become at least HC-3..."**. No timeframe was specified for the proposed operation of this facility as a Hazard Category 3 or higher facility by DNFSB. DNFSB wrote this statement without knowledge of the seismic risk as quantified in response to the NNSA detailed technical review comments on this issue. NNSA believes that understanding the initial, up-front, risk as well as the potential residual risk to operations is key to approving operations with minimum risk to the public, workers and the environment. Although operation of the facility as a Hazard Category 3 facility would involve much more graded requirements than a Hazard Category 2 facility, it is not clear to NNSA at this time that long term operation of this facility as a nuclear facility is prudent based upon the current understanding of the situation. Recommendations were made in the May 28, 2004 Salmon report conclusion for further study. It is possible that performing all of these actions, as well as potential for upgrades resulting from these investigatory items in a robust manner could result in NNSA reconsideration of this issue in terms of longer term operations of this facility under 10CFR830 Subpart B. Although the facility could not be certified to meet PC-2 requirements as was claimed in the DSA (for a new nuclear facility which exceeds the EG of 25 rem for accident consequences associated with Natural Phenomena Hazards (NPH) events, PC-3 would be required, not the lower PC-2), NNSA has determined per this SER that it could accept the risk for HC-2 operations for the short 5-month period based on the safety controls named.

2. Chapter 2 of the BIO states that the air is exhausted through a **34.5** ft (10.5 meters) tall stack adjacent to Building TA-54-412. Page 3B-9 of Appendix 3B states that the stack height used in the accident analyses was **11.3 m** high. The two statements do not agree on the height of the stack for DVRS. In the NNSA confirmatory analysis, NNSA noted that the χ/Q value for elevated releases did not agree with the value quoted in Appendix B of the BIO. The difference was attributed to the incorrect stack height of 11.3 m being used by the facility in the analyses. The correct stack height is 10.5 meters as stated in Chapter 2 of the BIO. However, because none of the accident analyses used the elevated χ/Q value to determine the consequences to the maximally exposed off-site individual (MEOI) the error did not result in the nonconservative selection of controls in terms of type, number or level.

3. The liquid nitrogen is stored in two Dewars located outside Building TA-54-433 and is piped through the wall into Cell 4. The gas evaporating off the liquid is routed via a pipe and valve system to the

glovebox. The system supplies a small makeup flow at approximately 5 cfh during processing operations. This is accomplished by the use of flow-restricting orifice(s). In conjunction with the relief valves and pressure regulator prevent an over-pressurization of the glovebox. In the event of a failure of the pressure regulator, the flow-restricting orifice prevents an over-pressurization of the glove box. The document does not formally elevate or recognize this function. Attachment 1 to this SER adequately addressed this issue.

4. Human errors occur and are listed in reference literature on a per demand basis, which is then multiplied by the demands per year to get a frequency. The discussions on the referenced pages do supply enough data to reconstruct the basis for the cited frequencies. For example, page ES-1 states that about 170 drums will be processed. Each one of these drums will be handled multiple times in the 5 months. Statement is made that "Accidents initiated by human error that impact one or two drums are generally considered to be in frequency category II for the unmitigated case." It is not clear from the description how one goes from a per demand failure to frequency. Reproducibility is a vital consideration when constructing a DSA so that its technical foundations can be checked and so that it can be used later for Safety Evaluations under the USQ and other processes. This needs to be defended better as it is too heuristic. Attachment 1 to this SER adequately addressed this issue.

5. NNSA has independently reproduced (to within acceptable accuracy) the unmitigated estimate for a fire in the facility due to lightning (0.14 strikes/yr x 10^{-2} – 10^{-3}/yr incipient fires or Category III). The statement in the BIO about effectiveness of LPS being limited so mitigated loss with LPS is still Category III is incorrect. Many organizations both inside and outside DOE who have not technically researched the issues of the reliability of an LPS to prevent fires believe that they are not reliable. In detailed literature reviews of this issue and most recently in a USQ and supporting documents produced by outside experts for WETF and other facilities at LANL, it is evident that a correctly installed and maintained LPS is about as reliable at interdicting fires, as is a FPS (about and average of 0.98 probability of performing its intended function for wood structures, it could be argued to be even greater probability for structures that are not primarily wood). NNSA views this relatively large probability of the LPS in preventing fires as worthy of consideration as a preventor. Conversely, if it were not installed maintained at the correct level, as it would be if it were named at the correct level, a valuable preventor like the LPS would not be reliable. After considering these issues in the context of the HA, and 10CFR830 Subpart B and applicable Safe Harbors, it is NNSAs judgment that the LPS needs to be at a SS-SSC with a DF specified in TSRs to ensure it meets NFPA 780 requirements. This is important as FPS and LPS could drive this scenario frequency to incredible or near incredible (mitigated) at no extra cost with regard to Safety Basis implementation. Attachment 1 to this SER adequately addressed this issue with accompanying page changes.

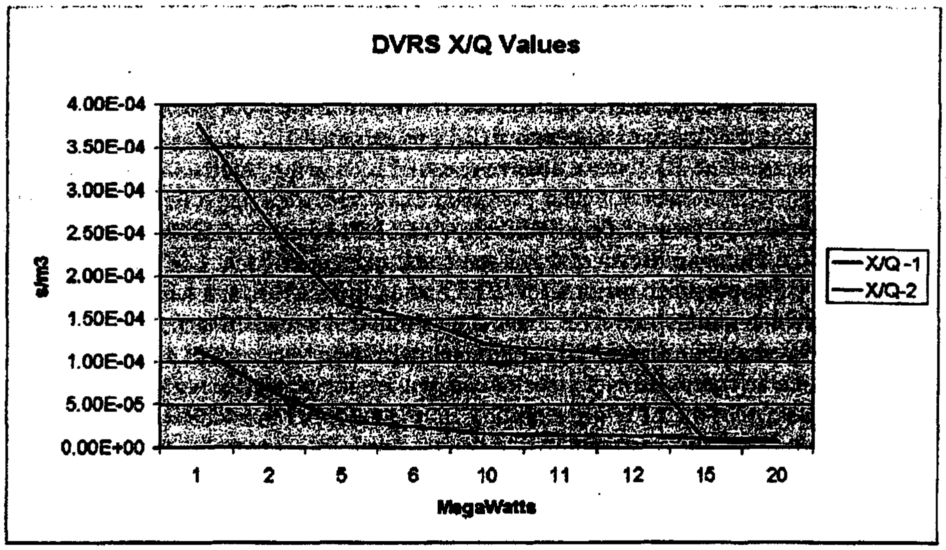
6. Chapter 4 states that the TRU waste drums shall meet the design requirements for Type A containers as specified in 49 CFR, paragraphs 173.410 and 173.412 and that TRU waste drums shall be capable of withstanding the water spray, free drop, and penetration tests for Type A containers that are specified in 49 CFR, Paragraph 173.465. It has already been identified via an open USQ for site-wide transportation that several drums at LANL were never tested to meet the free drop test requirements in 49 CFR 173.465 for drums containing fissile material. The drums are a safety class (SC) design feature (DF) for the DVRS Safety Basis. Tests have shown that drum weights above 360 lbs, failed Department of Transportation (DOT) TYPE A cert. Attachment 1 to this SER adequately addressed this issue.

7. The χ/Q values for the buoyant plumes are questionable. After reviewing the Atmospheric Input files for a 1.0 MW fire, it was noted that the facility had turned off any affects from building wake by setting the maximum value in MACCS2 for the scaling factor for entrainment of a buoyant plume "PRSCLCRW001" to 1E+6. The Code Manual for MACCS2 states "If there is a need to ignore the effect of building wake entrainment, for example, for a point source release, or from a small building, this can be achieved by setting SCLCRW to its maximum allowable value." When that is done, the calculation of the plume is based strictly on the Briggs plume rise formulas, irrespective of building height and the corresponding critical wind speed." This has the effect of reducing the χ/Q value from 3.78E-4 s/m^3 to 1.15 E-4 (a reduction factor of about 3.3). Unless the facility can guarantee that the building will not be standing during a fire scenario, it is non-conservative to ignore building wake

Attachment 2

Fire Size In MegaWatts	1	2	5	6	10	11	12	15	20
X/Q-1	3.78E-04	2.60E-04	1.67E-04	1.51E-04	1.20E-04	1.13E-04	1.07E-04	5.98E-06	6.30E-06
X/Q-2	1.15E-04	6.61E-05	3.12E-05	2.45E-05	1.54E-05	1.41E-05	1.28E-05	1.05E-05	8.22E-06

w/Bldg Wake = X/Q-1
w/o Bldg Wake = X/Q-2



effects (downwash of plume) in conjunction with a buoyant plume. The figure below demonstrates this effect quantitatively.

8. Section 3.4.2.2 of the BIO states, "The fire screen prevents embers from being entrained into the glovebox ventilation system, and helps to prevent thermal insult to the filters1. Furthermore, the screen reduces the amount of soot that can load onto the filters." The statement indicated that the fire screens had some safety significance that was not accounted for in the safety controls. Attachment 1 to this SER adequately addressed this issue.

9. Section 3.4.2.2.3 of the BIO states that in the mitigated case M1 a χ/Q value for a 0.1 MW fire was used in the dose calculation that lead to 30.3 rem/PECi. As noted in earlier, the χ/Q values for all buoyant plumes are in question. In this particular accident, the value for χ/Q could be as high as 7.37 E-4 s/m^3 (2.6 times higher than what was used) increasing the rem/PE-Ci to 79; thus increasing the

mitigated dose to 7.1 rem vise the 2.7 rem reported. This same comment applies to mitigated case M2 increasing the reported 27 rem to 71 rem. This deficiency could lead to inadequate selection of controls for safety needed to reduce the consequences below the Evaluation Guide of 25 rem. This issue is addressed later in this SER.

10. The BIO states that spotters will be present whenever forklift movements are made when MAR is present and will be trained in the use of the manual fire suppression equipment available in the airlock. No safety controls were derived for this accident that required and verified the availability of manual fire suppression equipment in the airlock. The assumption that manual fire suppression equipment will be available in the airlock is not protected. Attachment 1 to this SER adequately addressed this issue with the accompanying page changes.

11. Section 3.4.2.4.1 states, "The results of filter tests at Rocky Flats show a failure rate of vents or filters of 1.2% for drums in storage at least 10 years (some drums in the test had been in storage for more than 20 years). Most of these failures occurred at Rocky Flats due to the presence of chemicals (such as CCl_4); this chemical is not typically used at LANL. To date, there have not been any reports of drums with plugged filters at LANL. Based on the above information, it is reasonable to conclude that the filter failure rate at Area G is at least one order of magnitude less than the Rocky Flats rate, or approximately 0.1% (1E-3)." The statements imply that other chemicals besides CCl_4 may cause filter failure. The statements do not rule out other chemicals that may be used at LANL. Therefore, the statement about the failure rate at Los Alamos is at least one order less than Rocky Flats has no technical justification. Attachment 1 to this SER adequately addressed this issue.

12. The DVRS BIO Chapter 3 fails to list the drum vent testing program to ensure that there is a clear pathway for hydrogen generated inside a drum to escape. This was a RANT and AREA G requirement and, as such, should extend to DVRS. At a minimum, the vent-testing program should be identified as a control in this BIO. Attachment 1 to this SER adequately addressed this issue.

13. The Hazard Identification Checklist did not identify the possibility of the rollup door separating Cells 3 & 4 dropping on the glovebox or workers that may be underneath. The NNSA reviewer could not find any accident scenario in the subsequent hazard analysis in Appendix 3A that evaluated the hazard and consequence of the rollup door falling on workers or the glovebox that spans Cells 3 & 4. Attachment 1 to this SER with the accompanying page changes adequately addressed this issue.

14. The scenario on Page 3A-18 of Appendix 3A is a power failure resulting in pressurization of the glovebox with a release of materials. The scenario lists the building air exhaust system with HEPA filter as a control, but it does not indicate that the air exhaust system contributes to a reduction in the consequences to either the worker or the public. It was NNSA's opinion that the air exhaust system is key to reduction in consequences to both the worker and the public. Attachment 1 to this SER adequately addressed this issue.

15. The DVRS Facility did not consider a possible flow path through the rollup door that separates the adjoining Cell 5 as was done for Cell 1 in its leak path factor (LPF) analysis. There was no explanation nor is it apparent, that an open flow path would not exist from Cell 5 to TA-54-412 through the compactor. The methodology of developing the LPF assumed that the Air Exhaust System is intact, and the flow path through the exhaust ducting being unfiltered was not considered. For Case 1B (PC-2 seismic event with fire accident) the developed LPF = 0.1 of Appendix 3C was used. However, the BIO did not conclude the Air Exhaust System could survive a PC-2 seismic event.

Hence, for this accident, the air exhaust system can no longer be partially credited as a filtered flow path as done in the Appendix 3C LPF calculation. This new unfiltered flow path will likely increase the LPF value (i.e., > 0.1). Attachment 1 to this SER adequately addressed this issue.

16. Section 4.3.1.3 Functional Requirements for Bldg TA-54-412 states: "As discussed in Chapter 1, Section 1.5.4, snow and ice were not identified as hazards for the Quick-to-Waste Isolation Pilot Plant (QTW) Glovebox Campaign at the DVRS Facility because the campaign is scheduled for only the spring and summer seasons. Thus, a functional requirement related to these natural phenomena is not identified." Because LANL has chosen to develop this BIO, excluding consideration of ice and snow hazards, the approval of this BIO/TSRs will be required to be contingent on the time of year. Past history has shown that delays in schedule are common and delays in this program will be greater due to the constraints under which this BIO was developed. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

17. Table 4-7 under the Performance Criteria column lists the compressed air system as part of the air exhaust system. No functional requirements are listed, although performance criteria are supplied. As indicated the compressed air system is required for operation of the air exhaust system, which is a SC SSC. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

18. Table 4-9 under the "Evaluation" column states, "The HEPA filters and associated ductwork were designed to meet PC-2 seismic requirements. They were not designed for and not evaluated against a PC-3 seismic event. Therefore, there is a potential vulnerability that the air supply system will not be able to maintain confinement capability during and following a PC-2 seismic event (0.22 g) or a more severe seismic event." The statements contradict one another. If the HEPA filters and associated ductwork were designed to PC-2 criteria, there **should not** be a problem with them withstanding a PC-2 seismic event. Attachment 1 to this SER and its accompanying page changes adequately addressed this issue.

19. Section 4.4.1.5 states that the glovebox including stand is identified as a TSR Control in Chapter 4. The description of the In-Service Inspection states: "ISI: The glovebox will be maintained in accordance with Laboratory requirements." No additional information regarding what requirements or requirements documents (LIR, LPR, or LIGs) is provided. A thorough search of the BIO and TSRs submitted for approval indicates that there is no mention of where these "Laboratory requirements" reside. Attachment 1 to this SER and its accompanying page changes adequately addressed this issue.

20. Section 4.4.3.2 states, "In the event of a full glove breach, the glovebox exhaust system is required to maintain a flow of 125 linear ft/min through an open glove port, preventing outflow into the room. The fan/motor assembly is designed to provide this capability. A solenoid valve in the glovebox exhaust line will open a bypass line around the normal suction line to allow the fan to draw the increased flow from the glovebox. The bypass line is capable of passing up to 70 cfm, more than the 45 cfm that is necessary to meet the 125 linear ft/min flow requirement. In limiting the flow to no more than 70 cfm, the bypass line performs another SS function. The accident analysis for a glovebox fire is based on a maximum airflow of 70 cfm through the glovebox. This assumption must be protected in the TSRs." The statement indicates that the exhaust fan and the bypass solenoid operated valve are SS features of the glovebox exhaust system. However, in the preceding paragraph it states, "The accident analysis in Chapter 3 identified passive confinement as a SS function, and not active exhaust. Therefore, the SS components are limited to the confinement boundary (ductwork) from the glovebox to the HEPA filters (including the exhaust filters and the filter on the room inlet line), and

the filters." These two paragraphs contradict one another. Attachment 1 to this SER adequately addressed this issue.

Other issues involving the Technical Safety Requirements (TSRs) are discussed later in this SER.

1.0 Operations Covered and Hazard Classification

The Basis for Interim Operations (BIO) dated April 2004, the revised Technical Safety Requirements (TSRs) dated April 2004 attached to this SER, for the DVRS Facility, TA-54-412, and this SER with its attachment, form the nuclear Safety Basis for the Nuclear Hazard Category 2 DVRS Facility TA-54-412 (henceforward referred to as the Safety Basis) and applies to operations in which Hazard Category 2 quantities of nuclear materials are authorized at DVRS. Prior to the review by LASO, LANL/SBO reviewed the Safety Basis after which it was recommended for approval and transmitted to NNSA. The NNSA Review Team finds the Safety Basis for repackaging operations at the DVRS Facility, with the revised TSRs and conditions of approval, adequate to support safe operations in the facility.

Subsequent to submittal of the BIO/TSRs by the Facility, and after the review by SBO, a number of errors in the Safety Basis were identified that required correction. These deficiencies are delineated in the NNSA quality comments earlier in this SER and in Section 1.3, *TSR ISSUES AND REQUIRED REVISIONS* of this SER.

1.1 Basis and Defensibility for the Decision to use a Basis for Interim Operations (BIO) as the facility safety basis

At the time of the writing of this SER, the existing Safety Basis for the DVRS Facility (appropriate for a purely Radiological Facility but not necessarily for a Hazard Category 1, 2, or 3 nuclear facility) was a Hazards Analysis dated May 9, 2002, and the DVRS Phase 2b Technical Defense Report. This SER removes the applicability of this Safety Basis while the DSA and TSRs approved by this SER are in effect. Once the configuration of the facility id returned to that for which Radiological designation applies, with appropriate verification, then the facility may return to the previous Radiological safety basis for operations.

Under 10CFR830 Subpart B criteria, a Basis for Interim Operations (BIO) prepared according to DOE Standard 3011-2002, *Guidance for Preparation of Basis for Interim Operation (BIO) Documents*, is a recognized Safe Harbor methodology for DSA preparation for limited life Category 1, 2, or 3 Nuclear facilities. Preparation of this BIO and associated TSRs for DVRS ensures the following objectives are met as recognized formally by NNSA:

1. Fully compliant use of DOE-STD-3011-2002 (December 2002) as the Safe Harbor for producing a BIO under 10CFR830, Subpart B including a robust Hazard Analysis (HA) (NNSA recognizes that the DSA references some use of DOE-STD-3009 CN2. Where this has occurred, this is a conservative practice but not required per the SER for the approval of a BIO and TSRs such as this. The formal expectations concerning this issue is through the invocation of the DOE-STD-3011 Safe Harbor);

2. Through the production of 10CFR830 Subpart B compliant TSRs, combined with the SER ensures safe operations,

3. The 5-month lifetime of the facility of five-months; and

4. In complying with objectives 1, 2, & 3 above, the DVRS Glovebox BIO, TSRs and SER are supported as fully meeting the requirements of a 10CFR830 Subpart B, DOE-STD-3011-2002 BIO, Safe Harbor.

The formal hazards and accident analyses provide a safety value to the workers in that all of the hazards are identified and evaluated in a rigorous manner so that appropriate controls can be derived and implemented (NNSA identified deficiencies in the Hazard Analysis, however, NNSA determined to its satisfaction that there were no missing controls for safety). This BIO and the revised TSRs provide the framework for understanding the hazards and the risk mitigation associated with repackaging of waste within DVRS at the hazard category-2 (HC-2) inventories. The evaluation of the hazards and risks are necessary in order to derive the appropriate controls. **The BIO and the revised TSRs attached to this SER and the conditions of approval (COAs) stated in this SER, for the DVRS Facility, provide the basis for NNSA to accept the identified residual risks of Nuclear HC-2 waste repackaging operations not to exceed November 15, 2004.**

The robust HA and accident analysis along with the DOE-STD-3011-2002 compliant BIO, coupled with this SER adequately addresses the hazards and risks associated with handling the HC 2 inventories over the time frame for approval of the BIO/TSRs. The actual residual risk for the LANL site, associated with the waste stored at Area G, will be reduced with each repackaging and subsequent shipment of TRU waste from DVRS that is made. Completion of the transfers covered by this BIO are likely to result in a residual risk reduction of more than 70 percent for the LANL site by removing all of the QTW (2000 higher wattage drums) by March 31, 2005, and additional quantities of other TRU waste from Area G over the next five years.

To reduce the Site-wide risks associated with the TRU waste repackaging operations supporting "Quick to WIPP" several programmatic controls are imposed. These are the major controls for safety and include minimizing the MAR to what is essential to meet mission needs (which limits the potential consequences associated with the release of nuclear materials) and limiting the time frame over which this safety basis is in effect (which limits the overall probability or frequency of accidents). These two programmatic controls will in concert reduce the overall residual risk associated with repackaging operations involving HC 2 inventories in the DVRS facility. The MAR is minimized by limiting the MAR in the entire facility to 1100 plutonium-239 equivalent Curies (PE-Ci) (using 0.0614 Ci/g for the specific activity of plutonium-239 the correct conversion of 17,915 PE-g which is approximately 18 PE-kg). The time frame is limited by the BIO/TSRs and this SER stipulates that this safety basis is in effect for a period of five-months from the date NNSA formally releases DVRS for operations under this BIO.

The Hazard Controls (HCs) were developed into compliant TSRs to ensure that DVRS operations are carried out safely and remain within the approved BIO/TSRs safety envelope. The following is a summary of the Safety Class (SC) - Structures, Systems, and Components

(SSCs), Safety Significant (SS) - SSCs and defense in depth controls identified in the BIO/TSRs.

Table 4-1. Safety Structures, Systems, and Components

SSC	Safety Designation	Accidents Prevented or Mitigated	Type	Safety Function	Related TSR*
Building TA-54-412	SC	All	Mitigator	Prevents and mitigates the release of radioactive material, and provides physical support for safety SSCs, during and following design basis accidents.	DF
Building TA-54-433	SC	Spill, Fire, Deflagration, and Natural Phenomena Hazard (NPH) Events	Mitigator	Prevents and mitigates the release of radioactive material, and provides physical support for safety SSCs, during and following design basis accidents.	DF
Air Exhaust System	SC	Spill, Fire, Deflagration, and NPH Events	Mitigator	Provides a confinement barrier to mitigate the release of radioactive material during and after design basis operational accidents and natural phenomena events, and maintains a negative pressure within the DVRS Facility buildings, mitigating the release of radioactive material before, during, and after design basis operational accidents.	LCO/SR and DF
Compressed Air System	SC	Spill, Fire, Deflagration, and NPH Events	Support	Support operation of the Air Exhaust System	LCO/SR
Air Supply System	SC	Spill, Fire, Deflagration, and NPH Events	Mitigator	Confines radioactive material released from postulated design basis accidents.	LCO/SR and DF
Diesel Generator and Associated Electrical Distribution System	SC	Spill, Fire, Deflagration, and NPH Events	Support	Provides back-up electrical power to active SC-SSCs (i.e., the air exhaust system) and select SS-SSCs (i.e. the glovebox oxygen monitor) to allow them to perform their safety function if site power is unavailable.	LCO/SR
Fire Suppression System	SC	Fire, Deflagration, External Events, and NPH Events	Mitigator	Suppresses or limits the propagation of fires inside buildings TA-54-433 and TA-54-412 during and after design basis fire events.	LCO/SR and DF
Waste Drums	SC	All	Preventer	Provides primary confinement for readily dispersible transuranic (TRU) waste; reduces releases of TRU waste subjected to mechanical or thermal stresses from postulated accidents; and prevents accumulation of flammable gases inside the waste drum.	DF

SSC	Safety Designation	Accidents Prevented or Mitigated	Type	Safety Function	Related TSR*
Glovebox (including support stand)	SS	Fire, Deflagration, and NPH Events	Preventer	Confines airborne radioactive material before, during, and after design basis accidents.	DF
Drum Lifts	SS	Spill and NPH Events	Preventer	Holds the drums during lifting and lowering operations, and supports glovebox confinement while the drums are bagged-on the glovebox.	DF
Glovebox Exhaust System	SS	Spill, Fire, Deflagration, and NPH Events	Preventer Mitigator	Provides a confinement barrier that prevents a release of airborne radioactive material from the glovebox during normal and abnormal operations and during and after a DBE, and restricts the airflow through the glovebox in the event confinement is breached, limiting the severity of a potential fire.	AC and DF
Glovebox Atmosphere Control System	SS	Fire and Deflagration	Preventer	Prevents a fire within the glovebox during operations involving reactive or pyrophoric materials, and reduce the likelihood of a deflagration accident.	LCO/SR

*DF = Design feature
LCO = Limiting condition for operation
SR = Surveillance requirement
AC = Administrative Control

1.1.1 *Safety - Structures, Systems, and Components*

The Safety Class and Safety Significant Structures, Systems, and Component (SSC) controls identified in the DVRS BIO are summarized as follows:

The air exhaust system listed above is classified as a SC SSC. Because compressed air is required for operation of flow control dampers in the air exhaust system, portions of the compressed air system to include the air receiver tank, associated piping, valves, and accompanying apparatuses from the air receiver tank to the associated flow control dampers is also categorized as SC SSC. As such, they shall be maintained as SC SSCs. It should be noted that there has often been confusion in the past relative to operability for systems and "functional classification/operability definition." Functional classification is often confused with SSC ***level*** classification. In the real world, while it should be the goal to transmit information in a reliable manner, it is not possible to write down concepts perfectly, were it possible to do so humans would still interpret the perfectly written down concepts imperfectly. Often this becomes a level-of-understanding or a training issue because personnel do not understand that in this context confusion can often be reduced by consideration of the TSR General Principles of OPERABILITY (especially as this concept applies to subsystem level and operability definitions as it affects the system itself). A second consideration is that this is a BIO with all of the attendant gradations allowed under 10CFR830 Subpart B. The General Principles of OPERABILITY are reproduced below for reference and are also included in the TSRs submitted by LANL.

A system, subsystem, train, component, or device SHALL be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s), and when all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication, or other auxiliary equipment that is required for the system, subsystem, component, or device to perform their safety function(s) are also capable of performing their related support function(s). General Principles of OPERABILITY are as follows:

General Principle 1: A system is considered OPERABLE as long as there exists assurance that it is capable of performing its specified safety function(s).

General Principle 2: A system can perform its specified safety function(s) only when all of its necessary support systems are capable of performing their related support functions.

General Principle 3: When all systems designed to perform a certain safety function are not capable of performing that safety function, a loss of function condition exists.

General Principle 4: When a system is determined to be incapable of performing its intended safety function(s), the declaration of INOPERABILITY should be immediate.

1.1.2 Important Administrative Controls (ACs) Covered in TSRs Include:

- A Material-at-Risk (MAR) limit for the facility and per drum.
- At least one roll-up door to the north airlock shall be closed during operations inside the DVRS Facility, except for short periods as necessary to accommodate operations.
- All exterior doors other than the north airlock rollup doors shall be administratively controlled to remain closed when not in use for access or egress.
- At least one rollup door to Cell 1 shall be in the closed position at all times during operations inside the DVRS Facility. Both doors will remain closed except for transfers into and from the cell.
- All exterior doors other than the Cell 1 rollup doors shall be administratively controlled to remain closed when not in use for access or egress.
- Combustible control in buildings TA-54-412 and TA-54-433 (part of the fire protection program) will reduce the likelihood of a fire that could threaten the TRU waste material in Building TA-54-433.
- The headspace of all drums will be sampled before glovebox processing to ensure that flammable gas has not accumulated to a hazardous level (25% of the lower flammability limit).
- An AC under the Radiation Protection Program will require a HEPA-filtered glovebox exhaust system to maintain worker exposures as low as reasonably achievable (ALARA).

- Drums cannot be stacked and drum handling practices.
- Drums must meet the Area G TSR requirements before being brought into the facility.
- Drum staging allowed in Cells 1, 3, and 4 of Building 433 only.
- The oxygen monitor must be monitored at all times that waste is exposed inside the glovebox.
- Vehicles prohibited inside the facility during waste processing operations.
- Forklift maintenance, inspections, operator training and certification, and limited to building 412 airlock only during waste processing.
- Area G emergency procedures and training.
- Work authorization system.
- Glovebox drum limit.

As stated, each of the ACs is important to the safety of the facility. These ACs should be verified with an appropriate level of rigor to ensure that there is high confidence in the AC reliability. This level of rigor needs to be specifically addressed in the Readiness Verification activity prior to start up.

1.1.3 Defense-in-Depth for All Accidents

Throughout the DVRS Facility operations, there are controls that apply to all analyzed scenarios. These include both engineered features and safety management programs (SMPs). The cumulative effects of the controls reduce the unmitigated risk by reducing the likelihood and the consequences to both the public and the worker. NNSA has determined that the defense-in-depth approach in the DVRS BIO and accompanying TSRs is adequate. The following list identifies SMPs for analyzed accident scenarios listed in the TSRs.

Administrative Controls (ACs):

- Management Self-Assessments;
- Unreviewed Safety Questions;
- Nuclear Criticality;
- Emergency Preparedness;
- Conduct of Operations;
- Fire Protection;
- Radiation Protection;
- Maintenance;

- Configuration Management;
- Hazardous Material and Waste Management;
- Vehicle Safety;
- Hoisting and Rigging;
- Initial Startup and Testing;
- Quality Assurance;
- Occurrence Reporting;
- Training and Qualification; and
- Operating Records.

As stated for the previous list of ACs, each of the SMP ACs in this section is also important to the safety of the facility. These SMP ACs should be verified with an appropriate level of rigor to ensure that there is high confidence in the AC reliability. This level of rigor needs to be specifically addressed in the Readiness Verification activity prior to start up.

As a general statement, there is often discussion of what constitutes undue reliance on Administrative controls. Often these discussions degenerate into pure opinion with no resolution because no criteria are ever cited (other than pure opinion) in these discussions for what constitutes "too much" reliance on ACs vice Engineered Controls (ECs) like Design Features (DFs) or other SSCs. Naming Engineered Controls vice ACs can, and should be, a careful and deliberate process. In this context it is important to review guidance supplied under 10CFR830 Subpart B.

"Protection of the public is predominant in safety design; protection of workers is no less important. However, the degree of protection for facility workers achievable by SSCs is limited. Other factors such as disciplined conduct of operations, training, and safety management programs are no less important in assuring worker safety."

In prioritization of items for a facility safety strategy at the highest level of nuclear safety there are seven guidelines as follows (it should be noted that this prioritization includes both ACs and ECs):

DOE-STD-3009 CN2:
"The process of designating one or more safety SSCs ***as SC is judgment-based and depends on many factors such as effectiveness, a general preference of preventive over mitigative and passive over active, relative reliability, and cost considerations***." Prioritization guidance includes:

1. Hazardous material inventory should be minimized at all times (DOE G 420.1-1 states this is the first priority),
2. Safety SSCs are preferred over administrative controls,

3. Passive SSCs are preferred over active SSCs,
4. Preventive controls are preferred over mitigative controls,

   DOE G 420.1-1 adds a #5 in here as (SOE-STD-3009 puts it near the end indicating that this is not a prioritized list) :

   5. Facility safety SSCs are preferred over personal protective equipment,

6. Controls closest to the hazard may provide protection to both workers and the public,
7. Controls that are effective for multiple hazards can be resource effective."

There is no formal requirement to present a formal matrix of how exactly these considerations went into ***the judgment call on the issue of naming ACs vice ECs***. It can be seen from the addition by DOE G 420.1-1 above, that even the generally excellent 10CFR830 related documents do not perfectly agree on the generally excellent guidance in these documents. DOE G 420.1-1 states the first priority is Hazardous Material inventory control but again the addition by DOE G 420.1-1 shoes that the list is not ordered necessarily by priority. It should be further noted that if it was clear that Inventory Control was the first priority in the lists (specification/minimization of Hazardous Material Inventory (which includes MAR) is a major initial assumption in any analysis) then since Inventory Control is by its nature an AC, this is an automatic emphasis of ACs over ECs which could be construed as admitting contradiction into this nevertheless good postulate system. It should also be noted that the use of this guidance is not necessarily prioritized per the numbers above and it is subject to cost, effectiveness, reliability, etc., considerations as well as the fact that in some cases

Suffice it to say that NNSA did keep these principles in mind when it reviewed the BIO and TSRs and, though agreement on something like this will never be perfect, believes that (with changes, considerations, and issues cited specifically by this SER) the document generally reflects good and safe judgment in the DSA and TSRs.

It should be noted that the readiness verification activity could benefit for emphasis based upon the above 10CFR830 Subpart B related guidance.

1.2 NNSA EVALUATION OF REQUIREMENTS FOR THE DVRS SAFETY BASIS

The Hazards Analysis with the revised TSRs as amended by the SER are adequate to ensure the qualitative residual risk is acceptable for a 5-month duration operation. The accident analysis evaluated five accident scenarios and quantitatively evaluated off-site consequences in a bounding manner.

- **DOE-STD-3011-2002: "...The primary rationale for utilizing the BIO approach is that the short (i.e., normally less than 5 years) remaining**

> **operational life of the facility does not justify the increased time and cost required to develop a DSA fully utilizing the DOE-STD-3009 methodology.**
>
> **Existing information (e.g., current SAR, and supporting documentation) should be reviewed against the listing above. Maximum advantage should be taken of pertinent existing safety analyses and design information (i.e., requirements and their bases) that are immediately available, or can be retrieved through reasonable efforts. Other information arises from existing sources such as process hazards analyses (PrHAs), fire hazards analyses (FHAs), explosive safety analyses, health and safety plans (HASPs), environmental impact statements (EISs), etc. When existing information is not current and correct, cannot be verified, or does not exist, the existing information must be supplemented ..."**

This DVRS Safety Basis (BIO/TSRs/SER) shall remain in effect, as the interim authorization basis for Nuclear Hazard Category 2 operations for a maximum of five months.

- **DOE-STD-3011-2002: "...Consistent with the Rule, hazard controls identified in hazards analysis that are safety structures, systems, and components (safety SSCs) should be evaluated for classification as safety class or safety significant SSCs according to the definition of those terms in the Rule and the guidance in DOE-STD-3009. They should be described in a BIO chapter 4. Existing information should be used to the maximum extent possible, supplemented where necessary. The Rule (10 CFR 830.205) requires Technical Safety Requirements. These are derived from the DSA (BIO). Information useful to link the BIO to the TSR document, such as the bases of safety limits, etc., a listing of TSR design features and their rationales, and the bases for safety management programs should be presented in a BIO chapter 5. As with Category 3 DSAs, the basis for safety management programs, and any facility-specific characteristics of them that are necessary, is derived through hazards analyses. A listing of these programs, with references to sitewide programs and the facility-specific characteristics should be presented in summary table form..."**

The DVRS BIO and TSRs provide both a thorough hazards and accident analysis along with a detailed description of the safety Structures, Systems, and Components (SSCs) in accordance with the guidance as identified above. The TSRs with SER modifications are acceptable under 10CFR830 Subpart B and DOE G 423.1-1. The MAR is controlled with a Limiting Condition for Operation (LCO) in the TSRs. In addition, the TSRs stipulate a number of Safety Class SSCs, Safety Significant SSCs, DFs, and other robust administrative controls (ACs). With regard to use of this BIO/TSRs in context of a DOE-STD-3011-2002 Safe Harbor the following points apply:

Acknowledging that there are different levels of understanding of BIOs as well as 10CFR830 Subpart B, information is reproduced below that will assist internal and external organizational entities in understanding the BIO approach as well as fostering a structured approach to the NNSA approval. In this context, the following excerpt is reproduced so that a common and unambiguous understanding of BIO enabling requirements can be ensured to the degree possible.

- ***DOE-STD-3011-2002: "...This Standard provides a Department of Energy (DOE) approved methodology for preparing a Basis for Interim Operation (BIO) document. The BIO is an acceptable form of Documented Safety Analysis (DSA) in accordance with Table 2 of Appendix A, General Statement of Safety Policy, to Title 10 of the Code of Federal Regulations (CFR) Part 830, Nuclear Safety Management, Subpart B, Safety Basis Requirements (hereafter, in this Standard referred to as the "Rule"). It supplements the information in DOE Guide (G) 421.1-2, Implementation Guide for Use in Developing Documented Safety Analyses to Meet Subpart B of 10 CFR 830.***

  While this standard allows for an abbreviated and graded approach to development of a safety basis, the expectation exists that the completeness of the analysis will be sufficient so that even though a limited operational life is envisioned, significant hazards will be identified and appropriate controls implemented accordingly. It is also important to recognize and anticipate that the ideal may not be realized. That is, especially in the case of transition surveillance and maintenance, the time interval that a facility may be in that mode may extend many years beyond "short." When this may be the case, special attention must be paid to hazards that may develop over the extended period of time. For example, the importance of consideration of natural phenomenon hazards is increased as the time spent in a particular mode (limited operational life, transitions surveillance and maintenance, or deactivation) is extended..."

Conditions of Approval

The DVRS Safety Basis approval is subject to the following required conditions of approval meant to **reinforce and clarify the intent** and/or correct errors and other deficiencies in the BIO and TSRs related to the controls proposed in the Safety Basis. Note that wherever the term "days" is used in these conditions of approval it is taken to represent calendar days.

These conditions of approval are:

1. No operations are allowed in DVRS except those specifically authorized within this SER and the approved BIO. Operations shall not extend beyond five-months from the date NNSA formally releases DVRS for operations as a nuclear hazard category 2 facility.

2. The maximum MAR allowed in the facility is limited to 1100 Pu-239 equivalent Curies (PE-Ci) with not more than 900 PE-Ci per any drum, which is stated in the BIO and revised TSRs.

3. As a *condition of approval*, before this BIO is put into place a readiness verification by NNSA Facility Operations must be completed. The facility is not authorized to operate under the approved safety basis until released by NNSA Facility Operations after completion of readiness verification. The type and level of readiness verification to be

performed shall be established by the LASO Facilities Operations Branch. As a part of the readiness verification, FO will verify that the Facility Design Description (FDD) has been updated to include the equipment installed in the facility to support the activities described in the BIO.

1.3 TSR ISSUES AND REQUIRED REVISIONS

1. The definition of COLD STANDBY stated, "In COLD STANDBY MODE, all RADIOACTIVE MATERIAL has been removed from the DVRS FACILITY, except for surface contamination. Decontamination, maintenance, facility modification, and surveillance activities are allowed." The term "all RADIOACTIVE MATERIAL has been removed . . ." as written the exclusion of radioactive materials was all encompassing and would include HSR-1 check sources as well. This would essentially prohibit HSR-1 from performing source response checks of radiation detection instruments when the facility was in COLD STANDBY and not allow the facility to get to WARM STANDBY or OPERATIONAL. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

2. In LCO 3.1 the Frequency for the surveillances 4.1.1 and 4.1.2 states the surveillance is to be performed upon receipt. If the drum contents exceed the MAR limits for either a container or the facility, the facility would be forced to enter an LCO action statement. A better method would be to check the drum contents before receipt. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

3. The MODE APPLICABILITY for LCO 3.2 is identified only for "OPERATION" mode. This LCO defines operability for the air supply and air exhaust systems at DVRS. Specifically excluded in the mode applicability is WARM STANDBY. In WARM STANDBY mode, however, material is still present in the facility, albeit in a SAFE CONFIGURATION, but still available to be acted on by accident conditions and stresses. Utilizing the air supply and air exhaust systems at DVRS during WARM STANDBY will provide worker safety and offsite consequence benefits. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

4. In LCO 3.3 surveillance requirements for the UPS are basically two surveillances; a verification that the UPS is not in alarm status, and a FUNCTIONAL TEST to verify that the UPS is capable of powering the ventilation controls system and the oxygen monitor. The BASES does not supply any additional information as to the full intent of the FUNCTIONAL TEST. Because there is a lack of description of the UPS, it may be that the surveillances listed do not meet the requirements of DOE-S-3003-2000, *Backup Power Sources for DOE Facilities*. Sections 5.3 and 5.4 of the standard have a list of maintenance issues regarding UPSs that requires compliance with IEEE 450 (for lead-acid storage batteries) or 1106 (for nickel-cadmium batteries) depending on types of batteries used. These maintenance requirements may include checking float voltages, performing equalizing charges, and performing load tests. The lack of description in Chapter 4 of the BIO does not help with the determination of what is needed to ensure operability of the UPS. LANL LIR 230-01-02.2, Graded Approach for Facility Work states, "management level 1 (ML-1) – Rigorous application of applicable codes,

standards, procedural controls, verification activities, documentation requirements, and formalized maintenance program. . . ." The UPS is identified as a safety-class (SC) (ML-1) structure, system, or component (SSC) in Chapter 4 with the diesel generator and associated electrical wiring. The surveillances need to comply with requirements of DOE-S-3003-2000. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

5. In LCO 3.4 the LCO operability statements do not provide a basis for required activation temperature for the sprinklers in the Fire Suppression System. These parameters should be defined since the sprinklers for building 412 operate at 212 °F and the sprinklers inside building 433 operate at 165 °F. Additionally, there is no mention of the means of actuation that will be used (manual or automatic) and whether a fire detection system is required to be operable in order for the FSS to operate. Additionally, the sprinkler activation temperatures should be defined in the Design Features of the TSR document. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

6. In LCO 3.4 SR 4.4.2 verifies that the water supply valves (e.g., OS&Y, fire main block valves, post indicator valves) are in the open position (i.e., open flow path). The surveillance frequency was "*C and after maintenance that requires closure of water supply valves*." However, there was no requirement or control to physically lock these valves in the open position. Valves could be repositioned or closed after the completion of SR 4.4.2. Without some control to ensure the valves stay in the open position, NNSA had no assurance that these valves could not be closed or partially closed resulting in either the loss of fire water supply flow path or degraded flow. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

7. LCO 3.5 states the LCO is applicable to GLOVEBOX OPERATIONS. GLOVEBOX OPERATIONS is defined in the TSRs under the definitions; however, the LCO is discussing mode applicability and GLOVEBOX OPERATIONS is not one of the three modes defined in the TSRs. DOE-G-423.1-1, Section 5.2.3 states, "Limiting Conditions for Operation. The LCO statement should describe, as precisely as possible, the lowest functional capability or performance level of equipment required for safe operation of the facility. Each separate limiting condition should have an LCO with associated mode applicability, ACTION statements, and SRs." The association of the LCO to GLOVEBOX OPERATIONS, which was not a defined mode, does not conform to the DOE-G-423.1-1. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

8. DF 6.1.4 (Air Supply System) did not have an ISI for the fire dampers in supply duct, which is part of the 2-hour fire barrier boundary for Building TA-54-412. The 2-hour fire rating of Building TA-54-412 is dependent on the duct fire dampers closing at 165°F for both the Air Exhaust System and Air Supply System. Attachment 1 to this SER with its accompanying page changes adequately addressed this issue.

Summary of Acceptability of DVRS Glovebox BIO / TSRs

NNSA has reviewed and determined that with the revised TSRs and the specific COAs, the BIO/TSRs are adequate to control the nuclear safety risks at the DVRS Facility. Because of the nature of operations at the DVRS Facility, which directly support the removal of TRU waste from TA-54 (AREA G), the resultant risks, and the effectiveness of proposed controls approved in this SER, NNSA views the 5-month duration risks posed by operations are necessary to achieve significant risk reduction over the long term. The ongoing NNSA program, Quick-to-WIPP, entails moving 2000 drums of TRU waste materials from Area G to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, NM by September 2004 and further removing the legacy materials from the LANL site as part of the 2010 plan. The DVRS Facility is a critical element in completing this mission. NNSA has performed independent calculations to show that TRU dispersible waste material-at-risk at TA-54 could be reduced by more than 70% with the removal of the QTW drums alone and further significantly reduced by removing the legacy drums. NNSA regards this as the most viable way to increase nuclear safety at TA-54 and specifically at DVRS.

Through the defensible implementation of appropriate controls in accordance with DOE-STD-3011-2002 guidelines, the implementation of SER Conditions of Approval, the removal of the 2000 Quick-to-WIPP waste storage drums to the Waste Isolation Pilot Plant (WIPP) by September 2004, NNSA has determined that the consequences to the maximally exposed off-site individual (MEOI) and workers from the accident scenarios have either been prevented or significantly reduced per the requirements of the DOE-STD-3011-2002 as the 10CFR830 Subpart B safe harbor. After successful implementation of NNSA Conditions of Approval, safety class and safety significant controls, administrative control programs, design features and defense in depth controls, the NNSA can accept the risk of operations for continued operation of the DVRS Facility.

Review Process

NNSA LASO personnel performed the technical review of the BIO/TSRs. Reviewers walked down the facility as part of the review prior to reviewing the BIO. The reviewers undertook a survey of hazards in the course of the walk downs, and a detailed and careful scrutiny of the several relevant safety basis documents such as the Fire Hazards Analysis (FHA), Criticality Safety Evaluation (CSE), and the ASCG Seismic Analysis for DVRS, which supported the BIO was sufficiently thorough based upon the facility risk and justification in the Executive Summary of the SER.

The reviewers checked that the assumptions made in hazard analyses were consistent with accepted practice. Reviewers independently checked the HA along with the quantitative and qualitative consequence analyses and verified that the site parameters were conservative. When discrepancies were discovered, they were documented, and where necessary, corrected in this SER.

Base information was evaluated on the basis of consistency with the information gathered in walk-throughs, interviews, and comparisons among and within the several AB documents and supporting documents provided. Required conditions of approval are specified in the SER in order to address NNSA acceptance of residual risk per 10CFR830 Subpart B. NNSA met with the LANL facility and Safety Basis Office to present comments on the BIO and the TSRs to ensure each was understood, applicable and substantive. NNSA provided the Laboratory substantive technical comments identifying technical deficiencies in the BIO and TSRs.

The NNSA performed independent calculations and computer modeling evaluations to validate the accident analysis. The review team also compared the results of the HA with similar analyses for other LANL nuclear facilities with hazards of a similar significance and found them to be comparable. NNSA also made efforts to cross reference deficiencies with safety bases at other LANL nuclear facilities.

2.0 Base Information

2.1 Basis of Approval

The DVRS Glovebox BIO/TSRs were submitted to NNSA by LANL to furnish a safety basis for HC-2 facility activities over a 5-month time frame in support of removing TRU waste from Area G for permanent disposal at WIPP. This Safety Basis with the SER forms a complete, though interim, safety basis for the repackaging of TRU waste operations at DVRS.

The TA-54-412/433 DVRS Facility Glovebox BIO and TSRs as submitted followed DOE-STD-3011-2002 methodology and also incorporated a defensible format for the Hazard and Accident Analysis process. Chapter 1 provides the site, environment, natural phenomena, external man-made threats, and nearby facility descriptions. Also in Chapter 1 was information necessary for identifying and evaluating potential external event initiators for analyzing potential accident consequences.

The scope of Chapter 1 included the following topics:

- The location of TA-54-412/433 DVRS Facility within the state and county and its proximity to the public, to other Laboratory facilities, and to other land holdings;
- Characteristics of the surrounding environment that influence the design, operations, and safety of the DVRS Facility;
- Historical basis of the natural characteristics for the site, including meteorology, hydrology, geology, seismology, volcanology, and other natural phenomena;
- The design - or evaluation-basis natural phenomena to be examined;
- The location of TA-54-412/433 DVRS Facility within the state and county and its proximity to the public, to other Laboratory facilities, and to other land holdings;
- The points where the DOE evaluation guidelines apply, both onsite and offsite;
- Man-made external events that could impact the DVRS Facility; and
- Nearby Laboratory operations that could impact the DVRS Facility.

Chapter 2 provided information regarding the description of the DVRS Facility site and its structures and processes to support the assumptions used in the hazard and accident analysis. Included were descriptions of the major facility and structures necessary to understand the hazard and accident analysis. Provided were:

- Overview of the DVRS Facility site, including its mission and history.
- Description of the TA-54-412/433 DVRS Facility site facilities and design basis.
- Description of process systems and components.
- Description of confinement systems.
- Description of safety support systems.
- Description of site utilities.
- Description of auxiliary systems and support systems.

Chapter 3 described the hazard and accident analyses that were performed to analyze the hazards and accidents postulated to occur from DVRS Glovebox operations. These activities include repackaging operations of high activity TRU waste drum operations. General facility hazards are also considered, as are the hazards associated with natural phenomena and nearby Los Alamos National Laboratory (LANL or the Laboratory) facilities.

The hazard and accident analyses comply with the requirements of 10 *Code of Federal Regulations* (CFR) 830, "Nuclear Safety Management." For a facility with a limited operational life, which is the status of the DVRS Facility, 10 CFR 830 identifies U.S. Department of Energy (DOE)-STD-3011-94, which addresses preparing a basis for interim operation (BIO), as appropriate guidance. Although this document is a BIO, the hazard and accident analyses described in this chapter were prepared in a defensible manner using the *LANL Hazards Analysis Technical Methodology Handbook* (HA Handbook or Handbook) and as amended based upon quality issues by this SER

The hazard analysis methodology provided a comprehensive listing of process-related, natural phenomena, and external hazards that can result in local, on-site, or off-site consequences of concern should an accident occur. Consequence and likelihood estimates used to characterize hazards in the context of potential accidents were determined and lead to a thorough, predominantly qualitative, evaluation of the risk to the public and workers from potential accidents involving the identified hazards.

The results of the hazard analysis include potential accident scenarios and the associated safety controls (preventive and mitigative); safety-significant (SS) structures, systems, and components (SSCs); and a spectrum of scenarios to be evaluated quantitatively in the accident analysis.

Chapter 4 provided appropriate BIO-level detail on those facility structures, systems, and components (SSCs) classified as safety-class (SC) or safety-significant (SS) as a result of the hazard and accident analyses in Chapter 3. The structure and content of this chapter is more than is required for a DOE-STD-3011 BIO and followed graded expectations in Chapter 4 of DOE-STD-3009 as guidance (only). The following SSCs were identified in Chapter 3 as being the most important to safety. Their safety functions contribute substantially to preventing or mitigating the limiting accident scenarios evaluated in the accident analysis, or by providing critical defense-in-depth, or by providing for worker safety in potentially life-threatening or disabling situations:

TRU waste container design/integrity and vented - SC TSR-DF

Provides primary confinement for readily dispersible transuranic (TRU) waste; reduces releases of TRU waste subjected to mechanical or thermal stresses from postulated accidents; and prevents accumulation of flammable gases inside the waste drum.

Building TA-54-412 structure including outer wall fire barrier - SC TSR-DF

Prevents and mitigates the release of radioactive material, and provides physical support for safety SSCs, during and following design basis accidents.

Building TA-54-433 structure including outer wall fire barrier – SC TSR-DF

Prevents and mitigates the release of radioactive material, and provides physical support for safety SSCs, during and following design basis accidents.

Air Exhaust System including portions of the compressed air system– SC TSR LCO and DF

Provides a confinement barrier to mitigate the release of radioactive material during and after design basis operational accidents and natural phenomena events, and maintains a negative pressure within the DVRS Facility buildings, mitigating the release of radioactive material before, during, and after design basis operational accidents.

Air Supply System – SC TSR LCO and DF

Confines radioactive material released from postulated design basis accidents.

Diesel Generator including the Uninterruptible Power Supply and associated electrical system– SC TSR LCO

Provides back-up electrical power to active SC-SSCs (i.e., the air exhaust system) and select SS-SSCs (i.e. the glovebox oxygen monitor) to allow them to perform their safety function if site power is unavailable.

Building TA-54-412/433 fire suppression system (pre-action dry-pipe) including detectors/actuators - SC TSR LCO and DF

Suppresses or limits the propagation of fires inside buildings TA-54-433 and TA-54-412 during and after design basis fire events.

Glovebox including supporting stand – SS TSR DF

Confines airborne radioactive material before, during, and after design basis accidents.

Drum Lifts – SS TSR DF

Holds the drums during lifting and lowering operations, and supports glovebox confinement while the drums are bagged-on the glovebox.

Glovebox Exhaust System – SS TSR DF and Administrative Control

Provides a confinement barrier that prevents a release of airborne radioactive material from the glovebox during normal and abnormal operations and during and after a DBE, and restricts the airflow through the glovebox in the event confinement is breached, limiting the severity of a potential fire.

Glovebox Atmosphere Control System – SS TSR LCO

Prevents a fire within the glovebox during operations involving reactive or pyrophoric materials, and reduce the likelihood of a deflagration accident.

Site Summary
The BIO furnishes an executive summary and a site description including location, site characteristics, and natural phenomena. The site parameters have been verified to be accurate and consistent with those in other approved safety bases and were found to be adequate for the purposes of BIO/TSRs.

Accidents at other facilities could result in restricted access to DVRS.
Maximum magnitudes for earthquakes, resulting from fault activity are Mw 6 and 7 with return periods of about 2,000 and 10,000 years, respectively. The Performance Category 3 wind for Los Alamos is 117 mph and the seismic peak horizontal loading is 0.31g with an annual exceedance frequency of 5×10^{-4}. Lightning strike density is estimated to be about 6 strikes/km^2-yr.

Facility Summary
Chapters 2 and 3 of the BIO furnish an adequate overview of the DVRS site, facility, and systems. The operations at the DVRS Facility are needed to support repackaging of high activity TRU waste drums to support their shipment to the Waste Isolation Pilot Plant (WIPP) for permanent storage. The repackaging is expected to be completed within a 5-month period. This 5-month duration supports the use of DOE-STD-3011-2002 as the safe harbor for the DVRS Facility DSA.

3.0 Hazard and Accident Analysis

Hazard Categorization

The upper limit on the quantity of ^{239}Pu-E is established in the BIO and TSRs is stated to be 3,680 plutonium-239 equivalent curies (PE-Ci) (60.0 kg ^{239}Pu-E) for the facility and a single container limit of 100 PE-Ci. The facility limit is above the Nuclear Hazard Category 2 threshold of 55 PE-Ci for a Nuclear Hazard Category 2 facility per DOE-STD-1027. Therefore, the facility is correctly categorized in the BIO as a Nuclear Hazard Category 2 facility.

Hazard Analysis Methodology

The BIO employs the normal conventions of hazard analysis to bin and discuss accident likelihood, consequences, and risks. Specifically, accident consequence analysis is performed for operations involving spills and fires. Accident analysis involving external events and natural phenomena were also addressed in the BIO. The hazards associated with the DVRS facility appear in Chapter 3 of the BIO as well as Appendix A. A What-If HA and Process HA were performed and are presented in Appendix A of the BIO. A leakpath factor analysis is included in Appendix 3C. Additionally, Appendix 3D includes a Criticality Safety Evaluation of the DVRS operations.

Hazard Analysis Results

The BIO includes an adequate catalog of hazards associated with operations inside of the DVRS facility associated with repackaging operations. Natural phenomena that are identified in the HA tables include earthquakes, lightning, wildfires, etc. The risk-dominant hazards have either been identified or compensated for in the SER.

The atmospheric dispersion factor (χ/Q) values for the spill and fire scenarios (See table below) were independently verified to be conservative (95% taking into account an irregular site boundary), although, some problems were identified by NNSA. The methodology adheres to the recommendations of Appendix A to DOE-STD-3009. The MACCS2 code with the LANL Postmax Processor was employed to calculate the χ/Q values, and the five factor formula was used to calculate the consequences. NNSA's independent χ/Q results differed from those of the facility. In reviewing the atmospheric input files used for the fire modeling accidents using the MACCS2 computer code, NNSA reviewers noted that the facility had turned off the building wake effects model in the atmospheric input files. NNSA performed sensitivity analyses regarding buoyant plumes from the fire scenarios. Because of the low wattage fires modeled for the DVRS and the size of the building, it was NNSA's determination that turning off the building wake effects model and thereby neglecting the effects of downwash on the plume was non-conservative and resulted in a reduction of the χ/Q values for buoyant plumes by as much as a factor of 4 (See Attachment 2 to this SER). Additionally, NNSA found problems with the elevated release χ/Q values (Exhaust Stack Release) in that the facility modeled the elevated releases using a stack height of 11.3 meters when Chapter 2 of the BIO states that the stack height is 34.5 feet (10.5 meters). This had the effect of reducing the χ/Q for elevated releases by ~6%. Because the accident analyses did not use the χ/Q for an elevated release in any of the accidents analyzed, this error did not pose a problem with the accident analyses. However, the incorrect values did affect the Dose-to-Source Term Ratios listed in Table 3-16 of the BIO. The corresponding corrected values are provided in the Table below.

The table below lists the χ/Q values either verified by NNSA to be correct or provides the correct value utilizing the building wake effects model of the MACCS2 computer modeling code to correct the above identified deficiencies and the corresponding Dose-to-Source Term Ratio.

95th Percentile Site Boundary χ/Q Values for DVRS Accident Scenarios

Accident Scenario	RANT Site Boundary 95th Percentile χ/Q for 1 cm/s Deposition Rate (s/m^3)	Dose-to-Source Term Ratio (rem/PE-Ci) Ground-Level Release
Spill Accident –Non-buoyant release	9.23E-04	98.7
Fire Accident - 0.10 MW buoyant plume	5.52E-04	78.8
Fire Accident - 1 MW buoyant plume	3.78E-04	40.4
Fire Accident – 2 MW buoyant plume	2.60E-4	28.2

DVRS UNMITIGATED ACCIDENT SUMMARY		
ACCIDENT DESCRIPTOR	**DOSE**	**CHALLENGES EVALUATION GUIDELINE OF 25 REM?**
Operational Spill in Building 412 Air Lock	33 rem	Yes: SC-SSCs identified
Glovebox Fire	888 rem	Yes: SC-SSCs identified
Glovebox Deflagration	716 rem	Yes: SC-SSCs identified
Fires Inside Structure: 2 Cases 1. Fire in Building 412 Vehicle Air Lock 2. **Fire in Building 433 Staged Drums**	867 rem 406 rem	Yes: SC-SSCs identified Yes: SC-SSCs identified
Seismic Event: 2 Cases 1. PC-2 With Subsequent Fire 2. PC-3 With Subsequent Fire	918 rem 1118 rem	Yes: SC-SSCs identified Yes: SC-SSCs identified

The BIO used a standard breathing rate of 3.47×10^{-4} m^3/sec in the analyses. NNSA regards the use of 3.47×10^{-4} m^3/sec (representative of an adult male under moderate activity) as conservative. Additionally, the BIO used a surface factor of 38 cm in the dispersion analyses. NNSA regards the use of 38 cm for the surface roughness as conservative.

4.0 Safety Structures, Systems and Components

The following SSCs were identified in Chapter 3 as being the most important to safety. Their safety functions contribute to preventing or mitigating the limiting accident scenarios evaluated in the accident analysis, or by providing critical defense-in-depth, or by providing for worker safety in potentially life-threatening or disabling situations:

Safety Class SSC's

A number of accidents yielded consequences that challenged the NNSA evaluation guideline of 25 rem TEDE, so protective, mitigative, or preventive features that warrant a Safety Class designation were identified to mitigate the consequences below the EG or to prevent the accident altogether.

TRU waste container design/integrity and vented - SC TSR-DF

Provides primary confinement for readily dispersible transuranic (TRU) waste; reduces releases of TRU waste subjected to mechanical or thermal stresses from postulated accidents; and prevents accumulation of flammable gases inside the waste drum.

Building TA-54-412 structure including outer wall fire barrier - SC TSR-DF

Prevents and mitigates the release of radioactive material, and provides physical support for safety SSCs, during and following design basis accidents.

Building TA-54-433 structure including outer wall fire barrier – SC TSR-DF

Prevents and mitigates the release of radioactive material, and provides physical support for safety SSCs, during and following design basis accidents.

Air Exhaust System including portions of the compressed air system– SC TSR LCO and DF

Provides a confinement barrier to mitigate the release of radioactive material during and after design basis operational accidents and natural phenomena events, and maintains a negative pressure within the DVRS Facility buildings, mitigating the release of radioactive material before, during, and after design basis operational accidents.

Air Supply System – SC TSR LCO and DF

Confines radioactive material released from postulated design basis accidents.

Diesel Generator including the Uninterruptible Power Supply and associated electrical system– SC TSR LCO

Provides back-up electrical power to active SC-SSCs (i.e., the air exhaust system) and select SS-SSCs (i.e. the glovebox oxygen monitor). to allow them to perform their safety function if site power is unavailable.

Building TA-54-412/433 fire suppression system (pre-action dry-pipe) including detectors/actuators - SC TSR LCO and DF

Suppresses or limits the propagation of fires inside buildings TA-54-433 and TA-54-412 during and after design basis fire events.

SS-SSC SSCs

Glovebox including supporting stand – SS TSR DF

Confines airborne radioactive material before, during, and after design basis accidents.

Drum Lifts – SS TSR DF

Holds the drums during lifting and lowering operations, and supports glovebox confinement while the drums are bagged-on the glovebox.

Glovebox Exhaust System – SS TSR DF and Administrative Control

Provides a confinement barrier that prevents a release of airborne radioactive material from the glovebox during normal and abnormal operations and during and after a DBE, and restricts the airflow through the glovebox in the event confinement is breached, limiting the severity of a potential fire.

Glovebox Atmosphere Control System – SS TSR LCO

Prevents a fire within the glovebox during operations involving reactive or pyrophoric materials, and reduce the likelihood of a deflagration accident.

Defense-in-Depth SSC's

The DVRS BIO and the TSRs define these adequately. The BIO and TSRs provide the final designation of design feature, safety-class SSCs, safety-significant SSCs, safety limits, limiting control settings, limiting conditions for operations and administrative controls and their associated functions, functional requirements, and system evaluations. The safety funetions for the SC SSCs and safety-significant (SS) SSCs are clearly defined and are consistent with the bases derived in the hazard analyses. Descriptions in the BIO provide an adequate level of detail for describing intended safety functions or performance. With the COAs delineated in this SER and the facility supplied page changes enclosed in Attachment 1 to this SER the functional requirements for SSCs provide adequate parameters and limits to ensure that the safety function is fulfilled. The bases for controls are clearly derived relative to the hazard and accident analyses thereby ensuring that the TSRs are written in a manner that is adequate to implement safety at the DVRS Facility.

5.0 Derivation of Technical Safety Requirements (TSRs)

Safety Limits, Limiting Safety System Setpoints, and Limiting Conditions of Operation

The NNSA review team concurs (per gradation allowed under DOE-STD-3011 and the results of the analyses) that safety limits and limiting safety system set points are not required for DVRS. In this instance given the operations and activities in the DVRS Facility coupled with the results of the accident analysis NNSA has concluded that the safety SSCs including the design features, the Limiting Conditions for Operation (LCOs), and the Administrative Controls based upon Administrative Program Commitments in the TSR ACs are sufficient to ensure safe operations during the 5-month time frame authorized by this DVRS BIO/TSRs and SER. NNSA found the Programmatic Controls stated in the revised TSRs attached to this SER to be acceptable.

6.0 Programmatic Controls

6.1 Administrative Controls

The DVRS TSRs identified the administrative programs that ensure safe operation of the DVRS Facility. Administrative programs required for TSR compliance are:

1. Management Self-Assessments;
2. Unreviewed Safety Questions;
3. Nuclear Criticality;
4. Emergency Preparedness;
5. Conduct of Operations;
6. Fire Protection;
7. Radiation Protection;
8. Maintenance;

9. Configuration Management;
10. Hazardous Material and Waste Management;
11. Vehicle Safety;
12. Hoisting and Rigging;
13. Initial Startup and Testing;
14. Quality Assurance;
15. Occurrence Reporting;
16. Training and Qualification; and
17. Operating Records.

The Fire Protection Program AC was reviewed for completeness. In the TSRs the facility has committed to establish and maintain a fire protection program based on the criteria established in LPR 402-00-00, Appendix 9, as implemented in LANL requirements in Laboratory Implementation Requirements (LIR) 402-910-01, *LANL Fire Protection Program*. The fire protection program specifically includes:

1. Combustible loading control requirements established and approved by a fire protection engineer.

2. Ignition sources are controlled, to include a work authorization system for hot work, and electrical equipment compliant with NFPA 70, Underwriters Laboratories (UL), or equivalent requirements and properly grounded.

The Radiation Protection Program was reviewed for adequate controls. The program included a number of Specific Administrative Controls (SAC) that include:

A. The rollup doors to the Building TA-54-412 north airlock SHALL be administratively controlled to maintain one rollup door closed at all times during OPERATIONS and WARM STANDBY MODES. Both rollup doors may be open for a short duration during an ACTIVE TRANSFER to accommodate operations.

B. The rollup doors to Cell 1 in Building TA-54-433 SHALL be administratively controlled to maintain one rollup door closed at all times during OPERATIONS and WARM STANDBY MODES. Both rollup doors may be open for a short duration during an ACTIVE TRANSFER to accommodate operations.

C. Excluding the rollup doors addressed in items A and B above, exterior doors (this includes 1 of the 2 personnel doors in the building 54-412 airlock) to buildings TA-54-412 and TA-54-433 SHALL be administratively controlled to ensure that they are closed except for short durations when used for access and egress.

The Hazardous Material and Waste Management Program also included a number of SACs and was judged to be adequate for the short term BIO:

A. WASTE DRUMs processed at the DVRS FACILITY SHALL be limited to WASTE DRUMs that are within the key parameters assumed in the BIO: (a) maximum activity of 900 PE-Ci; (b) maximum of 200 fissile grams equivalent; (c) maximum weight of 1000 pounds; and (d) maximum weight of combustible material of 228.4 pounds.

B. Only one WASTE DRUM at a time SHALL be processed in the glovebox. All waste material from a WASTE DRUM SHALL be removed from the glovebox (except for contamination not removable without special decontamination processes) before another WASTE DRUM is lifted up to the receiving port.

C. While in OPERATION MODE, one individual will continually monitor open WASTE DRUM(s) attached to the glovebox or exposed waste material inside the glovebox. This may be performed remotely (e.g., via camera and monitor in the DVRS FACILITY) as well as by being present in cells 3 or 4.

The Vehicle Safety Program also was reviewed for adequacy and was judged to be adequate with the following SAC:

Vehicle access controls: Except for forklifts, vehicles are prohibited from inside Building TA-54-412 during OPERATION and WARM STANDBY MODEs. During these MODEs, forklifts are allowed only in the Building TA-54-412 airlock.

A review of the Quality Assurance Program indicates the facility has committed to meeting criteria listed LPR-308-00-00, *Integrated Quality Management*. The program has the following specific commitments:

- Be implemented through written procedures and instructions;
- Be applicable to construction, operation, maintenance, and design;
- Require that records be maintained to preserve the technical baseline documentation; and
- Be applicable to software used by equipment important to safety or to software that performs a safety function.

NNSA finds the Quality Management Program acceptable as a TSR Programmatic AC.

DESIGN FEATURES

The DVRS TSRs specify the following as SC Design Features:

The following SSCs are identified by the accident analysis as SC-SSC Design Features:

- Building TA-54-412;
- Building TA-54-433;
- Air exhaust system;

- Air supply system;
- Fire suppression system; and
- Waste Drums.

The following SSCs are identified by the hazard and accident analysis as SS-SSC Design Features:

- Glovebox (including support stand),
- Drum lifts, and
- Glovebox exhaust system.

Basis for Approval

- It is the judgment of NNSA that the management and organizational framework necessary to implement the commitments of the BIO, TSRs and SER are in place and working given the low risk presented by the SER approved MAR of 1100 PE-Ci of ^{239}Pu-equivalent and based upon comments relative to errors or inadequacies in the BIO and TSRs previously addressed in the SER and in the Executive Summary section.

- In light of the understood accident consequences and risks associated with the operations defined in the BIO, it is the judgment of NNSA that, with the SER *conditions of approval*, the residual risk for operations at DVRS is acceptable for the limited life of operations not to exceed 5-months.

7.0 List of Safety Basis Documents

1. *Basis for Interim Operation (BIO) for the Decontamination and Volume Reduction (DVRS) Facility, Dated April 8, 2004.*

2. *Technical Safety Requirements (TSRs) for the Decontamination and Volume Reduction (DVRS) Facility, Dated April 8, 2004.*

3. *NNSA Safety Evaluation Report (SER) with its attachments dated June 8, 2004.*