

Complete only applicable items.

3. Document Identifier: 000-3DR-MGR0-00300-000	ENG.20080312.0011	4. Rev.: 002	5. CBCN: 004
6a. Title: <i>Basis of Design for the TAD Canister-Based Repository Design Concept</i>		6b. Safety Classification of SSC: ITS / ITWI	
7. Reason for Change:  The <i>Basis of Design for the TAD Canister-Based Repository Design Concept</i> (BOD), 000-3DR-MGR0-00300-000, criteria must be changed to agree with recently provided changes to the <i>Preclosure Nuclear Safety Design Bases</i> , 000-3DR-MGR0-03500-000-000. This CBCN addresses the changes to the <u>Emergency Diesel Generator, Sub-Surface, Balance of Plant, and Aging facilities</u> criteria in <u>Chapters 7 through 10</u> of the BOD. This CBCN also includes changes to three system classification statements that were identified in the last NSDB tables. This CBCN is being issued in conjunction with CBCNs that address the mechanical handling changes, surface nuclear handling facilities, and the waste package and the rest of the intra-site changes.  Although the NSDB is not issued yet, the BOD criteria will be confirmed before the License Application is submitted to be in conformance with the issued NSDB. The BOD currently carries a TBV to document this confirmation.  Impacts of this are minimal. The designers have been coordinating with the analysts providing input to the NSDB. Some design products may require updating to reflect the most recent text. These changes are in progress and will be issued concurrently with or immediately after these CBCNs or the final NSDB.			
8. Supersedes Change Notice: <input type="checkbox"/> Yes    If, Yes, Change Notice: _____ <input checked="" type="checkbox"/> No			
9. Disciplines/Organizations Affected by this Change:			
Nuclear Facilities Project Engr. <i>IB</i>	Balance of Plant Facilities Project Engr.	Subsurface Facilities Project Engr.	
Civil/Structural/Architectural Discipline Engr. Manager	Electrical/I&C/Engr. Hazards/EQ Discipline Engr. Manager	Mechanical Discipline Engr. Manager	
Nuclear & Radiological Discipline Engr. Manager	Thermal/Structural Analysis Discipline Engr. Manager	Mining Discipline Engr. Manager	
LNS Document Review	PreClosure Safety Analysis Manager <i>WLB</i>	ESH Review Coordinator	
RPM Operations	RPM Construction/Startup	If 6b is ITS/ITWI: Quality Assurance: Quality Assurance	
10. Description of Change: Revise the following system classification statements to reflect latest changes:  <b>5.1.2 System Classification</b> The WHF has been classified as ITS because there are Category 2 event sequences that could occur in the WHF and features of the facility that prevent, reduce the frequency, or mitigate event sequences. The structure is ITS to maintain the waste form container integrity, building confinement integrity, and personnel shielding. The pool structure, TAD closure station, aging overpack access platform, DPC cutting station, preparation stations #1 and #2, decontamination pit, decontamination pit seismic restraints, shield doors (including anchorages), confinement doors, cask port slide gate, and overpack port slide gate are ITS.  Rails for railcars, ALARA shielding features, <del>boron makeup system</del> , DPC unloading bay gate, deep remediation station, DPC transfer station, staging shelf transfer station, staging shelf dual transfer station, rail cask transfer station, STC/TAD transfer station, transportation cask transfer station, (pool) crush pads, decontamination pit cover, decontamination pit platform are non-ITS. The WHF does not include SSCs that are ITWI.  <i>[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix A, Table A-1 specifically provides the classification for the system SSCs and Appendix E, Table E-1 provides the functions. Boron makeup system is removed - it is included in the Pool Water Treatment and Cooling System.]</i>			

Revise the following system classification statements to reflect latest changes: (continued)

### 13.1.2.2 Components Classified as Non-ITS

... In addition, the cask handling/cask restoration system and remediation system (in the WHF) are non-ITS.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix A, Table A-1 specifically provides the non-ITS classification of the system SSCs Appendix D, Table D-1 provides the functions. Although the Preclosure NSDB no longer refers specifically to the remediation system at all, it is provided here to capture its non-classification as if it is non-ITS. MGR-RD [DIRS 177491], Sections 3.1.2.G and 3.1.2.H provide specific direction that the naval canisters and the M-290 cask system will only be handled in the IHF (not CRCFs).]*

### 18.1.2 System Classification

The ~~double-interlock~~ preaction valves, sprinkler heads, and system actuation panels associated with double-interlock preaction suppression systems for fire suppression in that protect areas where ~~nuclear materials are handled~~ there is a potential for canister breach (in the CRCF and WHF) have been classified as ITS. The fire detection system for the ~~double-interlock~~ ITS preaction valves with associated detectors and control box (in the CRCFs and WHF) are classified as ITS.

The fire suppression system components other than those associated with double-interlock preaction suppression systems for fire suppression in that protect areas where ~~nuclear materials are handled~~ there is a potential for canister breach (in the CRCFs and WHF) are non-ITS. The fire detection system or all other systems except the ~~double-interlock~~ preaction valve with associated detectors and control box are non-ITS. The fire water, fire barriers, explosion protection, and fire alarm are non-ITS. The fire protection system does not include SSCs that are ITWI.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix A, Table A-1 specifically provides the classification of the system and Appendix D, Table D-1 for the functions. TMRB-2007-038 (BSC 2007 [DIRS 182184]), Preaction Double Interlock Fire Suppression.]*

Revise the Emergency Diesel Generator Facility (EDGF) criteria as follows:

#### 7.2.3.1.1 Structural Contribution to ITS Electrical Equipment Cooling

Although the EDGF facility is designated as a non-ITS structure, in conjunction with the non-confinement HVAC system, the ITS electrical equipment and battery rooms in the EDGF shall support the ITS electrical function (safety function).

- The mean conditional probability of failure of the portions of the surface non-confinement HVAC system that support the cooling of ITS electrical equipment and battery rooms in the EDGF shall be less than or equal to  $\pm 0.2.0 \times 10^{-02}$  per ITS electrical train over a period of 720 hours following a radionuclide release.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix F C, Table F C-1, Items ~~SB-VN.CR.01~~ and VN.WH.01.]*

**Chapter 8 Subsurface Facility** - There are no *Preclosure NSDB* criteria identified for the Subsurface Facility. Therefore, no changes are necessary.

Revise the Balance of Plant Facilities criteria as follows:

#### 9.10.2.3.11 NSDB Criterion - BOP Flood Protection-Control Features

Balance of Plant flood ~~protection control~~ features shall be designed to protect ITS SSCs from external flooding events (safety function).

- The site flood control features will be designed to the probable maximum flood. mean frequency of exceeding the designated flood capacity of 40,000 cubic feet per second shall not exceed  $1.0 \times 10^{-06}/yr$ .

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix F, Table F-1, Item SB.01.]*

Revise the Aging Facility criteria as follows:

### 10.2.3.1.3 HAM Structural Integrity

The HAMs shall be designed to **protect against direct exposure to personnel and** protect against structural collapse onto a waste container (safety functions).

- The mean conditional probability of loss of HAM gamma shielding due to an impact or collision shall be less than or equal to  $1.0 \times 10^{-05}$  per impact.
- The mean frequency of collapse of the HAM structure due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-06}$ /yr.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix F, Table F-1, Items AP.SB.HAC.01 and 02.]*

### 10.2.3.1.4 Cask Tractor

The cask tractor, in conjunction with the cask transfer trailer, shall be designed to **limit speed**~~reduce the severity of collision~~, and preclude cask breach ~~due to explosion~~ (safety functions).

- ~~The combined diesel fuel capacity of the cask tractor and cask transfer trailer shall be limited to a total of 100 gallons.~~
- The speed of the cask tractor shall be limited to 2.5 mph.
- The cask tractor fuel tank shall preclude fuel tank explosions [e.g., low-melting point construction].

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Items AP.RF.HAT.07 and 08 through 10 for the Receipt Facility; Appendix E, Table E-1, Items AP.WHF.HAT.07 and 08 for the WHF; and Appendix F, Table F-1, Items AP.SB.HAT.01 and 02 through 03. These requirements are not listed for the CRCF.]*

### 10.2.3.1.5 Site Transporter

The site transporter shall be designed to (a) protect against spurious movement, (b) ~~reduce the severity of collision~~ **limit speed**, (c) preclude a cask breach ~~due to explosions~~, (d) reduce the severity of a drop, ~~(e) limit fire severity~~, (ef) protect against ~~a sliding impact into a wall by a site transporter holding an aging overpack~~ **and inducing stresses on the waste container**, and (fg) protect against tipover of the site transporter (safety functions).

- The mean probability of spurious movement of the site transporter while the canister is being lifted or lowered shall be less than or equal to ~~4.0~~ **$1.0 \times 10^{-09}$**  per transfer.
- The speed of the site transporter shall be limited to 2.5 mph.
- The site transporter fuel tank shall preclude fuel tank explosions.
- The site transporter shall ~~be incapable of dropping~~ **preclude a [vertical] drop of an aging overpack from a height greater than 3 ft measured from the equipment base.**
- ~~The diesel fuel capacity of the site transporter shall be limited to a total of 100 gallons.~~
- The mean frequency of sliding impact ~~into a wall of the site transporter~~ **into a wall and inducing stresses that can breach a waste container** [within the CRCFs, WHF, and the Receipt Facility] due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-05}$ /yr.
- The mean frequency of tipover of the site transporter due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-06}$ /yr.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Items AP.RF.HAT.01 through 06 07 for the Receipt Facility; Appendix D, Table D-1, Items AP.CR.HAT.01 through 06 07 for the CRCFs; Appendix E, Table E-1, Items AP.WH.HAT.01 through 06 07 for the WHF; and Appendix F, Table F-1, Items AP.SB.HAT.09 10 through 12 15.]*

### 10.2.3.1.6 Horizontal Shielded Transfer Cask

The horizontal shielded transfer cask shall be designed to provide containment (safety function).

- The mean conditional probability of breach of a canister within a [horizontal transportation cask or] horizontal STC resulting from:
  - a drop shall be less than or equal to  $1.0 \times 10^{-05}$  per drop,
  - a drop of a load onto the horizontal STC shall be less than or equal to  $1.0 \times 10^{-05}$  per drop, and
  - a side impact ~~of or collision~~ shall be less than or equal to  $1.0 \times 10^{-08}$  per impact.
  - the spectrum of fires shall be less than or equal to ~~1.0~~ **$2.0 \times 10^{-06}$**  per fire event.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix D, Table D-1, Items DS.CR.23 and 30 for the CRCF; Appendix E, Table E-1, Items DS.WH. 04 and 10 for the WHF; Appendix F, Table F-1, Items AP.SB.HAC.01 through 03 through 05, and DS.SB.07 05.]*

Revise the Aging Facility criteria as follows: (continued)

### 10.2.3.1.7 Cask Transfer Trailer

The cask transfer trailers, in conjunction with the cask tractor and transportation cask or horizontal STC, shall be designed to preclude cask breach ~~due to explosion~~, reduce severity of a drop, and preclude puncture of a cask (including due to impact) (safety functions).

- ~~The combined diesel fuel capacity of the cask tractor and cask transfer trailer shall be limited to a total of 100 gallons.~~
- The cask transfer trailer fuel tank shall preclude fuel tank explosions [e.g., low-melting point construction].
- The cask transfer trailer shall ~~be designed to protect against~~ **preclude** dropping a [horizontal] transportation cask or horizontal STC **from a height greater than 6 ft measured from the equipment base.**
- The cask transfer trailer shall ~~be designed to protect against~~ **preclude** puncture of a [horizontal] transportation casks or horizontal STC due to **collision impact.**
- The cask transfer trailer shall ~~be designed to protect against~~ **preclude** puncture of canister by the hydraulic ram.
- **The speed of the cask transfer trailer shall be limited to 2.5 mph.**
- The cask transfer trailer shall be designed to ~~protect against~~ **preclude** puncture of a [horizontal] transportation casks and horizontal STCs due to the spectrum of seismic events.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Items AP.RF.HAT.09 ~~11~~ through 12 ~~15~~; Appendix E, Table E-1, Items AP.WH.HAT.09 through 12 for the WHF; and Appendix F, Table F-1, Items AP.SB.HAT.03 ~~04~~ through 08 ~~09~~.]*

### 10.2.3.1.8 Aging Overpack

The AOs shall be designed to protect against ~~canister breach~~ **direct exposure to personnel**, protect against sliding of an AO, and protect against tipover of the AO (safety functions).

- The mean conditional probability of ~~breach of a canister in an~~ **loss of shielding of the AO** resulting from:
  - a drop shall be less than or equal to ~~1.0~~  **$5.0 \times 10^{-06.05}$**  per drop and
  - ~~an side~~ **an side** impact or collision shall be less than or equal to  $1.0 \times 10^{-05.08}$  per impact.
- The mean frequency of sliding of an AO with a waste container into another AO on the aging pad due to the spectrum of seismic events shall be less than or equal to  $5.0 \times 10^{-06}$ /yr, and
- The mean frequency of tipover of the AO [with a waste container] on the aging pad due to the spectrum of seismic events shall be less than or equal to  $5.0 \times 10^{-08}$ /yr. ~~and~~

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Items AP.RF.HAC.01 and 02 for the Receipt Facility; Appendix D, Table D-1, Items AP.WHF.HAC.01 and 02 for the WHF; Appendix E, Table E-1, Items AP.CR.HAC.01 and 02 for the CRCFs; and Appendix F, Table F-1, Items AP.SB.HAC.06 ~~04~~ through 09 ~~07~~. The "protect against" safety function means either "reduce the probability of" or "reduce frequency of".]*

### 10.2.3.1.9 Dual-Purpose Canister in Aging Overpack

DPCs (horizontal or vertically oriented) ~~(analyzed as representative canisters)~~ in AOs shall provide containment (safety functions).

- The mean conditional probability of breach of a ~~representative~~ canister in an AO resulting from:
  - a drop shall be less than or equal to  $1.0 \times 10^{-05}$  per drop,
  - a drop of a load onto the DPC or AO shall be less than or equal to  $1.0 \times 10^{-05}$  per drop,
  - a side impact of collision shall be less than or equal to  $1.0 \times 10^{-08}$  per impact, and
  - the spectrum of fires shall be less than or equal to:
    - $1.0 \times 10^{-06}$  per fire event ~~while within the nuclear facilities and~~
    - $1.0 \times 10^{-04}$  per fire event ~~while in the Intra Site areas.~~

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Items DS.RF.01 through 03 and DS.RF.05; Appendix D, Table D-1, Items DS.CR.14 ~~20~~ through 16 ~~22~~ and DS.CR.18 ~~24~~; Appendix E, Table E-1, Item DS.WH.01 through 03 and DS.WH.05; and Appendix F, Table F-1, Items DS.SB.03 ~~04~~, DS.SB.04 ~~02~~, and 09 ~~07~~. Criteria not related to the Aging Facility (such as fires on casks) are not included here.]*

Revise the Aging Facility criteria as follows:

### 10.2.3.1.10 TAD Canister in Aging Overpack

TAD canisters (~~analyzed as representative canisters~~) in AOs shall provide containment (safety function).

- The mean conditional probability of breach of a ~~representative~~ canister in an AO resulting from:
  - a drop of the TAD canister shall be less than or equal to  $1.0 \times 10^{-05}$  per drop,
  - a drop of a load onto the TAD canister shall be less than or equal to  $1.0 \times 10^{-05}$  per drop,
  - a side impact of collision shall be less than or equal to  $1.0 \times 10^{-08}$  per impact, and
  - the spectrum of fires shall be less than or equal to  $1.0 \times 10^{-06.04}$  per fire event.

[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Items DS.RF.07 through 09 and DS.RF.11; Appendix D, Table D-1, Items DS.CR.29 26 through 22 28 and DS.CR.25 31; Appendix E, Table E-1, Items DS.WH.07 through 09 and DS.WH.11; and Appendix F, Table F-1, Items DS.SB.03 04, DS.SB.04 02, and DS.SB.09 07. Criteria not related to the Aging Facility (such as fires on casks) are not included here.]

### 10.2.3.1.11 DPCs in HAMS

DPCs (analyzed as a representative canister) in HAMS shall provide containment (safety function).

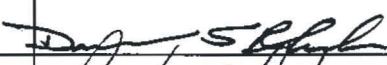
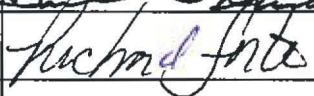

- The mean conditional probability of breach of a ~~representative~~ canister within a HAM resulting from:
  - a collision or side impact shall be less than or equal to  $1.0 \times 10^{-08}$  per event,
  - a drop of a load onto the HAM shall be less than or equal to  $1.0 \times 10^{-08.05}$  per drop,
  - the spectrum of fires shall be less than or equal to  $1.0 \times 10^{-06.04}$  per fire event.

[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix F, Table F-1, Items DS.SB.05 03, and 06, and 08. Although the criterion was written for both TAD canisters and DPCs, TAD canisters are not to be aged in HAMS and therefore, is removed from the text.]

Revise the Conformance Verification table as follows:

### Table 9-10

9.10.2.3.11 NSDB Criterion - BOP Flood ~~Protection-Control~~ Features

11. REVIEWS AND APPROVAL			
Printed Name	Title	Signature	Date
11a. Preparer: David S. Rhodes	Discipline Engineering Manager		3-11-08
11b. Concurrence: Richard Foster	Manager of Discipline Engineering		3-11-08
11c. Concurrence: N/A	Project Engineering Manager	N/A	N/A
11d. Approved: Barbara Rusinko	Engineering Manager		12 DS 3/12/08 3-13-08