

Complete only applicable items.

3. Document Identifier: 000-3DR-MGR0-00300-000		ENG. 20080312.0012	4. Rev.: 002	5. CBCN: 005
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> , 000-30R-MGR0-03500-000-000. This CBCN addresses the changes to the <u>mechanical handling</u> criteria in <u>Chapter 13</u> of the BOD. This CBCN is being issued in conjunction with CBCNs that address the nuclear facilities, Balance of Plant, waste package, Subsurface Facility, 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>NS</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>MSB</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 sections: 13.2.3.1.2 Cask Handling Cranes The cask handling cranes in the IHF, CRCFs, Receipt Facility, and WHF shall be designed to (a) protect against drop, (b) limit drop height, (c) protect against drop of a load onto a transportation cask, (d) limit speed, (e) protect against crane collapse onto a waste container, (f) maintain moderator control, and (g) protect against a cask or heavy object drop from the crane (safety function). <ul style="list-style-type: none"> <li>The mean probability of dropping a loaded <del>transportation</del> cask from a less than two-block height resulting from the failure of a <del>any</del> piece of equipment in the load bearing path <del>supporting the cask</del> shall be less than or equal to: <ul style="list-style-type: none"> <li>-- <math>3.0 \times 10^{-05}</math> per transfer for the IHF and CRCFs.</li> <li>-- <math>4.0 \times 10^{-05}</math> per <del>lift</del>transfer with the cask yoke or <math>1.0 \times 10^{-04}</math> per <del>lift</del>transfer with sling for the WHF and <del>CRCFs Receipt Facility</del>.</li> <li>— <del>No specific criteria was identified for the Receipt Facility.</del></li> </ul> </li> <li>The mean probability of dropping a loaded <del>transportation</del> cask from the two-block height resulting from the failure of <del>any</del> piece of equipment in the load bearing path shall be less than or equal to: <ul style="list-style-type: none"> <li>-- <math>4.0 \times 10^{-07}</math> per transfer for the IHF, WHF, Receipt Facility, and CRCFs</li> <li>— <del><math>5.0 \times 10^{-07}</math> per transfer for the Receipt Facility, WHF, and CRCFs.</del></li> </ul> </li> <li>The height of a two-block drop <del>height</del> from bottom of shortest cask to the floor shall not exceed: <ul style="list-style-type: none"> <li>-- 40 feet for the IHF</li> <li>-- 30 feet for the Receipt Facility, WHF, and CRCFs.</li> </ul> </li> <li>The mean probability of dropping a load onto a loaded cask or its contents shall be less than or equal to: <ul style="list-style-type: none"> <li>-- <math>3.0 \times 10^{-05}</math> per cask handled for the IHF</li> <li>-- <math>4.0 \times 10^{-05}</math> per cask handled for <del>the Receipt Facility and CRCFs</del></li> <li>-- <math>3.0 \times 10^{-05}</math> per lift for a 10-ton load from 10-foot cask handled in the WHF</li> <li>-- <math>9.0 \times 10^{-05}</math> per cask handled in the Receipt Facility.</li> </ul> </li> </ul>				

## 13.2.3.1.2 (continued)

- The speed of the cask handling crane trolley and bridge shall be limited to 20 ft/min in all facilities.
- The mean frequency of collapse of the cask handling crane due to a spectrum of seismic events shall be less than or equal to  $8.0 \times 10^{-06}$ /yr in all facilities.
- The mean probability of inadvertent introduction of an oil moderator into a canister shall be less than or equal to:
  - $9 \times 10^{-05}$  over a 720-hour period following the breach of a canister a radionuclide release for the Receipt Facility, WHF, and CRCFs.
  - No specific criteria was identified for the IHF and the Receipt Facility.
- The mean frequency of a hoist system failure of the cask handling crane due to a spectrum of seismic event shall be less than or equal to  $2.0 \times 10^{-05}$ /yr in all facilities.

[Preclosure NSDB (BSC 2008 [DIRS 184200]) Appendix B, Table B-1, Items H.IH.HM.02 through 08 for the IHF; Appendix C, Table C-1, Items H.RF.HM.02 through 08 for the Receipt Facility; Appendix D, Table D-1, Items H.CR.HM.02 through 09 for the CRCFs; and Appendix E, Table E-1, Items H.WH.HM.03 through 10 for the WHF.]

## 13.2.3.1.4 Cask Transfer Trolley

The cask transfer trolleys, including pedestals and seismic restraints, in the IHF, CRCFs, Receipt Facility, and WHF shall be designed to (a) limit speed, (b) protect against spurious movement, and (c) protect against sliding impact and inducing stress on the waste container (into a wall) of a trolley holding a cask, and (d) protect against rocking (which induces an impact into a wall) of a trolley holding a cask (safety function).

- The speed of the cask transfer trolley shall be designed not to exceed a speed of limited to 2.5 mi/hr mph in the IHF, Receipt Facility, WHF and CRCFs.
- The mean probability of a spurious movement of the cask transfer trolley while a canister is being lifted by the canister transfer machine shall be less than or equal to  ~~$1.0 \times 10^{-09}$~~   $1.0 \times 10^{-09}$  per transfer in the IHF, Receipt Facility, WHF and CRCFs.
- The mean frequency of a the sliding impact of a cask transfer trolley into a wall or structural column and inducing stresses that can breach the waste container due to the spectrum of seismic events shall be less than or equal to:
  - ~~$3.0 \times 10^{-05} \times 10^{-6}$~~   $1 \times 10^{-6}$ /yr in the IHF, Receipt Facility, WHF, and CRCFs
  - ~~$1.0 \times 10^{-05}$~~   $1.0 \times 10^{-05}$ /yr in the Receipt Facility, WHF and CRCFs.
- The mean frequency of a rocking impact of the cask transfer trolley into a wall or structural column and inducing stresses that can breach the waste container due to the spectrum of seismic events shall be less than or equal to:
  - ~~$3.0 \times 10^{-05} \times 10^{-6}$~~   $1 \times 10^{-6}$ /yr in the IHF, WHF, Receipt Facility, and CRCFs
  - ~~$1.0 \times 10^{-05}$~~   $1.0 \times 10^{-05}$ /yr in the CRCFs, WHF and Receipt Facility.

[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Items H.IH.HM.09 through 12 for the IHF; Appendix C, Table C-1, Items H.RF.HM.09 through 12 for the Receipt Facility; Appendix D, Table D-1, Items H.CR.HM.10 through 13 for the CRCFs; and Appendix E, Table E-1, Items H.WH.HM.12 through 15 for the WHF.]

## 13.2.3.1.8 DPC Lid Adapters

The DPC lid adapters in the CRCFs, WHF, and Receipt Facility shall be designed to protect against drop of a DPC (safety function).

- The DPC lid adapter is an integral part of the load-bearing path. See Canister Transfer Machine requirements.

[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Item H.RF.HM.03, for the Receipt Facility; Appendix D, Table D-1, Item H.CR.HM.02 for the CRCFs; and Appendix E, Table E-1, Item H.WH.HM.0610 for the WHF. DPCs are not handled in the IHF.]

## 13.2.3.1.13 Canister Transfer Machines

The canister transfer machines shall be designed to (a) protect against drop, (b) limit drop height, (c) protect against a drop of a load onto a canister, (d) protect against a spurious movement, (e) limit speed, (f) preclude non-flat bottom drop of a DPC, TAD, or naval SNF canister, (g) protect against direct exposure to personnel, (h) maintain moderator control, (i) ~~protect against~~ preclude canister breach, (k) maintain DOE SNF canister separation in the CRCFs, (l) protect against collapse of the CTM, and (m) protect against a canister or heavy object drop from the CTM (safety functions).

- The mean probability of dropping a canister from below the two-block height due to the failure of any a piece of equipment within the load-bearing shall be less than or equal to:
  - $1.0 \times 10^{-05}$  per transfer for each CTM in the Receipt Facility, WHF, and CRCFs
  - $2.0 \times 10^{-04}$  per transfer for each CTM in the IHF.
- The mean probability of a drop of a canister from the two-block height due to the failure of any a piece of equipment in the load-bearing path shall be less than or equal to:
  - $3.0 \times 10^{-08}$  per lift for the CTM for the CRCFs and WHF, IHF, and the Receipt Facility
  - ~~$3.0 \times 10^{-07}$~~  per lift for the IHF.
- The height of a two-block height drop shall not exceed 45 feet from the bottom of any a canister to the floor of the transportation cask or aging overpack or waste package cavity in the Receipt Facility, WHF, and CRCFs, and 40 feet including pallets in the IHF and 45 feet, and 45 feet in all other nuclear facilities .

## 13.2.3.1.13 (continued)

- The mean probability of dropping a load onto a canister shall be less than or equal to:
  - $1.0 \times 10^{-05}$  per transfer by CTM in the Receipt Facility, CRCFs, and WHF, and
  - $1.0 \times 10^{-03}$  per transfer by the CTM for the IHF.
- The mean probability of spurious movement of the CTM while the canister is being lifted or lowered shall be less than or equal to:
  - $4.97.0 \times 10^{-09}$  per lift for each CTM in the CRCFs, RF, IHF, and WHF and
  - $1.0 \times 10^{-02}$  per lift in the IHF.
  - $5.0 \times 10^{-09}$  per lift for each CTM in the Receipt Facility.
- ~~The Closure of the CTM slide gate shall be incapable of breaching a canister.~~
- The CTM shall preclude non-flat bottom drop of naval SNF canisters, DPCs, or TADs
- The mean probability of inadvertent radiation streaming ~~due to resulting from~~ the inadvertent opening of the CTM slide gate, the inadvertent raising of the CTM shield skirt, or an inadvertent motion of the CTM away from an open port shall be less than or equal to:
  - ~~$1.19.0 \times 10^{-05}$  per transfer in the CRCFs and the WHF~~
  - $1.0 \times 10^{-04}$  per transfer in the IHF
  - $1.0 \times 10^{-06}$  per transfer in the Receipt Facility.
- The speed of the CTM trolley and bridge shall be limited to 20 fpm.
- The mean frequency of collapse of the CTM due to the spectrum of a seismic events shall be less than or equal to  $1.0 \times 10^{-05}$ /yr.
- The mean frequency of a hoist system failure of the CTM due to spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-05}$ /yr.
- The mean probability of inadvertent introduction of an oil moderator into a canister in the ~~Receipt Facility, the WHF, and the CRCFs~~ shall be less than or equal to  $9.0 \times 10^{-05}$  over a 720-hour period following breach of a canister.
- The mean conditional probability of ~~failure of the applicable prevention feature given an attempt to load a DOE SNF canister anywhere other than the center of a receptacle~~ inadvertent placement of more than four DOE standardized canisters in a TAD waste package, TAD staging rack, or AO shall be less than or equal to  $3.0 \times 10^{-06}$  in the CRCFs.
- ~~The mean probability of collision between the two CTMs during canister transfer shall be less than or equal to  $3.0 \times 10^{-06}$ .~~
- The mean frequency of drop by the CTM of the naval SNF canister resulting in breach of the canister shall be less than or equal to  $2 \times 10^{-5}$  over the preclosure period.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Items H.IH.HTC.01 through ~~11~~12 for the IHF; Appendix C, Table C-1, Items H.RF.HTC.02 through ~~13~~12 for the Receipt Facility; Appendix D, Table D-1, Items H.CR.HTC.01 through ~~14~~13 for the CRCFs; and Appendix E, Table E-1, Items H.WH.HTC.01 through 12 for the WHF. Some of the interlocks identified for the CTM may be satisfied from the slide gates in Chapter 4.]*

## 13.2.3.1.14 Canister/Canister Transfer Machine Grapples

The canister grapples in the IHF and CRCFs and CTM grapples in the IHF, CRCFs, Receipt Facility and WHF shall be designed to protect against canister drop **and protect against drop of a load onto a canister** (safety function).

- The canister grapples and CTM grapples are an integral part of the load-bearing path. See Canister Transfer Machine requirements.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]) Appendix B, Table B-1, Items H.IH.HTC.~~12 and 13 and 14~~ for the IHF; Appendix C, Table C-1, Items H.RF.HTC.~~14~~13 for the RF; Appendix D, Table D-1, Items H.CR.HTC.14 and H.CR.HTC.15 for the CRCFs; and Appendix E, Table E-1, Items H.WH.HTC.13 for WHF.]*

## 13.2.3.1.15 Naval Canister Lid Adapter

The naval canister lifting adapter in the IHF shall be designed to protect against drop of a canister (safety function).

- The naval canister lifting adapter is an integral part of the load-bearing path of the CTM. See Canister Transfer Machine requirements.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Item H.IH.HTC.~~14~~ 15.]*

## 13.2.3.1.16 DOE/Naval Waste Package Inner Lid Grapples

The DOE waste package inner lid grapple and the naval waste package inner lid grapple in the IHF shall be designed protect against drop of a load onto a canister (safety function).

- The lid grapple is an integral part of the load-bearing path of the CTM. See Canister Transfer Machine requirements.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Items H.IH.HTC.~~15 and 16 and 17.~~]*

## 13.2.3.1.17 TAD Canister Staging Racks

The TAD ~~canister~~ staging racks (and fire thermal barrier) in the CRCFs shall be designed to protect against tipover/impact of a canister [via collapse of the rack] and protect against canister breach (safety function).

- The mean frequency of collapse of the TAD ~~canister~~ staging racks due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-06}$ /yr.
- The mean conditional probability of breach of a TAD contained within a staging rack resulting from the spectrum of fires shall be less than or equal to  $2 \times 10^{-6}$  per fire event.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]) Appendix D, Table D-1, Items H.CR.HTC.16 and H.CR.HTC.17.]*

### 13.2.3.1.18 DOE Canister Staging Racks

The DOE canister staging racks (and fire/thermal barrier) in the CRCFs shall be designed to protect against tipover/impact of a canister (safety function).

- The mean frequency of collapse of DOE canister staging racks (such that the spacing between the surface of adjacent DOE SNF standardized canisters in a staging rack is less than 30 cm) due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-6}$ .
- The mean conditional probability of breach of a DOE standardized canister contained within a staging rack resulting from the spectrum of fires shall be less than or equal to  $2 \times 10^{-6}$  per fire event

[Preclosure NSDB (BSC 2008 [DIRS 184200]) Appendix D, Table D-1, Item H.CR.HTC.17 18 and H.CR.HTC.19.]

### 13.2.3.1.20 TAD Closure Jib Crane

The TAD closure jib crane in the WHF shall be designed to protect against drop of a load [onto a TAD canister], protect against collapse of the TAD closure jib crane, and protect against a heavy object drop from the TAD closure jib crane (safety function).

- The mean probability of a drop of a load onto a waste container cask containing a TAD shall be less than or equal to  $3.0 \times 10^{-5}$  per lift.
- The mean frequency of collapse of the TAD closure jib crane due to the spectrum of seismic events shall be less than or equal to  $8.0 \times 10^{-6}$ /yr.
- The mean frequency of a hoist system failure of the TAD closure jib crane due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-5}$ /yr.

[Preclosure NSDB (BSC 2008 [DIRS 184200]) Appendix E, Table E-1, Items H.WH.HC.01 through 03.]

### 13.2.3.1.21 Waste Package Transfer Trolleys

The waste package transfer trolleys (including Pedestals, Seismic Rail Restraints, and Rails System) in the IHF and CRCFs shall (a) preclude uncontrolled rapid tilt-down, (b) limit speed, (c) protect against spurious movement, (d) protect against a tipover of a waste package on a the WPTT waste package transfer trolley holding a loaded waste package, and (e) protect against rocking (which induces an impact into a wall) with a waste package transfer trolley WPTT holding a loaded waste package (safety function).

- The waste package transfer trolley WPTT shall be designed to be incapable of an uncontrolled rapid tilt-down.
- The speed of the WPTT shall be limited to 2.5 mi/hr.
- The mean probability of spurious movement of the WPTT while the canister is being lowered shall be less than or equal to  $4.1 \times 10^{-9}$  per transfer.
- The mean frequency of tipover of the waste package transfer trolley system due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-6}$ /yr.
- The mean frequency of rocking impact of the waste package transfer trolley into a wall due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-5}$ /yr.

[Preclosure NSDB (BSC 2008 [DIRS 184200]) Appendix B, Table B-1, Items H.IH.HL.02 through 06 for the IHF and Appendix D, Table D-1, Items H.CR.HL.02 through 06 for the CRCFs.]

### 13.2.3.1.22 DPC Cutting Jib Crane

The DPC cutting jib crane in the WHF shall be designed to protect against drop of a load, protect against collapse of the DPC cutting jib crane, and protect against a heavy object drop from the DPC cutting jib crane (safety function).

- The mean probability of drop of a load onto a waste container cask containing a DPC shall be less than or equal to  $3.0 \times 10^{-5}$  per lift.
- The mean frequency of collapse of the DPC cutting jib crane due to the full spectrum seismic events shall be less than or equal to  $8.0 \times 10^{-6}$ /yr.
- The mean frequency of a hoist system failure of the DPC cutting jib crane due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-5}$ /yr.

[Preclosure NSDB (BSC 2008 [DIRS 184200]) Appendix E, Table E-1, Items H.WH.HD.01 through H.WH.HD.03.]

### 13.2.3.1.23 Preparation Station Jib Cranes

The preparation station jib cranes (1 and 2) in the WHF shall be designed to protect against a drop of a load onto canister, protect against collapse of the jib crane, and protect against a heavy object drop from the jib crane (safety function).

- The mean probability of drop of a load onto a canister shall be less than or equal to  $3.0 \times 10^{-5}$  per lift.
- The mean frequency of collapse of the jib crane due to the spectrum of seismic events shall be less than or equal to  $8.0 \times 10^{-6}$ /yr.
- The mean frequency of a hoist system failure of the jib crane due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-5}$ /yr.

[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix E, Table E-1, Items H.WH.HMH.0405 through 0307.]

### 13.2.3.1.25 Waste Package [Transfer Trolley] Shield Rings

The waste package [transfer trolley] shield rings shall be designed to provide lateral and vertical stability to the waste package in the ~~waste package transfer trolley~~WPTT (safety function).

- The mean frequency of the shield rings becoming displaced from the ~~waste package transfer trolley~~WPTT due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-05}$ /yr.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Item H.IH.HL.01 for the IHF and Appendix D, Table D-1, Item H.CR.HL.01 for the CRCFs. Although the waste packages have shield rings, these shield rings are those on the transfer trolley.]*

### 13.2.3.1.27 Transportation Cask and STC

~~Although not provided by the repository,~~ Transportation casks (not provided by the repository) and the shielded transfer cask (both analyzed as representative casks) provide containment of radionuclides, and protect against direct exposure to personnel and lid contact with canister (safety function).

- The mean conditional probability of a breach of a ~~representative~~ canister in a sealed ~~transportation cask~~ resulting from:
  - a drop shall be less than or equal to  $1 \times 10^{-05}$  per drop,
  - a drop of a load onto the cask shall be less than or equal to  $1 \times 10^{-05}$  per drop, and
  - a side impact or collision shall be less than or equal to  $1 \times 10^{-08}$  per impact.
- The mean conditional probability of loss of cask gamma shielding resulting from: ~~a drop, impact, or collision to a transportation cask shall be less than or equal to  $1 \times 10^{-05}$  per drop or impact.~~
  - a drop of a cask shall be less than or equal to:
    - $1.0 \times 10^{-05}$  per drop for the IHF, WHF, and CRCFs
    - $1.0 \times 10^{-06}$  per drop for the Receipt Facility.
  - a collision or side impact to a cask shall be less than or equal to  $1 \times 10^{-08}$  per impact.
  - drop of a load onto a cask shall be less than or equal to:
    - $1 \times 10^{-05}$  per impact for the IHF and CRCFs
    - $1 \times 10^{-06}$  per impact for the Receipt Facility.
- The mean conditional probability of breach of a sealed cask containing uncanistered SNF resulting from
  - a drop of a cask shall be less than or equal to  $1 \times 10^{-5}$  per drop
  - a drop of a load onto the cask shall be less than or equal to  $1 \times 10^{-5}$  per drop
  - a side impact or collision shall be less than or equal to  $1 \times 10^{-8}$  per impact..
- The geometry of the transportation casks that carry HLW and DOE standardized canisters shall preclude lid contact with canisters following a drop of a cask lid.
- The mean conditional probability of breach of a sealed cask containing uncanistered SNF resulting from the spectrum of fires shall be less than or equal to  $5 \times 10^{-2}$  per fire event.
- The mean conditional probability of breach of a sealed cask containing uncanistered commercial spent nuclear fuel on a truck trailer resulting from:
  - a collision followed by a rollover/drop shall be less than or equal to  $1 \times 10^{-8}$  per drop
  - a drop of a load onto the cask shall be less than or equal to  $1 \times 10^{-5}$  per drop

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Items H.IH.01 through 07 05 for the IHF; Appendix C, Table C-1, Items H.RF.01 through 0406 for the Receipt Facility; Appendix D, Table D-1, Items H.CR.01 through 0507; Appendix E, Table E-1, Items H.WH.01 through 0410 for the WHF; and Appendix F, Table F-1, Items H.SB.01 through 0408.]*

### 13.2.3.1.28 Site Prime Mover

The site prime mover (or equivalent), in conjunction with a transportation cask, shall be designed to ~~limit speed, and reduce the severity of a collision,~~ preclude fuel tank explosion, ~~and limit fire severity~~ (safety function).

- The speed of the site prime mover shall be limited to 9 mi/hr.
- The fuel tank of a site prime mover that enters the facility shall preclude fuel tank explosions
- ~~The diesel fuel capacity for a site prime mover that enters the facility shall be limited to a total of 100 gallons.~~

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Items H.IH.08.06 through and H.IH.09 08 for the IHF, Appendix C, Table C-1, Items H.RF.0507 through H.RF.0708 for the Receipt Facility, Appendix D, Table D-1, items H.CR.0608 through and H.CR.0809 for the CRCFs, Appendix E, Table E-1, Items H.WH.0511 through H.WH.0712 for the WHF, and Appendix F, Table F-1, Items H.SB.0509 through 0710.]*

### 13.2.3.1.30 Waste Package Closure Remote Handling System Bridge

The Waste Package Closure system shall be designed to protect against collapse of the ~~Remote h~~Handling System bridge (safety function).

- The mean frequency of collapse of the ~~Remote h~~Handling System bridge due to the spectrum of seismic events shall be less than or equal to  $8.0 \times 10^{-06}$ /yr.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Item H.IH.HWH.01 for the IHF and Appendix D, Table D-1, Item H.CR.HWH.01 for the CRCFs.]*

## 13.2.3.1.36 DOE SNF Standardized Canisters

Although these canisters are not provided by the repository, in conjunction with the mechanical handling system, the DOE standardized DOE SNF canister shall provide containment (safety function).

- The mean conditional probability of breach of a DOE standardized DOE SNF canister resulting from:
  - a drop of the canister shall be less than or equal to  $1.0 \times 10^{-05}$  per drop.
  - a drop of a load onto the canister shall be less than or equal to  $1.0 \times 10^{-05}$  per drop.
  - a side impact or collision shall be less than or equal to  $1.0 \times 10^{-08}$  per impact.
- The mean conditional probability of breach of a DOE standardized canister SNF resulting from the spectrum of fires while:
  - contained within a waste package shall be less than or equal to  $3.0 \times 10^{-04}$  per fire event.
  - contained within a transportation cask or staging area shall be less than or equal to  $2.0 \times 10^{-06}$  per fire event.
  - located within the CTM Shield Bell shall be less than or equal to  $1.0 \times 10^{-04}$  per fire event.
- The mean conditional probability of breach of a DOE standardized canister:
  - given the drop of an HLW canister onto the DOE standardized canister, shall be less than or equal to  $3.0 \times 10^{-02}$  per drop.
  - given the drop of another DOE standardized canister onto the first canister, shall be less than or equal to  $3.0 \times 10^{-02}$  per drop.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix D, Table D-1, Items DS.CR.04 through 0811; and Appendix F, Table F-1, Item DS.SB.01. This criterion also partially satisfies PO&PR (BSC 2008 [DIRS 185008]), Section 2.6.2. Although this criterion previously addressed the MCO, it has since been removed from the NSDB. HLW canisters were split out separately.]*

## 13.2.3.1.37 Dual Purpose Canister

Although DPCs are not provided by the repository, in conjunction with the mechanical handling system, the dual-purpose canister (analyzed as a representative canister) shall be designed to provide containment (safety functions).

- The mean conditional probability of breach of a representative canister resulting from a:
  - drop of the canister shall be less than or equal to  $1.0 \times 10^{-05}$  per drop.
  - drop of a load onto the canister shall be less than or equal to  $1.0 \times 10^{-05}$  per drop.
  - slide impact or collision shall be less than or equal to  $1.0 \times 10^{-08}$  per impact.
- The mean conditional probability of breach of a representative canister resulting from the spectrum of fires while:
  - contained within a transportation cask shall be less than or equal to  $2.0 \times 10^{-06}$  per fire event,
  - located within the CTM shield bell shall be less than or equal to  $1.0 \times 10^{-04}$  per fire event, and
  - contained within an aging overpack shall be less than or equal to  $1.0 \times 10^{-06}$  per fire event.
- The mean conditional probability of breach of a representative canister in a HAM resulting from:
  - a drop of a load onto a HAM shall be less than or equal to  $1 \times 10^{-05}$  per drop
  - a drop of a load onto a HAM shall be less than or equal to  $1.0 \times 10^{-08.05}$  per drop
  - a collision or side impact shall be less than or equal to  $1.0 \times 10^{-08}$  per event
  - the spectrum of fires shall be less than or equal to  $1.0 \times 10^{-06}$  per fire event

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Items DS.RF.01 through 06 for the Receipt Facility; Appendix D, Table D-1, Items DS.CR.1420 through 19 25 for the CRCFs; Appendix E, Table E-1, Items DH.WH.01 through 06 for the WHF, and Appendix F, Table F-1, items DS.SB.0103 through 0709. Note that some of the values for probability of breach due to fires in Table F-1 are inconsistent with corresponding values in other tables listed here.]*

## 13.2.3.1.38 TAD Canister

The TAD canister (analyzed as a representative canister) shall be designed to provide for containment (safety functions).

- The mean conditional probability of breach of a representative canister resulting from a:
  - drop of the canister shall be less than or equal to  $1.0 \times 10^{-05}$  per drop,
  - drop of a load onto the canister shall be less than or equal to  $1.0 \times 10^{-05}$  per drop, and
  - low-speed impact or collision shall be less than or equal to  $1.0 \times 10^{-08}$  per impact.
- The mean conditional probability of breach of a representative canister resulting from a fire while:
  - contained within a waste package resulting from a fire shall be less than or equal to  $2.03.0 \times 10^{-06}$  per fire event,
  - contained within a transportation cask [or STC] shall be less than or equal to  $1.02.0 \times 10^{-06}$  per fire event,
  - located within the CTM shield bell shall be less than or equal to  $1.0 \times 10^{-04}$  per fire event, and
  - contained within an AO shall be less than or equal to  $1.0 \times 10^{-04.06}$  per fire event.
- The mean conditional probability of breach of a canister in a HAM resulting from:
  - a drop of a load onto a HAM shall be less than or equal to  $1.0 \times 10^{-08.05}$  per drop
  - a collision or side impact shall be less than or equal to  $1.0 \times 10^{-08}$  per event
  - the spectrum of fires shall be less than or equal to  $1.0 \times 10^{-06}$  per fire event

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Items DS.RF.07 through 12 for Receipt Facility; Appendix D, Table D-1, Items DS.CR.20 26 through 26 32 for the CRCFs; Appendix E, Table E-1, Items DS.WH.07 through 12 for the WHF; and Appendix F, Table F-1, items DS.SB.0103 through 0709. Note that some of the values for probability of breach due to fires in Table F-1 are inconsistent with corresponding values in other tables listed here.]*

**13.2.3.1.39 HLW Canisters**

Although the HLW canisters are not provided by the repository, in conjunction with the mechanical handling system, the defense HLW canisters shall be designed to provide containment (safety function).

- The mean conditional probability of breach of HLW canister resulting from:
  - a drop of the canister shall be less than or equal to  $3.0 \times 10^{-02}$  per drop in the IHF and the CRCFs:
    - $3.0 \times 10^{-02}$  per drop in the IHF;
    - $7.0 \times 10^{-02}$  per drop in the CRCFs;
  - a side impact or collision shall be less than or equal to  $1.0 \times 10^{-08}$  per drop,
  - a drop of another HLW canister onto the first canister shall be less than or equal to  $3.0 \times 10^{-02}$  per drop.
  - a drop of a load onto a loaded cask shall be less than or equal to  $3.0 \times 10^{-05}$  per transfer.
- The mean conditional probability of breach of a HLW resulting from the spectrum of fires while:
  - in a waste package shall be less than or equal to  $3.0 \times 10^{-04}$  per fire event,
  - in a transportation cask shall be less than or equal to  $2.0 \times 10^{-06}$  per fire event,
  - located within the CTM shield bell shall be less than or equal to  $1.0 \times 10^{-04}$  per fire event, and
- The mean conditional probability of breach of an HLW canister:
  - given the drop of a DOE standardized canister onto an HLW canister, shall be less than or equal to  $3.0 \times 10^{-02}$  per drop.
  - given the drop of another HLW canister onto the first canister, shall be less than or equal to  $3.0 \times 10^{-02}$  per drop.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Items DS.IH.04 through 09 for the IHF; and Appendix D, Table D-1, Items DS.CR.0012 through 1319 for the CRCFs; and Appendix F, Table F-1, Item DS.SB.02.]*

**13.2.3.1.40 Naval Spent Fuel Canisters**

Although the naval SNF canisters are not provided by the repository, in conjunction with the mechanical handling system, the naval SNF canisters (analyzed as a representative canister) provide containment (safety function).

- The mean probability frequency of a drop by the CTM of the naval SNF canister resulting in a breach of the naval SNF canisters in the IHF shall be less than or equal to  $2.0 \times 10^{-05}$  over the preclosure period.
- The mean conditional probability of breach of a naval SNF canister in the IHF resulting from a:
  - drop of a load onto the canister shall be less than or equal to  $1 \times 10^{-05}$  per drop.
  - side impact or collision shall be less than or equal to  $1 \times 10^{-08}$  per impact.
- The mean probability of a breach of a naval SNF canister resulting from the spectrum of fires in the IHF resulting from a fires while:
  - contained within a waste package shall be less than or equal to  $1.0 \times 10^{-04}$  per fire event,
  - contained within a transportation cask shall be less than or equal to  $1.0 \times 10^{-06}$  per fire event, and
  - located within the CTM shield bell shall be less than or equal to  $1.0 \times 10^{-045}$  per fire event.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix B, Table B-1, Items DN.IH.04 through 09; and Appendix F, Table F-1, Item DN.SB.01. The naval SNF canisters, as handled only in the IHF, were analyzed as representative canisters in preclosure analyses. Note that some of the values for probability of breach due to fires in Table F-1 are inconsistent with corresponding values in other tables listed here.]*

**13.2.3.1.42 Horizontal Lifting Beam (Receipt Facility)**

The cask handling/cask receipt system shall be designed to protect the horizontal lifting beam against drop (safety function).

- The horizontal lifting beam is integral to the load-bearing path. See Cask Handling Crane requirements.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, item H.RF.HMC.02 for the Receipt Facility, H.CR.HMC.01 for the CRCFs and Appendix E, Table E-1, Item H.WH.HMC.02 for the WHF.]*

**13.2.3.1.44 Cask Support Frames**

The cask support frames at WHF Preparation Station #2, TAD Closure Station, DPC Cutting Station, shall be designed to protect against tipover of a cask (safety function).

- The mean frequency of failure of the cask support frame and anchorages due to the spectrum of seismic events shall be less than or equal to  $6.0 \times 10^{-05}$ /yr.
- The mean frequency of a cask drop due to a failure of the truck cask handling frame due to the spectrum of seismic events shall be less than or equal to  $2.0 \times 10^{-05}$ /yr.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix C, Table C-1, Item H.RF.HMC.02; and Appendix E, Table E-1, Items H.WH.HTF.07, H.WH.HMH.0408, H.WH.HC.04, and H.WH.HD.04 for the WHF.]*

**13.2.3.1.45 Deleted Truck Cask Handling Frame**

The truck cask handling frame in the WHF shall be designed to protect against drop from a crane (safety function).

- The mean frequency of a cask drop due to a failure of the truck cask handling frame due to the spectrum of seismic events shall be less than or equal to  $2 \times 10^{-5}$ /yr.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix E, Table E-1, Item H.WH.HTF.07]*

Delete the following sections

13.2.3.1.19 Vertical Shielded Transfer Cask Deleted

The vertical shielded transfer cask shall be designed to protect against expulsion of SNF assemblies and protect against direct exposure to personnel (safety function).

- The mean probability of the SNF expulsion from the STC after a drop or tipover shall be less than or equal to  $1 \times 10^{-05}$  per drop or tipover incident.
- The mean conditional probability of loss of STC shielding resulting from a drop, impact, or collision shall be less than or equal to  $1 \times 10^{-05}$  per drop or impact.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix E, Table E-1, Items H.WH.HF.01 and 02 This item is no longer addressed in the Preclosure NSDB (BSC 2008 [DIRS 184200].)]*

13.2.3.1.24 W74 Upper Basket Lifting Device Deleted

The W74 upper basket lifting device in the WHF shall be designed to protect against drop of a heavy load onto SNF assemblies (safety function).

- The mean probability of auxiliary pool crane dropping a heavy load onto fuel assembly due to the failure of any piece of equipment within the load path supporting the auxiliary pool crane shall be less than or equal to  $3.0 \times 10^{-06}$  per lift.

*[Preclosure NSDB (BSC 2008 [DIRS 184200]), Appendix E, Table E-1, Items H.WH.HTF.01. This item is no longer addressed in the Preclosure NSDB (BSC 2008 [DIRS 184200])]*

Make the changes to the conformance Table 13-1 as follows:

Section	Present Title	New Title
13.2.3.1.19	Vertical Shielded Transfer Cask	Deleted
13.2.3.1.24	W74 Upper Basket Lifting Device	Deleted
13.2.3.1.27	Transportation Cask	Transportation Cask and STC
13.2.3.1.36	DOE SNF Canisters	DOE Standardized Canisters
13.2.3.1.44	Horizontal Lifting Beam	Cask Support Frames
13.2.3.1.45	Cask Support Frames	Truck Cask Handling Frame


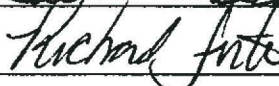

13.1.2.2 Components Classified as Non-ITS

The following mechanical handling system equipment have been classified as non-ITS. The mechanical handling system does not include SSCs that are ITWI.

Cask Handling

- Platform shield plate in the WHF, CRCFs and Receipt Facility
- Decontamination pit equipment - spray nozzle in the WHF
- Decontamination pit equipment - pump module in the WHF
- Long reach tool adapter in the WHF
- Horizontal cask stand in the Receipt Facility, CRCFs, and WHF
- Mobile lift in the WHF, CRCFs and Receipt Facility

*[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, Appendix A, Table A-1, does not include the horizontal cask stand in the CRCFs and WHF, it is being added here. 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).]*

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 0023/12/08 3-13-08