BSC

Calculation/Analysis Change Notice

Complete only applicable items.

1. QA: ~~NA~~ QA 03/31/08
2. Page 1 of 6

3. Document Identifier:	ENG.20080312.0009	4. Rev.:	5. CACN:
050-PSA-WH00-00100-000-00A		00A	001 03/31/08

6. Title:
Wet Handling Facility Event Sequence Development Analysis

7. Reason for Change:
This analysis has identified a potential initiating event that no longer exists due to a design evolution. The design of the aging overpack (AO) access platform in the Wet Handling Facility (WHF) has evolved to a configuration that no longer needs a heavy load lifting device such as a jib crane to help in the bolting or unbolting the AO lid; these tasks will be performed manually. At the time of preparation of this analysis, a jib crane was considered as part of the AO access platform. Since this design evolution exists, this CACN001 is needed to address associated potential initiating events that are no longer applicable.

This CACN001 corrects the list of internal initiating events presented in Table 10 by deleting initiating events associated with the jib crane impacting the AO/ST at the AO access platform. It also updates Section 6.2.12.2, which describes the affected initiating events, and updates the affected ESD (Fig. F-11) and event trees (Figures G-18 and G-19).

8. Supersedes Change Notice: ☐ Yes If, Yes, CACN No.: _____ ☒ No

9. Change Impact:

Inputs Changed:	☐ Yes	☒ No	Results Impacted:	☒ Yes	☐ No
Assumptions Changed:	☐ Yes	☒ No	Design Impacted:	☐ Yes	☒ No

10. Description of Change:

There is no change on the calculation method by this CACN001. The following changes will be made to the document 050-PSA-WH00-00100-000-00A:

1/ Page 98 – delete row with entry "WHF-1403" and "WHF-1407" from Table 10
2./ Page 121, Section 6.2.12.2 – delete entry no. 3
3/ Page F-12, Figure F-11 – Delete third "small bubble" and entries

4/ Page G-22, Figure G-18 – Change label of the 4th branch from "AO/DPC tip over" to "AO/DPC tip over (deleted)"

5/ Page G-23, Figure G-19 – Change label of the 4th branch from "AO/TAD tip over" to "AO/TAD tip over (deleted)"

Insert revised pages 98, 121, F-12, G-22, and G-23 that include change bars to identify revisions.

11. REVIEWS AND APPROVAL

Printed Name	Signature	Date
11a. Originator: Phuoc Le		3/11/08
11b. Checker: Howard Lambert	Howard Lambert	3-11-08
11c. EGS: Michael Frank		3/11/08
11d. DEM: M.R. Wisenburg		3/11/08
11e. Design Authority: B, Rushinko	BJ Toscetti	3/11/08

Table 10. List of Internal Initiating Events (Continued)

Identifier	General Event Description	MLD Figure #	HAZOP Table #	ESD Figure #
WHF-1105	Canister drops in CTM shield bell during move	D-11	—	F-13
WHF-1106	Canister collision due to CTM malfunction/misoperation leading to an impact	D-11	E-14	F-13
WHF-1201	CTT moves during cask unloading or STC loading leading to an impact	D-12	—	F-13
WHF-1202	Spurious movement of CTM bridge or trolley leading to an impact	D-12	—	F-13
WHF-1203	Canister strikes port edge, CTM slide gate, or wall leading to cask drop	D-12	—	F-13
WHF-1204	Side impact to cask during lift	D-12	E-13, E-15	F-13
WHF-1205	CTM wire rope cut leading to canister drop	D-12	E-13, E-15	F-13
WHF-1206	ST moves while loading leading to an impact	D-12	E-13, E-15	F-13
WHF-1207	Canister impact or drop caused by CTM motor failure to stop on demand	D-12	E-13, E-15	F-13
WHF-1208	Canister drop in CTM shield bell (with CTM slide gate closed) due to CTM malfunction	D-12	—	F-13
WHF-1209	Canister impact or drop from CTM failure or misoperation	D-12	E-11, E-13	F-13
WHF-1210	CTM drops object (e.g., lid) into the cask	D-12	—	F-13
WHF-1301	Jib crane drops object on TAD canister prior to or post TAD canister closure	D-13	—	F-25
WHF-1302	Bad weld	D-13	E-24	F-27
WHF-1303	Welding damages TAD canister	D-13	E-24	F-27
WHF-1306	TAD canister drying problem	D-13	E-24	F-26
WHF-1307	TAD canister inerting problem	D-13	E-24	F-26
WHF-1308	Line break	D-13	—	F-27
WHF-1401	Exposure due to collision involving the ST, facility structures, or equipment impacting loaded aging overpack	D-14	E-16	F-11
WHF-1402	Drop of heavy load onto aging overpack	D-14	E-16	F-11
	(Not used)			
WHF-1406	Collision between ST and another moving vehicle	D-14	E-16	F-11
	(Not used)			
WHF-1501	Impact from platform operations	D-15	—	F-24, F-28
WHF-1502	Cask handling crane drops object on STC/ TAD canister	D-15	—	F-24, F-28
WHF-1503	STD/ TAD canister collides with object while being moved by cask handling crane leading to side impact	D-15	—	F-24, F-28

6.2.12.2 Initiating Events

The individual initiating events that were identified in the MLD are indicated on the ESD by their initiating event identifiers and, for quantification purposes, are collected into one of three groups (represented as little bubbles), as follows:

1. Drop of heavy load on aging overpack/DPC or TAD canister.
2. Site transporter collision with another vehicle, facility structures, or equipment.
3. Side impact to aging overpack/TAD canister.

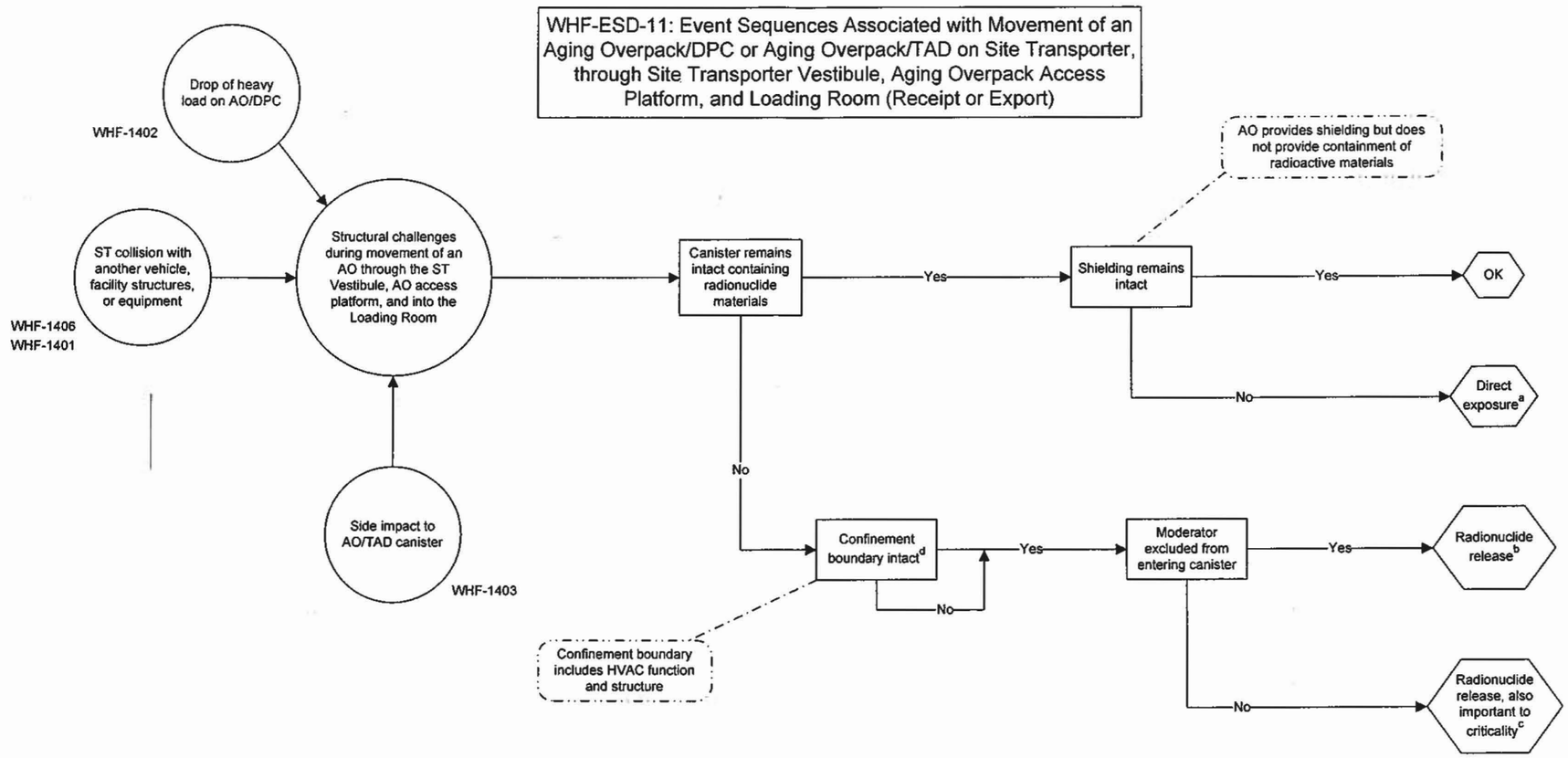
The aging overpack provides shielding but not containment or confinement.

The groups are summarized by a generic initiating event, which is represented by the big bubble in the ESD. The big bubble represents a structural challenge resulting from receipt of an aging overpack containing a DPC. The aging overpack provides shielding but no confinement.

6.2.12.3 System Response

After the structural challenge to the canister in an aging overpack has occurred, the first pivotal event asks whether the DPC remain intact and contains the radionuclides. If the DPC remains intact (a positive response to the first pivotal event), then the next question (second pivotal event) to be asked is whether the aging overpack shielding remains intact. If the aging overpack shielding is intact, then the end state is OK otherwise direct exposure occurs.

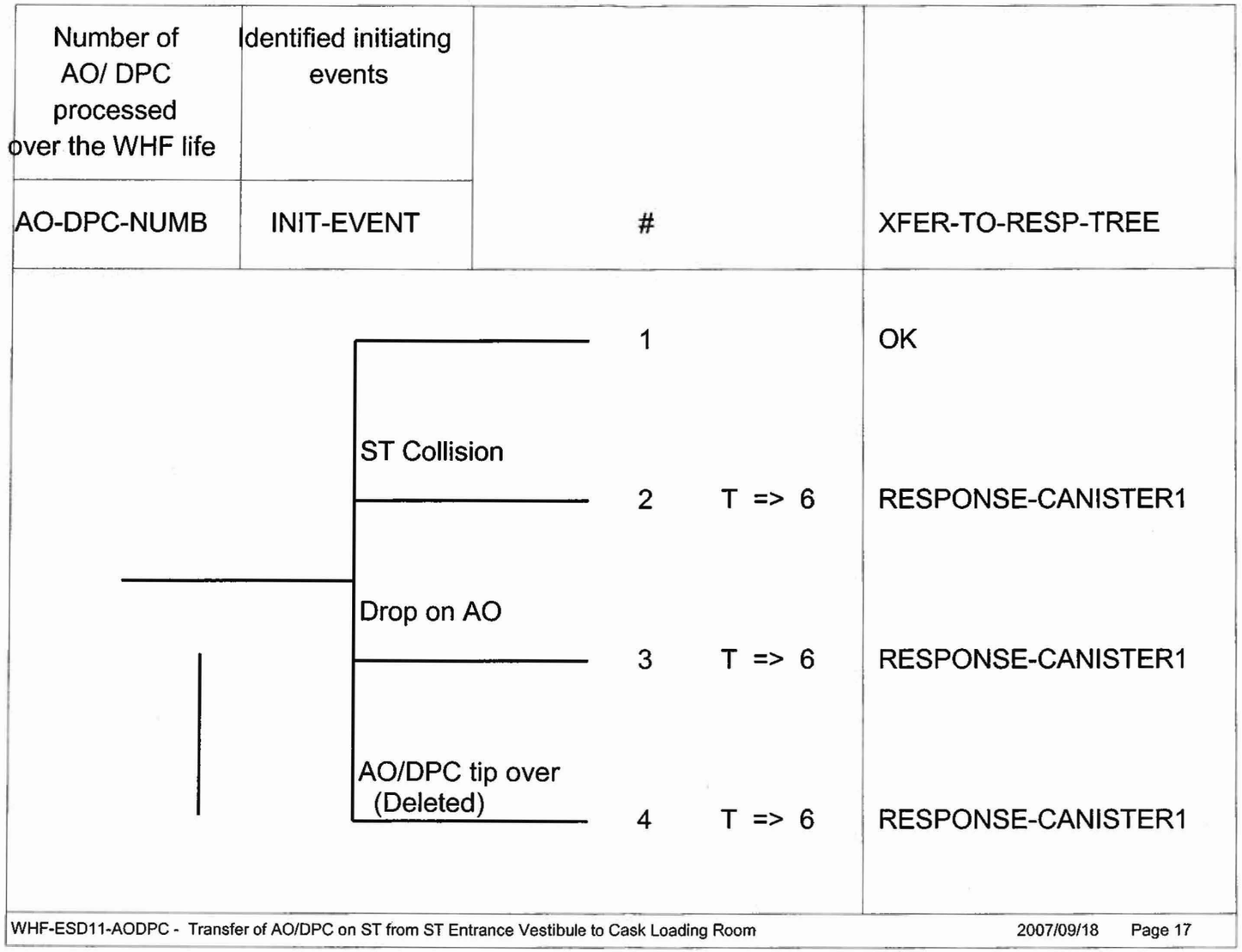
If the DPC does not remain intact, a radionuclide release occurs. Determining whether or not the containment boundary of the DPC remains intact may be probabilistic in that the event involves uncertainties in both the load imposed on the DPC and the strength of the DPC. For breach of the DPC canister, the availability of HVAC confinement and the potential for moderator intrusion is considered. First, a pivotal event asks whether HVAC confinement is maintained. In addition to whether or not the HVAC system is operating at the time of the release, this question implies maintenance of confinement over a mission time after a radionuclide release and a limitation on the amount of air leakage into the building that can be accommodated by the HVAC system. If HVAC confinement is maintained over the mission time, the release is considered a filtered release and the consequence analysis may take into account the filter efficiency. If HVAC confinement is not maintained, then the release is considered unfiltered. The remaining pivotal event provides further delineation of the event sequences by asking whether moderator is prevented from entering the breached canister. In the affirmative case, that is, the absence of moderator intrusion, the filtered or unfiltered release is represented by the Radionuclide Release end state. In the negative case, that is, if moderator enters the breached canister, the corresponding event sequences terminate in either a filtered or an unfiltered radionuclide release that must be further evaluated with respect to criticality (which is indicated as Also Important to Criticality). Note that Also Important to Criticality means that event



NOTE: [a]Direct exposure is that condition where individuals are directly exposed to the radiation beam streaming through areas where shielding has been compromised.
[b]Radionuclide release describes a condition where radioactive material has been released from the container creating an inhalation or ingestion hazard which is accompanied by the dose received from emersion in the plume, and direct exposure, described above.
[c]Radionuclide releases important to criticality describes a condition where the containment boundaries have been compromised, releasing radioactive material. A moderator is present and may enter the canister.
[d]Pivotal events for which both the yes and no paths merge are provided to simplify communication of the event sequences. The end state frequency and consequences for each path may be different.
Potential for fire analyzed in fire ESDs.
AO = aging overpack; DPC = dual-purpose container; ESD = event sequence diagram; HVAC = heating, ventilation, and air conditioning; ST = site transporter; TAD = transportation, aging, and disposal; WHF = Wet Handling Facility.

Source: Original

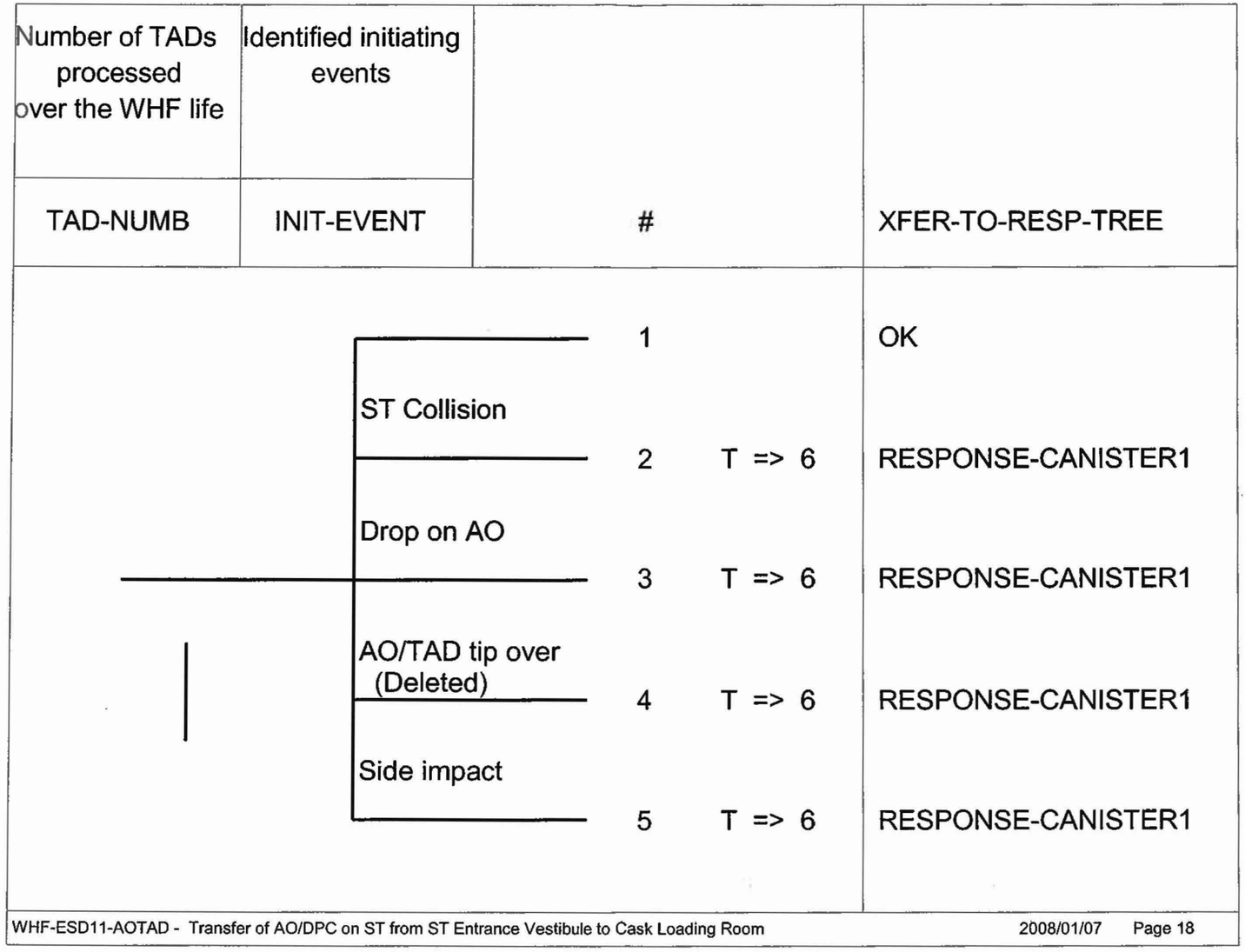
Figure F-11. WHF-ESD-11 Event Sequences Associated with Movement of an Aging Overpack/DPC or Aging Overpack/TAD on Site Transporter, through Site Transporter Vestibule, Aging Overpack Access Platform, and Loading Room (Receipt or Export)



NOTE: AO = aging overpack; DPC = dual-purpose canister; INIT = initiating; NUMB = number; RESP = response; ST = site transporter; T = transfer; XFER = transfer.

Source: Original.

Figure G-18. Event Tree WHF-ESD11-AODPC -- Transfer of Aging Overpack/DPC on Site Transporter from Site Transporter Vestibule to Cask Loading Room



NOTE: AO = aging overpack; DPC = dual-purpose canister; ESD = event sequence diagram; INIT = initiating; NUMB = number; RESP = response; ST = site transporter; T = transfer; TAD = transportation, aging, and disposal canister; WHF = Wet Handling Facility; XFER = transfer.

Source: Original.

Figure G-19. Event Tree WHF-ESD11-AOTAD – Transfer of Aging Overpack/DPC on Site Transporter from Site Transporter Entrance Vestibule to Cask Loading Room