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| 40430-PL-0010 | 1PCN6 | APPROVED | SILO 3 RETREIVAL AND DISPOSITION NUCLEAR HEATH AND SAFETY PLAN | ATT: RAYER, DIANA L<br>Project: 40430 |

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| EFFECTIVE DATE | PCN NO. | REV. NO. | DESCRIPTION |
|---|---|---|---|
| 03-23-05 | 2 | 1 | Changes to: (1) Section 1.4.3, *Silo 3 Material Retrieval and Packaging Activities*, to describe the in-line automatic samplers installed above Packaging Stations A and B; (2) Section 10.4, *Derivation of Safety Basis Requirements*, to make text consistent with PR-3; (3) Appendix B, under *Executive Summary*, and Sections B-3.2.3 and B-3.3, to change facility designation from Radiological to Less Than Nuclear; (4) Section, B-4.0, *Final Hazard Category*, to clarify purpose of Appendix G, and to change facility designation from Radiological to Less Than Nuclear; (5) Appendix F (FHA), on Pages 8, 16, 18, and 21, to remove the word "DELETION" left over from a previous PCN; (6) Appendix G, *Accident Analysis*, under Section G-2.3, *Common Assumptions*, to explain the calculated bulk density of 73 lb/ft$^3$ used in EBA-4; (7) Section G-3.4, *EBA-4: Breach of Full Package*, to discuss the calculated bulk density of 73 lb/ft$^3$; (8) Table G.3-4, *Breach of a Full Package Scenario Results*, to provide new dose values; (9) Section G-3.7, *EBA-7: ISO Penetrated*, to clarify ISO staging; (10) Table G.4-1, *Dose for Comparison to Emergency Guideline*, to provide new dose values for EBA-4; (11) Table G.4-2, *Dose for Comparison to Emergency Guideline Using Conservative Assumptions*, to provide new dose values for EBA-4; (12) App. G, Att. 4, *EBA-4 Spreadsheet*, *EBA-4 Solids Release*, to provide new dose values based on calculated bulk density of 73 lb/ft$^3$. |
| 04-15-05 | 3 | 1 | Changes to: (1) Section 1.4.3, *Silo 3 Material Retrieval and Packaging Activities*, under *Preliminary Pneumatic Retrieval and Equipment Installation*, to make past tense and to delete references to vacuum wand boots; and under *Routine Pneumatic Retrieval*, to delete discussions of vacuum wand boots; (2) Table 10-1, *Silo 3 System Safety Requirements*, to delete PR-4 regarding the flexible boots on the vacuum wands per DCN 40430-JEG-277 and DCN 40430-JEG-278; (3) Section 10.4, *Derivation of Safety Basis Requirements and Process Requirements*, to explain deletion of PR-4. |

| EFFECTIVE DATE | PCN NO. | REV. NO. | DESCRIPTION |
|---|---|---|---|
| 05-24-05 | 4 | 1 | Change to: (1) Section 16.0, *Emergency Response Plan*, to reflect replacement of landline phones with cell phones, elimination of the Communications Center, and clarification of Silos Project rally points; (2) Appendix F, *Fire Hazards Analysis*, to reflect replacement of land line phones with cell phones, and the replacement of the Savannah Communications Center monitoring system with local Protected Premises alarms. |
| 07-07-05 | 5 | 1 | Change to: (1) Section 10.3, *Silos Project Technical Safety Requirement (TSR)*, to specify new maximum values for area live loads and concentrated live loads; (2) Section 16.0 *Emergency Response Plan*, to change location of Rally Point 10; (3) Section 20, *References*, to update reference information for the OU4 TSR document. |
| 8-31-05 | 6 | 1 | Change to: (1) Section 1.4.3, Silo 3 Material Retrieval and Packaging Activities, to clarify that remote retrieval may require personnel entry into the Silo. |

temporary blanket for covering the manway was used to minimize airborne contamination. While maintaining ventilation on Silo 3 via the PVS, the center manway was opened, pulling air into the manway. The PRS was then started to remove enough material to allow the installation of the Camera and Lighting Assembly into the center manway (approximately eight feet below the manway flange).

While continuing to maintain ventilation on the silo via the PVS, each of the remaining five (5) manways was opened one at a time. Once the manway cover was removed, enough material was again removed to allow airflow to the center manway. This level was determined using the center manway camera. Once this level was achieved, a Manway Vacuum Wand Management System was installed on the manway. This continued until all five Manway Vacuum Wand Systems were installed. PCN3

**Routine Pneumatic Retrieval**

**Note: Prior to installation, the design of the pneumatic retrieval components will be evaluated against, and conform to, the Technical Safety Requirement (TSR) specified in Section 10.3. The pneumatic retrieval strategy has a demonstration plan [Ref. 25] for vacuum wand retrieval and will separately document the results.**

The VWMS is installed on the silo dome beneath a fabric enclosure structure that provides protection from the weather. The VWMS consists of flexible hoses and metal tubes (vacuum wands) that will be inserted through the six existing silo dome manways. A motorized hoist will be used at each manway to assist operators in manipulating the VWMS hoses/wands. Video cameras to allow for remote viewing.

At each vacuum wand (and associated manway), an enclosure is provided with passive air supply (inlet) and process vent (outlet) hose connections. DELETION PCN3

In order to keep silo pressure from becoming too negative, the passive air supply (from a HEPA filter) will replace air displaced during pneumatic retrieval and process vent operations. The process vent connection will normally be used to provide slight negative pressure when vacuum wand sections are added and when the pneumatic retrieval (vacuum) system is not in operation.

A vacuum relief valve on the passive air supply piping will open at 3 inches water column (WC) vacuum in the event the HEPA filter becomes plugged or does not allow sufficient air flow to alleviate silo negative pressure.

DELETION. There is a pressure transmitter on the silo dome to provide an alarm if the silo pressure becomes greater than 3 inches WC vacuum. The pneumatic system also has a low-pressure switch on the blower inlet that will open a blower inlet relief valve, and a low-flow switch to shut down the blower in the event of a plug in the pneumatic system or the passive air supply. PCN3

The PRS is contained in a steel beam/metal-sided building (the Process Building) adjacent to the silo. The PRS provides pneumatic, vacuum flow using rotary blowers. From the VWMS, the material/air stream enters the PRS baghouse collector, where material is separated from the air stream and fed by a screw conveyor and rotary airlock to the packaging screw conveyor. The air

stream from the PRS baghouse collector passes through a cartridge filter, a high-efficiency particulate air (HEPA)/ ultra-low penetrating air (ULPA) filter, and rotary blower and is discharged via the Silo 3 exhaust stack. Material collected by the cartridge filter is fed by the same screw conveyor and rotary airlocks to the packaging screw conveyor.

Pneumatic retrieval will be performed to the extent practicable (i.e., as long as material can be safely and effectively removed by vacuum). Of significant importance is the use of the VWMS/PRS for removal of material from behind the silo wall, at the proposed access location, to permit safe wall opening for mechanical retrieval. The VWMS/PRS can be used prior to the MRS and in conjunction with it.

**Mechanical Retrieval**

The Mechanical Retrieval System (MRS) is housed in a robust concrete structure (Excavator Building) attached to the silo structure. When free-flowing material has been removed from the silo to expose the inside of the silo wall, and pneumatic retrieval is no longer practical, an opening will be cut into the exposed silo wall to enable the use of a mechanical excavator (see Section 1.4.2). Compacted material remaining behind the wall will not prevent initiation of wall removal.

The selected excavator has an additional articulating joint. This provides a range of motion that allows it to work within the silo and adjoining excavator room. The machine can also articulate in a horizontal plane. This provides flexibility for supporting retrieval if only portion of the wall can be removed due to material impacted behind the wall.

The excavator can reach into the silo and loosen compacted material for vacuuming. Video cameras to allow for remote viewing. The excavator may also be used to manipulate the VWMS wand/hose to facilitate pneumatic retrieval. The remotely-operated excavator will enter the silo and dig into the waste pile. Removed material will be pneumatically retrieved, or placed in a below-grade bin in the Excavator Room and then moved to the two packaging stations via four conveyors. Three of the conveyors are screw-type, and one is a pocketed sidewall belt conveyor. The last of the screw-type conveyors is common to the PRS. Controlled personnel entry into the silo may be required to facilitate retrieval or perform non-routine maintenance. PCN6

**Waste Conditioning**

As the Silo 3 material is containerized, it will be conditioned by the addition of an aqueous solution to reduce dispersibility and metals mobility. The solution of ferrous sulfate, sodium lignosulfonate, and water will be sprayed onto the material in the fill chutes at the packaging stations. No credit was taken for waste conditioning in the hazard category calculations.