

5/25/2005 11:48  
Seq # 429567

ECDC PROJECT DOCUMENT CONTROL

SCHW6923  
Date: 05/25/05

DOCUMENT TRANSMITTAL: CONTROLLED

ECDC Control No: INFO  
Holder Name: PEIC  
Mail Stop: 78

59 4 5

**INSTRUCTIONS:**

NEW REVISION OF NHASP SILO 3 - REPLACE PAGES WITH THE ATTACHED NEW SHEETS

Document No	Rev	Status	Title of Document	Comments
40430-PL-0010 TAKE OFF DISTRIBUTION: <input type="checkbox"/>	1PCN4	APPROVED	SILO 3 RETREIVAL AND DISPOSITION NUCLEAR HEATH AND SAFETY PLAN	ATT: RAYER, DIANA L  Project: 40430

Send Transmittal back to Document Control, 52-7 if you need to be taken off Distribution.

IF TERMINATION OR TRANSFER OCCURS, NOTIFY ECDC AT EXTENSION 4641

**NOTE:** If you would like to be removed from distribution for any documents(s) please check box and destroy document. Send Transmittal back to Document Control, 52-7. Thanks ECDC

EFFECTIVE DATE	PCN NO.	REV. NO.	DESCRIPTION <span style="float: right;">5945</span>
03-23-05	2	1	<p>Changes to: (1) Section 1.4.3, <i>Silo 3 Material Retrieval and Packaging Activities</i>, to describe the in-line automatic samplers installed above Packaging Stations A and B; (2) Section 10.4, <i>Derivation of Safety Basis Requirements</i>, to make text consistent with PR-3; (3) Appendix B, under <i>Executive Summary</i>, 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, <i>Final Hazard Category</i>, 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, <i>Accident Analysis</i>, under Section G-2.3, <i>Common Assumptions</i>, to explain the calculated bulk density of 73 lb/ft<sup>3</sup> used in EBA-4; (7) Section G-3.4, <i>EBA-4: Breach of Full Package</i>, to discuss the calculated bulk density of 73 lb/ft<sup>3</sup>; (8) Table G.3-4, <i>Breach of a Full Package Scenario Results</i>, to provide new dose values; (9) Section G-3.7, <i>EBA-7: ISO Penetrated</i>, to clarify ISO staging; (10) Table G.4-1, <i>Dose for Comparison to Emergency Guideline</i>, to provide new dose values for EBA-4; (11) Table G.4-2, <i>Dose for Comparison to Emergency Guideline Using Conservative Assumptions</i>, to provide new dose values for EBA-4; (12) App. G, Att. 4, <i>EBA-4 Spreadsheet, EBA-4 Solids Release</i>, to provide new dose values based on calculated bulk density of 73 lb/ft<sup>3</sup>.</p>
04-15-05	3	1	<p>Changes to: (1) Section 1.4.3, <i>Silo 3 Material Retrieval and Packaging Activities</i>, under <i>Preliminary Pneumatic Retrieval and Equipment Installation</i>, to make past tense and to delete references to vacuum wand boots; and under <i>Routine Pneumatic Retrieval</i>, to delete discussions of vacuum wand boots; (2) Table 10-1, <i>Silo 3 System Safety Requirements</i>, 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, <i>Derivation of Safety Basis Requirements and Process Requirements</i>, to explain deletion of PR-4.</p>

EFFECTIVE DATE	PCN NO.	REV. NO.	DESCRIPTION
5/24/05	4	1	Change to: (1) Section 16.0, <i>Emergency Response Plan</i> , to reflect replacement of landline phones with cell phones, elimination of the Communications Center, and clarification of Silos Project rally points; (2) Appendix F, <i>Fire Hazards Analysis</i> , 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.

Any circumstance that could have resulted in an intake of radioactive materials by inhalation, ingestion, absorption, or injection shall be immediately reported to a supervisor. The supervisor shall immediately report the circumstance of possible radioactive materials intake to an RCT for evaluation. Radiological Control/Medical will determine further actions. 5945

In the unlikely case of body contact with an acid or caustic agent, non-permeable PPE should be doffed with extreme caution to prevent contact with the skin. Contaminated inner clothing shall be removed. The affected body area shall be washed thoroughly (15 minutes minimum) in a safety shower or eye bubbler in the case of a splash into the eye(s). Involved personnel shall report immediately to their supervisor and Medical.

In many cases, chemical contamination can be removed by physical means involving rinsing, wiping off, or vacuuming. Additional efforts to decontaminate may include the use of mild soap and/or soft-bristle brushes. Efforts shall be made to prevent loose chemical contamination from entering body openings and to prevent breaking the skin barrier. If the skin barrier is removed or breached during decontamination, medical assistance will be sought. Sensitive areas such as eyes, body cavities, or wounds are more difficult to decontaminate and will be dealt with by Medical.

If immediate medical treatment is required to save a life, decontamination will be delayed until the victim is stabilized.

#### Equipment Decontamination

If equipment becomes contaminated during a Silo 3 operation or maintenance activity, Radiological Control personnel will establish an area to perform the necessary decontamination. The area configuration will be based on the actual size of the equipment, levels of contamination, dispersability of the contamination, and the methods for performing the decontamination.

For chemical decontamination, efforts will be made to avoid coming into contact with the contaminated equipment. Standing or walking through pools of liquid will be discouraged. Objects may be encapsulated with plastic sheeting or other material to prevent contact with contaminated items. Physical removal methods for chemical contamination may include using water with a mild soap, vacuuming, scraping, brushing, and wiping. Surfactants, such as detergents, may be used to augment physical cleaning methods by reducing adhesion forces between chemical contaminants and the surface being cleaned, and by preventing redeposit of the contaminants.

## 16.0 EMERGENCY RESPONSE PLAN

The Silos Emergency Plan has been developed to cover extraordinary conditions that might occur at the Silos and is to be used in conjunction with Fluor Fernald Site Emergency Action Plan.

Silos project personnel have the responsibility to be aware of the actions required of them under all site emergency procedures. However, there are two emergency procedures that require particular emphasis:

- EM-0020, *Building Emergency Procedure* [Ref. 82]
- EM-0030, *Silos Area Emergency Procedure* [Ref. 83]

EM-0020 provides details for standard emergencies (e.g., Fire, Severe Weather, Bomb Threat). EM-0030 provides detail for actions to be taken in the event of a potential significant release of radon from Silos 1 or 2.

### Reporting

TABLE 16-1 lists the emergency numbers that shall be used to report emergencies at the Silos:

TABLE 16-1: FCP EMERGENCY ACTIONS AND NUMBERS		
SMOKE OR FIRE IN OR NEAR A FACILITY	SEVERE INJURY OR MEDICAL EMERGENCY	NON-EMERGENCY INJURY OR EVENT
<ol style="list-style-type: none"> <li>1. Pull fire alarm.</li> <li>2. Proceed to Rally Point.</li> <li>3. Call 911 and state:                             <ol style="list-style-type: none"> <li>a. WHAT happened</li> <li>b. WHERE: Fernald Site 7400 Willey Road Crosby Township</li> <li>c. TYPE OF HELP needed</li> <li>d. STAY ON LINE until told to hang up</li> </ol> </li> <li>4. Call AEDO at 648-6511.</li> </ol>	<ol style="list-style-type: none"> <li>1. Call 911 and state:                             <ol style="list-style-type: none"> <li>a. WHAT happened</li> <li>b. WHERE: Fernald Site 7400 Willey Road, Crosby Township</li> <li>c. TYPE OF HELP needed</li> <li>d. STAY ON LINE until told to hang up</li> </ol> </li> <li>2. Call AEDO at 648-6511.</li> </ol>	<ol style="list-style-type: none"> <li>1. Call AEDO at 648-6511.</li> <li>2. Contact your Supervisor.</li> <li>3. Seek care from on-site First Aid Station. AEDO will decide on off-site care.</li> </ol>

PCN4

5945

Site Notification Procedures

- Whenever personnel are working, a means to report emergencies shall be available at all work locations. Emergencies shall be reported as shown in **TABLE 16-1**.

Any injury, no matter how minor, shall be reported to FCP Medical Department for evaluation or treatment. The injured party shall be accompanied by the supervisor in charge or his designee. The Silos S&H Representative shall be notified as soon as possible after the injury/accident has occurred.

Silos personnel will be notified of emergency or abnormal conditions by the plant-wide alarm system and radio announcements. Emergencies may also be announced by fire-alarm pull stations, which are programmed to alarm locally.

What to Report

The following are examples of emergencies that justify calling and reporting:

Call 911, then the AEDO at 648-6511:

- Any Fire
- Severe Injury
- Chemical Splash with Serious Injury

Call the AEDO at 648-6511:

- Non-Emergency Injury
- Non-Emergency Injury Complicated by Contamination
- Hazardous Waste or Hazardous Substance Emergency with No or Minor Injuries
- Radiation/Contamination Release
- Chemical Spill
- Property Damage
- Adverse Weather Conditions
- Atypical Events
- Loss of Containment
- Loss of Utilities

DELETION

PCN1 & 4

PCN4

PCN1 & 4

**5945****Evacuation Routes**

Should a situation require an emergency evacuation of the work areas, all equipment should be shut off (if possible) and left in place. Silo 3 personnel should immediately proceed to Rally Point 10 at pole WP 148 located northwest of the Silo 3 area (NW corner of the Silos Loop Road). Rally Point 10 also serves as an alternate for AWR and WT&P personnel.

DELETION

**Fire Emergencies**

All work sites shall maintain effective communication to summon fire-fighting assistance. Access to work areas shall be maintained at all times to permit fire trucks and fire-fighting crews to safely approach the fire emergency.

Only trained personnel shall attempt to operate any fire-fighting equipment and only when the fire is clearly within the capability of the fire-fighting equipment.

The Subcontracted Response Forces will respond to all on-site fire emergencies. For any fire at the FCP, call 911 and then the AEDO at 648-6511.

**Explosion Emergencies**

If an explosion has occurred, the following actions are to be taken:

1. Activate the closest fire alarm, if possible. If a fire alarm is not available, notify other employees by an alternate method.
2. Evacuate the work area.

PCN 1 &amp; 4

PCN 1 &amp; 4

3. Proceed to Rally Point 10 at pole WP 148 located northwest of the Silo 3 area (NW corner of the Silos Loop Road).
4. If qualified, render first-aid to any injured personnel.
5. Instruct all persons in transit to avoid the work area and surrounding area.
6. Call 911 and then the AEDO at 648-6511.
7. Call for medical assistance, if necessary.
8. Report to your supervisor for accountability.

5945

PCN1 &amp; 4

### Chemical Emergencies

#### Splashes

Flush the affected area for 15 minutes and report to Medical Services. Remember to always follow the MSDS guideline.

#### Personal Contamination (Chemical)

When contaminated with a corrosive or caustic material, flush the affected area with clean water for 15 minutes. Report to Medical Services. The injured party shall be accompanied by the supervisor in charge or his designee. The Silos S&H Representative shall be notified as soon as possible after the injury/accident has occurred.

All instances of personal chemical contamination shall be reported to Silos S&H Representative, the AEDO, Silos Project management, and the RCS Control Room.

Any situation which could have resulted in the inhalation, ingestion, or absorption of a hazardous material shall immediately be reported to supervision and the Silos S&H Representative and the AEDO, who will report the circumstances to Medical Services. The involved personnel shall be directed by the AEDO or Supervision as to when and where to report for medical evaluation, completion of an Incident Investigation Report, and submission of bioassay samples (e.g., blood, urine).

### Radiological Emergencies

#### Radiological Releases

For all radiological releases, the release area shall be evacuated. The Supervisor in charge, AEDO, RCTs, Silos Project management, a Silos S&H Representative, and the RCS Control Room shall be notified of the release.

If there is a major release, all work shall be stopped in the Silos area, and the actions of EM-0030, *Silos Area Emergency Procedure* [Ref. 83], shall be followed.

### Hazardous Waste/Substance Emergencies

#### Uncontrolled Hazardous Waste or Hazardous Substance Release

Under 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*, an emergency exists when a site experiences an occurrence that results in, or is likely to result in, an uncontrolled hazardous waste or hazardous substance release, causing a potential health or safety hazard that cannot be mitigated by personnel in the immediate work area where the release occurs. In the case of an emergency, trained responders will be relied upon for response.

Silos Project personnel will assist trained responders by providing detailed information regarding the emergency and any technical input needed to ensure the safety of the responders, the public, and the environment.

#### Incidental Release of Hazardous Substances

Under 29 CFR 1910.120 (a) (3), responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel, are not considered to be emergency responses within the scope of HAZWOPER. Responses to releases of hazardous substances where a potential health or safety hazard (i.e., fire, explosion, or chemical exposure) does not exist are considered to be non-emergency responses.

Management will ensure that only qualified personnel, trained in incidental release clean-up under the Hazard Communication Standard, will respond to incidental releases. These personnel are not considered emergency responders.

### Spill Response

In order to prevent the spread of contamination from spills of hazardous chemicals, Fluor Fernald has provided the following controls for the Silos. In most instances, spills should be cleaned up quickly before they become larger or contaminate larger areas. Large spills should only be handled with the assistance of Subcontracted Emergency Response Services.

- **Engineering Spill Controls:** Secondary containment will be provided for any acid and caustic storage tanks determined to be necessary. Fuel cells are double-walled for containment of leaks. Floor areas are sloped to allow spilled materials to be collected in containment sumps.
- **Administrative Spill Controls:** Spill control kits will be placed in strategic areas. Specific spill-response steps are provided in the appropriate Fluor Fernald procedures. Only personnel trained in performing spill response should attempt to implement these procedures.

General Spill Guidelines

5945

The following guidelines are provided as basic information on spill response. These guidelines would apply to any spill potentials envisioned for the Silo 3 Project. Consult the applicable procedure, MSDS, or Work Plan for detailed spill response guidelines:

1. Before the task begins, review and be familiar with the MSDS or appropriate document for the chemical to be used.
2. Before the task begins, note the location(s) of the nearest spill kit(s) and ensure they are adequately stocked.
3. In the event of a spill, remove personnel from the area, as appropriate.
4. Contact your supervisor.
5. If the spill is large enough, it may require the assistance of subcontracted emergency response. The supervisor shall contact off-site services.
6. Barricade the spill area by the use of caution tape or another appropriate method.
7. Before entering the spill area, assure that the appropriate air monitoring has been performed.
8. Before entering the spill area, upgrade the level of protection, as necessary.
9. Prevent the spill from spreading any further by containing it with absorbent "socks," pads, or any compatible material.
10. Clean the spill by moving from the less-contaminated areas to the more-contaminated areas.
11. After cleaning the area, ensure that the area is safe for entry by use of air monitoring or other appropriate method before removing the barricade.
12. After cleaning the area, contain and dispose of the spilled material and PPE appropriately.

PCN4

Post-Emergency Response

Post-emergency response is defined under HAZWOPER as that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and cleanup of the site has begun. Making this distinction is critical because, among other things, different training requirements and different exposure levels may apply depending on the phase of response. If post-emergency response is performed by personnel who were part of initial emergency response, it is considered to be part of the initial response and not post-emergency response.

### Weather Limitations/Adverse Conditions

Any outside work will be suspended if warnings for high winds, lightning, or tornadoes are sounded. Any operations utilizing cranes or personnel working on elevated steel will be suspended if wind velocity reaches 25 mph.

Personnel will assemble in the Excavator Room when severe weather approaches and/or signaled to do so via the Emergency Message System.

## 17.0 OCCURRENCE REPORTING

DOE's Occurrence Reporting Program provides timely notification to the DOE Complex of events that could adversely affect: public or DOE worker health and safety, the environment, national security, DOE's safeguards and security interests, functioning of DOE facilities, or the Department's reputation. DOE analyzes aggregate occurrence information for generic implications and operational improvements. The Program and its data system, the ORPS, are described in DOE Order 231.1A [Ref. 84] and its associated manual, DOE Manual 231.1-2 [Ref. 85].

DOE Order 231.1A arranges occurrences into ten groups that relate to DOE operations. These ten groupings are used solely for ease of reference and do not represent program requirements. The categories of occurrences are designed to be generic. The ten groups of categorized occurrences are:

1. Facility Condition
2. Environmental
3. Personnel Safety
4. Personnel Radiation Protection
5. Safeguards and Security
6. Transportation
7. Value Basis Reporting
8. Facility Status
9. Nuclear Explosive Safety (not applicable at the FCP)
10. Cross-Category Items

Implementation of ORPS at the FCP is performed by the Occurrence Reporting Team (ORT) of the Safety & Health Department, SH&Q Division, per SH-0028, *Occurrence Reporting* [Ref. 43] and SH-1006, *Event Investigation and Reporting* [Ref. 61].

### Price-Anderson Amendments Act (PAAA) Background and Implementation

The Price-Anderson Amendments Act (PAAA) of 1988 provides indemnification (i.e., "nuclear insurance") to DOE contractors who manage and operate nuclear facilities in the DOE complex. Under this act, DOE contractors, subcontractors, and suppliers are subject to criminal and civil penalties for violations of nuclear safety requirements. Civil penalties (fines) are assessed against companies (not individuals). Criminal penalties include incarceration for individuals at all levels where egregious violations are committed.

## EXECUTIVE SUMMARY

The purpose of this document is to establish the design and operating features necessary to manage the risk of fire associated with operation of the systems within the Silo 3 Process Facility. The descriptions and conclusions are based on the preliminary design documentation. The Silo 3 Project is supported by the Fernald Closure Project (FCP) infrastructure services including water supply for fire protection and contracted emergency response.

Potential fire scenarios were analyzed for the Silo 3 Process Facility, including the maximum credible fire loss and the maximum possible fire loss. It was determined that fire suppression systems are not required for the Silo 3 Process Facility. Areas subject to contamination have been provided with a fire detection system to detect a fire in the incipient stage to alert occupants, thus controlling the spread of fire. Fire detection and fire alarm systems are provided throughout the facility. DOE-STD-1066-99, Section 6.2.5 [Ref. 1], suggests that hose runs from hydrants to all exterior portions of protected buildings be no more than 300 ft. There are areas of the Silo 3 Project that exceed a 300 ft hose run from the closest hydrants; however, water pressure and hose diameter are sufficient to provide adequate protection.

PCN4

Water supplies, fire reporting, and designated emergency response will likely change over the next few years during operation of the facility. Changes that have occurred include the demolition of the elevated water tank used for firewater and the replacement of the site Fire Department with contracted services. Neither of these changes should jeopardize the level of protection required for the facility. Generally, except for the loss of the elevated tank, water supplies should be more abundant as existing sprinkler-protected facilities are demolished at the site. As a result of the readiness review, this document may require updating prior to facility operation to ensure that all changes are adequately addressed and that the level of protection is not diminished. Any change in the response times between the contracted services will be reviewed and evaluated, as required during service procurement.

PCN4

The conclusion of this Fire Hazards Analysis is that the fire risk of the Silo 3 Process Facility are low to moderate and will be adequately controlled by the fire detection/alarms design and operating features provided. The objective of protecting the public and the environment from fire-induced releases is met. The objective of protecting employees from fire is accomplished with detection, notification, and means of egress. The property damage and project downtime risks are acceptable for the duration of this project.

## F-1.0 INTRODUCTION

The following fire hazard analysis was prepared to satisfy DOE requirements for the proposed project. This effort was based on performing a fire hazards analysis as required by DOE Order 420.1, *Facility Safety* [Ref. 2]; and DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees* [Ref. 3]. The subject project is located at the DOE FCP at Fernald, Ohio:

The intent of this analysis was to review the proposed project in accordance with the proposed design documents and determine what, if any, design modifications, enhancements, etc., would be necessary to the fire safety and life safety elements of the project.

The purpose of a fire hazards analysis is to comprehensively and qualitatively assess the risk from fire within individual fire areas in a DOE facility to ascertain whether the DOE fire safety objectives delineated in Order 420.1 and Order 440.1A are met.

### F-1.1 Purpose

The purpose of this document is to establish the design and operating features necessary to manage the risk of fire associated with operation of the Silo 3 Process Facility for the retrieval and packaging of the Silo 3 material.

The potential fire hazards associated with the processes, structures, facilities, and equipment are identified, and the fire prevention and protection strategies are outlined.

### F-1.2 Approach and Assumptions

The descriptions and conclusions in this document are based on the design documentation. The Silo 3 Process Facility is supported by the FCP infrastructure services including water supply and fire alarm systems, and by contracted fire and emergency response.

PCN4

A sprinkler system was not included in the design of the building for three chief reasons. First is the lack of combustibles. The main buildings are constructed primarily of steel and concrete. The combustible materials, e.g., insulation in the walls, roofing, and the membrane-covering meet code for fire resistance or are self-extinguishing. Most of the contents of the building are not combustible either. The few combustibles, listed in Section F-1.3 are widely dispersed so that the likelihood of fire spread is low. Second, in many areas contamination may be present and activation of a sprinkler head would cause its spread, greatly increasing the cost of recovery. Third is the duration of the project, scheduled for completion in less than 9 months from start to finish.

- **Chemical and Toxic Hazards:** Two chemicals will be used in the process, ferrous sulfate and sodium lignosulfonate. Both chemicals will be supplied as aqueous solutions and will remain in solution (in an even more diluted form) during use. Ferrous sulfate is not combustible, and sodium lignosulfonate will only burn if dried out. With the detection/alarm systems provided, none of the fire scenarios should involve the release of hazardous or toxic chemicals.

#### F-4.6 Fire Protection Water Run-Off

Water for fire fighting would only be used in the non-contaminated areas of the facility. Therefore, this should not create a contaminated water run-off problem greater than normal storm water run-off, since no breach of contaminated areas would occur.

#### F-4.7 Natural Hazards (Earthquake, Flood, and Wind)

Wind is the only natural hazard that could exacerbate a fire by allowing a fire to propagate between the trailer and the Process Building (Section F-6.4, MPFL). Earthquake and flood potentials do not affect the fire risks.

### F-5.0 FIRE PROTECTION

#### F-5.1 Water Supply

An adequate fire-protection water supply is available from the FCP site (Section F-1.4). Fires in areas that cannot be handled with portable fire extinguishers will be suppressed manually by the subcontracted fire department. The Silo 3 Civil Utility Plan, Drawing No. 94-X-3900-G-01299 [Ref. 10], outlines the site plan and the fire hydrant locations.

#### F-5.2 Fire Suppression

The Implementation Guide for DOE Orders 420.1 and 440.1 (paragraph 9.7) [Ref. 20] states that DOE has an obligation to provide protection for its facilities so that a fire will not result in an unacceptable program delay or property loss. Consequently, DOE considers any facility in excess of 5,000 ft<sup>2</sup> in ground floor area and any facility with a maximum possible fire loss (MPFL) of \$1 million (\$10 million approved at FCP via DOE memorandum, DOE-0320-99 [Ref. 21], J. Craig to G.L. Denver, January 22, 1999, *Change in Maximum Possible Loss Criteria at the Fernald Environmental Management Project*) as warranting protection by an automatic fire suppression system. The packaging area of the Silo 3 Process Building has a ground floor area of 5,700 ft<sup>2</sup> and Occupancy Classification of Group F-2 (Low Hazard). Group F-2 Occupancies do not require that an automatic sprinkler system be provided. On Feb. 1, 2000, a DOE memorandum provided FCP with a fire suppression system exemption [Ref. 22]. A fire detection and alarm system has been installed throughout the Silo 3 facility to assure occupant notification of emergencies. Fire

extinguishers are provided throughout the Silo 3 facility. They are located external to the fire hazard areas and near access ways so that incipient fires can be extinguished.

Fire suppression for the trailer emphasizes manual fire fighting. Normally-occupied areas have been provided with fire detection and alarm systems to assure prompt notification of emergencies to both occupants and to subcontracted emergency response. Portable fire extinguishers have been provided in accordance with NFPA 10, *Standard for Portable Fire Extinguishers* [Ref. 23]. Because of the lack of continuity of combustibles and the provisions of the fire detection system (see Section F-5.3), credible fires will be incipient in nature and can be suppressed using portable extinguishers. Because of the limited size and low or moderate hazard use, no automatic sprinkler protection is required. A trailer fire that is not controlled with portable extinguishers will require hose lines operated by the subcontracted fire department. The water supply distribution system to the Silo 3 area is a dead end run hydrant. This dead end run hydrant is within 290 ft of the supply tie-in point. There are parts of the Silo 3 Project that exceed the suggested maximum hose run distance of 300 ft distance from a hydrant, as specified in DOE STD 1066-99, Section 6.2.5 [Ref. 1]. However, water pressure and hose diameter are sufficient to provide adequate protection. The parts of the facility that fall outside this suggested hydrant support area are the Operations Support and Change Trailer, and the north and northwest sides of the Silo 3 Enclosure.

### F-5.3 Protective Signaling System

#### Fire Detection

The Silo 3 Process Facility has been provided with fire detection and alarm systems to assure prompt notification of fire emergencies to building occupants.

Detectors have been installed in accordance with NFPA 72, *National Fire Alarm Code* [Ref. 24], and are connected to the Silo 3 Process Building Fire Alarm Control Panel.

#### Fire Alarm System

In the Silo 3 Process Building, there is a central Fire Alarm Control Panel with Protected Premises units that will alarm locally or in the protected premises only. Manual pull boxes have been installed in accordance with NFPA 72 and the IBC. Notification devices consist of horns and strobes and are installed in all areas in accordance with NFPA 72.

#### Smoke Detection System

Industrial-grade duct smoke detectors powered by 24V with battery back-up have been installed in the facility. Photoelectric spot type smoke detectors have been installed in the Cargo Container Bay, Packaging Area, Storage Area, Waste Water Area, Electrical Building, Operations Support and Change Trailer, Corridors, Air Locks, supply air plenums for the air conditioning units and the Cargo Container Bay Air Handling Unit.

Each device is wired to the central Fire Alarm Control Panel (FACP). Upon activation, the FACP activates Silo 3 Project fire alarm horns/strobes. The Silo 3 Project also has numerous voice-message speakers.

PCN4

#### Heat Detection System

Combination rate-of-rise/fixed temperature type heat detectors have been installed above potentially dusty areas (i.e., rubber belt conveyors, within the air handling system, and in the Excavator Room). Each heat detector has a discrete address, will sound a general alarm.

PCN4

#### **F-5.4 Fire Department Response**

Fire pre-plans have been developed for each fire area to outline the fire-fighting strategies and precautions required for the Silo 3 Process Facility. These pre-plans have been developed and reviewed with the Crosby Township Fire Department. Selected Silo 3 Process Facility project employees will receive incipient fire training regarding portable extinguishers and the alarm system.

### **F-6.0 FACILITIES, EQUIPMENT, AND PROGRAM PRESERVATION**

#### **F-6.1 Essential Safety Class Systems**

No systems are considered essential safety class systems for this project as determined per the Silo 3 accident analysis in Appendix G of this N-HASP.

#### **F-6.2 Vital and Critical Program**

##### Vital Program Impact

A fire in the Process Building would be local and involve only one piece of equipment due to the lack of combustibles and their separation. As a result, recovery would not be more damaging to cost and schedule than other events such as the failure of containment (and the spread of contamination) or equipment failure. Areas where there are combustibles are areas where there is usual occupancy so that personnel would likely be available to mitigate the incipient fire immediately. In addition, the fire detection devices and alarms provided in these areas would alert others to help minimize damage and downtime.

### Primary Equipment

All components involved with the retrieval, conveyance, and packaging of silo material are primary equipment. The fire detection system reduces the significance of a fire involving any of these components.

#### **F-6.3 High-Value Equipment**

The following values were obtained from estimates and procurements to date:

• Inclined conveyor:	\$125,000
• Packaging system bag loaders:	\$400,000
• Package heat sealers:	\$320,000
• Excavator:	\$450,000
• Pneumatic Retrieval - Vacuum Blower Skid:	\$100,000
• Pneumatic Retrieval Collector:	\$120,000
• Pneumatic Retrieval Cartridge Filter:	\$65,000
• Motor control centers:	\$125,000
• 480-volt feeder:	\$81,000
• Control System:	\$200,000
• Continuous emissions monitor:	\$90,000
• Personnel contamination monitors:	\$90,000
• Tennelec counting systems:	\$90,000
• Process Vent System Collectors:	\$90,000
• HVAC:	\$275,000
• Trailer:	\$135,000
• Tanks:	\$90,000

#### **F-6.4 Facility Fire Loss Potential**

The maximum credible fire loss (MCFL) and MPFL potential in each fire area includes the cost of property loss, recovery, cleanup, and replacement.

##### **Maximum Credible Fire Loss**

- Fire Area 1 – Process, Excavator, and Cargo Container Buildings, and Silo 3 Enclosure:  
The MCFL is a fire in the packaging area of the Process Building that would result in damage to one of the two Container Management and Packaging Systems. The

property damage would be approximately \$800,000. Because of the redundant container management and packaging systems this MCFL would have little programmatic impact on the project.

- Fire Area 2 – Operations Support Area: The MCFL is a fire in the Operations Support and Change Trailer. An electrical fire could do significant damage to the trailer and control systems because of the trailer's frame construction. The property damage would be approximately \$900,000. This MCFL would have a programmatic impact on the project.

#### Maximum Possible Fire Loss

- Fire Area 1 –Process, Excavator, and Cargo Container Buildings, and Silo 3 Enclosure: The MPFL is a fire in the packaging area of the Process Building that would result in the loss of the Container Management and Packaging Systems, as well as all ancillary equipment. The property damage would be approximately \$2,500,000. This MPFL would have a programmatic impact on the project because the majority of the equipment is not readily replaceable.
- Fire Area 2 – Operations Support Area: The MPFL is an unmitigated fire in the trailer during high wind conditions and is the same as the MCFL for this area. The resulting damage would include the trailer with similar property damage of approximately \$900,000. This MPFL would have a programmatic impact on the project, but these facilities and associated equipment are more readily replaceable than those associated with Fire Area 1.

#### F-6.5 Emergency Planning

The Silo 3 Process Facility Project emergency planning will be integrated with PL-3020, the FCP Emergency Plan [Ref. 25], EM-0030, *Silos Area Emergency Procedure* [Ref. 26], and EM-0020, *Building Emergency Procedure* [Ref. 27], as warranted.

PCN4

#### F-7.0 CONCLUSION

The conclusion of this Fire Hazards Analysis is that the fire risk of the Silo 3 Process Facility are low to moderate and is adequately controlled by the fire detection/alarms design and operating features provided. The objective of protecting the public and the environment from fire-induced releases is met. The objective of protecting employees from fire is accomplished with detection, notification, and means of egress. The property damage and project downtime risks are acceptable for the duration of this project.

A small, localized fire in the contamination areas (see Section F-1.3) will be detected in the incipient stage and can be controlled with portable fire extinguishers and/or the ventilation system to isolate the areas.

THIS PAGE INTENTIONALLY BLANK