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Incident Response Template

Template for On Site Storage Fire Handbook

This response template was written with a focus on silo and dome incidents. However, most of the line items are suitable for warehouse storage and can form the basis for a flat storage plan.

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1. Purpose

To give clear instructions to site employees and Management personnel on the immediate and long-term actions related to the management of a fire or smolder in a storage facility.

2. Scope

To focus attention on the safety of all workers, the vessel and its contents.

All efforts will be to suppress the exothermic event while safely evacuating the vessel of material all while isolating the exothermic event to the one location on the site.

3. Personal Protective Equipment Required

List all PPE required to complete the job safely

- ✓ Hard Hat
- ✓ Hi-Vis Apparel
- ✓ Gloves
- ✓ Eye Protection
- ✓ Hearing Protection
- ✓ Steel Toed Boots

  - Respirator as required.
  - SABA (self-contained breathing apparatus) as required

4. Regulation and Reference Material

- Part 3 Division 3 - 115 General duties of employers - Henry Persson – Silo Fires handbook.
- Other regulations that are specific to the jurisdiction in which the storage is located. [place specific information here]

5. Definitions

Atmospheric exposure.

- STEL – short term exposure limit: is the acceptable average exposure over a short period of time, usually 15 minutes as long as the time-weighted average is not exceeded.
- TWA – time weighted average is the average exposure over a specified period, usually a nominal eight hours.
- IDLH – immediately dangerous to life or health: as exposure to airborne contaminants that is "likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment."

6. Procedures

6.1. If an exothermic event is discovered in a storage vessel, follow site procedures to conduct a controlled shut-down

6.1.1. Safely shut down the plant
6.1.2. Stop the infeeds to the storage
6.1.3. Stop all unloading of rail cars or trucks

6.2. Initiate a site evacuation (follow protocols developed in a separate handbook)

6.2.1. Cease all contractor work and ensure all workers are accounted for
6.2.2. Keep any contractors on stand-by in case extra manpower is required

6.3. Contact the following;

6.3.1. Plant manager or designate

6.3.1.1. The Plant Manager or designate will communicate to other corporate individuals

- VP of Operations – to inform senior Management
- Safety and Environment Manager – to assist with on-site safety, communication with regulatory officials
- Production Manager – to coordinate shift coverage/scheduling
- Maintenance Supervisor – to coordinate shift coverage/scheduling, contractor management
- Maintenance Purchaser/Planner – to procure required supplies, contractor management
- Logistics Manager – to coordinate truck or rail deliveries as required, contact corporate logistics/sales
- Corporate Controller – to communicate to insurance carriers
- Sales and Logistics Manager – to manage biomass deliveries to the site

6.3.2. Emergency responders – [local responders name and number here]

6.3.2.1. DO NOT HESITATE TO CALL. The Control Room Operator can call the local responders as required.

6.4. The Safety and Environment Manager is responsible for contacting Regulatory officials;

6.4.1. [name of regulatory agency here]

6.4.1.1. [name and number of official here]

6.5. Contractors will be contacted by their site contact

6.5.1. Inform the company of the situation

6.5.2. Work may need to be suspended depending on the nature and location of the work

6.6. Biomass (pellets, PKS, chips) delivery contractors will be notified of the situation by the Sales and Logistics Manager

6.6.1. Deliveries may need to be suspended

6.7. Set up the Incident Command team as per the emergency response plan – ERP;

6.7.1. Senior management representative – making the critical decisions

6.7.2. Management representatives – in charge of on site decisions

6.7.3. Safety/Environmental representative – communication with regulatory bodies, assisting in risk assessments of activities, providing support for any safety /environment concerns

6.8. Storage fire external resource – contact an external resource to assist in the decision making process

6.8.1. John Swann – (778) 281-1953, john.swaan@futuremetrics.com

NOTE: Do not open the vessel; the immediate goal is to eliminate the introduction of oxygen to the exothermic source

NOTE: THE FOLLOWING NEEDS TO BE DONE, BUT THE ORDER MAY NOT BE AS LISTED

6.9. Have clear communication with emergency responders as to the plan of approach.

6.9.1. **Before the storage is filled, provide copies of Henry Persson's Silo Fires handbook to the emergency responders.**

6.9.1.1. **Have them review the handbook so they are educated on the proper method of approaching the storage smolder/fire**

6.10. Determine what type of fire is in the storage

6.10.1. Smolder – smoke is emitting from the top

6.10.2. Open flames – flames are visible coming out of the storage

6.10.3. Is fire/smolder in the center of the storage – temperature monitors indicate high temperatures within the center or other area of the storage

6.11. Conduct an assessment to determine the access zone for workers.

6.11.1. Access the atmosphere using gas monitors to ensure the area is safe for human occupancy

6.11.1.1. Oxygen levels are between 19% to 23%

6.11.1.2. LEL is below 10%

6.11.1.3. Carbon monoxide (CO) levels are below the exposure limits;

- TWA: 25 ppm
- STEL: 100 ppm
- IDLH: 1200 ppm

6.11.1.4. Carbon Dioxide (CO_2) levels are below the exposure limits;

- TWA: 5000 ppm
- STEL: 15000 ppm
- IDLH: 40000 ppm

6.12. Close up the storage

6.12.1. Stop storage roof fans which close the dampers at the top of the storage

6.12.2. Do not put any more product into the storage

6.12.3. Stop all fans blowing air into the storage

6.13. Call Nitrogen supplier – [name of supplier here]

6.13.1. Cylinders, Containers & Tanks, Transportation – [contact number here])

6.13.2. National Sales Manager – [contact number here]

6.13.3. Arrange for a truck load of nitrogen to be delivered to the site. **Determine in advance how long a truck load of nitrogen will last**. Plan for additional shipments accordingly.

6.14. Measure the headspace gas and record every 20 minutes

6.14.1. Keep a documented record of the results

6.15. Attempt to inert the smolder inside the vessel with nitrogen

6.15.1. Avoid the use of carbon dioxide for the following reasons;

6.15.1.1. As CO_2 vaporizes, this can create a hazardous atmosphere for area workers

6.15.1.2. The inability to transfer the CO_2 effectively – vaporizer freezes up

6.16. Set up a TMVU – (trailer mounted vapor unit) if a vaporizer is not permanently onsite.

- 6.16.1. Hook up the nitrogen lines to the piping inside the storage, or;
- 6.16.2. Make up nitrogen probes with 1/16" holes spaced 1" apart along the entire length of the piping
- 6.16.3. Insert nitrogen probes into the vessel radially as close to the bottom as possible

6.17. Initiate fire suppression activities depending on the following;

- 6.17.1. Fire activity – active fire with flames vs. smoke emitting from vents
- 6.17.2. Vessel level
- 6.17.3. Ability to access the vessel safely
- 6.17.4. On agreement of the incident command team
- 6.17.5. The nature of the exothermic event – if the event is becoming more volatile

6.18. Set up site access control

- 6.18.1. Site loader operator can complete these duties
- 6.18.2. ALL who enter the site must sign in and sign out – no exceptions
- 6.18.3. Limit access to the site to only one area
- 6.18.4. If site resources are limited or the event will last several days, call a contactor to assist
  - 6.18.4.1. [name and number here]

6.19. Incident Commander is to set up shift coverage with local emergency responders

- 6.19.1. Depending on atmospheric levels, all work may require use of SABA units
- 6.19.2. This work can only be done by emergency responders trained in use of this equipment

6.20. Plan to empty the storage

- 6.20.1. Contact a trucking company to transport the burnt pellets – 2 to 3 dump trucks required
  - 6.20.1.1. [names and numbers of trucking company here]
- 6.20.2. Clear any trucks or rail cars holding biomass from the area
- 6.20.3. Set up the transfer belts so they by-pass the shaker and the pellets can be loaded directly into a dump truck
- 6.20.4. Set up spark suppression while loading pellets into the truck
  - 6.20.4.1. A manned fire hose to spray the pellets and suppress any embers/fire
- 6.20.5. Transfer the contaminated pellet material to an area that is sealed (paved) and far enough away from any biomass storage piles
  - 6.20.5.1. Ensure that another manned fire hose is present while spreading out material
- 6.20.6. Store the material in a segregated pile
- 6.20.7. Monitor the material for smolders for at least 24 hours

6.21. Apply a blanket of foam to the top of the material inside the storage if possible

6.21.1. Use an AR-AFFF Foam[1] thru a high expansion device to create a medium expansion foam with a polymer layer to retard drain down and create a barrier to hold the nitrogen within the pellet storage

6.22. Set up area atmosphere monitoring to ensure it meets the exposure limits;

6.22.1. O_2 = 19% to 23%

6.22.2. CO = TWA: 25 ppm, STEL: 100 ppm

6.22.3. CO_2 = TWA: 5000 ppm, STEL: 15000 ppm

6.22.3.1. If atmospheric readings indicate any exceedance, all workers in the affected area MUST don SABA to conduct any task

ATTENTION: CO LEL = 12.5% (125000 ppm). Immediately evacuate the area if high levels of CO are detected, greater than 100000 pm or 10%

6.23. Measure the atmosphere in the head-space of the vessel containing the exothermic event. The goal is to keep the LEL below 10%, this reading will be used to manage the flow of nitrogen into the bottom of the vessel

6.23.1. Use the water line from the deluge system on the side of the storage

6.23.1.1. Attach a low flow suction on the pipe coupling – shop-vac

6.23.1.2. Feed the discharge from suction into a small container (205 liter barrel)

6.23.1.3. Put atmospheric monitoring probe in the small container

6.23.1.4. Allow sufficient time for air to be drawn into the small container to get a reading of atmosphere inside the vessel with an exothermic event

6.24. Use thermal temperature readers to measure the external surface of the vessel at all levels, on all sides

6.24.1. Use water on the outside of the vessel to aid in controlling temperature

6.25. Incident Commander to assign responsibility to an individual employee on each shift to monitor the smoke exiting the vessel

6.25.1. Notify the Incident Commander if the color changes from white to dark or visa versa

6.25.2. Notify the Incident Commander if the volume is increasing or decreasing

6.26. Work with fire services team in efforts to managing the exothermic event –

<u>do not rush into</u> <u>any decision</u>

[1] Alcohol Resistant Aqueous Film-Forming Foam – This formulation combines fluoro- and hydrocarbon-surfactant technologies to provide superior fire and vapor suppression hydrocarbon fuel fires.

6.27. Hold a safety start-up meeting at the start of each crew shift

6.27.1. Develop safety plans for each task

6.27.2. Include all workers in the discussions so everyone was involved in the plans

6.27.3. With any task at hand, work with a sense of urgency, but do not proceed without conducting a proper hazard assessment and agreement from the incident command team

6.28. Inform everyone on site to refrain from using personal devices to capture pictures or videos

6.28.1. Maintain appropriate shift schedules for all employees;

6.28.2. Site hourly employees are not work beyond their regular working hours

6.28.3. Management members are to sign-in and out each day to ensure they are getting enough recovery time between shifts

6.28.4. Use standard protocols. For example,

6.28.4.1. 8 hours of time off is required between each shift

6.28.4.2. A 32 hour continuous break is required per week

6.29. Once storage is empty

6.29.1. Conduct a thorough clean-up of all equipment and tools used for the event

6.29.2. Arrange to have the storage inspected for structural integrity

6.29.3. Configure the belt transfer system back to original specifications

7. Communication Methods

7.1. Daily toolbox meetings

7.2. E-mail conversations

7.3. Site radio use

7.4. Cell phone conversations including text messages

8. Associated Documents

8.1. Henry Persson – Silo Fires article

9. Revisions Table

Document Owner: Safety & Environment Manger **Order of Revisions**	**Date**	**Author(s)**
Created:		

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Acknowledgement Form to be signed by every worker

I have read and understand the Storage Fire Management Procedure.

I further understand that should I have any questions or concerns related to this Storage Fire Management Procedure, I am required to advise my Supervisor immediately.

Employee Name (Print)	Employee Signature
Supervisor Name (Print)	Supervisor Signature
Date	