



JOB HAZARD ANALYSIS

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DIVISION Borden Chemical		LOCATION or BRANCH Leominster
DEPARTMENT PVC	SECTION	JOB TITLE Reactor Cleaning
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE
1. Air Out Reactor	1. Lack of air and residual vapors of MVC, MVA, TCE, etc. could cause fatality. <i>MVC must be below 500 ppm</i>	1. Use exhauster keeping hose one to two feet above bottom of reactor. Be sure exhauster in pulling (use hand to check). 2. Open bottom valve (opening not plugged spool pieces disconnected) as vapors are heavier than air. 3. Get operator to double check. 4. Reactor must air out 20 minutes minimum.
2. Lock Out Reactor	1. Accidental starting of reactor agitator would cause fatality. 2. Wrong (reacting reactor) locked out could cause pressure buildup and runaway batch.	1. Double check reactor number 2. Go to MCC room and throw switch to off position. 3. Insert lock on handle. 4. Return to reactor room. 5. Try start button on reactor. 6. Pin out stop button. 7. Get operator to double check.
3. Valve Off Reactor	1. Same as item 1-1 above.	1. Close all valves on all manifolds. 2. Open bleeder valves on all manifolds. 3. Open manual vent. 4. Have operator double check.
4. Set Up Safety Equipment	1. Used for vessel rescue and notifying others of problem. BOR 000208	1. Move rope fall to directly above manhole. 2. Put on wrist straps. 3. Activate alarm cart by plugging it in electrically. 4. Check alarm cart for proper operation. a. Light must be on. b. Manual pull must work. 5. Have operator double check 6. Put cords into reactor.

PREPARED BY: Russell L. Mercier

DATE: July 30, 1971

REVIEWED BY: John Isler, Jr.

DATE: August 3, 1971



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5. Install Ladder	1. Improperly installed ladder could fall and result in a fatality.	1. Check ladder to be sure it has no broken or cracked rungs or wet or slippery rungs. 2. Be sure it has rubber feet 3. Install ladder by putting it in feet first. 4. Ladder feet must straddle one blade. 5. Be sure feet rest securely on the bottom and do not set over the bottom outlet. 6. Test ladder to be sure it is stable by trying to move it sideways and back and forth
6. Enter Reactor	1. Fall from ladder. 2. Overcome by vapors, etc. 3. Cut from scraper not in pouch. 4. Drop tools or fall on man below.	1. Be sure reactor has been aired out for 20 minutes. 2. Be sure all tools are in the pouch. No pointed ends are to be exposed. 3. Install "Man In Reactor" sign. 4. Be sure someone is present 5. Climb the top of the reactor dome. 6. Facing the front of the reactor, carefully step onto the top rungs of the ladder. 7. Hold on to the manhole and be sure the ladder is stable. 8. Decend the ladder one step at a time. 9. If at any time, vapors are observed, immediately leave the reactor. 10. Go immediately to the bottom of the reactor, check for vapors. Your sense of smell can be deadened if you don't do this first.

BOR 000209

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DIVISION		LOCATION or BRANCH
Borden Chemical		Leominster
DEPARTMENT	SECTION	JOB TITLE
PVC		Reactor Cleaning
SEQUENCE OF BASIC JOB STEPS	POTENTIAL ACCIDENTS OR HAZARDS	RECOMMENDED SAFE JOB PROCEDURE
7. Clean Reactor	1. Chips in eyes. 2. Cuts from scraper. 3. Vapors causing death. 4. Falls from ladder. 5. A.O.L. 6. Improper cleaning of thermowell, bottom outlet or recovery header or manual vent could lead to an explosion, death or plant disaster. 7. Improper cleaning of dome and walls will also lead to quality problems due to fisheyes and poor heat transfer and increased particle size.	11. Check that bottom outlet valve is open. 12. Check that plugs and valves are all closed on manifold valves. 13. Check that manual vent is open. 1. Always wear PVC coated gloves to reduce possibility of A.O.L. 2. Always wear eye protection. 3. Whenever vapors are present sound the alarm on alarm cart. 4. Always scrape away from you. Scrapers are razor sharp and can cut severely. 5. Never over reach when on a ladder. Always get down and move the ladder, being sure it is always stable and straddle the blade. 6. Only one man on a ladder at a time. 7. Never stand under the ladder when another man is on it. 8. Reactor bottoms are round and slippery. Always use extreme caution. 9. Be sure all lines are cleaned - manual vent, relief valve, charge nozzles, etc. 10. Pick up all tools and polymer before leaving the reactor. 11. Exit from the reactor in reverse order of entering.
8. Remove all Safety Equipment	1. Loss of equipment and possible charge of reactor with flashlight or other	1. Be sure to remove all cords from the reactor. 2. Remove ladder.

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9. Unlock Reactor Agitator	object inside causing contamination of product. 1. Loss of agitation. 2. Deactivation or activation of wrong agitator could cause an accident to someone else.	3. Reinstall rope fall to normal position. 4. Remove sign. 1. Double check reactor number. 2. Go to MCC room and remove lock from switch. 3. Return to reactor room and remove pin from stop button. 4. Check agitator to be sure it goes on. 5. Notify operator.

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