

To: Distribution

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Subject: POWER FAILURE PROCEDURES

Interoffice
Communication

VISTA

Attached is the revised copy of the Vinyl Power Failure Procedures. These procedures combine the outdated power failure manual and the thunderstorm preparation and procedures.

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bls

Attachments

c: JF, JWW, DWH, CWT, VINYL SHIFT SUPERVISOR(S)

I. INTRODUCTION

When a power failure occurs, the first consideration is the in-plant personnel and secondly, to secure the plant. When power is lost, the reactor agitators stop and cooling tower pumps and fans are lost. This makes each reactor in the polymerization mode a potential runaway reactor, where the pressure and temperature may rise significantly and uncontrollably. Most power failures are of short duration (just a few seconds) but occasionally an extended power outage will occur. All shift personnel must know what action to take in either situation. These procedures will be outlined in this manual along with steps to take once power is regained.

II. UNEXPECTED AND EXPECTED POWER FAILURE PREPARATIONS

Unexpected power outages are hard to plan for. Preparations can be made for expected power outages that could result from the presence of threatening weather such as thunderstorms.

- A. Weather Awareness - All operating personnel should be appraised of upcoming weather conditions. There are two ways to do this; the first is just looking at cloud patterns and current weather conditions. The second is the weather alert radio monitor in the Vinyl Shift Supervisor's office which will sound an alarm as severe weather approaches our area. The chance of a power outage increases during thunderstorms, and we should prepare ourselves accordingly.
- B. Dress For The Occasion - If thunderstorms are approaching, operations personnel should be prepared by getting rainsuits on in advance of rain downpour. All shift supervisors, chief operators, and reactor "A" operators should always carry a radio when outside the control room, regardless of the weather. All field personnel should have a flashlight and a pair of channel locks.
- C. Double Check Emergency AMS Systems - Prior to thunderstorms, all Emergency AMS Kill Systems are to be double checked. It is important that these systems work when needed.
- D. Preload Catalyst Bombs - Preload catalyst bombs of each reactor in polymerization mode with kill solution. This will allow these reactors to be killed on a timely basis if the decision is made to kill reactors early.
- E. Panel Operator Precautions - In the event of imminent severe weather, the panel operator in each module should take the following precautionary measures:
 - Normally kill any reactors which have been running at least four hours (three for D-700 and 745). These reactors will have a fair amount of resin conversion and will be one less reactor to worry about should a power failure occur.

II. UNEXPECTED AND EXPECTED POWER FAILURE PREPARATIONS (Cont.)

E. Panel Operator Precautions - (Cont.)

- Do not charge any reactors back until the weather front has passed and charging is approved by the shift supervisor.
- If possible, hold an empty reactor in each module down and under a vacuum. This will allow you to vent a reactor to another reactor if necessary.
- Keep a mental track of which reactors would need to be killed first and keep your shift supervisor, chief operator, and reactor "A" operator advised of which reactors he will have to kill and in what order if the power does go out.

F. Reactor "A" Operator Stationing - As severe weather approaches, the "A" operator for each module is to be stationed in that module and be prepared to manually kill reactors as necessary.

G. Shift Supervisor and Chief Operator Stationing - Shift supervisors and chief operators should be in the control room or in their assigned module.

Shift Supervisor - Old Module

Chief Operator - New Module

H. Panel Operator Stationing - All panel operators should be at their respective panel station.

I. Yard Operator - As severe weather approaches, the Yard Operator should shutdown all VCM unloading compressors and block in each liquid and vapor line. Contact Shift Supervisor or chief lead after this is done.

III. WHEN THE POWER GOES OUT

A. Short Duration Outage - Most of the power outages at the plant are of short duration (a few seconds). Actions during this time period mainly involve restarting equipment (reactor agitators, cooling tower pumps and fans, incinerator, etc.) but do not normally require use of the emergency systems. Panel operators should closely monitor each reactor during the time frame of the power outage and when power is restored to ensure that the agitator restarts, cooling water flow is re-established, and the polymerization reaction is under control. Reactors can be bumped/killed with AMS using the normal injection system if needed.

III. WHEN THE POWER GOES OUT (Cont.)

B. Extended Power Outage (Cont.)

a) Panel Operator Response (Cont.)

- Reset all panel alarms.
- The dryer panel operator is to turn on the emergency power systems by turning on the toggle switch in the supply room for the emergency lighting generator and place the battery pack in emergency by throwing the switch into the "emergency" position.
- The dryer panel operator is to be the timekeeper on how long the power has been out, and communicate this information with the reactor panel operators.
- The reactor panel operators should relay the status and pressure of each reactor to the affected field personnel.
- Reactor kill guidelines during a power failure:
 - Bump 5265/5305 batches using manual mode of AUTO system within thirty seconds after the power is lost. These products run at higher pressures and an increase in pressure in these reactors is more critical. Have shift supervisor or chief lead check outage in AMS pots to verify addition to reactor.
 - You will have between one and two minutes to kill the remaining reactors. All reactors must be killed within two minutes.
 - Reactors which have run the longest and those just reaching heat-up will tend to run away first.
 - Once a reactor starts to run away, it will become increasingly difficult to kill. The reactor contents stop swirling after three to four minutes and AMS injection is much less effective at this time.
 - The automatic kill system can be used in the "manual" mode to add short AMS injections to a reactor if the manual system is inoperable or if the weather is severe enough that it is not safe for the reactor "A" operator to climb to the top of the reactor structure. The shift supervisor will make the decision on the severity of the weather.

III. WHEN THE POWER GOES OUT (Cont.)

B. Extended Power Outage (Cont.)

a) Panel Operator Response (Cont.)

- The "auto" mode of the automatic system should be used as a last resort. If repeated short AMS injections are not successful in controlling the polymerization reaction (in conjunction with use of the Emergency Cooling Water System), the "auto" mode should be used which will inject the entire AMS pot contents into a reactor.
- After approximately five minutes (time necessary to activate the Emergency Instrument Air System), the Emergency Cooling Water System can also be used for reactor control. The Emergency Cooling Water System supplies enough cooling capacity for one reactor in each module. Do not use the Emergency Cooling Water System if there is inadequate firewater available to fight an existing fire since the diesel pumps supplying emergency cooling water also supply water to the plant's firewater system. Operating procedures for each reactor module are as follows:

New Module

1. Close CV-104 (New Module Recovery Cooling Water Supply Valve) by using the switch located on the new module recovery panel.
2. Open CV-102 (New Module Emergency Cooling Water Supply Valve).
3. Open the cooling water control valve on the reactor condenser that is to be supplied with emergency cooling water. Close off other cooling water control valves in the new module by placing the individual reactor cooling water flow controller in manual and setting the output at 0%.
4. Emergency cooling water flow can be switched from one reactor condenser to another by opening and closing appropriate cooling water control valves.

III. WHEN THE POWER GOES OUT (Cont.)

B. Extended Power Outage (Cont.)

a) Panel Operator Response (Cont.)

Old Module

1. Open CV-101 (Old Module Emergency Cooling Water Supply Valve) by using the switch located on the new module recovery panel.
2. Open the cooling water control valve on the condenser that is to be supplied with emergency cooling water. (Close all other cooling water control valves in the old module by placing the individual reactor cooling water flow controller in manual and setting the output at 0%.
3. If cooling water is needed for D-300 and D-400, open CV-103 (Emergency Cooling Water Supply Valve for D-300/D-400).
4. Emergency cooling water flow can be switched from one reactor condenser to another by opening and closing the appropriate cooling water control valves.
 - Switches for major equipment such as recovery vacuum pumps and compressors, charge pumps, etc. should be switched off to minimize a potential power surge when power is regained.
 - If power is lost during a charge, take all pumps out of AUTO position or charge will restart when power is restored.

C. Reactor "A" Operator Response

- If you are not on top of the reactors when the power goes out, you should go there immediately. The only exception is if the shift supervisor determines that the weather is too severe for the reactor "A" operator to safely climb to the top of the reactor structure. In this case, the reactors will be killed using the "manual" mode of the automatic AMS Kill System. This mode allows for short AMS injection through the automatic kill line.
- Bump any 5265 or 5305 batches running with AMS during the first thirty seconds of the power failure by opening the manual AMS injection valves for ten seconds or until the shift supervisor or chief operator instructs you to close the valves.

III. WHEN THE POWER GOES OUT (Cont.)

C. Reactor "A" Operator Response (Cont.)

- The shift supervisor or chief operator will be stationed at the base of the reactor and will check that the AMS pot level has changed.
- The panel operator will instruct you when to kill reactors and in what order. If you lose communication with the panel operator, the next step is visual communication with the shift supervisor or chief operator below. If this fails or is unclear, the reactor "A" should kill each reactor at that time.
- The reactor should be manually killed by opening the manual AMS injection valves for ten seconds or until the shift supervisor or chief operator instructs you to close the valves.
- If a ten-second injection does not kill a reactor, repeat ten second injections with pot and cross-over connections. The manual valves should be shut when the low level red flashing light comes on to prevent blanking the reactor condenser with nitrogen.
- When all reactors have been killed and are under control, assist the shift supervisor or chief operator in putting the duraseal systems on nitrogen, blocking in the catalyst injection systems, blocking in the mechanical seals on the recovery vacuum pumps and compressors, blocking in the VCM charge pumps, block in stripping steam supply to each reactor and to batch water strippers, and block in steam supply to blowdown tank. Monitor the nitrogen pressure on the duraseal systems. If the pressure does not hold, it will be necessary to block in the reactor seals.

D. Shift Supervisor and Chief Operator Responsibility:

- If you are not at the base of the reactors when the power goes out, go there immediately.

Shift Supervisor - Old Module

Chief Operator - New Module

- You will be responsible for monitoring the pots and making sure AMS gets in when the reactor "A" panel operator kills a reactor.

THIS IS AN AREA -
WHERE WE CAN
HELP AS DIRECTED
BY FIELD VINYL
PERS.

III. WHEN THE POWER GOES OUT (Cont.)

D. Shift Supervisor and Chief Operator Responsibility:

- The panel operator directs reactor killing from the control room. The shift supervisor may elect to kill reactors earlier at his discretion if in his judgment the situation is serious enough to do so.
- When all reactors have been killed and are under control, assist the reactor "A" operator in putting the duraseal systems on nitrogen, blocking in the catalyst injection systems, blocking in the mechanical seals on the recovery vacuum pumps and compressors, blocking in VCM charge pumps, block in stripping stream supply to each reactor and to the batch water strippers and block in steam supply to blowdown tank. Monitor the nitrogen pressure on the duraseal systems. If the pressure does not hold, it will be necessary to block in the reactor seals.
- The first responsibility of the "A" operators assigned to drier room is to start-up the Emergency Instrument Air System as soon as possible. The reactor panel operators cannot use the Emergency Cooling Water System until instrument air pressure is established. Cooling water is essential to reactor control. Start-up procedures for the Emergency Instrument Air System are as follows:
 1. Check to see if the generator is operating. The generator should start automatically on power failure. If the generator is not running, make sure the starting mode switch on the generator's control panel is in the "auto" position. If the generator still will not start, check the trouble indicating lights on the generator's control panel to determine the problem.
 2. Close the chain operated 3" cooling water valve located under walkway west of the Deltech building.
 3. Start the sump pump supplying cooling water to the Joy reciprocating air compressors and Deltech air dryer. This pump is the east - most pump on the north side of the chiller building.

III. WHEN THE POWER GOES OUT (Cont.)

D. Shift Supervisor and Chief Operator Responsibility:

4. Start the Deltech air dryer by pressing the local "start" button on the dryer's instrument panel. If the dryer does not start, press the "RESET" button on instrument panel and then the "START" button. If the dryer does not start, start air compressors.
 5. Start either no. 8 or no. 9 air compressor, located northwest of the Deltech building, by pressing the local "START" button.
 6. After the compressor has started and the air system pressure has risen to at least 40 psig, notify the vinyl control room that the Emergency Instrument Air System is operating and that the Emergency Cooling Water System can now be used.
- After the Emergency Instrument Air System has been started up and instrument air pressure has been established, the dryer "A" operators should then block in all blend tank aeration lines. This will prevent slurry from backing into the air lines. Also close slurry supply valves from each blend tank.

E. Yard Operator

- Lock out silo unloading valves to prevent valves from operating.

IV. WHEN THE POWER COMES ON

A. Panel Operator

- Check with shift supervisor, chief or "A" operator to see if duraseal units and mechanical seal purge water pumps have been restarted and that duraseal and lip seal flow to each reactor seal has been established. If so, restart agitators.
- The dryer panel operator should turn off emergency lighting generator and reset battery pack power to normal mode.
- Set up cooling water system to normal operating position by opening/closing Emergency Cooling Water valves.

IV. WHEN THE POWER COMES ON (Cont.)

B. Reactor "A" Operator

- Set up reactor agitator seals to normal operating position. Restart duraseal units and check reactor seals.
- Set up the VCM charge pumps to normal operating ~~problems.~~
CONDITIONS.
- Set up mechanical seals on the recovery vacuum pumps and compressors to normal operating positions.
- Check all catalyst ram valves to be sure all are closed and then set up injection systems to normal operating positions. The RESET switch must be depressed before the ram valve will operate.
- Measure and record outage in each of the AMS kill pots. Relay this information to shift supervisor or chief operator. Refill each pot to proper level.

C. Shift Supervisor and Chief Operator

- Restart cooling tower pumps and fans.
- Restart the on-line incinerator.
- Contact reactor "A" operators for outages in each AMS kill pot.
- Reset deluge diesel fire pumps.
- Once the threat of power outage has passed, instruct utility operator to return instrument air system to normal operating. The utility operator should also be told that the cooling water system has been returned to normal so that he can start chemical treatment of the water to prevent possible scaling in heat exchangers and condensers.

D. Dryer "A" Operator

- Once air pressure has been re-established, set up blend tank aeration.
- Flush slurry lines.
- Restart all equipment, one dryer line at a time.
- Empty cones on fluid bed.

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Once the power outage has passed and all systems have been returned to normal, the decision must be made as how to process the emergency killed batches. Accurate outages from all AMS kill pots are essential in determining what steps to take. The Vinyl Operations Supervisor or Superintendent will make the decision as to how each batch is to be handled.