

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator

General Information

→ The incinerators remove VCM from the recovered monomer (RVCM)
→ receivers inert vent stream via combustion with air. The vinyl
→ chloride emission standard limits the maximum concentration of
vinyl chloride in atmospheric vents to 10 ppm. To reduce the VCM
level in the RVCM receiver inert vent stream, the inerts stream
is first cooled to 40°F by the chillers on top of the receivers to
condense the majority of the contained VCM. Inerts (and VCM) are *burned*
in a high efficiency burner at an operating temperature of ~~2,400~~²²⁰⁰°F.
Hydrogen chloride is a byproduct of combustion.

the combustion process for
The liquid seal flame arrestor prevents ~~burning VCM or natural gas~~
from flashing back through the inert vent line to the VCM re-
ceivers. The flame arrestor is a small vessel filled 1/3 to 1/2
full with an ethylene glycol solution. The inert vent line from
the recovered VCM receivers enters the flame arrestor just above
the liquid level. Internal baffles direct the flow of gases down-
ward, into the liquid. The inerts and VCM vapors pass ^{l.w.d.} underneath
the baffle and exit out the top of the flame arrestor. A separate
line runs to each incinerator from the flame arrestor.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

General Information (Continued)

The combustion gases from the incinerator are scrubbed with water in the quench tank and the packed scrubber. The incinerator's effluent gases are cooled and the hydrogen chloride is absorbed in the water, forming hydrochloric acid. *which is discharged to the open sewer south of the incinerator of immediately*

Both the incinerators are not to be operated at the same time.

Each incinerator has a double block and bleed valve assembly in the inerts feed line. These block valves will be closed whenever the incinerator is not in "high fire". This prevents flashback from one incinerator to the other. A manual block valve at the flame arrestor should be closed for the incinerator that is being used as the spare.

The major operating parameters of incinerator operations are as follows:

1. Both incinerators will operate continuously, either in the "high-fire" ^{or} ~~x~~ "low-fire" position ^{the} or a "pilot-on" position.
 - a. The "high-fire", or vent position is used when venting the inerts stream to the incinerator. This position provides maximum combustion air flow to the incinerator's combustion chamber to insure that sufficient air is available for combustion.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Safety Procedures

Items which are of particular concern for working safely around the incineration system are as follows:

1. Hydrochloric Acid - One of the byproducts from the combustion of vinyl chloride is hydrogen chloride. The hydrogen chloride is absorbed in water forming hydrochloric acid. Hydrochloric acid and hydrogen chloride are poisonous and very corrosive.

Contact with either one causes burns and ulceration of the skin. A safety shower and eyewash basin are provided at the incinerator site. The eyes or skin should be flushed immediately with water for five minutes or more following contact with hydrochloric acid. Any water in the incinerator area

may contain hydrochloric acid. *All incidents of this nature must be reported to the Supervisor immediately so first aid attention can be given.*

When working around the quench chamber or scrubber where there

is any possibility of coming in contact with the process streams, full face ^{Shield} ~~mask~~ *Chemical splash goggles (if under pressure)*, protective rubber gloves (not cloth or leather) and clothing are required to avoid skin contact. The

quench chamber and scrubber water should be drained to the sewer and then flushed with city water before opening ^{either} ~~the~~ unit for maintenance or inspection.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Safety Procedures (Continued)

2. ^{High} Hot Metal Temperature - The shell of the combustion chamber is not ins^ulated. If it were insulated, high temperatures would be generated at the carbon steel surface which would affect the integrity of the metal. When the incinerator is operating, the outside surface temperature of the combustion chamber will exceed 300°F. Contact with the combustion chamber must be avoided unless protective clothing is worn.

3. Explosive Mixtures - When the fuel gas and combustion air control valves are adjusted for proper firing rates, an oxygen analyzer ^{is} ~~should be~~ used to determine the quantity of oxygen in the stack gases. Excess oxygen should always be present in the stack gases to avoid forming explosive gas mixtures. ^{and to prevent smoking in} ~~the~~ the incinerator.

^{the} amount of oxygen in the stack gases should range from three to seven percent on a dry gas basis under all firing conditions. The unit should never be run during oxygen deficient conditions (that is, when no oxygen is detected in the stack gases). If this ~~were to~~ happen, the incinerator must be shutdown and placed in the purge cycle to remove the flammable gases.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Relighting Procedure (Continued)

4. Record on the incinerator checklist the time that venting begins.
5. When the receiver pressure falls to below the ~~vent~~ ^{receiver} vent pressure, the lead operator will put the incinerator back in low-fire. The control valves ^{and double block valves} will close and the incinerator flow should drop to zero.
6. The lead operator will record the time that the vent ^{is} ~~was~~ shut off on the incinerator checklist.

Glycol Supply Drum Fill Procedure

The glycol supply drum holds ethylene glycol for filling the incinerator liquid seal flame arrestor as needed. Pressure is maintained at 10 psig on the supply drum using nitrogen. When the supply drum level gets below 1/4 full, glycol must be made up into the drum using the following procedure:

1. Move a 55-gallon drum of ethylene glycol to the supply drum area.
2. Install a drum pump in the drum of ethylene glycol.
3. Attached a hose from the discharge of the drum pump to the hose connection on the supply drum.
4. Check the valves in the outlet of the supply drum and make sure they are closed.

What drum pump. There may be a chemical compatibility problem w/ a common use pump.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Control Room Panel Alarms (Continued)

→ 3. High Firebox Temperature (Setpoint 2600°F) X

- a. Check the pyrometer signals for error. Switch to the other pyrometer if this is the source of the problem.
- b. Check the temperature controller to make sure the fuel gas valve is closed. The setpoint for the fuel gas temperature control valve should always be less than the setpoint for the steam temperature control valve. If the fuel gas valve is closed, the steam valve should be open.
- c. Switch to low-fire if venting. In the low-fire mode have an outside operator check steam flow and pressure. If the temperature continues to rise, the unit will automatically shut down.
- d. Check the combustion air pressure ^(must be above 44 inches of water) and line for sufficient air supply to the burner.

→ 4. Low Firebox Temperature (Setpoint ¹⁵⁰⁰~~2500~~°F) X

- a. Check the temperature indicators to see if the controlling pyrometer signal is in error. If it appears to be drifting, switch to the other pyrometer for control.
- b. Check ^{the} steam temperature control valve for steam addition.

The steam valve should be closed. The setpoint for the fuel gas temperature control valve should always be greater than the setpoint for the steam temperature control valve.

See P 23 bottom
Do they match?

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Control Room Panel Alarms (Continued)

4. Low Firebox Temperature (Continued)

Check the fuel gas temperature controller to make sure the fuel gas valve is fully open. If the temperature continues to drop while venting, switch to low-fire.

- d. If the temperature is decreasing in the low-fire mode, have ^{the chief} ~~an outside~~ operator check the fuel gas flow and burner pressure. If the burner pressure is not normal, the burner may be plugged or the gas regulator may be malfunctioning. Shut the unit down *and correct the problem.*

- e. Check the combustion air pressure ~~and line~~ for sufficient *Same for Previous page?*
air supply to the burner.

f. Check the fuel gas flow rate on the local indicator. At low fire the gas flow should show 30% on the meter (300 SCFH). If below 30%, check the gas valve linkage to see if it is loose or has slipped. Contact

5. Steam Valve Open - This alarm comes on when the steam valve

that is used for cooling comes on. Upon acknowledging the alarm, the lead operator should check the fuel gas valve to make sure it is closed. If it is not closed, either the fuel gas temperature control valve setpoint is set incorrectly or there is a malfunction in the instruments, requiring a maintenance work order. The setpoint for the fuel gas temperature

control valve should always be set below the steam temperature control valve setpoint. The lead operator will also check the

flow of inerts to the incinerator and may need to reduce the flow if it is too high. The flow should normally be set at 3 roots of flow (300 SCFH).

Instrument maintenance to repair the linkage is needed.

Previous page

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Control Room Panel Alarms (Continued)

6. Malfunction Alarm (or Malfunction Summary Alarm) - This alarm *indicates that a malfunction alarm has occurred*
~~Alarm~~ at the local incinerator panel. The lead operator will notify the chief operator who will check the local panel and correct the alarm condition as soon as possible.
7. Total Water Low Flow (Setpoint 30 gpm) - A water flow less than 30 gpm through the total water flow meter will shutdown either incinerator if it is in the RUN mode.
- a. Check the water pressure before and after the strainer.
If the pressure drop is excessive (more than 20 psig), switch to the spare strainer and clean the dirty strainer as soon as possible. *Each incinerator has a separate set of strainers.*
- b. Check the water valves to make sure they are open from the cooling water blowdown line to the total water flow meter.
- c. Check the total water flow globe valve and open it as needed to get the flow back to the required 46 gpm.
8. Exhaust Stack Low O₂ Concentration (Setpoint % Oxygen) - This alarm comes on if the oxygen in the exhaust stack gases ^fgalls below 2 percent.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Control Room Panel Alarms (Continued)

If this alarm comes on, the incinerator must be shutdown and placed in the purge cycle to remove the flammable gases. The

fuel gas and combustion ^{air} control valve linkages ^{MUST} ~~should~~ also be checked to make sure ~~the~~ ^{they are} tight and that proper amount of air ^{is} ~~is~~ being fed to the burner.

the linkage on each valve (gas and air) must be checked for tightness. Also, the air

control valve must be checked for adequate air flow ~~pressure~~ volume

9. Incinerator Feed, High VCM Concentration (Setpoint % VCM) -

This alarm comes on in high fire if the VCM concentration in the inert gas stream rises to % VCM according to the inlet gas analyzer. The following should be checked:

- a. Check the receiver pressure. If it is below the set venting pressure, put the incinerator in low-fire to stop the flow of VCM to the incinerator.
- b. Have the chief operator check the operation of the Frick refrigeration unit. The chief operator should make sure that the switch is on to the receivers that are in service and that the suction (35 psig) and discharge pressures (125-150 psig) are normal.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Control Room Panel Alarms (Continued)

12. City Water On (Setpoint 35 gpm) - Cooling water flow switches

automatically to city water if the total water flow drops to
below 35 gpm. A manual switch ^{for each incinerator is} north of the D-500/600/700
cooling tower ^{and manually either} is used to switch ~~back~~ to tower water or city water.

a. Check to make sure the cooling water blowdown line is
not blocked in or plugged.

b. If the switch was caused by a power outage, do not reset
the valve until the power has been restored completely.

c. ^{Reset} the manual switch to use tower water when the normal
^{flow rate} is re-established.

The following alarms for the liquid level in the liquid seal flame
arrestor are also located in the control room, ~~near the pushbuttons~~
~~for the west incinerator:~~

13. High Liquid Level, Flame Arrestor - Have the chief operator

check the flame arrestor and the glycol supply drum to make
^{the valves between them are}
sure ~~they are~~ closed.

14. Low Liquid Level, Flame Arrestor - Have the chief operator

check the flame arrestor for leakage, especially the sample
valve and bleed valve on the level gauge.

Atmospheric
Bleeders should
be plugged!

Will sample ~~be~~ be used often enough to
call it a sample valve or a bleed? ~~Not~~
it should be plugged too.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Local Panel Alarms (Continued)

→ 3. High Quench Tank Level (Setpoint 10" Water Column) X

- a. Check the water flow at the total water flow indicator.
If the flow is above 50 gpm (100% on the scale), close the globe valve at the quench tank until flow is about 46 gpm (90% on the scale).
- b. Open the drain valve on the quench drain seal leg. Close the valve after the level drops below the high level setpoint.
- c. If the incinerator is in the high-fire mode of operation, put it in the low-fire mode. If the level does not decrease immediately, close the globe valve for the quench tank feed. Do not decrease the flow below the setpoint for the low total water flow (60% on the scale).
- d. If a high level continues and burner operation becomes erratic (increased gas and air pressure at the burner, poor temperature control, etc.), shut the unit down before the water level reaches the firebox. After the unit is shutdown, block in water flow to the unit and drain the level until it reaches ^{the}normal operating ^{level.}conditions.

III. OPERATING PROCEDURES (CONTINUED)

V. Incinerator (Continued)

Local Panel Alarms (Continued)

8. Waste Gas (Inerts High Pressure (Setpoint 5 psig)) - The incinerator being vented to will shut down if the inerts pressure at the incinerator exceeds 5 psig. Check the pressure control, *at the receivers and the flow rate to the incinerator.* valve setpoint and reduce ~~it~~ *the pressure* prior to re-starting the incinerator. Monitor the pressure following startup. Watch for excessive cycling or the pressure switch may be defective. Write instrument maintenance work orders ^{to} ~~for~~ ^{items} repairing these as soon as possible.
9. Low Fuel Gas Pressure (Setpoint 0.3 psig) - The incinerator flame may not be able to be sustained if the fuel gas pressure falls below 0.3 psig. Check the fuel gas regulator and pressure switch and make sure the valves are fully open.
10. Fuel Gas High Pressure (Setpoint 5 psig) - Follow the same steps given for the malfunction alarm, number 4 (above).

III. OPERATING PROCEDURES (CONTINUED)

F. Chem Wash

General Information

Chem wash and rinse is not done as a matter of routine on all reactors. The sequence for chem washing reactors is given on the reactor control panel. The product to next be charged in the reactor determines the sequence to be followed. If the reactor is not to be chem washed following rinsing to the blend tanks, proceed to rinse the reactor per procedures in section G.

→ After the reactor has been rinsed ^{to the blend tanks after dumping,} ~~during the dump cycle,~~ it is
→ ready to be chem washed, if needed. The chem wash ~~cycle is~~
→ ~~removed~~ removes polymer buildup from the reactor condenser, walls, baffles, and agitator. If polymer buildup is allowed to remain in the reactor, it continues to grow with each successive charge. Buildups will contribute to high gel, low quality resin, and will make reactor dumping very difficult if ^{the buildup} ~~it~~ gets large enough to break off and plug dump valves and lines. The reactor condenser and shell are chem washed ^{using given} ~~during~~ the procedure and then the chem wash solution must be removed from the reactor. Reactor chem washing must be followed by reactor rinsing (section G) to avoid chem wash contamination of the next batch of resin in the reactor. ^{TP} Operators must exercise caution during chem wash due to the caustic in the solution.

III. OPERATING PROCEDURES (CONTINUED)

F. Chem Wash (Continued)

General Information (Continued)

If any solution should get on an operator, ^{he must} flush immediately with water. Caustic feels slick to the touch and will start burning the skin just a few seconds after contact. If the solution sprays over the body, immediately get under a safety shower and remove clothing. If any should get in the eyes, flush ^{the} eyes for at least fifteen minutes but until all the burning stops. Report any contact with the chem wash solution to the Shift Supervisor.

HP Chem Wash solution sampling, disposal and makeup procedures are given in Section K of this manual.
Procedure

AND

1. The reactor should be in the CLEAN/RINSE mode (Dump Procedure Step 11k).
2. The lead operator will check and make sure that all the reactor valves are closed.
3. The lead operator then checks to see that the chem wash tank level is at the maximum ^{75%} level.

NOTE: Any loss of chem wash from the tank to the ground or sewer must be reported to the Shift Supervisor immediately. He must contact the utility operator if chem wash went to the sewer and the Operations Supervisor to report a spill of a hazardous substance.

4. Only one reactor at a time may be chem washed. The lead operator will check to make sure the chem wash system is available for use and will use the following procedure to chem wash the reactor:

III. OPERATING PROCEDURES (CONTINUED)

F. Chem Wash (Continued)

Procedure (Continued)

- a. Open the chem wash tank outlet valve. This valve allows chem wash to go to either of the two chem pumps from the chem wash tank.

NOTE: The chem wash pumps will only start if one of the suction valves, either from the tank or from the reactors, is open.

- b. Turn on the selected chem wash pump. One pump will be used and the other is a spare (and is valved off in the field).

- c. Open the chem wash heat ^{exchanger} ~~exchanger~~ inlet valve. This sends the chem wash through the preheater where it is heated with steam to a temperature specified on the field controller.

- d. Open the reactor condenser chem wash valve. On D-300 through D-600, this involves only pushbutton which operates double block valves on the chem wash line. At the present time only one of the double block valves operates and the other one stays open all of the time. On D-700, one pushbutton operates a valve on the chem wash header and two other pushbuttons allow either the condenser or reactor shell to be chem washed by operating valves to the "condenser" spray nozzle or "reactor" spray nozzle respectively.

III. OPERATING PROCEDURES (CONTINUED)

F. Chem Wash (Continued)

Procedure Continued

To chem wash D-700, open the chem wash header valve and the condenser spray nozzle valve.

- e. Record on the batch sheet the time when chem wash to the condenser was started.
- f. Chem wash the reactor condenser until the level in the chem wash tank reaches 50%.

NOTE: A small rise in pressure (10-20 psig) on the reactor is normal during chem wash. This is caused by the hot chem wash contacting residual

VCM in the reactor. *The reactor vent valve must remain closed while chem washing to the reactor or condenser.*

- g. When the chem wash tank level reaches 50% for D-300 through D-600, shut the valve opened in d(above) and open the reactor shell chem wash valve. One pushbutton operates double block valves on the chem wash line to the reactor. One valve is operable and one is not at the present time (this is the same valve mentioned in d(above) that stays open all of the time). On D-700, close the condenser spray nozzle valve and open the reactor spray nozzle valve.
- h. Record on the batch sheet the time when chem wash to the reactor was started.
- i. Chem wash the reactor shell until the level in the chem wash tank reaches 25%.

III. OPERATING PROCEDURES (CONTINUED)

F. Chem Wash (Continued)

Procedure (Continued)

- j. When the chem wash tank level reaches 25%, shut the valves to the reactor spray nozzle (one pushbutton on D-300 - D-600, two pushbuttons on D-700).
- k. Open the chem wash return valve on the reactor.
- l. Open the chem wash ^{tank (ok)} ~~tank~~ return valve.
- m. Opne the chem wash pump suction valve from the reactors.
- n. Close the chem wash pump suction valve from the chem wash tank.
- o. Close the chem wash heat exchanger inlet valve. The chem wash should now be returning from the reactors to the chem wash tank and the tank level will begin to rise.
- p. When the pressure on the reactor falls to ^{0 psig} ~~1000~~, open the atmospheric vent valve.
- q. When the chem wash tank high level alarm sounds (at 75%), close the chem wash tank return valve. This will dead-head the pump momentarily but will keep positive pressure on the chem wash header.
- r. Close the chem wash pump suction valve from the reactors. This will shut off the chem wash pump also.
- s. Close the valves to the reactor spray nozzle (one pushbutton on D-300 - D-600, two pushbuttons on D-700) and close the reactor chem wash return valve.

III. OPERATING PROCEDURES (CONTINUED)

F. Chem Wash (Continued)

Procedure (Continued)

Chem wash is now complete and the residual chem wash left in the reactors must be rinsed out of the reactor using the reactor rinse procedures in the following section of this manual.

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4. *Record the chem wash complete time on the batch sheet*
5. Extended periods of chem washing may be required if a condenser

is fouled or if chem wash is used during periods of excessive reactor downtime. The following procedure must be used:

- a. Follow steps a-e in procedure number 4 (above) to set up chem wash flow to the condenser.

-
- b. When the level in the chem wash tank reaches ^{50%} ~~30%~~, open the *the chem wash pump suction valve from the reactors,* chem wash tank return valve, and the reactor chem wash return valve. Chem wash will ^{now} ~~not~~ be circulating from the reactor through the heat exchanger into the reactor spray nozzle for the condenser.

→

NOTE: The atmospheric vent valve must remain closed while chem wash is flowing to the reactor condenser or shell. This is to prevent chem wash from splashing out the atmospheric vent.

- c. The lead operator may switch the chem wash back and forth to the condenser or to the reactor as needed during extended chem washing by operating the respective spray nozzle valves on the reactor.
- d. When ready to return the chem wash back to the tank, return *Chem Wash Procedure, Step 4 (above).*
to ~~stoppage under chem wash procedures (above).~~
-