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OPERATING MANUAL  
D-700 PVC REACTORS  
ABERDEEN, MISSISSIPPI

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OPERATING MANUAL  
D-700 PVC REACTORS  
ABERDEEN, MISSISSIPPI

I. INTRODUCTION

A. Operator Responsibilities

The purpose of this plant is to safely and economically convert vinyl chloride monomer (VCM) into a useable form of poly vinyl chloride (PVC). This is accomplished by a batch process in which VCM, water, initiator and colloid solution are charged into the reactor and under carefully controlled conditions, PVC with the desired physical properties is produced. This chemical reaction, which changes VCM to PVC, is called polymerization.

The operator helps fulfill the plant's purpose by making sure that quality production is obtained from his equipment without endangering his fellow workers or his equipment. The operator is able to attain his goals in safety, job performance and efficient operation through a training period and on the job experience.

The operator fulfills his responsibilities by:

1. Understanding how his equipment functions.
2. Understanding what role each piece of equipment plays in the process.
3. Keeping a close and regular check on equipment.
4. Knowing how to spot malfunctions and correct them.
5. Keeping his area of responsibility safe and clean.
6. Keeping complete and accurate records.

I. INTRODUCTION (CONTINUED)

A. Operator Responsibilities (Continued)

The operating Manual will cover the normal responsibilities and duties of the Lead Operator and the Reactor "A" Operator. Each phase in the production method will be covered. In addition to normal operating methods, it will also discuss operations under abnormal and emergency conditions. The operator must be prepared to meet these situations with temporary measures until the abnormal condition is corrected or the emergency crisis ceases to exist.

Safety takes second place to no plant activity. The safety of the plant personnel and equipment is to be carefully considered before any job is started. The Conoco safety slogan, "our work is never so urgent or important that we cannot take time to do it safely", is an idea that can help make the work area safer for everyone when it is put into practice.

Good housekeeping is also an important responsibility of the operators. It requires careful attention for safety reasons and to maintain good working conditions. Cleaning up after job completion is the responsibility of the person doing the job. A job should not be considered complete until all materials are picked up and properly stored.

I. INTRODUCTION (Cont.)

B. Process Information

Several types of resins are produced. Resin type is determined by a set of physical properties such as particle size and viscosity. Each type of resin produced requires that a certain set of operating conditions be closely followed so that the desired resin properties are obtained. Minor changes in formulas or operating conditions can cause major differences in the physical properties of the resin. Some factors in determining resin properties are reaction temperature, which helps determine viscosity, colloid, which influences particle size, and the amount of recovered VCM charged, which also affects particle size.

The phases of reactor operation and a brief description of each follows:

1. Evacuation

This step removes all air possible by steam ejectors. Too much air left in a reactor will alter particle size. Evacuation should require about five minutes.

2. Charge

Water, Colloid and VCM are charged to the reactor simultaneously through a timed sequence system. The temperature of the reactor contents at the end of charging is determined by the charge water temperature. The reactor will be below run temperature at the end of the charge and jacket steam will be used to raise the temperature to the desired level. Charge should take about nine minutes for D-741, D-742, D-743, and D-744. D-745 will require about fifteen minutes to charge.

I. INTRODUCTION (Cont.)

B. Process Information (Cont.)

3. Initiator

The initiator is manually loaded into the initiator injection pot and charged into the reactor after reactor charge is complete.

4. Polymerization

This is the time from the initiator addition until most of the VCM has been converted to resin. The reaction generates heat continuously as liquid VCM becomes PVC resin. Heat that is generated is removed by cooling water on the reactor jacket and condenser.

Reaction times varies, but generally requires five to six hours for D-741, D-742, D-743, and D-744. D-745 will require about 4½ to five hours.

5. Recovery and Steam Stripping

Recovery and steam stripping removes most of the un-reacted VCM from the reactor via a compressor-vacuum pump system. Steam is added to the bottom of the reactor and rises through the PVC and water slurry to help remove unreacted VCM. Recovery and steam stripping takes about 60 minutes for D-741, D-742, D-743, and D-744 with D-745 taking about 90 minutes to recover and strip.

6. Dumping

The PVC resin, after reaction is complete, is in a slurry form. The slurry is dumped to a strainer and dump tank and is pumped to blend tanks in the Dryer Room for drying. Dump requires about 25 minutes for D-741, D-742, D-743, and D-744 and 35 minutes for D-745.

## II. GENERAL PROCESS DESCRIPTION

### A. Evacuation

Before charging, the inerts present in the polymerization reactor are removed by evacuation. The interlock selector switch is placed on "evacuation" position. The main condenser valve is opened, the reactor evacuation valve is opened, the evacuation header valve, and the steam supply valves to the ejector system to be used are opened. Any condensate in the steam to the ejector is removed by a cyclone separator. The emergency cooling water supply valve to the reactor is then opened. When the reactor pressure reaches 28.5 inches of mercury vacuum, as indicated by the pressure indicator in the control room and a manometer at the reactor, evacuation is complete. This portion of the cycle requires about five minutes.

### B. Charge

#### 1. Precharge Preparation

After evacuation, the reactor is ready to be charged. In preparation for charge, adequate quantities of VCM, hot water, colliod solution, and initiator are made ready for the charge sequence.

Prior to charge, fresh VCM is transferred from the VCM storage sphere to the fresh VCM storage tank. This transfer of VCM begins automatically when the VCM liquid level falls below a certain level. When the high liquid level is regained, the transfer process shuts down automatically. Two 200 gpm VCM transfer pumps are used to transfer the VCM from the VCM storage sphere.

## II. GENERAL PROCESS DESCRIPTION (CONTINUED)

### B. Charge (Continued)

#### 1. Precharge Preparations (Continued)

Process water is automatically supplied to the hot water tank when the water level drops below a certain point. The water is filtered by the process water filter, and is heated in the hot water preheater, enroute to the hot water tank. The hot water tank temperature is maintained by the external steam coils on the hot water tank. The colloid solution, previously made-up, remains in the makeup tank until there is less than one reactor charge remaining in the colloid storage tank. The colloid is then pumped from the makeup tank through the colloid transfer filter to the colloid storage tank. While this transfer takes place, the colloid circulation pump is used to mix the new colloid with the colloid remaining in the storage tank. When the solution is transferred the pumps are shut down and a sample is taken to the laboratory for analysis.

After each reactor charge, colloid is transferred at 50 gpm from the storage tank to the colloid charge tank by the colloid circulation pump. When the storage tank contains less than one charge, the full charge tank will contain sufficient colloid to charge seven reactors. The colloid charge tank can be emptied to less than one charge while the new colloid solution is being transferred and analyzed.

## II. GENERAL PROCESS DESCRIPTION (Cont.)

### B. Charge (Cont.)

#### 1. Precharge Preparations (Cont.)

*underline* Immediately before the reactor is to be charged, the initiator injection system is made ready for charge in the following manner. First, the initiator injection pot, at the reactor to be charged, is drained to the sewer. Enough water is manually added as indicated by the local flow totalizer, so that the pot will be full after the initiator has been added. The initiator is then manually added to the initiator injection pot. The pot is then blocked in and pressurized with high pressure service water to at least 180 psig. The initiator injection system is now ready for the reactor charge.

*Caution on leaving in pot.*

#### 2. Reactor Charge

After evacuation is completed, the interlock selector switch is moved to the "charge" position. If the following precharge conditions are met, the charge sequence is ready to begin:

- a. Levels in the fresh VCM storage tank, the hot water tank, and the colloid charge tank are adequate for a complete reactor charge.
- b. There is sufficient pressure in the initiator injection pot and in the high pressure service water header.
- c. The charge meters are reset to the charge quantities.

Steam is usually applied to the reactor jacket at the start of charge by manually opening the steam valve from the Control Room.

## II. GENERAL PROCESS DESCRIPTION (CONTINUED)

### B. Charge (Continued)

#### 2. Reactor Charge (Continued)

This aids in heating the reaction mass to the desired temperature during and immediately following charge. The automatic charge sequence begins with the hot water charge. The hot water is pumped from the hot water tank, to the reactor by the hot water charge pump. After a predetermined quantity of hot water has been charged, the colloid charge pumps and the second hot water charge pump start. The next step in the charge sequence begins with the fresh and recovered VCM charges. The fresh VCM is pumped to the reactor from the fresh VCM storage tank, by one of the two VCM charge pumps. The recovered VCM is pumped from one of two recovered VCM storage tanks by the recovered VCM charge pump into the suction of the VCM charge pump. The recovered VCM is filtered in the recovered VCM filter and the total VCM charge is filtered enroute to the reactor by the VCM charge filter.

Shortly after the beginning of the VCM charge, one of the hot water charge pumps shuts down until the VCM charge is completed and then restarts. This insures that there will be an adequate amount of water charge remaining to flush out the charge line. Both hot water charge pumps continue to run until charge is completed.

## II. GENERAL PROCESS DESCRIPTION (Cont.)

### B. Charge (Cont.)

#### 2. Reactor Charge (Cont.)

When the VCM, water and collid charge is complete, the initiator is charged by opening the initiator charge valve from the reactor by the "A" operator. Loading the initiator and preparation of the initiator charge pot was discussed in the precharge preparation section.

### C. Polymerization

After charge is completed, the reactor interlock selector switch is placed in the "polymerization" position, and the reactor temperature controller is placed on automatic. When the reaction mass reaches the desired temperature the steam is turned off. The reaction mass temperature is automatically controlled by varying the amount of cooling water that is passed through the top-mounted knockback condenser and the reactor jacket.

The reaction mass is continually mixed and kept in suspension by the bottom-mounted single speed agitator. The agitator mechanical seals are lubricated and cooled by seal oil from a oil pressure unit.

During polymerization, mechanical seal purge water is injected into the reactor through the reactor cleaning nozzle and inboard of the agitator mechanical seal. The water is added to keep the reactor

## II. GENERAL PROCESS DESCRIPTION (CONTINUED)

### C. Polymerization (Continued)

cleaning nozzle and agitator mechanical seals clean. The purge water flow for each service is indicated with a rotameter and manually adjusted.

The inerts present in the reactor during polymerization accumulate in the reactor condenser head space. These inerts are vented to the recovery system to prevent inert blanketing.

*Inerts from  
initiator  
decomp.  
water  
etc.*

Approximately one and one-half hour after the beginning of each polymerization cycle, a sample of resin is taken. The sample is checked for unusual resin <sup>a</sup>agglomerates which indicate a potentially bad batch. If these resin <sup>a</sup>agglomerates occur, several more samples are taken. Depending on the severity of the problem, the batch may be killed early or the resin may be isolated after recovery.

*Water Shipped*

Before the sample is taken, the ~~blowdown~~ tank is recovered if it is not already under vacuum. To take a resin sample, the one-hour resin sampler is attached to the appropriate reactor sampling line and the valve opened until the sampling pressure gauge reads 60 psig. The sampling system lines are cleared of VCM vapors and resin by evacuating to the blowdown tank and flushing with water. The sampling system lines are then vented to the atmosphere and the sampler disconnected. The resin is removed from the sampler by removing the screen insert.

## II. GENERAL PROCESS DESCRIPTION (Cont.)

### C. Polymerization (Cont.)

When the desired degree of polymerization is reached and the reactor pressure has dropped to the desired pressure, the reaction is stopped by manually adding a mixture of AMS, BHT and OMS (the short stop solution) to the reactor. High pressure service water is used to pressure the short stop solution from the initiator injection charge pot into the reactor through the same piping as the initiator charge piping. The charge pot is then blocked in and refilled with the short stop solution. This system is also used to "kill" runaway reactions.

An emergency AMS kill pot, located at grade, is provided to pressure AMS into the reactor to kill the reaction in the event of a power failure or upon loss of agitation. The AMS will be injected into the reactor through nozzles in the reactor head, using pushbuttons on the control panel or by manually operated valves in the field. The pots for D-300, D-400, D-500, and D-600 will contain 15-20 gallons of AMS. The pot for D-700 will contain 40 gallons of AMS. The material will be pressurized into the reactors using nitrogen.

A nitric oxide (NO) short stop addition system is provided to inject NO into the reactors in the event of power failure, major VCM releases, fires, or other emergencies. The system is activated locally. NO is supplied from the emergency NO short stop bottles and is injected into the reactor through the same piping as the agitator mechanical seal purge water.

*revising to current*

## II. GENERAL PROCESS DESCRIPTION (Cont.)

### D. Recovery and Steam Stripping

#### 1. Recovery

When reaction is completed, the interlock selector switch is moved to the "recovery and steam stripping" position. The following sequence then occurs. The recovery compressor seal water systems, the water recirculation systems for the recovery knockout drums, and two of the three recovery compressors are manually started from the board. Cooling water to the recovered VCM condenser and the water recirculation cooler starts automatically with the compressors, and the hydroquinone injection system starts with the compressor seal water systems.

The vapor from the reactor flows through a pressure control valve to two resin knockout drums in series which remove carryover resin. The pressure control valve prevents excessive carryover of resin from the reactor by limiting the pressure to the recovery system to about 35 psig. Each of the knockout drums have an internal water spray system and a recirculation pump. Both knockout drums have on-off level control system which, on high liquid level, diverts the discharge of the water recirculation pumps to the ~~blowdown~~ <sup>water stripper</sup> tank. A water recirculation cooler, (the function of which is explained in the steam stripping portion of the recovery system process description),

## II. GENERAL PROCESS DESCRIPTION (Cont.)

### D. Recovery and Steam Stripping (Cont.)

is provided and can be used in the water recirculation loop of either scrubbing stage.

The VCM vapors from the knockout drums are compressed by the recovery compressors. The recovery compressors are constant volume liquid ring compressors with a water seal. The discharge streams from the compressors flow to two parallel seal water recirculation systems which operate as follows. Seal water is separated from the VCM vapors in the seal water separators, filtered by the seal water filters, cooled by the seal water coolers, and pumped back to the compressors by the seal water pumps. The flow of seal water to each compressor is controlled at 50 gpm. The seal water temperature is controlled just above the VCM condensation temperature (95-105°F). Automatic draining of the seal water separators to the ~~blowdown tank~~ <sup>water stripper</sup> is provided to maintain the correct water level.

The VCM vapors from the seal water system are condensed in two recovered VCM condensers. The condensed VCM is collected in the recovered VCM collect tank which is <sup>or</sup> ~~an~~ automatic on-off level control. VCM is transferred to the recovered VCM storage tanks by the recovered VCM transfer pump when there is high liquid level in the VCM collect tank.

Inerts are bled from the collect tank to the V-11 area ~~blowdown tank~~ <sup>water stripper</sup>.

## II. GENERAL PROCESS DESCRIPTION (CONTINUED)

### D. Recovery and Steam Stripping (Continued)

#### 1. Recovery (Continued)

When the reactor pressure drops to 7 psig, the two recovery vacuum pumps automatically start. The VCM flow from the recovery knockout drums and the seal water flow are both diverted to the vacuum pumps which discharge into the suction of the compressors.

#### 2. Steam Stripping

In order to reduce residual VCM in the slurry, the slurry in the reactor is heated and stripped with steam. At the start of a normal recovery, steam addition to the reactor is manually started from the control room and the slurry mass is heated. When the temperature of the reactor has risen to the desired temperature, the steam stripping operation is completed.

As recovery proceeds, less and less VCM is recovered from the reactor. To supply sufficient VCM vapor to the recovery vacuum pumps and compressors, a VCM backpressure system is used. This is done to prevent cavitation and overheating of the vacuum pumps and compressors. Before entering the recovery knockout drums, the steam and VCM from the reactor are combined with a bleed stream of VCM from the recovered VCM storage tanks. The amount of VCM bled into the recovery system is adjusted by the backpressure control valve such that a set supply pressure to the vacuum pumps is maintained.

## II. GENERAL PROCESS DESCRIPTION (CONTINUED)

### D. Recovery and Steam Stripping (Continued)

#### 2. Steam Stripping (Continued)

The majority of the steam is condensed in the first knockout drum described in the normal recovery process description.

The first stage of the scrubbing system consists of a recovery knockout drum with an internal water spray system, a water recirculation pump and the water recirculation cooler. The water cooler reduces the water temperature sufficiently to allow the internal spray system in the knockout drum to cool the VCM and condense much of the steam in the vapor stream. After leaving the first stage of the water scrubbing system, the VCM vapor flows to the second stage of the scrubbing system and then to the rest of the recovery system in the same manner as during normal recovery.

#### 3. Hydroquinone Injection

The VCM removed from the reactor during recovery still contains a small amount of initiator. As a result, the VCM will continue to polymerize, resulting in plugged recovery lines, charge lines, and recovered VCM storage tanks. Polymerization is significantly reduced by the addition of an inhibitor such as hydroquinone to the VCM stream as it is being recovered.

A 4.6 percent solution of hydroquinone in water is prepared in the hydroquinone storage tank.

## II. GENERAL PROCESS DESCRIPTION (Cont.)

### D. Recovery and Steam Stripping (Cont.)

#### 3. Hydroquinone Injection (Cont.)

The hydroquinone solution is pumped by the hydroquinone injection pump into the suction of the recovery seal water pumps. The injection pump starts and stops automatically with the seal water pumps. The metering pump has a variable stroke which can be adjusted manually to maintain the preset hydroquinone injection rate.

#### 4. Recovery of Blowdown Tank

The ~~blowdown~~ tank is to collect the various steam and water streams containing VCM from the four-reactor module. The emission recovery system is used to recover VCM vapor. When the pressure of the tank drops below the desired pressure, recovery of the tank is stopped.

### E. Reactor Dump and Rinse

After the reactor is recovered and steam stripped, the reactor interlock selector switch is moved to the "dump" position. The appropriate dump valves are opened from the control room and the slurry flows by gravity to the dump system. The slurry passes through an enclosed vibrating slurry strainer where the PVC culls are collected until dump is completed. The slurry then flows to the slurry dump tank. The slurry transfer pumps transfer the slurry to the blend tanks. The dump tank level is automatically controlled.

*Discuss transfer to V-11 water stripper with alternate recovery in CRD area*

## II. GENERAL PROCESS DESCRIPTION (CONTINUED)

### E. Reactor Dump and Rinse (Continued)

Near the end of dump, the reactor condenser is flushed with water by turning on the condenser rinse system from the board. Hot water is pumped from the hot water tank by the hot water charge pumps through the cleaning nozzle in the reactor condenser. The rinse water mixes with any remaining slurry and is pumped with the slurry to the blend tanks flushing out the slurry transfer lines.

The slurry strainer and the slurry dump tank are equipped with a water wash system to remove resin from the equipment between production of different types of resin.

### F. Chem Wash and Rinse

If it has been determined that the reactor needs cleaning, the reactor interlock selector switch is moved to the "clean and rinse" position after the dump and rinse is completed.

The chem wash solution is a caustic solution. The cleaning solution pump or spare pumps the solution at 500 gpm from the cleaning solution tank through the cleaning solution heater to the reactor condenser spray nozzle. Steam to the cleaning solution heater is automatically adjusted such that the exit temperature of the chem wash solution is 190°F. When the level in the reactor is above the agitator blades (approximately 5,000 gallons) as determined by the level change in the cleaning solution tank, no more solution

## II. GENERAL PROCESS DESCRIPTION (Cont.)

### F. Chem Wash and Rinse (Cont.)

is added to the system. Recirculation is then started with the cleaning solution being pumped from the reactor at approximately 250 gpm and back to the reactor through the reactor cleaning nozzle. Large PVC particles picked up in the reactor cleaning process are removed from the cleaning solution in the cleaning solution strainer before entering the suction of the cleaning solution pump. When the Chem wash has ended, the solution is pumped back to the cleaning solution tank at 500 gpm by the cleaning solution pump. For D-741, 742, 743, and 744, the process requires ten minutes to fill the reactor through the condenser, five minutes to wash the reactor, and ten minutes to empty the reactor, for a total of twenty-five minutes. For D-745, the process requires a total time of forty-one minutes--twenty-one minutes to wash through the condenser, ten minutes to wash the reactor and ten minutes to empty the reactor.

After the Chem wash is completed, the reactor is rinsed with hot water from the hot water tank. The hot water is pumped by the hot water charge pumps to the reactor. The water first enters through the condenser cleaning nozzle and then the reactor cleaning nozzle. The Chem wash and rinse system is manually controlled from the control room.

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*How to handle  
bulldozers etc  
on road.*

*Procedure  
instituted  
to be  
sure  
reactor  
is empty on  
rinse.*

## II. GENERAL PROCESS DESCRIPTION (Cont.)

### G. Water Swirl

If the resin formula calls for a water swirl, the reactor interlock selector switch is placed in the "swirl" position after the Chem wash rinse is completed. Cold or hot water enters the suction of the hot water charge pumps, and is pumped through the reactor charge line into the reactor. When the water charge reaches a preset amount, the water charge system is automatically shut down. The reactor agitator is then used to swirl the water for approximately 25 minutes. The lead operator then drains the water to the sewer. This completes one reaction cycle; the reactor is now ready for evacuation.

### H. <sup>Water</sup>~~Blowdown~~ Collection System

Various waste water streams from the process must be collected in an enclosed system for treatment. Water streams containing PVC and VCM from the recovery system, the VCM storage tanks, line and vessel purges, and miscellaneous flush and seal waters are intermittently sent to the blowdown tank.

When the liquid in the blowdown tank reaches a level 22 inches from the top of the tank, a high level alarm sounds in the control room. The operator will then start the tank's transfer pump and send the waste water to the batchwater stripping tanks in the V-11 module. This wastewater is then stripped with steam and vapors are recovered with the emission recovery system. Once stripping has been completed, the wastewater is drained to the sewer.

*additional detail so we don't lose it if  
he doesn't send.*

*If Time to  
evacuate is  
a long time  
may indicate  
water left in  
rx.  
OKC  
uses  
this.*

### III. OPERATING PROCEDURES

#### A. Reactor Evacuation

Evacuation of the reactor is required prior to charging in order to remove as much of the air as possible. Air is introduced into the reactor during previous phases of the reactor batch cycle since dump, rinse, and chem wash require that the reactor be vented to the atmosphere. Air in the reactor during reaction causes poor temperature control during polymerization and may alter the particle size of the resin.

Evacuation is accomplished using one of two two-stage steam jet ejector systems. Evacuation is controlled by the lead operator from the board. The "A" operator must confirm that all process equipment is operating correctly during evacuation.

#### Procedure

1. If the reactor has been opened, follow procedure given in the "Reactor Cleaning and Entry" section on how to close the reactor manhead. *& pressure test Rx.*
2. The lead operator puts the interlock mode selector on "evacuation."
3. The lead operator checks to see that all valves are closed.
4. The lead operator opens the condenser recovery valve and the reactor evacuation valve. Then the lead operator opens the steam supply valve and the evacuation header valve to the steam ejector system to be used as follows.

III. OPERATING PROCEDURES (Cont.)

A. Reactor Evacuation (Cont.)

Procedures (Cont.)

4. Continued

(a) For D-741, 742, 743, and 744, ~~he~~ *the operator* will open valves CV-230 and CV-226. This starts the ejector system located between D-742 and D-743.

(b) For D-745 ~~he~~ *the operator* will open valves CV-222 and CV-224. This will start the ejector system located between D-743 and D-744 reactor structure.

The operator then opens the emergency cooling water valve, which supplies cooling water to the reactor condenser.

NOTE: In the following steps, 5-10, the operators prepare the initiator for charge while evacuation is in progress.

5. The "A" operator will go to the initiator freezer and bring the specified amount of initiator to the initiator injection pot. Extreme caution must be exercised by the "A" operator to be sure that no VCM is allowed to get back into the initiator injection pot. When a small amount of VCM is mixed with a large amount of initiator, an extremely fast reaction takes place giving off heat and pressure. To guard against this situation, the operator must know that he has an adequate water supply and pressure. The reactor initiator injection valve must never be opened unless the bomb is fully pressurized with the inlet water valve open.

NOTE: The ~~following~~ precautions must be taken when handling initiator.

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### III. OPERATING PROCUDURES (Cont.)

#### A. Reactor Evacuation (Cont.)

##### Procedures (Cont.)

##### 5. Continued

- (a) Full Face shield and plastic gloves must be worn while handling initiator.
- (b) If any initiator is spilled on skin or clothings, immediately flush with water.
- (c) Should any initiator remain in the containers, return it to storage.
- (d) Take all empty containers to trash and split side of all containers.

6. The "A" operator must check the injection bomb to be sure that it is empty. Close the drain valve. Open the initiator addition valve.

7. The "A" operator will manually open the HPSW inlet valve, until the initiator water totalizer shows that 15 counts of water are in the initiator to the injection pot.

8. *If Change time is imminent.*  
The "A" operator will now add the initiator to the injection pot.

9. The "A" operator will now close the initiator addition valve and inform the lead operator that the initiator loading is complete and the bomb is ready to be pressurized.

10. The "A" operator will now open the 1" valve which supplies high pressure service water to the initiator injection pot.

(e) do not allow initiator to stand in injection bomb more than — minutes.  
Drain to sewer if necessary to empty.

Sounds like we are adding initiator too early.

III. OPERATING PROCEDURES (Cont.)

A. Reactor Evacuation (Cont.)

11. The lead operator will stop evacuation when a vacuum of 28.5 inches Hg is attained. The reactor pressure is double checked by the "A" operator at the reactor with a mercury manometer. The lead operator stops evacuation by closing the condenser recovery valve, the reactor evacuation valve, the evacuation header valve and steam supply valve to the ejectors. *in that order* This shuts off the evacuation steam jets. He then closes the emergency cooling water valves.
12. Evacuation is now complete.

### III. OPERATING PROCEDURES (CONTINUED)

#### B. Reactor Precharge

The reactor precharge procedure includes a series of precharge checks and precautions that must be carried out by the lead and "A" operators. If the necessary precharge conditions are not met, the Modicon (a small computer which controls the automatic charge sequence) will not allow the automatic charge sequence to begin.

It is the responsibility of the lead operator to see that all precharge checks and precautions are carried out. He should also read the log book at the start of the shift, covering the period since he was last on the job. This will alert him to any changes in formula, mechanical, or operational procedures that may not have been passed on verbally.

##### 1. Lead Operator Duties

- a. Check level in fresh VCM receiver to see that it is adequate for charge. This is a level of at least 247 inches on the sight glass. *What is its level gage?*
- b. Drain water in the recovered VCM receiver to the ~~blowdown~~ *water stripper* tank. Valves from the recovered receiver are manually opened from the board until pressure rise in the blowdown tank indicates all the water is out and VCM is being transferred. Valves are then manually shut from the board.
- c. Fill out the reactor charge sheet.
- d. Check the hot water tank level and temperature.

### III. OPERATING PROCEDURES (CONTINUED)

#### B. Reactor Precharge (Continued)

##### 1. Lead Operator Duties (Continued)

- e. Check to see that all valves on the reactor are closed.
- f. Have the "A" operator make a precharge check and reading of the following:
  - (1) Dura-Seal\* oil level and pressure.
  - (2) Mechanical seal purge water pressure and rate to the reactor agitator seal.
  - (3) Colloid charge tank level and temperature.
- g. Record the readings on the charge sheet as they are transmitted by the "A" operator.

##### 2. "A" Operator Duties

- a Check Dura-Seal\* level and pressure. There are two Dura-Seal\* units. One supplies seal oil pressure to all five reactor agitator mechanical seals and the other is a spare and starts automatically when the operating unit has low seal oil level or discharge pressure. If both units fail, an emergency supply of seal oil is provided by the emergency seal oil drum that is nitrogen pressurized. Valves must be opened manually at the unit if the emergency seal oil system is used.

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III. OPERATING PROCEDURES (CONTINUED)

B. Reactor Precharge (Continued)

2. "A" Operator Duties (Continued)

NOTE: When the primary and spare Dura-Seal\* oil units are down and the emergency system is in operation, reactors are not to be charged until at least one of the Dura-Seal\* oil units is operating. The emergency system is designed to be a backup system that should be used short term only.

When one of the Dura-Seal\* oil units is not in operating condition, inform the lead operator so that repairs can be made.

The seal oil level should be checked in both units. The discharge pressure should be checked and be in the range of 205-250 psig. If the pressure falls below 205 psig, the spare unit will automatically start up and the primary unit shut down. The spare unit will also automatically start up and the primary unit shut down when a low seal oil level is detected in the primary unit. Report the seal oil pressure to the lead operator.

\*Registered Trademark

III. OPERATING PROCEDURES (CONTINUED)

B. Reactor Precharge (Continued)

2. "A" Operator Duties (Continued)

- b. Check the mechanical seal purge water pressure and rate of flow to the agitator mechanical seal. Pressure should be 180-220 psig. Adjust the water flow rate to that given in the formula.

Report the seal water pressure and flow rate to the lead operator.

- c. Check the colloid charge tank level to be certain enough is in the tank to complete a charge. Notify the lead operator of the level present. A level of at least 26 inches should be shown on the sight glass before charge is started.
- d. Inform the lead operator when checks are completed and the reactor is ready for charge.

#### IIII. OPERATING PROCEDURES (Cont.)

##### C. Reactor Charge

This section includes vacuum break and reactor charge. The reactor charge is one of the most critical operations in terms of product quality. Care must be taken to assure that all the raw materials are added in the proper order in the proper amount.

##### Procedure

1. When evacuation and precharge checks are complete, the lead operator can move the interlock mode selector to "charge."
2. The lead operator should take the following steps and see that the following conditions are met before charge:
  - a. VCM transfer should be in auto.
  - b. Recovered VCM charge should be in auto with either the primary or spare pump selected for charge.
  - c. Fresh VCM charge should be in auto with either the primary or spare pump selected for charge.
  - d. Hot water charge should be in auto.
  - e. Colloid charge should be in auto with either the primary or spare pump selected for charge.
  - f. Select recipe to be charged by dialing recipe number on the recipe selector on the board.
  - g. Push the meter reset button, which resets all charge meters.

III. OPERATING PROCEDURES (CONTINUED)

C. Reactor Charge (Continued)

Procedure (Continued)

h. The charge light will now come on if all the following conditions are met:

- (1) The fresh VCM storage tank, hot water tank, and colloid charge tank all have a level adequate for one complete charge.
- (2) One reactor is in charge mode.
- (3) The high pressure service water header is at least 150 psig.
- (4) The reactor being charged has at least 25 inches Hg vacuum.
- (5) The initiator injection pot is at least 180 psig.

3. When a charge light is obtained on the panel, the lead operator will inform the "A" operator to stand by for breaking vacuum.

The lead operator will break vacuum by:

- a. Manually opening the reactor VCM charge valve from the board.
- b. Manually opening the reactor charge valve from the board.
- c. Turbine meters will start counting as VCM flows into the reactor.
- d. As soon as a positive pressure is indicated in the reactor, close the VCM charge valve.

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### III. OPERATING PROCEDURES (CONTINUED)

#### C. Reactor Charge (Continued)

##### Procedure (Continued)

4. The "A" operator will then watch the pressure gauge at the top of the reactor. When the pressure rises above zero, start checking the following:
  - a. Inspect manhead visually and by moving hands around Lenape\* lid feeling for escaping vapor.
  - b. Check safety disc gauges for pressure. Any pressure indicates a leaking or ruptured disc.
  - c. Turn flush water (injection water) on sprayhead. The purpose is to keep heads free of resin. Set rate according to recipe.
  - d. If all checks okay, notify lead operator. If not, notify lead to hold on charge until problem can be corrected.
5. The lead operator can now push the charge button. In rapid sequence, the following occurs:
  - a. Reactor water charge valve opens.
  - b. "A" hot water pump starts, valves open, and water starts into the reactor.
  - c. The valves from the fresh VCM receiver, 45-745, to the VCM charge pump and discharge valve open.
  - d. At set point No. 1 on water meters:

?  
we should  
eliminate  
this  
method  
to avoid  
exposure.

III. OPERATING PROCEDURES (CONTINUED)

C. Reactor Charge (Continued)

Procedure (Continued)

- (1) "B" hot water pump starts and discharge valve opens.
- (2) The colloid charge pump discharge valve will open and pump will start. The preset amount of colloid will be pumped into the reactor. When the colloid meter set point is reached, the colloid charge pump will cut off and the discharge valve and reactor colloid charge valve will close.

NOTE: The lead operator will turn on reactor jacket steam during colloid and water charge to assist reactor heatup.

- e. At set point No. 2 on water meter, the reactor VCM charge valve opens and the VCM and recovered VCM charge pumps start.
- f. At set point No. 3 on the water meter, "B" hot water pump stops and discharge valve closes. This allows time for all VCM to be charged to the reactor before the water charge is completed.

NOTE: A partially plugged filter pack can cause slow VCM flow, and it may be necessary to cut off "A" hot water pump also. If this should happen, be sure to have a minimum of 50 counts left on water charge meter. This is enough to clean lines and manifold of VCM. When the VCM is within ten counts of being complete, put "A" and "B" hot water pumps back on automatic and complete the charge.

### III. OPERATING PROCEDURES (CONTINUED)

#### C. Reactor Charge (Continued)

##### Procedure (Continued)

NOTE: When a filter is known to be fouled, isolate and switch to the spare unit. If you continue to try to force VCM through fouled filters, the high pressure will cause the filter elements to collapse and greatly increase the time taken to change them out.

- g. When VCM meters reach the set point (two meters running in tandem, first to reach the set point cuts pump off and closes valve), the VCM pump, outlet valve, inlet and discharge valve to VCM charge pump, and reactor VCM valve close. This action also starts "B" hot H<sub>2</sub>O pump and opens discharge valve.
- h. At set point No. 4 on the water meters, "A" and "B" hot water pumps stop and discharge valves close. Also, the reactor water charge valve and main dump valve close.
6. When the automatic charge sequence has been completed, it is safe to charge the initiator.
7. The "A" operator charges the initiator by opening the initiator reactor charge valve and flushing the initiator into the reactor with high pressure service water.
8. The lead operator will now record the final reactor temperature. Adjust reactor temperature set point to setting called for in the formula and put temperature controller in "auto" position.

Don't fill  
the pot  
where  
we did  
in the  
procedure.  
It is too  
soon.

### III. OPERATING PROCEDURES (CONTINUED)

#### D. Polymerization

Polymerization is the phase of the reactor cycle in which liquid VCM is converted into solid PVC. This portion of the reactor cycle is mainly accomplished by accurate instrumentation. The primary area of responsibility for the lead operator is coordination of the activities of the "A" operator. The "A" operator is required to sample the reactor and kill the reaction when polymerization has progressed to the point that product quality is satisfactory.

##### 1. Lead Operator Duties

- a. Change the interlock mode selector to "polymerization."

Monitor the temperature and pressure closely until the reactor reaches the desired set point and lines out.

- b. Cut off steam valve to jacket at two to four degrees below set point, depending on the rate of temperature rise.
- c. After 1 1/2 hours at run temperature, have "A" operator obtain slurry sample with reactor sample bomb.
- d. Examine the resin. At this stage of the reaction, the resin should be formed into individual, separate particles. Resin forms you would suspect as irregular are:
  - (1) Stringers--Several particles of resin stringing together.
  - (2) <sup>a</sup>Conglomerates--Clusters of resin stuck together in little balls.

### III. OPERATING PROCEDURES (CONTINUED)

#### D. Polymerization (Continued)

##### 1. Lead Operator Duties (Continued)

If either of the above conditions are observed, have the "A" operator take samples every fifteen minutes until a definite trend can be established. If this irregularity clears up, continue the run; but if the condition worsens, notify the shift supervisor who will make the decision as to what corrective action should be taken.

- e. It may become necessary to remove the inerts. Inerts in the condenser will cause the reactor pressure to rise as they blanket the condenser and do not allow VCM vapor to be condensed. Under these conditions, less heat can be removed even though the condenser water flow will be full open. Vent the inerts through the main condenser valve to the recovery system. Open the valve from the board. As soon as the "Valve Open" light comes on, push the "valve Close" button. One time should be enough; but if the reactor pressure does not stay at the set point, it may be necessary to vent twice.

##### f. Irregularities during polymerization:

- (1) Slow Heatup--May be caused by weak or no initiator.

Slow heatup can also be caused by no steam on reactor jacket or the cooling water valves may be open. Contact the shift supervisor if this condition persists.

### III. OPERATING PROCEDURES (CONTINUED)

#### D. Polymerization (Continued)

##### 1. Lead Operator Duties (Continued)

- (2) Excessively Long Run--Caused by low initial initiator charge or a buildup of inhibitor or chem wash solution (caustic) in batch. If there is only slow reaction and the resin checks okay, the shift supervisor will give word on what to do.

If caustic is in the reactor, the batch will turn slightly yellow and coarsen. If this is found to be true, kill immediately with the amount of short stop solution specified in the formula.

- (3) Simultaneous Temperature and Pressure Rise--Check cooling water temperature and valves. The reactor is producing more heat than the cooling water can remove. Also could be an overcharge of initiator. Notify shift supervisor for instructions.

*We have  
specific  
procedures  
include  
them here.*

- (4) Simultaneous Temperature and Pressure Drop--The cooling water valves are probably wide open. This happens more often in freezing weather when relays freeze up. Throttle manual valves until malfunction is found and corrected.
- (5) Agitator Kicks Out or Power Failure--Most power failures are of short duration (seconds to two minutes), and the reactor pressure does not have time to build to a dangerous level. If outage is prolonged, the pressure will build.

### III. OPERATING PROCEDURES (CONTINUED)

#### D. Polymerization (Continued)

##### 1. Lead Operator Duties (Continued)

If this situation occurs, follow the procedure in Section III.D.3, which outlines action to be taken during emergency shutdown (such as during a power failure).

##### 2. "A" Operator Duties

- a. When charge is complete, recheck water injection rates through the cleaning nozzle and seal flush.
- b. On instruction from the lead operator, resin samples will be taken from the reactor. This normally occurs 1 1/2 hours after initiator injection. If the first sample shows formation of undesirable resin particles, additional samples may be called for every fifteen minutes until a decision is made about what should be done with the batch.

Before the sample is taken, the blowdown tank, 45-319, is recovered if it is not already under vacuum. To take a resin sample, the sampler is attached to the appropriate reactor sampling line and the reactor sampling ram valve opened until the sampling pressure gauge reads 60 psig. The reactor sampling system lines are cleared of VCM vapors and resin by evacuating to the blowdown tank and flushing with water. The sampling system lines are then vented to the atmosphere and sampler 45-770 disconnected. The resin is removed from the sampler by removing the screen insert.

III. GENERAL PROCEDURES (Cont.)

D. Polymerization (Cont.)

2. "A" Operator Duties (Cont.)

- c. When the lead operator instructs the "A" operator to do so, the batch is killed by adding short stop solution to the reactor. High pressure service water is used to pressure the short stop solution from the initiator/AMS short stop charge pot into the reactor through the same piping as the initiator injection.

3. Emergency Shutdown

The following steps are to be taken during emergency shutdown:

- a. 1. Use the AMS emergency kill system for killing each reactor.

Each reactor has a pot located at grade beside each reactor, containing AMS. The AMS is injected into the head space of the reactor with nitrogen by opening the appropriate control valves, from the control room.

The handswitch for the control valves for each reactor is located next to the agitator start-stop handswitch on each reactor's control station.

2. If the AMS does not stop the reaction, use the nitric oxide (NO) short stop system for killing each reactor. There are six cylinders of NO that can be released for each reactor D-71, 742, 743, and 744. D-745 has twelve cylinders of NO which can be released. The NO system can be activated at the reactors by manually opening the correct valves.

*This is not  
the  
current  
procedure*

III. OPERATING PROCEDURES (Cont.)

D. Polymerization (Cont.)

3. Emergency Shutdown (Cont.)

- b. Use nitrogen to pressurize the Dura-Seal\* unit emergency seal oil drum and the mechanical seal purge water surge drum. The valves connecting the emergency seal oil and seal water drums with their respective systems must be opened manually.
- c. There will be sufficeint air in the air system surge tank to operate valves for approximately fifteen minutes. It will be necessary to use the nitrogen backup system to operate valves after fifteen minutes. The surge tank should be valved off before the backup nitrogen system is activated.
- d. Monitor each reactor for pressure rise. If the pressure continues to rise, the following steps are to be taken:
  - (1) Equalize the reactor with any other empty or killed reactor of the same type product.
  - (2) If the pressure still continues to rise, vent through the main condenser valve to the recovery system and the recovery system to the recovered VCM receiver.
  - (3) If this will not relieve the pressure buildup, then equalize the reactor with a reactor of different type resin.

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### III. OPERATING PROCEDURES (Cont.)

#### D. Polymerization (Cont.)

##### 3. Emergency Shutdown (Cont.)

- d. (4) When 1, 2, and 3 alone fail to relieve the reactor pressure, then manually vent at 170 psig as often as needed to maintain control.

NOTE: Step (4) is to be the last resort. Under the new EPA law, any venting must be reported and could result in a fine.

#### E. Recovery and Steam Stripping

The reactor is ready for recovery when certain conditions are reached in the reaction process. The conditions under which recovery will start are:

Pressure Drop--There is not enough unreacted VCM left in the reactor to maintain run pressure. A pressure drop is accompanied by a drop in the cooling water flow to the reactor jacket and condenser.

Runaway--Reaction has increased to the point that it has outrun the capabilities of the cooling water to control. Temperature and pressure will both rise when this occurs. Follow instructions on each product formual as to the exact conditions at which the reaction is killed.

Temperature Rise--Pressure Drop--This is the ideal recovery situation and indicated<sup>5</sup> proper initiator loading. The reaction will peak and slightly outrun the capabilities of the cooling water. This situation

### III. OPERATING PROCEDURES (Cont.)

#### E. Recovery and Steam Stripping (Cont.)

##### Temperature Rise--Pressure Drop (Cont.)

gives the best recovery conditions since there is less VCM to be recovered and more converted to resin.

Quick-Kill-- A reactor is sometimes killed on specific products to meet certain customer specifications--lower dry time (higher plasticizer absorption). The reactor is killed with a specified amount of the short stop solution at a specified set of conditions. The short stop solution mixture stops the reaction chain.

On a quick-kill batch, it is very important to guard against resin carryover to the recovery system. An injection of defoamer will help to control foaming. A fast recovery is also important and will affect the dry time.

#### 1. "A" Operator Duties

When notified by the lead operator that the recovery conditions specified in the formula are met, the "A" operator will take the following steps:

- a. Check the hydroquinone injection system to make sure that the proper valves are open and hydroquinone level is adequate.
- b. Check the blowdown tank level and pressure. Level and pressure must be low to allow the automatic drain on the water recirculation pump to operate.

III. OPERATING PROCEDURES (Cont.)

E. Recovery and Steam Stripping (Cont.)

1. "A" Operator Duties (Cont.)

- c. Check the water levels in the seal water separators and knockout drums. These levels are controlled automatically but should be checked before startup. Knockout drum level should be at or below the mid-point of the inlet to the vessel. The seal water separator level should be at or below the mid-point of the inlet of the vessel.
- d. Check the backflow pressure controller. It should be set at three inches Hg vacuum.
- e. Check to see that the flush to the knockout drum and seal water separator level gauges are on set at 1 gpm. These are FI-726, FI-727, FI-741, and FI-742.
- f. Notify the lead operator that the recovery system is ready to startup.
- g. Steam header pressure should be greater than 100 psig.
- h. Reactor steam line should be checked and reactor steam valves should be checked to make sure they are opening correctly.

2. Lead Operator Duties

- a. When the "A" operator has checked the recovery system, the lead operator can change reactor interlock mode to "recovery."
- b. Start the water recirculation pump, 72-889 and 72-890.

III. OPERATING PROCEDURES (Cont.)

E. Recovery and Steam Stripping (Cont.)

2. Lead Operator Duties (Cont.)

- c. Start the seal water pumps, 72-891 and 72-892. This automatically starts hydroquinone injection pump 72-895.
- d. Two recovery compressors, 72-903, 72-904, or 72-905, are started from handswitches located on the recovery control panel. This starts two compressors and opens the valves associated with compressor startup.
- e. The vacuum pumps will automatically come on when the suction pressure of the compressor is 7 psig. The necessary valve changes are also automatically made.
- f. When the reactor reaches the pressure specified in the product formula, the lead operator will move the reactor temperature set point to the specified stripping temperature, set the steam stripping flow controller on 23,000 lbs/hour, and begin steam stripping.
- g. Watch the temperature of the reactor condenser.
- h. When stripping conditions specified in the formula are met, steam stripping is complete.
- i. When steam stripping and recovery is complete, the recovery system is shut down as follows:

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### III. OPERATING PROCEDURES (Cont.)

#### E. Recovery and Steam Stripping (Cont.)

##### 2. Lead Operator Duties (Cont.)

- i. (1) Push stop buttons for the recovery compressor 72-903, 72-904, 72-905. This also stops the vacuum pumps.
- (2) Push stop buttons for seal water pumps 72-891 and 72-892. This also stops hydroquinone injection pump.
- (3) Push stop buttons for the water recirculation pumps, 72-889-72-890.

##### 3. Recovery System Troubleshooting

###### a. High Compressor Outlet Temperature

Probable cause is poor or no water recirculation in the recovery knockout drum, 45-760. Check VCM backflow controller setting. Controller setting should be at 3 inches Hg.

*back pressure?*

###### b. High Compressor Discharge Pressure

High pressure can be caused by:

- (1) Plugged Condenser-- Have Lead operator report problem to the shift supervisor.
- (2) Plug in the Line from the Condenser to the VCM Collect Tank--Line will have to be pulled and cleaned.
- (3) High Level in the VCM Collect Tank
  - (a) Switch transfer pump to manual.
  - (b) Check level of the recovered VCM receiver--east or west.

*(4) VCM receiver pressure?*

III. OPERATING PROCEDURES (Cont.)

E. Recovery and Compressor Stripping (Cont.)

b. High Compressor Discharge Pressure (Cont.)

- (4) No Cooling Water to Condenser--Check inlet and outlet water valves.
- (5) High Seal Water Temperature--This temperature should be  $110^{\circ} \pm 10^{\circ}$ . Check seal water pump for flow and pressure and check filter pack.

c. If the compressor is not compressing the VCM vapor and does not have a 50 to 70 psi discharge pressure:

- (1) Check seal water flow.
- (2) Check seal water separator water level and adjust as necessary.
- (3) Check seal water temperature--below 80°F water will condense the VCM vapor and cause displacement of the water seal around the compressor cone.

d. Recirculation water pump 72-889 goes out (mechanical-electrical).

- (1) Under normal operation, recirculation water pump 72-889 circulates water through the water recirculation cooler and into recovery knockout drum 45-760. Crossover piping is provided so that, if recirculation water pump 72-889 fails, recirculation water cooler and into recovery knockout drum 45-761.

NOTE: Normal operating temperatures for the recovery system during stripping are:

III. OPERATING PROCEDURES (Cont.)

E. Recovery and Steam Stripping (Cont.)

3. Recovery Troubleshooting (Cont.)

d. (1) Continued

(a) Reactor Condenser - 215-225°F (Peak Temperature)

(b) 45-760 Knockout Drum Outlet - 122-128°F

(c) 45-761 Knockout Drum Outlet - 90-115°F

(d) Compressor Outlet - 130-140°F

The lead operator must monitor these temperatures on the multipoint recorder and have the "A" operator check out and correct deviations.

e. Reactor Foaming (carryover)--When foaming is detected, the "A" operator will:

- (1) Inject defoamer into the reactor to reduce slurry surface tension and lower the reactor slurry level.

It may become necessary for the lead operator to shut down one compressor to slow the recovery. If excessive foaming occurs, shut down recovery and thoroughly flush the entire system with water until clear.

III. OPERATING PROCEDURES (CONTINUED)

F. Reactor Dump and Rinse

When the recovery of the reactor has been completed, the slurry is ready to be dumped to the slurry blend tank(s) that has been designated by the shift supervisor.

1. "A" Operator Duties

- a. Check the selected blend tank or tanks to make sure it will hold the batch.
- b. If transferring to small blend tank, set up piping to go to appropriate tank. Check to see that the blend tank sewer valve is closed and the aeration air is flowing in the tank.
- c. Check the slurry transfer pump valving to make sure the flow will be going to the correct line.
- d. Place the coarse overflow collector into position. Inform the lead operator that the dump can begin.
- e. Monitor the dump tank level until the flow to the pump and discharge from the reactor have leveled out to a steady rate.
- f. Add calcium stearate ~~to the dump tank~~ as directed by the shift supervisor. ~~(except with 5425, 5465, and 5446 resins).~~
- g. If instructed by the lead operator, open the reactor manhead to inspect the reactor internals. Follow opening procedure in "Reactor Cleaning and Entry" section.

III. OPERATING PROCEDURES (Cont.)

F. Reactor Dump and Rinse (Cont.)

2. Lead Operator Duties

- a. Select the blend tank to be used by opening the appropriate control valves in the slurry transfer lines. The valves are operated by handswitches located on the recovery section of the control panel, as follows:

|         |                              |
|---------|------------------------------|
| CV-1521 | To T-501                     |
| CV-1522 | To T-407                     |
| CV-1506 | To T-747                     |
| CV-1523 | To T-502                     |
| CV-1524 | To small blend tank manifold |
- b. Check the sewer valve on the reactor to be sure it is closed.
- c. Turn on the Sweco\* strainer.
- d. Check the Sweco\* exhaustor to be sure it is running. It should be running continuously.
- e. Turn the interlock mode selector switch to the "dump" position.
- f. After the "A" operator informs lead operator that dump can begin, place the slurry transfer pumps, 72-896 and/or 72-897, in the "run" position. This opens the slurry transfer pumps' seal water supply valves, CV-864 and/or CV-866, before the pumps start. The level in slurry dump tank 45-766 is automatically controlled.
- g. Five minutes after the start of dump, open the reactor vent to go the atmosphere.

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III. OPERATING PROCEDURES (Cont.)

F. Reactor Dump and Rinse (Cont.)

2. Lead Operator Duties (Cont.)

- h. When there is no slurry flow through FI-747, the reactor is rinsed according to formula instructions.
- i. When dump and rinse are complete, place the slurry transfer pumps in the stop position. This shuts down the pumps, 72-896 and/or 72-897, and then the slurry transfer pump seal flush water valve, CV-864 and/or CV-866.

*Include instructions & how to assume reactor is empty.*

G. Chem Wash and Rinse

Chem wash and rinse is not done as a matter of routine on all reactors; however, if it has been determined that chem wash is needed, the shift supervisor will inform the lead operator to do so.

After the reactor has been rinsed during the dump cycle, it is ready to be chem washed. The chem wash cycle is necessary to remove 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 they get large enough to break off and plug dump valves and lines.

Operators must exercise caution during chem wash due to the caustic in the solution. If any solution should get on an operator, flush immediately with water. Caustic feels slick to the touch and will start burning the skin just a few seconds after contact. If the

III. OPERATING PROCEDURES (Cont.)

G. Chem Wash and Rinse (Cont.)

solution should spray over the body, immediately get under a safety shower and remove your clothing. If any should get in the eyes, flush eyes for at least fifteen minutes until all burning stops and report to your supervisor.

Procedure

1. The lead operator will check and make sure the reactor sewer valve is closed.
2. The lead operator will then place the interlock mode selector switch to "clean and rinse."
3. The lead operator then checks to see that the cleaning solution tank, 45-767, is at least 85 percent full.
4. The lead operator then opens the valves from the cleaning solution pumps, 72-989 or 72-899, to the reactor condenser cleaning nozzle. The atmospheric vent on the reactor should be closed. All other reactor valves are closed.
5. The lead operator then opens the suction valves, CV-873, for the cleaning solution pumps, 72-898 or 72-899.
6. The lead operator will then turn on one cleaning solution heater temperature controller is set at 190°F.
7. The lead operator will then turn on one cleaning solution pump 72-898 or 72-899.

III. OPERATING PROCEDURES (Cont.)

G. Chem Wash and Rinse (Cont.)

Procedure

8. When the chem wash solution has been flushed through the reactor condenser, the lead operator will:
  - a. Stop the cleaning solution pump.
  - b. Close pump suction valve CV-873 from the cleaning solution tank.
  - c. Open chem wash return valve on reactor.
  - d. Open cleaning solution pump suction valve CV-874 from the reactor.
  - e. Close valves to the reactor cleaning nozzle.
  - f. Open valves to the reactor cleaning nozzle.
  - g. Restart the cleaning solution pump. The chem wash solution should now be circulating from the bottom of the reactor back to the reactor cleaning nozzle.
  - h. The reactor agitator remains on.
9. The lead operator will recirculate the chem wash solution through the reactor for five minutes and will then pump the chem wash solution back to the cleaning solution tank by:
  - a. Opening CV-872
  - b. Closing CV-871. This sends the cleaning solution pump discharge to the cleaning solution tank.

DTH 000101188

### III. OPERATING PROCEDURES (Cont.)

#### G. Chem Wash and Rinse (Cont.)

##### Procedure (Cont.)

10. The "A" operator should monitor the cleaning solution pump and notify the lead operator when it loses suction (check pressure gauge on pump discharge).
11. The lead operator will now shut off the cleaning solution pump.
12. The lead operator will then check the cleaning solution tank level indicator to see if all the chem wash solution has returned. If any solution is lost or accidentally dumped to the sewer, notify the utilities supervisor. The spilled solution must be neutralized to avoid upsetting the chemical balance in the lagoons.
13. The lead operator will now close the reactor cleaning valves and open the condenser cleaning valve and the reactor sewer valve.
14. The lead operator will cut on both hot water charge pumps and flush through the condenser to the sewer for ten minutes.
15. The lead operator will then close the condenser cleaning valve, open the reactor cleaning valve, and flush the reactor to the sewer for ten minutes.
16. The lead operator will now close the reactor sewer valve and open the atmospheric vent.
17. Because of the water dilution and resin accumulation, chem wash solution must be disposed of and fresh caustic pumped to the cleaning solution tank once per week. Follow the procedure outlined under "Used Chem Wash Solution Disposal".

*utilities  
operator  
or duties*

*Include  
procedure  
to be  
done  
if it is  
empty.*

III. OPERATING PROCEDURES (Cont.)

H. Full and Partial Swirl

To assist in the production of quality resin, particularly low gel, it has been found that, by filling the reactor with water and agitating, the gel count is markedly lower.

1. Full Swirl

In this swirl, the reactor is almost completely filled with water.

Lead Operator Duties

- a. Have "A" operator open manhead (refer to reactor manhead opening procedures).
- b. Turn the interlock mode selector switch to the "swirl" position.
- c. Opens the reactor main charge valve and water charge valve.
- d. Starts both hot water charge pumps.
- e. (1) D-741, 742, 743, and 744--Adds 1500 counts of water to reactor (15,000 gallons).  
(2) D-745--Adds 2000 counts of water to reactor (20,000 gallons).
- f. Cuts off pumps and closes valves.
- g. Agitates for ten minutes.
- h. Opens sewer valve and dumps.

DTH 000101190

2. Partial Swirl

This swirl procedure is the same as the full swirl except for the amount of water used. Charge 750 counts (7500 gallons) for D-741, D-742, D-743, and D-744 and 1000 counts (10000 gallons) for D-745. Then follow the same procedure as the full swirl.

### III. OPERATING PROCEDURES (Cont.)

#### I. Colloid Solution Makeup

##### A-Operator

The properties of polyvinyl chloride (PVC) are strongly dependent upon the type and quality of the colloid solution used. The colloid solution must be made very accurately and consistently every time it is prepared. The colloid solution is a three percent solution of Dow F-50 Methocel\* powder in water.

There is a local instrument panel located near the colloid makeup tank on the second floor of the recovery building. These instruments are to aid the operator in making the colloid solution in a consistent manner.

#### 1. Lead Operator Duties

As soon as the lead operator is notified by the "A" operator that the colloid storage tank level is below the straight wall, he will schedule the "A" operator to make up colloid solution as follows:

- a. With the "A" operator at the colloid tanks, open the makeup tank outlet valve (CV-857) and start the colloid transfer pump to ~~the~~ transfer the colloid solution to the storage tank.
- b. To mix any remaining heel in the storage tank with the new colloid solution, open the storage tank inlet valve (CV-858).

\* Registered Trademark

### III. OPERATING PROCEDURES (CONTINUED)

#### I. Colloid Solution Makeup (Continued)

##### 1. Lead Operator Duties (Continued)

and circulation pump inlet valve (CV-859) and start the colloid circulation pump. The charge tank inlet valve (CV-861) must be closed.

- c. When the "A" operator indicates that the makeup tank is empty, close the makeup tank outlet valve (CV-857) and turn off the transfer pump.
- d. With the circulation pump still running, notify the "A" operator to catch a colloid solution sample and take it to the laboratory for analysis.
- e. Close the storage tank inlet valve (CV-858) and circulation pump inlet valve (CV-859) and turn off the circulation pump.
- f. Schedule the "A" operator to makeup a new batch of colloid solution as soon as possible.
- g. During the first part of the colloid makeup procedure when notified by the "A" operator, the lead operator will open the hot water charge valve (CV-706) and will start one hot water charge pump and the discharge valve associated with the charge pump to transfer hot water to the colloid makeup tank. The colloid makeup tank water meter will close the valves and shut down the hot water pump automatically when it reaches its set point.

### III. OPERATING PROCEDURES (CONTINUED)

#### I. Colloid Solution Makeup (Continued)

##### 2. "A" Operator Duties

The "A" operator aids in colloid solution transfer by notifying the lead operator when the colloid storage tank needs to be refilled. After transfer, the "A" operator notifies the lead operator that the makeup tank is empty and then catches a sample of the colloid solution in the storage tank and takes it to the laboratory.

When notified by the lead operator, the "A" operator makes up a new batch of colloid solution by the following procedure:

- a. Bring sixteen bags of Dow F-50 Methocel\* powder (50 pounds per bag) to the top of the colloid makeup tank.
- b. Rinse the colloid makeup tank with water to the sewer until it is clean.
- c. Reset the colloid makeup water meter to 538 gallons, open the colloid tank inlet valve (CV-856), and notify the lead operator to open the hot water charge valve (CV-706), start a hot water charge pump, and open the discharge valve associated with the pump selected. The water meter will stop the pump and close the actuated valves that were opened when the set point is reached. Check to see that the agitator blades are covered.

\*Registered Trademark

III. OPERATING PROCEDURES (CONTINUED)

I. Colloid Solution Makeup (Continued)

2. "A" Operator Duties (Continued)

- d. Start the colloid tank heater and the tank agitator. The temperature controller will close the steam valve when the water in the tank reaches 200°F.
- e. When the heater is off, add the methocel powder very slowly with the agitator still on. Each bag should take about one minute to add. If the powder is added too quickly, it will form lumps and not dissolve properly. Carry the empty bags to a trash container.
- f. Allow about thirty minutes to let the agitator thoroughly mix the powder into the hot water. Check the mixture for lumps and continue to mix if lumps are present.
- g. When the mixture contains no lumps, reset the colloid makeup water meter to 2,623 gallons and open the colloid tank inlet valve (CV-856) and the colloid tank water valve (CV-828) to add cold water. The water meter will close the actuated valves that were opened when the set point is reached. Measure the outage on the colloid makeup tank to check the accuracy of the water meter. The straight wall portion of the tank contains 14.8 gallons per inch.

### III. OPERATING PROCEDURES (CONTINUED)

#### I. Colloid Solution Makeup (Continued)

##### 2. "A" Operator Duties (Continued)

- h. Start the colloid tank cooler. The temperature controller will close the cooling jacket valve when the colloid solution reaches 85°F. Check the cooling water temperature. If it is 80°F or above, the solution will cool very slowly; so close the manual cooling water valves and open the process water valves to the jacket.
- i. Check the temperature after four hours of cooling. If the temperature is 85°F and the temperature controller has closed the cooling jacket valve, turn off the agitator. If the tank is still cooling, leave the agitator on until the tank has reached 85°F. It is very important to cool the colloid solution completely each time to produce a good quality colloid solution.

*Safety  
Precautions  
against breathing  
dust &  
spills are slipping*

### III. OPERATING PROCEDURES (CONTINUED)

#### J. Hydroquinone Solution Makeup

Hydroquinone is injected into the recovery system to short stop the chain reaction and polymerization of vinyl chloride. If the hot VCM gases are allowed to flow through the recovery lines without any inhibitor, they continue the reaction that was started in the reactor and rapidly fill and plug the recovery lines. Plugged lines in the recovery system are very time consuming to pull and clean and cause considerable amounts of downtime.

Adequate and accurate injection of hydroquinone eliminates this problem. Hydroquinone (commercial name Tecquinol\*) comes in a powder form and must be put into a solution with water for our use.

When the hydroquinone solution level is low, as determined by the low level alarm LA-733 in the control room and/or by the hydroquinone storage tank sight glass, a new batch is to be made on the next day shift. Each batch should last approximately one month.

##### 1. Lead Operator Duties

As soon as it is determined that the hydroquinone storage tank is low, the day shift lead operator should schedule hydroquinone makeup between reactor recoveries.

\*Registered Trademark

### III. OPERATING PROCEDURES (CONTINUED)

#### J. Hydroquinone Solution Makeup (Continued)

##### 2. "A" Operator Duties

When notified by the lead operator to make up a new batch of hydroquinone solution, the "A" operator does the following:

- a. Weight up twenty pounds of hydroquinone powder.
- b. Turn off hydroquinone metering pump suction valve and, with the nitrogen turned on and the vent closed, drain the remaining heel to the sewer and rinse with water to the sewer.
- c. Open the vent and add water until the tank is about half full.
- d. Turn off the nitrogen temporarily and add the hydroquinone powder through the funnel.
- e. Turn on the agitator and open the nitrogen line.
- f. Fill with water to the full mark on the sight glass (fifty gallons).
- g. Close the vent and mix until the powder is dissolved.
- h. Make sure the valves are lined up to the hydroquinone metering pump.

##### 3. Safety Precautions

Rubber gloves and full face shield must be worn while handling and transferring hydroquinone dust and liquid. Hydroquinone dust can irritate and seriously damage the eyes.

III. OPERATING PROCEDURES (CONTINUED)

J. Hydroquinone Solution Makeup (Continued)

3. Safety Precautions (Continued)

First Aid--In case of contact, immediately flush eyes with water for fifteen (15) minutes. Notify the plant nurse. Flush skin with water and wash clothing before reuse.

K. Used Chem Wash Solution Disposal

Procedure

1. The shift supervisor must have given instructions to dump the used chem wash solution and make up a fresh batch.
2. The lead operator will instruct the "A" operator to open the tank's drain valve. The valve is opening <sup>20</sup> using the gear operator on the valve.
3. As soon as the tank is empty of solution as indicated by the level indicator in the control room, the "A" operator will open the three inch process water valve to the tank to flush out the tank. Then the "A" operator will close the process water valve and the drain valve.
4. Make up a new batch of cleaning solution.

*How?*

NOTE: Notify the utility operator that the cleaning solution has been dumped to the sewer.

### III. OPERATING PROCEDURES (CONTINUED)

#### L. Initiator Handling and Storage

In the conversion of vinyl chloride monomer to polyvinyl chloride resin, an initiator is needed to start and help sustain the reaction process. The Aberdeen plant uses peroxide-type initiators. The physical properties of the type resin needed determines the type of initiator to be used. All of these products must be kept in cold storage because of rapid decomposition at room temperatures. The initiator is a skin and eye irritant and must be handled accordingly.

Safety precautions for all types of initiator are basically the same, with some differences in handling temperatures and explosive limits.

#### 1. Safety Precautions in Handling Initiator

- a. Always wear impervious gloves.
- b. Wear full face shield when handling an open container.
- c. Avoid contact with skin or clothing (will bleach out clothes).
- d. Do not leave initiator unattended when not under refrigeration.
- e. If initiator is spilled, soak up with absorbent material, such as vermiculite, and spread thinly in an isolated area.
- f. Dispose of empty containers immediately. Leave cap off and split the side of this container.

### III. OPERATING PROCEDURES (CONTINUED)

#### L. Initiator Handling and Storage (Continued)

##### 1. Safety Precautions in Handling Initiator (Continued)

- g. Bring only what is necessary to the production area. Do not allow the amount in the reactor area freezers to exceed one shift's consumption.
- h. If a partial or full jug of initiator is found sitting out, it may be water, but always handle and dispose of just as if it were initiator.
- i. If spilled on skin area, wash with large amounts of water.
- j. If splashed in the eyes, flush with water for fifteen (15) minutes and notify your supervisor. Do not use oils or salves on the eyes.
- k. Should any initiator catch on fire, use a dry chemical or foam fire extinguisher. Water will only spread the fire. However, if the fire is spreading and likely to ignite other initiator, get out of the area, since an explosion is very likely.

##### 2. Physical Characteristics

The following physical characteristics are given for Lupersol 223-75 and Lup-11 because they are currently in use; however, a different initiator may be used in the future.

*Add others*

### III. OPERATING PROCEDURES (Cont.)

#### L. Initiator Handling and storage (Cont.)

##### 2. Physical Characteristics (Cont.)

|                         | <u>Lup</u><br><u>223</u> | <u>Trigonox</u>         |
|-------------------------|--------------------------|-------------------------|
| Form                    | Liquid                   | Liquid                  |
| Freezing Point, °F      | -110                     | -2                      |
| Top Safe Storage, °F    | 20                       | 0 - 40                  |
| Decomposition Temp., °F | 50                       | 160                     |
| Container               | One-Gallon<br>Poly Jug   | Five-Gallon<br>Poly Jug |
| Label                   | Red*                     | Yellow**                |

\*Red Label--Liquid with flash point below 80°F.

\*\*Yellow Label--All liquids and solids with flash point  
above 80°F.

##### 3. Initiator Storage Freezers

Three walk-in freezers and one chest freezer have been installed for initiator storage at temperatures down to -30°F. Each freezer has two independent refrigeration compressors with one to be held in reserve. This is to insure continuous operation at the temperature set point. High temperature in any freezer will activate the air horn and a beacon flasher alarms. An automatic defrost system controlled by time clocks will provide frost-free operation.

###### a. Operating Conditions

###### (1) Temperature

The temperatures are adjustable. They can be set from -30°F to +30°F.

###### (2) Alarms

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The chest and the walk-in freezers on high temperature

III. OPERATING PROCEDURES (Cont.)

L. Initiator Handling and Storage (Cont.)

3. Initiator Storage Freezers (Cont.)

a. Operating Conditions (Cont.)

(2) Alarms (Cont.)

setting with actuate the red beacon light and air freezer.

This is the same for all freezers in the plant. The alarm's present setpoint is 17°F (+29). 

(3) Compressors

The compressors for the freezers are located in two interconnected sheds 50 feet north of the freezers. The compressors for the chest freezer and the west and middle walk-in freezers are located in the west shed. The compressors for the east walk-in freezer is in the east shed.

The compressors in the west shed are numbered 1 thru 6.

(a) No. 1 and No. 2 compressors serve the middle walk-in freezer.

(b) No. 3 and No. 4 compressors serve the west walk-in freezer.

(c) No. 5 and No. 6 compressor serve the chest freezer on the west end.

The compressors in the east shed are numbered 7 and 8.

They serve the east walk-in freezer.

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III. OPERATING PROCEDURES (Cont.)

L. Initiator Handling and Storage (Cont.)

a. Operating Conditions (Cont.)

(4) Compressor Shutdown Conditions (Automatic)

- (a) Freezer temperature
- (b) Compressor low oil level
- (c) High or low compressor pressure

(5) Circuit Breakers

(a) West Compressor Shed - Located on north wall.

- (1) Compressor Panel--The compressor circuit breakers are numbered in sequence 1 thru 6.
  - (2) Fan Panel - The fans are numbered 2, 3, 5, and 6.
  - (3) Auxillary Panel - Contains lights, defrost controls, alarms, fans, and defrost time clocks.
- (b) East Compressor Shed - Located on north wall.
- (1) Compressor Panel - The compressor circuit breakers are numbered 1 and 2. The fans are numbered 7 and 8.
  - (2) Auxillary Panel - Contains lights, defrost controls, alarms, and defrost time clocks.

(6) Defrost Cycles - Adjustable

In the walk-in freezers, each compressor switches to hot gas bypass every six hours to provide a defrost cycle. This is controlled by a time clock.

(7) Freezer Capacity

- (a) East walk-in freezer - 600 gallons
- (b) Middle and West walk-in freezers - 550 gallons
- (c) Chest freezer - 100 gallons

### III. OPERATING PROCEDURES (Cont.)

#### L. Initiator Handling and Storage (Cont.)

##### 4. Design and Operational Functions

Each freezer is provided with two refrigeration units each which are capable of maintaining the desired freezer temperature. Both units can be run simultaneously to allow a check on compressor operation.

The temperature element in each freezer is connected to a mercury switch which starts and stops the compressor. These are adjustable and can be set for different temperatures.

Each compressor has a timer which activates a solenoid valve in the hot gas line to send hot gas directly to the evaporator to allow for the defrost cycle. The fan normally runs with the compressor but is off during the defrost cycle. The east, middle, and west walk-in freezers defrost every six hours, and the chest freezer defrosts every eight hours. The water-cooled condensers on each compressor in the west compressor shed have water bypass to allow continuous flow and prevent freezeup during cold weather. The condensers also have inlet and outlet valves to allow for acid cleaning. Condenser cooling water is normally supplied by and returned to the cooling tower. During shutdowns and power outages, a bypass valve from the well/city water can be opened to supply water pressure. If the condensers are put on the well water, open the block valve in the manhole at the west end of the cooling tower to divert the water to the sewer.

III. OPERATING PROCEDURES (Cont.)

L. Initiator Handling and Storage (Cont.)

4. Design and Operational Functions (Cont.)

The condensers for the east walk-in freezers are air-cooled and are not tied into the cooling water system.

5. Daily Operational Checks

- a. Each compressor oil level by maintenance.
- b. Temperature recorders by "A" operator.
- c. Frost buildup on freezer coils by "A" operator.

NOTE: Manual defrost instructions are on the inside front of each time clock.

NOTE: Due to the explosive nature of this initiator, formal approval must be obtained from the operations superintendent and the mechanical superintendent before any changes are made to this operation.

III. OPERATING PROCEDURES (CONTINUED)

L. Initiator Handling and Storage (Continued)

6. Emergency Procedure for Initiator Freezers

If the power should go off, do not open the freezers but do the following:

a. Find out if the power failure is because of a malfunction in the plant.

(1) If trouble is inside the plant, survey the situation and estimate how long the outage will be. Freezers should hold temperature from 3-4 hours, depending on what is in them, the outside temperature, and how many times the door is opened.

(2) If trouble is determined to be outside the plant, call Berl Hill at 369-4731, 369-2159, or 369-2019.

(a) Keep in touch with the Light Department to determine how long the outage will be.

(b) If outage is expected to be over three (3) hours, call Jim Barton (369-4755) or Joann Pope.

They will arrange for purchase of dry ice.

b. If a compressor should fail and it is not an electrical problem, get in touch with maintenance as soon as possible.

(1) If help is not available from maintenance, get in touch with Dahlem Sales and Service at 369-2165 or residence 369-4435

III. OPERATING PROCEDURES (Cont.)

L. Initiator Handling and Storage (Cont.)

6. Emergency Procedure for Initiator Freezers (Cont.)

- (2) If the problem cannot be fixed, try to move all initiator to other freezer. If not possible, get dry ice.

NOTE: If compressors should go out on a freezer, make sure fans are turned off to that freezer. Middle walk-in freezer 1 and 2 fans, west walk-in freezer 3 and 4 fans, and chest freezer 5 and 6 fans in the west compressor shed. The east walk-in freezer 7 and 8 fans located in the east compressor shed.

- c. Notify the following if an emergency should arise with the initiator freezers:

Jim Barton - 369-4755  
Pete Markey - 369-

7. Circle Chart Responsibility and Change Schedule

- a. The "A" operator on each shift will check the charts to be sure they have ink and are rotating.
- b. The "A" operator on the 11-7 shift will place new charts in the recorder and turn in the previous day's chart to the shift supervisor.

### III. OPERATING PROCEDURES (CONTINUED)

#### M. Reactor Pressure Check

Prior to the startup of a reactor after an extended outage or following a maintenance outage such as replacing a main dump valve or rodding out the condenser tubes, the reactor must be hydrostatically pressure checked. This is to insure that no leakage occurs at the reactor, either inward or outward.

#### Procedure

1. The lead operator sets up the pressure check as follows:
  - a. Place the reactor mode in "emergency" to gain use of both the charge water valve and the rinse valves.
  - b. Open both hot water charge pump discharge valves CV-849 and CV-829.
  - c. Open the reactor charge water valve.
  - d. Open the main charge valve.
  - e. Open the emergency vent valve.
2. The lead operator then turns on both hot water charge pumps and fills the reactor.
3. The "A" operator stands by to notify the lead operator when water comes out the atmospheric vent, showing that the reactor is full.
4. The lead operator then shuts down the hot water charge pumps and closes all valves. This must be done immediately to avoid overpressuring the reactor and blowing the rupture discs.

III. OPERATING PROCEDURES (CONTINUED)

M. Reactor Pressure Check (Continued)

Procedure (Continued)

5. The "A" operator then increases the reactor pressure by charging water into the reactor through the initiator injection system.
6. The lead operator monitors the reactor pressure from the control room and instructs the "A" operator to shut off water addition when the pressure reaches 130 psig.
7. The "A" operator then checks the reactor for leaks at the reactor bottom and top side. If a flange or gasket has been changed, check these very closely.
8. The lead operator then monitors the reactor pressure. If the reactor holds 130 psig for ten minutes, the pressure check is terminated. If the reactor loses pressure, instruct the "A" operator to bring the pressure back up to 130 psig with the high pressure service water and reinspect the reactor for leaks.  
NOTE: Do not charge a reactor that will not hold pressure.
9. When the pressure check is completed, the lead operator dumps the water in the reactor to the sewer. The reactor is now ready to start evacuation procedure.

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### III. OPERATING PROCEDURES (CONTINUED)

#### N. Reactor Cleaning and Entry

##### 1. Reactor Manhead Opening Procedures

One of the most critical parts of the operator's job is the opening of the reactor Lenape\* manhead. Following is a list of procedures that must be followed by the "A" operator or anyone else when opening a reactor manhead.

##### Procedure

- a. Check the pressure gauge and/or bleed valve for pressure or vacuum.
- b. Put on continuous flow fresh air mask.
- c. Unlatch Lenape\* lock on Lenape\* manhead roll-bar and drop down.

NOTE: If the reactor has pressure when the roll-bar arm is lifted, the pressure will start escaping. If this should happen, immediately push lift-bar down and notify the lead operator.

- d. Slowly raise manhead four to six inches and hold in that position.
- e. Call lead operator and have him cut on the reactor evacuation ejector to pull air inward through the manhead.
- f. Finish raising the manhead.
- g. Remove continuous flow fresh air mask and process with task.
- h. Change "O" ring on manhead.

?  
How about  
Keep it on.

### III. OPERATING PROCEDURES (CONTINUED)

#### N. Reactor Cleaning and Entry (Continued)

##### 1. Reactor Manhead Opening Procedures (Continued)

- not practical* →
- i. Look at the bottom of rupture discs to determine if they are plugged with resin.
  - j. If the bottom manhead is to be opened, inspect the bottom of the reactor through the open manhead. The reactor should contain no liquids.
  - k. Go to the bottom of the reactor and make sure that the safety chain and jacking bolts are in proper position on the bottom manhead.
  - l. Remove bolts in manhead.
  - m. Carefully open manhead with jacking bolts.

##### 2. Reactor Cleaning and Entry

This section will cover precautions taken prior to entry and during entry and cleaning of the reactor. The following is a check list stating conditions which must be met by anyone entering the reactor.

##### Procedure

- a. The reactor must be empty and flushed with water.
- b. The O<sub>2</sub> content must be greater than 20 percent.
- c. The VCM content must be less than 10 ppm.
- d. The top and bottom manways must be open.
- e. The nitric oxide (NO) piping must be disconnected.

### III. OPERATING PROCEDURES (Cont.)

#### N. Reactor Cleaning and Entry (Cont.)

##### 2. Reactor Cleaning and Entry (Cont.)

###### Procedure (Cont.)

f. The following lines must be blanked:

- (1) Main eight-inch dump line.
- (2) Four-inch steam stripping lines.
- (3) Six-inch condenser lines.
- (4) Four-inch chem wash and rinse line to condenser\*
- (5) Four-inch chem wash and rinse line to reactor.\*
- (6) One-inch initiator injection line.
- (7) One-inch inerts vent.
- (8) Three-inch colloid charge line.
- (9) One-inch sample line.
- (10) Six-inch VCM charge line--D-745 only.

g. Lock out and tag agitator breaker.

h. Test agitator switch.

i. Special precautions and safety equipment that may be needed are:

- (1) Impervious suit.
- (2) Continuous flow fresh air mask.
- (3) Rubber gloves.
- (4) Scaffolding for work above bottom level.
- (5) Two-way radio communication plus manway watch.
- (6) Safety harness and rope.

\*When preparing to blank or remove blank in chem wash line, lock out cleaning solution pump, open chem wash line to reactor, and bleed line at discharge of pump before breaking chem wash flange.

### III. OPERATING PROCEDURES (CONTINUED)

#### N. Reactor Cleaning and Entry (Continued)

##### 2. Reactor Cleaning and Entry (Continued)

- j. While cleaning the buildups from the baffles and blade, take extreme care not to scratch the reactor walls. These walls have been polished to eliminate giving the resin being formed during reaction a place to create a buildup.  
NEVER SCRAPE THE WALLS.
- k. Around the shaft at the bottom of each reactor is a carbon throttle bushing. The purpose of the throttle bushing is to protect the reactor seal from resin. The seal water flush will not be effective if the throttle bushing or holder is damaged. If there is any buildup in this area, it is the Maintenance Department's responsibility to remove it. Operators are NOT to clean the throttle bushing. Damage to the throttle bushing may cause seal failure.
- l. If hammer and chisel are required to clean the reactor, be careful of chisel placement to avoid it kicking back out of the buildup and causing personal injury.
- m. While in the reactor, check the safety discs for buildups, nozzles for plugs, and the bottom of the condenser for plugging.
- n. When internal job is completed, remove scaffolding from the reactor and store neatly. Remove any loose buildup on the reactor bottom and close the bottom manhead.
- o. Clean up any debris, rags, etc. The job is never complete until the area is clean.

### III. OPERATING PROCEDURES (CONTINUED)

#### O. Housekeeping Guidelines

Good housekeeping is a major portion of any task to be undertaken, and no task can be called complete until the work area has been cleaned. Return all tools and materials used to their proper place and do not leave lying around to create a safety hazard.

The housekeeping of the reactor area is the responsibility of all people working there. This includes supervisors, operators, maintenance, and contractors.

Individual areas of housekeeping responsibilities are:

1. Control Room and Reactor Area--To be kept clean by each shift.
2. Food Preparation Area--To be kept clean by each shift.
3. Control Room Refrigerator--To be cleaned and washed by the 7-3 shift each Monday.
4. Storage Shed Area--To be cleaned and straightened by the 7-3 shift each Tuesday.
5. Initiator Storage Area--To be kept orderly by each shift and cleaned thoroughly by the 7-3 shift each Wednesday.

All reactor personnel are responsible for the entire reactor area; but certain areas are set up for shift responsibility as to special housekeeping, painting, and general upkeep. These are:

1. 7-3 Shift
  - a. Reactor condenser level.
  - b. Reactor manhead level.
  - c. Reactor bottom level.

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III. OPERATING PROCEDURES (CONTINUED)

0. Housekeeping Guidelines (Continued)

2. 3-11 Shift

- a. Reactor table top level.
- b. VCM receiver area.
- c. Initiator freezer area.

3. 11-7 Shift

- a. First floor recovery building.
- b. Second floor recovery building.

#### IV. EQUIPMENT INDEX

##### A. Reactors

##### 1. Polymerization Reactors 45-741, 45-742, 45-743, and 45-744

###### a. Purpose

Vessel used to react VCM to PVC in a water suspension.

###### b. Description

Vertical-mounted, bottom-agitated vessel, 12-foot diameter by 22-foot straight wall height (28 feet overall height), jacketed, and with top-mounted condenser. The reactor is stainless steel, and the cooling water and steam jacket is carbon steel. Approximate capacity is 19,000 gallons.

###### c. Normal Operating Conditions

The reactor produces various resin types, operating in a pressure range of 28.5 inches Hg vacuum to 150 psig and a temperature range of 80-225°F.

###### d. Design Conditions

|                 | <u>Shell</u>          | <u>Jacket</u> |
|-----------------|-----------------------|---------------|
| Temperature, °F | 250                   | 200           |
| Pressure, psig  | 200 (and full vacuum) | 30            |

##### 2. Polymerization Reactors 45-781

###### a. Purpose

Vessel used to react VCM to PVC in water suspension.

###### b. Description

Vertical-mounted, bottom-agitated vessel, diameter by 28-foot straight wall height (35 feet overall height), jacketed and

DTH 000101216

IV. EQUIPMENT INDEX (Cont.)

A. Reactors (Cont.)

2. Polymerization Reactors 45-781 (Cont.)

b. Description (Cont.)

with top-mounted condenser. The reactor is stainless steel, and the cooling water and steam jacket is carbon steel. Approximate capacity is 30,000 gallons.

c. Normal Operating Conditions

The reactor produces various resin types, operating in a pressure range of 28.5 inches Hg vacuum to 150 psig and a temperature range of 80 - 225°F.

d. Design Conditions

|                 | <u>Shell</u> | <u>Jacket</u> |
|-----------------|--------------|---------------|
| Temperature, °F | 250          | 200           |
| Pressure, psig  | FV-225       | 45            |

B. Heat Exchangers

1. Reactor Condensers 55-328, 55-329, 55-330, and 55-331

a. Purpose

To remove the heat of reaction from the polymerization reactor by condensing VCM vapor.

b. Description

Each of the reactor condensers are vertical, mounted on top of the polymerization reactors. Cooling water (shell side) is used to condenser VCM (tube side). Each condenser has 2,100 square foot surface area provided by 999 tubes which are eight feet long by one-inch diameter. Materials of construction

IV. EQUIPMENT INDEX (Cont.)

B. Heat Exchangers (Cont.)

b. Description (Cont.)

are stainless steel or stainless steel clad for all surfaces in contact with VCM.

c. Normal Operating Conditions

Condensers operate in a temperature range of 80-225°F and pressure range of 28.5 inches Hg vacuum to 150 psig during the reactor cycle.

d. Design Conditions

|                 | <u>Shell</u> | <u>Tubes</u>          |
|-----------------|--------------|-----------------------|
| Temperature, °F | 200          | 250                   |
| Pressure, psig  | 120          | 200 (and full vacuum) |

2. Reactor Condenser 55-358

a. Purpose

To remove the heat of reaction from the polymerization by condensing VCM vapor.

b. Description

Condenser is vertical, mounted on top of the polymerization reactors. Cooling water (shell side) is used to condense VCM (tube side). Each condenser has square foot surface area provided by 2700 tubes which are ten feet long by one-inch diameter. Materials of construction are stainless steel and stainless steel clad for all surfaces in contact with VCM.

DTH 000101218

IV. EQUIPMENT INDEX (Cont.)

B. Heat Exchangers (Cont.)

2. Reactor Condenser 55-358 (Cont.)

c. Normal Operating Conditions

Condensers operate in a temperature range of 80-225°F and a pressure range of 28.5 inches Hg vacuum to 150 psig during the reactor cycle.

d. Design Conditions

|                 | <u>Shell</u> | <u>Tubes</u> |
|-----------------|--------------|--------------|
| Temperature, °F | 250          | 250          |
| Pressure, psig  | 120          | FV-225       |

3. Hot Water Preheater 55-332

a. Purpose

To heat process water to 145°F before it enters the hot water tank, 45-748.

b. Description

Horizontal shell and tube type exchanger with steam on the shell side and water on the tube side. Surface area of 331 square feet is provided by 64 tubes 20 feet long by one-inch diameter. The tubes are stainless steel, and the shell is carbon steel.

c. Normal Operating Conditions

Steam temperature and pressure on the shell side will vary. Water on the tube side will be around 50 psig and will enter near 60°F and exit at 145°F.

IV. EQUIPMENT INDEX (Cont.)

B. Heat Exchangers (Cont.)

3. Hot Water Preheater 55-332 (Cont.)

d. Design Conditions

|                 | <u>Shell</u> | <u>Tube</u> |
|-----------------|--------------|-------------|
| Temperature, °F | 400          | 400         |
| Pressure, psig  | 175          | 200         |

4. Hot Water Tank Heater 55-333

a. Purpose

To maintain water temperature in hot water tank 45-748.

b. Description

External plate coil type heat exchanger that will be clamped outside the hot water tank; stainless steel construction.

c. Normal operating Conditions

Steam in the coil should be around 341°F and 105 psig. Water in the hot water tank should be near 145°F.

d. Design Conditions

400°F and 175 psig.

5. Water Recirculation Cooler 55-334

a. Purpose

To cool the recirculation water in recovery knockout drum 45-760.

b. Description

DTH 000101220

Horizontal mounted, shell and tube type heat exchanger.

Cooling water is on the shell side and recirculating water is on the tube side. Surface area of 1,441 square feet is provided by 466 tubes, 16 feet long by 3/4-inch diameter. The tubes are stainless steel and the shell is carbon steel.

IV. EQUIPMENT INDEX (Cont.)

B. Heat Exchangers (Cont.)

4. Water Recirculation Cooler 55-334 (Cont.)

c. Normal Operating Conditions

| d. <u>Design Conditions</u> | <u>Shell</u> | <u>Tube</u> |
|-----------------------------|--------------|-------------|
| Temperature, °F             | 450          | 400         |
| Pressure, psig              | 150          | 150         |

5. Seal Water Coolers 55-335 and 55-336

a. Purpose

To cool the circulating vacuum pump and compressor seal water.

b. Description

Horizontal-mounted shell and tube type heat exchanger. Cooling water is on the shell side and recirculating seal water is on the tube side. Surface area of 339 square feet is provided by 182 tubes 10 feet long by 3/4-inch diameter. The tubes are stainless steel and the shell is carbon steel.

c. Normal Operating Conditions

| d. <u>Design Conditions</u> | <u>Shell</u> | <u>Tube</u> |
|-----------------------------|--------------|-------------|
| Temperature, °F             | 200          | 380         |
| Pressure, psig              | 150          | 150         |

6. Recovered VCM Condensers 55-337 and 55-338

a. Purpose

To condense VCM vapor during recovery as it is removed from the polymerization reactors.

DTH 000101221

IV. EQUIPMENT INDEX (CONTINUED)

B. Heat Exchangers (Continued)

c. Normal Operating Conditions

Steam temperature and pressure on the shell side will vary.

Cleaning solution on the tube side is estimated to enter at 175°F and leave at 190°F with a pressure of 125 psig.

d. Design Conditions

|                 | <u>Shell</u> | <u>Tube</u> |
|-----------------|--------------|-------------|
| Temperature, °F | 175          | 200         |
| Pressure, psig  | 400          | 400         |

C. Tanks and Vessels

1. Instrument Air Capacity Tank 45-301

a. Purpose

To provide adequate instrument air during periods of high demand and temporarily supply air during instrument air failure.

b. Description

Vertical-mounted, five-foot nine-inch straight wall height, four-foot diameter, carbon steel construction.

c. Normal Operating Conditions

100 psig and 80°F

d. Design Conditions

DTH 000101222

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

2. Recovered VCM Storage Tanks 45-317 and 89-520

a. Purpose

Storage of recovered VCM and charge tank for recovered VCM.

b. Description

Vertical-mounted, 18-foot straight wall height, 22-foot overall height, eight-foot diameter with an approximate capacity of 7,200 gallons, carbon steel construction

*Water  
Shipped*  
c. Normal Operating Conditions

Ambient temperature and 20-70 psig.

3. Blowdown Tank 45-319

a. Purpose

To provide for collection and recovery of various VCM containing vapor vents and waste waters.

b. Description

Horizontal-mounted, 26-foot straight wall length, six-foot diameter, approximate capacity 5,500 gallons, carbon steel construction.

c. Normal Operating Conditions

Ambient temperature to 150°F and pressure from 10 inches Hg vacuum to 10 psig.

d. Design Conditions

350°F and full vacuum to 80 psig.

*150 psig*  
DTH 000101223

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

4. Fresh VCM Storage Tank 45-745

a. Purpose

VCM storage tank which holds fresh VCM used in reactor charge.

b. Description

Vertical-mounted, 22-foot straight wall height, 26-foot overall height, eight-foot diameter with an approximate capacity of 8,700 gallons, carbon steel construction.

c. Normal Operating Conditions

Ambient temperature and 20-70 psig.

d. Design Conditions

150°F and full vacuum to 150 psig.

5. Hot Water Tank 45-748

a. Purpose

To supply a large volume of hot water for reactor charge and rinse.

b. Description

Vertical, cone roof, 42-foot straight wall height, 12-foot diameter with an approximate capacity of 35,000 gallons, aluminum construction.

c. Normal Operating Conditions

Atmospheric pressure and 145°F.

d. Design Conditions

212°F and 1.5 inches of water.

DTH 000101224

IV. EQUIPMENT INDEX (Cont.)

C. Tanks and Vessels (Cont.)

6. 1. Initiator Inejction Pot 45-750

a. Purpose

To inject initiator into the reactor during charge.

b. Description

Vertical-mounted, two-foot straight wall height with one-foot diameter, approximate capacity 12 gallons, stainless steel construction.

c. Normal Operating Conditions

Temperature near 70°F and 180-260 psig.

d. Design Conditions

150°F and 300 psig.

2. Initiator Injection Pot 45-784

a. Purpose

To inject initiator into the reactor during charge.

b. Description

Vertical-mounted, two foot straight wall height with one and one-half foot diameter, approximate capacity 30 gallons, stainless steel construction.

c. Normal Operating Conditions

Temperature near 70°F and 180-260 psig.

d. Design Conditions

300 ° F and 450 psig

DTH 000101225

IV. EQUIPMENT INDEX (Cont.)

C. Tanks and Vessels (Cont.)

7. Colloid Makeup Tank 45-751

a. Purpose

To provide for consistent colloid solution makeup.

b. Description

Top agitated, vertical-mounted, flat top, 11 1/2-foot straight wall height, seven-foot diameter, approximate capacity 3,300 gallons, bottom jacket for heating, side jacket for cooling, stainless steel construction.

c. Normal Operating Conditions

Atmospheric pressure and 70-200°F.

d. Design Conditions

400 °F and 0 psig

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

8. Colloid Storage Tank 45-752

a. Purpose

To provide colloid solution storage.

b. Description

Vertical-mounted, flat top, cone bottom, 12-foot straight wall height, seven-foot diameter, approximate capacity 3,400 gallons, stainless steel construction.

c. Normal Operating Conditions

Atmospheric pressure and 70-85°F.

d. Design Conditions

150°F and 0 psig

9. Colloid Charge Tank 45-753

a. Purpose

To provide a sufficient quantity of quality colloid solution for charge.

b. Description

Vertical-mounted, flat top, cone bottom, 14-foot straight wall height, 5 1/2-foot diameter, capacity approximately 2,400 gallons, stainless steel construction.

c. Normal Operating Conditions

Atmospheric pressure and 70-85°F.

d. Design Conditions

150°F and 0 psig

DTH 000101227

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

10. Seal Oil Storage Drum 45-754

a. Purpose

To provide seal oil storage.

b. Description

Horizontal-mounted, five-foot straight wall length by three-foot diameter, carbon steel construction, approximate capacity 270 gallons.

c. Normal Operating Conditions

Atmospheric pressure, ambient temperature.

d. Design Conditions

150°F and 0 psig

11. AMS Short Stop Charge Pots 45-755, 45-756, 45-757, and 45-758

a. Purpose

To provide a means for injecting short stop solution into any or all of the reactors to stop the reaction.

b. Description

Vertical-mounted, two-foot straight wall height, six-inch diameter, capacity approximately three gallons, stainless steel construction.

c. Normal Operating Conditions

Approximately 70°F and 180-260 psig.

d. Design Conditions

150°F and 300 psig

DTH 000101228

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

12. Mechanical Seal Purge Water Surge Drum 45-759

a. Purpose

To provide seal purge water in the event of electrical power failure.

b. Description

Vertical-mounted, seven-foot straight wall height, 3 1/2-foot diameter, capacity approximately 500 gallons, stainless steel construction.

c. Normal Operating Conditions

Approximately 70°F and 200 psig.

d. Design Conditions

150°F and 300 psig

13. Recovery Knockout Drums 45-760 and 45-761

a. Purpose

To prevent liquid and solids carryover to the recovery vacuum pumps and compressors during reactor recovery.

b. Description

Vertical-mounted; bottom section has five-foot straight wall height; five-foot diameter; top section has ten-foot straight wall height; three-foot diameter; top section has water spray to help remove carryover; carbon steel construction.

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

c. Normal Operating Conditions

100-200°F and 0-35 psig

d. Design Conditions

300°F and full vacuum to 150 psig

14. Seal Water Separators 45-762 and 45-763

a. Purpose

To separate the circulating vacuum pump and compressor seal water from the recovered VCM vapor.

b. Description

Vertical-mounted, seven-foot straight wall height, four-foot diameter, approximate capacity 650 gallons, carbon steel construction.

c. Normal Operating Conditions

100-150°F and 40-80 psig

d. Design Conditions

300°F and full vacuum to 150 psig

15. Recovered VCM Collect Tank 45-764

a. Purpose

To collect recovered VCM and provide liquid head for VCM transfer pump to allow pumping of recovered VCM to recovered VCM storage tank.

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

b. Description

Horizontal-mounted, ten-foot straight wall length, three-foot diameter, approximate capacity 520 gallons, carbon steel construction.

c. Normal Operating Conditions

70-100°F and 35-75 psig

d. Design Conditions

160°F and full vacuum to 150 psig

16. Hydroquinone Storage Tank 45-765

a. Purpose

Provide for hydroquinone storage and makeup.

b. Description

Top-agitated, vertical-mounted, 2'6" straight wall height, two-foot diameter, approximate capacity 60 gallons, carbon steel construction.

c. Normal Operating Conditions

Temperature near ambient; pressure about 1 psig.

d. Design Conditions

150°F and 16 psig

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

17. Slurry Dump Tank 45-766

a. Purpose

To provide sufficient head for the slurry transfer pumps to operate correctly.

b. Description

Vertical-mounted, flat top, cone bottom, three-foot straight wall height, five-foot diameter, approximate capacity 440 gallons, stainless steel construction.

c. Normal Operating Conditions

One-inch water vacuum and 150-200°F.

d. Design Conditions

250°F and two-inch water pressure.

18. Cleaning Solution Tank 45-767

a. Purpose

To provide an adequate amount of chem wash solution during reactor chem wash.

b. Description

Vertical-mounted, flat top, cone bottom, ten-foot straight wall height, ten-foot diameter, approximate capacity 5,800 gallons, carbon steel construction.

c. Normal Operating Conditions

Atmospheric pressure and 60-190°F

d. Design Conditions

250°F and ± five-inch water pressure.

DTH 000101232

IV. EQUIPMENT INDEX (CONTINUED)

C. Tanks and Vessels (Continued)

19. Reactor Evacuation Ejector Cyclone Separator 45-768

a. Purpose

To remove any condensate present in the motive steam to the reactor evacuation steam ejector.

b. Description

High efficiency horizontal separator, Anderson type L5-4-175, 10 3/4-inch outside diameter, 26 inches long, carbon steel construction with stainless steel internal baffles.

c. Normal Operating Conditions

Steam in is 125 psig and 353°F.

d. Design Conditions

400°F and 175 psig

20. Reactor Sampling Bomb 45-770

a. Purpose

To safely obtain a resin sample from the reactor.

b. Description

3/4-inch stainless steel pipe, three inches long. One end is capped, and the other is fitted with a coupling. A basket strainer fits inside the sampler for easy resin removal.

c. Normal Operating Conditions

Slight vacuum to 60 psig and 70-140°F.

DTH 000101233

IV. EQUIPMENT INDEX (Cont.)

C. Tanks and Vessels (Cont.)

21. AMS Emergency Kill Pots 45-786

a. Purpose

To inject AMS into the reactor during power failure or upon loss of agitation.

b. Description

Vertical-mounted, three-foot straight wall height, two feet in diameter, capacity approximately 60 gallons, carbon steel construction.

c. Normal Operating Conditions

Approximately 70°F and 300 psig.

d. Design Conditions

150°F and 400 psig.

IV. EQUIPMENT INDEX (CONTINUED)

D. Filters

1. Process Water Charge Filter 64-716

a. Purpose

To remove dirt and scale from the charge water.

b. Description

Filterite Model 88MS04-316-4FD-C300, cartridge type, stainless steel.

c. Normal Operating Conditions

40 psig and 70°F

d. Design Conditions

300 psig and 200°F. Particle retention size is ten microns.

2. VCM Charge Filters 64-718 and 64-742

a. Purpose

To remove any PVC particles from the VCM charge to the reactor.

b. Description

Filterite model 906415-001, cartridge type, stainless steel filter with polypropylene filtering element.

c. Normal Operating Conditions

150-200 psig and ambient temperature.

d. Design Conditions

150°F, 300 psig, 1,000 gpm, particle retention size is ten microns.

IV. EQUIPMENT INDEX (CONTINUED)

D. Filters (Continued)

3. Recovered VCM Filter 64-719

a. Purpose

To remove PVC particles from the recovered VCM charge to the reactor.

b. Description

Filterite Model 909596, cartridge type, stainless steel filter with polypropylene filtering element.

c. Normal Operating Conditions

40-130 psig and ambient temperature.

d. Design Conditions

150°F, 190 psig, 250 gpm, particle retention size ten microns.

4. Process Water Filter 64-720

a. Purpose

To remove dirt and scale from process water to the hot water tank.

b. Description

Dollinger Model LL-122-280, cartridge type, carbon steel filter with polypropylene filtering element.

c. Normal Operating Conditions

40 psig and 70°F

d. Design Conditions

100°F, 100 psig, 200 gpm, particle retention size ten microns.

DTH 000101236

IV. EQUIPMENT INDEX (CONTINUED)

D. Filters (Continued)

5. Colloid Makeup Water Filter 64-721

a. Purpose

To remove dirt and scale from water used in colloid makeup.

b. Description

Dollinger Model LL-222-180, Series 150, cartridge type, stainless steel filter, cotton filtering element.

c. Normal Operating Conditions

40 psig and 70°F

d. Design Conditions

250°F, 250 psig, 125 gpm, particle retention size ten microns.

6. Colloid Transfer Filters 64-722 and 64-723

a. Purpose

To remove any undissolved F-50 methocel (the powder that is dissolved in water to make the colloid solution) from the colloid solution.

b. Description

Dollinger Model LL-222-66, cartridge type, stainless steel filter with polypropylene filtering element.

c. Normal Operating Conditions

35 psig and 85°F

d. Design Conditions

100°F, 75 psig, 50 gpm, particle retention size 90 microns.

DTH 000101237

*Have these been removed?*

IV. EQUIPMENT INDEX (CONTINUED)

D. Filters (Continued)

7. Service Water Filter 64-724

a. Purpose

To remove dirt and scale from service water.

b. Description

Dollinger Model LL-222-280, cartridge type, stainless steel filter with cotton filtering element.

c. Normal Operating Conditions

40 psig and 70°F

d. Design Conditions

100°F, 100 psig, 190 gpm, particle retention size ten microns.

8. Seal Oil Supply Filters 64-725 and 64-726

a. Purpose

Removes dirt and scale from seal oil.

b. Description

Dollinger Model LL-222-39, Series 150, cartridge type, stainless steel filter with cotton filtering element.

c. Normal Operating Conditions

245 psig and 100°F

d. Design Conditions

150°F, 275 psig, 4 gpm, particle retention size one micron.

IV. EQUIPMENT INDEX (CONTINUED)

D. Filters (Continued)

9. Seal Oil Return Filters 64-727 and 64-728

a. Purpose

Removes dirt and scale from seal oil.

b. Description

Dollinger Model LL-222-39, Series 150, cartridge type, stainless steel filter with cotton filtering elements.

c. Normal Operating Conditions

220 psig and 100°F

d. Design Conditions

150°F, 275 psig, 4 gpm, particle retention size one micron.

10. Seal Water Filters 64-731 and 64-732

a. Purpose

To remove PVC resin from the circulating seal water for the recovery vacuum pumps and compressors.

b. Description

Dollinger Model LL-122-140, cartridge type, carbon steel filter with polypropylene filtering element.

c. Normal Operating Conditions

90-130 psig and 100-150°F

d. Design Conditions

300°F, 150 psig, 160 gpm, particle retention size 100 microns.

IV. EQUIPMENT INDEX (CONTINUED)

D. Filters (Continued)

11. Slurry Strainer 64-733

a. Purpose

To remove large resin particles from the slurry.

b. Description

Sweco Model LS605 1210, vibrating screen, stainless steel filter and filtering element.

c. Normal Operating Conditions

One-inch water vacuum and 150-200°F

d. Design Conditions

250°F, two-inch water pressure, 1,000 gpm, particle retention on four-mesh screen.

12. Cleaning Solution Strainer 64-734

a. Purpose

To remove PVC particles from the cleaning solution.

b. Description

Ten-inch Elco line strainer, carbon steel construction.

c. Normal Operating Conditions

2 psig and 180°F

d. Design Conditions

200°F, 20 psig, 500 gpm, particle retention on four-mesh screen.

IV. EQUIPMENT INDEX (CONTINUED)

D. Filters (Continued)

13. Breathing Air Filters 64-735, 64-736, 64-737, 64-738, 64-739, 64-740

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a. Purpose

To remove dirt and scale from the breathing air.

b. Description

Dollinger Model GP-246-15, cartridge type, stainless steel filter, Nylon 147 filtering element.

c. Normal Operating Conditions

70-90 psig and 60-70°F

d. Design Conditions

100°F, 125 psig, 6,000 standard cubic feet per hour (SCFH), particle retention size five microns.

14. Blowdown Tank Drain Strainer 64-741

a. Purpose

To remove PVC particles in water dumped to the sewer from the blowdown tank.

b. Description

Andale type 105 simplex strainer, basket strainer, cast iron with stainless steel filtering element.

c. Normal Operating Conditions

8-9 psig and 100-150°F

d. Design Conditions

200°F, 125 psig, 200 gpm, particle retention size 3/8 inch.

IV. EQUIPMENT INDEX (CONTINUED)

E. Pumps

1. VCM Charge Pumps 72-875 and 72-876

a. Purpose

To supply reactors with VCM during charge.

b. Description

Centrifugal type, Goulds Model 3736, 3X6-13DV, Group L, 150-HP, 3,560 RPM. The casing is carbon steel and the impeller is cast iron.

c. Normal Operating Conditions

Rated for 800 gpm at 450 feet of differential head.

2. Recovered VCM Charge Pumps 72-877 and 72-878

a. Purpose

To supply recovered VCM to the suction of the VCM charge pumps during charge.

b. Description

Centrifugal type, Goulds Model 3196 MT, 2X3-13, 25 hp 1,750 rpm. The casing is stainless steel and the impeller is cast iron.

c. Normal Operating Conditions

Rated for 450 gpm at 82 feet of differential head.

IV. EQUIPMENT INDEX (CONTINUED)

E. Pumps (Continued)

3. Hot Water Charge Pumps 72-879 and 72-880

a. Purpose

To supply the reactor with hot water during charge.

b. Description

Centrifugal type, Goulds Model 3196 LTC, 2X3-13, 100-HP, 3,550 rpm. The casing is stainless steel and the impeller is cast iron.

c. Normal Operating Conditions

Rated for 450 gpm at 410 feet of differential head.

4. Colloid Batch Transfer Pump 72-881 and Colloid Circulation Pump 72-882

a. Purpose

The batch transfer pump is used primarily to transfer colloid from the colloid makeup tank to the colloid storage tank. The colloid circulation pump is used primarily to circulate colloid in the storage tank and to transfer colloid from the storage tank to the colloid charge tank. These pumps are piped so they can be used to spare each other.

b. Description

Centrifugal type, Goulds Model 3196 MT, 1X2-10, 3-HP, 1,750 rpm. The casing and impeller are stainless steel.

c. Normal Operating Conditions

Rated for 50 gpm at 69 feet differential head.

IV. EQUIPMENT INDEX (CONTINUED)

E. Pumps (Continued)

5. Colloid Charge Pumps 72-883 and 72-884

a. Purpose

Used to charge colloid to the reactor.

b. Description

Centrifugal type, Goulds Model 3736, 1X2-11B, 50-HP,  
3,550 rpm. The casing and impeller are stainless steel.

c. Normal Operating Conditions

Rated for 100 gpm at 470 feet differential head.

6. High Pressure Service Water Pumps 72-885 and 72-886

a. Purpose

To provide high pressure water for a variety of uses.

b. Description

Centrifugal type, Goulds Model 3196 LTC, 2X3-13, 60-HP,  
3,550 rpm. The casing and impeller are stainless steel.

c. Normal Operating Conditions

Rated for 150 gpm at 415 feet of differential head.

7. Mechanical Seal Purge Water Pumps 72-887 and 72-888

a. Purpose

To supply high pressure water to the reactor agitator seals  
and the reactor cleaning nozzle flush.

b. Description

Centrifugal type, Goulds 3196 MT, 1X2-10, 30-HP, 3,500 rpm.  
The casing and the impeller are stainless steel.

IV. EQUIPMENT INDEX (CONTINUED)

E. Pumps (Continued)

c. Normal Operating Conditions

Rated for 40 gpm at 415 feet of differential head.

8. Water Recirculation Pumps 72-889 and 72-890

a. Purpose

To circulate water in the recovery knockout drums.

b. Description

Centrifugal type, Goulds Model 3196 MT, 2X3-10, 7 1/2 HP, 1,750 rpm. The casing is stainless steel and the impeller is cast iron.

c. Normal Operating Conditions

Rated for 200 gpm at 68 feet differential head.

9. Seal Water Pumps 72-891 and 72-892

a. Purpose

To circulate the seal water used by the recovery vacuum pumps and compressors.

b. Description

Centrifugal type, Goulds Model 3196 MT, 2X3-10, 10-HP, 1,750 rpm. The casing is stainless steel and the impeller is cast iron.

c. Normal Operating Conditions

Rated for 160 gpm at 94 feet of differential head.

IV. EQUIPMENT INDEX (CONTINUED)

E. Pumps (Continued)

10. Recovered VCM Transfer Pumps 72-893 and 72-894

a. Purpose

To transfer recovered VCM from the recovered VCM collect tank to a recovered VCM storage tank.

b. Description

Centrifugal type, Goulds Model 3196 MT, 1X2-10, 3-HP, 1,750 rpm. The casing is stainless steel and the impeller is cast iron.

c. Normal Operating Conditions

Rated for 50 gpm at 75 feet of differential head.

11. Hydroquinone Injection Pump 72-895

a. Purpose

To supply hydroquinone solution for injection into recovery system seal water during reactor recovery.

b. Description

Reciprocating type, Milton-Roy Model DB-1-30R, 1/4 HP, 1,750 rpm, carbon steel construction.

c. Normal Operating Conditions

0.081 gph at approximately 282 feet of differential head.

12. Slurry Transfer Pumps 72-896 and 72-897

a. Purpose

To transfer slurry from the reactor to the slurry blend tanks.

IV. EQUIPMENT INDEX (CONTINUED)

E. Pumps (Continued)

b. Description

Centrifugal type, Goulds Model 3196 MT, 4X6-13, 40-HP,  
1,770 rpm. The casing and impeller are stainless steel.

c. Normal Operating Conditions

Rated for 600 gpm at 126 feet of differential head.

13. Cleaning Solution Pumps 72-898 and 72-899

a. Purpose

To supply chem wash solution to the reactors during chem  
wash.

b. Description

Centrifugal type, Durco Model Mark II, Group II, 4X3-10/80,  
75-HP, 3,550 rpm, stainless steel casing and impeller.

c. Normal Operating Conditions

Rated for 500 gpm at 165 feet of differential head.

14. Blowdown Tank Pump 72-900

a. Purpose

To pump water which has been stripped of VCM from the  
blowdown tank to the sewer.

b. Description

Centrifugal type, Durco Model Mark II, Group II, 4X3-10/84,  
7 1/2 HP, 1,750 rpm. The casing is stainless steel and the  
impeller is cast iron.

c. Normal Operating Conditions

Rated for 200 gpm at 63 feet of differential head.

IV. EQUIPMENT INDEX (CONTINUED)

F. Compressors and Fans

1. Recovery Vacuum Pumps 72-901 and 72-902

a. Purpose

To recover unreacted VCM from the polymerization reactors.

b. Description

Bingham Model 4G-M, 75-HP, 1,200 rpm. Constant volume liquid ring with a water seal. The liquid ring is driven by a multivaned impeller in a circular pumpcase. Construction is cast iron casing and ductile iron impeller.

c. Normal Operating Conditions

24 inches Hg vacuum to 7 psig inlet, 0-10 psig discharge, and 100-150°F.

2. Recovery Compressors 72-903, 72-904, and 72-905

a. Purpose

To recover unreacted VCM from the polymerization reactors.

b. Description

Nash Model 1256, 150-HP, constant volume liquid ring with water seal. The liquid ring is driven by a multivaned impeller in a circular pumpcase. Construction is cast iron casing and stainless steel impeller.

c. Normal Operating Conditions

0-35 psig inlet, 40-80 psig outlet, and 100-150°F.

IV. EQUIPMENT INDEX (CONTINUED)

F. Compressors and Fans (Continued)

3. Slurry Strainer Exhauster 49-368

a. Purpose

To keep personnel exposure to VCM vapors to a minimum.

b. Description

Centrifugal fan, Buffalo Forge Model 365 DL, 3-HP, 1,800 rpm, stainless steel construction.

c. Normal Operating Conditions

Near atmospheric pressure and 150-200°F.

G. Agitators

1. Reactor Agitators 51-101, 51-102, 51-103, and 51-104

a. Purpose

To keep the colloid, VCM, and water in the reactor well mixed.

b. Description

Bottom entering, single speed, four blades at 45° angle, 200-HP, 125 rpm, stainless steel construction.

c. Normal Operating Conditions

15,000 gallons of liquid or slurry in vertical vessel, 22-foot straight wall by 12-foot diameter, at about 120°F and 130 psig.

IV. EQUIPMENT INDEX (CONTINUED)

G. Agitators (Continued)

2. Colloid Makeup Tank Agitator 51-105

a. Purpose

To provide agitation needed to dissolve F-50 methocel in water.

b. Description

Top entering, single speed, "Lightnin" Model 73-Q-5, 5-HP, 1,750 rpm. Wetted parts are stainless steel.

c. Normal Operating Conditions

3,000 gallons of colloid solution; tank is vertical; seven-foot diameter by 11'6" tall; temperature ranges from 70-250°F and atmospheric pressure.

3. Hydroquinone Storage Tank Agitator 51-106

a. Purpose

To provide agitation needed to dissolve hydroquinone powder in water.

b. Description

Top entering, single speed, "Lightnin" Model N33-33, 1/3-HP, 1,750 rpm.

c. Normal Operating Conditions

Approximately fifty gallons hydroquinone solution in vertical tank 2'6" high by two-foot diameter, 1 psig, and 70°F.

IV. EQUIPMENT INDEX (CONTINUED)

H. Package Units

1. Seal Oil Pressure Units 95-299 and 95-300

a. Purpose

To supply seal oil to the reactor agitator seals at the required temperature and pressure.

b. Description

Dura circulator Model SWAR-40-25.

c. Normal Operating Conditions

245-250 psig, 100-150°F. The seal oil is Di(2-Ethylhexy) phthalate (DOP) which has a viscosity of 35 cp.

V. INSTRUMENT INDEX

A. Flow Controllers

| <u>Item No.</u> | <u>Service</u>        | <u>Type</u>            | <u>Set Point</u>   |
|-----------------|-----------------------|------------------------|--------------------|
| FIRC-710        | Reactor Cooling Water | Meter run with orifice | Cascade control;   |
| FIRC-711        | Flow Controllers      | plate, board-mounted   | the temperature    |
| FIRC-712        |                       | indicators and         | controller of each |
| FIRC-713        |                       | recorders.             | reactor sets the   |
| FRC-201         |                       |                        | set point.         |

NOTE: FIRC-710 controls the cooling water to reactor 45-741.  
FIRC-711 controls the cooling water to reactor 45-742.  
FIRC-712 controls the cooling water to reactor 45-743.  
FIRC-713 controls the cooling water to reactor 45-744.  
FRC-201 controls the cooling water to reactor 45-781.

|         |                      |                       |        |
|---------|----------------------|-----------------------|--------|
| FIC-738 | Recovery Vacuum Pump | Brooks Model 3611     | 50 gpm |
| FIC-739 | and Compressor Seal  | Rotameter with trans- |        |
| FIC-740 | Water Flow Control-  | mitter and a local    |        |
|         | lers                 | Foxboro flow con-     |        |
|         |                      | troller               |        |

NOTE: FIC-738 controls the seal water to vacuum pump 72-901 and  
compressor 72-903.  
FIC-739 controls the seal water to vacuum pump 72-902 and  
compressor 72-904.  
FIC-740 controls the seal water to compressor 72-905.

|         |                  |                    |         |
|---------|------------------|--------------------|---------|
| FCi-749 | Reactor Agitator | Kates Model MFA1-1 | 1.0 gpm |
| FCi-750 | Mechanical Seal  | Flow Regulator     |         |
| FCi-751 | Oil Supply Flow  |                    |         |
| FCi-752 | Regulators       |                    |         |

NOTE: FCi-749 controls the seal oil flow to reactor 45-741 double  
mechanical seal.  
FCi-750 controls the seal oil flow to reactor 45-742 double  
mechanical seal.  
FCi-751 controls the seal oil flow to reactor 45-743 double  
mechanical seal.  
FCi-752 controls the seal oil flow to reactor 45-744 double  
mechanical seal.

V. INSTRUMENT INDEX (Cont.)

B. Flow Totalizers

| <u>Item No.</u>        | <u>Service</u>                                                            | <u>Type</u>                                                       | <u>Set Point</u>                                          |
|------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------------|
| FQIC-701A<br>FQIC-701B | VCM Charge Totalizers                                                     | Foxboro Turbine Meter,<br>Board-Mounted Read-<br>out              | Determined by<br>specific batch<br>recipe.                |
| FQIC-702               | Recovered VCM Charge<br>Totalizer                                         | Fischer/Porter Vortex<br>Shedding Meter, Board<br>Mounted Readout | Determined by<br>specific batch<br>recipe.                |
| FQIC-704               | Hot Water Charge<br>Totalizer                                             | Foxboro Turbine Meter,<br>Board-Mounted Read-<br>out.             | Determined by<br>specific batch<br>recipe.                |
| FQIC-705               | Colloid Charge<br>Totalizer                                               | Brooks Oval Meter,<br>Board-Mounted Read-<br>out.                 | Determined by<br>specific batch<br>recipe.                |
| FQIC-706               | Colloid Makeup<br>Water Flow<br>Totalizer                                 | Brooks Oval Meter,<br>Local Colloid Board<br>Readout              | Hot Water, 538<br>Gallons<br>Cold Water, 2,623<br>Gallons |
| FQI-798                | Reactor Steam Stripping<br>Flow Totalizer                                 | Flow Nozzle with D/P<br>Cell, Board-Mounted<br>Readout.           | None; totalizes<br>only.                                  |
| FQI-757                | Hot Water Charge Totalizer                                                | Orifice Plate with D/P<br>Cell, Board-Mounted<br>Readout.         | None; totalizes<br>only.                                  |
| FQI-811                | Steam to Reactor Module<br>Flow Totalizer                                 | Orifice Plate with D/P<br>Cell, Board-Mounted<br>Readout          | None; Totalizes<br>only.                                  |
| FIC-708                | Reactor Steam Stripping<br>Flow Control                                   | Flow Nozzle with D/P<br>Cell, Board-Mounted<br>Controller         | 23,000 lbs/hr.                                            |
| FQI-203                | Initiator Injection Pot<br>Service Water Flow<br>Totalizer--D-745 Reactor | Neptune Displacement<br>Meter, Local Read-<br>out only            | Determined in<br>Field                                    |

V. INSTRUMENT INDEX (CONTINUED)

C. Level Controllers

| <u>Item No.</u> | <u>Service</u>       | <u>Type</u>       | <u>Set Point</u>               |
|-----------------|----------------------|-------------------|--------------------------------|
| LC-720          | Seal Water Separator | Displacer, Fisher | 16 Inches from                 |
| LC-722          | Level Controllers    | Model 2500T       | Bottom of Dis-<br>placer Float |

NOTE: LC-720 controls the water level in seal water separator 45-762.  
LC-722 controls the water level in seal water separator 45-763.

|         |                                                |                                  |                               |
|---------|------------------------------------------------|----------------------------------|-------------------------------|
| LIC-725 | Slurry Dump Tank<br>45-766 Level<br>Controller | Displacer, Fisher<br>Model 2500T | To be determined<br>in field. |
|---------|------------------------------------------------|----------------------------------|-------------------------------|

D. Pressure Controllers

| <u>Item No.</u> | <u>Service</u>                                                                               | <u>Type</u>                                                      | <u>Set Point</u> |
|-----------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------|
| PCi-704         | Recovered VCM Storage<br>Tanks 89-520 and 45-<br>317 Inert Vent Back-<br>pressure Regulator  | Self-Contained Pres-<br>sure Regulator                           | 60 psig          |
| PCi-706         | Steam Stripping<br>Header Steam Supply<br>Backpressure Regu-<br>lator                        | Self-Contained Pres-<br>sure Regulator                           | 100 psig         |
| PIC-725         | Recovery Knockout<br>Drum 45-760 Inlet<br>Pressure Controller                                | Diaphragm with Fox-<br>boro Controller                           | 35 psig          |
| PIC-726         | VCM Bleed Stream to<br>Recovery System<br>Pressure Controller                                | Vacuum D/P Transmit-<br>ter with a Local Fox-<br>boro Controller | 3" Hg Vacuum     |
| PCi-729         | Hydroquinone Storage<br>Tank 45-765 Nitrogen<br>Pressure Regulator                           | Self-Contained Pres-<br>sure Regulator                           | 1 psig           |
| PCi-731         | Mechanical Seal Purge<br>Water Surge Drum<br>45-759 Nitrogen<br>Supply Pressure<br>Regulator | Self-Contained Pres-<br>sure Regulator                           | 180 psig         |

V. INSTRUMENT INDEX (CONTINUED)

D. Pressure Controllers (Continued)

| <u>Item No.</u> | <u>Service</u>                                                         | <u>Type</u>                            | <u>Set Point</u> |
|-----------------|------------------------------------------------------------------------|----------------------------------------|------------------|
| PCi-739         | Seal Oil Pressure Unit<br>95-299 Nitrogen Supply<br>Pressure Regulator | Self-Contained Pres-<br>sure Regulator | 200 psig         |
| PCi-741         | Seal Oil Pressure Unit<br>95-300 Nitrogen Supply<br>Pressure Regulator | Self-Contained Pres-<br>sure Regulator | 200 psig         |
| PCi-743         | Breathing Air Station                                                  | Self-Contained Pres-                   | 20 psig          |
| PCi-744         | Supply Pressure Regu-                                                  | sure Regulator                         |                  |
| PCi-745         | lator                                                                  |                                        |                  |
| PCi-746         |                                                                        |                                        |                  |
| PCi-747         |                                                                        |                                        |                  |
| PCi-752         |                                                                        |                                        |                  |

NOTE: PCi-743 regulates breathing air to the reactor area, ground level.  
PCi-744 regulates breathing air to the reactor area, second level.  
PCi-745 regulates breathing air to the recovery building, first floor.  
PCi-746 regulates breathing air to the recovery building, second floor.  
PCi-747 regulates breathing air to the charge area.  
PCi-752 regulates breathing air to the reactor area, third level.

|         |                      |                      |          |
|---------|----------------------|----------------------|----------|
| PCi-754 | NO Short Stop Supply | Self-Contained Pres- | 200 psig |
| PCi-755 | Pressure Regulator   | sure Regulator       |          |
| PCi-756 |                      |                      |          |
| PCi-757 |                      |                      |          |

NOTE: PCi-754 regulates NO supply pressure to reactor 45-741.  
PCi-755 regulates NO supply pressure to reactor 45-742.  
PCi-756 regulates NO supply pressure to reactor 45-743.  
PCi-757 regulates NO supply pressure to reactor 45-744.

|         |                                             |                                                            |                              |
|---------|---------------------------------------------|------------------------------------------------------------|------------------------------|
| PIC-759 | Blowdown Tank 45-319<br>Pressure Controller | Vacuum D/P Transmitter<br>with Local Foxboro<br>Controller | To be Determined<br>in Field |
|---------|---------------------------------------------|------------------------------------------------------------|------------------------------|

V. INSTRUMENT INDEX (CONTINUED)

E. Temperature Controllers

| <u>Item No.</u>                                                     | <u>Service</u>                                                         | <u>Type</u>                                                   | <u>Set Point</u>                          |
|---------------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------|
| TIC-701                                                             | Hot Water Tank 45-748<br>Temperature Control-<br>ler                   | Resistance Bulb with<br>Board-Mounted Fox-<br>boro Controller | 140°F                                     |
| TIC-702                                                             | Hot Water Preheater<br>55-332 Discharge<br>Temperature Con-<br>troller | Filled System with<br>Local Foxboro Con-<br>troller           | 145°F                                     |
| TRC-703                                                             | Charge Water Temper-<br>ature Controller                               | Resistance Bulb with<br>Board-Mounted Fox-<br>boro Controller | Determined by<br>Specific Batch<br>Recipe |
| TIRC-706                                                            | Reactor Polymerization                                                 | Resistance Bulb with                                          | Determined by                             |
| TIRC-707                                                            | Temperature Control-                                                   | Foxboro Controller                                            | Specific Batch                            |
| TIRC-708                                                            | lers                                                                   |                                                               | Recipe                                    |
| TIRC-709                                                            |                                                                        |                                                               |                                           |
| TIRC-201                                                            |                                                                        |                                                               |                                           |
| NOTE: TIRC-706 controls reactor 45-741 polymerization temperature.  |                                                                        |                                                               |                                           |
| TIRC-707 controls reactor 45-742 polymerization temperature.        |                                                                        |                                                               |                                           |
| TIRC-708 controls reactor 45-743 polymerization temperature.        |                                                                        |                                                               |                                           |
| TIRC-709 controls reactor 45-744 polymerization temperature.        |                                                                        |                                                               |                                           |
| TIRC-201 controls reactors 45-781 polymerization temperature.       |                                                                        |                                                               |                                           |
| TIRC-710                                                            | Reactor Steam Strip-                                                   | Resistance Bulb with                                          | 225°F                                     |
| TIRC-711                                                            | ping Temperature                                                       | Board-Mounted                                                 |                                           |
| TIRC-712                                                            | Controller                                                             | Foxboro Controller                                            |                                           |
| TIRC-713                                                            |                                                                        |                                                               |                                           |
| TIRC-202                                                            |                                                                        |                                                               |                                           |
| NOTE: TIRC-710 controls reactor 45-741 steam stripping temperature. |                                                                        |                                                               |                                           |
| TIRC-711 controls reactor 45-742 steam stripping temperature.       |                                                                        |                                                               |                                           |
| TIRC-712 controls reactor 45-743 steam stripping temperature.       |                                                                        |                                                               |                                           |
| TIRC-713 controls reactor 45-744 steam stripping temperature.       |                                                                        |                                                               |                                           |
| TIRC-202 controls reactor 45-781 steam stripping temperature.       |                                                                        |                                                               |                                           |
| TIC-716                                                             | Seal Water Temperature                                                 | Filled System with                                            | To be Determined                          |
| TIC-717                                                             | Controller                                                             | Local Foxboro                                                 | in Field                                  |
|                                                                     |                                                                        | Controller                                                    |                                           |

NOTE: TIC-716 controls seal water cooler 55-335 outlet temperature.  
TIC-717 controls seal water cooler 55-336 outlet temperature.

V. INSTRUMENT INDEX (CONTINUED)

E. Temperature Controllers (Continued)

| <u>Item No.</u> | <u>Service</u>                                                   | <u>Type</u>                                       | <u>Set Point</u> |
|-----------------|------------------------------------------------------------------|---------------------------------------------------|------------------|
| TIC-718         | Cleaning Solution Heater<br>55-339 Outlet Temperature Controller | Filled System with<br>Local Foxboro<br>Controller | 190°F            |
| TIC-730         | <del>Blowdown</del> Tank 45-319<br>Temperature Controller        | Filled System with<br>Local Foxboro<br>Controller | 175°F            |

VI. ALARMS AND SAFETY EQUIPMENT

A. Continuous Flow Fresh Air System

In order to provide personnel protection, a continuous flow fresh air system has been installed. This system consists of personnel fresh air masks and a constant flow breathing air supply. The supply lines are piped to all affected areas of the plant. The individual hookup stations consist of quick connect/disconnect-type fittings.

The individual lines to the designated areas are designed to allow a minimum flow of 6 SCFM to each mask at approximately 10-15 psig. An air pressure regulator, shutoff valve, and an air filter are provided at the piping header to each individual area.

The air supply system utilizes two Nash compressors supplying 100 SCFM each at a maximum pressure of 80 psig. Each compressor will supply about fifteen masks with air at one time. The compressors normally are both in operation at the same time, except in cases of mechanical failure.

The system is equipped with both visible and audible low pressure alarms which are activated at 50 psig. The revolving beacon light is mounted on a pole to give wider visibility, and the horn is mounted at the compressor. An on-off switch is provided at each compressor.

VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

A. Continuous Flow Fresh Air System (Continued)

The following job operations will REQUIRE the wearing of a continuous flow fresh air mask supplied through the fresh air lines or a Scott Air Pak:

1. Venting or changing filters in any VCM vessel.

NOTE: No vessel or line should be vented unless there is no alternative, such as using pipe or hose to transfer VCM into the recovery system or blowdown tank.

2. Entering any vessel that normally contains VCM, such as reactors, blowdown tanks, knockout drums, receivers, etc (except for scaffolding construction).
3. Opening large reactor manhead (wear mask until the manway is partially open and the evacuation jet is moving air through the manway).
4. Opening any line that may possibly contain VCM vapors.
5. At ANY location where the VCM concentration is above the current allowable limit. Anytime VCM is detected by sight or smell, the concentration is well above the limits and precaution is mandatory.

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## VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

### B. Alarms and Switches

#### 1. Amperage Alarms

| <u>Item No.</u> | <u>Service</u>       | <u>Type</u>   | <u>Set Point</u>               |
|-----------------|----------------------|---------------|--------------------------------|
| AAHL-701        | Low or High Amperage | Board-Mounted | To be determined in the field. |
| AAHL-702        | to the Reactor Agi-  | Alarm         |                                |
| AAHL-703        | tator Motor          |               |                                |
| AAHL-704        |                      |               |                                |

IAHL-200

NOTE: AAHL-701 indicates abnormal amperage to reactor 45-741 agitator motor.

AAHL-702 indicates abnormal amperage to reactor 45-742 agitator motor.

AAHL-703 indicates abnormal amperage to reactor 45-743 agitator motor.

AAHL-704 indicates abnormal amperage to reactor 45-744 agitator motor.

IAHL-200 indicates abnormal amperage to reactor 45-781 agitator motor.

#### 2. Flow Alarms and Switches

| <u>Item No.</u> | <u>Service</u>             | <u>Type</u>                                    | <u>Set Point</u> |
|-----------------|----------------------------|------------------------------------------------|------------------|
| FSL-701A and B  | Low VCM Flow during Charge | Switch that Activates Alarm (FAL-701) on Board | 400 gpm          |
| FAL-701         | Low VCM Flow during Charge | Board-Mounted Alarm                            | 400 gpm          |
| FAL-714         | Low Seal Water Flow        | Board-Mounted                                  | 2 gpm            |
| FAL-715         | to the Reactor             | Alarm                                          |                  |
| FAL-716         | Agitators                  |                                                |                  |
| FAL-717         |                            |                                                |                  |

NOTE: FAL-714 indicates low flow to reactor 45-741.

FAL-715 indicates low flow to reactor 45-742.

FAL-716 indicates low flow to reactor 45-743.

FAL-717 indicates low flow to reactor 45-744.

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VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

B. Alarms and Switches (Continued)

3. Level Alarms and Switches

| <u>Item No.</u> | <u>Service</u>                                  | <u>Type</u>                                     | <u>Set Point</u>                  |
|-----------------|-------------------------------------------------|-------------------------------------------------|-----------------------------------|
| LAH-701         | High VCM Level in Fresh VCM Storage Tank 45-745 | Board-Mounted Alarm                             | 252 Inches above Bottom Tangent   |
| LSH-701A        | High VCM Level in Fresh VCM Storage Tank 45-745 | Switch Activates LAH-701                        | 252 Inches above Bottom Tangent   |
| LSH-701B        | High VCM Level in Fresh VCM Storage Tank 45-745 | Switch that Serves as Charge Permissive         | 252 Inches above Bottom Tangent   |
| LSH-701C        | Level Control of Fresh VCM Receiver 45-745      | Switch which Stops VCM Transfer                 | 225 Inches Above Discharge Nozzle |
| LSL-701D        | Level Control of Fresh VCM Receiver 45-745      | Switch which Starts Transfer                    | 219 Inches Above Discharge Nozzle |
| LAH-710         | High Level in Colloid Makeup Tank 45-751        | Alarm on Colloid Local Board                    | 8 Inches from Top of Tank         |
| LSH-711B        | High Water Level in Hot Water Tank 45-748       | Switch that Serves as Charge Permissive         | 129 Inches above Discharge Nozzle |
| LSH-711C        | Hot Water Tank 45-758 Level Control             | Switch which Stops Water Transfer on High Level | 360 Inches above Bottom Tangent   |
| LSL-711D        | Hot Water Tank 45-748 Level Control             | Switch which Starts Water Transfer              | 350 Inches above Discharge Nozzle |
| LAH-713         | High Level in Colloid Storage Tank 45-752       | Board-Mounted Alarm                             | 6 Inches from Top of Tank         |

VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

B. Alarms and Switches (Continued)

3. Level Alarms and Switches (Continued)

| <u>Item No.</u> | <u>Service</u>                                 | <u>Type</u>                                       | <u>Set Point</u>               |
|-----------------|------------------------------------------------|---------------------------------------------------|--------------------------------|
| LAH-714         | High Level in Colloid Charge Tank<br>45-753    | Board-Mounted Alarm                               | 8 Inches from Top of Tank      |
| LSL-715         | Low Level in Colloid Charge Tank<br>45-753     | Switch Serves as Charge Permissive                | 24 Inches above Bottom Tangent |
| LSH-716         | Level Control of Recovery Knockout Drum 45-760 | Switch Opens Valve to Blowdown Tank on High Level | 28 Inches above Bottom Tangent |
| LSL-717         | Level Control of Recovery Knockout Drum 45-760 | Switch Closes Valve to Blowdown Tank on Low Level | 18 Inches above Bottom Tangent |
| LSH-718         | Level Control of Recovery Knockout Drum 45-761 | Switch Opens Valve to Blowdown Tank on High Level | 28 Inches above Bottom Tangent |
| LSH-719         | Level Control of Recovery Knockout Drum 45-761 | Switch Closes Valve to Blowdown Tank on Low Level | 18 Inches Above Bottom Tangent |
| LAH-720         | High Level in Seal Water Separator<br>45-762   | Local Alarm                                       | 44 Inches above Bottom Tangent |
| LAL-720         | Low Level in Seal Water Separator<br>45-762    | Local Alarm                                       | 16 Inches above Bottom Tangent |
| LAH-722         | High Level in Seal Water Separator<br>45-763   | Local Alarm                                       | 44 Inches above Bottom Tangent |
| LAL-722         | Low Level in Seal Water Separator<br>45-763    | Local Alarm                                       | 16 Inches above Bottom Tangent |

VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

B. Alarms and Switches (Continued)

3. Level Alarms and Switches (Continued)

| <u>Item No.</u> | <u>Service</u>                                | <u>Type</u>                                                                            | <u>Set Point</u>              |
|-----------------|-----------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------|
| LAH-725         | High Level in Slurry Dump Tank 45-766         | Board-Mounted Alarm                                                                    | 6 Inches from Top of Tank     |
| LAH-727         | High Level in Cleaning Solution Tank 45-767   | Board-Mounted Alarm                                                                    | 6 Inches from Top of Tank     |
| LAL-729         | Low Level in Cleaning Solution Tank 45-767    | Board-Mounted Alarm                                                                    | 6 Inches from Bottom of Tank  |
| LSL-730         | Low Level in Seal Oil Reservoir 95-299        | Switch Activates LAL-730, Starts Spare Seal Oil Unit 95-300, and Turns Off 95-299      | To be Defined by Vendor       |
| LAL-730         | Low Level in Seal Oil Reservoir 95-299        | Board-Mounted Alarm                                                                    | To be Defined by              |
| LSL-731         | Low Level in Seal Oil Reservoir 95-300        | Switch Activates LAL-731, Starts Spare Seal Oil Unit 95-299, and Turns Off 95-300      | To be Defined by Vendor       |
| LAL-731         | Low Level in Seal Oil Reservoir 95-300        | Board-Mounted Alarm                                                                    | To be Defined by Vendor       |
| LAL-733         | Low Level in Hydroquinone Storage Tank 45-765 | Board-Mounted Alarm                                                                    | 6 Inches above Bottom Tangent |
| LAH-734         | High Level in Cleaning Solution Tank 45-767   | Switch Shuts Down Cleaning Solution Pumps 72-898 and 72-899 and Caustic Transfer Pumps | 6 Inches from Top of Tank     |
| LAL-739         | Low Level in Colloid Makeup Tank 45-751       | Board-Mounted Alarm                                                                    | One Inch above Bottom Tangent |

VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

B. Alarms and Switches (Continued)

3. Level Alarms and Switches (Continued)

| <u>Item No.</u> | <u>Service</u>                      | <u>Type</u>                                                                       | <u>Set Point</u>              |
|-----------------|-------------------------------------|-----------------------------------------------------------------------------------|-------------------------------|
| LAH-740         | High Level in Blow-down Tank 45-319 | Board-Mounted Alarm                                                               | 22 Inches from Top of Tank    |
| LSL-741         | Low Level in Blow-down Tank 45-319  | Switch will Shut Off Blowdown Tank Pump 72-900 and Close Valves CV-880 and CV-891 | 12 Inches from Bottom of Tank |

4. Pressure Alarms and Switches

| <u>Item No.</u>                                     | <u>Service</u>                                  | <u>Type</u>                                                                                                          | <u>Set Point</u> |
|-----------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------|
| PSH-703                                             | High Pressure in Initiator Injection Pot 45-750 | Switch turns on high pressure light on the board and is a precharge condition.                                       | 180 psig         |
| PSL-707                                             | Low Pressure in Steam Stripping Header          | Switch closes control valve that supplies steam to the reactor during steam stripping.                               | 100 psig         |
| PSL-712<br>PSL-713<br>PSL-714<br>PSL-715<br>PSL-205 | Low Pressure in Reactor during Recovery         | Switch prevents opening of reactor dump valve unless pressure during recovery has been at least as low as set point. | 8 psig           |

NOTE: PSL-712 senses pressure in reactor 45-741.  
PSL-713 senses pressure in reactor 45-742.  
PSL-714 senses pressure in reactor 45-743.  
PSL-715 senses pressure in reactor 45-744.  
PSL-205 senses pressure in reactor 45-781.

VI. ALARMS AND SAFETY EQUIPMENT (Cont.)

B. Alarms and Switches (Cont.)

4. Pressure Alarms and Switches (Cont.)

| <u>Item No.</u> | <u>Service</u>  | <u>Type</u>               | <u>Set Point</u> |
|-----------------|-----------------|---------------------------|------------------|
| PSL-716         | Low Pressure in | Switch keeps charge from  | 25" Hg           |
| PSL-717         | Reactors during | starting by preventing    | Vacuum           |
| PSL-718         | Evacuation      | main reactor charge valve |                  |
| PSL-719         |                 | from opening unless pres- |                  |
|                 |                 | sure is at low set point/ |                  |
|                 |                 | or above.                 |                  |

NOTE: PSL-716 senses pressure in reactor 45-741.  
PSL-717 senses pressure in reactor 45-742.  
PSL-718 senses pressure in reactor 45-743.  
PSL-719 senses pressure in reactor 45-744.

|         |                  |                     |          |
|---------|------------------|---------------------|----------|
| PAH-720 | High Pressure in | Board-Mounted Alarm | 160 psig |
| PAH-721 | Reactors         |                     |          |
| PAH-722 |                  |                     |          |
| PAH-723 |                  |                     |          |
| PAH-206 |                  |                     |          |

NOTE: PAH-720 indicates high pressure in reactor 45-741.  
PAH-721 indicates high pressure in reactor 45-742.  
PAH-722 indicates high pressure in reactor 45-743.  
PAH-723 indicates high pressure in reactor 45-744.  
PAH-206 indicates high pressure in reactor 45-781

|         |                                                                                                                    |                                                                                                                            |          |
|---------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------|
| PSL-727 | Low Recovery Com-<br>pressor Suction<br>Pressure                                                                   | Switch will start<br>recovery vacuum pumps<br>72-901 and 72-902 and<br>activate proper valving<br>sequence during recovery | 7 psig   |
| PDS-728 | High Differential<br>Pressure Between<br>Recovery Vacuum<br>Pump Suction and<br>Recovery Compres-<br>sor Discharge | Switch shuts off<br>recovery compressors<br>72-903, 72-904, and 72-<br>905 and vacuum pumps<br>72-901 and 72-902.          | 80 psig  |
| PSL-732 | Low Pressure on<br>High Pressure<br>Service Water<br>System                                                        | Switch prevents automatic<br>charge sequence from<br>beginning and activates<br>PAL-732                                    | 150 psig |
| PAL-212 | Low Pressure on<br>AMS kill Pot                                                                                    | Switch alerts operator to low<br>nitrogen pressure on Emer-<br>gency AMS kill pot.                                         | 275 psig |

VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

B. Alarms and Switches (Continued)

4. Pressure Alarms and Switches (Continued)

| <u>Item No.</u> | <u>Service</u>                                            | <u>Type</u>                                                                                                           | <u>Set Point</u> |
|-----------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------|
| PAL-732         | Low Pressure on High Pressure Service Water System        | Board-Mounted Alarm                                                                                                   | 150 psig         |
| PSL-737         | Low Pressure on Mechanical Seal Purge Water System (MSPW) | Switch activates PAL-737 and turns on spare (MSPW) pump 72-887 or 72-888.                                             | 180 psig         |
| PAL-737         | Low Pressure on Mechanical Seal Purge Water System        | Board-Mounted Alarm                                                                                                   | 180 psig         |
| PSL-738         | Low Pressure from Seal Oil Unit 95-299                    | Switch activates spare seal oil unit 95-300, turns off 95-299, activates the necessary valves, and activates PAL-738. | 205 psig         |
| PAL-738         | Low Pressure from Seal Oil Unit 95-299                    | Board-Mounted Alarm                                                                                                   | 205 psig         |
| PSL-740         | Low Pressure from Seal Oil Unit 95-300                    | Switch activates spare seal oil unit 95-299, turns off 95-300, activates the necessary valves, and activates PAL-740. | 205 psig         |
| PAL-740         | Low Pressure from Seal Oil Unit 95-300                    | Board-Mounted Alarm                                                                                                   | 205 psig         |
| PAH-750         | High Pressure on Initiator Injection Pot 45-750           | Board-Mounted Alarm                                                                                                   | 225 psig         |

VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

B. Alarms and Switches (Continued)

4. Pressure Alarms and Switches (Continued)

| <u>Item No.</u>                                                                                                                                                                                                                                                                                 | <u>Service</u>                                            | <u>Type</u>                                                                        | <u>Set Point</u> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------|------------------|
| PAH-751                                                                                                                                                                                                                                                                                         | High Seal Oil System Pressure                             | Board-Mounted Alarm                                                                | 255 psig         |
| PAL-753                                                                                                                                                                                                                                                                                         | Low Pressure on NO Short Stop Bottles                     | Board-Mounted Alarm                                                                | 350 psig         |
| PSL-758                                                                                                                                                                                                                                                                                         | Low Pressure on High Pressure Service Water System (HPSW) | Switch turns on spare HPSW pump 72-885 or 72-886.                                  | 180 psig         |
| PAH-760                                                                                                                                                                                                                                                                                         | High Pressure in Blowdown Tank 45-319                     | Board-Mounted Alarm                                                                | 10 psig          |
| PSL-762                                                                                                                                                                                                                                                                                         | Low Steam Pressure to Blowdown Tank 45-319                | Switch closes TCV-730 and PCV-759 and re-sets on rising steam pressure of 50 psig. | 40 psig          |
| PAL-763                                                                                                                                                                                                                                                                                         | Low Instrument Air Pressure                               | Board-Mounted Alarm                                                                | 85 psig          |
| TAH-706<br>TAH-707<br>TAH-708<br>TAH-709<br>TAH-201                                                                                                                                                                                                                                             | High Temperature in the Reactors                          | Board-Mounted Alarm                                                                | 160°F            |
| NOTE: TAH-706 indicates high temperature in reactor 45-741.<br>TAH-707 indicates high temperature in reactor 45-742.<br>TAH-708 indicates high temperature in reactor 45-743.<br>TAH-709 indicates high temperature in reactor 45-744.<br>TAH-201 indicates high temperature in reactor 45-781. |                                                           |                                                                                    |                  |
| TAH-715                                                                                                                                                                                                                                                                                         | High Discharge Temperature on the Recovery Compressors    | Board-Mounted Alarm                                                                | 150°F            |
| TAH-719                                                                                                                                                                                                                                                                                         | High Seal Oil Temperature                                 | Board-Mounted Alarm                                                                | 125°F            |
| TAH-720                                                                                                                                                                                                                                                                                         | High Temperature in Initiator Injection Pot 45-750        | Board-Mounted Alarm                                                                | 75°F             |

## VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

### C. Firewater System

The firewater system consists of a deluge system, combustible hydrocarbon analyzer, and fire monitors with hose connections.

#### 1. Fire Monitors

The fire monitors are normally supplied from the city water system. A tie-in with the firewater system allows the fire monitors to operate off either water system. There are six fire monitors located around the perimeter of the recovery building and reactor area.

#### 2. Hydrocarbon Analyzer

A continuous combustible hydrocarbon analyzer is used to detect major VCM leaks. When the VCM level at any sample point reaches the set point, the deluge system is activated automatically.

#### 3. Deluge System

The deluge system is normally supplied from the firewater system. It can be operated on process water. The deluge system is a sprinkler system which will cover the reactors, dump system, fresh and recovered VCM storage tanks, and both floors of the recovery building with a water spray. The deluge system is designed to lower VCM concentrations in the reactor and recovery building area in the event of a VCM leak and as a sprinkler system to help put out fires. The deluge system can be activated manually, by the combustible hydrocarbon analyzer, or by thermal sensors.

VI. ALARMS AND SAFETY EQUIPMENT (CONTINUED)

C. Firewater System (Continued)

3. Deluge System (Continued)

The revised firewater system contains three new post indicator valves (PIV) and one PIV was relocated. These are valves which have indicators on them to show whether the valve is open or closed. These valves are used to direct water to either the D-700 reactor area or the V-11 area.

The valves are located at:

1. The southwest corner of the new cooling water tower.
2. East wall of the V-11 building.
3. Two are located at the northwest corner of the intersection of the entrance road and second street.

D. Fixed Point VCM Monitor

A fixed point VCM monitor is used to detect VCM and record the VCM concentration at various locations in the reactor and recovery building.

VII. EQUIPMENT ENTRY PROCEDURE

EPA standards for VCM emissions and OSHA regulations on personnel exposure to VCM require that certain operating procedures be followed when there is the possibility of VCM emission to the atmosphere or personnel exposure to VCM. For this reason and to ensure safe working conditions at all times, the "Engineering and Work Practice Control Program for the Reduction of Employee Exposure to Vinyl Chloride" manual should be consulted whenever equipment in the reactor area is opened for any reason. This manual contains a list of detailed procedures as well as safety precautions for equipment opening.

APPENDIX A  
EQUIPMENT LIST - CONTINUED

Tanks and Vessels  
(Continued)

Service

|        |                                              |
|--------|----------------------------------------------|
| 45-759 | Mechanical Seal Purge Water Surge Drum       |
| 45-760 | South Recovery Knockout Drum                 |
| 45-761 | North Recovery Knockout Drum                 |
| 45-762 | South Seal Water Separator                   |
| 45-763 | North Seal Water Separator                   |
| 45-764 | Recovered VCM Collect Tank                   |
| 45-765 | Hydroquinone Storage Tank                    |
| 45-766 | Slurry Dump Tank                             |
| 45-767 | Cleaning Solution Tank                       |
| 45-768 | Reactor Evacuation Ejector Cyclone Separator |
| 45-770 | Reactor Sampling Bomb                        |
| 45-778 | Initiator Charge Pot for Reactor 45-781      |
| 45-786 | AMS Emergency Kill Pot for Reactor 45-781    |

Filters

|        |                                                             |
|--------|-------------------------------------------------------------|
| 64-716 | Process Water Charge Filter                                 |
| 64-718 | North VCM Charge Filter                                     |
| 64-719 | Recovered VCM Filter                                        |
| 64-720 | Process Water Filter                                        |
| 64-721 | Colloid Makeup Water Filter                                 |
| 64-722 | North Colloid Transfer Filter                               |
| 64-723 | South Colloid Transfer Filter                               |
| 64-724 | Service Water Filter                                        |
| 64-725 | Seal Oil Supply Filter for Seal Oil Pressure<br>Unit 95-299 |
| 64-726 | Seal Oil Supply Filter for Seal Oil Pressure<br>Unit 95-300 |
| 64-727 | Seal Oil Return Filter for Seal Oil Pressure<br>Unit 95-299 |
| 64-728 | Seal Oil Return Filter for Seal Oil Pressure<br>Unit 95-300 |
| 64-731 | South Seal Water Filter                                     |
| 64-732 | North Seal Water Filter                                     |
| 64-733 | Slurry Strainer                                             |
| 64-734 | Cleaning Solution Strainer                                  |
| 64-735 | Breathing Air Filter (Reactors, First Level)                |
| 64-736 | Breathing Air Filter (Reactors, Second Level)               |
| 64-737 | Breathing Air Filter (Recovery Building<br>First Floor)     |
| 64-738 | Breathing Air Filter (Recovery Building,<br>Second Floor)   |
| 64-739 | Breathing Air Filter (Charge Area)                          |
| 64-740 | Breathing Air Filter (Reactors, Third Level)                |
| 64-741 | Blowdown Tank Drain Strainer                                |
| 64-742 | South VCM Charge Filter                                     |

## APPENDIX A

### EQUIPMENT LIST

#### Reactors

|        |                        |
|--------|------------------------|
| 45-741 | Polymerization Reactor |
| 45-742 | Polymerization Reactor |
| 45-743 | Polymerization Reactor |
| 45-744 | Polymerization Reactor |
| 45-781 | Polymerization Reactor |

#### Heat Exchangers

|        |                              |
|--------|------------------------------|
| 55-328 | Reactor 45-741 Condenser     |
| 55-329 | Reactor 45-742 Condenser     |
| 55-330 | Reactor 45-743 Condenser     |
| 55-331 | Reactor 45-744 Condenser     |
| 55-358 | Reactor 45-781 Condenser     |
| 55-332 | Hot Water Preheater          |
| 55-333 | Hot Water Tank Heater        |
| 55-334 | Water Recirculation Cooler   |
| 55-335 | West Seal Water Cooler       |
| 55-336 | East Seal Water Cooler       |
| 55-337 | West Recovered VCM Condenser |
| 55-338 | East Recovered VCM Condenser |
| 55-339 | Cleaning Solution Heater     |

#### Eductors and Ejectors

|                  |                               |
|------------------|-------------------------------|
| EE-701           | Reactor 45-741 Jacket Eductor |
| EE-702           | Reactor 45-742 Jacket Eductor |
| EE-703           | Reactor 45-743 Jacket Eductor |
| EE-704           | Reactor 45-744 Jacket Eductor |
| EE-705           | Reactor Evacuation Ejector    |
| EE-201 A, B, & C | Reactor 45-781 Jacket Eductor |
| EE-200           | Reactor Evacuation Ejector    |

#### Tanks and Vessels

|        |                                              |
|--------|----------------------------------------------|
| 45-301 | Instrument air Capacity Tank                 |
| 45-317 | East Recovered VCM Storage Tank              |
| 89-520 | West Recovered VCM Storage Tank              |
| 45-319 | Blowdown Tank                                |
| 45-745 | Fresh VCM Storage Tank                       |
| 45-748 | Hot Water Tank                               |
| 45-750 | Initiator Injection Pot                      |
| 45-751 | Colloid Makeup Tank                          |
| 45-752 | Colloid Storage Tank                         |
| 45-753 | Colloid Charge Tank                          |
| 45-754 | Seal Oil Storage Drum                        |
| 45-755 | AMS Short Stop Charge Pot for Reactor 45-741 |
| 45-756 | AMS Short Stop Charge Pot for Reactor 45-742 |
| 45-757 | AMS Short Stop Charge Pot for Reactor 45-743 |
| 45-758 | AMS Short Stop Charge Pot for Reactor 45-744 |

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# APPENDIX A

## EQUIPMENT LIST - CONTINUED

|                                 |              | <u>Service</u>                     |
|---------------------------------|--------------|------------------------------------|
| <u>Pumps</u>                    | <u>Motor</u> |                                    |
| 72-875                          | 70-875       | VCM Charge Pump                    |
| 72-876                          | 70-876       | VCM Charge Pump                    |
| 72-877                          | 70-877       | Recovered VCM Charge Pump          |
| 72-878                          | 70-878       | Recovered VCM Charge Pump          |
| 72-879                          | 70-879       | Hot Water Charge Pump              |
| 72-880                          | 70-880       | Hot Water Charge Pump              |
| 72-881                          | 70-881       | Colloid Batch Transfer Pump        |
| 72-882                          | 70-882       | Colloid Circulation Pump           |
| 72-883                          | 70-883       | Colloid Charge Pump                |
| 72-884                          | 70-884       | Colloid Charge Pump                |
| 72-885                          | 70-885       | High Pressure Service Water Pump   |
| 72-886                          | 70-886       | High Pressure Service Water Pump   |
| 72-887                          | 70-887       | Mechanical Seal Purge Water Pump   |
| 72-888                          | 70-888       | Mechanical Seal Purge Water Pump   |
| 72-889                          | 70-889       | Water Recirculation Pump           |
| 72-890                          | 70-890       | Water Recirculation Pump           |
| 72-891                          | 70-891       | Seal Water Pump                    |
| 72-892                          | 70-892       | Seal Water Pump                    |
| 72-893                          | 70-893       | Recovered VCM Transfer Pump        |
| 72-884                          | 70-894       | Recovered VCM Transfer Pump        |
| 72-895                          | 70-895       | Hydroquinone Injection Pump        |
| 72-896                          | 70-896       | Slurry Transfer Pump               |
| 72-897                          | 70-897       | Slurry Transfer Pump               |
| 72-898                          | 70-898       | Cleaning Solution Pump             |
| 72-899                          | 70-899       | Cleaning Solution Pump             |
| 72-900                          | 70-900       | Blowdown Tank Pump                 |
| <u>Compressors<br/>and Fans</u> |              |                                    |
|                                 | <u>Motor</u> |                                    |
| 72-901                          | 70-901       | Recovery Vacuum Pump               |
| 72-902                          | 70-902       | Recovery Vacuum Pump               |
| 72-903                          | 70-903       | Recovery Compressor                |
| 72-904                          | 70-904       | Recovery Compressor                |
| 72-905                          | 70-905       | Recovery Compressor                |
| 49-368                          | 70-864       | Slurry Strainer Exhauster          |
| <u>Agitators</u>                |              |                                    |
|                                 | <u>Motor</u> |                                    |
| 51-101                          | 70-814       | Reactor 45-741 Agitator            |
| 51-102                          | 70-815       | Reactor 45-742 Agitator            |
| 51-103                          | 70-816       | Reactor 45-743 Agitator            |
| 51-104                          | 70-817       | Reactor 45-744 Agitator            |
| 51-105                          | 70-818       | Colloid Makeup Tank Agitator       |
| 51-106                          | 70-819       | Hydroquinone Storage Tank Agitator |
| 51-110                          | 70-971       | Reactor 45-781 Agitator            |

APPENDIX A

EQUIPMENT LIST - CONTINUED

| <u>Package Units</u> | <u>Service</u>                                    |
|----------------------|---------------------------------------------------|
| 95-299               | Seal Oil Pressure Unit                            |
| 95-300               | Seal Oil Pressure Unit                            |
| PA-703               | Deluge System                                     |
| PA-704               | Deluge System Combustible Hydrocarbon Analyzer    |
| PA-705               | Fire Monitor                                      |
| PA-706               | Fire Monitor                                      |
| PA-707               | Fire Monitor                                      |
| PA-708               | Fire Monitor                                      |
| PA-709               | Fire Monitor                                      |
| PA-710               | Fire Monitor                                      |
| PA-711               | Deleted                                           |
| PA-712               | Fixed Point VCM Monitor                           |
| PA-713               | Emergency NO Short Stop Bottles                   |
| PA-714               | Emergency NO Short Stop Bottles                   |
| PA-715               | Emergency NO Short Stop Bottles                   |
| PA-716               | Emergency NO Short Stop Bottles                   |
| PA-717               | Programmable Logic Controller                     |
| PA-200               | Emergency NO Short Stop Bottles                   |
| PA-201               | Nitrogen Supply bottle to AMS Emergency Kill Pot. |

## APPENDIX B

### INSTRUMENT LIST

#### Item No.

#### Service

#### Amperage Instruments

|          |                                                          |
|----------|----------------------------------------------------------|
| AI-701   | Reactor Agitator 51-101 Motor Amperage Indicator         |
| AAHL-701 | Reactor Agitator 51-101 Motor High or Low Amperage Alarm |
| AI-702   | Reactor Agitator 51-102 Motor Amperage Indicator         |
| AAHL-702 | Reactor Agitator 51-102 Motor High or Low Amperage Alarm |
| AI-703   | Reactor Agitator 51-103 Motor Amperage Indicator         |
| AAHL-703 | Reactor Agitator 51-103 Motor High or Low Amperage Alarm |
| AI-704   | Reactor Agitator 51-104 Motor Amperage Indicator         |
| AAHL-704 | Reactor Agitator 51-104 Motor High or Low Amperage Alarm |
| AI-705   | Recovery Vacuum Pump 72-901 Motor Amperage               |
| AI-706   | Recovery Vacuum Pump 72-902 Motor Amperage               |
| AI-707   | Recovery Compressor 72-903 Motor Amperage                |
| AI-708   | Recovery Compressor 72-904 Motor Amperage                |
| AI-709   | Recovery Compressor 72-905 Motor Amperage                |

#### Control Valves

|        |                                                           |
|--------|-----------------------------------------------------------|
| CV-701 | Fresh VCM Storage Tank 45-745 Outlet Valve                |
| CV-702 | Deleted                                                   |
| CV-703 | Recovered VCM Valve to VCM Charge Pumps 72-875 and 72-876 |
| CV-704 | VCM Charge Pump 72-875 Discharge Valve                    |
| CV-705 | VCM Charge Pump 72-876 Discharge Valve                    |
| CV-706 | Hot Water Tank 45-748 Outlet Valve                        |
| CV-707 | Colloid Charge Pump 72-885 Discharge Valve                |
| CV-708 | Deleted                                                   |
| CV-709 | Hot Water Valve to Colloid Makeup Tank 45-751             |
| CV-710 | Reactor 45-741 Main Charge Valve                          |
| CV-711 | Reactor 45-741 Colloid Charge Valve                       |
| CV-712 | Reactor 45-741 Steam Stripping Valve                      |
| CV-713 | Reactor Condenser 55-328 Cleaning and Rinse Valve         |
| CV-714 | Reactor 45-741 Vent Valve                                 |
| CV-715 | Reactor 45-741 Inert Vent Valve                           |
| CV-716 | Reactor 45-741 Recovery and Evacuation Valve              |
| CV-717 | Reactor 45-741 Cleaning and Rinse Valve                   |
| CV-718 | Deleted                                                   |
| CV-719 | Deleted                                                   |
| CV-720 | Reactor 45-742 Main Charge Valve                          |
| CV-721 | Reactor 45-742 Colloid Charge Valve                       |
| CV-722 | Reactor 45-742 Steam Stripping Valve                      |
| CV-723 | Reactor Condenser 55-329 Cleaning and Rinse Valve         |
| CV-724 | Reactor 45-742 Vent Valve                                 |
| CV-725 | Reactor 45-742 Inert Vent Valve                           |
| CV-726 | Reactor 45-742 Recovery and Evacuation Valve              |
| CV-727 | Reactor 45-742 Cleaning and Rinse Valve                   |
| CV-728 | Deleted                                                   |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

Item No.

Service

### Control Valves (Continued)

|        |                                                          |
|--------|----------------------------------------------------------|
| CV-729 | Deleted                                                  |
| CV-730 | Reactor 45-743 Main Charge Valve                         |
| CV-731 | Reactor 45-743 Colloid Charge Valve                      |
| CV-732 | Reactor 45-743 Steam Stripping Valve                     |
| CV-733 | Reactor Condenser 55-330 Cleaning and Rinse Valve        |
| CV-734 | Reactor 45-743 Vent Valve                                |
| CV-735 | Reactor 45-743 Inert Vent Valve                          |
| CV-736 | Reactor 45-743 Recovery and Evacuation Valve             |
| CV-737 | Reactor 45-743 Cleaning and Rinse Valve                  |
| CV-738 | Deleted                                                  |
| CV-739 | Deleted                                                  |
| CV-740 | Reactor 45-744 Main Charge Valve                         |
| CV-741 | Reactor 45-744 Colloid Charge Valve                      |
| CV-742 | Reactor 45-744 Steam Stripping Valve                     |
| CV-743 | Reactor Condenser 55-331 Cleaning and Rinse Valve        |
| CV-744 | Reactor 45-744 Vent Valve                                |
| CV-745 | Reactor 45-744 Inert Vent Valve                          |
| CV-746 | Reactor 45-744 Recovery and Evacuation Valve             |
| CV-747 | Reactor 45-744 Cleaning and Rinse Valve                  |
| CV-748 | Deleted                                                  |
| CV-749 | Deleted                                                  |
| CV-750 | Reactor 45-741 Hot Water Rinse Supply Valve              |
| CV-751 | Reactor Condenser 45-741 Chem Wash Solution Supply Valve |
| CV-752 | Reactor 45-741 Recovery Valve                            |
| CV-753 | Reactor 45-741 Initiator Charge Valve                    |
| CV-754 | Reactor 45-741 VCM Charge Valve                          |
| CV-755 | Reactor 45-741 Water Charge Valve                        |
| CV-756 | Deleted                                                  |
| CV-757 | Reactor 45-741 Initiator Charge Line Sewer Valve         |
| CV-758 | Reactor 45-741 Slurry Dump Valve                         |
| CV-759 | Reactor 45-741 Sewer Drain Valve                         |
| CV-760 | Reactor 45-741 Chem Wash Solution Return Valve           |
| CV-761 | Deleted                                                  |
| CV-762 | Reactor 45-741 Evacuation Valve                          |
| CV-763 | Reactor 45-741 Initiator Charge Valve                    |
| CV-764 | Reactor 45-742 Hot Water Rinse Supply Valve              |
| CV-765 | Reactor 45-742 Evacuation Valve                          |
| CV-766 | Reactor 45-742 Chem Wash Solution Supply Valve           |
| CV-767 | Reactor 45-742 Recovery Valve                            |
| CV-768 | Reactor 45-742 Initiator Charge Valve                    |
| CV-769 | Reactor 45-742 VCM Charge Valve                          |
| CV-770 | Reactor 45-742 Water Charge Valve                        |
| CV-771 | Deleted                                                  |
| CV-772 | Reactor 45-742 Slurry Dump Valve                         |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

### Item No.

### Service

#### Control Valves (Continued)

|        |                                                                |
|--------|----------------------------------------------------------------|
| CV-773 | Reactor 45-742 Chem Wash Solution Return Valve                 |
| CV-774 | Reactor 45-742 Sewer Drain Valve                               |
| CV-775 | Deleted                                                        |
| CV-776 | Reactor 45-742 Initiator Charge Valve                          |
| CV-777 | Reactor 45-742 Initiator Charge Line Sewer Valve               |
| CV-778 | Reactor 45-743 Hot Water Rinse Supply Valve                    |
| CV-779 | Reactor 45-743 Evacuation Valve                                |
| CV-780 | Reactor 45-743 Chem Wash Solution Supply Valve                 |
| CV-781 | Reactor 45-743 Recovery Valve                                  |
| CV-782 | Reactor 45-743 Initiator Charge Valve                          |
| CV-783 | Reactor 45-743 VCM Charge Valve                                |
| CV-784 | Reactor 45-743 Water Charge Valve                              |
| CV-785 | Deleted                                                        |
| CV-786 | Reactor 45-743 Slurry Dump Valve                               |
| CV-787 | Reactor 45-743 Chem Wash Solution Return Valve                 |
| CV-788 | Reactor 45-743 Sewer Drain Valve                               |
| CV-789 | Deleted                                                        |
| CV-790 | Reactor 45-743 Initiator Charge Valve                          |
| CV-791 | Reactor 45-743 Initiator Charge Line Sewer Valve               |
| CV-792 | Reactor 45-744 Hot Water Rinse Supply Valve                    |
| CV-793 | Reactor 45-744 Evacuation Valve                                |
| CV-794 | Reactor 45-744 Chem Wash Solution Supply Valve                 |
| CV-795 | Reactor 45-744 Initiator Charge Valve                          |
| CV-796 | Reactor 45-744 VCM Charge Valve                                |
| CV-797 | Reactor 45-744 Water Charge Valve                              |
| CV-798 | Deleted                                                        |
| CV-799 | Reactor 45-744 Slurry Dump Valve                               |
| CV-800 | Reactor 45-744 Chem Wash Solution Return Valve                 |
| CV-801 | Reactor 45-744 Sewer Drain Valve                               |
| CV-802 | Deleted                                                        |
| CV-803 | Reactor 45-744 Initiator Charge Valve                          |
| CV-804 | Reactor 45-744 Initiator Charge Line Sewer Valve               |
| CV-805 | Reactor 45-744 Recovery Valve                                  |
| CV-806 | Colloid Charge Pump 72-884 Discharge Valve                     |
| CV-807 | Deleted                                                        |
| CV-808 | Cold Water Addition Valve for Swirl                            |
| CV-809 | Cold Water Addition Valve for Charge                           |
| CV-810 | Recovery Vacuum Pump 72-901 Suction Valve                      |
| CV-811 | Recovery Vacuum Pump 72-901 Discharge Valve                    |
| CV-812 | Recovery Vacuum Pump 72-901 Seal Water Supply Valve            |
| CV-813 | Recovery Vacuum Pump 72-901 Mechanical Seal Water Supply Valve |
| CV-814 | Reactor Jacket Eductor EE-701 Steam Valve                      |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                   | <u>Service</u>                                                        |
|-----------------------------------|-----------------------------------------------------------------------|
| <u>Control Valves (Continued)</u> |                                                                       |
| CV-815                            | Reactor Jacket Eductor EE-702 Steam Valve                             |
| CV-816                            | Reactor Jacket Eductor EE-703 Steam Valve                             |
| CV-817                            | Reactor Jacket Eductor EE-704 Steam Valve                             |
| CV-818                            | Fresh VCM Storage Tank 45-745 Inlet Valve                             |
| CV-819                            | Hot Water Preheater 55-332 Water Inlet Valve                          |
| CV-820                            | Recovery Vacuum Pump 72-902 Suction Valve                             |
| CV-821                            | Recovery Vacuum Pump 72-902 Discharge Valve                           |
| CV-822                            | Recovery Vacuum Pump 72-902 Seal Water Supply Valve                   |
| CV-823                            | Recovery Vacuum Pump 72-902 Mechanical Seal Water Supply Valve        |
| CV-824                            | Deleted                                                               |
| CV-825                            | Deleted                                                               |
| CV-826                            | Deleted                                                               |
| CV-827                            | Deleted                                                               |
| CV-828                            | Colloid Makeup Tank 45-751 Process Water Valve                        |
| CV-829                            | Hot Water Charge Pump 72-880 Discharge Valve                          |
| CV-830                            | Recovery Compressor 72-903 Suction Valve                              |
| CV-831                            | Recovery Compressor 72-903 Discharge Valve                            |
| CV-832                            | Recovery Compressor 72-903 Seal Water Supply Valve                    |
| CV-833                            | Recovery Compressor 72-903 Mechanical Seal Water Supply Valve         |
| CV-834                            | Deleted                                                               |
| CV-835                            | Water Recirculation Cooler 55-334 Cooling Water Return Valve          |
| CV-836                            | Recovery Knockout Drum 45-760 Water Recirculation Inlet Valve         |
| CV-837                            | Recovery Knockout Drum 45-760 Water Blowdown Valve                    |
| CV-838                            | Recovery Knockout Drum 45-761 Water Recirculation Inlet Valve         |
| CV-839                            | Recovery Knockout Drum 45-761 Water Blowdown Valve                    |
| CV-840                            | Recovery Compressor 72-904 Suction Valve                              |
| CV-841                            | Recovery Compressor 72-904 Discharge Valve                            |
| CV-842                            | Recovery Compressor 72-904 Seal Water Supply Valve                    |
| CV-843                            | Recovery Compressor 72-904 Mechanical Seal Water Supply Valve         |
| CV-844                            | Recovered VCM Condensers 55-337 and 55-338 Cooling Water Return Valve |
| CV-845                            | Deleted                                                               |
| CV-846                            | Deleted                                                               |
| CV-847                            | Reactor Evacuation Ejector EE-706 First Stage Steam Valve             |
| CV-848                            | Reactor Evacuation Ejector EE-706 Second Stage Steam Valve            |
| CV-849                            | Hot Water Charge Pump 72-879 Discharge Valve                          |
| CV-850                            | Recovery Compressor 72-905 Suction Valve                              |
| CV-851                            | Recovery Compressor 72-905 Discharge Valve                            |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                   | <u>Service</u>                                                          |
|-----------------------------------|-------------------------------------------------------------------------|
| <u>Control Valves (Continued)</u> |                                                                         |
| CV-852                            | Recovery Compressor 72-905 Seal Water Supply Valve                      |
| CV-853                            | Recovery Compressor 72-905 Mechanical Seal Water Supply Valve           |
| CV-854                            | Recovery Vacuum Pumps 72-901 and 72-902 Bypass Valve                    |
| CV-855                            | Recovery Compressors 72-903, 72-904, and 72-905 Bypass Valve            |
| CV-856                            | Colloid Makeup Tank 45-751 Water Inlet Valve                            |
| CV-857                            | Colloid Makeup Tank 45-751 Colloid Outlet Valve                         |
| CV-858                            | Colloid Recirculation Valve to Colloid Storage Tank 45-752              |
| CV-859                            | Colloid Circulation Pump 72-882 Inlet Valve                             |
| CV-860                            | Deleted                                                                 |
| CV-861                            | Colloid Charge Tank 45-753 Inlet Valve                                  |
| CV-862                            | Deleted                                                                 |
| CV-863                            | Dump System Water Rinse Valve                                           |
| CV-864                            | Slurry Transfer Pump 72-896 Mechanical Seal Water Valve                 |
| CV-865                            | Deleted                                                                 |
| CV-866                            | Slurry Transfer Pump 72-897 Mechanical Seal Water Valve                 |
| CV-867                            | Deleted                                                                 |
| CV-868                            | Deleted                                                                 |
| CV-869                            | Deleted                                                                 |
| CV-870                            | Deleted                                                                 |
| CV-871                            | Cleaning Solution Heater 55-339 Inlet Valve                             |
| CV-872                            | Cleaning Solution Storage Tank 45-767 Top Inlet Valve                   |
| CV-873                            | Cleaning Solution Pumps 72-898 and 72-899 Suction Valve                 |
| CV-874                            | Reactor Cleaning Solution Return Valve to Cleaning Solution Tank 45-767 |
| CV-875                            | Seal Oil Pressure Unit 95-300 Seal Oil Return Valve                     |
| CV-876                            | Seal Oil Pressure Unit 95-299 Seal Oil Return Valve                     |
| CV-877                            | Seal Oil Pressure Unit 95-300 Seal Oil Supply Valve                     |
| CV-878                            | Seal Oil Pressure Unit 95-299 Seal Oil Supply Valve                     |
| CV-879                            | Initiator Injection Pot 45-750 Service Water Inlet Valve                |
| CV-880                            | Blowdown Tank Pump 72-900 Discharge Valve                               |
| CV-881                            | 45-741 Emergency NO Short Stop Three-Way Valve                          |
| CV-882                            | 45-742 Emergency NO Short Stop Three-Way Valve                          |
| CV-883                            | 45-743 Emergency NO Short Stop Three-Way Valve                          |
| CV-884                            | 45-744 Emergency NO Short Stop Three-Way Valve                          |
| CV-885                            | 45-741 Emergency NO Short Stop Valve                                    |
| CV-886                            | 45-742 Emergency NO Short Stop Valve                                    |
| CV-887                            | 45-743 Emergency NO Short Stop Valve                                    |
| CV-888                            | 45-744 Emergency NO Short Stop Valve                                    |
| CV-889                            | Recovery Seal Water and VCM Diverter Valve                              |
| CV-890                            | Recovery Seal Water and VCM Diverter Valve                              |

APPENDIX B  
INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                      | <u>Service</u>                                           |
|--------------------------------------|----------------------------------------------------------|
| <u>Level Instruments (Continued)</u> |                                                          |
| LIC-726                              | Deleted                                                  |
| LA-726                               | Deleted                                                  |
| LAH-727                              | Cleaning Solution Tank 45-767 High Level Alarm           |
| LI-728                               | Cleaning Solution Tank 45-767 Level Indicator            |
| LAL-729                              | Cleaning Solution Tank 45-767 Low Level Alarm            |
| LSL-730                              | Seal Oil Pressure Unit 95-299 Reservoir Low Level Switch |
| LAL-730                              | Seal Oil Pressure Unit 95-299 Reservoir Low Level Alarm  |
| LSL-731                              | Seal Oil Pressure Unit 95-300 Reservoir Low Level Switch |
| LAL-731                              | Seal Oil Pressure Unit 95-300 Reservoir Low Level Alarm  |
| LC-732                               | Deleted                                                  |
| LAL-733                              | Hydroquinone Storage Tank 45-765 Low Level Alarm         |
| LSH-734                              | Cleaning Solution Tank 45-767 High Level Switch          |
| LA-735                               | Deleted                                                  |
| LA-736                               | Deleted                                                  |
| LA-737                               | Deleted                                                  |
| LA-738                               | Deleted                                                  |
| LAL-739                              | Colloid Makeup Tank 45-751 Low Level Alarm               |
| LAH-740                              | Blowdown Tank 45-319 High Level Alarm                    |
| LSL-741                              | Blowdown Tank 45-319 Low Level Switch                    |

Pressure Gauges

|        |                                                           |
|--------|-----------------------------------------------------------|
| PG-701 | VCM Charge Pump 72-875 Discharge Pressure Gauge           |
| PG-702 | VCM Charge Pump 72-876 Discharge Pressure Gauge           |
| PG-703 | Recovered VCM Charge Pump 72-877 Discharge Pressure Gauge |
| PG-704 | Recovered VCM Charge Pump 72-878 Discharge Pressure Gauge |
| PG-705 | Fresh VCM Storage Tank 45-745 Pressure Gauge              |
| PG-706 | Recovered VCM Storage Tank 89-520 Pressure Gauge          |
| PG-707 | Recovered VCM Storage Tank 45-317 Pressure Gauge          |
| PG-708 | Deleted                                                   |
| PG-709 | Deleted                                                   |
| PG-710 | Deleted                                                   |
| PG-711 | Deleted                                                   |
| PG-712 | Process Water Filter 64-720 Inlet Pressure Gauge          |
| PG-713 | Process Water Filter 64-720 Outlet Pressure Gauge         |
| PG-714 | Hot Water Charge Pump 72-879 Discharge Pressure Gauge     |
| PA-715 | Hot Water Charge Pump 72-880 Discharge Pressure Gauge     |
| PG-716 | Deleted                                                   |
| PG-717 | Deleted                                                   |
| PG-718 | Deleted                                                   |

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# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                    | <u>Service</u>                                                           |
|------------------------------------|--------------------------------------------------------------------------|
| <u>Pressure Gauges (Continued)</u> |                                                                          |
| PG-719                             | Colloid Makeup Water Filter 64-721 Inlet Pressure Gauge                  |
| PG-720                             | Colloid Makeup Water Filter 64-721 Outlet Pressure Gauge                 |
| PG-721                             | Colloid Batch Transfer Pump 72-881 Discharge Pressure Gauge              |
| PG-722                             | Colloid Transfer Filter 64-722 Outlet Pressure Gauge                     |
| PG-723                             | Colloid Circulation Pump 72-882 Discharge Pressure Gauge                 |
| PG-724                             | Colloid Transfer Filter 64-723 Outlet Pressure Gauge                     |
| PG-725                             | Colloid Charge Pump 72-883 Discharge Pressure Gauge                      |
| PG-726                             | Colloid Charge Pump 72-884 Discharge Pressure Gauge                      |
| PG-727                             | Steam Stripping Header Pressure Gauge                                    |
| PG-728                             | Reactor 45-741 Steam Stripping Line Pressure Gauge                       |
| PG-729                             | Deleted                                                                  |
| PG-730                             | Reactor Condenser 55-328 Pressure Gauge                                  |
| PG-731                             | Reactor Agitator 51-101 Seal Oil Return Pressure Gauge                   |
| PG-732                             | Reactor 45-742 Steam Stripping Line Pressure Gauge                       |
| PG-733                             | Reactor Condenser 55-329 Pressure Gauge                                  |
| PG-734                             | Deleted                                                                  |
| PG-735                             | Reactor Agitator 51-102 Seal Oil Return Pressure Gauge                   |
| PG-736                             | Reactor 45-743 Steam Stripping Line Pressure Gauge                       |
| PG-737                             | Reactor Condenser 55-330 Pressure Gauge                                  |
| PG-738                             | Deleted                                                                  |
| PG-739                             | Reactor Agitator 51-103 Seal Oil Return Pressure Gauge                   |
| PG-740                             | Reactor 45-744 Steam Stripping Line Pressure Gauge                       |
| PG-741                             | Reactor Condenser 55-331 Pressure Gauge                                  |
| PG-742                             | Deleted                                                                  |
| PG-743                             | Reactor Agitator 51-104 Seal Oil Return Pressure Gauge                   |
| PG-744                             | Recovery Knockout Drum 45-760 Pressure Gauge                             |
| PG-745                             | Water Recirculation Pump 72-889 Discharge Pressure Gauge                 |
| PG-746                             | Deleted                                                                  |
| PG-747                             | Recovered VCM Bleed Back Line Pressure Gauge                             |
| PG-748                             | Recovery Knockout Drum 45-761 Pressure Gauge                             |
| PG-749                             | Water Recirculation Pump 72-890 Discharge Pressure Gauge                 |
| PG-750                             | Deleted                                                                  |
| PG-751                             | Recovery Vacuum Pump 72-901 Inlet Pressure Gauge                         |
| PG-752                             | Recovery Compressors 72-904 or 72-905 Suction Pressure Gauge             |
| PG-753                             | Recovery Compressors 72-903, 72-904, and 72-905 Discharge Pressure Gauge |
| PG-754                             | Seal Water Separator 45-762 Pressure Gauge                               |
| PG-755                             | Seal Water Separator 45-763 Pressure Gauge                               |
| PG-756                             | Seal Water Pump 72-891 Discharge Pressure Gauge                          |
| PG-757                             | Seal Water Filter 64-731 Outlet Pressure Gauge                           |
| PG-758                             | Seal Water Pump 72-892 Discharge Pressure Gauge                          |
| PG-759                             | Seal Water Filter 64-732 Outlet Pressure Gauge                           |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                    | <u>Service</u>                                                                  |
|------------------------------------|---------------------------------------------------------------------------------|
| <u>Pressure Gauges (Continued)</u> |                                                                                 |
| PG-760                             | Recovered VCM Collect Tank 45-764 Pressure Gauge                                |
| PG-761                             | Recovered VCM Transfer Pumps 72-893 and 72-894<br>Discharge Pressure Gauge      |
| PG-762                             | Recovery Knockout Drum 45-760 VCM Inlet Line Pressure<br>Gauge                  |
| PG-763                             | Hydroquinone Storage Tank 45-765 Pressure Gauge                                 |
| PG-764                             | Hydroquinone Injection Pump 72-895 Discharge Pressure<br>Gauge                  |
| PG-765                             | Slurry Transfer Pump 72-896 Discharge Pressure Gauge                            |
| PG-766                             | Deleted                                                                         |
| PG-767                             | Slurry Transfer Pump 72-897 Discharge Pressure Gauge                            |
| PG-768                             | Deleted                                                                         |
| PG-769                             | Caustic Solution Pump 72-898 Discharge Pressure Gauge                           |
| PG-770                             | Caustic Solution Pump 72-899 Discharge Pressure Gauge                           |
| PG-771                             | Cleaning Solution Heater 55-339 Outlet Pressure Gauge                           |
| PG-772                             | Service Water Filter 64-724 Inlet Pressure Gauge                                |
| PG-773                             | Service Water Filter 64-724 Outlet Pressure Gauge                               |
| PG-774                             | Service Water Pumps 72-885 and 72-886 Discharge<br>Pressure Gauge               |
| PG-775                             | Mechanical Seal Purge Water Pumps 72-887 and 72-888<br>Discharge Pressure Gauge |
| PG-776                             | AMS Short Stop Charge Pot 45-755 Outlet Pressure Gauge                          |
| PG-777                             | AMS Short Stop Charge Pot 45-756 Outlet Pressure Gauge                          |
| PG-778                             | AMS Short Stop Charge Pot 45-757 Outlet Pressure Gauge                          |
| PG-779                             | AMS Short Stop Charge Pot 45-758 Outlet Pressure Gauge                          |
| PG-780                             | Deleted                                                                         |
| PG-781                             | Blowdown Tank Pump 72-900 Discharge Pressure Gauge                              |
| PG-782                             | Blowdown Tank 45-319 Pressure Gauge                                             |
| PG-783                             | Seal Oil Return Header Pressure Gauge                                           |
| PG-784                             | Seal Oil Pressure Unit 95-299 Pressure Gauge                                    |
| PG-785                             | Seal Oil Pressure Unit 95-300 Pressure Gauge                                    |
| PG-786                             | Seal Oil Supply Header Pressure Gauge                                           |
| PG-787                             | Deleted                                                                         |
| PG-788                             | Deleted                                                                         |
| PG-789                             | Deleted                                                                         |
| PG-790                             | Deleted                                                                         |
| PG-791                             | Reactor Ejector Cyclone Separator 45-768 Outlet<br>Pressure Gauge               |
| PG-792                             | Breathing Air Header Pressure Gauge                                             |
| PG-793                             | Recovery Vacuum Pump 72-902 Suction Pressure Gauge                              |
| PG-794                             | Deleted                                                                         |
| PG-795                             | Initiator Injection Pot 45-750 Pressure Gauge                                   |
| PG-796                             | Seal Oil Return Filter 64-727 Outlet Pressure Gauge                             |
| PG-797                             | Seal Oil Return Filter 64-728 Outlet Pressure Gauge                             |

## APPENDIX B

### INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                    | <u>Service</u>                                                                      |
|------------------------------------|-------------------------------------------------------------------------------------|
| <u>Pressure Gauges (Continued)</u> |                                                                                     |
| PG-798                             | Emergency NO Short Stop Bottle PA-713 Pressure Gauge                                |
| PG-799                             | Emergency NO Short Stop Bottle PA-714 Pressure Gauge                                |
| PG-800                             | Emergency NO Short Stop Bottle PA-715 Pressure Gauge                                |
| PG-801                             | Emergency NO Short Stop Bottle PA-716 Pressure Gauge                                |
| PG-802                             | VCM Charge Filter 64-718 and 64-742 Discharge<br>Pressure Gauge                     |
| PG-803                             | Recovered VCM Charge Filter 64-719 Discharge<br>Pressure Gauge                      |
| PG-804                             | Reactor 45-741 Resin Sampling System Pressure Gauge                                 |
| PG-805                             | Reactor 45-742 Resin Sampling System Pressure Gauge                                 |
| PG-806                             | Reactor 45-743 Resin Sampling System Pressure Gauge                                 |
| PG-807                             | Reactor 45-744 Resin Sampling System Pressure Gauge                                 |
| PG-808                             | Instrument Air Capacity Tank 45-301 Pressure Gauge                                  |
| PG-809                             | Mechanical Seal Purge Water Surge Drum 45-759<br>Pressure Gauge                     |
| PG-810                             | High Pressure Service Water Header Pressure Gauge<br>(Downstream of PCi-817)        |
| PG-811                             | Mechanical Seal Purge Water Header Pressure Gauge<br>(Downstream of PCi-818)        |
| <u>Pressure Instruments</u>        |                                                                                     |
| PA-701                             | Deleted                                                                             |
| PCi-702                            | Deleted                                                                             |
| PSH-703                            | Initiator Injection Pot 45-750 High Pressure Switch                                 |
| PCi-704                            | Recovered VCM Storage Tanks 89-520 and 45-317 Inert<br>Vent Back Pressure Regulator |
| PI-705                             | Reactor Evacuation Header Pressure Indicator                                        |
| PCi-706                            | Steam Stripping Header Steam Supply Back Pressure<br>Regulator                      |
| PSL-707                            | Steam Stripping Header Low Pressure Switch                                          |
| PCi-708                            | Deleted                                                                             |
| PCi-709                            | Deleted                                                                             |
| PCi-710                            | Deleted                                                                             |
| PCi-711                            | Deleted                                                                             |
| PSL-712                            | Reactor 45-741 Pressure Switch (Prevents dump before<br>recovery)                   |
| PSL-713                            | Reactor 45-742 Pressure Switch (Prevents dump before<br>recovery)                   |
| PSL-714                            | Reactor 45-743 Pressure Switch (Prevents dump before<br>recovery)                   |
| PSL-715                            | Reactor 45-744 Pressure Switch (Prevents dump before<br>recovery)                   |
| PSL-716                            | Reactor 45-741 Pressure Switch (Prevents charge before<br>evacuation)               |
| PSL-717                            | Reactor 45-742 Pressure Switch (Prevents charge before<br>evacuation)               |

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## APPENDIX B

### INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                         | <u>Service</u>                                                                                                                             |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <u>Pressure Instruments (Continued)</u> |                                                                                                                                            |
| PSL-718                                 | Reactor 45-743 Pressure Switch (Prevents charge before evacuation)                                                                         |
| PSL-719                                 | Reactor 45-744 Pressure Switch (Prevents charge before evacuation)                                                                         |
| PR-720                                  | Reactor 45-741 Pressure Recorder                                                                                                           |
| PAH-720                                 | Reactor 45-741 High Pressure Alarm                                                                                                         |
| PR-721                                  | Reactor 45-742 Pressure Recorder                                                                                                           |
| PAH-721                                 | Reactor 45-742 High Pressure Alarm                                                                                                         |
| PR-722                                  | Reactor 45-743 Pressure Recorder                                                                                                           |
| PAH-722                                 | Reactor 45-743 High Pressure Alarm                                                                                                         |
| PR-723                                  | Reactor 45-744 Pressure Recorder                                                                                                           |
| PAH-723                                 | Reactor 45-744 High Pressure Alarm                                                                                                         |
| PI-724                                  | Reactor Recovery Pressure Indicator                                                                                                        |
| PIC-725                                 | Recovery Knockout Drum 45-760 Inlet Pressure Controller                                                                                    |
| PIC-726                                 | VCM Bleed Stream to Recovery System Pressure Controller                                                                                    |
| PSL-727                                 | Recovery Compressors 72-903, 72-904, and 72-905 Suction Low Pressure Switch                                                                |
| PDS-728                                 | Recovery Vacuum Pumps 72-901 and 72-902 Suction and Recovery Compressors 72-903, 72-904, and 72-905 Discharge Differential Pressure Switch |
| PCi-729                                 | Hydroquinone Storage Tank 45-765 Nitrogen Pressure Regulator                                                                               |
| PCi-730                                 | Deleted                                                                                                                                    |
| PCi-731                                 | Mechanical Seal Purge Water Surge Drum 45-759 Nitrogen Supply Pressure Regulator                                                           |
| PSL-732                                 | High Pressure Service Water System Low Pressure Switch                                                                                     |
| PAL-732                                 | High Pressure Service Water System Low Pressure Alarm                                                                                      |
| PCi-733                                 | Deleted                                                                                                                                    |
| PCi-734                                 | Deleted                                                                                                                                    |
| PCi-735                                 | Deleted                                                                                                                                    |
| PSL-737A and B                          | Mechanical Seal Water System Low Pressure Switches                                                                                         |
| PAL-737                                 | Mechanical Seal Water System Low Pressure Alarm                                                                                            |
| PSL-738                                 | Seal Oil Pressure Unit 95-299 Discharge Low Pressure Switch                                                                                |
| PAL-738                                 | Seal Oil Pressure Unit 95-299 Discharge Low Pressure Alarm                                                                                 |
| PCi-739                                 | Seal Oil Pressure Unit 95-299 Nitrogen Supply Pressure Regulator                                                                           |
| PSL-740                                 | Seal Oil Pressure Unit 95-300 Discharge Low Pressure Switch                                                                                |
| PAL-740                                 | Seal Oil Pressure Unit 95-300 Discharge Low Pressure Alarm                                                                                 |
| PCi-741                                 | Seal Oil Pressure Unit 95-300 Nitrogen Supply Pressure Regulator                                                                           |
| PA-742                                  | Deleted                                                                                                                                    |

## APPENDIX B

### INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                         | <u>Service</u>                                                                       |
|-----------------------------------------|--------------------------------------------------------------------------------------|
| <u>Pressure Instruments (Continued)</u> |                                                                                      |
| PCi-743                                 | Breathing Air Station Supply Pressure Regulator<br>(Reactors, Ground Level)          |
| PCi-744                                 | Breathing Air Station Supply Pressure Regulator<br>(Reactors, Second Level)          |
| PCi-745                                 | Breathing Air Station Supply Pressure Regulator<br>(Recovery Building, First Floor)  |
| PCi-746                                 | Breathing Air Station Supply Pressure Regulator<br>(Recovery Building, Second Floor) |
| PCi-747                                 | Breathing Air Station Supply Pressure Regulator<br>(Charge Area)                     |
| PCi-748                                 | Deleted                                                                              |
| PCi-749                                 | Deleted                                                                              |
| PAH-750                                 | Initiator Injection Pot 45-750 High Pressure Alarm                                   |
| PAH-751                                 | Seal Oil Supply High Pressure Alarm                                                  |
| PCi-752                                 | Breathing Air Station Supply (Reactors, Third Level)                                 |
| PAL-753                                 | Emergency NO Short Stop Bottles Low Pressure Alarm                                   |
| PCi-754                                 | PA-713 NO Supply Pressure Regulator to Reactor 45-741                                |
| PCi-755                                 | PA-714 NO Supply Pressure Regulator to Reactor 45-742                                |
| PCi-756                                 | PA-715 NO Supply Pressure Regulator to Reactor 45-743                                |
| PCi-757                                 | PA-716 NO Supply Pressure Regulator to Reactor 45-744                                |
| PSL-758                                 | High Pressure Service Water Low Pressure Switch                                      |
| PIC-759                                 | Blowdown Tank 45-319 Pressure Controller                                             |
| PAH-760                                 | Blowdown Tank 45-319 High Pressure Alarm                                             |
| PI-760                                  | Blowdown Tank 45-319 Pressure Indicator                                              |
| PS-761                                  | Deleted                                                                              |
| PSL-762                                 | Blowdown Tank 45-319 Stripping Steam Low Pressure Switch                             |
| PAL-763                                 | Reactor Area Instrument Air Low Pressure Alarm                                       |

#### Rupture Discs

|        |                                               |
|--------|-----------------------------------------------|
| RD-701 | Reactor 45-741 Rupture Disc                   |
| RD-702 | Reactor 45-742 Rupture Disc                   |
| RD-703 | Reactor 45-743 Rupture Disc                   |
| RD-704 | Reactor 45-744 Rupture Disc                   |
| RD-705 | Reactor Condenser 55-328 Rupture Disc         |
| RD-706 | Reactor Condenser 55-329 Rupture Disc         |
| RD-707 | Reactor Condenser 55-330 Rupture Disc         |
| RD-708 | Reactor Condenser 55-331 Rupture Disc         |
| RD-709 | Reactor 45-741 First of Double Rupture Discs  |
| RD-710 | Reactor 45-742 First of Double Rupture Discs  |
| RD-711 | Reactor 45-743 First of Double Rupture Discs  |
| RD-712 | Reactor 45-744 First of Double Rupture Discs  |
| RD-713 | Reactor 45-741 Second of Double Rupture Discs |
| RD-714 | Reactor 45-742 Second of Double Rupture Discs |

APPENDIX B  
INSTRUMENT LIST - CONTINUED

Item No.

Service

Rupture Discs (Continued)

|                     |                                                                |
|---------------------|----------------------------------------------------------------|
| RD-715              | Reactor 45-743 Second of Double Rupture Discs                  |
| RD-716              | Reactor 45-744 Second of Double Rupture Discs                  |
| RD-717              | Fresh VCM Storage Tank 45-745 Rupture Disc                     |
| RD-718              | Recovered VCM Storage Tank 89-520 Rupture Disc                 |
| RD-719              | Recovered VCM Storage Tank 45-317 Rupture Disc                 |
| RD-720              | Deleted                                                        |
| RD-721              | Deleted                                                        |
| RD-722              | Deleted                                                        |
| RD-723              | Deleted                                                        |
| RD-724              | Deleted                                                        |
| RD-725              | Deleted                                                        |
| RD-726              | Recovery Knockout Drum 45-760 Rupture Disc                     |
| RD-727              | Recovery Knockout Drum 45-761 Rupture Disc                     |
| RD-728              | Initiator Injection Pot 45-750 Rupture Disc                    |
| RD-729              | Deleted                                                        |
| RD-730              | Deleted                                                        |
| RD-731              | Recovery Vacuum Pump 72-901 Inlet Rupture Disc                 |
| RD-732              | Recovery Vacuum Pump 72-902 Inlet Rupture Disc                 |
| RD-733              | Deleted                                                        |
| RD-734              | Deleted                                                        |
| RD-735              | Seal Water Separator 45-762 Rupture Disc                       |
| RD-736              | Seal Water Separator 45-763 Rupture Disc                       |
| RD-737              | Deleted                                                        |
| RD-738              | Deleted                                                        |
| RD-739              | Recovered VCM Condenser 55-337 VCM Outlet Rupture Disc         |
| RD-740              | Recovered VCM Condenser 55-338 VCM Outlet Rupture Disc         |
| RD-741              | Recovered VCM Collect Tank 45-764 Rupture Disc                 |
| RD-742              | Deleted                                                        |
| RD-743              | Deleted                                                        |
| RD-744              | Blowdown Tank 45-319 Rupture Disc                              |
| RD-745 to<br>RD-759 | Deleted                                                        |
| RD-760              | Recovered VCM Collect Tank 45-764 Inlet Line Rupture Disc      |
| RD-761              | Deleted                                                        |
| RD-762              | Deleted                                                        |
| RD-763              | Deleted                                                        |
| RD-764              | Deleted                                                        |
| RD-765              | Slurry Dump Line Rupture Disc                                  |
| RD-766              | Cleaning Solution Strainer 64-734 Inlet Piping Rupture<br>Disc |
| RD-767              | Deleted                                                        |

Safety-Relief Valves

|        |                             |
|--------|-----------------------------|
| SV-701 | Reactor 45-741 Relief Valve |
| SV-702 | Reactor 45-742 Relief Valve |
| SV-703 | Reactor 45-743 Relief Valve |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                         | <u>Service</u>                                                                      |
|-----------------------------------------|-------------------------------------------------------------------------------------|
| <u>Safety-Relief Valves (Continued)</u> |                                                                                     |
| SV-704                                  | Reactor 45-744 Relief Valve                                                         |
| SV-705                                  | Reactor Condenser 55-328 Relief Valve                                               |
| SV-706                                  | Reactor Condenser 55-329 Relief Valve                                               |
| SV-707                                  | Reactor Condenser 55-330 Relief Valve                                               |
| SV-708                                  | Reactor Condenser 55-331 Relief Valve                                               |
| SV-709                                  | Reactor 45-741 Jacket Relief Valve                                                  |
| SV-710                                  | Reactor 45-742 Jacket Relief Valve                                                  |
| SV-711                                  | Reactor 45-743 Jacket Relief Valve                                                  |
| SV-712                                  | Reactor 45-744 Jacket Relief Valve                                                  |
| SV-713                                  | Hot Water Preheater 55-332 Relief Valve                                             |
| SV-714                                  | Deleted                                                                             |
| SV-715                                  | Deleted                                                                             |
| SV-716                                  | Deleted                                                                             |
| SV-717                                  | Fresh VCM Storage Tank 45-745 Relief Valve                                          |
| SV-718                                  | Recovered VCM Storage Tank 89-520 Relief Valve                                      |
| SV-719                                  | Recovered VCM Storage Tank 45-317 Relief Valve                                      |
| SV-720                                  | VCM Charge Pumps 72-875 and 72-876 Suction Piping Relief Valve                      |
| SV-721                                  | Recovered VCM Charge Pumps 72-877 and 72-878 Suction Piping Relief Valve            |
| SV-722                                  | Recovered VCM Charge Filter 64-719 Relief Valve                                     |
| SV-723                                  | Recovered VCM Charge Pumps 72-877 and 72-878 Discharge Piping Relief Valve          |
| SV-724                                  | VCM Charge Filter 64-718 Relief Valve                                               |
| SV-725                                  | VCM Charge Line Relief Valve (Down Stream of VCM Charge Totalizers FQIC-701A and B) |
| SV-726                                  | Recovery Knockout Drum 45-760 Relief Valve                                          |
| SV-727                                  | Recovery Knockout Drum 45-761 Relief Valve                                          |
| SV-728                                  | Deleted                                                                             |
| SV-729                                  | Water Recirculation Cooler 55-334 Relief Valve                                      |
| SV-730                                  | Deleted                                                                             |
| SV-731                                  | Recovery Vacuum Pump 72-901 Inlet Relief Valve                                      |
| SV-732                                  | Recovery Vacuum Pump 72-902 Inlet Relief Valve                                      |
| SV-733                                  | Hydroquinone Storage Tank 45-765 Relief Valve                                       |
| SV-734                                  | Hydroquinone Injection Pump 72-895 Discharge Relief Valve                           |
| SV-735                                  | Seal Water Separator 45-762 Relief Valve                                            |
| SV-736                                  | Seal Water Separator 45-763 Relief Valve                                            |
| SV-737                                  | Seal Water Filter 64-731 Relief Valve                                               |
| SV-738                                  | Seal Water Filter 64-732 Relief Valve                                               |
| SV-739                                  | Recovered VCM Condenser 55-337 VCM Outlet Relief Valve                              |
| SV-740                                  | Recovered VCM Condenser 55-338 VCM Outlet Relief Valve                              |
| SV-741                                  | Recovered VCM Collect Tank 45-764 Relief Valve                                      |
| SV-742                                  | Cleaning Solution Heater (Tubes) 55-339 Relief Valve                                |
| SV-743                                  | Mechanical Seal Purge Water Surge Drum 45-759 Relief Valve                          |

## APPENDIX B

### INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                         | <u>Service</u>                                                                       |
|-----------------------------------------|--------------------------------------------------------------------------------------|
| <u>Safety-Relief Valves (Continued)</u> |                                                                                      |
| SV-744                                  | Blowdown Tank 45-319 Relief Valve                                                    |
| SV-745                                  | Breathing Air Station Supply Piping Relief Valve<br>(Reactors, Ground Level)         |
| SV-746                                  | Breathing Air Station Supply Piping Relief Valve<br>(Reactors, Ground Level)         |
| SV-747                                  | Breathing Air Station Supply Piping Relief Valve<br>(Recovery Building First Floor)  |
| SV-748                                  | Breathing Air Station Supply Piping Relief Valve<br>(Recovery Building Second Floor) |
| SV-749                                  | Breathing Air Station Supply Piping Relief Valve<br>(Charge Area)                    |
| SV-750                                  | AMS Short Stop Charge Pot 45-755 Relief Valve                                        |
| SV-751                                  | AMS Short Stop Charge Pot 45-756 Relief Valve                                        |
| SV-752                                  | AMS Short Stop Charge Pot 45-757 Relief Valve                                        |
| SV-753                                  | AMS Short Stop Charge Pot 45-758 Relief Valve                                        |
| SV-754                                  | Reactor 45-741 Steam Stripping Line Relief Valve                                     |
| SV-755                                  | Reactor 45-742 Steam Stripping Line Relief Valve                                     |
| SV-756                                  | Reactor 45-743 Steam Stripping Line Relief Valve                                     |
| SV-757                                  | Reactor 45-744 Steam Stripping Line Relief Valve                                     |
| SV-758                                  | Deleted                                                                              |
| SV-759                                  | Deleted                                                                              |
| SV-760                                  | Recovered VCM Collect Tank 45-764 Inlet Line Relief Valve                            |
| SV-761                                  | Recovered VCM Transfer Pumps 72-893 and 72-894<br>Discharge Relief Valve             |
| SV-762                                  | Recovered VCM Storage Tanks 89-520 and 45-317 Inlet<br>Line Relief Valve             |
| SV-763                                  | VCM Charge Pumps 72-875 and 72-876 Discharge Relief Valve                            |
| SV-764                                  | Breathing Air Station Supply Piping Relief Valve<br>(Reactors, Third Level)          |
| SV-765                                  | Cleaning Solution Filter 64-734 Relief Valve                                         |
| SV-766                                  | Deleted                                                                              |
| SV-767                                  | VCM Charge Filter 64-742 Relief Valve                                                |
| SV-768                                  | Instrument Air Capacity Tank 45-301 Relief Valve                                     |

#### Temperature Gauges

|        |                                                                      |
|--------|----------------------------------------------------------------------|
| TG-701 | Hot Water Preheater 55-332 Outlet Temperature Gauge                  |
| TG-702 | Recovered VCM Storage Tank 89-520 Temperature Gauge                  |
| TG-703 | Recovered VCM Storage Tank 45-317 Temperature Gauge                  |
| TG-704 | Colloid Makeup Tank 45-751 Temperature Gauge                         |
| TG-705 | Colloid Storage Tank 45-752 Temperature Gauge                        |
| TG-706 | Colloid Charge Tank 45-753 Temperature Gauge                         |
| TG-707 | Reactor Jacket 45-741 Cooling Water Return Temperature<br>Gauge      |
| TG-708 | Reactor Condenser 55-328 Cooling Water Return Tempera-<br>ture Gauge |

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APPENDIX B  
INSTURMENT LIST - CONTINUED

| <u>Item No.</u>                       | <u>Service</u>                                                           |
|---------------------------------------|--------------------------------------------------------------------------|
| <u>Temperature Gauges (Continued)</u> |                                                                          |
| TG-709                                | Reactor Jacket 45-742 Cooling Water Return Temperature Gauge             |
| TG-710                                | Reactor Condenser 55-329 Cooling Water Return Temperature Gauge          |
| TG-711                                | Reactor Jacket 45-743 Cooling Water Return Temperature Gauge             |
| TG-712                                | Reactor Condenser 55-330 Cooling Water Return Temperature Gauge          |
| TG-713                                | Reactor Jacket 45-744 Cooling Water Return Temperature Gauge             |
| TG-714                                | Reactor Condenser 55-331 Cooling Water Return Temperature Gauge          |
| TG-715                                | Water Recirculation Cooler 55-334 Outlet Temperature Gauge               |
| TG-716                                | Deleted                                                                  |
| TG-717                                | Water Recirculation Cooler 55-334 Cooling Water Return Temperature Gauge |
| TG-718                                | Water Recirculation Cooler 55-334 Inlet Temperature Gauge                |
| TG-719                                | Seal Water Cooler 55-335 Cooling Water Return Temperature Gauge          |
| TG-720                                | Seal Water Separator 45-762 Seal Water Outlet Temperature Gauge          |
| TG-721                                | Deleted                                                                  |
| TG-722                                | Seal Water Cooler 55-336 Cooling Water Return Temperature Gauge          |
| TG-723                                | Seal Water Separator 45-763 Seal Water Outlet Temperature Gauge          |
| TG-724                                | Recovered VCM Condenser 55-337 Cooling Water Return Temperature Gauge    |
| TG-725                                | Recovered VCM Condenser 55-337 VCM Outlet Temperature Gauge              |
| TG-726                                | Deleted                                                                  |
| TG-727                                | Recovered VCM Condenser 55-338 Cooling Water Return Temperature Gauge    |
| TG-728                                | Recovered VCM Condenser 55-338 VCM Outlet Temperature Gauge              |
| TG-729                                | Deleted                                                                  |
| TG-730                                | Cleaning Solution Tank 45-767 Temperature Gauge                          |
| TG-731                                | Seal Oil Return Temperature Gauge                                        |
| TG-732                                | Seal Oil Pressure Unit 95-299 Cooling Water Return Temperature Gauge     |
| TG-733                                | Seal Oil Pressure Unit 95-300 Cooling Water Return Temperature Gauge     |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                       | <u>Service</u>                                                                      |
|---------------------------------------|-------------------------------------------------------------------------------------|
| <u>Temperature Gauges (Continued)</u> |                                                                                     |
| TG-734                                | Seal Oil Supply Temperature Gauge                                                   |
| TG-735                                | Colloid Makeup Tank Jacket 45-751 Cooling Water<br>Return Temperature Gauge         |
| TG-736                                | Fresh VCM Storage Tank 45-745 Temperature Gauge                                     |
| TG-737                                | Process Water Temperature Gauge                                                     |
| TG-738                                | Hot Water Tank 45-748 Temperature Gauge                                             |
| TG-739                                | Initiator Charge Pot 45-750 Temperature Gauge                                       |
| TG-740                                | Blowdown Tank 45-319 Temperature Gauge                                              |
| <u>Temperature Instruments</u>        |                                                                                     |
| TIC-701                               | Hot Water Tank 45-748 Temperature Controller                                        |
| TIC-702                               | Hot Water Preheater 55-332 Discharge Temperature<br>Controller                      |
| TRC-703                               | Charge Water Temperature Controller                                                 |
| TR-704                                | Colloid Makeup Tank 45-751 Temperature Recorder                                     |
| TSH-704                               | Colloid Makeup Tank 45-751 High Temperature Switch                                  |
| TSL-704                               | Colloid Makeup Tank 45-751 Low Temperature Switch                                   |
| TI-705                                | VCM Charge Temperature Indicator                                                    |
| TIRC-706                              | Reactor 45-741 Polymerization Temperature Controller                                |
| TAH-706                               | Reactor 45-741 High Temperature Alarm                                               |
| TIRC-707                              | Reactor 45-742 Polymerization Temperature Controller                                |
| TAH-707                               | Reactor 45-742 High Temperature Alarm                                               |
| TIRC-708                              | Reactor 45-743 Polymerization Temperature Controller                                |
| TAH-708                               | Reactor 45-743 High Temperature Alarm                                               |
| TIRC-709                              | Reactor 45-744 Polymerization Temperature Controller                                |
| TAH-709                               | Reactor 45-744 High Temperature Alarm                                               |
| TIRC-710                              | Reactor 45-741 Steam Stripping Temperature Controller                               |
| TIRC-711                              | Reactor 45-742 Steam Stripping Temperature Controller                               |
| TIRC-712                              | Reactor 45-743 Steam Stripping Temperature Controller                               |
| TIRC-713                              | Reactor 45-744 Steam Stripping Temperature Controller                               |
| TR-714                                | Reactor Multipoint Temperature Recorder (For all<br>Four Reactors)                  |
| TAH-715                               | Recovery Compressors 72-903, 72-904, and 72-905<br>Discharge High Temperature Alarm |
| TIC-716                               | Seal Water Cooler 55-335 Outlet Temperature<br>Controller                           |
| TIC-717                               | Seal Water Cooler 55-336 Outlet Temperature<br>Controller                           |
| TIC-718                               | Cleaning Solution Heater 55-339 Outlet Temperature<br>Controller                    |
| TAH-719                               | Seal Oil Pressure Units 95-299 or 95-300 Discharge<br>High Temperature Alarm        |
| TAH-720                               | Initiator Injection Pot 45-750 High Temperature Alarm                               |
| TW-721                                | Cleaning Solution Heater 55-339 Steam Inlet Thermowell                              |
| TW-722                                | Cleaning Solution Heater 55-339 Solution Inlet Thermowell                           |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

### Item No.

### Service

#### Temperature Instruments (Continued)

|         |                                                                   |
|---------|-------------------------------------------------------------------|
| TW-723  | Deleted                                                           |
| TW-724  | Cleaning Solution Heater 55-339 Solution Outlet Thermowell        |
| TW-725  | VCM Charge Filters 64-718 and 64-742 Outlet Piping Thermowell     |
| TR-726  | Recovery System Multipoint Temperature Recorder                   |
| TW-727  | Water Recirculation Cooler 55-334 Cooling Water Supply Thermowell |
| TW-728  | Seal Water Cooler 55-335 Cooling Water Supply Thermowell          |
| TW-729  | Recovered VCM Condenser 55-337 Cooling Water Supply Thermowell    |
| TIC-730 | Blowdown Tank 45-319 Temperature Controller                       |
| TW-731  | Reactor 45-741 Cooling Water Return Thermowell                    |
| TW-732  | Reactor 45-742 Cooling Water Return Thermowell                    |
| TW-733  | Reactor 45-743 Cooling Water Return Thermowell                    |
| TW-734  | Reactor 45-744 Cooling Water Return Thermowell                    |

#### Amperage Instruments

|         |                                                   |
|---------|---------------------------------------------------|
| II-200  | Reactor Agitator 51-110 Motor Amperage Indicator  |
| IR-200  | Reactor Agitator 51-110 Motor Amperage Recorder   |
| IAH-200 | Reactor Agitator 51-110 Motor Amperage High Alarm |
| IAL-200 | Reactor Agitator 51-110 Motor Amperage Low Alarm  |

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APPENDIX B

INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>       | <u>Service</u>                                                                          |
|-----------------------|-----------------------------------------------------------------------------------------|
| <u>Control Valves</u> |                                                                                         |
| CV-200                | Reactor 45-781 Main Dump Valve                                                          |
| CV-201                | Reactor 45-781 VCM Charge Valve                                                         |
| CV-202                | Reactor 45-781 Slurry Dump Valve                                                        |
| CV-203                | Reactor 45-781 Chem Wash Return Valve                                                   |
| CV-204                | Reactor 45-781 Hot Water Charge Valve                                                   |
| CV-205                | Reactor 45-781 Sewer drain Valve                                                        |
| CV-206                | Reactor 45-781 Steam Stripping Valve                                                    |
| CV-207                | Reactor 45-781 Steam Stripping Valve                                                    |
| CV-208                | Reactor 45-781 Colloid Charge Valve                                                     |
| CV-209                | Reactor 45-781 Initiator Charge Valve                                                   |
| CV-210                | Reactor 45-781 Resin Sampling Valve                                                     |
| CV-211                | Reactor Jacket Educator EE-201 Steam Valve                                              |
| CV-213                | Reactor 45-781 Chem Wash Supply Valve                                                   |
| CV-214                | Reactor 45-781 Rinse Supply Valve                                                       |
| CV-215                | Reactor Condenser 55-358 Cleaning and Rinse Valve                                       |
| CV-216                | Reactor 45-781 Cleaning and Rinse Valve                                                 |
| CV-217                | Reactor 45-781 Evacuation Valve                                                         |
| CV-218                | Reactor 45-781 Recovery Valve                                                           |
| CV-219                | Reactor 45-781 Recovery and Evacuation Valve                                            |
| CV-220                | Reactor Condenser 55-358 Inert Vent Valve                                               |
| CV-221                | Reactor 45-781 Vent Valve                                                               |
| CV-222                | Evacuation Ejector First Stage Steam Valve                                              |
| CV-223                | Evacuation Ejector Second Stage Steam Valve                                             |
| CV-224                | Evacuation Header Valve to EE-200                                                       |
| CV-225                | Reactor 45-781 VCM Charge Valve                                                         |
| CV-226                | Evacuation Header Valve to EE-705                                                       |
| CV-227                | Reactor 45-781 AMS Emergency Kill Valve                                                 |
| CV-228                | Reactor 45-781 AMS Emergency Kill Valve                                                 |
| CV-891                | Steam Valve for Blowdown Tank 45-319 Pressure Regulation                                |
| CV-892                | Water Drain Valve from Recovered VCM Storage Tank 89-520<br>to the Blowdown Tank 45-319 |
| CV-893                | Water Drain Valve from Recovered VCM Storage Tank 45-317<br>to the Blowdown Tank 45-319 |
| CV-894                | VCM Recovery Valve for Blowdown Tank 45-319                                             |
| CV-895                | VCM Recovery Valve for VCM Storage Tank 45-745, 89-520,<br>and 45-317                   |
| CV-896                | Instrument Air Supply Valve to Reactors 45-741, 45-742,<br>45-743, 45-744, and 45-781   |
| CV-897                | Hot Water Rinse Header Valve to Reactors 45-741, 45-742,<br>45-743, 45-744, and 45-781  |

Flow Instruments

|                  |                              |
|------------------|------------------------------|
| FQIC- 701A and B | VCM Charge Totalizers        |
| FSL-701A and B   | VCM Charge Low Flow Switches |

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# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                 | <u>Service</u>                                                  |
|---------------------------------|-----------------------------------------------------------------|
| <u>Flow Instruments (Cont.)</u> |                                                                 |
| FAL-701                         | VCM Charge Low Flow Alarm                                       |
| FQIC-702                        | Recovered VCM Charge Totalizer                                  |
| FQIC-704                        | Hot Water Charge Totalizer                                      |
| FQIC-705                        | Colloid Charge Totalizer                                        |
| FQIC-706                        | Colloid Makeup Tank 45-751 Makeup Water Flow Totalizer          |
| FI-707                          | Deleted                                                         |
| FR-708                          | Reactor Steam Stripping Flow Recorder                           |
| FQI-708                         | Reactors Steam Stripping Flow Totalizer                         |
| FIC-708                         | Reactor Steam Stripping Flow Controller                         |
| FIRC-710                        | Reactor 45-741 Cooling Water Flow Controller                    |
| FIRC-711                        | Reactor 45-742 Cooling Water Flow Controller                    |
| FIRC-712                        | Reactor 45-743 Cooling Water Flow Controller                    |
| FIRC-713                        | Reactor 45-744 Cooling Water Flow Controller                    |
| FI-714                          | Reactor Agitator 51-101 Inboard Seal Water Flush<br>Rotameter   |
| FAL-714                         | Reactor Agitator 51-101 Seal Water Low Flow Alarm               |
| FI-715                          | Reactor Agitator 51-102 Inboard Seal Water Flush<br>Rotameter   |
| FAL-715                         | Reactor Agitator 51-101 Seal Water Low Flow Alarm               |
| FI-716                          | Reactor Agitator 51-103 Inboard Seal Water Flush<br>Rotameter   |
| FAL-716                         | Reactor Agitator 51-103 Seal Water Low Flow Alarm               |
| FI-717                          | Reactor Agitator 51-104 Inboard Seal Water Flush<br>Rotameter   |
| FAL-717                         | Reactor Agitator 51-104 Seal Water Low Flow Alarm               |
| FI-718                          | Reactor 45-741 Spray Nozzle Flush Rotameter                     |
| FQI-203                         | Reactor 45-781 Initiator Injection Pot 45-778 Flow<br>Totalizer |
| FIRC-201                        | Reactor 45-781 Cooling Water Flow Controller                    |
| FI-200                          | Reactor Agitator 51-110 Lip Seal Flush Rotameter                |
| FI-202                          | Reactor 45-781 Spray Nozzle Flush Rotameter                     |
| FI-205                          | Reactor Agitator 51-110 Mechanical Seal Oil Supply<br>Rotameter |
| OF-206                          | Reactor Condenser 55-358 Cooling Water Supply Orifice           |
| RO-207                          | Reactor 45-781 Inert Vent Restriction Orifice                   |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                     | <u>Service</u>                                                                           |
|-------------------------------------|------------------------------------------------------------------------------------------|
| <u>Flow Instruments</u> (Continued) |                                                                                          |
| FI-719                              | Reactor 45-742 Spray Nozzle Flush Rotameter                                              |
| FI-720                              | Reactor 45-743 Spray Nozzle Flush Rotameter                                              |
| FI-721                              | Reactor 45-744 Spray Nozzle Flush Rotameter                                              |
| FI-722                              | Deleted                                                                                  |
| FI-723                              | Deleted                                                                                  |
| FI-724                              | Deleted                                                                                  |
| FI-725                              | Deleted                                                                                  |
| FI-726                              | Recovery Knockout Drum Level Controller LC-716<br>Water Flush Rotameter                  |
| FI-727                              | Recovery Knockout Drum Level Controller LC-718<br>Water Flush Rotameter                  |
| FI-728                              | Recovery Vacuum Pump 72-901 Double Mechanical Seal<br>Water Rotameter                    |
| FI-729                              | Recovery Vacuum Pump 72-901 Inboard Flush Water Rotameter                                |
| FI-730                              | Recovery Vacuum Pump 72-902 Double Mechanical Seal<br>Water Rotameter                    |
| FI-731                              | Recovery Vacuum Pump 72-902 Inboard Flush Water<br>Rotameter                             |
| FI-732                              | Recovery Compressor 72-903 Double Mechanical Seal<br>Water Rotameter                     |
| FI-733                              | Deleted                                                                                  |
| FI-734                              | Recovery Compressor 72-904 Double Mechanical Seal<br>Water Rotameter                     |
| FI-735                              | Deleted                                                                                  |
| FI-736                              | Recovery Compressor 72-905 Double Mechanical Seal<br>Water Rotameter                     |
| FI-737                              | Deleted                                                                                  |
| FIC-738                             | Recovery Vacuum Pump 72-901 and Recovery Compressor<br>72-903 Seal Water Flow Controller |
| FIC-739                             | Recovery Vacuum Pump 72-902 and Recovery Compressor<br>72-904 Seal Water Flow Controller |
| FIC-740                             | Recovery Compressor 72-905 Seal Water Flow Controller                                    |
| FI-741                              | Seal Water Separator Level Controller LC-720<br>Flush Water Rotameter                    |
| FI-742                              | Seal Water Separator Level Controller LC-722<br>Flush Water Rotameter                    |
| FIC-743                             | Deleted                                                                                  |
| FI-744                              | Recovered VCM to Recovery Knockout Drum 45-760 Bullseye                                  |
| FI-745                              | Deleted                                                                                  |
| FI-746                              | Deleted                                                                                  |
| FI-747                              | Slurry Dump to Slurry Strainer FD-717 Bullseye                                           |
| FI-748                              | Deleted                                                                                  |
| FCI-749                             | Reactor Agitator 51-101 Mechanical Seal Oil Supply<br>Flow Regulator                     |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                     | <u>Service</u>                                                                              |
|-------------------------------------|---------------------------------------------------------------------------------------------|
| <u>Flow Instruments (Continued)</u> |                                                                                             |
| FCI-750                             | Reactor Agitator 51-102 Mechanical Seal Oil Supply<br>Flow Regulator                        |
| FCI-751                             | Reactor Agitator 51-103 Mechanical Seal Oil Supply<br>Flow Regulator                        |
| FCI-752                             | Reactor Agitator 51-104 Mechanical Seal Oil Supply<br>Flow Regulator                        |
| FI-753                              | Reactor Agitator 51-101 Mechanical Seal Oil Supply<br>Rotameter                             |
| FI-754                              | Reactor Agitator 51-102 Mechanical Seal Oil Supply<br>Rotameter                             |
| FI-755                              | Reactor Agitator 51-103 Mechanical Seal Oil Supply<br>Rotameter                             |
| FI-756                              | Reactor Agitator 51-104 Mechanical Seal Oil Supply<br>Rotameter                             |
| FQI-757                             | Hot Water Charge Totalizer                                                                  |
| RO-758                              | Colloid Makeup Water Supply Restriction Orifice                                             |
| OF-759                              | Reactor 45-741 Cooling Water System Orifice Flanges                                         |
| OF-760                              | Reactor 45-742 Cooling Water System Orifice Flanges                                         |
| OF-761                              | Reactor 45-743 Cooling Water System Orifice Flanges                                         |
| OF-762                              | Reactor 45-744 Cooling Water System Orifice Flanges                                         |
| FI-763                              | Slurry Transfer Pump 72-896 Inboard Seal Flush Water<br>Rotameter                           |
| FI-764                              | Slurry Transfer Pump 72-897 Inboard Seal Flush Water<br>Rotameter                           |
| FI-765                              | Deleted                                                                                     |
| FI-766                              | Deleted                                                                                     |
| FI-767                              | VCM Charge Pump 72-875 Double Mechanical Seal Water<br>Rotameter                            |
| FI-768                              | VCM Charge Pump 72-876 Double Mechanical Seal Water<br>Rotameter                            |
| FI-769                              | Recovered VCM Charge Pump 72-877 Double Mechanical<br>Seal Rotameter                        |
| FI-770                              | Recovered VCM Charge Pump 72-878 Double Mechanical<br>Seal Rotameter                        |
| RO-771                              | VCM Charge Pump 72-875 Double Mechanical Seal Water<br>Back Pressure Restriction Orifice    |
| RO-772                              | VCM Charge Pump 72-876 Double Mechanical Seal Water<br>Back Pressure Restriction Orifice    |
| RO-773                              | Recovered VCM Charge Pump 72-877 Mechanical Seal<br>Water Back Pressure Restriction Orifice |
| RO-774                              | Recovered VCM Charge Pump 72-878 Mechanical Seal<br>Water Back Pressure Restriction Orifice |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                     | <u>Service</u>                                                                                |
|-------------------------------------|-----------------------------------------------------------------------------------------------|
| <u>Flow Instruments</u> (Continued) |                                                                                               |
| FI-775                              | Water Recirculation Pump 72-889 Inboard Seal Flush<br>Water Rotameter                         |
| FI-776                              | Deleted                                                                                       |
| FI-777                              | Water Recirculation Pump 72-890 Inboard Seal Flush<br>Water Rotameter                         |
| FI-778                              | Seal Water Pump 72-891 Inboard Seal Flush Water<br>Rotameter                                  |
| FI-779                              | Seal Water Pump 72-892 Inboard Seal Flush Water<br>Rotameter                                  |
| RO-780                              | Recovery Vacuum Pump 72-901 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice |
| RO-781                              | Recovery Vacuum Pump 72-902 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice |
| RO-782                              | Recovery Compressor 72-903 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice  |
| RO-783                              | Recovery Compressor 72-904 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice  |
| RO-784                              | Recovery Compressor 72-905 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice  |
| RO-785                              | Recovered VCM Transfer Pump 72-893 Mechanical Seal<br>Water Back Pressure Restriction Orifice |
| RO-786                              | Recovered VCM Transfer Pump 72-894 Mechanical Seal<br>Water Back Pressure Restriction Orifice |
| FI-787                              | Recovered VCM Transfer Pump 72-893 Mechanical Seal<br>Water Rotameter                         |
| FI-788                              | Recovered VCM Transfer Pump 72-894 Mechanical Seal<br>Water Rotameter                         |
| FI-789                              | Recovery Vacuum Pump 72-901 Inboard Flush Water<br>Rotameter                                  |
| FI-790                              | Recovery Vacuum Pump 72-901 Double Mechanical Seal<br>Water Rotameter                         |
| FI-791                              | Recovery Vacuum Pump 72-902 Inboard Flush Water<br>Rotameter                                  |
| FI-792                              | Recovery Vacuum Pump 72-902 Double Mechanical Seal<br>Water Rotameter                         |
| FI-793                              | Deleted                                                                                       |
| FI-794                              | Recovery Compressor 72-903 Double Mechanical Seal<br>Water Rotameter                          |
| FI-795                              | Deleted                                                                                       |
| FI-796                              | Recovery Compressor 72-904 Double Mechanical Seal<br>Water Rotameter                          |
| FI-797                              | Deleted                                                                                       |
| FI-798                              | Recovery Compressor 72-905 Double Mechanical Seal<br>Water Rotameter                          |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                     | <u>Service</u>                                                                                |
|-------------------------------------|-----------------------------------------------------------------------------------------------|
| <u>Flow Instruments (Continued)</u> |                                                                                               |
| RO-799                              | Recovery Vacuum Pump 72-901 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice |
| RO-800                              | Recovery Vacuum Pump 72-902 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice |
| RO-801                              | Recovery Compressor 72-903 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice  |
| RO-802                              | Recovery Compressor 72-904 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice  |
| RO-803                              | Recovery Compressor 72-905 Double Mechanical Seal<br>Water Back Pressure Restriction Orifice  |
| FI-804                              | AMS Short Stop Charge Pot 45-755 Water Flush Rotameter                                        |
| FI-805                              | AMS Short Stop Charge Pot 45-756 Water Flush Rotameter                                        |
| FI-806                              | AMS Short Stop Charge Pot 45-757 Water Flush Rotameter                                        |
| FI-807                              | AMS Short Stop Charge Pot 45-758 Water Flush Rotameter                                        |
| FI-808                              | Blowdown Tank 45-319 Level Cage Water Flush Rotameter                                         |
| FI-809                              | Recovered VCM Sampling System Bullseye                                                        |
| FI-810                              | Recovered VCM Sampling System Bullseye                                                        |
| FQI-811                             | Steam to Reactor Module Flow Totalizer                                                        |
| RO-812                              | Deleted                                                                                       |
| RO-813                              | Deleted                                                                                       |
| FI-814                              | Blowdown Tank Pump 72-900 Double Mechanical Seal Water<br>Rotameter                           |
| FI-815                              | Blowdown Tank Pump 72-900 Inboard Seal Water Flush<br>Rotameter                               |
| RO-816                              | Blowdown Tank Pump 72-900 Double Mechanical Seal Water<br>Back Pressure Restriction Orifice   |
| <u>Level Gauges</u>                 |                                                                                               |
| LG-701A, B,<br>C, and D             | Fresh VCM Storage Tank 45-745 Level Gauge                                                     |
| LG-702A, B,<br>C and D              | Recovered VCM Storage Tank 89-520 Level Gauge                                                 |
| LG-703A, B,<br>C and D              | Recovered VCM Storage Tank 45-317 Level Gauge                                                 |
| LG-704A, B,<br>C and D              | Hot Water Tank 45-748 Level Gauge                                                             |
| LG-705                              | Deleted                                                                                       |
| LG-706A, B,<br>and C                | Colloid Storage Tank 45-752 Level Gauge                                                       |
| LG-707A, B<br>and C                 | Colloid Charge Tank 45-753 Level Gauge                                                        |
| LG-708                              | Recovery Knockout Drum 45-760 Level Gauge                                                     |
| LG-709                              | Recovery Knockout Drum 45-761 Level Gauge                                                     |
| LG-710                              | Hydroquinone Storage Tank 45-765 Level Gauge                                                  |

# APPENDIX B

## INSTRUMENT LIST - CONTINUED

| <u>Item No.</u>                 | <u>Service</u>                                            |
|---------------------------------|-----------------------------------------------------------|
| <u>Level Gauges (Continued)</u> |                                                           |
| LG-711                          | Seal Water Separator 45-762 Level Gauge                   |
| LG-712                          | Seal Water Separator 45-763 Level Gauge                   |
| LG-713                          | Recovered VCM Collect Tank 45-764 Level Gauge             |
| LG-714                          | Seal Oil Storage Drum 45-754 Level Gauge                  |
| LG-715                          | Deleted                                                   |
| LG-716                          | Blowdown Tank 45-319 Level Gauge                          |
| LG-717                          | Mechanical Seal Purge Water Surge Drum 45-759 Level Gauge |
| <u>Level Instruments</u>        |                                                           |
| LI-701                          | Fresh VCM Storage Tank 45-745 Level Indicator             |
| LAH-701                         | Fresh VCM Storage Tank 45-745 High Level Alarm            |
| LS-701A, B, C and D             | Fresh VCM Storage Tank 45-745 Level Switches              |
| LA-702                          | Deleted                                                   |
| LA-703                          | Deleted                                                   |
| LI-704                          | Recovered VCM Storage Tank 89-520 Level Indicator         |
| LA-705                          | Deleted                                                   |
| LA-706                          | Deleted                                                   |
| LI-707                          | Recovered VCM Storage Tank 45-317 Level Indicator         |
| LA-708                          | Deleted                                                   |
| LA-709                          | Deleted                                                   |
| LAH-710                         | Colloid Makeup Tank 45-751 High Level Alarm               |
| LI-711                          | Hot Water Tank 45-748 Level Indicator                     |
| LS-711A                         | Deleted                                                   |
| LA-711B, C, and D               | Hot Water Tank 45-748 Level Switches                      |
| LA-712                          | Deleted                                                   |
| LAH-713                         | Colloid Storage Tank 45-752 High Level Alarm              |
| LAH-714                         | Colloid Charge Tank 45-753 High Level Alarm               |
| LSL-715                         | Colloid Charge Tank 45-753 Low Level Switch               |
| LSH-716                         | Recovery Knockout Drum 45-760 High Level Switch           |
| LSL-717                         | Recovery Knockout Drum 45-760 Low Level Switch            |
| LSH-718                         | Recovery Knockout Drum 45-761 High Level Switch           |
| LSL-719                         | Recovery Knockout Drum 45-761 Low Level Switch            |
| LC-720                          | Seal Water Separator 45-762 Level Controller              |
| LAH-720                         | Seal Water Separator 45-762 High Level Alarm              |
| LAL-720                         | Seal Water Separator 45-762 Low Level Alarm               |
| LA-721                          | Deleted                                                   |
| LC-722                          | Seal Water Separator 45-763 Level Controller              |
| LAH-722                         | Seal Water Separator 45-763 High Level Alarm              |
| LAL-722                         | Seal Water Separator 45-763 Low Level Alarm               |
| LA-723                          | Deleted                                                   |
| LC-724                          | Recovered VCM Collect Tank 45-764 Level Controller        |
| LIC-725                         | Slurry Dump Tank 45-766 Level Controller                  |
| LAH-725                         | Slurry Dump Tank 45-766 High Level Alarm                  |

APPENDIX B

INSTRUMENT LIST - CONTINUED

Item No.

Temperature Gauges

Service

|        |                                                           |
|--------|-----------------------------------------------------------|
| TG-201 | Reactor 45-781 Jacket Cooling Water Return Temperature    |
| TG-202 | Reactor Condenser 55-358 Cooling Water Return Temperature |

Temperature Instruments

|               |                                                       |
|---------------|-------------------------------------------------------|
| TIRC-201      | Reactor 45-781 Polymerization Temperature Controller  |
| TAH-201 A & B | Reactor 45-781 High Temperature Alarms                |
| TRC-202       | Reactor 45-781 Steam Stripping Temperature Controller |
| TR-203        | Reactor Condenser 55-358 Temperature Recorder         |
| TW-205        | Reactor 45-781 Cooling Water Return Thermowell        |

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## APPENDIX B

### INSTRUMENT LIST - CONTINUED

#### Item No.

#### Pressure Gauges

#### Service

|        |                                               |
|--------|-----------------------------------------------|
| PG-200 | Reactor 45-781 Pressure Gauge                 |
| PG-202 | Initiator Charge Pot 45-784 Pressure Gauge    |
| PG-205 | Reactor Condenser 55-358 Pressure Gauge       |
| PG-206 | Reactor 45-781 Steam Stripping Pressure Gauge |
| PG-212 | Reactor 45-781 VCM Charge Pressure Gauge      |
| PG-213 | Reactor 45-781 Nitric Oxide Pressure Gauge    |
| PG-222 | Steam Tracina Manifold Pressure Gauge         |

#### Pressure Instruments

|               |                                                                |
|---------------|----------------------------------------------------------------|
| PS-205        | Reactor 45-781 Pressure Switch (Prevents dump before recovery) |
| PAH-206 A & B | Reactor 45-781 High Pressure Alarm                             |
| PR-206        | Reactor 45-781 Pressure Recorder                               |
| PT-206        | Reactor 45-781 Pressure Transmitter                            |
| PI-211        | Reactor 45-781 Pressure Indicator (Manometer)                  |
| PS-212        | Initiator Charge Pot Pressure Switch                           |
| PCV-216       | Steam Tracing Pressure Reducing Valve                          |
| PCi-          | AMS Emergency Kill System Nitrogen Pressure Regulator          |

#### Rupture Disc

|        |                                            |
|--------|--------------------------------------------|
| RD-200 | Reactor 45-781 Rupture Disc                |
| RD-201 | Reactor Condenser 55-358 Rupture Disc      |
| RD-204 | Initiator Charge Pot 45-778 Rupture Disc   |
| RD-206 | Reactor 45-781 Rupture Disc                |
| RD-207 | Reactor 45-781 Rupture Disc                |
| RD-208 | Reactor 45-781 Rupture Disc                |
| RD-209 | Reactor 45-781 Rupture Disc                |
| RD-210 | AMS Emergency Kill Pot 45-786 Rupture Disc |
| RD-211 | Reactor Condenser 55-358 Rupture Disc      |

#### Safety-Relief Valves

|         |                                               |
|---------|-----------------------------------------------|
| PSV-200 | Reactor 45-781 Relief Valve                   |
| PSV-201 | Reactor Condenser 55-358 Relief Valve         |
| PSV-202 | AMS Emergency Kill Pot 45-786 Relief Valve    |
| PSV-203 | Reactor 45-781 VCM Charge Header Relief Valve |
| PSV-206 | Reactor 45-781 Relief Valve                   |
| PSV-207 | Reactor 45-781 Relief Valve                   |
| PSV-208 | Reactor 45-781 Relief Valve                   |
| PSV-209 | Reactor 45-781 Relief Valve                   |
| PSV-211 | Reactor Condenser 55-358 Shell Relief Valve   |
| PSV-212 | Reactor 45-781 Jacket Relief Valve            |
| PSV-213 | Reactor Condenser 55-358 Relief Valve         |