DOW CHEMICAL U.S.A.

Building 8601
July 17, 1992

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NSPS SUBPART DDD, PROCESS SECTIONS, POLY C/LA. DIVISION

Pursuant to NSPS SUBPART DDD definitions for process sections, equipment assignments have been designated within Poly C to conform to these guidelines. Attachments Number 1 through Number 9 are index flowsheets for Poly C showing the color coded elements that comprise each of the of the defined process sections. The key process elements for each of the process sections are identified as follows:

RAW MATERIALS PREPARATION

Raw materials for this process section include ethylene, solvent, octene, premix (including premix raw materials), co-catalyst, hydrogen, and catalyst kill. Several areas of the raw materials preparation section are assignable to one process line only, i.e. train specific. The other areas of raw materials preparation are common to all three trains.

The following describes the raw materials prep section for each of the three process lines:

This section begins with the ethylene feed to the process line and continues through to the inlet of the reactors. It includes premix, co-catalyst, and catalyst kill feeds to the polymerization reaction section. The key process elements included in this section are the ethylene purification beds, the ethylene compressor, the solvent/ethylene mixing ejector, the reactor process feed temperature conditioning exchangers, and all process piping from the feed ethylene through to the reactor inlet connecting these elements. This section also includes the premix/co-catalyst day tanks, pumps, and all process piping between these elements and to the polymerization reaction section feed inlets (see Attachments 3, 4, and 5).

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MATERIAL RECOVERY (continued)

This section begins at the outlet of the post reactor static mixer and continues through to the solvent/ethylene mixing ejector, through the ethylene recycle compressor, and through to the polymer outlet of the second stage devolatilization vessel. The key process elements included in this section are the post reactor devolatilization pre-heater(s), devolatilizing vessels, first stage process gear pump, the vacuum system components (drums, exchangers, and pumps), recycle column, coalescer, recycler condensers, recycle drum (D-6X1), process solvent purification beds, recycle ethylene compressor, process solvent pumps, and all process piping between these components (see Attachments 3, 4, and 5).

The common material recovery section includes the solvent/monomer storage drums, the drum outlet pumps, the solvent waste drum, and all process piping connecting between these components and to the other sections (see Attachment 1).

PRODUCT FINISHING

There are train (process line) specific finishing sections, as well as a common product finishing section.

The following describes the individual train specific product finishing:

This section begins at the outlet of the second stage devolatilizer and continues through the check hopper vessels. The key process elements included in this section are the second stage process gear pump, the additives side-arm extruder and weigh belt feeder system, static mixer, pelletizer, spin dryer, classifier, transfer system and check hoppers, the pellet water recirculation system, and all piping between these components (see Attachments 3, 4, 5, 6, and 7).

The common product finishing section begins with the outlet of the additive storage hoppers, includes the transfer system supplying each train specific additive hopper (HA), includes the additive bulk rail car unloading system to the additive storage silos, the additive reclaim hopper, and the additive tank truck unloading system (see Attachment 7).

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NON-AFFECTED AREAS (continued)

section. The utilities support systems include the plant air system, cooling tower and chill water systems, high and low pressure steam systems, DOWTHERM®A and hot oil systems, and the mineral oil system (see Attachments 8 and 9). All instrumentation that is part of equipment within an established process section is assigned to that process section.

Two copies of this report detailing the Poly C facility process sections under NSPS DDD for Polymers will be filed -- one at Environmental Services and one in the Poly C NSPS file.

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Attachments

pb

UNLOADING / STORAGE CONCERNS
POSSIBLE PROBLEMS / PREVENTIVE MEASURES

7. CATALYST COMPONENT VAPORS BACKING UP IN NITROGEN LINE

   PREVENTIVE MEASURES:

   A. Nitrogen line has higher pressure.

   B. Check valve.

   C. Double block and bleed.

8. CONTAMINANTS GETTING INTO CATALYST VESSELS

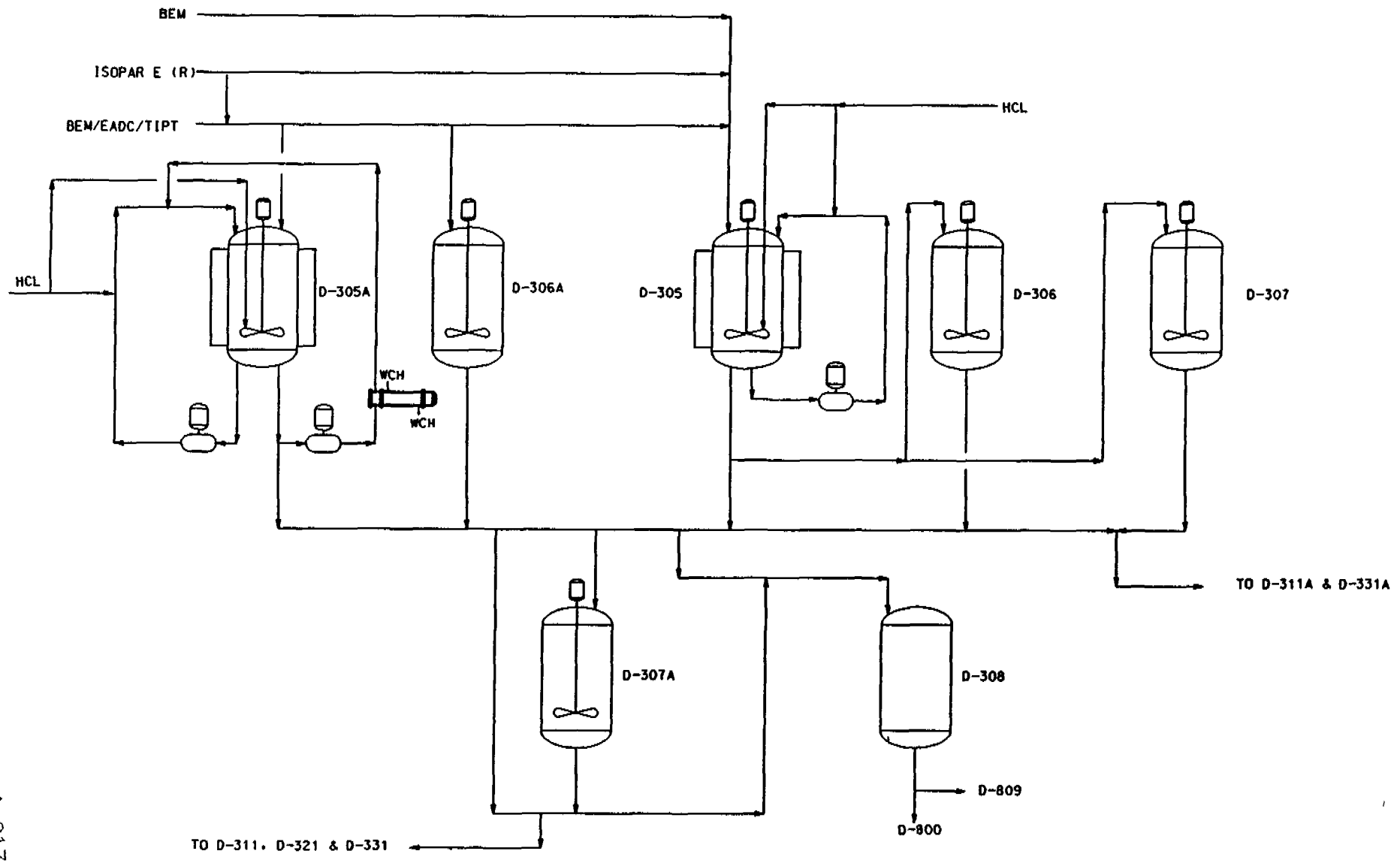
   PREVENTIVE MEASURES:

   A. Positive pressure nitrogen pad.

   B. High and low pressure alarm.

RC TEST NO.	MATERIAL(S)	MAXIMUM OPERATING TEMP. (DEG C)	TEST TYPE	TEMP ONSET MAX, END (DEG C)	DELTA H (J/GRAM)	MAX. TEMP. & PRESS. RATE (DEG C, PSIA)	FLAMMABILITY FLASH PT. (C) AUTOIGNITION DETAILS	DUST EXPLOSION DETAILS Kst, bar-m/s
RCT-85-0111	ISOPAR E	50	DTA	ND	-	470	0.9% TO 7.0% 7.0 C 382.0 C	N/A
RCT-84-0189	ISOPAR E	50	AT		-		0.9% TO 7.0% 7.0 C 366.0 C	N/A
RCT-85-0112	OCTENE-1	50	DTA	ND	-	470	0.8% TO 6.7% 15.0 C	N/A
RCT-85-0113	50% ISOPAR E 50% OCTENE-1	50	DTA	ND	-	470	-	N/A
RCT-91-0805	75% ETHYLENE 25% MOLE SIEVE	50	ARC		-131	375	-	

CATALYST PREPARATION AREA



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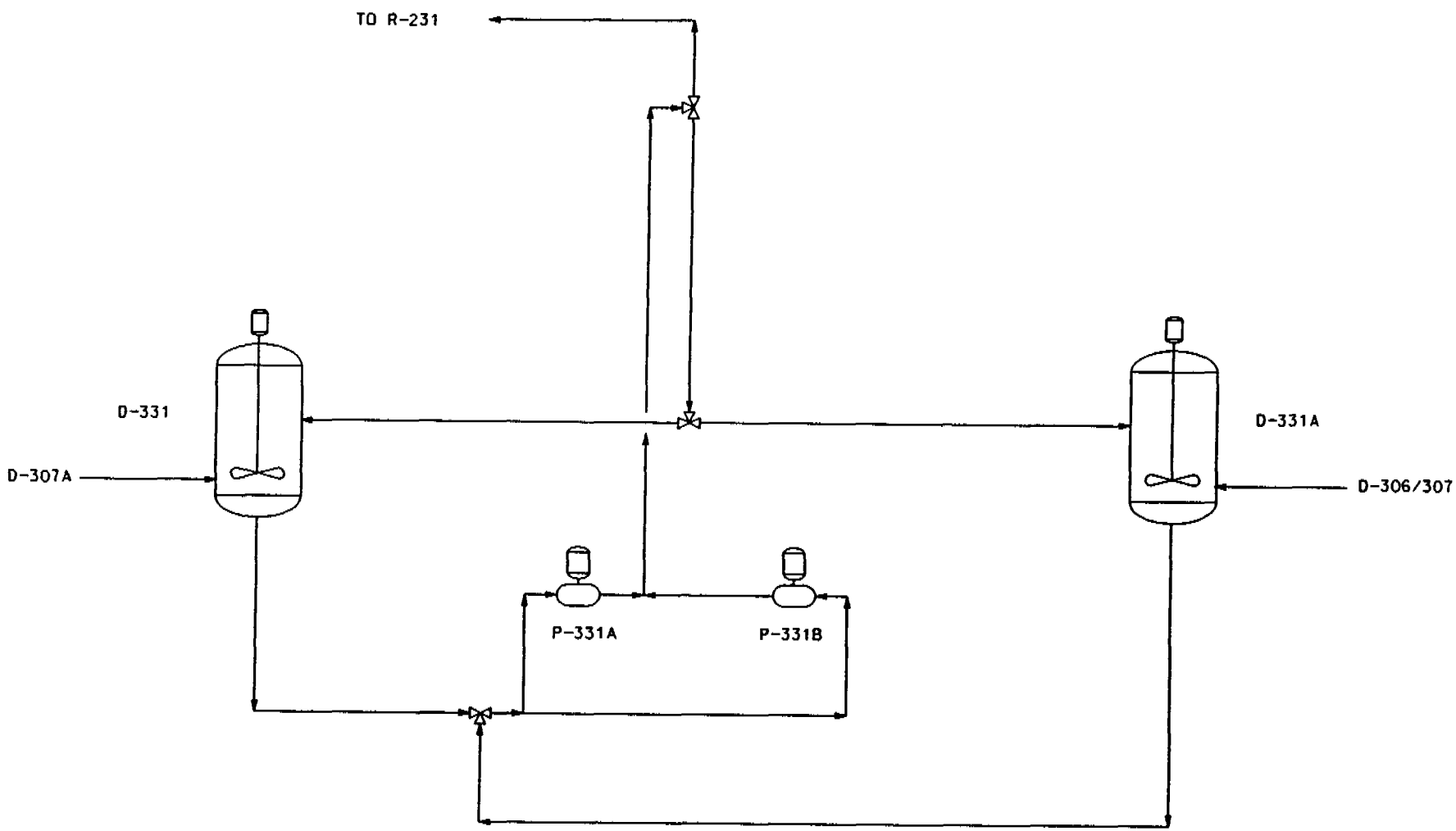
TRAIN 3 CATALYST FEED SYSTEM



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STANDARD CATALYST RAW MATERIALS

ISOPAR E
(Flammable Liquid)

BUTYL ETHYL MAGNESIUM, 15% IN HEPTANE
(Pyrophoric When Heptane Evaporates)

ANHYDROUS HCL
(Corrosive)

ETHYL ALUMINUM DICHLORIDE, 15% IN HEPTANE
(Pyrophoric When Heptane Evaporates)

TETRA ISOPROPYL TITANATE, 50% IN HEXANE
(Decomposes Slowly in Air and Moisture to Form Isopropanol)

STANDARD CATALYST PREPARATION

Magnesium Dialkyl(MgR2) + 2 Anhydrous HCl ---->

Magnesium Chloride (MgCl2) + 2 RH + 3800 Btu/lb HCl.

40 Magnesium Chloride + 12 Ethyl Aluminum Dichloride (EADC)

----> 40 MgCl2 * 6 EADC + 6 EADC.

40 MgCl2 * 6 EADC + 6 EADC + 3 Tetra Isopropyl Titanate (TiPT)

----> MgCl2 * Ti(OC3H7)Cl2 + (C2H5)*

"Premix Catalyst"

CATALYST KILL IN D-308

$$MgCl_2 + 2H_2O \longrightarrow MgCl(OH)_2 + 2HCl.$$

$$C_2H_5AlCl_2 + 3H_2O \longrightarrow 2HCl + 3Al(OH)_3 + C_2H_6.$$

$$Ti(OC_3H_7)_4 + 2H_2O \longrightarrow TiO_2 + 4C_3H_7OH.$$

CATALYST AREA

1. Runaway reaction in D-305 or D-305A

   PREVENTATIVE MEASURES:

   a. HCL addition shutdown on high temperature by the MOD V.

   b. PSV's to D-308

2. Overfill D-308 and Backup thru Vent Header

   PREVENTATIVE MEASURES:

   a. Redundant High Level Alarms

   b. Transfer shutdown on High Level by MOD V.

   c. N2 purge on vent line to D-308.

3. Flushing Active Catalyst from D-308 to D-809

PREVENTATIVE MEASURES:

a. D-308 contains water at all times.

b. Sample required for transfer.

4. Materials Back-flowing from Mix Vessels to Storage Vessels.

PREVENTATIVE MEASURES:

a. Higher N2 pressure on storage tanks

b. Automated block valves.

5. Unloading EADC or ATE into BEM or Vice Versa. (Cross Contamination of Catalyst Components)

PREVENTATIVE MEASURES:

a. BEM tank trucks flange connection is unique to BEM

6. Cross-Contamination of Catalyst Components During Unloading.

PREVENTATIVE MEASURES:

a. Requires independent input by two operations personnel.

b. Maximum heat release with worst case cross-contamination of Ethyl Aluminum Dichloride into the Magnesium Alkyl tank or vice-versa is a 25 Deg C temperature rise.

RC TEST NO.	MATERIAL(S)	MAXIMUM OPERATING TEMP. (DEG C)	TEST TYPE	TEMP ONSET MAX, END (DEG C)	DELTA H (J/GRAM)	MAX. TEMP. & PRESS. RATE (DEG C, PSIA)	FLAMMABILITY FLASH PT. (C) AUTOIGNITION DETAILS	DUST EXPLOSION DETAILS Kst, bar-m/s
RCT-82-0151	ISOPAR E + TEA + HEC-3 CATALYST	60	DTA	ND	-	475	-	N/A
RCT-82-0147	ISOPAR E + HEC-3 CATALYST	60	DTA	ND	-	368	-	N/A
RCT-82-0062	ISOPAR E + TEA	60	DTA	UNK, 310, 330	-	408	-	N/A
RCT-82-0148	ISOPAR E + TEA	60	DTA	275, 285, 295	-	445	-	N/A
ARCT-912	ISOPAR E + TEA + ETHYLENE	60	ARC	-	-	-	-	N/A
RCT-92-0072	ISOPAR E + TEA + AIR	60	MCC	-	-247.0	-	-	N/A

ETHYLENE PURIFICATION

1. OVERHEATING THE ETHYLENE BEDS DURING PRE-LOADING.

   PREVENTATIVE MEASURES:

   a. Alarms at 100 deg C (Mole Sieve).

   b. Regulator on ethylene bed preload lines.

   c. Ethylene bed HV's which open to the flare.

   d. PSV's to vent header.

2. OVERHEATING THE KATALCO BEDS DURING PRE-LOADING.

   PREVENTATIVE MEASURES:

   a. Alarms at 120 Deg C (Katalco)

   b. Low pressure (10 - 12 psig) Katalco preload lines.

   c. PSV's to atmosphere.

3. COMPRESSOR INCIDENTS (ETHYLENE DECOMP. ETC.)

PREVENTATIVE MEASURES:

a. High temperature shutdown.

b. Low suction pressure shutdown.

c. High pressure shutdown.

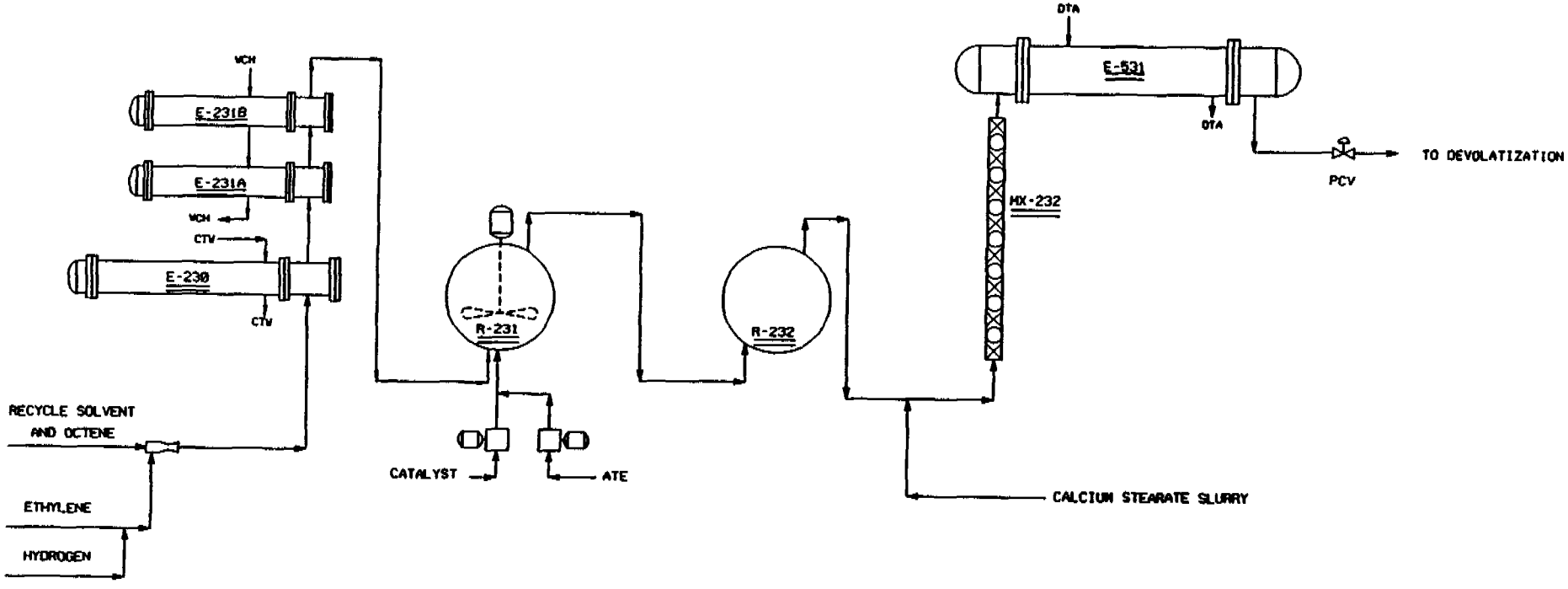
d. High vibration shutdown.

4. FLAMMABILITY - 2.7% TO 36% BY VOLUME IN AIR

PREVENTATIVE MEASURES:

a. HAD's, sprinkers, combustible gas detectors and monitor guns are employed in that area.

NORMAL REACTOR CONFIGURATION



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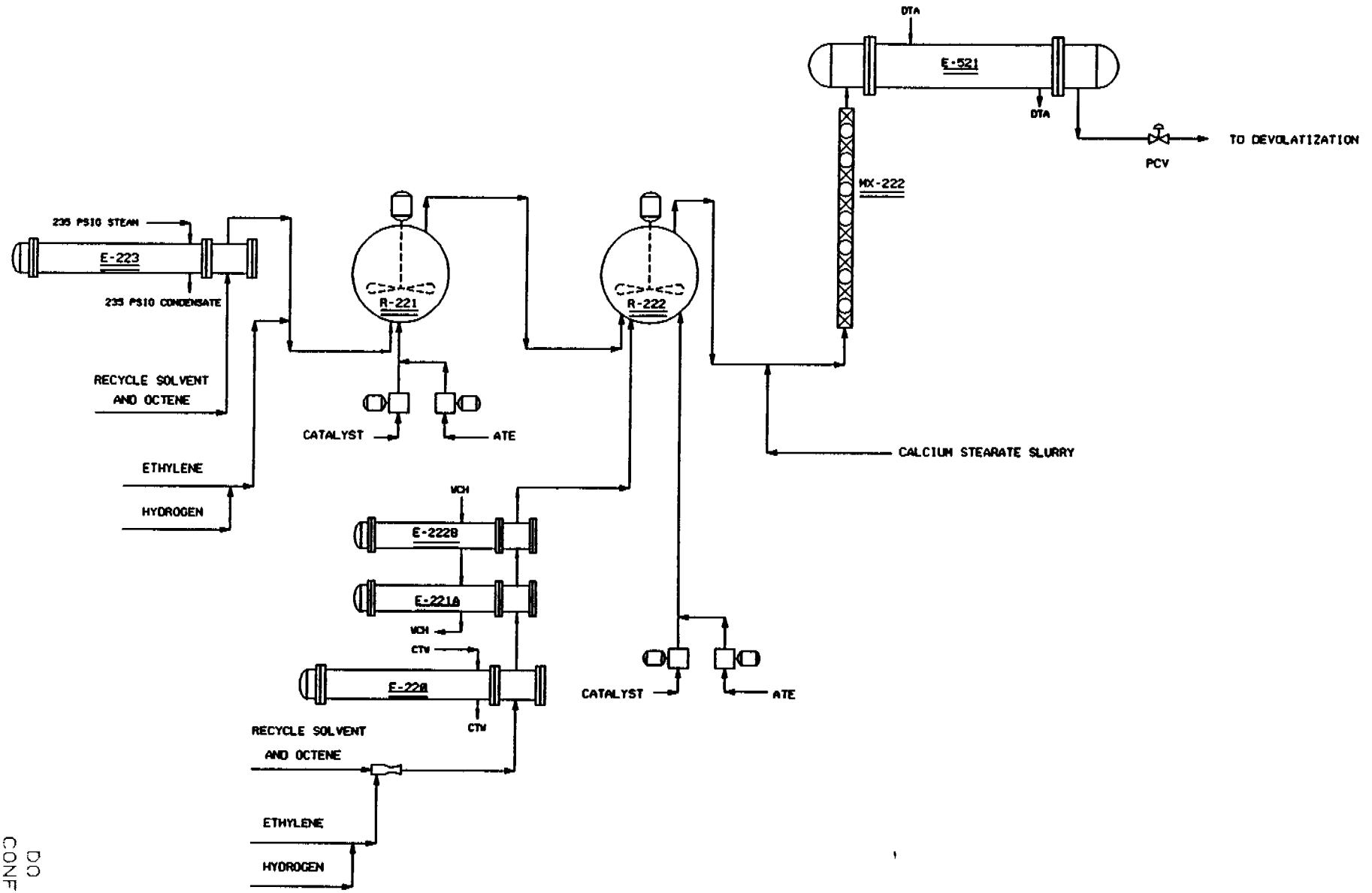
DUAL REACTOR CONFIGURATION



REACTOR AREA

1. REACTOR AREA RAW MATERIAL LIST

a. Ethylene

b. Solvent (Isopar E)

c. Hydrogen

d. Cooling and Chilled Water

e. Triethyl Aluminum (ATE)

f. Premix Catalyst

g. Calcium Stearate

h. Mineral Oil

i. Nitrogen

2. FLAMMABLE MATERIALS AND EXPLOSIVE LIMITS:

a. Ethylene (3.0 TO 34.0 VOL %)

b. Solvent (0.9 TO 7.0 VOL %)

c. Hydrogen (4.1 TO 74.2 VOL %)

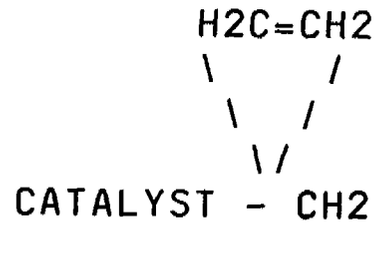
d. ATE (Pyrophoric if < 15 wt% in Solvent)

e. Calcium Stearate

f. Premix Catalyst (i.e. SOLVENT 0.9 TO 7.0 wt%)

REACTOR AREA

3. ETHYLENE POLYMERIZATION



Heat of Reaction: 1470 Btu/lb of Polyethylene

a. Low Pressure Reaction (450-500 PSIG)

b. Reactor Temperatures 180-205 C

c. Conversion Greater than 90%

d. Reaction Stopped by Deactivating Catalyst

4. Uncontrolled temperature rise in the reactor.

PREVENTATIVE MEASURES:

a. Catalyst deactivates at high temperatures.

b. Capability of tripping catalyst pump from the Control Room.

c. Large Solvent flows act as a coolant.

5. Tube leak on the reactor pre-coolers.

PREVENTATIVE MEASURES:

a. Combustible gas detector alarms in both cooling tower and chill water tank.

6. Reactor overpressures.

PREVENTATIVE MEASURES:

a. Redundant high pressure alarm

b. Safety valves on each reactor with redundant flow indication to D-212/222/232.

c. Safety valves on reactor pre-cooler feed lines and on process line to post reactor heater set to relieve at lower pressure than reactor safety relief valves.

d. Fail open pressure control valves for each train.

NOTE: Reactor dump lines for Train 2 have been removed and dump lines on Trains 1 and 3 disabled. (Complies with Tech Center LPTEC Standard 207)

7. Reactor thermocouple failure.

PREVENTATIVE MEASURES:

a. Reaction begins to terminate with increased temperature due to catalyst deactivation.

b. Redundant thermocouples throughout the reactors.

8. Reactor seal failure (internal/external).

PREVENTATIVE MEASURES:

a. Mineral oil leakage into the reactors presents no reactivity hazard.

b. Mineral oil leakage to atmosphere before complete failure should be picked up by the combustible gas detectors near the seals.

c. Flow indication on the mineral oil flow to the seals.

d. HAD's installed near seal area to detect fire and trip the sprinkler system.

9. Flammable Materials

PREVENTATIVE MEASURES:

a. Combustible gas detectors throughout the area.

b. Deluge system covers the area.

c. HAD's located to detect presence of fire.

10. ATE Exposure To Air

PREVENTATIVE MEASURES:

a. Small leak should not ignite. ATE reacts with moisture in the air faster than solvent evaporates to yield a pyrophoric mixture. In addition, procedure dictates having a water source and fire extinguisher present.

b. Solvent flush procedure prior to line openings.

c. Large leak - Water Curtain Fire Protection.

11. Blowdown Drum, D-212,222,232, Reactions

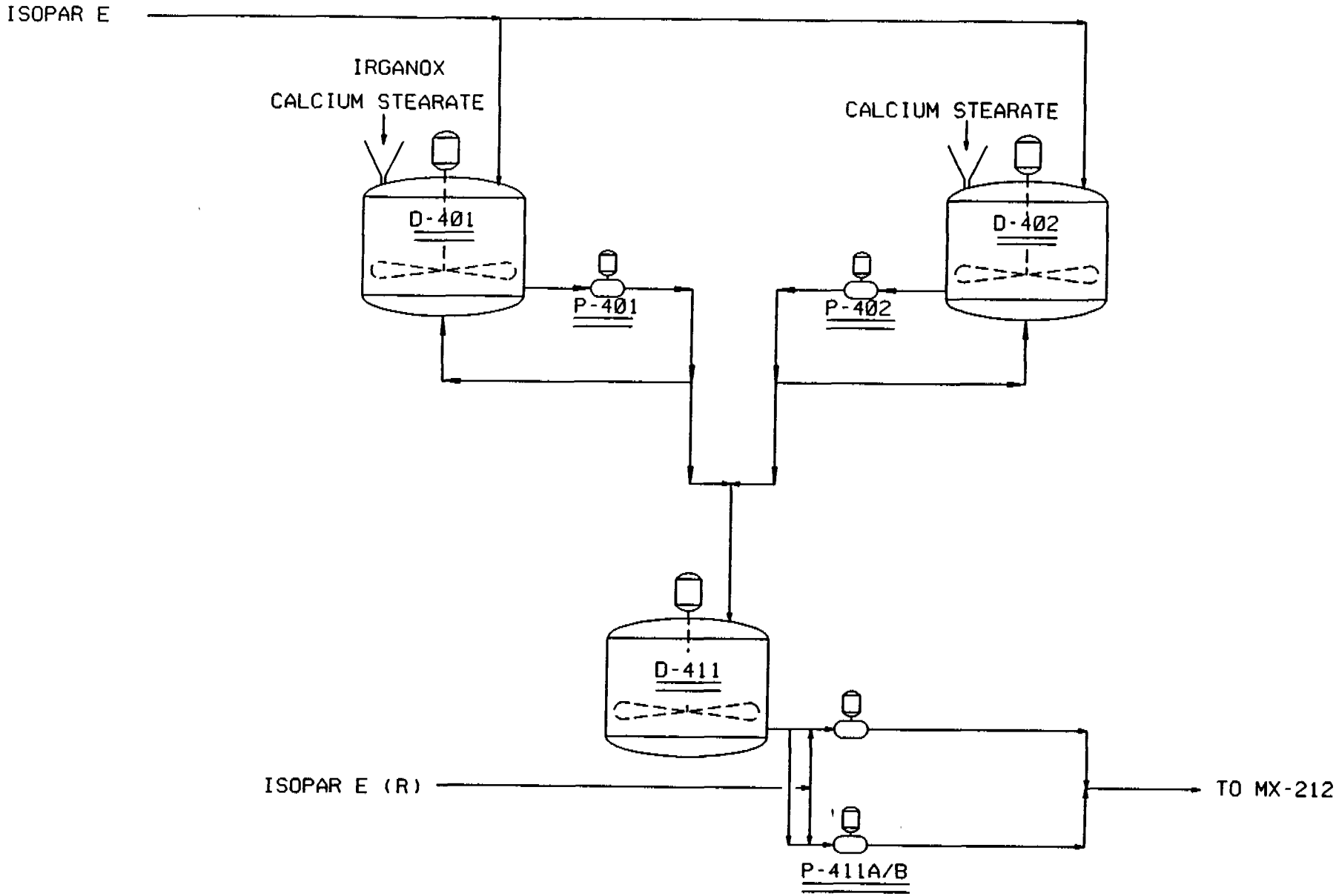
PREVENTATIVE MEASURES:

a. Blowdown drums maintain a water level for Premix dumps from D-311,321,331 and ATE dumps from D-312,322,332. The water will kill the catalyst however, be aware of the heat release and resulting temperature rise. The vessels do vent to the flare for this scenario.

RC TEST NO.	MATERIAL(S)	MAXIMUM OPERATING TEMP. (DEG C)	TEST TYPE	TEMP ONSET, MAX, END (DEG C)	DELTA H (J/GRAM)	MAX. TEMP. & PRESS. RATE (DEG C, PSIA)	FLAMMABILITY FLASH PT. (C) AUTOIGNITION DETAILS	DUST EXPLOSION DETAILS Kst, bar-m/s
RCT-85-0113	50% ISOPAR E 50% OCTENE-1	220	DTA	ND	-	470	-	N/A
RCT-85-0114	ISOPAR E + 1-OCTENE + POLYETHYLENE	220	DTA	100, 111, 118	-	470	-	N/A
RCT-85-0115	ISOPAR E + POLYETHYLENE	220	DTA	97, 110, 120	-	470	-	N/A
RCT-85-0116	1-OCTENE + POLYETHYLENE	220	DTA	91, 110, 121	-	470	-	N/A
RCT-82-0062	ISOPAR E + TEA	220	DTA	UNK, 310, 330	-	408	-	N/A
RCT-82-0148	ISOPAR E + TEA	220	DTA	275, 285, 295	-	445	-	N/A
ARCT-912	ISOPAR E + TEA + ETHYLENE	220	ARC	-	-	-	-	N/A
RCT-82-0151	ISOPAR E + TEA + HEC-3 CATALYST	220	DTA	ND	-	475	-	N/A
RCT-82-0147	ISOPAR E + HEC-3 CATALYST	220	DTA	ND	-	368	-	N/A
RCT-81-1565	ISOPAR E + CALCIUM STEARATE	230	DTA	ND	-	-	-	N/A
RCT-88-0284	ISOPAR E + CALCIUM STEARATE + IRGANOX 1010	230	DSC	219, 229, 235	-16.0	250	-	N/A
RCT-88-1033	ISOPAR E + CALCIUM STEARATE + IRGANOX 1010	230	DSC	213, 236, UNK	-	250	-	N/A
RCT-86-0323	ISOPAR E + CALCIUM STEARATE + IRGANOX 1010	230	DTA	110, 119, 130	-	370	-	N/A

RC TEST NO.	MATERIAL(S)	MAXIMUM OPERATING TEMP. (DEG C)	TEST TYPE	TEMP ONSET, MAX, END (DEG C)	DELTA H (J/GRAM)	MAX. TEMP. & PRESS. RATE (DEG C, PSIA)	FLAMMABILITY FLASH PT. (C) AUTOIGNITION DETAILS	DUST EXPLOSION DETAILS Kst, bar-m/s
RCT-81-1460	ISOPAR E + DHT-4A	230	DTA	310, 315, 325	-	380	-	N/A
RCT-81-1817	ISOPAR E + DHT-4A + IRGANOX 1010	230	DTA	ND	-	-	-	N/A
RCT-86-0325	ISOPAR E + DHT-4A + IRGANOX 1070	230	DTA	251, 258, 267	-	370	-	N/A
RCT-86-0324	ISOPAR E + DHT-4A + IRGANOX 1070 + PEPQ	230	DTA	254, 260, 268	-	370	-	N/A
RCT-84-0298	ISOPAR E + DHT-4A + IRGANOX 1070 + PEPQ + CAST	230	DTA	65, 120, 152	-	361	-	N/A
RCT-85-0575	ISOPAR E + DHT-4A + IRGANOX 1076 + PEPQ + CAST	230	DSC	278, 289, 299	9.0	299	-	N/A
RCT-85-0577	ISOPAR E + DHT-4A + IRGANOX 1076 + PEPQ + CAST + IRGAFOS 168	230	DTA	105, 117, 131	-	435	-	N/A
RCT-84-0299	IRGANOX 1010 + PEPQ + POLYMER	230	DSC	300, 389, 400	43.3	450	-	N/A
RCT-81-0914	IRGANOX 1010 + ISOPAR E	230	DTA	ND	-	500	-	N/A
RCT-81-0919	IRGANOX 1010 + ISOPAR E + PEPQ	230	DTA	ND	-	500	-	N/A
RCT-86-0322	IRGANOX 1076 + ISOPAR E	230	DTA	335, 385, UNK	-	415	-	N/A
RCT-86-0974	ISOPAR E + PEPQ + IRGANOX 1076 + IRGAFOX 168	230	DSC	133, 294, UNK	-	400	-	N/A

CALCIUM STEARATE AREA



CALCIUM STEARATE AREA

1. CALCIUM STEARATE RAW MATERIALS LIST:

   a. Calcium Stearate

   b. Irganox 1010

   c. Isopar E

   d. Nitrogen

CALCIUM STEARATE AREA

1. Dust Explosion

PREVENTATIVE MEASURES:

a. N2 pads on unloading lines and vessels

b. All equipment grounded.

2. Solvent/Calcium Stearate explosive mixture in unloading lines.

PREVENTATIVE MEASURES:

a. N2 flow in unloading lines for conveyor required to open slide valves.

b. Low pressure in tank required to open slide valves.

CALCIUM EARATE AREA

1. CATALYST DEACTIVATION

$2TiCl2P + 4H2O \rightarrow 2TiO2 + 2HP + 4HCl + H2$

P = growing polymer chain

$MgCl2 + H2O \rightarrow MgCl(OH) + HCl + H2O$

$\rightarrow MgO + 2HCl + H2O$

$\rightarrow Mg(OH)2 + 2HCl$

$C2H5AlCl2 + 3H2O \rightarrow 2HCl + Al(OH)3 + C2H6$

$Ti(OC3H7)4 + 2H2O \rightarrow TiO2 + 4C3H7OH$

$Al(C2H5)3 + H2O \rightarrow Al2O3 + 6C2H6$

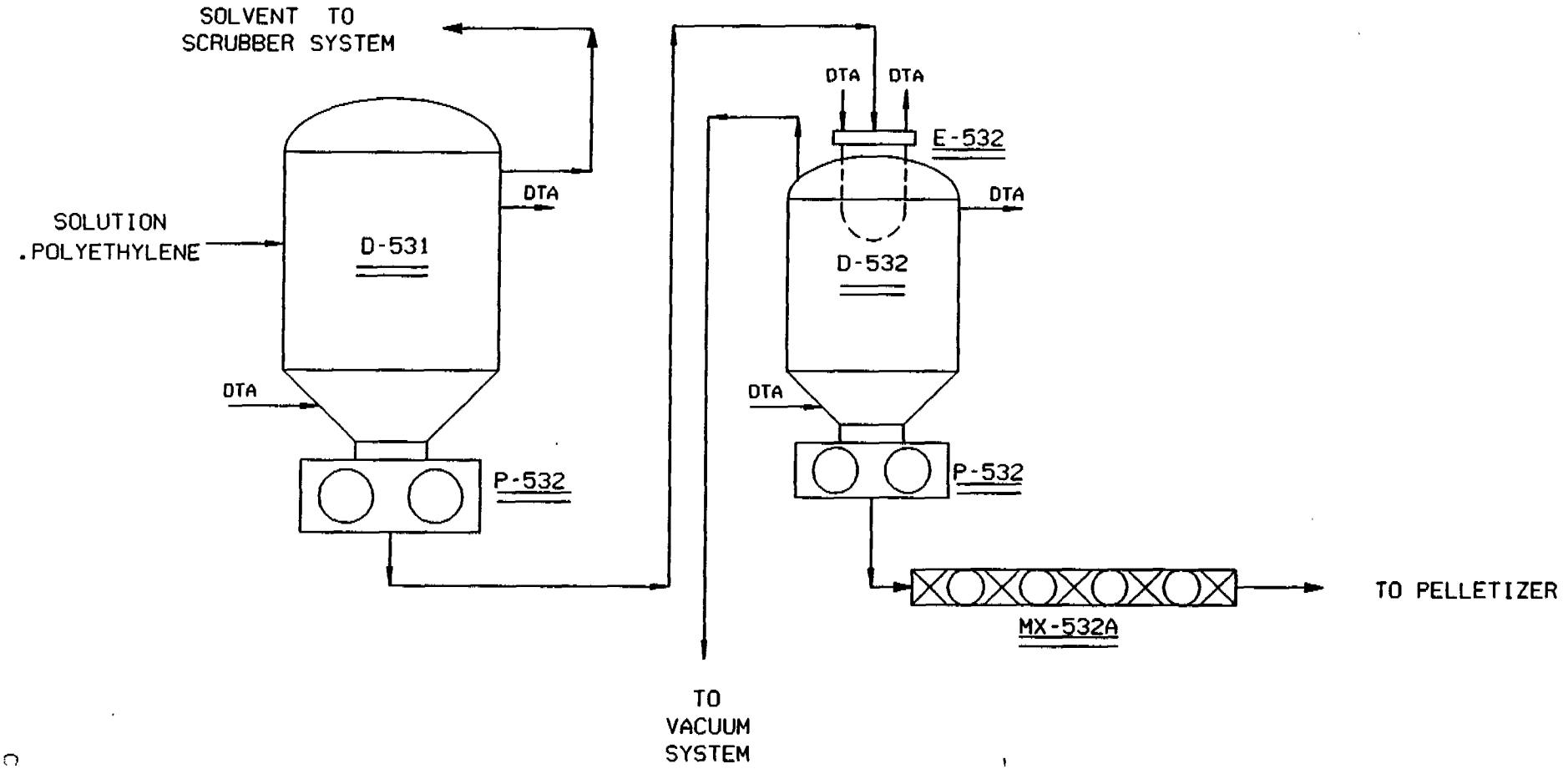
$AI(OH)3 + 3C2H6$

$MgCl2 + CaSt2 \rightarrow MgSt2 + CaCl2$

$CaSt2 + 2HCl \rightarrow CaCl2 + StH$

RC TEST NO.	MATERIAL(S)	MAXIMUM OPERATING TEMP. (DEG C)	TEST TYPE	TEMP ONSET MAX, END (DEG C)	DELTA H (J/GRAM)	MAX. TEMP. & PRESS. RATE (DEG C, PSIA)	FLAMMABILITY FLASH PT. (C) AUTOIGNITION DETAILS	DUST EXPLOSION DETAILS Kst, bar-m/s
RCT-81-1565	ISOPAR E + CALCIUM STEARATE	30	DTA	ND	-	-	-	N/A
RCT-81-1817	ISOPAR E + IRGANOX 1010	30	DTA	ND	-	-	-	N/A
RCT-88-0284	CALCIUM STEARATE +ISOPAR E + IRGANOX 1010	30	DSC	219, 229, 235	-16.0	250	-	N/A
RCT-88-1033	CALCIUM STEARATE +ISOPAR E + IRGANOX 1010	30	DSC	213, 236, UNK	-	250	-	N/A
RCT-86-0323	CALCIUM STEARATE +ISOPAR E + IRGANOX 1076	30	DTA	110, 119, 130	-	370	-	N/A
RCT-86-0325	ISOPAR E + DHT-4A IRGANOX 1076	30	DTA	251, 258, 267	-	370	-	N/A
RCT-86-0324	ISOPAR E + PEPQ + DHT-4A + IRGANOX 1076	30	DTA	254, 260, 268	-	370	-	N/A
RCT-84-0298	ISOPAR E + DHT-4A + PEPQ + CAST + IRGANOX 1010	30	DTA	65, 120, 152	-	361	-	N/A
RCT-85-0575	ISOPAR E + DHT-4A + PEPQ + CAST + IRGANOX 1010	30	DSC	278, 289, 299	9.0	299	-	N/A
RCT-85-0577	ISOPAR E + DHT-4A + IRGANOX 1076 + IRGAFOS 168 + CAST	30	DTA	105, 117, 131	-	435	-	N/A
RCT-85-0113	ISOPAR E + 1-OCTENE	30	DTA	ND	-	470	-	N/A

DEVOLATILIZERS



DEVOLATILIZATION

1. Overfill of the Devolatilizers.

   PREVENTATIVE MEASURES:

   a. High level switch provided to alarm at 60% of devolatilizer level.

2. Restricted discharge line on pumps P-511,521,531 and P-512,522,532.

   PREVENTATIVE MEASURES:

   a. High discharge pressure shutdown.

   b. High gear box torque shutdown.

   c. Low temperature on discharge line of both pumps prevents startup.

3. Tube leak in E-512,522,532 - DTA to polyethylene.

PREVENTATIVE MEASURES:

a. No reactive chemical problem but will create a process problem.

4. High devolatilizer jacket DTA pressure.

PREVENTATIVE MEASURES:

a. All devolatilizer's have PSV's that relieve to the DTA storage drum, D-502.

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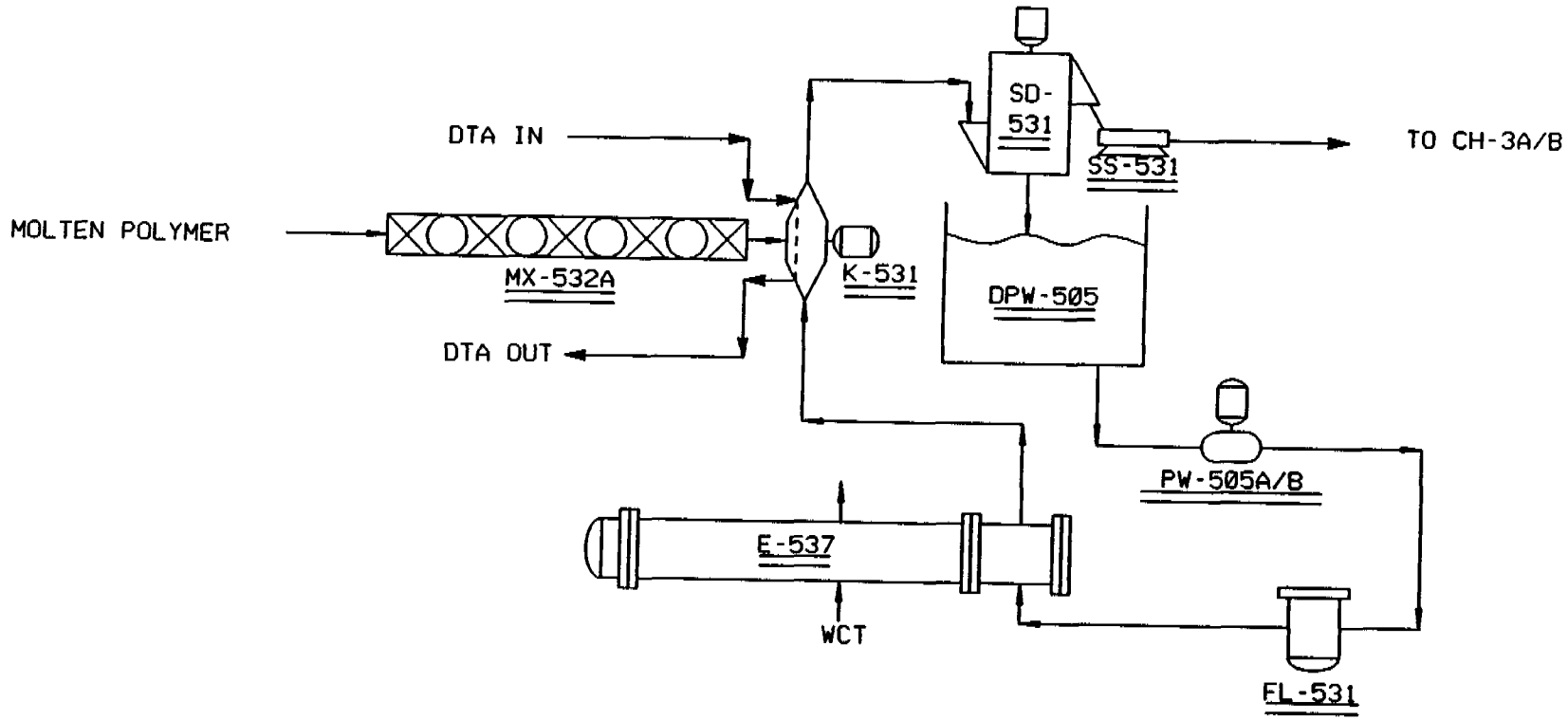
RCT-85-0114	33% ISOPAR E + 33% 1-OCTENE + 34% LLDPE	280	DTA	100, 111, 118	-	470	-	N/A
RCT-87-0877	13% ISOPAR E + 52% DOWTHERM A + 20% LLDPE + 14% CAST	300	DSC	218, 241, UNK	13.8	400	-	N/A
RCT-82-1105	DOWTHERM A	300	DSC ARC FP FL AI	ND 209, 359, UNK - - -	- - - - -	370 350 - - -	- - 111 0.8% TO 7.0% 615	N/A N/A N/A N/A N/A
RCT-85-0113	50% ISOPAR E 50% OCTENE-1	220	DTA	ND	-	470	-	N/A

PELLETIZING AREA



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PELLETIZING

1. Materials Handled

   REACTIVE CHEMICAL HAZARD: NONE

   a. Water

   b. Dowtherm A

   c. Polymer (pellets)

2. Safety Concerns

   PREVENTATIVE MEASURES:

   a. MX-512 (static mixer) upstream of pelletizer has a rupture disk in case of excessive pressure.

   b. A guard is provided over the disc to prevent injury to personnel in case of release.

   c. Should DTA line to die open to the pellet water, no reactive chemical hazard is present.

MATERIAL HANDLING SYSTEM

1. Dust Explosions.

   PREVENTATIVE MEASURES:

   a. Combustible gas detectors in all hoppers and silos.

   b. Air purge on all hoppers and Silos.

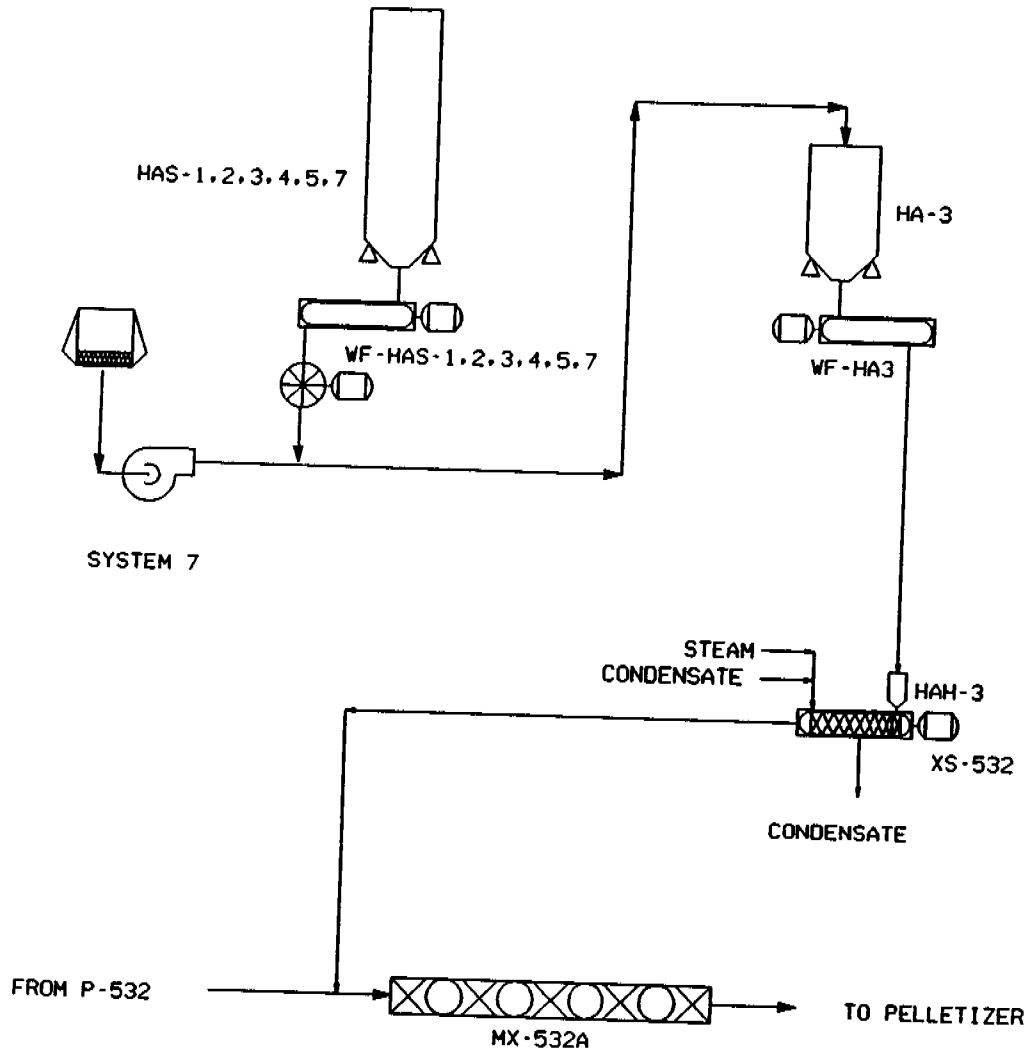
2. Solvent Buildup in the check hoppers.

   PREVENTATIVE MEASURES:

   a. Optional Nitrogen purge on check hoppers.

   b. Calculated solvent content based on process conditions.

ADDITIVE SYSTEM



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ADDITIVES

1. Additives added via Side-arm Extruder, XS-512,522,532

   REACTIVE CHEMICAL HAZARD: NONE WITH PLANT CHEMICALS

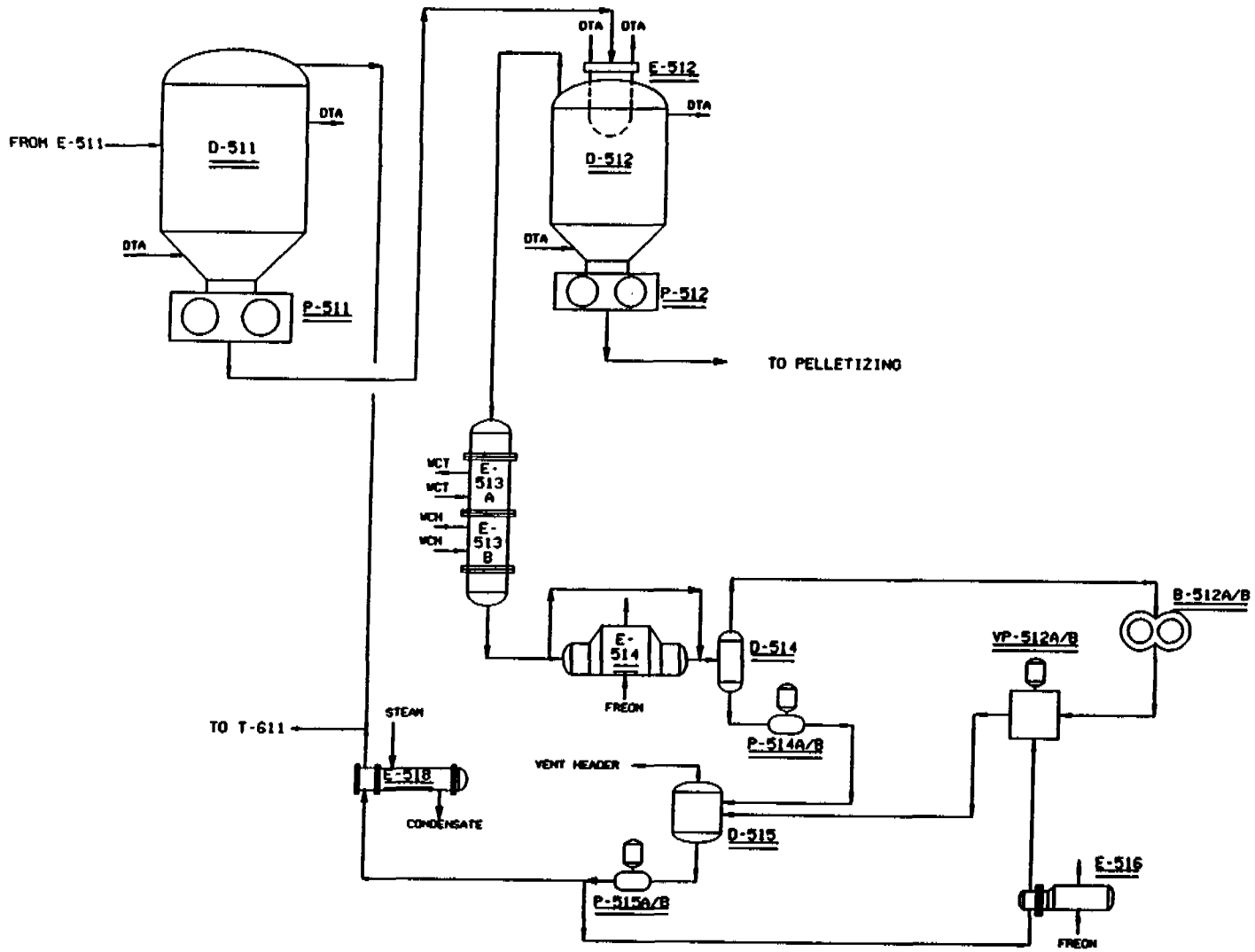
   a. Erucamide
   b. Irgafos 168
   c. Superfloss (SiO2)
   d. Irganox 1010
   e. PEPQ
   f. Talc
   g. Calcium Stearate
   h. DHT-4A

2. Side-arm Extruder Overpressuring

   PREVENTATIVE MEASURES:

   a. Protected by rupture disk and high pressure shutdown.

SOLVENT RECOVERY



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DOW CONFIDENTIAL

SOLVENT RECOVERY

1. TUBE LEAK IN E-513A/B - WATER INTO SOLVENT

   CONCERNS:

   a. Process efficiencies will be affected.

   b. Could result in a plant shutdown.

   c. Potential for reaction - none.

2. TUBE LEAK IN E-514 - REFRIGERANT 22 INTO SOLVENT

   CONCERNS: (No Longer Used)

   a. Process efficiencies will be affected.

   b. Potential for reaction - none.

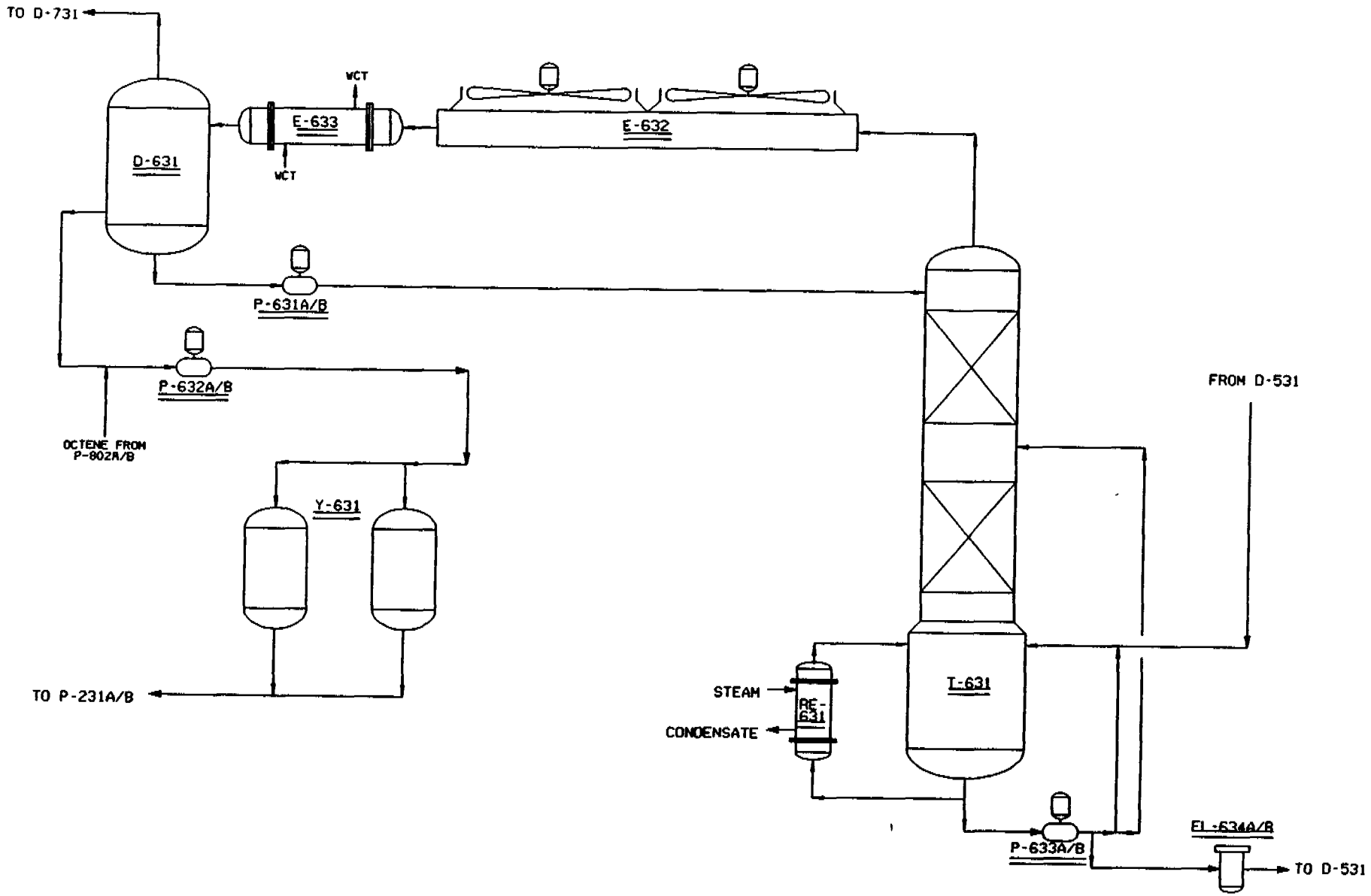
3. FLAMMABILITY

   PREVENTATIVE MEASURES:

   a. Gas detectors located throughout area.

   b. Foam and water available in area.

SOLVENT PURIFICATION



SOLVENT PURIFICATION

1. E-617 TUBE LEAK SOLVENT/OCTENE INTO WATER

   PREVENTATIVE MEASURES:

   a. Leak will be detected by combustible analyzers in the chill water system.

2. E-611 TUBE LEAK - SOLVENT INTO CONDENSATE SYSTEM

   PREVENTATIVE MEASURES:

   a. Combustible gas detector on condensate drum.

   b. Pressure relief valve on condensate surge drum.

3. E-613 TUBE LEAK - SOLVENT INTO WATER SYSTEM

   PREVENTATIVE MEASURES:

   a. Leak will be detected by combustible analyzers in the cooling tower water system.

4. RE-611 TUBE LEAK - WATER IN SOLVENT

   CONCERNS:

   a. Process efficiencies will be effected.

   b. No reactive chemicals concerns.

5. FLAMMABLES IN ENTIRE AREA

   PREVENTATIVE MEASURES:

   a. Analyzers near pump area to detect leaks.

   b. Foam and water available in entire area.

6. OVERHEATING MOLECULAR SIEVE BEDS

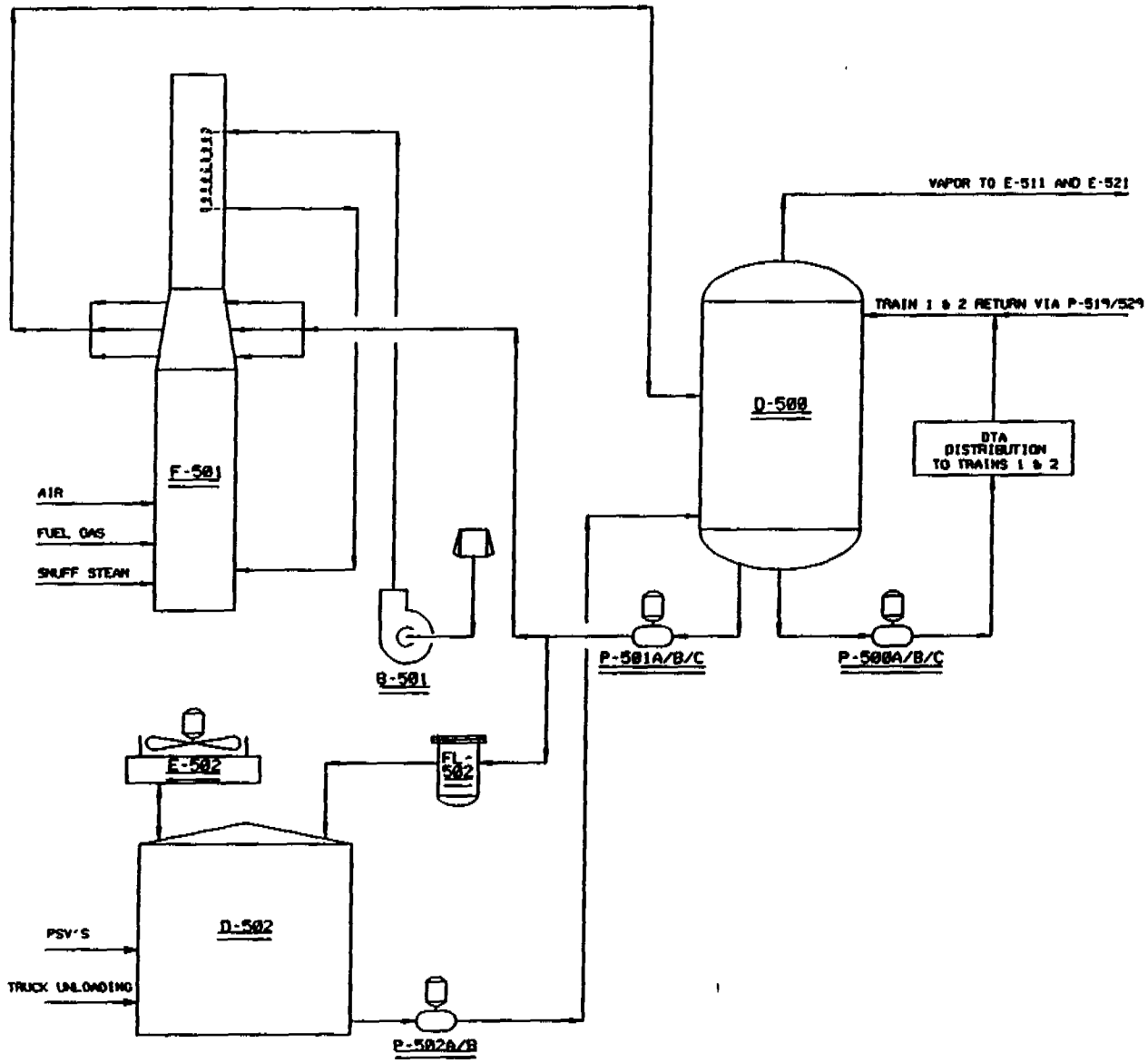
   PREVENTATIVE MEASURES:

   a. Solvent absorbs any heat that is generated.

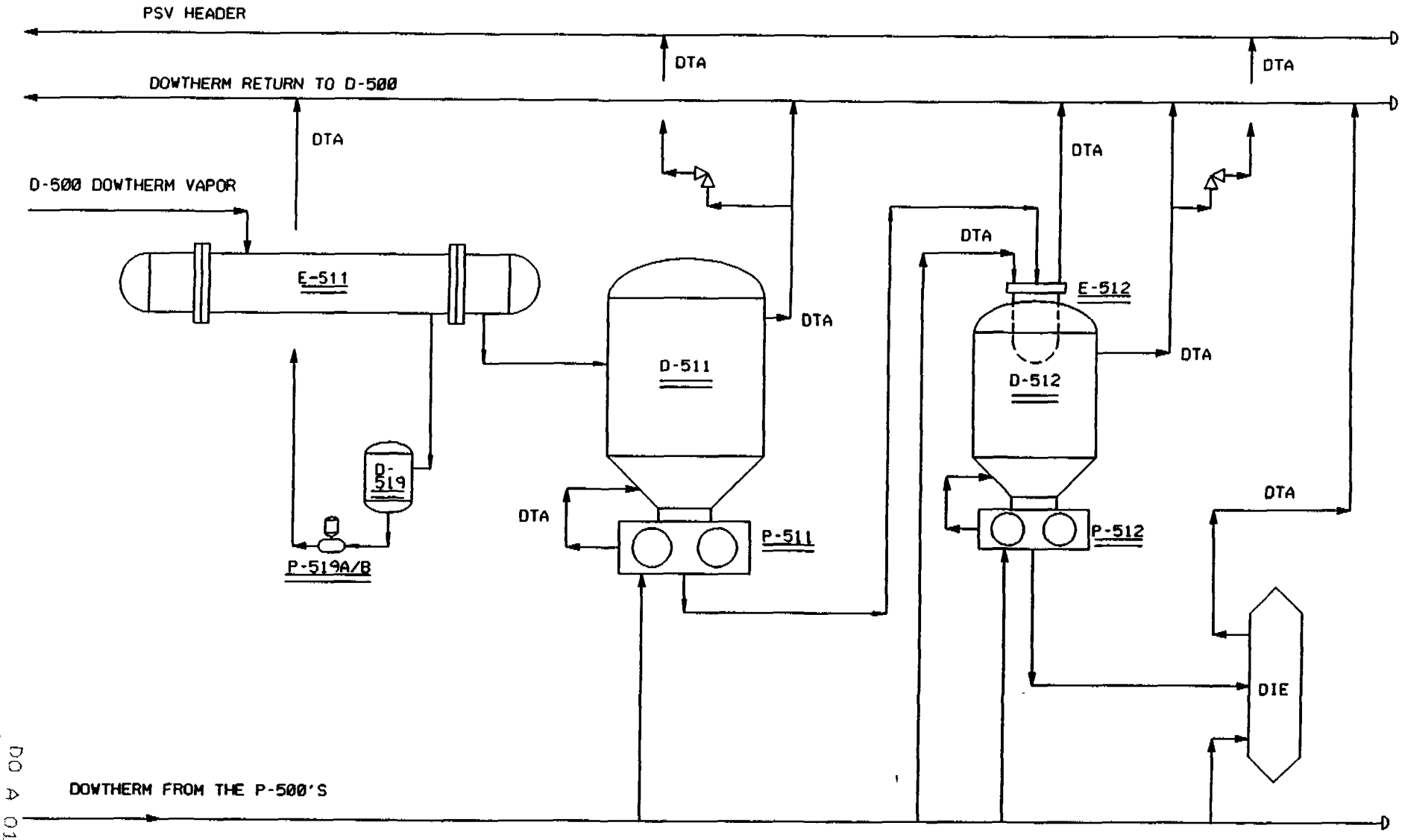
7. REACTIONS OR POTENTIAL REACTIONS - NONE

RC TEST NO.	MATERIAL(S)	MAXIMUM OPERATING TEMP. (DEG C)	TEST TYPE	TEMP ONSET MAX, END (DEG C)	DELTA H (J/GRAM)	MAX. TEMP. & PRESS. RATE (DEG C, PSIA)	FLAMMABILITY FLASH PT. (C) AUTOIGNITION DETAILS	DUST EXPLOSION DETAILS Kst, bar-m/s
RCT-85-0114	33% ISOPAR E + 33% 1-OCTENE + 34% LLDPE	200	DTA	100, 111, 118	-	470	-	N/A
RCT-85-0113	50% ISOPAR E 50% OCTENE-1	200	DTA	ND	-	470	-	N/A
RCT-85-0115	50% ISOPAR E + 50% LLDPE	200	DTA	97	-	470	-	N/A
RCZ-88-0300	59.4% RECYCLE SOLVENT (CONTAINS 2.1% STEARIC ACID + 2.1% PALMITIC ACID) + 40.6% SILICA GEL	50	ARC	-	-	300	-	N/A

DOWTHERM AREA



DOWTHERM DISTRIBUTION



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DOW CONFIDENTIAL

DOWTHERM AREA RAW MATERIALS

DOWTHERM A

FUEL GAS

COOLING TOWER WATER

235 PSIG STEAM

NITROGEN

AIR

DOWTHERM AREA

1. LOSS OF FLAME IN FURNACE

   PREVENTATIVE MEASURES:

   a. Dual piot detectors/dual flame detectors.

   b. Automatic furnace trip.

2. EXPLOSIVE MIXTURE IN FURNACE WHEN LIGHTING

   PREVENTATIVE MEASURES:

   a. Furnace purged automatically prior to lighting sequence.

   b. Automatic double block and bleed on main/pilot gas.

3. TUBE RUPTURE INSIDE FURNACE

PREVENTATIVE MEASURES:

a. Internal inspection of furnace tubes.

b. Remotely operable valve for snuffing steam.

c. Remote emergency shutdown.

d. Remotely operable EBV's on flash drum.

e. High convection temperature trip.

4. WATER LEAKAGE INTO SYSTEM DURING SHUTDOWN

PREVENTATIVE MEASURES:

a. Trip on high pressure in flash drum.

b. PSV's on flash drum.

c. Non-condensable vents open to storage tank during startup.

5. PROCESS LEAK INTO E-511

PREVENTATIVE MEASURES:

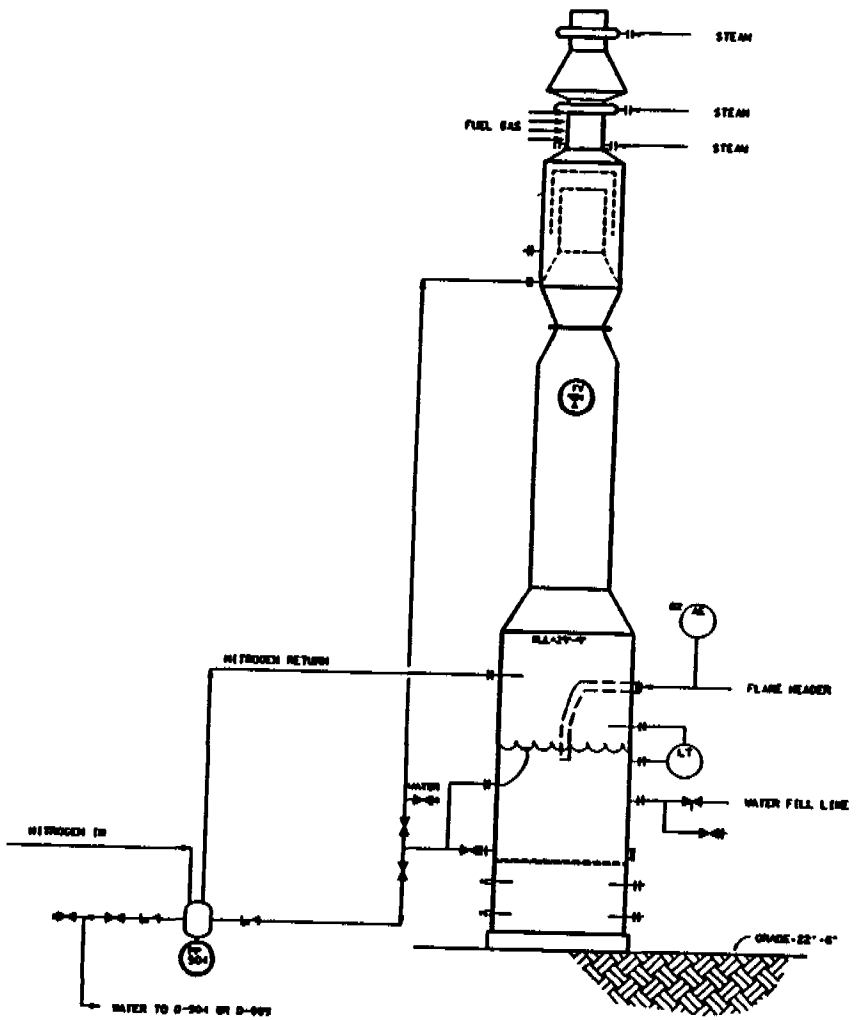
a. High pressure alarm on E-511 shell side.

b. PSV's to protect D-519 and D-500.

c. Remotely operable valve for isolating E-511 shell from D-500.

RC TEST NO.	MATERIAL(S)	MAXIMUM OPERATING TEMP. (DEG C)	TEST TYPE	TEMP ONSET MAX, END (DEG C)	DELTA H (J/GRAM)	MAX. TEMP. & PRESS. RATE (DEG C, PSIA)	FLAMMABILITY FLASH PT. (C) AUTOIGNITION DETAILS	DUST EXPLOSION DETAILS Kst, bar-m/s
RCT-82-1105	DOWTHERM A	300	DSC ARC FP FL AI	ND 209, 359, UNK - - -	- - - - -	370 350 - - -	- - 111 0.8% TO 7.0% 615	N/A N/A N/A N/A N/A
RCT-83-0969	DOWTHERM A + OXYGEN	300	DTA	ND	-	310	-	N/A
RCT-86-0306	DOWTHERM A + ABSORBENT PADS	30	DTA	ENDOTHERMIC 120, 138, 144	-	325	-	N/A

FLARE SYSTEM



FLARE

1. Leakage of Air into the Flare Header System

   PREVENTIVE MEASURE:

   a. Nitrogen purge on each branch of flare header.

   b. Oxygen analyzer on the flare header at the flare.

   c. Small positive pressure on the flare.

2. Outside Spill which could be Ignited by the Flare, FV-904A

   PREVENTIVE MEASURE:

   a. Remotely operated steam valves to snuff pilot.

3. High or Low Water Level in Flare

   PREVENTIVE MEASURE:

   a. High and low water alarms

   b. High pressure alarms

REACTIVE CHEMICALS ISSUES AND OPPORTUNITIES

1. Further investigate the reactive chemicals potential of the portable waste trailer that is routinely used for waste containment within Poly C.

2. Consider the need for a plant policy on lab chemical ownership, auditing and receiving. Consider the need for a Reactive Chemicals Chart for Lab Chemicals.

3. In the Additives Area, require reactive chemicals testing of new additives packages for the Dowlex Process.

4. Update the Poly C Process Reactive Chemicals Chart.

5. Investigate the need for additional reactive chemicals testing of absorbent materials employed at Poly C.

6. Review the depad procedures for unloading alkyls. What would be the reactive chemicals consequences of not closing the manual nitrogen valve after off-loading?

7. Is electronic access to pertinent reactive chemicals test data generated for the Poly C Process (or any process) acceptable versus plant hardcopies?

8. Consider the need to document the emergency reactive chemicals functionality of applicable critical instruments.

SELF EVALUATION QUESTIONNAIRE

1. TESTING AND EVALUATION OF REACTIVE CHEMICAL DATA

a. Has reactive chemical test data been gathered for the following:

Process materials and mixtures that are normal to the process	Yes [X]	No [ ]	
Mixtures that may result from abnormal conditions.	Yes [X]	No [ ]	
Material of construction throughout the process. Are wrong materials of construction identified?	Yes [ ]	No [X]	N/A
Effects of pH	Yes [X]	No [ ]	
Abnormal temperature	Yes [X]	No [ ]	
Water	Yes [X]	No [ ]	
Abnormal concentrations	Yes [X]	No [ ]	
Flammable dusts	Yes [X]	No [ ]	
Explosive range known	Yes [X]	No [ ]	
Rate of pressure rise data	Yes [X]	No [ ]	
Accelerating Rate Calorimetry (ARC) test on reactive mixtures that are handled in drum or larger volumes.	Yes [X]	No [ ]	
Chemical formulations.	Yes [X]	No [ ]	
Changes of chemical components in formulation.	Yes [X]	No [ ]	
Significant change in concentrations of components in formulation.	Yes [ ]	No [X]	SOME

b. Have all systems been evaluated with regard to result from test data? Yes [X] No [ ] NO DOCUMENTATION

Has all reactive chemicals data been reviewed by the Reactive Chemicals Test Group and Process Engineering as it relates to the process? Yes [X] No [ ] NO DOCUMENTATION

Has all data been reviewed by Process Engineering as it relates to pressure relief design? Yes [X] No [ ] NO DOCUMENTATION

c. Do all individuals involved with reactive chemical evaluation understand the information on the data sheets and know the limitations for extrapolating operating parameters from the data? Yes [X] No [ ]

d. Is process data current? Yes [X] No [ ]

Does it thoroughly define hazardous bounds? Yes [X] No [ ]

Side reactions? Yes [X] No [ ]

Does data include total potential energy available? Yes [ ] No [X] SOME

Has test data that was generated before 1/1/82 been reviewed with the Reactive Chemical Testing Lab? Yes [ ] No [X]

Has irrelevant RC data been discarded? Yes [X] No [ ]

Has reactor pressure relief analysis and design documentation been completed for vessels containing reactive materials? Yes [X] No [ ]

2. CONFIRMING ANALYSIS OF RAW MATERIALS

a. Is there a program in place for confirming positive identification of all raw materials? (Includes outside vendor and Dow supplied raw materials and also raw materials being supplied by pipeline). Yes [X] No [ ]

Is a Certificate of Analysis required and received for those difficult to test? Yes [X] No [ ]

b. Are inhibitor levels tested on in-coming raw materials that require an inhibitor? Yes [ ] No [ ] N/A

3. CRITICAL INSTRUMENTS AND DEVICES

a. Are critical instruments and devices provided with redundancy? Yes [ ] No [X] NOT ALL

b. Do you have a program for testing all critical instruments? Yes [X] No [ ]

c. Are there any critical instruments in the process that, if failed, would not alarm or indicate that the signal is incorrect? Yes [X] No [ ]

d. Are alarms activated when critical instruments fail? Yes [X] No [ ] SOME

e. Is the emergency reactive chemicals functionality of critical instruments documented? Yes [ ] No [X]

f. Has the process been reviewed within the past two years to determine if adequate monitoring of important parameters is in place? Yes [X] No [ ]

g. Is there a policy covering changes in set points for trips and alarms? Yes [X] No [ ]

4. MATERIALS OF CONSTRUCTION

a. Are unwanted reactions that can be caused by material of construction known by those who can install the wrong material?
Yes [ ] No [X] N/A

b. Are there procedures in place to assure that materials such as lubricants, thread compound, valve packing, leak repair compounds, etc. are compatible with the process chemicals?
Yes [X] No [ ]

c. Are completely halogen-saturated lubricants used in Chlorine service? Yes [X] No [ ]

d. Does the Tech Center provide information/recommendations for material of construction? Yes [X] No [ ]

e. Is information on material of construction sought from suppliers of raw materials? Yes [X] No [ ]

5. SIDE REACTIONS

a. Have side and insitu reactions in your process been adequately researched and identified? Yes [X] No [ ] SOMEWHAT

b. Have conditions for unwanted reactions been identified?
Yes [X] No [ ] SOME

PH Yes [X] No [ ] Water Yes [X] No [ ]

Contaminants Yes [X] No [ ] H2 evolution Yes [ ] No [X] N/A

c. Is any part of your process subject to peroxide, acetylide or azide formation? Yes [ ] No [X] N/A

If so, are the sources known and a program in place to keep this under control? Yes [ ] No [X]

6. OPERATING DISCIPLINE

a. Is Operating Discipline documentation current and complete?
Yes [ ] No [X] 50%

Has it been reviewed by all operating personnel within the past 12 months? Yes [ ] No [X] 50%<

b. Are the Start up and Shutdown sequences written and available for operating personnel? Yes [X] No [ ]

Are reasons for sequences and consequences of deviation well documented and understood by operating personnel?
Yes [X] No [ ]

c. Is the process designed to avoid the activation of large amounts of reactants together at the same time?
Yes [X] No [ ]

Is the most critical reactant metered in under carefully monitored rates that are controlled by temperature/pressure/flow parameters? Yes [X] No [ ]

Is it possible for a critical operating parameter such as flow to be wrong without the operator knowing?
Yes [X] No [ ]

Are analytical devices in place to verify critical parameters?
Yes [X] No [ ]

d. Are procedures in place to prevent charging of the wrong materials from look-alike drum? Yes [ ] No [ ] N/A

Are look-alike drums stored in different storage areas?
Yes [ ] No [ ] N/A

e. Are conditions that approach out-of-range parameters alarmed?
Yes [X] No [ ]

Is redundant instrumentation and procedures in place to prevent over-filling vessels? Yes [X] No [ ]

7. SCENARIOS

a. Are worse case credible scenarios and corrective procedures documented for each step of the process?
Yes [X] No [ ]

b. Have worst case scenarios been highlighted and the process system analyzed for preventive or fail-safe provisions?
Yes [X] No [ ]

Do these provide automated protection if the operating personnel fail to take proper action? Yes [ ] No [X] SOME

Are the consequences known by operating personnel when equipment and operating errors occur in the same scenario?
Yes [X] No [ ]

c. Do all parts of the process go to a fail-safe mode in a:

Power failure?	Yes [X] No [ ]
Cooling loss?	Yes [ ] No [X]
Nitrogen failure?	Yes [ ] No [X]
Air failure?	Yes [X] No [ ]

8. SCRUBBERS (NOT APPLICABLE)

a. Is back-flow of the scrubber chemicals into the process possible? Yes [ ] No [ ]

b. Can flammable or reactive materials accumulate in the scrubber medium or vapor space? Yes [ ] No [ ]

c. If the scrubber is pH controlled, are pH monitoring and adjustment features provided? Yes [ ] No [ ]

d. Are additional scrubber gases such as nitrogen purges etc. controlled adequately to prevent loss of scrubber efficiency? Yes [ ] No [ ]

9. WASTE WATER STRIPPER (NOT APPLICABLE)

a. Is the waste water storage vessel protected from the wrong material entering it? Yes [ ] No [ ]

b. Is the stripper protected from back flow or back pressure? Yes [ ] No [ ]

c. Is level monitoring with low level alarm provided for the stripper and any associated knock-out vessels? Yes [ ] No [ ]

10. CATALYSTS

a. Can catalyst in your process transport downstream and become a hazard? Yes [X] No [ ] REMOTE

b. Can iron chloride be made in your process by inadvertent pH excursions? Iron chloride is an effective catalyst for many reactions and has been responsible for many incidents. Yes [X] No [ ] REMOTE

c. Are procedures in place for starting up a catalyst or adsorbent bed that prevent a high temperature plug-flow temperature front? Yes [X] No [ ]

d. Are all potential reactions known for improper flows or conditions across the catalyst bed? Yes [ ] No [X]

e. Can the catalyst be affected by material of construction, or some ingredient in the formulation? Yes [X] No [ ] O2,CO, CO2

f. Can an unintended material backflow or migrate into the process and have a catalytic effect? Yes [X] No [ ]

11. INHIBITORS (NOT APPLICABLE)

a. Are inhibitor levels monitored? Yes [ ] No [ ]

b. Are inhibitors temperature sensitive with respect to effectiveness? Yes [ ] No [ ]

c. Is freeze protection necessary? Yes [ ] No [ ]

d. Is separation of inhibitor from product temperature dependent? Yes [ ] No [ ]

e. Does the inhibitor require a small amount of oxygen to be effective? Yes [ ] No [ ]

If so, are oxygen levels monitored? Yes [ ] No [ ]

f. Is the inhibitor affected by material of construction or vice versa? Yes [ ] No [ ]

12. LAB CHEMICAL STORAGE

a. Is there a policy governing ownership responsibility for lab chemicals? Yes [ ] No [X]

b. Has the material of construction for the chemical containers been tested for long term compatibility? Yes [ ] No [X]

c. Is there a receiving procedure to prevent chemicals from being left at a delivery point for excessive periods of time?
Yes [ ] No [X]

d. Is the storage life/self-reactivity/aging data known for stored materials so as to establish a maximum storage age at a given temperature? Yes [ ] No [ ] N/A

e. Are unstable chemicals given special storage provisions?
Yes [X] No [ ]

Are stored items in drums checked for over-pressure?
Yes [ ] No [ ] N/A

Are containers occasionally found to be over-pressured?
Yes [ ] No [ ] N/A

Is moisture a problem with some chemicals you store?
Yes [ ] No [X]

f. Are drums of materials that are sensitive to water stored indoors? Yes [ ] No [ ] N/A

13. HAZARDOUS MATERIAL HANDLING

a. Have inadvertent operations been identified which could subject process materials (specifically gases) to heat of compression?
Yes [X] No [ ]

b. Do you vacuum break with nitrogen? Yes [X] No [ ]

c. Do you monitor for oxygen content in the part of the process that operates under vacuum? Yes [X] No [ ]

Is oxygen monitored in process systems where the components can be easily oxidized? Yes [X] No [ ]

d. Is the design of your process system such that it is virtually impossible for two highly reactive chemicals to get together unintentionally? Yes [X] No [ ]

Are there redundant safeguards? Yes [X] No [ ]

e. Are drums of materials that are incompatible kept segregated?
Yes [ ] No [ ] N/A

Are they identified by label/color code etc.?
Yes [ ] No [ ] N/A

f. Are procedures, equipment, and training in place to quickly handle leaks of hazardous materials to prevent exposure to the plant or community?
Yes [X] No [ ]

g. In the event of a leak or spill do you know which absorbent material to avoid? Spontaneous combustion incidents are common. Yes [X] No [ ] WE ONLY USE ONE.

h. Can material be concentrated or built up in a recycle stream to the point of instability? Yes [X] No [ ] REMOTE

Can polymer or other materials in the process build up and become pyrophoric when exposed to air? Yes [X] No [ ]

i. Are any peroxide-forming materials and conditions present in your process? Yes [ ] No [X]

14. WASTE HANDLING

a. Is sawdust or cellulosics based materials used as an absorbents? Yes [ ] No [X]

If so, are procedures and ratios specified to prevent reaction or spontaneous combustion? Yes [ ] No [ ] N/A

b. Have all absorbents in use been tested with the process materials? Yes [ ] No [X] ONLY ONE

Are there any prohibited absorbents? Yes [ ] No [X] MOC REQ'D TO

Do employees know? Yes [ ] No [X]- CHANGE

c. Are different waste chemicals collected in a common container? Yes [X] No [ ]

If so, is control of what is put into the container vested in one person or job? Yes [ ] No [X]

Are pH or other analytical procedures used as part of this control? Yes [ ] No [X]

d. Are joint procedures with Environmental Services periodically reviewed? Yes [X] No [ ]

e. Does control of waste include? Yes [X] No [ ]

Material of construction	Yes [X]	No [ ]
Time limit of storage	Yes [X]	No [ ]
Written procedure for disposal	Yes [X]	No [ ]
Ownership	Yes [X]	No [ ]

15. HEELS IN TANK CARS, TANK TRAILERS, BARGES, PROCESS LINES AND STORAGE VESSELS

a. Are procedures in place to analytically test all heels to assure that the look-alike heels are what they are supposed to be? Yes [X] No [ ] NO ANALYTICAL

b. Is odor used as an identifying method? Yes [ ] No [X]

c. Are low points in pipelines checked? Yes [ ] No [X]

d. Are heels from cleaning, such as water, a hazard with your products? Yes [ ] No [X]

e. Are vapors in pressurized vessels/trailers analyzed if no liquid sample can be obtained? Yes [X] No [ ]

f. Are dedicated transport vessels used without confirming analysis of the heels? Yes [X] No [ ]

16. EXCHANGERS

a. Is the exchanger media compatible with the process material?
Yes [X] No [ ]

b. Will a leak into the process be hazardous?
Yes [ ] No [X]

c. Is monitoring provided to detect a leaking exchanger?
Yes [ ] No [X]

d. Is the exchanger essential to the safety of the process?
Yes [ ] No [X]

e. Is temperature monitoring provided around the exchanger?
Yes [X] No [ ]

f. Has the maximum temperature of the reboiler been evaluated with respect to length of time exposure, such as during total reflux conditions? Yes [ ] No [X]

g. Have the effects of a leaking steam valve to a shutdown reboiler been evaluated? Yes [X] No [ ]

h. Has the heat history of polymerizable bottoms been evaluated with respect to reboiler temperature and length of time of exposure? Yes [ ] No [X]

i. Have you evaluated the effects of recirculation or cooling failure? Yes [X] No [ ]

17. AGITATORS

a. Is monitoring provided to detect agitator failure?
Yes [X] No [ ]

Motor amps? Yes [X] No [ ]
Rotation detectors? Yes [ ] No [X]
Blade detector? Yes [ ] No [X]

b. Has agitator failure been evaluated during the step with the most available energy to determine if a run-away can occur?
Yes [X] No [ ]

c. Are reactive feed flows interlocked to stop on agitator failure? Yes [X] No [X] MOD=YES TDC=NO

d. Are run step procedures in place to assure proper mixing and proper reaction? Yes [X] No [ ]

e. Are amp readings alone on the agitator appropriate to determine the progress of the reaction? Yes [X] No [ ]

18. STATIC MIXERS

a. Are temperatures before and after monitored?
Yes [X] No [ ]

b. Are there sufficient reactants within the mixer that overheat could result if flow of reactants is suddenly stopped without purge-out? Yes [ ] No [X]

19. PUMPS

a. Are feed pumps interlocked with shutdown trips?
Yes [X] No [X] MOD=YES TDC=NO

b. Are pumps temperature monitored on or within 6-inches downstream of the pump casing to detect deadheading?
Yes [ ] No [X]

c. Does the monitoring scheme assure detection and alarm on pump cavitation? Yes [ ] No [X]

d. Are pump seals monitored for flow of seal fluid and seal loss?
Yes [X] No [ ]

e. Have seal fluid leaks into the process streams been evaluated?
Yes [X] No [ ]

f. Is temperature monitoring provided for pumps that are used for mixing? Yes [ ] No [ ] N/A

20. BACK FLOW

a. Have potential back flow scenarios been evaluated? YES

b. Has process back-flow been effectively prevented in the following?

Feed lines	Yes [X]	No [ ]
Nitrogen connections	Yes [X]	No [ ]
Condensate	Yes [X]	No [ ]
Gas cylinders	Yes [ ]	No [X]

c. Are means other than block valves and check valves provided to prevent back flow, such as stopping pumps and depressuring?
Yes [ ] No [X]

21. LOW FLOW RATE

a. Have low flow rates been evaluated for their effects on reaction stability and heat removal? Yes [X] No [ ]

Example: throttle back during startup/shutdown/hurricane shutdown.

b. Has total reflux of your distillation column or reactor systems been evaluated for loss of overheads through leaking overhead valves? Yes [ ] No [X]

Concentration of unstable components in certain trays
Yes [ ] No [X]

Overheating/heat history problems in the reboiler?
Yes [ ] No [X]

22. RELIEF DEVICES and VENT SYSTEMS

a. Have pressure relief systems been designed for worse case credible reactive chemicals run-away? Yes [ ] No [X]

b. Are relief valve discharge headers combined with other vents?
Yes [X] No [ ]

If so, is there a reactive problem? Yes [X] No [ ]

c. Have hazard analysis been performed and documented to define credible reactive pressure relief scenarios?

Yes [ ] No [X] FIRE SIZING

d. Does documentation of reactive pressure relief designs meet minimum requirements as it applies to the following?

Yes [X] No [ ]

Reactive chemicals tests or kinetic data used as a basis

Yes [ ] No [X]

Scenarios used for design. Required capacity

Yes [X] No [ ]

Device size, PSV orifrice, manufacturer, serial no., spec sheet.

Yes [X] No [ ]

23. COMPATIBILITY CHART

a. Has a current cross compatibility chart been developed for displaying chemical compatibility of the materials used in the block that may be mixed unintentionally?

Yes [ ] No [X]

b. If so, are the materials that are self-reactive included in the data? Yes [X] No [ ]

c. Is the compatibility chart posted where all block employees can use it? Yes [X] No [ ]

d. Is there a policy for keeping the cross-compatibility chart up-to-date? Yes [ ] No [X]

24. REACTIVE CHEMICAL TRAINING

a. Is periodic reactive chemical training conducted and documented? Yes [X] No [ ]

b. Does reactive chemical training include materials specific to the block? Yes [X] No [ ]

c. Has hazard information of chemical mixtures that can be reactive/flammable/explosive been included in the training program? Yes [X] No [ ]

d. Is the cross-compatibility chart included in the periodic reactive chemical training? Yes [X] No [ ]

e. Are case histories of past incidents in your unit, the Dow world, and the chemical industry that are related to the process you operate included in the training program?

Yes [ ] No [X]

f. Have potentially wrong mixtures or procedures been emphasized in the training program so that employees will know not to allow certain chemicals to mix or to get out of parameters?

Yes [X] No [ ]

g. Are employees trained on the ways instruments and control devices are prone to fail? Yes [X] No [ ]

h. Are employees trained on materials of construction that can cause a potential reactive chemical problem?
Yes [ ] No [X] N/A

25. REACTIVE CHEMICAL REVIEWS

a. Are all processes in the block reviewed-by line supervision and engineers, technology center, and Safety Superintendent at least every two years? Yes [X] No [ ]

b. Is a Reactive Chemical Committee Review held for your processes every two years or within 90 days of a new superintendent?
Yes [X] No [ ]

c. Are process changes reviewed by members of the Reactive Chemicals Committee before they are implemented?
Yes [X] No [ ]

d. Are pre-startup reviews held for process changes and recommissioning out-of-service equipment? Yes [X] No [ ]

e. Are product formulation changes reviewed by the Reactive Chemicals Committee? Yes [X] No [ ]

Michael P. Olsen
Production Specialist
Polyethylene C
September 21, 1992

REACTIVE CHEMICALS SECTION:

1. OBTAIN ABSORBENTS DATABASE FROM JOE SCHELL AND REVIEW COMPATIBILITY OF THE 3M OIL SORBENT WITH VARIOUS CHEMICALS FOUND IN THE POLY C BLOCK. IF OTHER ABSORBENTS ARE USED, TESTING SHOULD BE DONE IF DATA IS NOT AVAILABLE ON THIS DATABASE.

   Responsibility/Timing: Mike Olsen / 4th Qtr, 1992

   Answer: Database reviewed and the only current testing was with Dowtherm A. Testing is scheduled for the 4th qtr on 3M Oil Sorbent with 1-octene and Isopar E.

2. SINCE THE ANHYDROUS HCL SCRUBBER IS USED INFREQUENTLY, CONSIDER REVIEWING THE WORST CASE SCENARIOS ASSOCIATED WITH THE SCRUBBER AND MAKE SURE THAT THE LINES OF DEFENSE ARE APPROPRIATE.

   Responsibility/Timing: Bob Cameron / 4th Qtr, 1992

   Answer: Scenarios will be documented and a procedure developed for the control room McIntosh.

3. CONSIDER ADDING STORAGE OF LAB CHEMICALS TO THE C-9 CHECKLIST. THE DESIRED OUTCOME IS TO HAVE A PROGRAM THAT WILL INSURE THAT REACTIVE AND HAZARDOUS CHEMICALS ARE NOT KEPT ON-SITE PAST THEIR SHELF LIFE.

   Responsibility/Timing: Alvin Hebert / 1st Qtr, 1993

   Answer:

4. IMPLEMENT A PROGRAM TO AVOID ACCUMULATION OF LARGE QUANTITIES OF ALKYL SAMPLES IN THE PLANT LAB.

   Responsibility/Timing: Dan DuRousseau / 4th Qtr, 1992

   Answer: Complete. Program in place.

5. MAKE SURE THAT A PROGRAM IS IN PLACE TO AVOID ADDITION OF INCOMPATIBLE WASTE INTO THE PORTABLE WASTE TRAILER. A LIST OF APPROVED MATERIALS TO BE ADDED TO THE TRAILER SHOULD BE POSTED ON THE TRAILER.

   Responsibility/Timing: Ada Simpson / 1st Qtr, 1993

   Answer:

6. IS BACKFLOW OF PROCESS CHEMICALS INTO THE ISOPROPYL TITANATE CYLINDER A CREDIBLE SCENARIO? IF SO, WITH THIS CREATE A REACTIVE CHEMICALS HAZARD?

Responsibility/Timing: Bob Cameron / 4th Qtr, 1992

Answer:

7. CONSIDER INCLUDING CASE HISTORIES OF INCIDENTS IN YOUR ANNUAL REACTIVE CHEMICALS TRAINING.

Responsibility/Timing: Mike Olsen / 2nd Qtr, 1993

Answer: This will become a part of the annual C-9 reactive chemicals training presentation. The mechanism is in place to make it happen.

8. REVIEW PRE-1982 REACTIVE CHEMICALS TEST DATA WITH THE REACTIVE CHEMICALS TESTING GROUP TO MAKE SURE THE DATA IS STILL APPROPRIATE.

Responsibility/Timing: Mike Olsen / 1st Qtr, 1993

Answer:

9. IF COMPACTED CALCIUM STEARATE IS USED INSTEAD OF POWDER DETERMINE IF A DUST EXPLOSION HAZARD WILL EXIST IN THE HOPPER. THIS MAY BE POSSIBLE BY EROSION OF THE PELLETS.

Responsibility/Timing: George Shofoluwe / 4th Qtr, 1992

Answer: The phase III design of the system calls for the use of nitrogen rather than compressed air for the conveying of the calcium stearate and purging of all hoppers. The use of an inert gas such as nitrogen virtually eliminates the dust explosion potential of calcium stearate in the system even if pure powder were to be used. A special design dense phase conveying system to be used will also reduces attrition of pellets and affords low nitrogen use. (The cost of nitrogen to operate this system is approximately $295/yr) Combined with proper equipment grounding, this should provide more than adequate safeguards.

10. POLYETHYLENE CAN UNDERGO SLOW EXOTHERMIC DEGRADATION IF HELD ADIABATICALLY AT TEMPERATURES EXCEEDING 250 DEGREES C FOR EXTENDED PERIODS OF TIME (CRI REPORT #LAD AR 89-19). REVIEW THE POTENTIAL FOR THIS TO OCCUR IN YOUR PROCESS AND MAKE SURE THE APPROPRIATE LINES OF DEFENSE EXIST.

Responsibility/Timing: Mike Olsen / 1st Qtr, 1993

Answer: Have reviewed CRI and will check process data to ascertain if adiabatic conditions exceeding 250 C are even possible. First pass look indicates probably not.

11. REACTIVE CHEMICALS TEST DATA IS NEEDED TO DETERMINE COMPATIBILITY OF ADDITIVES AND DOWTHERM A. IF INCOMPATIBLE, MAKE SURE ADEQUATE LINES OF DEFENSE ARE IN PLACE TO AVOID AN INCIDENT.

    Responsibility/Timing: Mike Olsen / 1st Qtr, 1993

    Answer: Contacted Reactive Chemicals Group to schedule testing. Plans are to test Dowtherm A versus each neat additive and two of the predominant additive packages utilized at Poly C. Contact between Dowtherm A and additives requires an E-5X2 tube leak or XS-522 1st zone barrel jacket leak.

12. UPDATE POLY C CHEMICALS COMPATIBILITY CHART.

    Responsibility/Timing: Ada Simpson / 1st Qtr, 1993

    Answer: Will utilize the software package developed in Texas.

13. REVIEW DEPAD PROCEDURES FOR UNLOADING ALKYLS. WHAT WOULD BE THE REACTIVE CHEMICALS CONSEQUENCE OF NOT CLOSING THE MANUAL NITROGEN VALVE AFTER OFF-LOADING?

    Responsibility/Timing: Bob Cameron / 4th Qtr, 1992

    Answer:

14. CONCERNING THOSE CRITICAL INSTRUMENTS THAT EXIST PRIMARILY AS LINES OF DEFENSE FOR AVOIDING REACTIVE CHEMICALS INCIDENTS, CONSIDER DOCUMENTING THE WORST CASE SCENARIOS.

    Responsibility/Timing: Mike Olsen / 1st Qtr, 1993

    Answer: Utilization of LPETC Standard #202 will be the starting point for considering this potential need.

Michael P. Olsen
Production Specialist
Polyethylene C
December 2, 1992

From: LACSDC::OLSEN "MICHAEL P. OLSEN, POLY C, BLDG 8601, 504-389-6155" 2-DEC-1992 13:10:04.65
To: LARNDC::SCHELL
CC: OLSEN
Subj: RX CHEM CONSOLIDATED AUDIT QUESTION - JOE, THESE ARE ALL OF THE EXISTING PRE-1982 TESTING I COULD LOCATE. I COULDN'T FIND ANY IN THE REACHEM DATABASE. HOW DO WE/I PROCEED FROM HERE? A MEETING OR CAN YOU LOOK AT

1992 CONSOLIDATED AUDIT RECOMMENDATIONS AND RESPONSES

REACTIVE CHEMICALS SECTION:

8. REVIEW PRE-1982 REACTIVE CHEMICALS TEST DATA WITH THE REACTIVE CHEMICALS TESTING GROUP TO MAKE SURE THE DATA IS STILL APPROPRIATE.

Responsibility/Timing: Mike Olsen / 1st Qtr, 1993

Answer:

REACTIVE CHEMICALS PRE-1982 TESTING INFORMATION

RC TEST NO.	MATERIAL(S)	MAXIMUM OPERATING TEMP. (DEG C)	TEST TYPE	TEMP ONSET MAX, END (DEG C)	MAX. TEMP. & PRESS. RATE (DEG C, PSIA)
RCT-81-1565	ISOPAR E + CALCIUM STEARATE	30	DTA	ND	-
RCT-81-1817	ISOPAR E + IRGANOX 1010	30	DTA	ND	-
RCT-81-1460	ISOPAR E + DHT-4A	230	DTA	310, 315, 325	380
RCT-81-1817	ISOPAR E + DHT-4A + IRGANOX 1010	230	DTA	ND	-
RCT-81-0914	IRGANOX 1010 + ISOPAR E	230	DTA	ND	500
RCT-81-0919	IRGANOX 1010 + ISOPAR E + PEPQ	230	DTA	ND	500

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