

CAUSTIC I / CHLOR - ALKALI 2

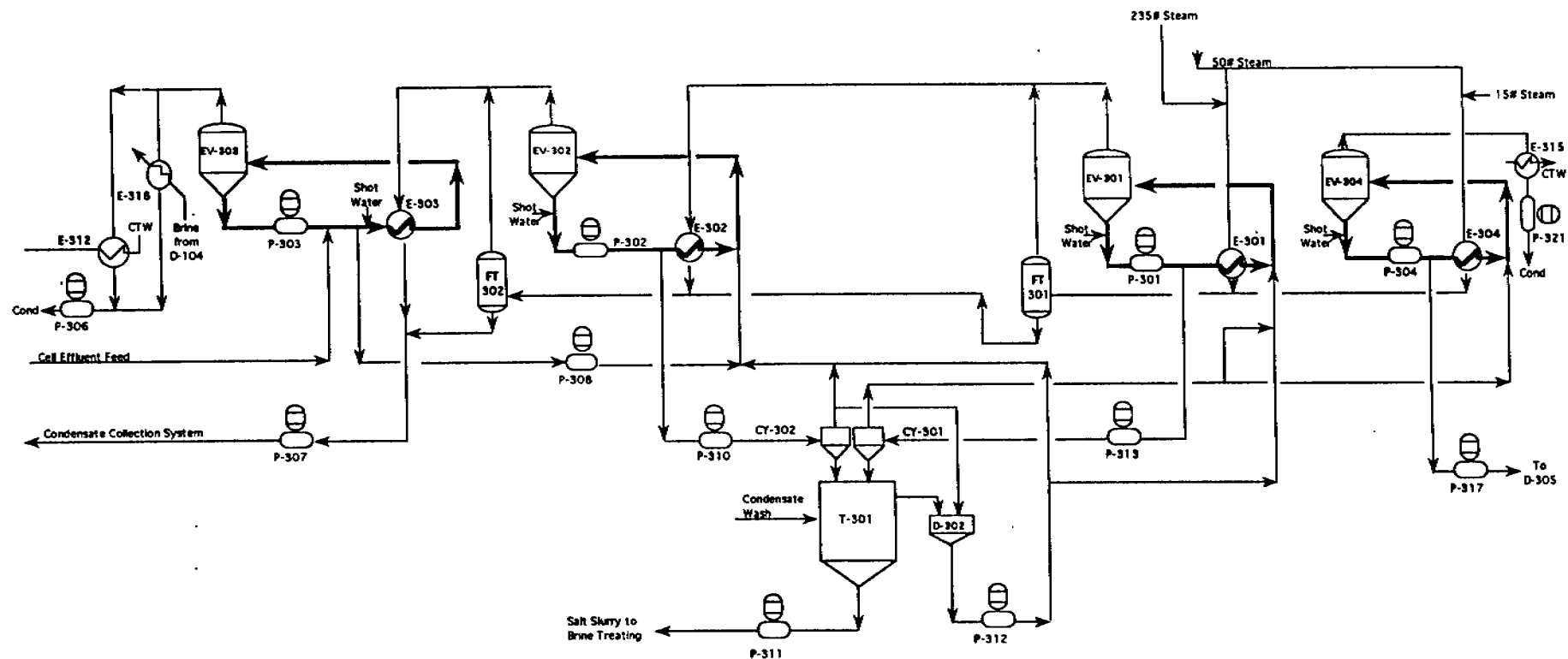
1994

REACTIVE CHEMICALS REVIEW

CAUSTIC AREA - both plants

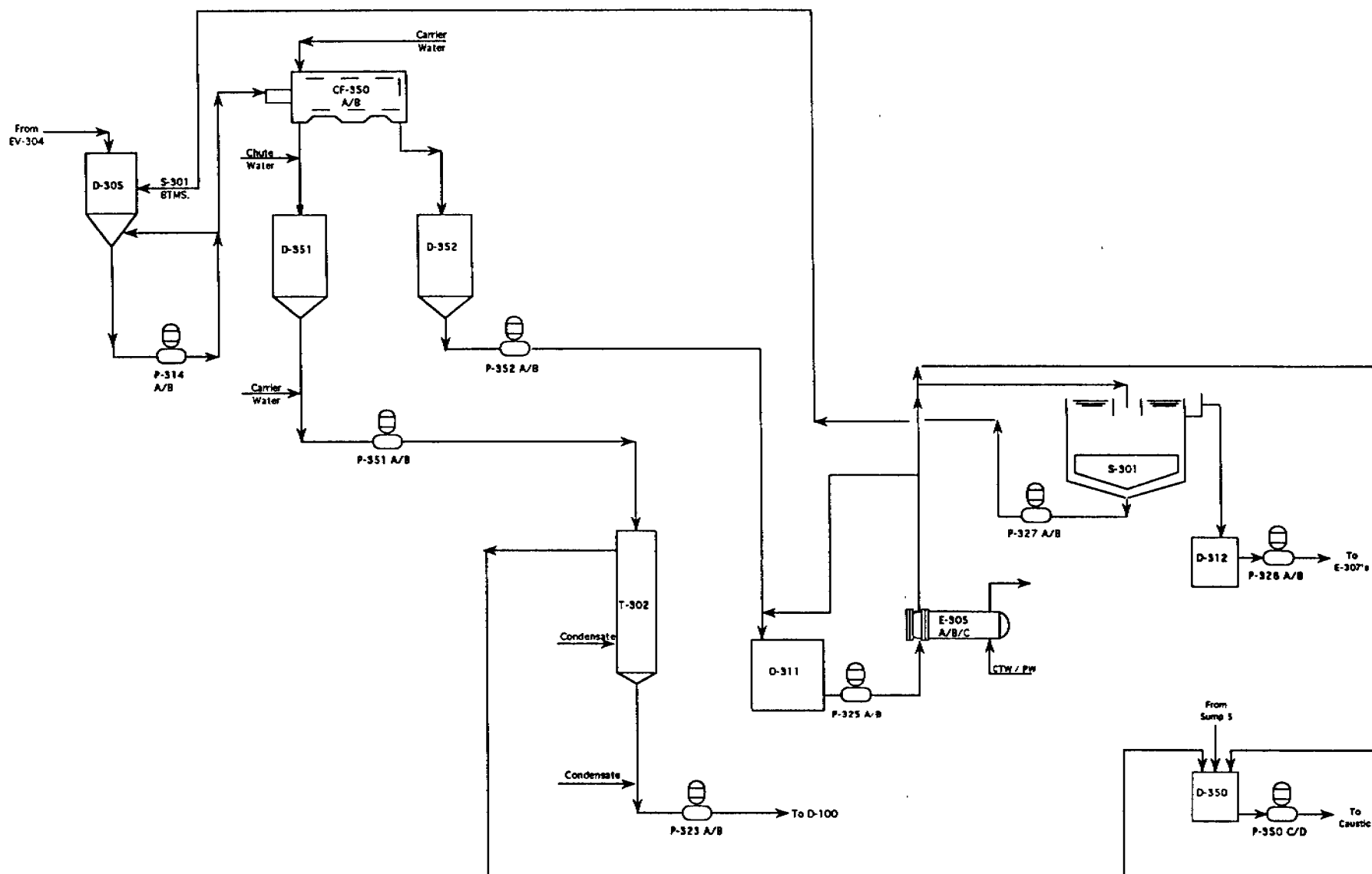
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NaOH EVAPORATOR AREA

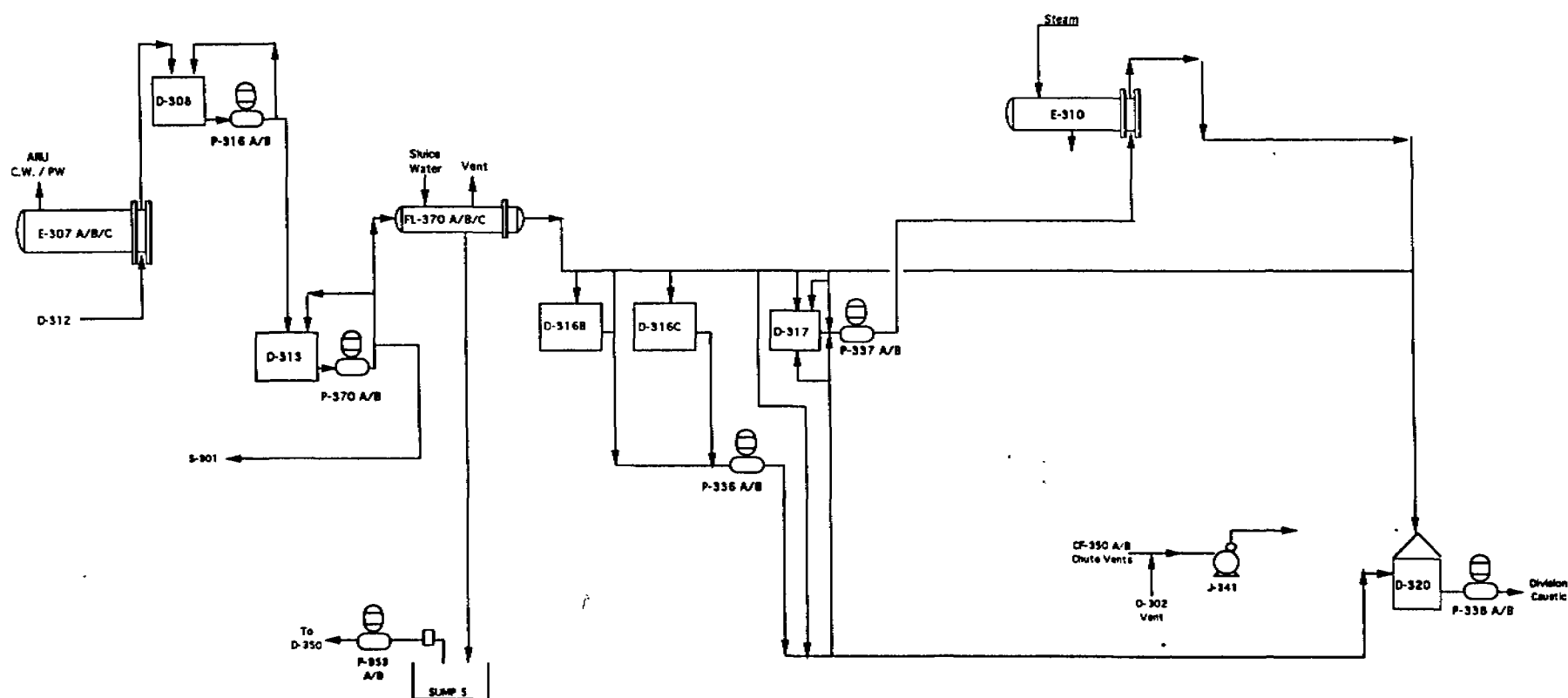


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NaOH CENTRIFUGES & PRIMARY COOLING AREAS

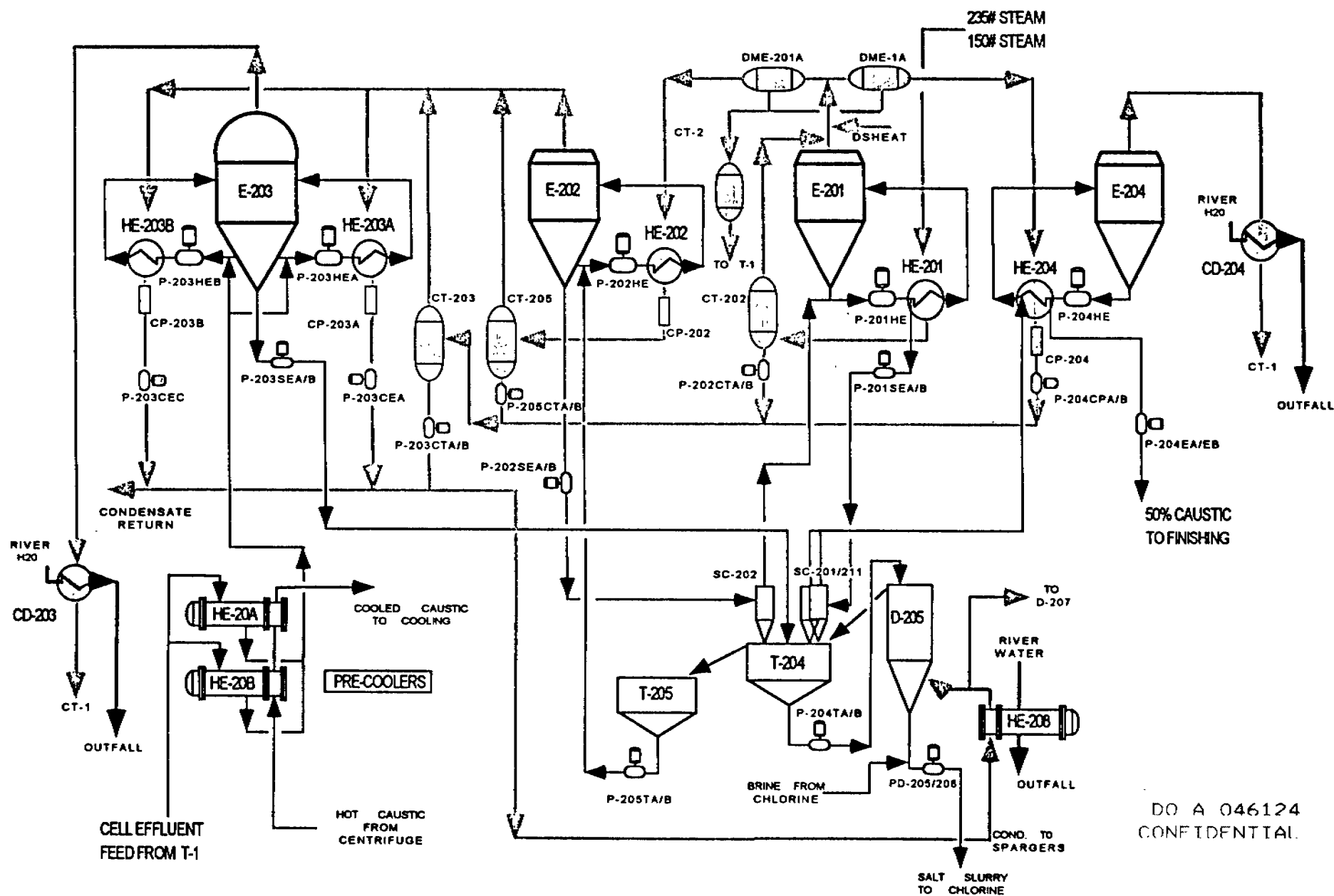


NaOH FINISHING AND STORAGE AREA



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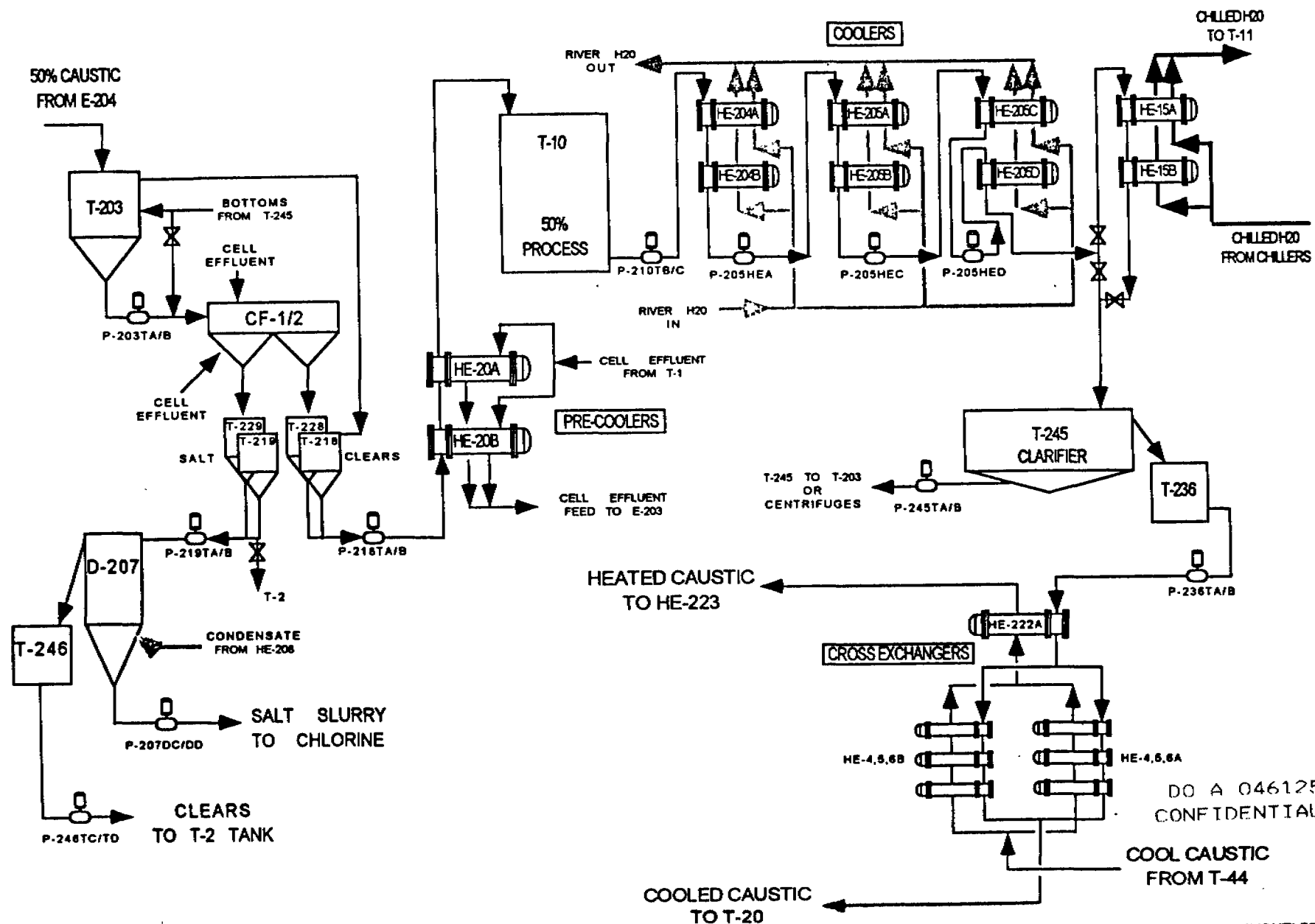
CAUSTIC 1 EVAPORATOR AREA



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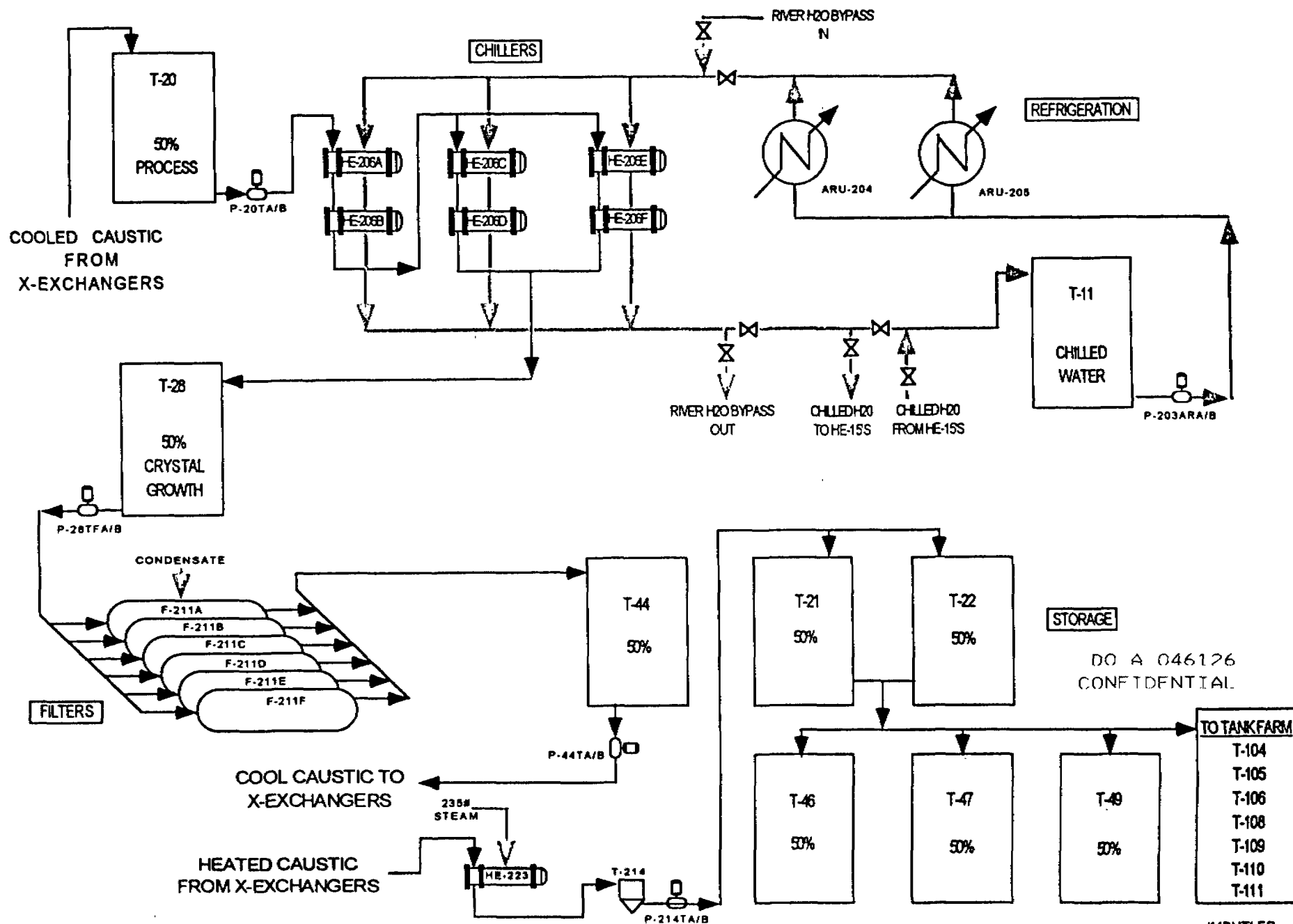
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CAUSTIC 1 CENTRIFUGES/PRIMARY COOLING



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CAUSTIC 1 CHILLING/FILTERING/STORAGE



DOW

CAUSTIC I/CAII

**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994**

RAW MATERIALS/PROCESS AIDS

- RAW MATERIALS
 - » Cell Effluent (8-11% NaOH, 15-17% NaCl, 72% Water)

- PROCESS AIDS
 - » Steam (150# and 235#)
 - » Carrier Brine (Caustic I Only)
 - » Process Water
 - » River Water
 - » Instrument Air
 - » Plant Air

- SUPPLIES
 - » HCL (Used for PH Control at Caustic I-Does Not Contact Process)
 - » Lithium Bromide (ARU-not in Contact With Process)

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**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994****RAW MATERIALS/PROCESS AIDS: SOURCE AND STORAGE****- SOURCE**

- » Cell Effluent - CL2 and CA2 (Pipelines)
- » Steam - Power I (Pipelines)
- » Carrier Brine - CL2 (Caustic I Only-Pipeline)
- » Process Water - Utilities (Pipeline)
- » River Water - Plant Pumps (Caustic I Only-Pipeline)
- » HCL - Solvents (Pipeline)
- » Lith. Bromide - ARU (Contained Within Unit)
- » CTW - Plant Pumps (CAII Only)

- BLOCK STORAGE

- » Cell Effluent - T-1 (Plant Feed), T-2 (User Feed), T-1A, T-2A, T-3, T-109
Tanks @ Caustic; D-301, D-316A @ CAIII
- » HCL, Steam, Carrier Brine, Process Water, River Water
 - No Storage: Supplied via Pipeline on Demand
- » Lith. Bromide - Stored Within ARU

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CAUSTIC I/CAII

**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994**

RAW MATERIAL: SPECIFICATIONS

Cell Effluent

Caustic (NaOH)	%	5-15
Iron (Fe)	PPM	1.0
Sodium Sulfate (Na ₂ SO ₄)	PPM	2500
Sodium Sulfite (Na ₂ SO ₃)	PPM	1-20
Sodium Chlorate (NaClO ₃)	%	0.03

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CAUSTIC I/CAII

**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994**

PRODUCTS/BY-PRODUCTS

- PRODUCT

» 50% Caustic (50% NaOH, 0.5% NaCl, 49.5% Water)

- BY-PRODUCTS

» Condensate (Boiler and Non-boiler Grade)

» Salt Slurry

» Sulfate Purge

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CAUSTIC I/CAII

**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994**

PRODUCTS/BY-PRODUCTS: IN-PLANT DISTRIBUTION

- PRODUCT

- » Caustic - Pipelines to Storage Tanks in Plant and at Tank Farm
- » Cell Effluent - Pipelines to Users (Backflow Protection Critical)

- BY-PRODUCTS

- » Condensate
 - Boiler Grade Routed from Collection Tank to Power I or Used Internally
 - Non-Boiler Grade consumed in Process or Routed to Canal
- » Salt Slurry
 - Routed from Two Salt Columns (D-205&D-207) to CL2 or Used Internally (CAII)
 - Brine from CL2 Mixed with Salt to Assist in Transfer
- » Sulfate Purge
 - Routed to User Feed Tank (T-2) @ Caustic

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CAUSTIC I/CAII

**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994****PRODUCT SPECIFICATIONS****50% CAUSTIC**

Caustic (NaOH)	%	49.0-51.0
Salt (NaCl)	%	1.0
Iron (Fe)	PPM	5.0
Sodium Carbonate (Na ₂ CO ₃)	%	0.2
Sodium Sulfate (Na ₂ SO ₄)	%	0.025
Sodium Chlorate (NaClO ₃)	%	0.15
Nickel/Copper (Ni/Cu)	PPM	1.0
Arsenic (As)	PPM	1.5
Mercury (Hg)	PPM	0.5
Lead (Pb)	PPM	5.0
Heavy Metals as Pb	PPM	15.0
Silicon (Si)	PPM	100
Manganese (Mn)	PPM	1.0

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**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994**

BY-PRODUCT SPECIFICATIONS

Salt Slurry

Caustic (NaOH)	%	1.25 Max
Salt Settle Volume (SV)	%	5-50

Boiler Grade Condensate

Conductivity	MMHOS	10 Max
Hydrazine	PPM	0

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CAUSTIC I/CAII

**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994**

REACTIVITY: 50% NaOH

- WATER

- Dilution With Water is Exothermic
- Rapid Temperature Increase Can Result
- Heat of Dilution:



- ACIDS

- Reaction is Violent and/or Explosive

- ORGANIC COMPOUNDS

- Potential Violent Reaction

- METALS

- Rapid Reaction With Aluminum, Tin, and Zinc.
- Can React with Amphoteric Metals in Water Solutions to Generate H₂ Gas
- Reaction With Bronze and Brass

- Flammability

- Not Flammable

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CAUSTIC 1

**REACTIVE CHEMICALS REVIEW
OCTOBER, 1994**

REACTIVE CHEMICAL CONCERNS

CONCERN

Cell Effluent Distribution-
Backflow From User Plants

Water/NaOH Heat of Dilution

Utility Systems-
Caustic Contamination

Corrosion of Nickel Clad Vessels
by Hypochlorites in the Cell
Effluent Feed

PREVENTIVE MEASURES

User Plants Surveyed in May, 1994 to Ensure
Backflow Protection is In-place.

Water is Added Throughout Process. Continuous
Flow and Closed System Control Temperature
Increase Near Normal and Eliminate Impact Of
Boiling Action, Respectively.

Double Block and Bleed Used at All Cross
Tie Points.

Cell Effluent Analyzed for Hypochlorites.
Neutralized With Sodium Bisulfite.

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CAUSTIC I CRITICAL INSTRUMENT PROGRAM

<u>Tag - Instrument</u>	<u>Frequency</u>
LSH1328 - T-2 HI LEVEL	6 MONTH
LSH1329 - T-1 HI LEVEL	6 MONTH
LSH1378 - T-1A HI LEVEL	6 MONTH
LSH1537 - T-204 HI LEVEL	3 MONTH
LSH2104 - T-104 HI LEVEL	6 MONTH
LSH2105 - T-105 HI LEVEL	6 MONTH
LSH2106 - T-106 HI LEVEL	6 MONTH
LSH2108 - T-108 HI LEVEL	6 MONTH
LSH2109 - T-109 HI LEVEL	6 MONTH
LSH2110 - T-110 HI LEVEL	6 MONTH
LSH2111 - T-111 HI LEVEL	6 MONTH
LSH2629 - T-218 HI LEVEL	3 MONTH
LSH2630 - T-228 HI LEVEL	3 MONTH
LSH2654 - T-219 HI LEVEL	3 MONTH
LSH2655 - T-229 HI LEVEL	3 MONTH
LS5000A - T-21 HI LEVEL	6 MONTH
LS5007A - T-22 HI LEVEL	3 MONTH
LS5012A - T-28 HI LEVEL	3 MONTH
LS5024A - T-44 HI LEVEL	3 MONTH
LS5047A - T-47 HI LEVEL	3 MONTH
LS5061A - T-46 HI LEVEL	6 MONTH
LS5070A - T-49 HI LEVEL	6 MONTH
LS5075A - T-48 HI LEVEL	6 MONTH
LS7100A - T-20 HI LEVEL	6 MONTH
LS7168 - T-245 HI LEVEL	6 MONTH
LS7168A - T-245 HI HI LEVEL	6 MONTH
LS7200A - T-236 HI LEVEL	6 MONTH
LS82010 - T/C STATION #1 HI LVL SWITCH	1 WEEK
LS82011 - T/C STATION #2 HI LVL SWITCH	1 WEEK
LT1625 - E-204 LEVEL	6 MONTH
LT1626 - E-204 LEVEL	6 MONTH
PHI2418 - T-11 pH	1 WEEK
PT1621 - E-204 PRESSURE	6 MONTH
PT1621A - E-204 PRESSURE	6 MONTH
TRC3185 - ARU-204 LOW TEMP	6 MONTH
TRC3179 - ARU-205 LOW TEMP	12 MONTH
TT1628 - E-204 INLET TEMPERATURE	12 MONTH
TT7142 - HE-6 OUTLET TEMPERATURE	6 MONTH
TT1628A - P-204E DISCHARGE TEMP	6 MONTH
TT50006 - T-28 TEMPERATURE	6 MONTH
VI6551 - AC-301 SOUTH VIBRATIONS	12 MONTH
VI6552 - AC-301 MIDDLE VIBRATIONS	12 MONTH
VI6553 - AC-301 NORTH VIBRATIONS	12 MONTH

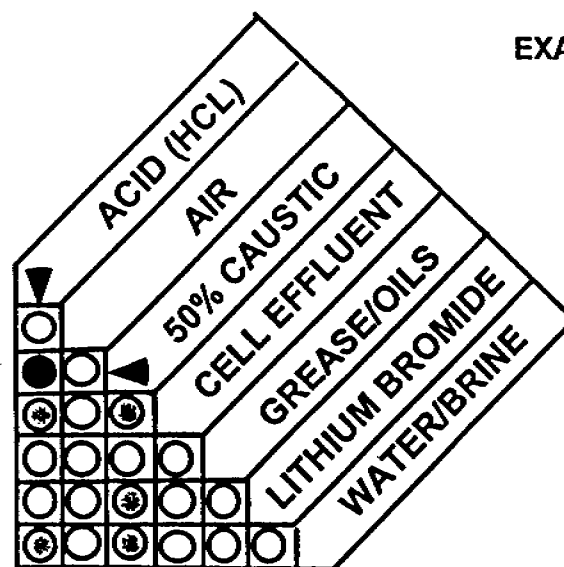
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CAUSTIC I/CAII

REACTIVE CHEMICALS REVIEW OCTOBER, 1994

REACTIVE CHEMICALS GUIDE



EXAMPLE: ACID - 50% CAUSTIC
READ DOWN AND ACROSS
AS INDICATED BY ARROWS

- EXTREME HAZARD - REACTS VIOLENTLY !!! DO NOT MIX!!!
- ⊛ POTENTIAL HAZARD - COULD REACT UNDER CERTAIN CONDITIONS.
USE CAUTION WHEN MIXING
- NO HAZARD - NORMALLY WILL NOT REACT

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