

CHLOR - ALKALI 2

1994

REACTIVE CHEMICALS REVIEW

CELL AREA

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CELL AREA

Chlorine Cells

Potential Problem: Loss of Anolyte Level

Result: Hydrogen in Chlorine Explosion; Arcing within cell

Preventative Measures:

- 2 level transmitters and 1 low level carbon probe
- 4" rectifier shutdown (2/3, 2/2, 1/1)
- backup side feed level controller
- low level alarms
 - low 5.5 "
 - low-low 5.0 "
- 6" minimum operating head
- VRD conforming to CATC guidelines
- Level selection - high reading at >16"
low reading at < 16"
- visual rounds

Potential Problem: High Series Hydrogen Pressure

Result: Hydrogen in Chlorine Explosion

Preventative Measures:

- 2 series relief on hydrogen stack at 4.5 - 6.0 "
- high H2 pressure alarm at 4"
- foam drains

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Potential Problem: High Hydrogen During Operation

Result: Hydrogen in Chlorine Explosion

Preventative Measures:

- 2" air dilution valves
- open air dilution valves between 0.5 and 1.0%
- "quickie H2" and "total gas H2" analyzers
- Trouble shooting
 - plugged radial feeders
 - take salt off (300 gpl max salt)
 - look for restricted H2 outlets
 - bad cells --
- Follow CATC guideline concerning air dilution and shutdown
- series voltage alarm to detect possible clip drop voltage prob.
- clip drop profiles quarterly by cell crew
- anolyte and catholyte temperature alarms > 80 C

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Potential Problems Oxygen in hydrogen

Result: Explosion in hydrogen header ("pop" if minor in nature)

Incidents:

- 1993 Mod5 code problem resulted in no N2 purge on shutdown which lead to an explosion S-5/S-8 @ CA-2
- 1993 CA-2 Hydrogen log fire due to arcing at boot connection on S-8 hydrogen log caused by ground on series
- 1994 S-4 at Cl-1 plant; failure to bottle series before lowering head to stop under-cell leak.
- 1994 S-5 at Cl-1 between cell leak caused loss of catholyte level; H2 ignited above caustic trap.

Preventative Measures:

- Nitrogen purge activated in startup/shutdown steps for the hydrogen stacks
- Low nitrogen flow alarm at 200 lb/hr; normal rate 500 lb/hr
- Nitrogen valve position alarms
- hydrogen compressor shutdown -1.5 INWA instantaneous or 1/8 INWA for 2 seconds
- standard operating procedure to "bottle" series on all shutdowns (purges the cell with brine)
- off-line procedures for cell maintenance
- cell sprayers and housekeeping

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