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ETC 15452

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ETH 000185

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ETHYL CORPORATION
Medical Department
Baton Rouge, Louisiana

INDUSTRIAL HYGIENE SURVEY
of
Baton Rouge Plant

Preliminary Survey of Materials and Processes
in
SODIUM AREA

I. General

The portion of the Ethyl Baton Rouge plant designated as the Sodium Area converts brine to sodium, caustic soda, and chlorine. A simplified chart of Sodium Area operations as supplied by Mr. Motsinger is attached. We have made some supplementary indications on the chart to help tie it into the descriptions in this report. The principal manufacturing operations are:

- 1) Brine treating. All sulfate must be removed and a very dry salt prepared for feeding the sodium cells. Brine is heated and saturated for the caustic cells.
- 2) Downs Cells. In these the dry salt is mixed with some calcium chloride to reduce its melting point, and the melted salt electrolyzed to sodium and chlorine. (The TEL-TML operations use most of the sodium. Most of the chlorine goes to the Hydrocarbon Area for manufacturing solvents, ethylene dichloride, and vinyl chloride. By-product HCl then goes into making ethyl chloride and methyl chloride there for use in the TEL-TML plant).
- 3) Hooker cells. These cells convert a saturated salt solution to caustic soda, hydrogen, and chlorine. At present the crude caustic liquor is shipped to Allied Chemical. The hydrogen is vented. The chlorine goes mainly to Hydrocarbon Area operations. ETC 15453
- 4) Chlorine recovery. The chlorine from the Downs cells is dry, but the considerable water in the hot chlorine from the Hooker cells must be removed in three stages. Part of the dry chlorine is liquefied and filled into tank cars. The remainder goes to the Hydrocarbon Area. E-00519

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II. Materials (Raw, Product, By-product, Supportive)

Brine-treating section

Barium chloride. This is purchased in bags (e.g. from E. Kuhlmann of France) and dumped into a dissolver pit. The solid is dissolved in water heated by injected steam, and stirred by injected air.

Barium sulfate sludge. The sulfate content of the raw brine from Allied is precipitated by addition of barium chloride solution in (five) treating tanks. The resulting barium sulfate sludge is allowed to settle for hauling to a landfill area.

Caustic is added to the tank to overcome the accumulating acidity from the reaction.

Diatomaceous earth is added as an assist just before the filtration of the brine.

Natural gas, fuel for dryers and other operations

Downs Cells section (154 cells, 7 volts/cell) (600°C)

Sodium chloride, dessicated, as feed.

Calcium chloride, solid, added to salt feed for cells

Metallic sodium, mainly used in TEL manufacture. Excess to storage and sales.

Chlorine to chlorine recovery section.

Sodium-calcium sludge is filtered into drums and hauled to river.

Sodium oxide vapors. Most of this is an aerosol, drawn into hoods and exhausted through low chimneys. Released several times a day when cells must be opened. (Face Masks used for personnel protection)

Hooker (Diaphragm) Cells section (132 cells) (550 volts)

Clarified, saturated brine

Hydrogen chloride to reduce pH.

Asbestos for diaphragms.

Anodes, graphite. See Supportive materials.

Cell liquor. Mixture caustic soda plus unreacted salt. Product pumped "across the fence" to Allied Chemical. 11.5% NaOH, 15% NaCl.

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Chlorine, wet, to cooler and dryers.

Hydrogen by-product. To roof vent.

Chlorine Recovery

Chlorine, wet, then dried. Some is liquefied.

Chill Water for 1st stage sweat-out.

Freon in chiller stage.

Sulfuric acid for acid scrub.

"Gunk" from liquid chlorine stripper. This is a mixture of off-gases from caustic cells, and consists of chlorides of nitrogen and carbon. The material is mostly CH_3Cl , CH_2Cl_2 , CHCl_3 , CCl_4 , with small amounts of NCl_3 . Separated as bottoms in the stripper, it is washed with caustic, and scrubbing is sewered. (There are plans to move these bottoms to the HC area for processing).

Supportive Materials

Graphite anode make-up

Spacers
Graphite Sheets
Mastic, heated in box
One cell/day is re-built with new anodes.

Bus bar clean-up and tinning section

HCl troughs }
Copper chloride } for clean-up

Metallic tin }
Metallic antimony } for tinning bars in furnace

Metallic lead, formed into bases of cells for electrical conductor.

Other Supportive and Maintenance Materials

Paint, protective, for bases of diaphragm cells

Paints, other (check with Maintenance)

Roofing Compound

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Lime. 2 million lbs, slurried and also bagged, kept at-the-ready, in case of sodium cell shut-down or spills.

Soda Ash. Scattered on floors, then swept up to maintain dry surface, prevent electrical shock.

Soaps and Cleaners, Misc. (Check with Maintenance)

HTH. Shower sanitizer.

Lubes, Misc. (See also memo DEC/HMT, 10/14/74 on compressor lubes.)

Charcoal. This is dried as a service to HC Area and returned to them.

III. Indicated Problems, Now Under Remedial Study

Sodium Oxide. (See under "Downs Cells")

Brine-treating tanks. Hot, salty mist may be capable of being reduced.

"Gunk" disposal (See under "Chlorine Recovery")

Sodium-calcium sludge disposal. (See under "Downs Cells".)

Attachment: SODIUM AREA (Simplified lay-out of operations)

D.E. Cooper
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SODIUM AREA

