To: R. A. Conrad

From: R. D. Hillman and B. E. Davis
Date: May 18, 1987

Interoffice Communication

Subject: Site Visit to Vulcan Chemicals Liquid Waste Incineration Unit in Geismar, Louisiana

VIST

Richard Hillman and Brian Davis met with Vulcan Chemical personnel and inspected the liquid waste incineration unit at Vulcan Chemicals in Geismar, Louisiana on April 13, 1987. The operations and maintenance problems encountered with this practice were discussed along with the solutions developed to solve them. The personnel at Vulcan were willing to share most of their information and indicated a willingness to provide more if needed if we attempt to incinerate liquid wastes (Heavy Ends) in the VCM Plant Incinerators.

Currently Vulcan purchases Light Ends materials from the VCM Plant, recovering some of the components in one of their solvent processes. They expressed no current interest in accepting our Heavy Ends material, with a major factor being the high sodium concentration present in the Heavy Ends. They were not very optimistic about the success of burning our Heavy Ends material without severe fouling and refractory damage.

Notes from the site visit are attached. Please contact us if you have any questions.

Richard D. Hillman
Process Engineer

Brian E. Davis
Environmental Coordinator

jh
cc: JAD PEM GEH WPS ERT MLA SCR PLF HLH MGH SVC
CRM JCL WLM GWB - Houston

Notes on Inspection of Vulcan
Liquid Waste Incinerator

Participants

Vista - R. D. Hillman (VCM Plant)
B. E. Davis (LCCC)

Vulcan - Martin Rider, Production Manager
Jim Janson , Production superintendent for Utilities
Bennie Garner, Day Foreman for Utilities

General Information

1. Vulcan incinerates several waste solvent streams along with "heavy" (after a solvent extraction process) EDC bottoms materials. Liquid wastes provide about 80-90% of the 15 MM BTU/HR duty.

2. An orifice meter is used to measure the feed rate. Both sides of the meter are manually flushed with a solvent each 2-4 hours to reduce plugging problems.
3. To reduce solids build-up in their flat-bottom feed storage tank they have a 1200 gpm circulation loop with tank spargers to help keep the solids suspended. The tank must still be cleaned out once per year, to remove accumulated solids.

4. Vulcan has a John Zinc incinerator designed primarily for liquids incineration with some vapor vents. It has two feed sections: one has 2 liquid feeds and 1 vapor feed, the other has 1 liquid feed and 2 vapor feeds. The liquid feed lines have simple nozzles while the vapor feed lines have no nozzle, only an orifice.

5. They require no type of particulate scrubber. Apparently the few particulates produced are removed in the HCl recovery section, which Vulcan personnel would not discuss.

6. Their liquid feed material normally has little or no sodium. They once accidently got a small amount of caustic mixed with the feed and within 30 minutes a coating had formed on the waste heat boiler tubes, causing an increase in the effluent temperature.

7. Vulcan currently uses Hastelloy C burner tips which suffer erosion problems caused by feed flashing at the end of the tips. Each tip currently has a 3-4 week service life. They spend about $8M/year for tips. One of their plants is using Zirconium alloy tips with apparently good results. The plant plans to test one of these tips at the Geismar location soon.

8. Vulcan experienced problems with the flame detection scanners due to the movement of the flame. They solved the problem by mounting scanners on the end of the firebox directed length-wise through the combustion section, in a tube identical to the feed nozzles. The felt a side-mounted scanner or a scanner mounted behind a feed tip would be ineffective.

9. Vulcan personnel estimated that the burning of liquid wastes in the VCM Incinerator, even without the high sodium concentration problems would result in a 25-30% increase in annual maintenance costs. Even without a significant sodium concentration in the feed they have to clean the waste heat boiler tubes at least once annually.

10. Major pluggage problems were experienced initially. They currently flush the liquid feed lines at least once per shift with 100-150 gallons of solvent, and also any time that the liquid is shut-off for any reason.

11. They were unable to control the quench rate automatically from the temperature, due to the slow response to any change in feed rate or composition.

12. Due to the characteristics of some of their feed streams Vulcan pre-heats most the feed to about 400°C, using 90-95% steam tracing on the feed lines.

13. All parts (valves, pumps, etc.) are spared to reduce possible down-time.

14. The incinerator refractory material is 86-90% aluminum silicate brick which works well so long as no sodium is present.

15. Currently the Vulcan incinerator is TSCA permitted for PCB's since their feed stream has up to 300 ppm levels of PCB's. They achieved the required 99.9999% destruction efficiency at 900°C (the VCM Plant Incinerator currently operates at 1100°C). Vulcan currently has interim status for burning hazardous waste and is requesting a variance because they are meeting the more stringent requirements of the PCB permit. They also believe that they are exempt as a recycle process and are petitioning the DEQ for this exemption.

16. They monitor continuously for carbon monoxide, oxygen, and VCM and twice daily they pull grab samples to check the carbon dioxide level.

17. Vulcan currently achieves a 98% stream factor when burning liquids and a 99% stream factor while feeding only vent streams. They admitted that it took several years of practice to achieve this performance level.

18. The liquid feed rate is normally 2-3 gpm.

19. A separate incinerator is operated to handle the vent gases from the Oxychlorination Unit.

20. Vulcan burns all of their heavy ends material and has no back-up disposal method. They have the capacity for storing a small (5-7 day) inventory while the incinerator is off-line. Vulcan burns only their own heavy ends.

21. Vulcan has no special instrumentation for burning heavy ends and most of the control, including the air rate, is on manual control.

22. The incinerator is a forced draft type with apparently no fugitive emissions problems from the firebox section.

23. Vulcan personnel were unwilling to discuss the HCl recovery equipment downstream of the incinerator, except to say that no particulate scrubbing equipment was required. We believe that food grade HCl is produced.

To: C. R. Miller

From: B. E. Davis
Date: November 4, 1986

VISTA

Interoffice Communication

Subject: LCVCM Heavy Ends

Per your request (September 29, 1986, IOC from C. R. Miller to R. A. Conrad), the attached table characterizes the LCVCM Heavy Ends. Analyses for EDC, 1,1,2-trichloroethane, and water are performed on each Heavy Ends shipment. The other characteristics are not routinely analyzed for; the typical values and ranges shown are compiled from a limited number of samples (19) taken over the last 10 years.

BFG is experienced in catalytically oxidizing by-product streams similar to our Heavy Ends. In lieu of further analytical work by Vista, BFG may prefer to conduct a test run using our Heavy ends in their Catoxid process. A Heavy Ends sample can be sent to BFG for their preliminary evaluation prior to a test run trailer shipment. Please provide advanced notice of any test run to allow for proper manifesting of the Heavy Ends shipment as it is a characteristic hazardous material.

If additional by-product analysis is needed or if BFG would like a Heavy Ends sample, please contact our Chief Chemist, Paul Fetzer, to arrange it. If I can be of further assistance please do not hesitate to contact me.

Brian Davis

B. E. Davis

cc: RAC PEM GEH MLA WPS PLF SCR
JAD MGH - LCCP
JCL - HOUSTON

LCVCM Heavy Ends Characteristics

Characteristic	Typical	Range	Units
Chlorine	33	25-40	wt.%
Carbon	46	40-50	wt.%
Hydrogen	4.7	4-5	wt.%
Oxygen	3.5	0-7	wt.%
Nitrogen	<0.1	<0.1	wt.%
Sulfur	<0.1	<0.1	wt.%
EDC (1)	12	5-35	wt.%
1,1,2-trichloroethane (1)	15	10-25	wt.%
Water (1)	70	30-140	ppm
PCB's (prior to discounting)	26	2-57	ppm
PCB's Discounted (3)	2.8	0.4-7.6	ppm
Sodium	1000	10-8000	ppm
Copper	22	2.5-100	ppm
Iron	55	10-110	ppm
Miscellaneous Metals (2)	62	10-500	ppm
Viscosity	26	20-40	cps
Net Heating Value	7800	6000-9000	BTU/lb.
Specific Gravity	1.3	1.2-1.4	

Notes: (1) Routine analysis done on each shipment.
(2) Molybdenum, chromium, and nickel.
(3) Discount factors of 50 for monochlorobiphenyls and 5 for dichlorobiphenyls have been applied per 40 CFR Part 761.3(5) (TSCA). The VCM Plant is an inadvertent manufacturer of PCB's but is certified as an excluded manufacturing process.