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11/09/2001 02:17 PM

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Subject: Cordova FC Waste Management Review

As we discussed in our meeting on Monday I am sending you a brief description of a "program" or "project" that I would like to have initiated with respect to fluorochemical wastes. "Fluorochemical Wastes" refers to those materials that are typically placed in drums for disposal off-site. As we continue to push our wastewater capture and collection programs the universe of "Fluorochemical Wastes" is growing along with the attendant costs. First some background....you can skip by the bullet points if you want to get to my recommendations.

- Until the mid-1980's FC wastes were incinerated at Cottage Grove. Due to a growing waste volume and problems with incinerating these waste they began stockpiling FC wastes at Cottage Grove. Incinerating FC's creates HF which has to be neutralized with lime in the wastewater treatment system. You may produce more waste than you had initially. There were various concerns with handling HF and there were concerns with premature degradation of the refractory. Burning HF wastes required a lower burn rate for all wastes. In order to reduce the drum backlog at the Incinerator, they focused on burning wastes that had fewer problems.
- By the mid-1980's there was a significant stockpile of FC wastes at CG. We obtained proposals from a number of waste management companies for the landfilling of these stockpiled drums. These were all hazardous waste landfills that utilize state-of-the-art methods for controlling leachate and stabilizing wastes prior to disposal. We accepted a proposal from USPCI in Lone Mountain, OK and the CG stockpile was transported to that facility over a three month period. In addition we began sending wastes routinely from the SMMD facilities to Lone Mountain.
- There were a series of incidents at Lone Mountain that gradually led to a phase-out in the use of that facility. Some of the drums contained HF which presented industrial hygiene problems which were unique to the Lone Mountain Site. Vigorous acid-base reactions within there solidification pits occurred on two occasions.
- FC wastes have been gradually migrated to WTI. Since the wastes are containerized, industrial hygiene problems have been eliminated and the wastes are easier to manage. The cost is typically around \$0.75/pound. Cordova's annual costs for FC disposal exceed \$1MM.
- One of the strategies for managing FC wastewaters that came out of Jerry Wacker's FC Wastewater Emission Reduction Team was to blending scrap solvents with concentrated FC wastewaters. The mixture, which was typically 1 part FC wastewater and 4 parts scrap solvent, was sent to Continental Cement (CC). At the time, the scrap solvents were already going to CC, so for a small increase in cost we were able to capture these wastewater streams. This program was partially implemented at Decatur but with phase-out announcement it never reached its full potential. In addition, the CG Incinerator's desire to utilize existing scrap solvent streams to fuel combustion was and is at odds with this program since full implementation of the wastewater program would necessarily involve the use of all of the facility's scrap solvent.
- One other item worth noting is that the Incinerator is interested in treating more FC waste since the new facility is better equipped to handle this type of material. The extent to which they will be able to process these materials is unknown at this time.
- As you know, I met with Leif Owens, Lynn Running, and Tom Ashenmacher (CG Incinerator) to review the status of a number of the FC wastewaters that were captured as an outcome of Dan Keller's Drying Team. The plan to have all of these materials burned at Cottage Grove but for a variety of reasons they have all been sent to WTI in East Liverpool, Ohio. One of the problems in this particular case the Waste Stream Profile that was used to manage this material was very general and encompassed many different types of wastes. The Incinerator had no way of knowing that this was a very dilute material that can and will easily managed. I don't think that I'm incorrect in saying that this change will result in a savings to 3M of around \$500,000.

Project Purpose

**Exhibit
1806**

State of Minnesota v. 3M Co.,
Court File No. 27-CV-10-28862

Jos has indicated Cordova would be the right place to start with our program and I agree. The purpose of this effort will be to assure that all FC wastes are responsibly and cost effectively managed. There is no assurance that this effort will reduce our costs. However, since we currently ship just about everything to WTI I think there is a good possibility that our efforts would result in the transfer of wastes to a less costly locations. These would include CG, Continental, and/or a hazardous waste landfill. The two steps are described below:

1. Waste Stream Profile Review

From a regulatory standpoint, most of the existing Waste Stream Profiles are probably adequate. As long as the hazard characteristics are adequately evaluated and described, the other constituents present may be described in very general terms and are usually determined by the needs of a disposal facility. Since many of the wastes are incinerated at WTI this has been acceptable. It may not matter for them to know whether the fluorine content is 5 or 50%. Pat Sheller has a very good system that describes individual process streams. However she converts a number of waste streams and consolidates them into a limited number of FC profiles that have much broader descriptions. These broad descriptions preclude us being more selective in how we might manage individual waste streams. In addition, much of the nomenclature that is used to describe FC wastes is very general and not understood by many of staff functions that manage the waste. "FC inert", "FC surfactant", "FC distillation bottoms" are terms that may be routinely used to describe these streams but they do little to assist the waste management effort. The items addressed would include the following:

- **Creation of a profiles which more specifically describe the waste stream.** Pat Sheller already has a data base that contains this information and the purpose would be to provide the Incinerator (or Reverse Supply Chain Department) with better information on the contents of each container.
- **Development of required physical/chemical information.** In order to link a waste with the proper management method, i.e. landfill, incineration, fuel blending, you need some general information on the waste's characteristics. This would include F content, HF content, heating value, water content, pH, physical consistency, vapor pressure, as well as any non-FC constituents that may be present. I haven't reviewed Pat's data base with respect to this information and much of this information may already be available. Where it is lacking we could utilize the process engineers and the lab to provide the necessary information. I would anticipate that the analytical testing that would be required would be minimal.
- **Education and Training.** Terms like "FC inerts" have inherent meaning to FC scientists and engineers. From a waste management standpoint it tells me that you have a material that is volatile and not miscible with many solvents. If we continue to use this type of nomenclature in describing these wastes, then we need to make sure that the waste management arm understands it as well.

2. Waste Management Review

The second goal of the program would be to link specific waste streams with the appropriate management method. Specific management methods include:

- **Cottage Grove Incinerator.** The information obtained during the profile review would allow the CG Incinerator to determine which wastes it would manage internally. More importantly it would tell them the appropriate means for delivering it to the combustion system.
- **Outside Incineration.** The information obtained during the profile review would allow the CG Incinerator to determine which wastes it would not manage internally. These might be highly concentrated waste streams that would generate significant quantities of secondary waste.
- **Fuel blending/cement kilns:** This approach was pursued for the disposal of concentrated FC wastewaters but it could have application for a number other waste streams. Unlike incinerators, cement kilns are not adversely affected by high concentrations of fluorine and by identifying the proper solvents we may be able to better exploit this disposal method.
- **Landfill:** Hazardous waste landfills employ state-of-the art methods for stabilizing wastes and controlling leachate. This may not be an appropriate disposal method for all FC wastes, but if an FC constituent can be sufficiently immobilized into eh solidification process it may provide an adequate

method of disposal. We may be required to do some research on the appropriate chemical fixation methods.

I don't anticipate that this will take an enormous amount of time. A focused effort by a limited number of parties can accomplish what I've described in fairly short order. Outside of the Corodva plant staff I would include Tom Ashenmacher from the Incinerator (and anyone else they designate) and myself. I can't guarantee that we will save some money but at a minimum we will have generated information that will make the disposal decisions safer and more scientific.