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# RESPONSES TO TELEPHONE CONVERSATION CONCERNING THE HYDROFLUORIC ACID TANK CAR CLOSURE PLAN INFORMATION AND DATA AND PROPOSED HYDROFLUORIC ACID NEUTRALIZATION SYSTEM

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RESPONSES

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DOE-0145-95

Mr. Mark Metcalf
Hazardous and Solid Waste Division
Ohio Environmental Protection Agency
401 East Fifth Street
Dayton, Ohio 45402-2911

Dear Mr. Metcalf,

**RESPONSES TO TELEPHONE CONVERSATION CONCERNING THE HYDROFLUORIC ACID TANK CAR CLOSURE PLAN INFORMATION AND DATA AND PROPOSED HYDROFLUORIC ACID NEUTRALIZATION SYSTEM**

This letter is in response to your telephone conversation on October 18, 1994, with Mr. John Lippitt, Fernald Environmental Restoration Management Corporation (FERMCO) Project Manager for the Hydrofluoric Acid (HF) Tank Car Closure. In your conversation, you requested additional information to facilitate your review and approval of the revised Closure Plan Information and Data (CPID) submitted in July, 1994. The following enclosures have been prepared in response to your request:

Enclosure 1: A review of controls and requirements for operating the HF Neutralizations System to be used for elementary neutralization of the HF wastes being stored in the HF Tank Car.

Enclosure 2: Regulatory discussions supporting why fluoride is not a constituent of concern for evaluating contamination and declaring clean closure of soils associated with the HF Tank Car Hazardous Waste Management Unit (HWMU).

Enclosure 3: A copy of the July 27, 1994, letter submitting the revised CPID and addressing other HF residues in a portable tank (dumpster) and a "Resource Conservation and Recovery Act, 1976 (RCRA) empty" rail car currently located in the same secondary containment area as the HF Tank Car.

If you have any questions or need additional information, please contact Mr. John Sattler at (513) 648-3145.

Sincerely,

Wally Quaider

W. J. Quaider
Acting Associate Director
Office of Safety & Assessment

FN:Sattler

Enclosures: As Stated

Recycled and Recyclable

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M. Yates, FERMCO
Operating Record, FERMCO
Closure Files, FERMCO

ENCLOSURE 1: OVERVIEW OF HF NEUTRALIZATION SYSTEM OPERATING REQUIREMENTS

# OVERVIEW OF HF NEUTRALIZATION SYSTEM OPERATING REQUIREMENTS

The following is an overview of the operational controls specified in the final design and the anticipated operating conditions for system start up. The anticipated control settings are based on bench-scale testing. The final control settings used will be based on information obtained during system testing and start up.

The tank to be used for neutralization is a previously unused tank in the Tank Farm Area north of Plant 4. The tank is a 1,400 gallon carbon steel tank with a rubber liner that was designed and installed in 1989 for HF neutralization as part of a Tank Farm Upgrade Project. The tank was constructed with three baffles, each 8 inches in width and spaced at 120-degree intervals in the tank. The tank is equipped with an agitator constructed with two sets of 25-inch diameter axial-flow turbine blades capable of rotating at a speed of 84 revolutions per minute (rpm). An electric variable speed drive is being installed to vary the agitator speed from 20 to 84 rpm while maintaining an output torque sufficient to turn the agitator. The existing 1.5 HP motor meets the calculated requirements for agitating the neutralized slurry at the maximum speed of 84 rpm. The tank lid is bolted to the top of the tank and is constructed in 2 sections. There are 13 openings on the tank including an overflow line, a bottom discharge\recirculation line, a 12 inch by 12 inch inspection opening and 11 flanged nozzles on the lid of the tank to be used for venting, lime\calcium carbonate feed inlet, the agitator shaft, and installation of control instrument sensors. The tank has sheet metal and fiberglass insulation jacketing.

Prior to using the system, the sheet metal and fiberglass jacketing on top of the tank will be removed to allow inspections and access into the neutralization tank. The tank will be inspected to verify the integrity of the baffles and liner. The acid inlet line will be extended to approximately 12 inches above the tank bottom. An elbow will be installed on the discharge piping to extend the discharge pipe inlet from its current 8 inches on center from the bottom of the tank to within 2 inches of the bottom. The motor will be tested and the agitator configuration of the neutralization tank will be inspected and verified. All piping and connections not required for the neutralization will be removed or blanked to prevent undesired flow and to create a piping system isolated from all other existing FEMP piping systems. Testing of the tank and piping systems will be done in accordance with DOE and FEMP standards and will be described in detail in the start up/testing procedures.

The HF transfer system being installed consists of a Teflon diaphragm metering pump with a Kynar liner for use with HF solutions, Kynar connecting piping to and from the metering pump, and existing Teflon-lined (PTFE) carbon steel transfer piping leading to the neutralization tank. The metering pump will be set to transfer the HF to the neutralization tank at a rate of 1.7 gpm. A rotameter will be installed in the HF transfer line to monitor the HF flow rate to the neutralization tank. The pump pressure regulator will be set for a maximum 50 psi. If the pressure exceeds 50 psi, an internal pressure relief valve will be activated to recirculate the HF to the suction side of the pump. The internal recirculation prevents excessive pressure in the HF transfer system without atmospheric releases of HF.

Prior to use, all necessary piping modifications will be made to isolate the transfer lines and the lines will be connected to the HF metering pump. New Kynar piping will be used to connect the metering pump inlet to the existing Teflon-lined HF Tank Car off-loading pipe connection. New Kynar piping will also be used to connect the metering pump discharge to the existing PTFE transfer piping. The PTFE transfer piping was installed during the 1989 Tank Farm Upgrade. The existing PTFE piping to the neutralization tank will be modified to provide isolated direct piping from the HF Tank Car to the neutralization tank. Acid-indicating flange and fitting covers will be installed to allow immediate leak detection to minimize potential HF releases and exposures. The transfer system piping will be hydrostatically tested to 75 psi after the HF transfer system installation has been completed, but prior to start up. This is 150% of the maximum design pressure of the transfer system using the metering pump with the operating control set at 50 psi. The metering pump will be tested to verify pressure and flow rate settings.

The potable water feed to the neutralization tank is regulated by a batch controller that is interlocked with an actuated solenoid valve. The actuated valve will shut off the water feed when 968 gallons of water have been introduced to the neutralization tank. The water feed line is also equipped with a backflow prevention device.

Instruments will be installed on the tank to monitor pH, temperature, level, and pressure. These instruments will be equipped with switches and transmitters interlocked to the HF transfer metering pump and an actuated solenoid valve on the suction side of the pump to control the transfer of HF from the HF Tank Car to the neutralization tank. The HF transfer pump and actuated valve on the transfer line cannot operate or will be shut off when the instrument measurements are beyond the operating ranges. An alarm will also sound if the temperature. pH or liquid level in the neutralization tank exceeds preset limits. Redundant instrumentation will be provided to monitor and control the neutralization tank pH, temperature, and liquid level. A strip chart recorder will be installed to provide a constant readout of system conditions. The pH will be monitored between 0 and 14, temperature between 6°F and 200°F, tank level between 0 and 100 percent, and pressure between 0 and 60 inches of water.

The liquid level monitoring instrument on the tank will be equipped with a low and high level switch. The low level switch is interlocked to both the lime\carbonate bag slitter and dry powder feed system and to the HF transfer pump and actuated valve. This prevents the addition of lime and carbonate and HF when there is no water in the neutralization tank. The low level switch will be set at approximately 2 feet from the bottom of the tank (or one half the batch depth of four feet). The high level switch is interlocked to both the HF transfer and water feed systems to prevent tank overflow through excessive addition of HF or water. Under normal operations, a 12 inch freeboard will be maintained in the neutralization tank. The tank overflow line will be modified to overflow if the liquid level reaches within 2 inches of the top of the tank. The high level switch will be set at approximately 6 inches from the top of the tank. The overflow line will be extended just under the surface of a shallow lime solution contained in the bottom of a 55 gallon drum.

The pH instrument will be calibrated to prevent HF addition when the pH measurement falls below 6. In addition, if the pH falls below 5, an alarm will sound to alert the operator to potential low acid conditions. After the HF flow is stopped, the slurry will be agitated for 15 minutes and the HF feed pump and valve will be restarted by the operator if the pH rises above 6. The cycle will be repeated until the pH remains between 5 and 6 for fifteen minutes after the last addition of HF.

The high temperature switch will stop the addition of HF if the internal temperature of the tank contents exceed 140°F. The maximum temperature allowed for the rubber tank lining is 200°F (based on information provided by the manufacturer). In bench-scale testing under simulated adiabatic conditions, the temperature of the neutralization mixture reached a maximum of 106°F when the starting temperature of the water was 68°F.

The pressure instrument is provided as a safety back up in the unlikely event that the tank vent and overflow become clogged. Carbon dioxide gas will be released from the tank during the neutralization of the HF. The release rate of carbon dioxide is estimated to be 10 cfm at an HF addition rate of 1.7 gpm. A process vent will be installed on the tank to prevent the occurrence of positive pressure in the tank during operation. A ventilation stack with a length of 20 feet and a diameter of 6 inches will not allow the pressure to rise more than 0.1 inches of water above atmospheric pressure when the carbon dioxide release rate is four times this rate or 40 cfm. The outlet of the vent will be located to disperse the carbon dioxide gas in such a way as to prevent the creation of an oxygen-deficient pocket of air that might be hazardous to exposed personnel.

To prevent the venting of possible HF vapors, the HF will be added through a dip tube into the tank that will terminate at a distance of 12 inches above the tank bottom. The HF leaving the dip tube will be mixed and neutralized with the tank contents before volatilization of the HF can occur. The design of the HF feed was based on an evaluation of the potential for carbon dioxide bubbles formed during the neutralization reaction to provide a transport mechanism for HF vapors from the tank. An evaluation was done on the rate at which HF vapor present in the bubbles might leave the bubbles and be neutralized prior to the bubbles reaching the surface of the tank contents and leaving the tank. The evaluation showed that the $CO_2$ bubbles would be relatively small due to the mechanical agitation present in the tank and that they would rise through the tank contents relatively slowly due to the significant viscosity of the tank contents. Any HF vapor contained within a bubble would be immediately transported out of the bubble and neutralized when the bubble was exposed to unreacted calcium and lime slurry. Therefore, the carbon dioxide gas leaving the neutralization tank would be effectively scrubbed by the tank contents and would be essentially free of HF vapor as long as the acid condition in the neutralization slurry are controlled as described above.

During the 1989 Tank Farm Upgrade Project, a lime addition system was also constructed over the top of the neutralization tank which includes a bag slitter, dust collector, and lime feeder. The lime and calcium carbonate will be delivered to the feeder in 60- or 100-pound sacks that will be manually fed into the bag slitter. The bag contents will be fed into the lime storage hopper and

then into the neutralization tank at a rate determined by the speed of the lime feed screw. A total of 268 pounds of calcium carbonate and 625 pounds of lime will be used for a typical neutralization batch. At an assumed bulk density of these solids of 40 pounds per cubic foot, the solids will need to be added at a minimum addition rate of 0.40 cfm to add all of the solids in 1 hour or less.

Prior to use, a new lime feed screw and cylinder will be installed to provide solids addition at the rate of 0.40 cfm. There is currently a variable speed control for the lime feed screw that is controlled by a programmable logic controller. This system will be revised to eliminate the controller and convert the lime feed screw to a manually controlled variable-speed operation. This will assist in optimizing the addition of neutralization solids and reducing the neutralization batch time as much as possible. The dust collector system installed on the lime addition system will be energized and tested. Filter bags and other system components will be replaced or repaired as required to restore operation of the dust collection unit.

After neutralization, the non-hazardous, reacted slurry will be pumped into portable tanks and transferred to Plant 8 for filtration. Up to five 1,150 gallon batches of neutralized slurry will be accumulated in an agitated holding tank in Plant 8. The slurry will be segregated and filtered separately to minimize the mass loading of fluoride to the FEMP waste water treatment system (WWTS). Based on bench-scale test results, the filtered solids will be non-RCRA hazardous low-level radioactive wastes and the filtrate will be suitable for discharge to the FEMP WWTS general sump. The filtered solids and filtrate will be tested to confirm disposal requirements before final disposition.

The HF Neutralization System will be operated by certified Hazardous Waste System Operators. Operator training and certification will be conducted in accordance with DOE and FERMCO training requirements. When in operation, a Certified Operator will be assigned to each subsystem (i.e., the lime\calcium carbonate feed system, the neutralization tank system and slurry transfer slurry system, and the HF transfer system). A field supervisor will monitor conditions and provide an interface for coordination with FEMP field support services and the Project Manager and Design Engineers.

Operations will not be conducted when weather conditions present unacceptable risks to personal safety and health (e.g., excessive ice build up on elevated walkways to access the HF Tank Car) or temperatures exceed operating ranges of equipment (e.g., metering pump recommended operating range is from 35° to 125°F). The system start up and operating procedures will identify weather conditions that will prevent processing. However, if weather conditions deteriorate after processing has been initiated and freezing is a concern, the slurry will be removed from the neutralization tank before the end of the work shift.

ENCLOSURE 2: REGULATORY BASIS FOR NOT INCLUDING FLUORIDE AS A CONSTITUENT OF CONCERN IN THE CLOSURE PLAN INFORMATION AND DATA

**REGULATORY BASIS FOR NOT INCLUDING FLUORIDE AS A CONSTITUENT OF CONCERN IN THE REVISED HF TANK CAR CLOSURE PLAN INFORMATION AND DATA SUBMITTED IN JULY 1994**

Additional information was requested to explain why fluoride was not a constituent of concern (COC) for the HF Tank Car soils. This seemed to be inconsistent with using fluoride as a COC was for rinseates during closure of the Drummed HF Residue and Associated Storage Areas Inside Plant 4 (HWMU No. 6).

Fluoride was not included as a constituent of concern in the July 1994 revision to the HF Tank Car CPID because the HF managed in the HWMU is not a listed hazardous waste and fluoride is not listed as a hazardous constituent in OAC 3745-51-11 (40 CFR 261 Appendix VIII). The basic difference between the HF Tank Car and HWMU No. 6 inside Plant 4 is the hazardous waste listing criteria in OAC 3745-51-33 (40 CFR 261), as it applies to the wastes involved. The wastes managed in HWMU No. 6 were wastes from the clean out of an anhydrous hydrofluoric acid product tank and were declared to be a listed RCRA waste (U134) based on OAC 3745-33(C) (40 CFR 261.33(c)). Accordingly, the CPID for HWMU No. 6 included evaluation of fluoride as a decomposition product of a listed waste. The HF in the HF Tank Car is a recovered production process residues and, under OAC 3745-51-33(G) (40 CFR 261.33(d)), it is not a listed hazardous waste and fluoride from the HF in the HF Tank Car is not a decomposition product from a listed waste.

The requirements for RCRA Corrective Action were also reviewed to verify that fluoride should not be a constituent of concern for closure of the HF Tank Car. It was determined that Corrective Actions for fluoride are not required for closure of the HF Tank Car, based on the information provided in pages 16-18 of the September 1, 1993, Ohio EPA Interim Final Closure Plan Review Guidance for RCRA Facilities (OEPA Closure Guidance). This determination was based on these two findings:

1. Since the wastes in the HF Tank Car are not listed hazardous wastes and do not contain hazardous constituents, the only continuing concern is the potential release of corrosive hazardous waste (D002) from the HF Tank Car. Therefore, pH is a sufficient indicator parameter to assess the impact and need for remediation of contamination in soils within the HF Tank Car HWMU.

   Section 2.9, Paragraph 1, <u>Corrective Action/DERR Referral for General Contamination</u> of the OEPA Closure Guidance, "requires owners/operators to identify, investigate, and remediate, if necessary, releases of hazardous waste or hazardous waste constituents...." Fluoride is not a constituent of concern and the use of pH testing is sufficient because:

   a. Based on laboratory analysis, the HF in the tank car was determined to be hazardous only for RCRA corrosivity (D002).

   b. The HF in the tank car is a recovered from a processed material. In accordance with OAC 3745-51-33(G) (40 CFR 261.33(d)), a manufacturing process waste is not subject to the RCRA listing unless it is identified under K-series or F-series hazardous waste code listings. HF is not listed as a hazardous constituent in 40 CFR 261 Appendix VII which identifies the basis for the K- or F-series hazardous waste listings.

c. Fluoride is not a hazardous constituent listed in OAC 3745-51-11 (40 CFR 261 Appendix VIII) and it is not listed as a hazardous constituent in the Ground Water Monitoring List in the Appendix to OAC 3745-54-98 (40 CFR 264 Appendix IX).

d. Fluoride is not included in Table 302.4 - List of Hazardous Substances and Reportable Quantities in 40 CFR Part 302.

2. There is no evidence, or reason to suspect, that there have been any releases of HF from the HF Tank Car after the residues became subject to regulation as a corrosive hazardous waste. In addition, there are other sources of fluoride that make it unsuitable for evaluating impacts of potential releases from the HF Tank Car.

Paragraph 3 of Section 2.9, in the OEPA Closure Guidance states, "To prove that soil contamination is from a source different from the RCRA Unit being closed, the owner/operator, at a minimum, must a) identify an alternative source(s) of contamination, b) document no release(s) from the unit, and c) include arguments for one of the following possibilities: (i) contamination is ubiquitous; (ii) no statistical difference in the soil; or, (iii) mass balance analysis." Accordingly, the following arguments have been provided.

a. *Alternate Sources* - Fluoride in the soil may have originated from the following sources:

i) De minimis losses resulting from reuse/resale activities during production that were not regulated under RCRA;
ii) Emission blow down from Plant 4 hydrofluorination production processes;
iii) Activities at the site prior to RCRA enactment;
iv) CERCLA regulated contamination sources; and,
v) Naturally occurring sources, such as calcium fluoride and sodium fluoride.

b. *Document No Releases* - In October 1988, the HF in the HF Tank was returned from a prospective buyer and placed into storage pending reuse or resale. The HF has not been removed from the HF Tank Car since the speculative accumulation limit was exceeded and it became regulated as a hazardous waste for corrosivity (D002). There are no spills event reports indicating that there have been any releases from the HF Tank Car. In addition, ultrasound tests and visual inspections were conducted in March\April of 1994. The test and inspections confirmed the integrity of the tank and found no evidence of leaks or spills from the HF Tank Car.

c. *i) Ubiquitous Contamination* - It is reasonable to assume that the cumulative impact from airborne contaminants over 30 plus years of operation has resulted in widespread dispersion of fluoride contamination in the Tank Farm Area soils. The original design used a common drainage collection system for the rail lines and HF Tank

Car and Anhydrous Hydrofluoric Acid (AHF) and HF process storage tanks located within the Tank Farm Area. During periods of heavy precipitation, contamination from de minimums material handling losses during production would have dispersed fluoride contamination through the Tank Farm Area soils. In addition, the Tank Farm Area is located across 2nd Street, approximately 300 feet North of Plant 4. Hydrofluorination process operations were conducted in Plant 4 during uranium production.

*ii) No Statistical Differences* - The soils sampling and pH analyses conducted in June 1994, support the assertion that no HF has been released from the HF Tank Car. No statistical difference have been identified during the soil pH analysis between the soil underlying the unit and nearby soils.

ENCLOSURE 3: JULY 27, 1994 TRANSMITTAL LETTER FOR THE HF TANK CAR CPID

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ENV. ENG. SDS DEPT

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JUL 27 1994

DOE-2152-94

Mr. Thomas Crepeau
Data Management Section
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43266-0149

Dear Mr. Crepeau:

**TRANSMITTAL OF REVISED RESPONSES TO COMMENTS AND REVISED CLOSURE PLAN INFORMATION AND DATA FOR THE HYDROFLUORIC ACID TANK CAR**

References: 1) Letter, D. R. Schregardus to R. J. Hansen, "Notice of Deficiency," subject Closure Plan U.S. Department of Energy - Fernald Environmental Management Project, dated October 4, 1993

2) Letter, DOE-0278-94, J. P. Hamric to T. Crepeau, "Transmittal of Response to Comments and Revised Closure Plan Information and Data for the Hydrofluoric Acid Tank Car," dated November 10, 1993

3) Letter, M. W. Metcalf to W. J. Quaider, "HF Tank Car Closure Plan Extension Request," dated May 2, 1994

Enclosed are revised responses to the October 4, 1993, Notice of Deficiency (NOD) comments and a copy of the revised Closure Plan Information and Data (CPID) for the Hydrofluoric Acid (HF) Tank Car, Hazardous Waste Management Unit No. 38, at the Fernald Environmental Management Project (FEMP). The revised comment responses and CPID document have been prepared to replace the previous CPID Revision 2, originally submitted to the Ohio Environmental Protection Agency (OEPA) on November 10, 1993.

In addition to revising the CPID in response to the NOD comments, a limited number of other changes have been incorporated in the CPID to reflect activities and refinements that have occurred since November 1993. The CPID has been revised to reflect the April 14, 1994, movement of the HF Tank to the Main Tank Farm secondary containment area. Analysis of soil samples underneath the HF Tank Car were completed in June 1994, in accordance with the CPID, and the analytical results, along with the statement that further soil remediation activities should not be necessary, has been incorporated into the document. In addition, based upon safety considerations and information obtained from the bench scale test completed on May 18, 1994, the HF Tank Car

neutralization solution spray flush has been replaced by a water spray flush. Accordingly, because use of a water spray flush will not precipitate solids, the discussion that a remote camera will be used to look for solids inside the tank car has been struck from the CPID. Lastly, as discussed in Section 3.4 of the CPID, the HF neutralization system will be maintained in operating condition for use in support of Safe Shutdown under Removal Action 12.

Presently, there are two containers of HF material being evaluated under Safe Shutdown, Removal Action 12, to determine if the contents will require treatment by the HF neutralization system. These containers are a 500 gallon portable tank (dumpster) containing an estimated 400 gallons of suspected HF residues, and a second tank car that has been declared "empty", but may contain a small amount of HF residue. Both containers have been relocated to the Main Tank Farm secondary containment area with the HF Tank Car. Sampling and analysis of the residues will be completed in August 1994.

If you have any questions regarding this resubmittal of the HF Tank Car CPID, please contact John Sattler at (513) 648-3145.

Sincerely,

Wally Quaider

Walter J. Quaider
Acting Associate Director
Safety, Operations and
Technical Support

FN:Sattler

Enclosure: As Stated

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