United States of America v. Magnesium Corp. of America, et al. Case No. 2:01CV0040B Consent Decree

Appendix No. 3

Filtration System Design, Construction and Operation Plan

APPENDIX 3

FILTRATION SYSTEM DESIGN, CONSTRUCTION AND OPERATION

Purpose

The purpose of the filtration treatment system (Filtration System) is to remove chlorinated hydrocarbons (CHCs) from several acidic wastewater inflows described below. The system will use a pressure filtration process consisting of diatomaceous earth (DE), pre-coated plate and frame filters. The system will not be required to include a secondary filtration or carbon polishing process step. The input wastewater and certain process water will be piped to gravity feed the Filtration System in order to remove chlorinated hydrocarbons by forming a filter cake. The filter cake will be disposed in accordance with RCRA regulations.

Streams to Be Filtered

The liquid wastewater and product streams that will be filtered originate from the Melt/Reactor and Electrolytic process areas, and wash-down of those operating areas as detailed below. CHCs, consisting of hexachlorobenzene, polychlorinated biphenyls, dioxins and furans, are formed in the chlorine rich off-gas streams from these process areas. Process water used to cool and scrub these off-gas streams is acidified by the absorption of hydrogen chloride gas. Particulate material containing the CHCs is entrained in the cooling/scrubbing liquors. Washdown water from these operating areas could potentially contain CHC-laden dust, and will be filtered prior to discharge to the wastewater pond.

Reactor Acid

The off-gas from the melt/reactor process contains chlorine, hydrogen chloride and condensed salt and oxide particulate. The CHCs are formed as the gas cools while passing through the off-gas ductwork. The CHCs adhere to the particulate in the gas stream (reactor dust).

The off-gas from the melt/reactor is first processed through a series of Ducon scrubbers. These scrubbers absorb hydrogen chloride and reactor dust. Following the Ducon scrubbers the off-gas is routed to the Chlorine Reduction Burner (CRB) which converts residual chlorine gas to hydrogen chloride which is absorbed in the recirculating scrubber liquor. The hydrogen chloride produced by the CRB and residual entrained reactor dust is further removed in a series of three packed bed scrubbers before passing through a high-energy venturi scrubber (specifically designed for particulate removal). The exhaust is then vented to the main stack.

The hydrochloric acid recovered by the scrubbers is utilized in the process as cooling water, used as a reagent to produce ferrous chloride product, and used as a reagent to produce calcium chloride feedstock/product. Excess hydrochloric acid solution not otherwise utilized will be filtered prior to discharge to the waste impoundment.

The Filtration System will process two separated streams, one for feedstock acid that will be returned to the process and one for acidic wastewater that will be discharged to the waste impoundment. Reactor (feedstock) acid will be filtered prior to use in production of ferrous chloride and calcium chloride. Acidic wastewater (i.e., excess reactor hydrochloric acid

solution) will be filtered prior to discharge to the wastewater impoundment (aka Retrofitted Waste Pond when completed).

Spent Liquor Tank

The off-gas stream from the electrolysis of the magnesium chloride contains chlorine gas, condensed salts, metal and oxide particulates. The CHCs are formed as the gas cools while passing through the chlorine gas cooling boxes and ductwork. The CHCs adhere to the particulate in the gas stream (anode dust).

The spent liquor tank receives wastewater from the electrolytics process areas. The wastewater is primarily generated by the wet system that sprays cooling water into the chlorine gas stream and dissolves and removes anode dust from the chlorine gas headers. The spent liquor tank, which is approximately 2,500 gallons in size, discharges from the tank through a single pipe that will be combined with the melt/reactor acidic wastewater stream for filtration prior to discharge to the wastewater impoundment.

Wash-Down Water

Operating areas in the melt/reactor and electrolytics are regularly washed down to remove corrosive salts and acid. The wash-down water may contain CHCs from either anode or reactor dust. The wash-down water may combine with acid from process areas that contains CHCs associated with either anode or reactor dust.

The wash-down water will be combined with the spent liquor tank and melt/reactor acidic wastewater stream for filtration prior to discharge to the wastewater impoundment.

Scope

The development of the Filtration System consists of three tasks: I) design of the Filtration System, II) construction of the Filtration System, III) reports.

TASK I. FILTRATION SYSTEM DESIGN

1. In accordance with the Project Compliance Schedule (Appendix 14 of the Consent Decree), USM will submit preliminary and final designs and specifications for the Filtration System to EPA for approval. The preliminary design will contain the following project management and system design elements:

- a. Documentation of the overall management strategy for performing the construction, operation, maintenance, and monitoring of the system.
- b. Description of the responsibility and authority of key personnel involved with the implementation.
- c. Description of the qualification of key personnel directing this effort, including contractor personnel.
- d. Preliminary design of the Filtration System to be installed as set forth in the Consent Decree and herein.

- e. A schedule and list of tasks for final design, start of construction, and operation of the Filtration System.
- f. Detailed performance criteria for wastewater treatment.
- g. A description of how the preliminary design is expected to meet the performance requirements set forth in Paragraph 15 of the Consent Decree.

2. The Filtration System design deliverables will consist of Design Plans and Specifications. USM will submit to EPA for approval in accordance with the Project Compliance Schedule (Appendix 14 of the Consent Decree) design plans and specifications (in both preliminary and final forms) which include, but are not limited to, the following:

- a. Discussion of design strategy and the design basis to include updated schedules and compliance with performance requirements set forth in Paragraph 15 of the Consent Decree.
- b. Discussion of important factors including (1) effectiveness of treatment technology, (2) the constructability of the design, and (3) use of currently accepted construction practices and techniques.
- c. Description of assumptions made and detailed justification.
- d. Detailed drawings of proposed design including a process flow diagram.
- e. Site map showing the location of treatment units and associated piping.
- f. A listing of all input wastewater streams and description of the industrial processes and locations where the wastewater is generated.
- g. For each wastewater input stream, the flow in gallons/year, the duration and events, and provide a description of all piping, storage vessels, transfer stations or any other ancillary equipment.
- h. A detailed description for each step of the wastewater treatment process. This includes a description of storage, mixing, treatment and discharge.

3. USM will submit for EPA approval in accordance with the Project Compliance Schedule (Appendix 14 of the Consent Decree) an Operation and Maintenance (O & M) Plan to address the implementation and long-term maintenance of the Filtration System. The O & M Plan will identify and describe the process, documentation required during O & M, and schedule for O & M activities. The O & M Plan will include but is not limited to the following elements:

- a. A description of the procedures to collect, analyze and dispose of filter cake and any other solid wastes generated by the process.
- b. Description of routine O & M including tasks required to operate and maintain the Filtration System and a schedule showing frequency and duration of each O & M task.

- c. Description of potential operating problems including procedures to be used to analyze and diagnose potential operational problems, sources of information regarding problems, description of means to detect problems and common or anticipated trouble-shooting steps and remedies.
- d. A description and schedule of all sampling, monitoring, required laboratory analysis and their reporting, description of quality control/quality assurance, data analysis to demonstrate effectiveness of the Filtration System and compliance with the terms of the Consent Decree.
- e. Description of a contingency plan to be used should systems fail, including alternate procedures to prevent undue hazards, an analysis of vulnerability, and additional resource requirements should a failure occur.
- f. A Health and Safety Plan or Standard Operating Procedure that includes a description of precautions for specific equipment and preventive measures to minimize exposure to contaminants for site personnel.

4. USM will submit for EPA approval in accordance with the Project Compliance Schedule (Appendix 14 of the Consent Decree) a Construction Quality Assurance Plan. The Plan will identify and document the framework and components of a construction quality assurance program including but not limited to the following: responsibility and authority, personnel qualification, inspection and testing activities, sampling and testing requirements, and documentation and reporting.

Design Phases – The design of the Filtration System will include the phases outlined below:

a. Preliminary (30%) Filtration System Design

(1) USM will submit for EPA approval in accordance with the Project Compliance Schedule (Appendix 14 of the Consent Decree) the Preliminary Filtration System Design Report when the design effort is approximately 30% complete. At this stage USM will have field verified the existing conditions at the site. The 30% design will reflect a level of effort such that the specifications may be reviewed to determine if the final design will provide an effective and operable treatment system. Supporting data and documentation will be provided with the design documents defining the functional aspects of the treatment system. The 30% construction drawings will reflect organization and clarity.

(2) USM will prepare and include in the technical specifications governing the treatment system, contractor requirements for providing appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

b. Final (90%) Filtration System Design

The Final Filtration System Design Report will consist of the final design plans and specification (90-100% complete), the Final Operation and Maintenance Plan, Final Construction Quality Assurance Plan, Final Project Schedule, and Final Health and Safety Plan. The quality of the design documents should be such that USM could include them in a bid package and invite contractors to submit bids for the construction project.

Task II. FILTRATION SYSTEM CONSTRUCTION

Following EPA approval of the Final Filtration System Design Report, USM will implement construction in accordance with the procedures and specifications in the Report and EPA-approved Filtration System Work Plan, and in accordance with the Project Compliance Schedule (Appendix 14 of the Consent Decree). During the Construction Phase, USM will implement the elements of the approved Construction Quality Assurance Plan and Operation and Maintenance Plan, as necessary and appropriate.

Inspections:

- uSM will conduct periodic inspections to monitor the construction and/or installation of components for the Filtration System. Equipment will be operationally tested.
 uSM will certify that the equipment has performed to meet the purpose and intent of the specifications. Re-testing will be completed when deficiencies are revealed.
- b. When all construction is complete, USM will notify EPA for the purposes of conducting a final inspection. The final inspection is to determine whether the project is complete and consistent with contract documents and requirements of the Consent Decree.

Task III: REPORTS

USM will submit in accordance with the Project Compliance Schedule (Appendix 14 of the Consent Decree) plans, drawings, specifications and reports set forth in Tasks I through II, above, to document the design, construction, operation, maintenance and monitoring of the Filtration System.

Deliverables

- Preliminary Filtration System Design Report
- Final Filtration System Design Report

The Final Filtration System Design Report will include a certification of truth, accuracy, and completeness by the Project Coordinator in accordance with Paragraph 64 of the Consent Decree.