



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
RESOURCE CONSERVATION AND RECOVERY ACT**

GENERAL INFORMATION

Facility Name: US Magnesium, LLC

RCRA ID: UTD000690867

Facility Location:

12819 North Skull Valley Road, Rowley, UT
84029, Lat./Long.: 40.913756, -112.734511

Facility Contact:

Jeffrey Mensinger, Environmental Manager,
(801) 433-4086

Mailing Address: 238 N 2200 W, Salt Lake City,
UT 84116-2921

RCRAInfo Notification Status:

Large Quantity Generator

Date of Inspection: April 27, 2023

Arrival Time: 8:30 a.m.

Departure Time: 3:15 p.m.

Lead Inspector & Report Author: Annette Maxwell, U.S. EPA RCRA Inspector

Inspection Attendees:

1. Jackie Vega, U.S. EPA
2. Jeffrey Mensinger, Environmental Manager, US Magnesium (USM)
3. Roger Francom, Senior Environmental Coordinator, USM

Additionally, the following staff were present for limited portions of the inspection:

1. Brad Drayton, Engineer, USM
2. Anthony Smith, Chemical Supervisor, USM
3. Trent Loomis, USM

Type and Purpose of Inspection: Compliance Schedule Evaluation (CSE)

Facility Type: Primary Magnesium, Biennial Report NAICS: 33141 - Nonferrous Metal (Except Aluminum) Smelting and Refining

Applicable Regulations: Inspection Authority of RCRA §3007; Consent Decree, Case No. 2:01CV0040B, including projects underway pursuant to Section VI (RCRA Work Requirements) and Paragraph 12 re: compliance with applicable regulations including R315-260 to R315-273 of the Utah Administrative Code (UAC) and R315-15 of the UAC

Inspection Type: Announced Inspection

Disclaimer

This report is a summary of observations and information gathered from the facility at the time of the inspection. The information provided does not constitute a final decision on compliance with RCRA

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regulations, nor is it meant to be a comprehensive summary of all activities and processes conducted at the facility.

BACKGROUND INFORMATION

Regulatory Status

According to the RCRAInfo database, US Magnesium is a small quantity generator (SQG) of hazardous waste. During the inspection, Mr. Mensinger and Mr. Francom confirmed this generator status. During previous inspections the facility's generator status was Large Quantity Generator.

Facility and Process Description

US Magnesium (USM or Facility) is a manufacturing facility for magnesium metal. The basic processes used to generate magnesium are:

- Transfer of water from the Great Salt Lake through large solar ponds for evaporation and concentration of brine containing magnesium chloride
- Transfer of the brine to a circular holding pond (the star pond)
- Through desulfation (source of waste gypsum, slurried and piped to gypsum stack) and
- Deboronation (boron removal; this operation is a source of acidic waste sent to waste pond)
- Through spray dryers to produce powdered magnesium chloride
- Through a melt-reactor
- Through carbon anode electrolytic cells to separate magnesium and chlorine, and
- Molten magnesium is then transferred to a foundry and casting house for production of magnesium ingots

The facility has also produced for sale secondary products including liquid chlorine, hydrochloric acid, ferric chloride, magnesium chloride, calcium chloride and lithium carbonate. A limited amount of sodium chloride and brine are also sold for offsite use. At the time of the inspection, production of some secondary products was limited or temporarily halted due to a temporary halt in magnesium production and other factors.

The facility includes shallow solar evaporation ponds designed to evaporate water from Great Salt Lake, deep brine holding ponds arranged in a circular formation (referred to as the star pond), a hydrochloric acid plant, a chlorine plant, a boron removal plant, a ferrous chloride plant, three spray dryers (a fourth was largely constructed but not completed at the time of the site visit), a melt-reactor, four electrolytic cell buildings, a foundry and casting house, multiple maintenance shops, a laboratory, a sanitary lagoon, a solid waste landfill, dredged salt pile storage, smut (metal oxides) pile storage, a gypsum stack, a large evaporation waste pond divided into two sections and connected via an overflow pipe, and a historic (inactive) barium sulfate disposal area.

The introduction of petroleum coke and chlorine in the melt reactor and the use of carbon anodes in the electrolytic process are sources of chlorinated hydrocarbons including hexachlorobenzene, dioxins & furans and polychlorinated biphenyls.

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When the chlorine plant is operational, a reboiler has been a source of carbon tetrachloride hazardous waste generation.

Recent changes to the facility included removal from service of open, unlined earthen ditches previously used to route waste to the evaporation waste pond; waste is now transported to the waste ponds via HDPE piping systems pursuant to RCRA Administrative Order Docket No. RCRA-08-2016-0004.

Additional information regarding US Magnesium's magnesium manufacturing process is available in the document Tripp, Thomas G. (2009) "Production of magnesium from Great Salt Lake, Utah USA," *Natural Resources and Environmental Issues*: Vol. 15 , Article 10., available at: <https://digitalcommons.usu.edu/nrei/vol15/iss1/10> and in the NIOSH Health Hazard Evaluation Report, HETA #2004-0169-2982, U.S. Magnesium Rowley, Utah, dated October 2005.

Containerized hazardous waste is primarily stored in a gated, secured central accumulation area located near the southwestern-most portion of the facility. Based on the facility-submitted 2019 and 2021 Biennial Reports, hazardous wastes recently generated at the facility include but are not limited to:

- Anode dust (D004, D007, D032)
- Waste carbon tetrachloride solution (D002, D019, D032, D033)
- Waste flammable liquids (gasoline/diesel) D001
- Process equipment clean out rinse water (D002, D007)
- Waste corrosive liquid - lab waste (D002, D005, D007, D009, D011)
- Spent phosphoric acid (D002, D007)
- Waste sodium hydroxide solution (D002)
- Waste flammable compressed gas paint waste (D001)
- Waste solids from process equipment cleanout (D007, D019, D022, D039)
- Waste corrosive liquids (off-spec water treatment chemical, D002)

Based upon review of the RCRAInfo e-Manifest database, shipments of hazardous waste (corrosive liquid) were most recently shipped in December 2022 and PCB-containing solids were most recently shipped in April 2023.

A Class IIIb industrial solid waste landfill permit application was submitted to the Utah Department of Environmental Quality on December 16, 2021, in compliance with Consent Decree paragraph 22 and Appendix 14 (Project Compliance Schedule).

An SPCC plan is maintained for both the plant area and for the solar pond area of the facility.

An onsite sewage treatment system includes an aerobic digester. Following treatment, the wastewater is discharged to the sanitary lagoon.

At the time of the inspection, the emergency off-gas system was offline; however, magnesium production was not underway.

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A Consent Decree (CD), Case No. 2:01CV0040, United States of America v. Magnesium Corporation of America, et al., was entered and became effective on 6/30/2021. The status of certain projects performed pursuant to this CD was evaluated during the inspection and is discussed below.

A RCRA 3008(h) Administrative Order, Docket No. RCRA-08-2016-0004, dated 8/3/2016, was issued to implement certain projects including closure and capping of open-air earthen waste ditches as described above. Installation of a waste piping system and capping of the ditches had been completed, and a five-year compliance monitoring period was ongoing at the time of the inspection.

A February 2014 RCRA 7003 Administrative Order on Consent, Docket No. RCRA-08-2014-0001, was issued in response to large spills of acidic liquid waste caused by breaches in the Current Waste Pond berm onto land managed by the Bureau of Land Management (BLM). The 2014 AOC required the company to: 1) construct a fence with signage on affected BLM land to prevent public access, 2) stop further discharges onto BLM land, and 3) address residual soil contamination on BLM property.

The Facility holds a groundwater discharge permit, Permit No. UGW450012, issued by the Utah Department of Environmental Quality under the Utah Administrative Code Rule 317-6. Activities to be performed pursuant to this permit and pursuant to the CERCLA Response Action of the Consent Decree, include installation of a hydraulic barrier wall encompassing the waste ponds and other areas.

This Facility was added to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, aka Superfund) National Priorities List on November 4, 2009. Activities performed under CERCLA include work performed pursuant to an Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study, Docket No. CERCLA008-2011-0013. The US Magnesium Superfund website is <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0802704>.

Hill Brothers Chemical Co., a separate business entity, is located immediately south of the ferrous chloride plant on property leased from USM. A second separate business entity, Envirotech, operates at the site for collection of calcium carbonate.

OPENING CONFERENCE

Upon arrival at the facility, an opening conference was conducted with Mr. Mensinger and Mr. Francom. Jackie Vega and I presented our federal inspector credentials, and I explained the purpose of the inspection and provided a reminder to indicate confidential business information, if shared. I was not denied access to the facility and was allowed to inspect all areas that I selected for inspection.

The following information was obtained verbally during the opening conference and facility discussion with Mr. Mensinger and Mr. Francom:

The number of employees at the time of this inspection was approximately 150, with lithium operations running 24 hours per day, seven days per week.

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Regarding the landfill application, a financial assurance mechanism had recently been provided to UDEQ, and the permit may be issued by the end of June 2023.

For Electrolytic Cell Building 4 anode dust, the building has not been transitioned to a wet anode dust collection system, but the building was not in operation at the time of the inspection and Mr. Mensinger stated that it will use such a system upon return to operations. Mr. Francom stated that recent TCLP testing identified chromium levels of drag chain-collected anode dust to be below the regulatory limit and ranging between 1 ppm to just below 5 ppm.

The facility's generator status at the time of the inspection was Small Quantity Generator based upon laboratory waste, anode dust and some other various hazardous wastes.

Regarding the courtyard located between Electrolytic Cell Buildings 2 and 3, the grizzly boxes will be filled in as part of the Courtyard Capping Project under the Consent Decree. Mr. Mensinger stated that there has been some difficulty getting a contractor to perform the work, and site conditions were still wet and spongy in a portion of the area due to the long period of frequent precipitation during the weeks leading up to the inspection. Most of the surface of the courtyard had been scraped to prepare it for the upcoming work.

The emergency off-gas system (EOG) had been cleaned out and was ready for new filters and was awaiting new parts. Mr. Mensinger stated that the EOG would be back up and running by the time magnesium manufacturing resumes.

Mr. Francom stated that, regarding the generation of carbon tetrachloride, a process change was underway that is expected to preclude the generation of carbon tetrachloride waste in the future, so this hazardous waste is not expected to be generated going forward.

For the retrofitted waste pond project, a contract was awarded, and mobilization was anticipated to begin within the next few days. Phase 1 of the project is complete, and Phase 2 is expected to take two years.

For intake P-N from the Great Salt Lake (GSL) to the solar ponds, one pump was operating. Intake from the GSL has been continuous despite the status of magnesium production.

Used oil is tested onsite for halogens using Clor-D-Tect tests, which frequently indicate the presence of halogens. Because of this, the oil cannot be recycled and must be disposed. Mr. Mensinger stated that it could perhaps be due to chlorinated parafins in synthetic virgin material.

Regarding the wastewater piping system installed pursuant to the RCRA 3008(h) AOC, solids can build up at junction boxes causing backups within the system, and when this occurs cleanouts must be performed.

Pumps from the reuse system project had been removed for use in the lithium carbonate plant but will be reinstalled before magnesium manufacturing resumes.

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The chlorinated hydrocarbon filtration system project final design, which is a submittal under the Consent Decree, was expected to be finished by the end of June 2023. Following the inspection, on June 9, 2023, the final drawings were submitted by email; this submittal had not yet been reviewed at the time of finalizing this inspection report.

TOUR INFORMATION

Mr. Mensinger and Mr. Francom accompanied us during the Facility tour.

All photographs collected during the inspection and referenced below are included in Attachment 1 – Photograph Log; however, photographs claimed by USM to be CBI are redacted as identified in Attachment 1.

Areas of the Facility included in the site tour were:

- Reuse system project area:
 - CRB area
 - West and east packed tower areas
 - High energy scrubber area
 - Run-down tank
 - Electrolytic cell buildings 1&2 quench tank tie-ins
- Courtyard located between Electrolytic Cell Buildings 2 and 3
- Waste Yard 180-day hazardous waste central accumulation area
- Lithium carbonate plant – outdoor area only
- Ditch caps
- Lagoon
- RWP berm construction
- BLM land vicinity
- Ferrous chloride plant
- Landfill

The following narrative of this section includes areas listed above in which conditions of interest or potential deficiencies were noted. The information included below was obtained by my observation or by explanation provided by the accompanying facility personnel (Mr. Mensinger and Mr. Francom) unless otherwise noted.

At the Reuse System project area, I observed

- the 20,000-gallon CRB Water/Seal Leg Water Collection Tank and piping leading to a unit near the chlorine reduction burner (CRB) that appeared to be the CRB absorber; this tank is for storage and reuse of CRB water,
- the black tank installed near the CRB as part of the CRB Water/Seal Leg Water Collection System,
- the high energy scrubber with piping to east and west packed towers and to the spent liquor tank, and

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- the wash water column with piping to the east and west packed towers and piping routed in the direction (did not fully trace the path of the piping) of the Electrolytic Cell Buildings 1&2 quench tank tie-in.

Mr. Brad Drayton joined the inspection for this portion of the site tour and described the pipe routing for the various portions of the project. For the 1&2 quench tanks, he stated that Tank 1 was currently disconnected but could be reconnected.

For photos of the reuse system project, see the May 2022 inspection report and the Complaint Waste Stream Reuse Project Completion Report dated 8/29/2022 [note: the completion report contains confidential business information and so is access restricted].

In the Waste Yard 180-day CAA, I observed the following containers:

- 3 blue poly 55-gallon drums marked “Rec. Main Offgas Header” and 4/25/23. Mr. Francom stated that an analysis for these was pending. Mr. Francom stated that pending analyses included TCLP metals, volatiles, semi-volatiles and PCBs. (photos 4-6)
- 1 black metal 55-gallon drum marked “Universal Waste Aerosol Cans” and dated 4-26-23 (photo 7)
- 1 blue poly 55-gallon drum marked “Oil/Trash (photo 8)
- 1 blue poly 55-gallon drum marked “Oil Absorbent” (photo 9)
- 1 green metal 55-gallon drum marked “Used Gas” and “Hazardous Waste” and placarded “Flammable Liquid” and dated 4-26-23 (photo 10); this drum had small holes in the top, which was rusty and degraded
- 1 gray metal 55-gallon drum marked “Hazardous Waste” and placarded “Flammable Liquid” and dated 4-26-23 (photos 11 and 12)
- 3 blue poly 55-gallon drums marked “Water Treatment” and “Pending Characterization” (photo 13)
- 1 white poly approximately 30-gallon container marked “Sulfuric Acid” and “Storage/Reuse”; this container did not appear to be a waste (photo 14)
- 1 blue poly 55-gallon drum marked “Spent Sulfuric” and “Storage for Reuse”; this container did not appear to be a waste because it could be reused (photo 15)
- 1 white supersack marked “Bld one anode dust and debris” and labeled “Caution Contains PCBs” (photos 16 and 17)
- 1 white supersack marked “Bldg 4 Grizzly Anode Dust and Debris Hazardous Material” and labeled “Caution Contains PCBs” (photo 18); this container appeared to be leaking
- 1 blue poly 55-gallon drum marked “Bldg 4 Anode Dust” and “Hazardous Material” labeled “Caution Contains PCBs” and dated 4-24-23 (photos 19 and 20)
- 1 blue poly 55-gallon drum marked “Bld One Anode Dust and Debris” and dated 4-24-23
- 1 blue poly 55-gallon drum marked “Bld 2 Anode Dust and Debris” and dated 4-24-23 and labeled “Caution Contains PCBs”
- 1 blue poly 55-gallon drum marked “Bld 4 – Grizzly Anode Dust and Debris” and “Hazardous Material” and labeled “Caution Contains PCBs” and dated 4-24-23

Containers and tanks holding waste that is pending analysis must comply with the requirements of UAC R315-262, such as container labeling, from the point of generation through off-site shipment if that

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waste is later determined to be hazardous. As a result, a best practice for managing waste that may be hazardous is to manage it in full accordance with the hazardous waste regulations until such time as it is confirmed that the waste is not hazardous to avoid potential violations.

At the lithium carbonate plant, I observed one of two open-air digester leach pits used for initial processing of smut from magnesium manufacturing. Facility personnel (Anthony Smith and Trent Loomis) working at the digester during the inspection stated that it is 50,000 gallons in size and is lined with a sealer membrane and with specially treated brick and mortar capable of withstanding acidic conditions. A secondary smut waste is generated from the lithium carbonate production process and is stockpiled approximately ¼ mile from the digester near the southwestern portion of the facility. Photos of the digester leach pit and secondary smut waste were collected (photos 25 and 26); both of these photos are claimed Confidential Business Information.

At the sanitary lagoon I observed that the surface was largely covered in phragmites (photos 27 and 28).

At the previous ditches capped pursuant to the RCRA Administrative Order on Consent, Docket No. RCRA-08-2016-0004 (photos 29-30 and 45-49), I observed that the caps appeared to be in good condition. At the western ditch cap near the lithium carbonate plant, additional soil has been placed to accommodate vehicles driving over the cap to obtain smut for processing in the lithium carbonate plant as source/ore material. During the inspection, I did not observe evident damage to the cap from this vehicle traffic, but this is an area of potential damage to the cap that should be carefully monitored. As stated in the Soil Cap Monitoring and Maintenance Plan, any areas of the cap where tracks are observed that are two inches or greater in depth compared to the surrounding cap surface must be repaired as soon as practicable, and inspection records are to be maintained in the on-site Operating Record.

At the berm work completed as phase 1 of the Retrofitted Waste Pond project, I observed that the berm was in good condition with no evident points of deterioration (photos 31-37). I did not observe the vicinity of the overflow pipe located in between the Current Waste Pond and the Old Waste Pond, but Mr. Francom stated that it has been blocked off because of sinkhole formation in the vicinity. He also stated that a contractor working on groundwater sampling and other tasks on the day of the inspection reported to him that, as he recalled from the conversation with the contractor, the pH of the discharge from the plant to the Current Waste Pond was approximately 5 and the pH of the Current Waste Pond was approximately 9. In the northwestern portion of the Old Waste Pond, I observed two plover-like birds foraging in the dry sediment.

At the northwest portion of the operating area where breaches to impoundment berms had previously occurred resulting in spills of liquid waste onto BLM land to the north, which were the subject of the RCRA 7003 Administrative Order on Consent, Docket No. RCRA-08-2014-0001, I observed that no liquid waste was being held in the section of former impoundment area immediately to the south (photos 38-40). The area adjacent to and including the affected BLM land appeared to be in the same status as that observed in previous inspections (photos 41-44). Ponding from recent precipitation was present in the BLM land area.

In the ferrous chloride plant area, I observed that no liquid was being held in the secondary containment; this had been an observation and concern during a May 2022 inspection and is now resolved. The

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ferrous chloride plant, which generates ferrous chloride by digesting iron scrap in hydrochloric acid, was not in operation at the time of the inspection. During normal operations ferric chloride is generated after the ferrous chloride is used in the chlorine bypass scrubber. This ferric chloride can then be sold or used elsewhere within the plant.

Additional Information

Used oil:

The used oil storage area was not inspected during this inspection. However, used oil disposal was discussed. As described on page 5 above, Mr. Francom stated that it is transported by Safety Kleen to Wasatch Regional Landfill. However, following the inspection, the Wasatch Regional Landfill reported to the Utah DEQ Solid Waste Program that they do not accept used oil from the facility. Wasatch Regional Landfill is not authorized to receive hazardous waste.

Regarding used oil failing screening tests designed to indicate whether the total halogen content of the used oil is greater than 1,000 ppm, the rebuttable presumption that the used oil is mixed with listed hazardous waste could be rebutted by demonstrating that the used oil does not contain hazardous waste, for example by analytical testing on representative samples. It is important to note that some degreasers, brake cleaners and carburetor cleaners contain halogenated solvents, and they must be disposed of separately and not mixed with used oil to avoid rendering the used oil un-recyclable hazardous waste. Similarly, spent solvents, pesticides and PCBs may also be a source of halogen in used oil if added to used oil tanks or containers. Such wastes must continue to be managed and disposed separately after a successful rebuttal.

In addition to analytical testing, the rebuttable presumption may also be rebutted using information about the process generating used oil; such a demonstration may need to contain details including, but not limited to, process descriptions, information about virgin materials, identification of potential halogen sources with information on how those sources are prevented from being added to used oil tanks or containers, or other relevant information, and may be paired with analytical or screening results that narrow down the source of halogens to a particular process to demonstrate that source. For guidance on the rebuttable presumption, see <https://www.epa.gov/hw/information-regarding-resource-conservation-and-recovery-act-rcra-used-oil-rebuttable>. Rebuttal demonstrations should also consider any necessary documentation which may be required by used oil transporters to be able to accept it for transport to destination facilities such as used oil processors and re-refiners, who must maintain such documentation for three years.

Insurance:

Per the 2014 RCRA 7003 AOC, USM must maintain comprehensive general liability insurance and automobile insurance with limits of \$1 million dollars, combined single limit, naming the EPA as an additional insured. On May 5, 2023, I received by email copies of insurance certificates for 2021-2022 and 2022-2023 (Attachment 2 – Insurance). However, they did not appear to meet the requirements of the AOC because they do not name the EPA as a certificate holder and because they do not appear to include comprehensive general liability insurance and automobile insurance.

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CLOSING CONFERENCE

During the closing conference, I stated a concern regarding the 55-gallon drum in the Waste Yard that had a degraded top, and Mr. Francom stated that he would repack the contents.

Inspection Follow-up

Additional information is needed for the following:

- Hazardous waste determination documentation for wastes that were pending analysis at the time of the inspection:
 - Three drums marked “Rec. Main Offgas Header”
 - Three drums marked “Water Treatment”
- An update on the status of the drum of waste gasoline that had holes in the rusty top of the drum.
- Copies of analytical results for drag-chain system-generated anode dust from Electrolytic Cell Building 4 that have been collected within the last three years, and a description of the sampling methodology used to collect representative samples.
- Copies of analytical results for contaminated soil “scrapings” removed from the Courtyard, and a description of the sampling methodology used to collect representative samples.
- Copies of analytical results for solids removed from the grizzly box located on the east side of the courtyard located between Electrolytic Cell Buildings 2 and 3, adjacent to Electrolytic Cell Building 2.
- Copies of disposal documentation for used oil that has failed screening for halogen content (i.e. screening tests indicate the used oil contains greater than 1,000 ppm total halogens) and as a result cannot be recycled and must be disposed of as hazardous waste. If rebuttal demonstration documentation related to the rebuttable presumption has been prepared, this may be relevant to include.

SIGNATURES

ANNETTE MAXWELL

Digitally signed by ANNETTE MAXWELL
Date: 2023.06.20 07:23:49 -06'00'

Annette Maxwell, Lead RCRA Inspector

JANICE PEARSON

Digitally signed by JANICE PEARSON
Date: 2023.06.21 07:40:37 -06'00'

Janice A. Pearson, Manager
RCRA & OPA Enforcement Branch
Enforcement and Compliance Assurance Division

ATTACHMENT LIST

Attachment 1 – Photograph Log
Attachment 2 – Insurance