



July 2012

Draft Hazardous Waste Permit Modification

Public Participation Procedures and Comment Period Ohio Administrative Code (OAC) Rule 3745-50-22 (B)(5)(a)&(b)

All persons, including the applicant, may submit written comments relating to this draft action. Written comments or requests for a public meeting may be submitted before the end of the comment period to the address in the box on the right.

The comment period begins on July 31, 2012, and ends on September 14, 2012. A copy of the permit application and the draft permit is available for review by the public at the following locations:

Harris-Elmore Public Library
328 Toledo Street
Elmore, Ohio 43416
(419) 862-2482

Ohio EPA
Northwest District Office
347 North Dunbridge Road
Bowling Green, Ohio 43402
(419) 352-8461

Ohio EPA
Division of Materials and Waste Management
Lazarus Government Center
50 West Town St., Suite 700
Columbus, Ohio 43215
(614) 644-2621

Facility Name: Materion Brush, Inc.
U.S. EPA I.D.: OHD 004 212 999
Location: 14710 W. Portage River South Road
Near State Routes 105 and 590
Elmore, Ohio
Facility Owner: Materion Brush, Inc.
6070 Parkland Boulevard
Mayfield Heights, Ohio 44143
Facility Operator: Materion Brush, Inc.
6070 Parkland Boulevard
Mayfield Heights, Ohio 44143
Activity: Remedy Selection & Statement of Basis for Central Magnesium Fluoride Lagoon
Comment Period: July 31, 2012 through September 14, 2012
Submit Comments to: Ohio EPA
Division of Materials and Waste Management
Engineering, Remediation and Authorizations Section
P.O. Box 1049
Columbus, Ohio 43216-1049
(614) 644-2621
dmwmcomments@epa.state.oh.us

The draft permit is available for review by the public online at:

http://www.epa.ohio.gov/dmwm

After the close of the public comment period, Ohio EPA will, without prior hearing, issue a modified permit in accordance with Chapter 3734 of the Ohio Revised Code. After all public comments have

been considered, a modified permit will be issued with terms and conditions as are necessary to ensure compliance with hazardous waste rules.

**Description of Facility
OAC Rule 3745-50-22
(B)(1)**

Materion Brush, Inc. is a 443 acre facility located at 14710 W. Portage River South Road in Elmore, Ohio. The facility is bounded by Portage River South Road and the Portage River to the north, State Route 590 to the west, and agricultural land to the east and south. Access to the site is restricted through perimeter fencing and a security gate. The facility converts beryllium hydroxide powder from the company's mill in Delta, Utah into beryllium metal, beryllium alloys, and high-purity beryllium oxide powders.

**Description of
Requested Permit
Modification
OAC Rule 3745-50-22
(B)(2)**

This Statement of Basis (SB) presents and explains the proposed remedies/corrective measures to address contaminated soil and residual sludge at Unit 4- the Central Magnesium Fluoride Lagoon (Unit 4) at Materion Brush Inc. (Materion) located in Elmore, Ohio. It includes summaries of all corrective measures scenarios evaluated by Materion. The Ohio Environmental Protection Agency (Ohio EPA) will select the final remedy after the

public comment period has ended and comments provided by the public have been considered.

This SB is being issued by Ohio EPA as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). This document summarizes information that can be found in greater detail in the final RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS) Reports and other pertinent documents and records contained in Ohio EPA's files. Ohio EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the RCRA activities conducted at the Materion facility.

**Regulatory Basis to
Support the Decision
to Modify the Permit
Application
OAC Rule 3745-50-22
(B)(3)**

In accordance with OAC rule 3745-50-51(J), the director may initiate a permit modification of a hazardous waste facility installation and operation permit.

Accordingly, Ohio EPA is issuing a draft action indicating

the Director's intention with respect to the issuance of a modified permit to Materion Brush, Inc..

**Contact Person
OAC Rule 3745-50-22
(B)(6)**

For additional information, please contact Michael Terpinski at (419) 373-3075.

Materion DIM factsheet.doc

Statement of Basis for the Remediation of

Materion Brush Inc.

**Elmore, Ohio
Ottawa County**

OHD 004 212 999

prepared by

The Ohio Environmental Protection Agency

July 2012

Table of Contents

1.0	INTRODUCTION.....	3
2.0	PROPOSED REMEDY.....	3
3.0	FACILITY BACKGROUND.....	3
4.0	CORRECTIVE ACTION PROCESS.....	4
4.1	RCRA FACILITY INVESTIGATION AT MATERION BRUSH INC.....	4
	TABLE 1 - WASTE MANAGEMENT UNITS REQUIRING CORRECTIVE MEASURES.....	5
4.2	Findings of RCRA Facility Investigation.....	6
	TABLE 2 - RFI ACTIVITIES AND FINDINGS.....	6
5.0	SCOPE OF CORRECTIVE ACTION.....	12
5.1	Corrective Measures Study.....	12
	TABLE 3 - THRESHOLD AND BALANCING CRITERIA.....	13
5.2	Corrective Measures Recommendations.....	15
5.2.1	Ground water.....	15
5.2.2	Soils.....	15
6.0	OHIO EPA'S SELECTED REMEDY.....	15
7.0	Summary of Proposed Remedy Meeting Evaluation Criteria.....	16
8.0	BIBLIOGRAPHY.....	17
9.0	GLOSSARY OF TERMS.....	17
	Site Location Map.....	19

1.0 INTRODUCTION

This Statement of Basis (SB) presents and explains the proposed remedies/corrective measures to address contaminated soil and residual sludge at Unit 4- the Central Magnesium Fluoride Lagoon (Unit 4) at Materion Brush Inc. (Materion) located in Elmore, Ohio (Figure 1). It includes summaries of all corrective measures scenarios evaluated by Materion. The Ohio Environmental Protection Agency (Ohio EPA) will select the final remedy after the public comment period has ended and comments provided by the public have been considered.

This SB is being issued by Ohio EPA as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). This document summarizes information that can be found in greater detail in the final RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS) Reports and other pertinent documents and records contained in Ohio EPA's files. Ohio EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the RCRA activities conducted at the Materion facility.

Ohio EPA may modify the proposed remedies or select other remedies based on new information or public comments. Therefore, the public is encouraged to review and comment on all corrective measures scenarios. All documents supporting this SB are contained in the Harris Elmore Public Library, 328 Toledo Street, Elmore, Ohio 43416, the Ohio EPA Central Office, 50 West Town Street, Columbus, Ohio, 43215, and the Ohio EPA Northwest District Office, 347 North Dunbridge Road, Bowling Green, Ohio, 43402.

2.0 PROPOSED REMEDY

Ohio EPA proposes the following remedy to address contaminated soil and residual sludge at Unit 4. See Figure 1 for a facility plan showing the location of Waste Management Units (WMUs) and other features of the site.

WMU 4 Limited removal of residual shallow sludge combined with a cover system, ground water monitoring, and an environmental covenant.

3.0 FACILITY BACKGROUND

Materion is a 443 acre facility located at 14710 W. Portage River South Road in Elmore, Ohio. The facility is bounded by Portage River South Road and the Portage River to the north, State Route 590 to the west, and agricultural land to the east and south. Access to the site is restricted through perimeter fencing and a security gate. The facility

converts beryllium hydroxide powder from the company's mill in Delta, Utah into beryllium metal, beryllium alloys, and high-purity beryllium oxide powders.

Unit 4 is located in the central portion of the facility, as shown in Figure 1. The unit is bordered on all sides by facility buildings and other features. Unit 4 is a rectangular-shaped lagoon approximately 12 feet deep with an earthen base, earthen dike walls, and an underdrain system. It operated from approximately 1956 through 1974 and received magnesium fluoride process sludge that also contained lead, copper, and beryllium. During closure of the unit, most of the sludge was reportedly removed, and the dike walls pushed inward. Roughly one foot of soil cover was placed over top and gravel is present at ground surface.

Unit 4 is relatively flat with rough dimensions of 175 feet by 150 feet, totaling around 0.6 acres. The area is occasionally used for equipment storage, but is usually vacant. There are no plans to redevelop the area, though its central location and flat terrain could potentially lend itself to such a use in the future.

On September 20, 2011, Ohio EPA issued a RCRA Part B Permit Renewal to Materion Brush Inc. that required them to conduct the necessary investigations to fully identify the nature and extent of contamination at the facility and to evaluate the corrective measures necessary to protect human health and the environment. The following section describes the corrective action process at Materion.

4.0 CORRECTIVE ACTION PROCESS

The initial step in every corrective action process for facilities regulated under RCRA is site characterization or investigation to define the nature and extent of contamination at the facility. The information collected during the site investigation supports selection and implementation of long-term remedies to address contaminated waste areas necessary to protect human health and the environment. The site investigation concludes with the facility's submittal of the RCRA Facility Investigation Report (RFI Report) to Ohio EPA.

4.1 RCRA FACILITY INVESTIGATION AT MATERION BRUSH INC.

With Ohio EPA oversight, and in accordance with their hazardous waste permit, Materion completed a systematic investigation of soil and ground water conditions at the site, including off-site areas such as the Portage River. The RFI was conducted in two phases, phase 1 and phase 2, and included desktop evaluations, soil sampling, ground water sampling, surface water sampling, and sludge sampling.

Phase 1's focus was primarily to verify releases at WMUs and collect environmental setting data. Its activities included:

- Review of Materion and Ohio EPA files;
- Review of materials stored or managed at each WMU;
- Review of operations and as-built drawings at each WMU, as applicable;
- Identification of potential exposure pathways; and,
- Collection of 240 soil, sediment, sludge, and ground water samples;

Phase 2's primary objective was determining the extent of contamination and collecting data necessary to support a baseline risk assessment. Its activities included:

- Collection of more than 200 additional soil, sediment, sludge, and ground water samples; and,
- Calculation of a baseline risk assessment

The investigation was conducted in accordance with the requirements of Materion's hazardous waste permit and U.S. EPA-approved RFI Work Plans (the RFI process began in 1994, prior to Ohio EPA assuming corrective action responsibility for the facility on June 14, 2001 when Materion's (then Brush Wellman) Part B permit was renewed).

Risk assessment was performed at each WMU, Area of Investigation, and Area of Concern where hazardous constituents were detected above published, risk-based screening levels or, in the case of inorganic constituents, to site-specific background concentrations. Based upon the RFI data and the identified exposure pathways, the risk assessment concluded that unacceptable risk to human health or the environment was potentially present at three WMUs. A fourth unit was added in 2009 at Ohio EPA's request. Only Unit 4 is the subject of this SB. Other units listed as not meeting risk will be addressed at a later date, with Units 26 and 38 scheduled next.

TABLE 1 - WASTE MANAGEMENT UNITS REQUIRING CORRECTIVE MEASURES

Waste Management Unit (WMU)	Years in use/Type of waste disposed in WMU
Unit 4- Central Magnesium Fluoride Lagoon	Operated from approximately 1956 through 1974. Received magnesium fluoride process

	sludge that also contained lead, copper, and beryllium.
Unit 9- Lagoon 5	Has operated as a process lagoon from 1968 to present. The unit received magnesium hydroxide, oxide scrubber water, metal hydroxides, and calcium fluorides.
Unit 26- South Hyde Run Ditch	Receives treated effluent from three NPDES outfalls as well as discharges from the on-site Industrial Solid Waste Landfill sedimentation basin. Beryllium, cadmium, chromium, cobalt, copper, fluoride, nickel, and zinc were detected in soil above background concentrations.
Unit 38- North Hyde Run Ditch	Receives discharges from several NPDES outfalls and has received releases from other WMUs and process tanks. VOCs, SVOCs, and inorganics were found in soil, sediment, and surface water samples. PCBs were also found in the 0-2 foot soil interval.

Note: several WMUs have previously been addressed by RCRA closure and/or other corrective measures, or required no further action. The results of the investigations conducted at each of the WMUs are summarized in Table 2. Please see Ohio EPA files for more information.

4.2 Findings of RCRA Facility Investigation

The findings of the RFI investigations are presented in the RFI Report (Cox-Colvin & Assoc., 2000) which is available at Ohio EPA's Northwest District Office. This report summarizes the nature and extent of contamination in soil and ground water at the Materion site. The following Table presents the RFI investigations and major findings at each of the WMUs:

TABLE 2 - RFI ACTIVITIES AND FINDINGS

WMU #/AOC/AOI	RFI Activities	RFI Findings
North Lagoons AOI (Units 1, 2, 3, and 39)	Sediment, surface water, soil, and ground water sampling (incl. monitoring)	Units are contiguous and managed similar types of waste. RFI Phase 1 indicated a release to soil and

	well installation)	ground water, but no unit posed an unacceptable risk. <u>COCs</u> - methylene chloride, PCE, beryllium, cadmium, copper, fluoride, lead, cyanide, selenium, PCBs
Unit 6 (Settling Lagoon 2)	Waste, ground water, and soil samples taken.	An inactive settling lagoon which operated from 1963 to 1980. A release from sludge to soil and from soil to ground water has occurred, but does not pose an unacceptable risk. <u>COCs</u> - 1,2,DCE, PCE, TCE, arsenic, beryllium, hexavalent chromium, copper, Arochlor-1248.
Unit 7 (Closed RCRA Copper Lagoon 3)	Sludge samples and ground water samples from all wells surrounding AOI.	An impoundment constructed with an earthen base and dikes which operated from 1968-1988. Unacceptable risks not present. <u>COCs</u> - VOCS + cis-1,2-DCE, inorganics plus fluoride.
Unit 8 (Settling Lagoon 4)	Soil samples, ground water samples, magnetometer survey.	An impoundment constructed with an earthen base and dikes which operated from 1963-1973. As many as 1,000 drums of beryllium compound waste were placed in the NW corner. Unacceptable risks not present. <u>COCs</u> - VOCS + cis-1,2-DCE, SVOCs, PCBs, inorganics plus fluoride.
Unit 9 (Active Settling Lagoon 5)	Sludge and ground water samples taken.	Has operated as a process lagoon from 1968 to present. The unit received magnesium hydroxide,

		<p>oxide scrubber water, metal hydroxides, and calcium fluorides. This unit was originally screened out of the corrective action process, but was reintroduced in 2009.</p> <p><u>COCs</u>- VOCs and inorganics + fluoride</p>
Unit 10 (Closed RCRA Waste Lagoon No. 6)	Ground water sampled.	<p>Operated as a process lagoon from 1968 to 1988. Unacceptable risks not present.</p> <p><u>COCs</u>- VOCs and inorganics + fluoride.</p>
Unit 4 (Central Magnesium Fluoride Lagoon)	Collection of soil and sludge samples.	<p>Operated from approximately 1956 through 1974. Received magnesium fluoride process sludge that also contained lead, copper, and beryllium.</p> <p><u>COCs</u>- inorganics.</p>
Unit 44 (Furnace Rebuild Storage Area)	Collection of soil samples.	<p>Blacktopped unit used since the 1960s to store various furnace materials and parts. Unacceptable risks not present.</p> <p><u>COCs</u>- inorganics.</p>
Unit 5 (South Landfill)	Electromagnetic and magnetic surveys, soil sampling, and ground water sampling.	<p>A roughly 3 acre unit comprised of 3 areas- eastern, middle, and western. The eastern portion is thought to consist of 6 trenches where toluene, paper, wooden pallets, and paint sludge were burned. The western portion served as a disposal site for magnesium fluoride waste. The middle area was a disposal area for plant scrap, including ~ 85-90 drums</p>

		<p>of 80% kerosene and 20% dialkylphosphate. No evidence of buried drums was found during the geophysical survey, possibly because all drums were excavated in 1985. Unacceptable risks not present.</p> <p><u>COCs</u>- VOCs, inorganics, PCBs.</p>
Unit 13 (Lagoon 5 Storage Tank)	Soil sampling.	<p>A 1,400,000 gallon NPDES-permitted tank which used to receive decant water from Units 1 & 2 and now stores water from Unit 9 and small quantities of post-settled magnesium fluoride, ammonium sulfide sludge, and vacuum filter sludge. 12 holes in the tank's bottom were repaired in 1985. Unacceptable risks not present.</p> <p><u>COCs</u>- in Phase 1, VOCs and inorganics + fluoride; in Phase 2, inorganics + fluoride.</p>
Unit 17 (Closed RCRA Triangular Lagoon)	Waste in this unit was characterized by sludge sampling in 1984. Ground water sampling was also performed.	<p>A 0.1 acre unit formed by constructing earthen dikes against the creek bank of Hyde Run Ditch. It operated from 1958 until 1988. The unit served as batch treatment for nearly all Materion's industrial wastewater. Lime or sulfuric acid was added to the unit prior to transfer to Units 7 or 10. Unacceptable risks not present.</p> <p><u>COCs</u>- VOCs + cis,1,2-DCE, inorganics + fluoride.</p>
Unit 26 (South Hyde Run Ditch)	Soil, surface water, and sediment samples.	<p>Receives treated effluent from three NPDES outfalls as well as discharges from the on-site industrial</p>

		<p>solid waste landfill sedimentation basin.</p> <p><u>COCs</u>- Beryllium, cadmium, chromium, cobalt, copper, fluoride, nickel, and zinc.</p>
Unit 28 (Oil Separator Pond)	Sampling of process water entering the unit as well as sludge samples.	<p>An active unit (1953- present) that separates process water and oil from Materion’s rolling operations. Unacceptable risks not present.</p> <p><u>COCs</u>- oil & grease, VOCs, SVOCs, PCBs, pH.</p>
Unit 29 (Alloy Make-Up Pond)	Samples of sediment/sludge taken.	<p>A 50’ X 200’ pond used to store make-up water and formerly used to store returned cooling water. While there was a release to soils underlying the unit, COCs were not detected above risk-based concentrations or background. This unit was evaluated in the ecological, but not human health, risk assessment.</p> <p><u>COCs</u>- VOCs, inorganics, PCBs</p>
Unit 38 (North Hyde Run Ditch)	Samples of surface water, sediment, and soil were collected.	<p>Receives discharges from several NPDES outfalls and has received releases from other WMUs and process tanks.</p> <p><u>COCs</u>- VOCs, SVOCs, PCBs, and inorganics.</p>
Unit 46 (Cast Pond Skimmer)	3 sludge samples taken from base of unit.	<p>An active, unlined process pond built in 1968. Sludge is periodically dredged, stabilized, and disposed of as a non-hazardous waste. Unacceptable risks not present.</p>

		<u>COCs</u> - inorganics and PCBs.
Unit 49 (Beryllium-Compound Contaminated Waste Drum Storage Area)	Soil sampling.	A release to soil occurred and the unit was included in the baseline risk assessment. Unacceptable risks not present. <u>COCs</u> - barium, beryllium, cadmium, cobalt, and fluoride.
Unit 50 (Metallic Beryllium-Contaminated Waste Drum Storage)	Soil sampling.	Two units which store non-hazardous waste which are separated by a road. Results were inconclusive as to whether a release to soil had occurred, so the unit was included in the baseline risk assessment. Unacceptable risks not present. <u>COCs</u> - beryllium, cadmium, cobalt, copper, fluoride, and nickel.
Unit 51 (Old Decontamination Building Solids Settling Tank)	Soil sampling.	A concrete-bottomed UST installed in 1968. Phase 1 results indicated a release had occurred to subsurface soil. Phase 2 activities were performed to determine the extent of the release. Unacceptable risks not present. <u>COCs</u> - VOCs, SVOCs, PCBs, and inorganics.
PCE Release Area- AOC	Soil sampling, monitoring well installation, ground water sampling, vapor extraction pilot test.	A 1,200 gallon spill of PCE from this AST to a courtyard area occurred in 1991. A release to ground water was confirmed and the unit is now in Materion's IGWMP. <u>COCs</u> - PCE, 1,2-DCE, TCE

- **WMUs in bold type require corrective measures**

5.0 SCOPE OF CORRECTIVE ACTION

Corrective Measures are necessary to address contamination present in ground water and soil in certain areas at the Materion facility.

5.1 Corrective Measures Study

Upon completion of the RFI, Materion provided Ohio EPA with the Corrective Measures Study (CMS) Report, which outlined its proposed remedies for Unit 4. The CMS Report identifies various remedial options and discusses the cost and technologies associated with each.

As part of the RFI/CMS process, criteria for evaluating proposed remedies were developed by U.S. EPA under the corrective action program of the Resource Conservation and Recovery Act (RCRA). The evaluation criteria are found in U.S. EPA guidance documents. The criteria are used by Ohio EPA to evaluate the remedies proposed by a facility when the facility's investigation of environmental conditions on its property determines that some type of action is necessary to reduce the potential risk to human health and the environment. The nine evaluation criteria are listed and described in Table 3. The first four evaluation criteria are threshold criteria required for acceptance of a remedy. All four of these criteria must be met in order for the remedy to be acceptable. The other five evaluation criteria are the balancing criteria used to help select the best remedy.

TABLE 3 - THRESHOLD AND BALANCING CRITERIA

Threshold Criteria

Protect human health and the environment- Remedies shall be evaluated to determine if they can adequately protect human health and the environment, in both the short and long term, from unacceptable risks posed by environmental contaminants at the facility.

Attain media cleanup standards set by the implementing agency- Remedies shall be evaluated to determine if the final numerical standards for the subject environmental media will be achieved. The evaluation will include the method of verification and its supporting quality assurance and quality control procedures used to make the decision.

Control source of the release(s) to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment- Remedies shall be evaluated to determine if it is practicable to physically remove the source of environmental contamination as part or all of a remedy.

Comply with applicable standards for management of waste- Remedies shall be evaluated to determine if they meet all of the applicable requirements of state, federal, and local environmental laws for management of waste.

Balancing Criteria

Long term reliability and effectiveness- Remedies shall be evaluated to determine their ability to maintain reliable protection of human health and the environment over time once the measure is fully implemented. This includes assessment of the residual risks remaining from untreated wastes and the adequacy and reliability of controls such as containment systems and enforceable land use restrictions (e.g., Environmental Covenants).

Reduction in the toxicity, mobility, or volume of wastes- Remedies shall be evaluated to determine the following: 1) short term risks that might be posed to the community during implementation of the remedy; 2) potential impacts on workers during implementation of the remedy and reliability of worker protection measures; 3) potential environmental impacts of the remedy and the effectiveness and reliability of mitigative measures employed during implementation; and, 4) time until protection is achieved.

Implementability- Remedies shall be evaluated to determine the ease or difficulty of implementation and shall include, as appropriate, the following: 1) technical difficulties and unknowns associated with the construction and operation of a technology, the reliability of a technology, ease of undertaking additional remedies, and the ability to monitor the effectiveness of the remedy; 2) administrative feasibility, including activities needed to coordinate with other offices and agencies and the ability and time required to obtain the necessary approvals and

permits, as necessary; and, 3) the availability of any service and materials needed to support and complete the remedy.

Cost- Remedies shall evaluate capital costs, annual operation and maintenance costs, and the net present value of those costs. The cost estimates include only the direct costs of implementing the corrective measures. Cost estimates are provided in the CMS.

5.2 Corrective Measures Recommendations

Materion's CMS Workplan was approved by Ohio EPA in 2006. Supplemental Investigations for Unit 4 were performed in 2007 and 2008. The Supplemental Investigation Report, Revision 2 was approved in 2010. The following is a summary of Materion's proposed remedies.

5.2.1 Ground water

Ground water beneath Unit 4 is not currently used for potable or non-potable purposes. Ground water is first encountered in the bedrock, so direct contact is not an issue. An environmental covenant prohibiting the use of ground water for potable purposes will also be drafted and recorded.

5.2.2 Soils

Potential pathways of concern include current and future on-site workers. The CMS Report evaluated the following remedies for contaminated soils at Unit 4:

- Alt U4-A- No action.
- Alt U4-B- Limited removal of residual sludges combined with an environmental covenant and ground water monitoring.
- AltU4-C- Use of an engineered cover to reduce direct contact with soils/sludges, coupled with an environmental covenant and ground water monitoring.
- Alt U4-D- A combination of Alt U4-B and Alt U4C, this option will include limited sludge removal, installation of an engineered cover system, and an environmental covenant and ground water monitoring.
- Alt U4-E1- Soil excavation and off-site disposal coupled with an environmental covenant.
- Alt U4-E2- Soil excavation and on-site disposal coupled with an environmental covenant.

6.0 OHIO EPA'S SELECTED REMEDY

Ohio EPA has reviewed the final CMS Report. The RFI Report was previously approved by U.S. EPA January 19, 2001. Based upon these reviews, Ohio EPA is proposing the

following remedy and is seeking public comment. Ohio EPA will consider all comments on the Statement of Basis. After all comments have been considered, Ohio EPA will issue a Response to Comments which will include responses to all written and verbal comments received during the public comment period. Implementation of the final remedies will be required through a modification to the terms and conditions of Materion's Part B permit. Ohio EPA's proposed remedy is summarized below:

WMU 4 (Central Magnesium Fluoride Lagoon)

The proposed remedy for this unit is Remedy Alternative U4-D. This remedy includes limited sludge removal, installation of an engineered control and an environmental covenant and ground water monitoring. It also received the highest overall score when Materion compared their 6 proposed remedies. At least two feet of soil will be removed under this alternative, with lateral excavation continuing until PRGs are met for lead and beryllium. Excavated materials will be characterized and disposed of accordingly. The excavated area will be filled, compacted, and a cap meeting the general requirements of Ohio EPA's CPRG Appendix G, *Final Covers for Hazardous Waste Surface Impoundments, Waste Piles, and Landfills* placed over top. More specifics for cover design will be identified during the CMI Phase and be subject to Ohio EPA's approval.

This alternative controls exposure and reduces risk through its environmental covenant, physical removal of waste, storm sewer installation, and cover system installation. It can be implemented relatively quickly and allows for future industrial use of the unit should Materion choose to do so in the future.

7.0 Summary of Proposed Remedy Meeting Evaluation Criteria

Ohio EPA has determined that the combination of capping technologies, source removal, ground water monitoring, and institutional controls through an environmental covenant as a proposed remedy meets the threshold and balancing criteria outlined in Table 3. Ohio EPA believes the cap will be effective in the short term and reliable and effective for the long term, particularly in combination with the previously mentioned activities. The cap will reduce precipitation infiltration which should reduce the mobility of the materials remaining in Unit 4 and prevent migration of contaminants into the underlying ground water. The protection provided by the capping remedy will extend into the future with continuing inspections and maintenance of the landfill cap.

Continued monitoring of the ground water below the WMUs will help determine the success of the remedies, including that for Unit 4. Oversight by Ohio EPA as construction work is performed will ensure that applicable standards for managing the waste are met. Ohio EPA believes Remedial Alternative U4-D, while more expensive

than Materion’s preferred remedy, U4-B, to be both cost effective and environmentally protective. Ohio EPA believes the proposed remedy will be protective of human health and the environment as removal of the near-surface sludge will reduce the source of contaminants causing potential exposure and will reduce continued leaching of contaminants to ground water. The backfilling and capping activities will further enhance the remedy. Finally, ground water monitoring will serve as an ongoing check of the remedy’s effectiveness. Oversight by Ohio EPA as the remedy is performed will ensure that applicable standards for managing any materials considered to be a regulated hazardous waste are met. The above remedy for the unit is implementable.

8.0 BIBLIOGRAPHY

Cox & Colvin, 2000. RFI Report.

Cox & Colvin, 2011. Corrective Measures Study Revision 2.

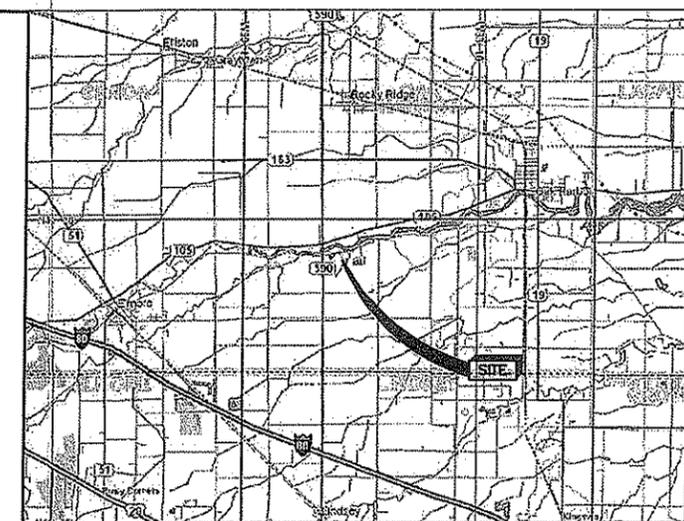
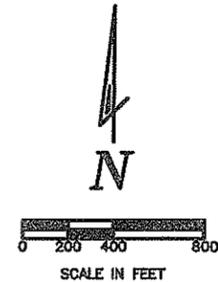
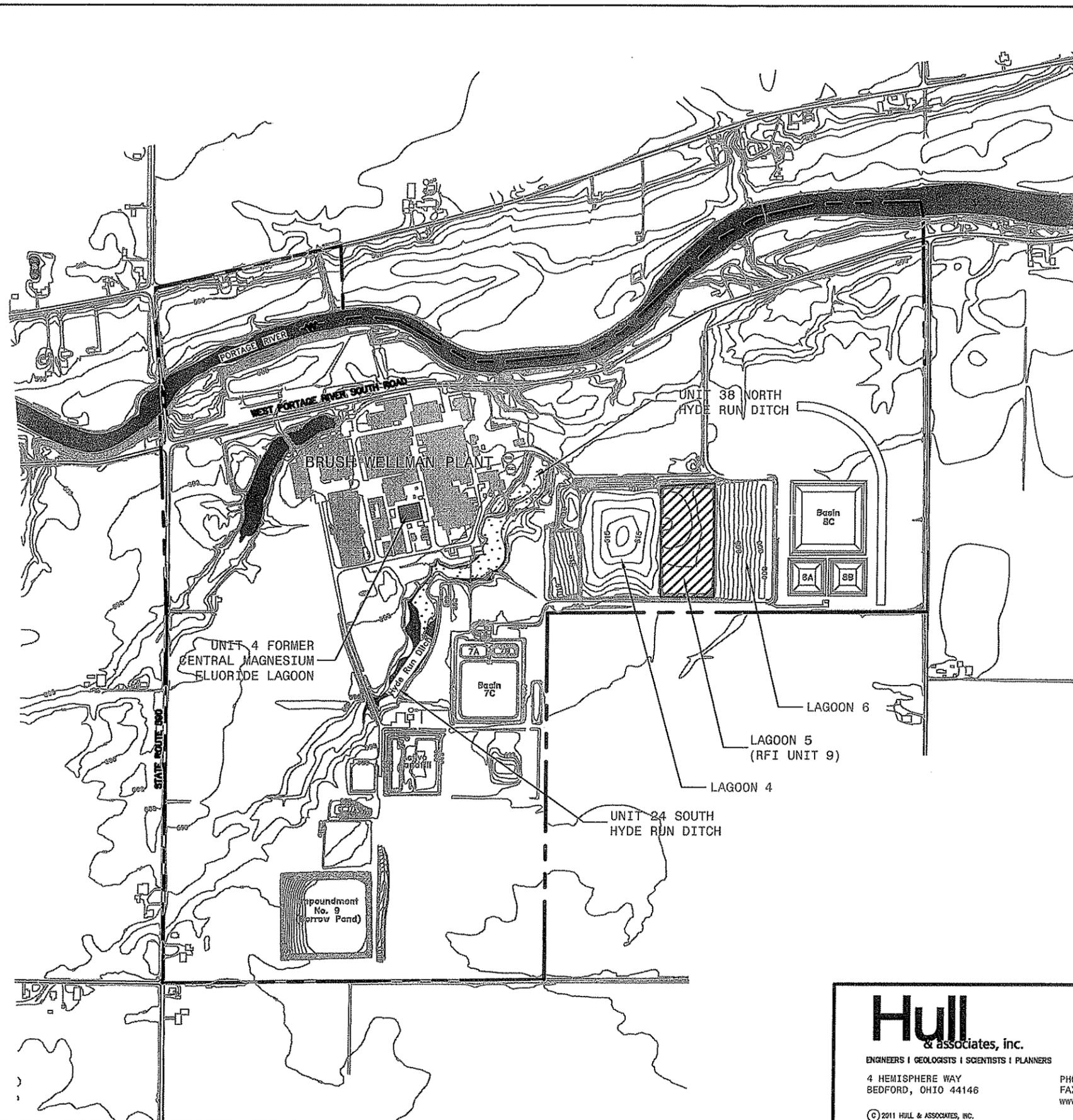
Ohio EPA, 2009. Closure Plan Review Guidance.

9.0 GLOSSARY OF TERMS

Constituents of Concern (COC)	Any contaminant discovered during a facility investigation at a level that has the potential to negatively impact human health or the environment.
Corrective Measures Study (CMS)	A study undertaken whose purpose is to develop and evaluate remedial alternatives for the cleanup of contaminants at a facility.
Environmental Covenant	A legally enforceable document that imposes activity and use restrictions. The land use restriction runs with the land and is binding upon existing and future property owners, should the property be sold.
Institutional Control	Land and water use restrictions to prevent exposures to COCs.

Resource Conservation and Recovery Act (RCRA)	A federal law that regulates the generation, transport, storage, treatment, and disposal of hazardous wastes.
RCRA Facility Investigation	A study conducted to collect information necessary to adequately characterize a site for the purpose of developing and evaluating effective remedial alternatives.
Responsiveness Summary	A summary of all the comments received from the public and Ohio EPA's response to those comments.
Statement of Basis (SB)	Summarizes information contained in RFI/CMS reports and the administrative record. Solicits public comment on all possible alternatives that may not have been identified in the CMS. Is a public participation document and expected to be widely read. Describes the proposed remedy, but does not select the final remedy.
Waste Management Unit (WMU)	Any discernible unit at which wastes have been placed at any time irrespective of whether the unit was intended for the management of hazardous waste; such units include any area at a facility where solid wastes have been routinely and systematically released.
Area of Concern (AOC)	An area that has received, at any time, solid or hazardous waste through deliberate placement of the waste or because of an accidental release or spill.

Site Location Map



VICINITY MAP
USGS MAP
N.T.S.

LEGEND

- — — — — PROPERTY LIMITS
- — — — — 600
- — — — — 2 FOOT CONTOURS

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MATERION BRUSH INC.
ELMORE, OHIO
UNIT 4 CORRECTIVE MEASURES STUDY - REVISION 1

**FIGURE 1
SITE LAYOUT**

PROJECT NO.: BWI024	SUBMITTAL DATE: JULY 2011
CAD DWG FILE: BWI024.100.0001 GAC	PLOT DATE: 7/7/11

OHIO ENVIRONMENTAL PROTECTION AGENCY

**MODIFIED OHIO HAZARDOUS WASTE FACILITY
INSTALLATION AND OPERATION PERMIT**

Date of Issuance:

Effective Date:

U.S. EPA ID No.: OHD 004 212 999

Ohio Permit No.: 3-62-0042

Name of Permittee: Materion Brush Inc.

Mailing Address: 14710 West Portage River South Road
Elmore, Ohio 43416

Facility Location: 14710 West Portage River South Road
Near State Routes 105 and 590
Elmore, Ohio 43416

Person to Contact: Troy Kajfasz

This Modified Ohio Hazardous Waste Facility Installation and Operation Permit is issued pursuant and subject to Section 3734.05(I) of the Ohio Revised Code and Rule 3745-50-51(J) of the Ohio Administrative Code.

The Ohio Hazardous Waste Facility Installation and Operation Permit with the above-referenced permit number, as issued by the Ohio Environmental Protection Agency and journalized on September 20, 2011, is hereby incorporated by reference in its entirety, except as it may be modified herein.

This modification of the permit shall remain in effect until such time as the Ohio Hazardous Waste Facility Installation and Operation Permit is renewed, modified, withdrawn, suspended or revoked.

The modified Terms and Conditions of this permit are attached and are incorporated herein by reference. The modified Terms and Conditions supersede and replace the corresponding pages found in the September 20, 2011, renewal permit.

Scott J. Nally
Director

MODULE E - CORRECTIVE ACTION REQUIREMENTS

E. CORRECTIVE ACTION SUMMARY

The Permittee began corrective action under the authority of U.S. EPA. A Visual Site Inspection (VSI), ~~part of the RCRA Facility Assessment (RFA),~~ was conducted ~~at the facility by Harding Lawson Associates under contract with the U.S. EPA~~ in August, 1987. ~~The report from the VSI was submitted to the facility on September 30, 1987. The report and~~ identified 37 Waste Management Units (WMUs). Of the original 37 WMUs, U.S. EPA determined that 24 WMUs should be included for further action during the RCRA Facility Investigation (RFI).

~~U.S. EPA issued a Federal Part B Hazardous Waste Permit which became effective, for a ten-year period, on August 27, 1992. This permit included a Corrective Action Schedule of Compliance. In accordance with the schedule, the Permittee submitted its Facility Background Report, Potential Corrective Measures Technology (PCMT) Report, and RFI Workplan. The Federal permit lists the requirements for the RFI Workplan. After further consideration, U.S. EPA ultimately determined that only 19 WMUs and one Area of Concern (AOC) for a spill of tetrachloroethylene (PCE) must be included in the RCRA Facility Investigation (RFI) RFI. However, three additional WMUs were later added to the RFI, for a total of 22. These 22 WMUs and the PCE AOC are listed in Permit Condition E.3(a) and can be found in Exhibit B-4, Volume 3 of the permit application.~~

~~Nine of the WMUs were combined in the RFI into three Areas of Investigation (AOIs) because they are located near each other and were used to handle similar waste. The three AOIs include the North Lagoons AOI, the Settling Lagoons AOI, and the Magnesium Fluoride Lagoon/Furnace Rebuild Storage AOI. The WMUs, AOIs and the PCE AOC can be found in Exhibit B-4, Volume 3 of the permit application.~~

Conditional approval of the RFI Workplan was provided by U.S. EPA on September 29, 1994. The Permittee submitted the final RFI Workplan on November 3, 1994. The facility investigation was conducted in two phases. Phase I was implemented between November 1994 and September 1995. The primary focus of Phase I was release verification at individual WMUs and the collection of data characterizing the environmental setting. Approximately 240 soil, sediment, sludge, groundwater, and surface water samples were collected. As a result, the facility's Interim RFI Report was submitted to U.S. EPA in September 1995. Based on the Phase I results, the Permittee elected to implement Interim Stabilization Measures (ISM) for the PCE AOC (release area) to minimize the further spread of contamination in soil and ground water and to reduce the potential threat to human health and the environment. More information concerning these actions can be found in the Final RFI Report dated August 8, 2000.

The Phase II Scope of Work (SOW) was submitted to U.S. EPA in September 1995. The primary focus of Phase II was to determine the extent of contamination and to collect data necessary to support a baseline risk assessment. ~~U.S. EPA and Ohio EPA provided comments on the Interim RFI Report and the Phase II Scope of Work. The Permittee submitted the Phase II RFI Scope of Work Addendum on May 24, 1996.~~ The Phase II field activities began in June 1996 and ended in December 1996. Over 200 soil, sediment, sludge, groundwater, and surface water samples were collected and analyzed. Aquifer testing, sludge depth determination, ground water modeling, ecological reconnaissance inventory, and a baseline risk assessment were part of Phase II. The Permittee submitted the Final RFI Report on August 27, 1997. ~~U.S. EPA and Ohio EPA provided comments and deficiencies on the report in letters dated November 21, 1997, June 25, 1998, October 9, 1998, and April 21, 1999. U.S. EPA conditionally approved the RFI report on June 25, 1998.~~ U.S. EPA approved the Phase II Continuation Scope of Work on October 15, 1999. The results of the Ground Water Quality Assessment Report submitted on February 16, 2000, and subsequent amendments ~~were, have been~~ included in a Revised RFI Report which was submitted by the Permittee on August 25, 2000.

Upon issuance of an Ohio Hazardous Waste Facility Installation and Operation Permit Renewal (renewal permit) on June 14, 2001, Ohio EPA assumed corrective action oversight at the facility. Therefore, the Permittee must follow the work schedule in this permit and submit all required reports to Ohio EPA.

The RFI Final Report was approved by US EPA on January 19, 2001 and was approved by Ohio EPA on February 2, 2005. This report concluded that 3 waste management units must be addressed in the Corrective Measures Study (CMS) phase of the project. A fourth waste management unit, WMU No. 28, the Oil Separator Pond, was also investigated and it was subsequently determined it that it should not be included in the CMS phase. Another WMU was added in 2009 at Ohio EPA's request.

The CMS workplan was approved by Ohio EPA on May 23, 2006. The CMS workplan and implementation schedule required submittal of a Vapor Intrusion Investigation Workplan, Unit 4 Supplemental Investigation Workplan and Project Management Plan. These plans were submitted on November 13, 2006, November 20, 2006 and May 11, 2006 respectively.

~~On June 6, 2007, the facility sent a letter to Ohio EPA describing an environmental covenant to be entered into by the parties during final remedy implementation. The letter identified future land use restrictions at the site.~~

On May 26, 2009, the CMS workplan was revised to incorporate an evaluation of Lagoon 5 (WMU No. 9). This revision was necessary as a condition of the SWMU No. 9 interim measures approval letter of March 4, 2009. This CMS revision was

approved by Ohio EPA on September 15, 2009.

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~~The Unit 4 Supplemental Investigation Workplan was submitted to Ohio EPA on November 20, 2006. Ohio EPA commented on the workplan on February 28, 2007 and July 6, 2007. The facility revised the plan in response to Ohio EPA comments on April 5, 2007 and August 7, 2007. Ohio EPA approved the Unit 4 Supplemental Investigation workplan on September 13, 2007. The plan was implemented between October 2007 and October 2008. On October 6, 2008, the final report on the supplemental investigation was submitted to Ohio EPA. Ohio EPA provided comments on the report in letters dated July 6, 2009 and June 8, 2010. In response to Ohio EPA comments, the facility revised the report on September 2, 2009 and August 10, 2010. The Supplemental Investigation Report final SIR report was approved by Ohio EPA on October 29, 2010. The facility submitted the corrective measures study report for unit 4 to Ohio EPA on February 25, 2011. A second revision to the Unit 4 CMS was received November 2, 2011.~~

The Vapor Intrusion Investigation workplan for non-residential buildings located above a ground water plume containing volatile organic compounds (VOCs) was submitted to Ohio EPA on October 18, 2006 and was approved by Ohio EPA on August 23, 2007. Phase I and Phase II investigations were completed between August 2007 and September 2008. The facility submitted results of sub-slab soil gas sampling on August 30, 2010. Ohio EPA approved the sub-slab soil gas sampling results in a letter dated October 26, 2010.

In addition to the waste management units investigated during the RFI, Materion Brush has identified waste management units (WMU) not previously identified. These WMUs are listed in Permit Condition E.3(b). In accordance with Permit Condition E.10, information pertaining to these new WMUs has been submitted. Ohio EPA has also identified a WMU listed in Permit Condition E.3(c). Ohio EPA will review the information provided by Materion Brush for the WMUs in Permit Condition E.3, paragraphs (b) and (c). Based on the results of this review, a RCRA Facility Investigation (RFI) may be required for these new WMUs. In accordance with Permit Condition E.5 of this permit, Ohio EPA will notify Materion Brush, in writing, of the need to submit an RFI workplan or additional information for the WMUs identified in Permit Conditions E.3(b) and E.3(c).

E.1 Corrective Action at the Facility
OAC Rules 3745-50-10 & 3745-54-101

In accordance with OAC Rule 3745-50-10 waste management unit means any discernible unit at which solid waste, hazardous waste, infectious waste (as those terms are defined in ORC Chapter 3734), constructions and demolition debris (as defined in ORC Chapter 3714) industrial waste, or other waste (as those terms are defined in ORC Chapter 6111), has been placed at any time, irrespective of whether the unit was intended for the management of waste or hazardous waste. Such units include any area at a facility at which wastes have been routinely and systematically

released. For the purpose of Corrective Action, facility is defined as all contiguous property under the control of the owner or operator seeking a permit under Subtitle

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C of RCRA. The terms Interim Measure (IM), RCRA Facility Investigation (RFI), Corrective Measures Study (CMS) and Corrective Measure Implementation (CMI) are defined in U.S. EPA's Corrective Action Plan (CAP) (OSWER Directive 9902.3-2A, May 1994).

The Permittee must institute Corrective Action as necessary to protect human health and the environment for all releases of hazardous wastes or hazardous constituents from any waste management units (WMUs) at the Facility, regardless of the time at which waste was placed in such units.

E.2 Corrective Action Beyond the Facility Boundary
OAC Rule 3745-54-101

The Permittee must implement Corrective Action beyond the Facility property boundary, where necessary to protect human health and the environment, unless the Permittee demonstrates to the satisfaction of Ohio EPA that, despite the Permittee's best efforts, the Permittee was unable to obtain the necessary permission to undertake such actions. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the Facility boundary where off-site access is denied. On-site measures to address such releases will be addressed under the RFI, CMS, and CMI phases, as determined to be necessary on a case-by-case basis.

E.3 Identification of WMUs
OAC Rules 3745-50-44(D) and 3745-54-101

(a) U.S. EPA and the Permittee has identified the following WMUs (SWMUs) which have undergone investigation during the RFI:

1. North Tailings Lagoon No.1
2. North Tailings Lagoon No. 3
3. North Tailings Lagoon No. 5 / Landfill
4. Central Magnesium Fluoride Lagoon
5. South Landfill
6. Inactive Settling Lagoon No. 2 (Closed)
7. Copper Lagoon No. 3 (RCRA Closed)
8. Inactive Settling Lagoon No. 4 (Closed)
9. Active Settling Lagoon No. 5
10. Waste Lagoon No. 6 (RCRA Closed)
11. Lagoon No. 5 Storage Tank
12. Triangular Lagoon (RCRA Closed)
13. South Hyde Run Ditch
14. Oil Separator Pond
15. Alloy Make-up Pond

16. North Hyde Run Ditch
17. Alloy Cooling Pond Sludge Fill Area
18. Fluoride Furnace Rebuild Storage Pad
19. Cast Shop Skimmer Pond
20. Beryllium-Compound Contaminated Waste Drum Storage Area
21. Metallic Beryllium Contaminated Waste Drum Storage Area
22. Old Decontamination Building Solids Settling Tank
23. PCE AOC

Section 5 of the Final RFI Report lists all the WMUs presently evaluated. Exhibit B-4 is a topographical drawing which locates the WMUs. This figure can be found in Volume 3 of the Permit Application.

(b) The Permittee has also identified the following WMUs, which may undergo investigation:

1. Hazardous Waste Container Storage Building
2. Former Pad C
3. New Decontamination Building and Sump
4. Redruming in Oxide Area
5. Redruming in Whiting Area
6. Alloy By-Product Storage Pad
7. Waste Oil Drum Storage Area
8. Basins 7A, 7B, 7C
9. Basins 8A, 8B, 8C
10. Industrial Sewers
11. IWTP Sludge Staging Area
12. Trash Hopper
13. Used Graphite Storage Area
14. Used Fluorescent Bulb Satellite Accumulation Area
15. Landfill Office Septic Tank and Leach Field
16. Perchloroethylene Still Bottoms Satellite Accumulation Area at Scrap Reclamation
17. Perchloroethylene-contaminated Groundwater Satellite Accumulation Area at Perchloroethylene Spill Area
18. MEK/Collodion Waste Satellite Accumulation Area South of Sintering Airlock
19. Laboratory Solvents Satellite Accumulation Area at Analytical Laboratory
20. By-Product Storage Area West of Whiting and Alloy Offices
21. By-Product Storage Area Between Casting & ICC
22. By-Product Storage Area East of Whiting & West of W. Administration

23. By-Product Storage Area Between Resource Recovery & Outside Services
24. By-Product Storage Area Southwest of Sintering
25. By-Product Storage Area West of W. Butler Building
26. Electrical Substation No. 2

(c) Ohio EPA has identified the following WMUs, which may undergo investigation:

1. The Source Area for the Lead Waste Pile;

(d) The following WMUs are included in the IGWMP:

1. Inactive Settling Lagoon No. 2 (WMU #6) (Closed)
2. Copper Lagoon No. 3 (WMU #7) (RCRA Closed)
3. Inactive Settling Lagoon No. 4 (WMU #8) (Closed)
4. Active Settling Lagoon No. 5 (WMU #9)
5. Waste Lagoon No. 6 (WMU #10) (RCRA Closed)
6. Triangular Lagoon (WMU #17) (RCRA Closed)
7. PCE AOC (PCE Release Area)

E.4 Progress Reporting

Beginning the month after permit journalization, the Permittee shall submit a quarterly progress report for all corrective action activities. The report shall be due every three months by the 15th day of the month following the reporting period.

E.5 RCRA Facility Investigation (RFI) OAC Rule 3745-54-101

The purpose of conducting an RFI is to evaluate the nature and extent of releases of hazardous wastes and hazardous constituents from all applicable WMUs. Materion has conducted an RFI to address releases from WMUs identified in Permit Condition E.3 (a) above. Ohio EPA will notify Materion, in writing, of the need to submit an RFI workplan or additional information for the WMUs identified in Permit Conditions E.3(b) and E.3(c). In accordance with Permit Conditions E.10 and E.11, Ohio EPA will determine if an RFI is required for any newly identified WMUs. The major tasks and required submittal dates for any potential forthcoming RFIs are shown below. The scope of work for each of the tasks is found in U.S. EPA's CAP.

(a) RFI Workplan

The Permittee must submit a written RFI Workplan for any newly discovered unit(s) to Ohio EPA on a time frame established by Ohio EPA.

- (i) Within sixty (60) days of receipt of any Ohio EPA comments on the RFI Workplan, the Permittee must submit either an amended or new RFI Workplan that incorporates Ohio EPA's comments.
- (ii) Ohio EPA will approve or modify and approve, in writing, the amended or new RFI Workplan. The RFI Workplan, as approved or as modified and approved, shall be incorporated into this permit and become an enforceable condition of this permit. Subsequent changes to the approved RFI Workplan must be authorized by Ohio EPA.

(b) RFI Implementation

The Permittee must implement the RFI Workplan according to the terms and schedule in the approved RFI Workplan.

(c) RFI Final Report

Within sixty (60) days after the completion of the RFI, the Permittee must submit an RFI Final Report to Ohio EPA. The RFI Final Report must describe the procedures, methods, and results of the RFI. The Final Report must contain adequate information to support further decisions concerning Corrective Action at the Facility.

- (i) Within sixty (60) days of receipt of any Ohio EPA comments on the RFI Final Report, the Permittee must submit either an amended or new RFI Final Report that incorporates Ohio EPA's comments.
- (ii) Ohio EPA will approve or modify and approve, in writing, the amended or new RFI Final Report. The RFI Final Report, as approved or as modified and approved, shall be incorporated into this permit and become an enforceable condition of this permit. Subsequent changes to the approved RFI Final Report must be authorized by Ohio EPA.

E.6 Interim Measure (IM)

The following specific IM(s) have been identified by Ohio EPA:

Settling Lagoon No. 5 was identified as Unit 9 during the RFI. Lagoon No. 5 is an active settling lagoon that receives process waste water and storm water. During the week of August 4, 2008, a confirmed air release of beryllium occurred from this unit and was later attributed to dust from mowing activities along the sides of the lagoon walls. The facility has implemented a series of interim measures to prevent recurrence of beryllium releases from the lagoon. These actions include suspension of all mowing activities inside the lagoon dike walls; installation of a non-

woven geotextile and an approximately 12-inch soil layer to cover sediments along the western wall of the lagoon; and maintenance of water levels within the lagoon above the level of the sediments. These interim measures are to be maintained at Lagoon No. 5, at a minimum, until completion of the evaluation of the interim measures is complete (to be conducted subsequent to the CMS for Units 26 and 38).

Per the March 4, 2009 Interim Measures approval letter, Materion Brush is required to perform monthly inspections of the above-referenced interim measures to ensure that the geotextile/soil layer and water level within the lagoon are adequate to prevent sludge from becoming exposed along the dike wall.

In the event the RFI Final Report or other information documenting a release of hazardous waste or constituents to the environment, Ohio EPA may require (or the Permittee may propose) the development and implementation of additional IM(s) (this may include an IM Workplan) at any time during the life of the permit to mitigate or eliminate a threat to human health or the environment. The Permittee must implement the IM upon a time frame established by Ohio EPA.

E.7 Determination of No Further Action

(a) Permit Modification

Based on the results of the completed RFI or other relevant information, the Permittee may submit an application to Ohio EPA for a permit modification under OAC Rule 3745-50-51 to terminate Corrective Action tasks which are enumerated throughout Section E of the permit. Other Corrective Action tasks identified in Section E shall remain in effect. This permit modification application must conclusively demonstrate that there are no releases of hazardous waste or constituents from WMUs at the Facility that pose an unacceptable risk to human health and the environment.

If, based upon review of the Permittee's request for a permit modification, the results of the completed RFI, and other information, Ohio EPA determines that releases or suspected releases which were investigated either are nonexistent or do not pose an unacceptable risk to human health and the environment, Ohio EPA will approve the requested modification. Decisions regarding the completion of RCRA Corrective Action and no further action may be made for the entire Facility, for a portion of the Facility, or for a specific unit or release.

(b) Periodic Monitoring

A determination of no further action shall not preclude Ohio EPA from requiring continued or periodic monitoring of air, soil, ground water, or surface water, if necessary to protect human health and the environment, when site-specific circumstances indicate that a potential or an actual release of hazardous waste or constituents exists.

(c) Further Investigations

A determination of no further action shall not preclude Ohio EPA from requiring further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates that a release or potential release from a WMU at the Facility may pose an unacceptable risk to human health or the environment. In such a case, Ohio EPA shall initiate a modification to the terms of the permit to rescind the determination made in accordance with Permit Condition E.7(a). Additionally, in the event Ohio EPA determines that there is insufficient information on which to base a determination, the Permittee, upon notification, is required to develop a Work Plan and upon Ohio EPA approval of that Work Plan, perform additional investigations as needed.

E.8 Corrective Measures Study (CMS)

If Ohio EPA determines, based on the results of the RFI and any other relevant information, that corrective measures are necessary, Ohio EPA will notify the Permittee in writing that the Permittee must conduct a CMS either as described below or as described in Ohio EPA's notification to the Permittee. The purpose of the CMS will be to develop and evaluate the corrective action alternative(s) and to outline one or more alternative corrective measure(s) that will satisfy the performance objectives specified in Permit Condition E.9.

(a) CMS Workplan

The Permittee must submit a written CMS Workplan to Ohio EPA within ninety (90) days from the notification by Ohio EPA of the requirement to conduct a CMS.

- (i) Within sixty (60) days of receipt of any Ohio EPA comments, the Permittee must submit either an amended or new CMS Workplan that incorporates Ohio EPA's comments.
- (ii) Ohio EPA will approve or modify and approve, in writing, the amended or new CMS Workplan. The CMS Workplan, as approved or as

modified and approved, must be incorporated into this permit and become an enforceable condition of this permit. Subsequent changes to the approved CMS Workplan must be authorized by Ohio EPA.

(b) CMS Workplan Implementation

The Permittee must implement the CMS Workplan according to the terms and schedule in the approved CMS Workplan.

(c) CMS Final Report

Within sixty (60) days after the completion of the CMS, the Permittee must submit a CMS Final Report to Ohio EPA. The CMS Final Report must summarize the results of the investigations for each remedy studied and must include an evaluation of each remedial alternative.

- (i) Within sixty (60) days of receipt of any Ohio EPA comments, the Permittee must submit either an amended or new CMS Final Report that incorporates Ohio EPA's comments.
- (ii) Ohio EPA will approve or modify and approve, in writing, the amended or new CMS Final Report. The CMS Final Report, as approved or as modified and approved, must be incorporated into this permit and become an enforceable condition of this permit. Subsequent changes to the approved CMS Final Report must be authorized by Ohio EPA.

E.9 Corrective Measures Implementation (CMI)

Based on the results of the CMS, the Permittee must implement one or more of the Corrective Measures authorized by Ohio EPA. Ohio EPA will authorize one or more of the Corrective Measures in the CMS, and will notify the Permittee in writing of the decision. The Corrective Measure selected for implementation must: (1) be protective of human health and the environment; (2) attain media cleanup standards; (3) control the source(s) of releases so as to reduce or eliminate further releases of hazardous waste(s) (including hazardous constituent[s]); and (4) comply with all applicable standards for management of wastes.

If two or more of the Corrective Measures studied meet the threshold criteria set out above, Ohio EPA will authorize the Corrective Measures Implementation by considering remedy selection factors including: (1) long-term reliability and effectiveness; (2) the degree to which the Corrective Measure will reduce the toxicity, mobility or volume of contamination; (3) the Corrective Measure's short-term effectiveness; (4) the Corrective Measure's implementability; and (5) the relative cost associated with the alternative.

(a) Permit Modification

Ohio EPA will initiate a permit modification, as provided by OAC Rule 3745-50-51 to require implementation of the corrective measure(s) authorized.

The Permittee must not implement the corrective measure until the permit is modified pursuant to OAC Rule 3745-50-51.

(b) Corrective Measures

Ohio EPA has determined that the combination of removal, engineering, institutional controls/environmental covenants and ground water monitoring will be effective and reliable corrective measures for Unit 4-Central Magnesium Fluoride Lagoon.

(i) The permittee shall implement corrective measures as described below:

(a) Removal of soil and residual sludge to a minimum depth of two feet.

(b) Excavation of soil and residual sludge laterally until the lead and beryllium Preliminary Risk Goals (PRGs) of 945 mg/kg and 2,000 mg/kg, respectively, are confirmed by analytical testing

(c) Excavation, characterization, and disposal of soils in accordance with applicable federal and state laws and regulations.

(d) Filling and compacting of the excavated area to provide a suitable subgrade and elevation for the cover system.

(e) Design of the cover system in general accordance with Appendix G of Ohio EPA's Closure Plan Review Guidance. Specific cover design, grading, subgrade thickness and storm sewer configuration will be identified during the Corrective Measures Implementation (CMI) phase, but is expected to contain a 20 mil-thick HDPE barrier membrane overlain by a sand drainage layer, aggregate base, and asphalt. A storm sewer will drain the cover and surrounding area and be connected to an existing storm sewer.

(ii) Within forty-five (45) days of issuance of this permit modification, the Permittee must submit a ground water monitoring program for Unit 4 which contains at least the following provisions:

(a) Ground Water Sampling Procedures including:

- (i) sampling preparation and equipment maintenance
- (ii) well inspection
- (iii) ground water level measurements
- (iv) well purging
- (v) sample collection
- (vi) sample labeling
- (vii) field measurements and calibration
- (viii) field quality/quality control
- (ix) sample volume, preservation, containers, and holding times
- (x) sample handling, chain-of-custody control, and shipping procedures

(b) Monitoring well installation and abandonment activities including:

- (i) installation time-frame
- (ii) installation and abandonment techniques
- (iii) construction materials
- (iv) well installation
- (v) well development
- (vi) quality control for monitor well drilling and installation
- (vii) monitor well surveying

(c) Ground Water Monitoring Program including:

- (i) monitoring overview
- (ii) parameter list
- (iii) analytical methods and practical quantitation limits (PQLs)
- (iv) statistical analysis
- (v) provisions for characterizing and responding to statistical exceedances

(c) Environmental Covenant

The Permittee must obtain an Environmental Covenant in accordance with Ohio's Environmental Covenant law, Ohio Revised Code sections 5301.80 to 5301.92, that will declare the site is restricted to industrial use only and prohibit the use of on-site ground water for potable purposes.

(d)(b) Financial Assurance
OAC Rule 3745-54-101

As part of the modification of this permit to incorporate CMI, the permittee shall provide financial assurance in the amount necessary to implement the corrective measure(s) as required by OAC Rule 3745-55-011 (b) and (c).

~~Within thirty (30) days after receiving approval of the CMI, the Permittee must provide financial assurance in the amount necessary to implement the corrective measure(s) as required by OAC Rule 3745-54-101 (B) and (C).~~

E.10 Newly Identified WMUs or Releases
OAC Rule 3745-54-101

(a) General Information

The Permittee must submit to Ohio EPA, within 30 days of discovery, the following information regarding any new WMU identified at the Facility by Ohio EPA or the Permittee:

- (i) The location of the unit on the site topographic map;
- (ii) Designation of the type of unit;
- (iii) General dimensions and structural description (supply any available drawings);
- (iv) When the unit was operated; and
- (v) Specification of all waste(s) that have been managed at the unit.

(b) Release Information

The Permittee must submit to Ohio EPA, within thirty (30) days of discovery, all available information pertaining to any release of hazardous waste(s) or hazardous constituent(s) from any new or existing WMU.

E.11 Corrective Action for Newly Identified WMUs and Releases
OAC Rule 3745-54-101

If Ohio EPA determines that a RFI is required for newly identified WMUs, the Permittee must submit a written RFI Workplan to Ohio EPA upon a time frame established in written notification by Ohio EPA in accordance with Permit Condition E.5. This determination will be made based on the information submitted in accordance with Permit Condition E.10.

Further investigations or corrective measures will be established by Ohio EPA.

Permittee must make such submittal in accordance with time frames established by Ohio EPA.

E.12 Completion of Corrective Action
OAC Rule 3745-54-101

After completing Corrective Action as necessary to protect human health and the environment for all releases of hazardous wastes or hazardous constituents from any WMUs at the Facility, the Permittee shall submit a Corrective Measures Completion of Work (CMCW) Report. The CMCW Report shall document that Corrective Action construction is complete, cleanup objectives and standards have been met, and any releases of hazardous waste or constituents no longer pose an unacceptable risk to human health and the environment. The CMCW Report may be submitted for any part of the Facility for which corrective measures are complete, or for the entire Facility. The CMCW Report must be submitted as a request for permit modification pursuant to OAC Rule 3745-50-51.

E.13 Documents Requiring Professional Engineer Stamp
ORC Section 4733.01

Preparation of the following Corrective Action documents constitutes the "practice of engineering" as defined by ORC Section 4733.01:

Final Interim Measures Report
Corrective Measures Final Design
Corrective Measures Construction Completion Report
Corrective Measures Attainment of Groundwater Performance Standards Report
Corrective Measures Completion of Work Report
As such, the Permittee must ensure that these documents, as submitted to Ohio EPA, are stamped by a Professional Engineer licensed to practice in the State of Ohio.