TECHNICAL SUPPORT DOCUMENT (TSD)

September 2017
(Revised: February 7, 2022)

I. GENERAL COMMENTS:

A. Company Information

Business Name: Materion Brush Inc. DBA Materion Ceramics

Facility Address: 6100 S. Tucson Blvd., Tucson, Arizona 85706
Mailing Address: Same as Facility Address

B. Background

Materion Brush Inc. (MBI) submitted an application for renewal of the air quality permit on March 23, 2017. The permit was deemed administratively complete on April 28, 2017. This TSD is written in support of the renewal application.

The facility meets the definition of a ceramic plant and machine shop that processes beryllium oxide (BeO). MBI fabricates various BeO and other ceramic products used in the integrated circuit electronics industry. In general, many operations at MBI revolve around the engineered formulation and processing of BeO powder, pressing of BeO parts, and firing of BeO parts into BeO ceramic, and ultimately the machining of those ceramic parts to certain specifications.

The facility is required to obtain an air quality permit due to being subject to the National Emission Standard for Hazardous Air Pollutants (NESHAPS) for Beryllium (40 CFR 61, Subparts A and C) which prohibits the emission of more than 10 grams of beryllium over a 24 hour period. It is important to note that the 10 - gram limit includes both fugitive and non-fugitive emissions.

Compliance with the standard is maintained by using a facility-wide dust collection system consisting of four subsystems that filter out the air, and remove particulates using High Efficiency Particulate Air (HEPA) filtration. The filtered air ultimately combines downstream of the final HEPA filters and is exhausted from a single emission point (stack) at the facility. Compliance with the permit is also maintained by the use and implementation of approved operation and maintenance (O & M) and pollution prevention procedures.

Emissions from the single emission point allows MBI to meet verification performance testing requirements by the use of standard stack testing methods. MBI has received approval from the Administrator (see EPA Letter to PDEQ dated September 3, 1992) to modify EPA Test Method 103 or 104 to include the use of an in-stack filter as described in EPA Test Method 17. This approved testing change allows the filter to be sealed immediately after the test and shipped to the laboratory for analysis. It eliminates the testing site cleaning of the probe which may be more conducive to errors. The letter from EPA to PDEQ is dated September 3, 1992, and is attached as Appendix I at the end of the technical support document.

MBI installed a continuous emissions monitoring system that utilizes triboelectric technology in an effort to improve the real-time emissions monitoring capabilities at the facility. The continuous monitoring system is capable of detecting levels of particulate emissions much smaller than the applicable standard. The system in addition to monitoring emissions from the stack, also monitors emissions between the initial and final filters on the Torit, 15K and 40K particulate filtration subsystems, and after the final filter in the EF-1 particulate filtration subsystems.

A significant permit revision was submitted and the permit revised on April 29, 2015, to include monitoring of the Auburn triboelectric particle detectors into the existing permit and to exclude the requirement to conduct performance stack testing unless required by the Pima County Department of Environmental Quality (PDEQ). The decision to exclude MBI from the requirement to conduct annual performance stack testing was based on the historical test results over the previous 10 years and MBI's voluntary efforts to install advanced equipment for monitoring the performance of the stack and particulate filtration subsystems.

Solvents, acids, and bleaches are also used in processes at the facility as cleaning agents and binders but none in sufficient quantities to trigger permitting thresholds. Several fossil fuel fired commercial and industrial equipment (boilers and heaters) are used at the facility for purposes of material prep, heating water and temperature control for the facility.

MBI continues to evaluate other processes, products, and markets. One such product currently under R&D is a Cadmium-Zinc-Tellurium target used in the manufacture of solar equipment.

The Table below summarizes the permit actions taken since the last permit renewal.

Table 1A: Summary of Permit Actions within the Previous Permit Term

Date Received/ Approved	Permit Action
Approved 4/10/2013	1571-16P: Permit Amendment: Request to remove the daily pressure drop reading requirement in Forms EV-4-0069 and EV-4-0133 based on installation of the automatic shutdown system installed prior to the issuance of the 2006 renewal permit and explained in the previous TSD issued with the 2006 and the 2012 renewals. (See Section XI. Previous Permit Conditions).
Received 03/04/2014 Approved 4/23/2014	1571-17P: Minor Revision: Application proposing the addition of three screen printers at the facility to apply molybdenum/manganese base coats to parts.
Received 07/15/2014 Approved 4/29/2015	1571-18P: Significant Permit Revision: Application proposing to incorporate the Auburn Tribo particle detectors into the existing permit as an additional qualitative monitoring system for the pollution control equipment.
Received 4/27/2015 Approved 4/28/2015	1571-19P: Facility Change allowed without permit revision Replacement of K.O. Lee grinder with newer Eco Tech replacement grinding unit.
Received June 11, 2015	1571-20P: O & M Plan Submittal for Aqua Regia Operation: Received the Aqua Regia Operation and Maintenance Plan (document CX-3-0014, Revision B) as detailed in permit condition Part C.IV.1).
Received/Approved 8/27/2015	1571-21P: Change of the primary Responsible Official Replacement of Jeffrey Zenan as the primary R.O. to replace Ken Harrison. And the addition of Joshua Schiro as an additional R.O.
Received 1/19/2016 Approved 1/21/2016	1571-22P: Facility Change allowed without permit revision Request to amend permit for the change/replacement of the Bryan steam boiler (Cap. 1.5 MMBtu) with a new Parker Boiler (Cap. 1.26 MMBtu).
Received 6/7/2016 Approved 8/19/2016	1571-101P [1] : Facility Change without a permit revision Proposal to Calcine liquid Beryllium Hydroxide in the TK4 Kiln to produce BeO powder.
Received March 23, 2017	1571-102P: Application to renew current permit.

[1] New permit action numbering system begun with the Accela Automation system, Pima County's civic platform database.

The Table below summarizes the permit actions taken since the last permit renewal.

Table 1B: Summary of Permit Actions within the Current Permit Term

Date Received/ Approved	Permit Action
Received 3/29/2019 Approved 04/09/2019	1571-104P: Facility Change without a permit revision Notice and approval to install Optisonic 550 X (5-axis machine) in the complex machining area of the plant.
Received 12/17/2018 Approved 01/02/2019	1571-103P: Facility Change without a permit revision Starting January 1, 2019, the source legal name was change from Materion Ceramics Inc. to Materion Brush Inc. Updated Permit cover and TSD to reflect change.
Received 10/28/2021 Approved 11/01/2021	1571-106P: Facility Change without a permit revision Starting 11/01/2021, Materion will receive Lithium Carbonate and Alumina powders for processing through existing Tunnel Kiln #4. No changes to existing equipment and potential to emit. Updated TSD to reflect change.

II. FACILITY DESCRIPTION

A. Process Description

Beryllium Ceramic Production Process:
On August 19, 2016, MBI received approval to begin a new process at the facility to calcine beryllium hydroxide liquid to produce up to 273 lbs/day of THOX (Thermalox-V) BeO powder using the existing TK4 Kiln located in Room 28. The kiln will be vented to a scrubber inside the plant to remove potential acid gases released during the new process. The scrubber exhausts inside the room. The BeO powder produced will be processed and used in the exact same manner and in addition to the UOX powder historically received at the plant for manufacturing the various BeO ceramic products.
The BeO ceramic production process begins in the material preparation area. The BeO powder goes through various steps which may include introducing additives and binders, wet milling, and spray drying in preparation for the forming processes. After the powder is placed in containers, it is transported to three forming production areas as described below. Dry Pressing is used in the Dry Pressing area (Room 32), Extrusion in the Extruded Products area (Room 16), and isostatic-pressing in the Laser Forming/Machining area (Rooms 36 & 38). The final stage of ceramic parts production involves firing the formed parts which is performed in various kilns located throughout the plant in Rooms 17, 28, 29, 25, 16, 32, and 43.

Dry Press Areas (Room 32):
Using a variety of mechanical or hydraulic presses, parts are formed in the dry pressing area after which they are placed in kilns for firing. If required, parts are then sent to machining, lapping, or inspection areas depending on product specifications. During various stages, the parts also may be deburred, cleaned, and rinsed. The products are finally inspected and packaged for stock or shipping.

Extruded Products Area (Room 16):
An extrusion press is used to form varying rod products. Similar to the pressing area process, parts are placed in kilns for firing upon which any required final machining to customer specifications is performed. Parts are then cleaned, inspected and packaged for stock or shipping.

Lasers Forming/Machining Area (Rooms 36 & 37):
This area uses an ISO Static press (Iso-press) to form cylindrical, square or rectangular shapes. The next step termed "green machining", is a rough machining of unfired cylindrical parts after the forming process. The parts are then placed in kilns for firing. Required final machining to customer specifications is performed following firing. Other shapes that are Iso-pressed are typically fired first and then sent for final machining operations. The parts are finally cleaned, inspected and sent for either metallizing or packaged for stock or shipping.

Metallizing/Clean Room/Firing Areas (Rooms 29, 30, & 50):
Metallization can include roll-coating, spraying or screen printing of a moly manganese base coat onto the parts. Parts are then fired in hydrogen atmosphere furnaces. Parts that require nickel plating are then taken through an electrolytic process. The final step for these parts is cleaning, inspection and packaging in preparation for delivery to the customer.

Aqua Regia Cleaning Process - Area (Room 28):
This process is used to perform special cleaning of BeO parts using either an ultrasonic cleaner and phosphoric acid solution or an Aqua Regia acid solution. The processes are accomplished under a ventilation hood and the vapors scrubbed through a countercurrent scrubber column using an alkaline solution to scrub the acid vapors. The scrubber discharges directly inside Room 28.

Other Materials & Research & Development

Alumina Process:
MBI has been manufacturing alumina ceramics for several years. Alumina is a mid-grade alternative to BeO for some applications and generally not considered to be a significant health hazard. When processed it is handled exactly the same way as the BeO ceramic products.

Cadmium-Zinc-Tellurium Target R&D activities:
In the *Cadmium-Zinc-Tellurium Target* manufacturing process, powder is formed and machined for the purposes of delivery to the customer. This process is in the new product development stage and is therefore still under Research & Development (R&D). When used on some machines, portable HEPA filtration is employed during those operations. If MBI goes into regular production for this process MBI will revise the permit and likely install HEPA or wet filtration device on the machines involved and vent the exhaust from the control devices inside the plant.

YAG R&D activities:
MBI has recently begun R & D production of Ytria-Alumina-Garnet (YAG) ceramic to be used as a transparent ceramic for some applications. YAG is not generally considered to be a significant health hazard. When processed it is handled exactly the same way as BeO and alumina.

B. Air Pollution Control Equipment

Facility-Wide Particulate Collection and Control System

All manufacturing or support operations with the potential to generate airborne beryllium containing particulate are controlled by a facility-wide dust collection system. This system includes four separate subsystems identified as air pollution control equipment at the facility and includes:

- a 15K cfm dust collecting system consisting of a 60 Cartridge filter unit and a High Efficiency Particulate Air (HEPA) triple stage final filter house;
- a 40K cfm dust collecting system consisting of two Farr 80 filter units and a HEPA double stage final filter house;
- a Torit 7K cfm triple stage HEPA filtered dust collecting system and;
- a 6.5K EF-1 Air (HEPA) filtration system.

All four collection and control subsystems combine and are routed to a single stack to be exhausted. Production operations that would involve the potential emissions of beryllium, either utilize wet methods and are completely enclosed (hooded), or use a high vacuum pick-up sweep at the point of operation for capture of beryllium containing particulate material. Airflow from the systems is routed to one of the air pollution control (APC) units for removal by filtration. There are several cleaning air showers at the facility. The exhausted air from these APC units is either HEPA filtered outside the building or have self-contained HEPA filters within the unit. In either case, exhaust air ultimately is vented through the control systems before being released to the ambient air. The systems are continuously monitored with differential pressure gauges that will cause an automatic shutdown should the differential pressure go outside the permitted set points due to a malfunction of the filtration subsystems.

Auburn Triboelectric Particulate Probes - Qualitative Particulate Monitoring Systems

The facility operates a qualitative monitoring system for the pollution control equipment in operation. MBI has installed particle probes to provide continuous monitoring for particulates that may be present in the exhaust air that passes between the primary filters and the final filters on the four (4) subsystems. A final particle probe monitors the combined exhaust air from all subsystems prior to being discharged to the ambient air from the stack.

A base station has been installed with capabilities of monitoring pre-set alarms for notification and response purposes. The alarm levels have been established to be indicative of a primary filter failure. A diagram of the pollution control equipment and the location of the particle detector probes is provided in Attachment 3 of the permit.

Vents and Exhaust Fans - Emission Control

MBI has identified several "building penetrations" (i.e., exhaust or intake vents that are not routed to any control system) that exist at the facility. These exhaust/intake vents fall into seven main categories:

- Powered Exhaust Fans in Production Areas
- Powered Exhaust Fans in Non-Production Areas
- Relief Vents in Production Areas
- Relief Vents in Non-Production Areas
- Gas Vents from Area Heaters in Production Areas
- Gas Vents from Area Heaters in Non-Production Areas
- Make-Up Air Intakes

Of these seven main categories of "building penetrations", the category of most concern are the powered exhaust fans in production areas. The powered exhaust fans in the production areas, which are all mounted in or near the building roof, have the greatest potential to contribute to fugitive emissions. Twelve of these vents were identified in the MBI letter dated February 28, 2001.

III. REGULATORY HISTORY

A. Testing & Inspections

Testing and inspections have occurred regularly and there have been no reports of exceedances or violations recorded in the last permit term. Since the APC subsystems are routed to a single stack, it allows the use of standard stack testing methods using EPA Method 103. MBI obtained EPA approval to modify the test to include and in-stack filter in order to provide more efficient sample collection. The last full compliance inspection was conducted on June 5 and 8, 2015, and the facility was determined to be compliant.

Vent & Exhaust Fan Testing & Results

Historical records show that when the plant was originally built in 1979 and 1980, some vents were tested. The Control Officer required MBI to test for beryllium emissions from other vents as they were located in the production area. Of the twelve vents, five were selected to be tested based upon stack configuration, production area vented, and potential for emissions. Such tests, using EPA Test Methods 1 through 4 and 104, were conducted on May 23, 2001, and on May 29, 2001. Test results showed non-detect levels of beryllium using the analytical method, effectively zero emissions from the vents.

In a previous TSD, a hypothetical number using the detection limit of 0.145 grams of beryllium per 24-hour period from tested vents was used to estimate the potential to emit (PTE) from all the vents (tested and untested). This led to a number of 0.4 grams of beryllium per 24-hour period. This methodology was revisited following public comment during the renewal permit process. Upon further review, the Control Officer determined the methodology was erroneous and misleading. Testing of the vents completed by reputable testing companies in 2001 and 2010 has shown non-detect levels of beryllium emissions and these are the actual results from the vents and not the hypothetical number of 0.4 grams of beryllium per 24-hr period.

Concurrent with the 2001 testing of the exterior vents, indoor sampling was conducted in the production areas using NIOSH Methods 7102 and 7300 in an attempt to determine a relationship between concentrations of beryllium in the production areas and the amount of beryllium exhausted through the uncontrolled vents, even though no powered exhaust vents are located in rooms where beryllium powder is used. Indoor sampling results (nine samples taken at normal production levels, or 4 to 6 feet above floor level) yielded beryllium concentration values that ranged from 0.0502 μg per m3 of sampled air at the low end to 0.0573 μg per m3 of sampled air at the high end. Although no exact quantitative relationship between indoor beryllium concentrations and outdoor beryllium vent exhaust amounts could be derived because of differences in the test methods, a qualitative appraisal suggests that the indoor and outdoor results are reasonably consistent. This qualitative relationship is important because indoor sampling is conducted and recorded much more frequently than the exterior testing. Thus if indoor sampling conducted on a more frequent basis consistently shows minute beryllium concentrations, there will consistently be non-detect emissions at all vents based on non-detect vent testing results.

It is unlikely for beryllium to be emitted from the powered exhaust vents (as demonstrated by the testing in 2001 and 2010) as there are no powered exhaust vents located in rooms where beryllium powder is used. However, the Control Officer believes it is appropriate for MBI to maintain internal operating procedures that would require MBI staff shutting down the powered exhaust fans in affected production areas as one of the first actions taken in the event of a beryllium powder spill in any of these rooms. The permit contains permit conditions requiring the Permittee to follow these procedures.

PDEQ does not require periodic testing of the powered exhaust vents in these areas since there are no beryllium forming or machining processes in these areas. The firing rooms where vents 1-7 are located contain kilns where products are already formed and no beryllium oxide powder is used. The room where lapping is performed is a self-contained room in firing room #2 with its own air intake and air handler that is HEPA filtered and does not affect vents 2 and 3.

The lapping room designation is used to identify the approximate location of these two vents and not the rooms they draw air from. The affected room contains electric furnaces that do not affect the lapping room itself. Lapping is performed in a self-contained room within the room containing the kiln(s). This was verified by PDEQ permitting staff during a physical inspection completed on September 17, 2012.

Based on the above, it is highly unlikely that there will be any beryllium emissions found in these exhaust vents. The powered exhaust vents are in place to reduce the heat loading from the electric furnaces in these areas. MBI is required to perform weekly inspections of the powered vents, as well as doorways, outside duct work, and pollution control devices for any maintenance needs or evidence of beryllium emissions.

In addition to the monitoring requirements, should a powder spill occur MBI is also required, by the permit, to immediately activate a beryllium oxide spill response plan and isolate the area, turn off any powered exhaust vents that may be located in adjacent rooms, thoroughly clean the affected area, follow thorough decontamination procedures and document the spill in the facility Incident Management System.

These and other internal procedures not highlighted in the permit are followed by MBI to ensure that no emissions of beryllium will occur from the vents and exhaust fans.

B. Permit Deviation Reports

Table 2: Summary of Permit Deviations within the Previous Permit Term

Date	Permit Deviation/Notification
June 5 & 6, 2015	1571-3D: Deviation Report Description: Failed to report a stack particle probe alarm condition within 24 hours on May 16, 2015. Failed to submit the 2014 BACT report with 30 days of the permit anniversary date. Failed to submit a timely O & M Plan for the Aqua Regia cleaning station. Corrective Actions: MBI misunderstood the requirement to report any and all stack probe alarms even in the event of a precipitation event or during a planned shutdown. A database system was implemented to place reminders for the required annual or periodic reports.
August 22, 2015	1571-4D: Deviation Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.
August 28, 2015	1571-5D:Deviation Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period on August 10th due to precipitation event while operations and the APC systems were off-line.
September 5, 2015	1571-6D: Deviation Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.
October 17, 2015	1571-7D: Deviation Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.
April 10, 2016	1571-0001R: Report [1] The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.
June 11, 2016	1571-0001N: Notification The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.

Date	Permit Deviation/Notification
June 26, 2016	1571-0002R: Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.
June 29, 2016	1571-0003R: Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were on-line at the time. During stack probe alarm, none of the upstream probes before the stack probe registered any increase in particle emissions. Heavy enough precipitation has been observed to be able to can enter the exhaust ductwork past the rain guards near the blower seal and cause water to be impact the stack probe alarm. No corrective action required.

Date Received/ Approved	Permit Action
July 1, 2016	1571-0002N: Notification The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were generally off-line. One 6 hour period when APC was on-line, but no beryllium generating operations were in operation. During period no upstream particle probe alarms in front of the final HEPA filters alarmed when the APC was on-line. Heavy enough precipitation has been observed to be able to can enter the exhaust ductwork past the rain guards near the blower seal and cause water to be impact the stack probe alarm. No corrective action required.
July 17, 2016	1571-0004R/0003N: Report/Notification The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.
July 28, 2016	1571-0005R: Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were on-line at the time. During stack probe alarm, none of the upstream probes before the stack probe registered any increase in particle emissions.
July 29 – August 1, 2016	1571-0006R: Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.
August 9, 2016	1571-0007R: Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were on-line at the time. During stack probe alarm, none of the upstream probes before the stack probe registered any increase in particle emissions.
September 7, 2016	1571-0009R: Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were on-line at the time. During stack probe alarm, none of the upstream probes before the stack probe registered any increase in particle emissions.
September 30, 2016	1571-0010R: Report The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.
December 17, 2016	1571-0004N: Notification The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.

Date Received/ Approved	Permit Action
December 24 – Jan.1, 2017	1571-0005N: Notification The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were generally off-line. Once 6 hour period when APC was on-line but no beryllium generating operations were in operation. During period no upstream particle probe alarms in front of the final HEPA filters alarmed when the APC was on-line. Heavy enough precipitation has been observed to be able to can enter the exhaust ductwork past the rain guards near the blower seal and cause water to be impact the stack probe alarm. No corrective action required.
April 2, 2017	1571-0006N: Notification The stack particle probe alarm averaged more than 100 pA for more than a 5 minute period due to precipitation event while operations and the APC systems were off-line.

[1] New permit action numbering system began with the Accela Automation system, Pima County's civic platform database.

As can be seen from the permit deviations and excess emission notifications/reports received by PDEQ during the previous permit term, the stack particulate probe predominantly generates alarms during precipitation events during non-business hours when operations and the APC systems are off-line. On 6 occasions the APC systems were on-line but the upstream particulate probes did not alarm or register increases in particulate emissions. PDEQ has added provisions to the permit that exempts the Permittee from notifying and filing reports for alarm conditions when the stack particle probe alarm averages more than 100 pA for more than a 5 minute period, during precipitation events occurring during non-business hours, when the APC systems are off-line, provided the documentation is maintained on site verifying the precipitation event and off-line status of the operations and APC during the period of the stack probe alarm.

IV. EMISSION ESTIMATES

A. Facility Wide Estimates

Source information for the Potential to Emit Summary tables is taken from the MBI application submitted for the renewal.

1. **Beryllium oxide operations** - Character of Emissions: Controlled Non-Fugitive.
MBI operations include pressing, firing, drilling, grinding, milling, abrading, and otherwise shaping of BeO material. There are no emission factors in AP-42, the EPA's FIRE database, or in any other document researched by PDEQ. The PTE for beryllium operations will default to the federal standard for beryllium (40 CFR Part 61, Subpart C). That standard is set at no more than 10 grams of beryllium over a 24-hour period (0.004 Tons per Year) and does not distinguish between fugitive and non-fugitive emissions.

2. **Natural Gas Fuel Fired Equipment** - Character of Emissions: Uncontrolled Non-Fugitive.
MBI has several pieces of natural gas burning equipment on site. The two largest are the Ajax boilers (rated at 3.0MMBtu per hour) and the Parker boiler (rated at 1.26 MMBtu per hour). Comfort heaters used at the facility totaling 1.74 MMBtu/hour have been determined by the Control Officer as deminimus emission sources and insignificant activities in accordance with PCC 17.04.340.A(114). Emission estimates are based on the emission factors in AP-42 Tables 1.4-1 through 1.4-4 (7/98version). Estimates are based on uncontrolled, continuous firing for 8760 hours per year for the current equipment list in the permit for the facility.

Natural Gas Fuel Fired Equipment	
Pollutant	**Tons per Year**
Nitrogen Oxides	2.41
Carbon Monoxide	2.03
Sulfur Dioxide	0.015
Particulate Matter*	0.18
Volatile Organic Compounds	0.13
Lead	Negligible
Hazardous Air Pollutants	0.05

*Assumes all particulate emissions are PM_{10}

3. **Solvent Operations** - Character of Emissions: Controlled and uncontrolled non-fugitive. MBI uses different types of solvents in its operations as both cleaning and binding agents. The VOC emissions worksheet in the application based on annual usage lists total VOC emissions rate of 0.53 lb per hour for solvent-using operations. Not all of the operations have identical annual operating hours. For potential to emit (PTE) estimates, all operations are assumed to operate the maximum 8760 hours per year.

   PTE_{VOC} = 0.53 lb/hr x 8760 hr/yr x 1 ton/2000 lb = 2.31 tpy

4. **Hazardous Air Pollutants** - Character of Emissions: Generally controlled non-fugitive. There are four processes where hazardous air pollutants are emitted during facility operations other than beryllium generating operations, and the HAPs generated from natural gas commercial and industrial equipment listed above. Some Nickel is emitted in the nickel plating operation, a small amount of HCL is emitted in the plating and cleaning processes, the potentials for the cadmium and fugitive HAP from solvents is estimated below. HAP emissions from the beryllium and combustion flue gas are accounted for in IV.A.1 & 2 of the TSD.

   $PTE_{cadmium}$ = 1.41 lb/yr $_{max\ removal}$ x 1 ton/2000 lb x (1-99.97%$_{CE}$) = 2.12×10^{-7} tpy

   PTE_{Ni} = 9.05×10^{-5} lbs/Amp-hr x 0.81Amp-hr/hr x 8760 hr/yr x 1 ton/2000 lb = 7.29×10^{-7} tpy

   PTE_{HCl} = 785 lbs/year $_{max\ usage}$ x 1 ton/2000 lb = 0.39 tpy

   $PTE_{Volatile\ HAP}$ = 1.65 lbs/year $_{max\ usage}$ x 1 ton/2000 lb = 8.25×10^{-4} tpy

B. Potential-to-Emit Summary

The following table of emission estimates represents MBI's potential to emit for the facility.

Table I – Potential to Emit

POTENTIAL TO EMIT SUMMARY (TONS PER YEAR)	
Conventional Pollutants	
Nitrogen Oxides (NO_X)	2.41
Carbon Monoxide (CO)	2.03
Sulfur Dioxide (SO_X)	0.015
Particulate Matter (as PM_{10} not including HAPs)	0.18
Volatile Organic Compounds (not including HAPs)	2.31
Lead	Negligible
HAPs	
Beryllium[1]	0.004
Hydrogen Chloride	0.04
Volatile HAPs	8.25×10^{-4}
Cadmium	2.12×10^{-7}
Nickel	7.29×10^{-7}
Total HAPs	0.0448

[1] Based on the potential to emit estimates as provided in the application and the control equipment required to maintain the 10-gram beryllium standard, MBI is a Class II synthetic minor source of both PM_{10} and HAP emissions and a true minor source of all other pollutants. The facility is a Class II facility due to being subject to 40 CFR Part 61 – Subpart C National Emission Standard for Beryllium.

V. APPLICABLE REQUIREMENTS

A. Code of Federal Regulations (CFR):

40 CFR Part 61 Subpart A General Provisions
40 CFR Part 61 Subpart C National Emission Standard for Beryllium

B. Pima County Code (PCC) Title 17

MBI is also subject to local (Pima County) air pollution emission standards. The specific Pima County conditions applicable to MBI are identified below:

17.12.185.A.2 Permit Contents for Class II and III Permits
17.16.050 Visibility Limiting Standards
17.16.100 Particulate Materials
17.16.130 Applicability
17.16.165 Standards of Performance for Fossil-Fuel Fired Industrial and Commercial Equipment
17.16.430.F&G Standards of Performance for Unclassified Sources
17.16.530 National Emission Standards for Hazardous Air Pollutants
17.20.010 Source Sampling, Monitoring, and Testing
17.24.050 Reporting as a Permit Requirement

C. Pima County State Implementation Plan – SIP Rule:

Rule 316:	Particulate Materials
Rule 343:	Visibility Limiting Standard
Rule 321:	Emission-Discharge Opacity Limiting Standards
Rule 332:	Emissions-Discharge Mass Limiting Standard

VI. PERMIT CONTENTS

The following section of the TSD refers to the specific conditions of the permit and explains in detail why the permit was written as presented.

PART B: BERYLLIUM PROCESSING SPECIFIC CONDITIONS

A. Applicability:

MBI is subject to federal National Emission Standard for Hazardous Air Pollutant (NESHAP) under 40 CFR Subpart 61 National Emission Standard for Beryllium. The standard limits beryllium emissions from the stack to 10 grams per 24 hour period. The subpart lists ceramic plants and machine shops processing beryllium and beryllium oxide as subject to the standard. Since MBI operates both a ceramic plant and a machine shop that performs cutting, grinding, turning, milling and lapping.

The federal standard does not require that sources direct all emissions to the stack. PDEQ has required that MBI direct emissions from all operations that have the slightest potential for beryllium release to the stack. The 10 grams per 24 hour period is measured at the stack to include all emissions from all processes. It is important to note that MBI has had non-detect test results for beryllium emissions throughout the last permit term. This means that MBI's beryllium emissions are so low that the monitors used for measurement cannot pick up any emissions at the lowest measurable level of the instrument.

B. Emission Limitations, Standards and Operational Requirements:

II.A & II.B of Part B

Federal emission limit for beryllium emissions. The 10 grams limit over a 24-hour period. II.B is a federal requirement for MBI to install, operate and maintain air pollution control equipment (APC) and the qualitative beryllium monitoring system) listed in II.B 1 – 6.

II.C of Part B

Condition ensures that Permittee only emits beryllium emissions from any operations using methods allowed by the permit. The only method allowed by the permit is directing all emissions to the stack through the air pollution control equipment. As additional preventative measures, the Permittee is required to follow approved O & M and emissions prevention plans approved by the Control Officer.

II.D of Part B

The Permittee is prohibited from allowing any beryllium emissions when changing the filters or collector drums on any APC identified in the permit. Approved operation and maintenance procedures are required to be followed during these change-outs. A requirement to obtain approval for any changes to these procedures is included in II.F of Part B.

II.E of Part B

The Permittee is required to set the max alarm level that is below the applicable emission standard in II.A of the permit. This alarm level has been set to no greater than 75% of the standard.

II.F. of Part B

A requirement to obtain approval for any changes to these procedures is included in II.F of Part B.

II.G of Part B

Whenever there is a potential that beryllium or beryllium containing compounds will be emitted from any operation, the Permittee is required to operate APC and PMS at all times. In the event of PMS failure, the Permittee may continue to operate the facility while repairs to the PMS are made.

II.H of Part B

Standard Pima County SIP Rule and Pima County Code regulation that prohibits MBI from having any type of visible emissions, whether point or fugitive dust beyond the property boundary line. The Permittee is required to use all reasonably necessary and feasible precautions in order to achieve this.

II.I of Part B

This federal condition requires MBI to maintain and operate the facility and all associated equipment in a manner that demonstrates good air pollution control practices to minimize emissions. The Permittee needs to keep records and information that demonstrates to the Control Officer that acceptable operating and maintenance procedures were used to minimize emissions.

II.J of Part B

Federal requirement prohibits the Permittee from using any methods, equipment or gases, to conceal or dilute emissions that would cause a violation of a standard. The Permittee is also prohibited from operating in a manner that would avoid coverage by a standard that would apply to larger operations.

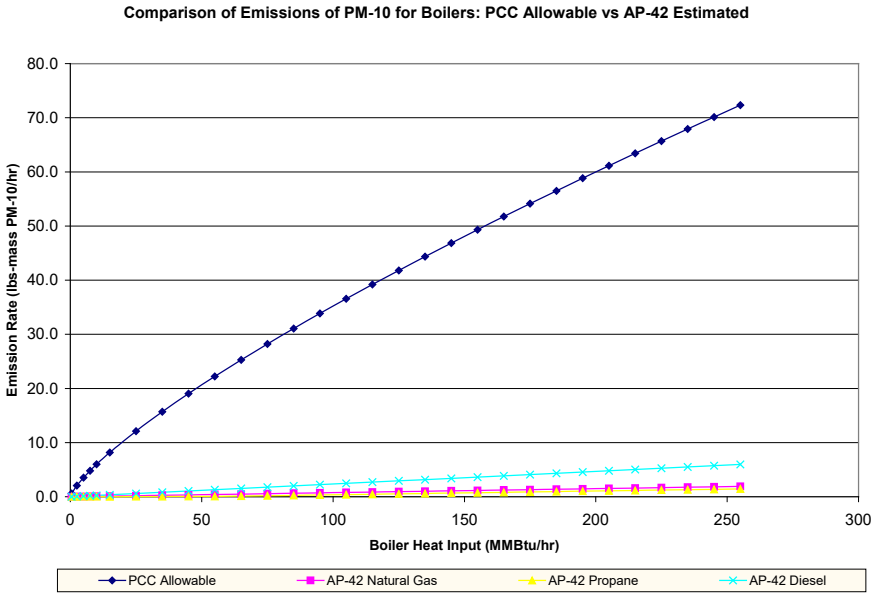
II.K of Part B

A general local requirement that specifies the authority, if necessary, for the Control Officer to require the Permittee install abatement equipment or alteration of the stack or any outlet such that discharge of air contaminants to adjoining property is eliminated or reduced to prevent a violation of Title 17 of the Pima County Code.

II.L, M, N & V.D of Part B

This formula sets a limit for the allowable emissions of particulate matter allowed by Pima County Code for any fuel burning equipment such as boilers and heaters at the facility. Even when operating at maximum capacity, the Permittee is always in compliance with this standard and will never emit quantities allowed by this formula. This is because potential emissions using manufacturer or AP-42 emission factors are more than ten times lower than the allowable emissions in this standard. Based on this fact, the Permittee is not required to show compliance with this standard. The following chart demonstrates this fact. Condition N prevents the Permittee from using any fuel in this equipment other than natural gas. As the graph shows, with the allowable emissions much higher than the most conservative emission factors, there is no requirement for MBI to perform any testing to show compliance with the particulate matter standard.

Figure 2



Comparative Chart of Allowable Particulate Emissions Under Pima County Code, Title 17, and Estimated Potential Emissions based on EPA AP-42 Estimates for External Combustion Sources. Allowable emissions are consistently over ten times estimated potential emissions. Therefore, it is not necessary to include the standard in the permit explicitly, but by reference in Attachment 1.

II.O & P of Part B

Federal and local opacity standards. Since the local requirement is more stringent than the Pima County SIP requirement, the Permittee is always in compliance with Condition II.N when in compliance with Condition II.P of Part B.

II.Q of Part B

Local requirement for the Permittee to store and transport or VOC containing materials in a manner that controls any releases to the atmosphere.

C. Monitoring & Recordkeeping Requirements:

III.A of Part B

A requirement for the Permittee to monitor and record each time APC device identified in II.B of Section I is activated. The Permittee is required to record the date, start and stop time the APC is activated and the name of the person making the record. This condition enables the Permittee to demonstrate to the Control Officer when the APC is running should that information be required in the future.

III.B of Part B

A requirement for the Permittee to record all instances when the alarm level on any particle detector probe registers 100 pico amps sustained for a period of five minutes or longer.

III.C of Part B

Weekly monitoring checks of the powered exhaust vents listed in Table 3 of Section I. The weekly checks include doorways, outside duct work as well as all collection and filtering systems with a potential for carrying beryllium containing compounds. The Permittee is required to keep records that show the date, system checked, the identification of the person making the check and results of the check. Any corrective action is required to be noted. These weekly checks are a way to assure the Control Officer that all possible methods are used to prevent any emissions of beryllium or beryllium containing compounds from outlets not authorized by the permit.

III.D of Part B

This condition required the Permittee to implement the Emissions Prevention Plan procedures approved by the Control Officer and a requirement to follow approved procedures for any changes to the plan.

III.E of Part B

A requirement to continuously operate the photohelic gauges in order to monitor pressure drops across the filters. An anomalous pressure drop/ rise would either indicate that there is not enough airflow/ excessive airflow across the filters such that collection efficiency is inadequate. To show that the gauges are operating as required with adequate airflow, the Permittee is required to maintain the air pollution control systems to operate within the operating ranges specified in Table 2 of the Section I. These operating ranges were set after the Permittee performed testing while the facility was operating under optimum conditions. The photohelic gauges identified in this condition must be interlocked to the fans powering the APC systems to provide an automatic shutdown should the pressure drop reach the preset failure levels listed in Table 2. Lastly, the Permittee must Operate, Maintain, and record the levels of the particle monitoring system whenever there is a potential to emit beryllium or beryllium containing compounds in accordance with the APC Referenced Procedures and Forms

III.F of Part B

The Permittee is required to operate the monitoring and automatic shutdown system at all times that the facility is operating beryllium or beryllium containing compound operations. Recordkeeping commensurate with PDEQ approved levels to show compliance is required.

III.G & H of Part B

A requirement to maintain required records each time the filters in any of the APCs are replaced and each time the dust collector drum is changed out..

III.I, J & K of Part B

In III.J, the Permittee is required to post signs in production areas listed in Table 3 of the permit that process beryllium or beryllium containing products. These signs shall show the power switch for the powered exhaust vents and describe when the fan(s) or vent(s) shall immediately be shut-off in the event of a beryllium powder spill. Based on testing conducted in 2001 and 2010, III.J prohibits any emissions of beryllium from any of the powered exhaust vents located in areas identified in Table 3 of the permit. Should a spill occur, III.K requires that the Permittee record each instance that a powered exhaust fan listed in Table 3 is shut down.

III.L of Part B

Since the fuel-fired equipment use natural gas as a fuel, required monitoring for abnormal emissions is not required. The option remains for the Control Officer to require calendar quarterly checks should it be deemed necessary. When checks are required, MBI shall maintain records as required by the permit.

D. Reporting Requirements:

IV.A of Part B

This section contains general reporting for the following requirements; initial startup which was reported on June 2, 1980, excess emissions, deviations reporting, beryllium spill reporting.

IV.B of Part B

Requirement for the Permittee to submit an annual emissions inventory when requested by the Control Officer.

IV.B of Part C

Requirement for an Annual Beryllium Technology Assessment. The technology assessment requires MBI to report to the Control Officer any improvements in continuous emissions monitoring for beryllium and any other technology improvements in the industry. The viability of any new improvements and a cost analysis by MBI is required to be presented to the Control Officer.

E. Testing Requirements:

V.A of Part B

A federal requirement for initial testing. This initial testing was completed on October 28, 1980. This section also prescribes procedures to be followed whenever testing is planned or conducted.

V.B of Part B

The federal regulation governing Beryllium processing plants does not prescribe any further testing after the initial testing is completed. The Control Officer requires periodic testing and procedures as prescribed in these conditions of the permit. This testing is required to assure the Control Officer that MBI is operating the plant as applied for in the permit application and assures the public that the plant is operated to levels that meet the federal regulation. Testing has consistently shown that MBI's releases through the stack are at levels that are not detectable an therefore orders of magnitude below the federally required level of 10 grams per day.

V.C of Part B

Statutory Authority allowing the Control Officer to require the Permittee to monitor, sample, or otherwise quantify the emissions of air pollution, which may reasonably be attributed to the Permittee.

PART C: AQUA REGIA ACID CLEANING SPECIFIC CONDITIONS

A. Applicability:

The Aqua Regia acid cleaning process removes surface contamination such as metal marks from the fired beryllium oxide. This process is not subject to any federal standard and is only subject to local Pima County Code (PCC) requirements under PCC 17.16.430 – Standards of Performance for Unclassified Sources. It is important to note that since this standard encompasses all sources that are not classified elsewhere, not all sections under PCC 17.16.430 are applicable to the Aqua Regia cleaning process.

B. Emission Limitations, Standards and Other Requirements:

II.A & B of Part C

The Permittee is required to install, operate and maintain listed air pollution control (APC) equipment associated with the cleaning process. MBI is required to use good air pollution control and operational practices in order to minimize emissions. Use of acceptable practices and maintenance of commensurate acceptable records will be reviewed by the Control Officer to determine whether these practices meet acceptable standards to comply or meet the county performance standards.

II.C, D & E Part C

This is a Pima County Code requirement to control gaseous or odorous materials from the cleaning process and prevent air pollution. This control can range from APC equipment, methods of storage, use and transportation of solvents when cleaning. II.E is a general requirement under the unclassified sources that gives the Control Officer authority to require installation of equipment or alteration of stack if used to reduce or eliminate air pollution to adjoining property.

II.F Part C

MBI is required to establish procedures for inspection and maintenance of the acid cleaning process and associated equipment. All records and procedures are to be kept onsite and the Control Officer will review these during facility inspections.

III Part C

Appropriate monitoring and recordkeeping commensurate with good engineering practices are required to be established and followed. These should primarily be found in the schedule and procedures for inspection and maintenance discussed in this section.

VII. IMPACTS TO AMBIENT AIR QUALITY

None required as the source is not subject to PSD or NSR as it is not a major source.

VIII. CONTROL TECHNOLOGY DETERMINATION

No control technologies needed to be determined. This facility is in an area of attainment and is not a new source or source triggering a BACT analysis.

IX. PREVIOUS PERMIT CONDITIONS

Significant Permit Revision

On April 29, 2015, a significant permit revision was issued to include monitoring of the Auburn triboelectric particle detectors into the existing permit as a qualitative measure of performance and to exclude the requirement to conduct performance stack testing unless required by the Pima County Department of Environmental Quality (PDEQ). The decision to exclude MBI from the requirement to conduct annual performance stack testing was based on the historical test results over the previous 10 years and MBI's voluntary efforts to install advanced equipment for monitoring the performance of the stack and particulate filtration subsystems. Special reporting requires the notification and reporting when the stack particle probe detector alarms indicating a malfunction and potential for excess emissions. Stack testing can however be required at any time under the authority of the Control Officer in accordance with the provisions in the air quality permit.

Changes in this Permit Renewal

1. PDEQ updated and corrected the General Permit Conditions and references as needed.

2. During this permit renewal, the previous permit reporting conditions (IV.A.1 & 2) were combined into IV.A.1.a & b and the remaining conditions (IV.A.3-6) were renumbered to (IV.A.2-5) to categorize and clarify the special reporting requirements.

3. During this permit renewal, the previous permit condition (IV.A.3) which provide reporting requirements for the stack particle probe alarm was split into IV.A.2.a and b to define conditions when reporting is necessary and when no reporting is necessary for stack particle probe alarms due to precipitation events during non-business hours when the APC systems are off-line.

Historical Notes

Some historical notes have been retained and listed below in increasing chronological order to retain the historical development of some pertinent permit conditions. Other notes provide clarification of the last draft permit process.

1. Initial testing was completed by MBI before October 28, 1980. MBI is required to perform annual emission testing to assure compliance with the 10 grams per 24 hour period federal standard. MBI shall follow testing procedures and notification requirements outlined in the permit and Title 17 of Pima County Code. ***Retained for clarification purposes only to show that compliance with the federal standard has been achieved.***

2. The Tape Room was closed during previous application processes. Therefore the use and potential emissions of Toluene are no longer pertinent to the permit. Should the Permittee resume manufacture of Tape products, a permit revision shall be required. ***Note for clarification purposes only. Not pertinent to this renewal.***

3. On December 30, 2003, a draft permit developed during the permit drafting stage was sent to EPA for Courtesy review. Response was received in February 2004. At several meetings with MBI staff, the EPA comments were addressed. A follow up letter dated January 30, 2003, summarized the changes in the permit that were agreed to. The final issue was monitoring the powered exhaust vents. EEMC was scheduled to visit the plant in mid-February to assess the monitoring requirements and report their findings for an inspection program protocol. ***Note for clarification purposes only. Not pertinent to this renewal***

4. MBI requested that the word "daily" in the first sentence in III.C of Part B, Section I (Monitoring and Recordkeeping) should be changed to "weekly". It was suggested that the inspections required would be done much more efficiently and thoroughly if one section of the Ducting System was checked for flaws or leaks each inspection day, on a rotating basis such that each section was inspected at least once per week. ***Included for historical notes purposes only. Not pertinent to this renewal***

5. MBI proposed that the Ducting System be defined as four separate sections each to be inspected once per week. The entire System would be subject to inspection on a weekly basis. This inspection, done on four different days, would be more thorough and efficient than if the entire System were inspected on one day. ***Included for historical notes purposes only. Not pertinent to this renewal***

6. MBI changed the intake to the 40,000 cfm Farr Final Filters in order to facilitate more efficient fan operation. PDEQ was notified in a letter dated December 17, 2003, that this might change the pressure differentials across the filter, but in fact, no change in standards was required after the installation was completed and tested. ***Included for historical notes purposes only. Not pertinent to this renewal***

7. In a letter dated July 28, 2003, MBI informed PDEQ that an improved version of the final HEPA filters would be used in all air pollution control systems as listed in II.B of Part B. These filters lowered the static pressure and the pressure drop across the filters. This lower pressure drop required the minimum values of the final filters prescribed in III.D Table 1 of Part B, Section I of the draft permit to be changed from "0.5" to "0.4". This change to the draft permit was accepted by PDEQ. ***Retained to show establishment of operating ranges.***

8. In discussions with EPA, it was recommended that the source perform an additional modified stack test on the powered vents during the life of the permit. In view of the non-detect results from the previous testing, it is difficult to justify the expenditure in manpower and resources to repeat the testing on a frequent schedule, especially when the vents exhaust from areas in the plant where there is no reasonable likelihood of BeO powder to be present. There is no beryllium powder processed in these areas.

   In the permit issued in 2007, the Permittee agreed to terminology that would require the powered exhaust vents to be tested during the penultimate year of the term of this permit. **This *testing was completed in 2010 and* results have shown non-detect levels, similar to the 2001 test results. Based on this, t*he condition was modified to only test when the Control Officer makes a written request that testing shall be conducted.***

9. The permit summary on page 3 of the permit and language in the applicability for beryllium processing conditions in I of Part B, Section I was revised to refer to MBI operations according the definition in 40 CFR 61 Subpart C. This clarifies any discrepancies that may arise from processes defined by equipment used onsite. ***Retained for clarification purposes only.***

10. Emissions have been further defined in II.A of Part B, Section I. to include total emissions from any kind of activity at the facility. ***Retained for clarification purposes only.***

11. A requirement to install listed pollution control equipment in Attachment 2 of the permit was added in II.B of Part B, Section I. The pollution control equipment will have the components shown in II.B of Part B, Section I. ***Retained to show original development of permit condition.***

12. In previous drafts there was no requirement to direct all beryllium containing emissions from any operation to the air pollution control equipment and stack. This requirement has been added in II.C of Part B, Section I and MBI shall direct any kind of beryllium emissions to the air pollution control equipment and eventually the stack. ***Retained to show original development of permit condition.***

13. A requirement was added to not allow any kind of beryllium emissions from any vents, doorways or other openings except through air pollution control equipment listed/ identified in II.B of Part B and the stack. MBI is also required to implement an emissions prevention plan which shall be submitted as required in III.C of Part B. The emissions and detection plan shall be submitted for approval to the Control Officer within 90 days of issuance of the final permit. ***Retained to show original development of permit condition.***

14. MBI shall follow the four change-out procedures dated 10/12/06 in II.B.D when changing filters or collector drums on any pollution control equipment. These O & M plans assure that MBI minimizes the possibility of Beryllium emissions. ***Retained to show original development of permit condition.***

15. Requirements in III.A and B (now C) of Part B for monitoring and recordkeeping of the pollution controls and powered exhaust vents were added to ensure that Beryllium emissions are minimized. ***Retained to show original development of permit condition.***

16. Recordkeeping as required in III.G, of each instance when the filters in any of the four air pollution control devices are replaced. ***Retained to show original development of permit condition.***

17. References to the particulate detection probes used to measure the qualitative performance of the filtration systems in the permit were removed from the 2006-2011 draft permit. ***Retained for clarification purposes only.***

18. MBI is required to install photohelic gauges that continuously monitor and show the operating ranges and failure ranges of the air pollution control device collection system. This system shall be operated at all times and maintained according to an O & M plan either developed by the manufacturer or MBI. The ranges for the photohelic gauges are shown in Table 2 of Part B.
The photohelic gauges were installed during the 2006-2011permit term. An O&M Plan was developed by MBI and approved by PDEQ.

19. On February 12, 2009, MBI submitted a facility change notification in which MBI informed PDEQ of an R&D project in which a mixture of cadmium and tin were going to be utilized in the project to produce targets for a solar panel manufacturing company. The metal powder is isostatically pressed into a specific shape and then dry machined on a lathe. After machining, the targets are sent to the customer.

20. On June 26, 2009, MBI submitted a notification of an increase in volume of cadmium-tin powder to be processed. ***Added for clarification purposes only.***

21. On July 8, 2009, MBI submitted a minor revision application to add this process as part of its main operations. This additional operation triggered the applicability of 40 CFR 63 Subpart XXXXXX, National Emission Standards for Hazardous Air Pollutants – Area Source Standards for Nine Metal Fabrication and Finishing Source Categories. The subpart addresses sources that use materials that contain the potential to emit metal fabrication or finishing metal HAP (MFHAP) as outlined in the subpart. The permit was revised in June 2010. During the recent renewal of the permit, MBI noted that they are not subject to 40 CFR 63 Subpart XXXXXX and conditions should not be included in the renewal.

    PDEQ reviewed this request and verified that the NESHAP states that a facility has to be primarily engaged in the subject source categories and is not relevant to the MBI facility. The definition of primarily engaged is given below:

    > *Primarily engaged means the manufacturing, fabricating, or forging of one or more products listed in one of the nine metal fabrication and finishing source category descriptions in Table 1, ''Description of Source Categories Affected by this Subpart,'' where this production represents at least 50 percent of the production at a facility, and where production quantities are established by the volume, linear foot, square foot, or other value suited to the specific industry. The period used to determine production should be the previous continuous 12 months of operation. Facilities must document and retain their rationale for the determination that their facility is not ''primarily engaged'' pursuant to 40 CFR 63.10(b)(3) of the General Provisions.*

    Added for clarification purposes to show that PDEQ has evaluated the process and determined it is not required to be included as a permitted process.

22. On December 7, 2009, MBI submitted another minor revision to add an aqua regia cleaning system and scrubber to replace an existing like equipment. The new system was necessary to allow the scrubber to remain on during shutdown periods when facility equipment and dust collector systems are shut off. Previously, the acid had to be neutralized and discharged to MBI's industrial wastewater collection system for treatment. The purchase of the new cleaning system was a cost saving measure for MBI to enable the source to keep the acid longer, decrease waste and potential accidents in handling. This process triggered a local requirement in PCC 17.16.430.F & G that addresses processing and handling of acids. The permit was revised in June 2010. ***Added for clarification purposes to show development of conditions.***

23. Following public comments submitted during the hearing on July 12, 2012, the following changes were made:

    PDEQ has provided more clarification to the statement in VI, Part B.A of the Technical Support Document that… "MBI direct emissions from all operations that have the slightest potential for beryllium release to the stack…" A new permit condition has been added in III.J of the permit that states:

    a. *The Permittee shall not allow emissions of beryllium powder from any of the powered exhaust vents located in the areas listed in Table 3 of this Part.*

       Beryllium is not expected in the powered exhaust vents and the above condition prevents that from occurring.

    b. The previous permit condition addressing testing of vents designated as 1, 3 & 7 has been revised. Should there ever be a requirement to test the vents, PDEQ has revised previous permit condition III.K (now III.L) to now read as follows:

       "…the Permittee shall perform testing on any of the powered exhaust vents listed in Table 3…"

       A facility layout with the approximate location of the seven vents can be found on page 22.

24. During the previous April 2015 permit renewal, the excerpt below was deleted from Condition III.E as MBI had installed the monitoring and automatic shutdown system. The deleted language is as follows:

    Prior to installation of this system, the Permittee shall monitor and record the photohelic gauge readings at least daily whenever there is the potential to emit beryllium or beryllium containing compounds. At a minimum, the record shall include the date, the time the readings were made, the specific segment of the collection system to which the pressure drop applies, the value of the pressure drop noted on the gauge, and the name of the person making the check.

X. INSIGNIFICANT ACTIVITIES

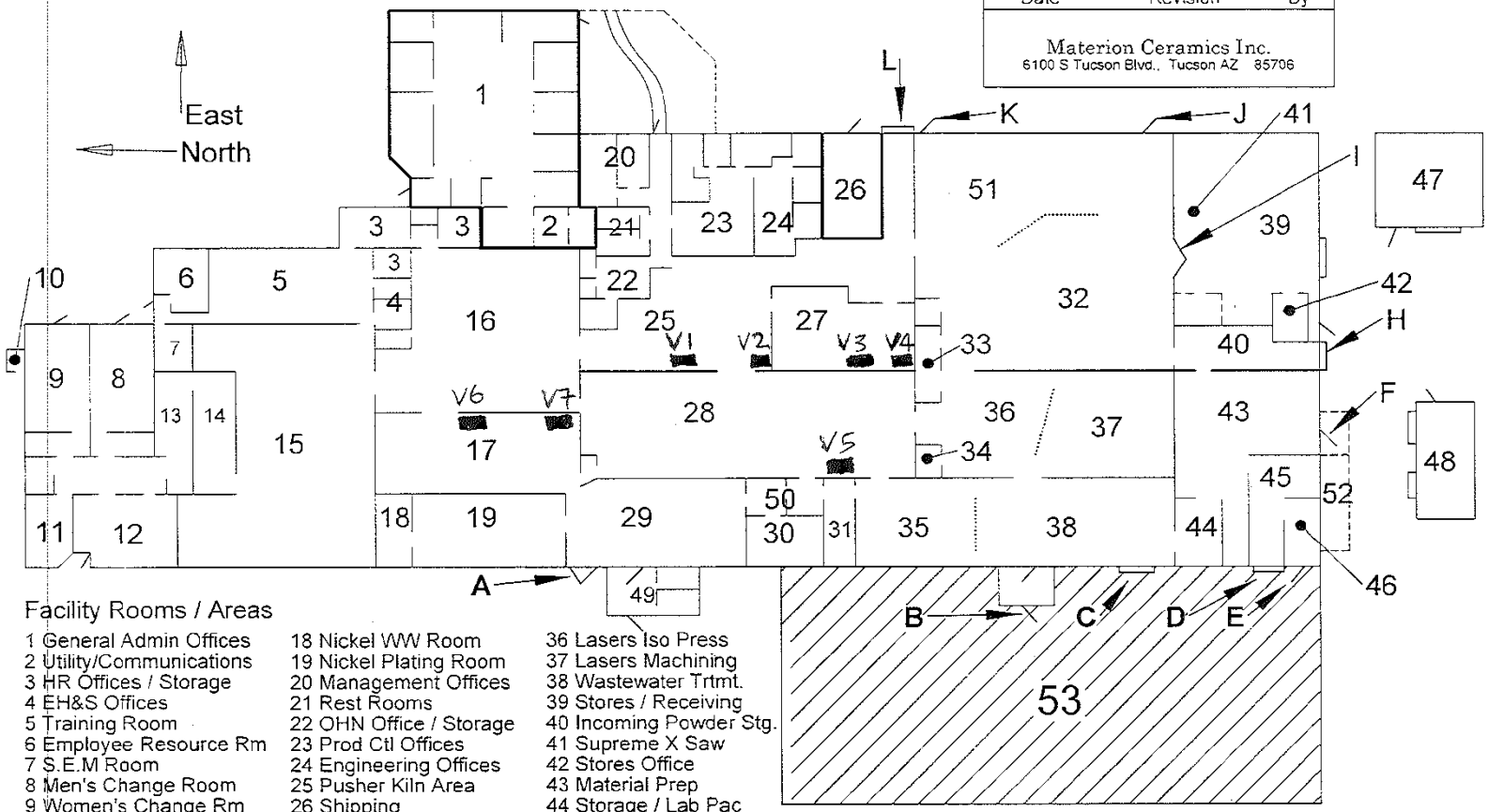
None

Materion Ceramics Inc. Facility Layout

Drawing for Illustration Purposes Only
Sections May Not be to Scale

03/15/2011	Current Laycut	RN
Date	Revision	By

Materion Ceramics Inc.
6100 S Tucson Blvd., Tucson AZ 85706



Facility Rooms / Areas

1 General Admin Offices
2 Utility/Communications
3 HR Offices / Storage
4 EH&S Offices
5 Training Room
6 Employee Resource Rm
7 S.E.M Room
8 Men's Change Room
9 Women's Change Rm
10 N Boiler Room
11 Laundry Room
12 Lunch Room
13 Respirator Storage
14 AS / Wk Boot Storage
15 Complex Machining
16 Extrusion
17 Small Kiln Room
18 Nickel WW Room
19 Nickel Plating Room
20 Management Offices
21 Rest Rooms
22 OHN Office / Storage
23 Prod Ctl Offices
24 Engineering Offices
25 Pusher Kiln Area
26 Shipping
27 Lapping
28 Large Kiln Room
29 Metalizing Firing
30 Met. Clean Room
31 Met. Office / Lab
32 Dry Pressing (all)
33 Tool Room
34 Metrology Room
35 Machine Services
36 Lasers Iso Press
37 Lasers Machining
38 Wastewater Trtmt.
39 Stores / Receiving
40 Incoming Powder Stg.
41 Supreme X Saw
42 Stores Office
43 Material Prep
44 Storage / Lab Pac
45 Mechanical Room
46 S Boiler Room
47 Maintenance Bldg.
48 Chemical Storage
49 Met. Rest Rooms
50 Metalizing Prep Rm
51 Inspection / Parts Clng
52 Compressors / Stm Blrs
53 Fenced Yard Area
■ Vent Locations

Production Area Exit Doors

A. Metalizing Firing*
B. Wastewater Trtmt
C. Wastewater Trtmt**
D. Mechanical Room**
E. Boiler Room
F. Material Prep
H. Material Prep Rec**
I. Press Room*
J. Press Rm - S
K. Press Rm - N
L. East Service**

** Double Door* *** Roll-Up Door*

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

September 3, 1992

Mr. Bill Maxwell
Environmental Specialist
Department of Environmental Quality
130 West Congress Street
Tucson, Arizona 85701-1317

Dear Mr. Maxwell:

I have reviewed your request concerning the proposed changes for the annual testing for beryllium at the Brush-Wellman plant. Provided this facility has not triggered the requirement for meeting 40 C.F.R. 61.32.(b) and is eligible to use Method 103, I see no reason to prohibit the in-stack filter placement for the annual testing at this facility.

If the testing indicates that the facility ever exceeds the 10 gram of beryllium per day limit in 40 C.F.R. § 61.32(a), EPA would expect you to require the facility to use Method 104 and to implement the requirements of 40 C.F.R. § 61.32(b) for ambient sampling.

If you have any questions concerning this matter, please give me a call at (415) 744-1149.

Sincerely,

Steven J. Frey
Environmental Engineer

cc: Peter Westlin, EMB