

**DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION  
ACTIVITY REPORT: Scheduled Inspection**

M271125960

FACILITY: SANDVIK HARD MATERIALS CO		SRN / ID: M2711
LOCATION: 510 GRIFFIN RD, WEST BRANCH		DISTRICT: Saginaw Bay
CITY: WEST BRANCH		COUNTY: OGEMAW
CONTACT: Jamie Green , Powder Plant Engineer/Env. Coordinator		ACTIVITY DATE: 06/04/2014
STAFF: Sharon LeBlanc	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: scheduled site inspection- carbide production facility.		
RESOLVED COMPLAINTS:		

On Wednesday, June 4, 2014, AQD District Staff conducted a scheduled site inspection at Sandvik Hard Materials Co. (Sandvik) (SRN M2711) 510 Griffin Road, West Branch, Michigan. Permit Cards indicates that 23 active Permits to Install (PTIs) are associated with the referenced facility. Six (6) PTIs have been voided since the July 2, 2009, site inspection. The facility was reported to be purchased by Sandvik in 2000. The majority of the existing permits were applied for and obtained by GTE Valenite Corporation (aka Valenite Inc.). Site inspection activities were conducted with the intent of confirming the operational and compliance status of permitted equipment onsite.

Mr. Jamie Green (Powder Plant Engineer/Environmental Coordinator) and Mr. Brittany Zettel (Quality Manager), answered questions and provided a tour of the facility on June 4, 2014. The Sandvik facility specializes in cemented carbide products, and the tour included a general overview of operation and practices. The facility consists of two buildings (Plant 645 and Plant 620), which were inspected as part of the site visit. Plant 620 is used primarily for activities associated with raw material storage and carbide powder production. Plant 645 is used for activities associated with sintering and hard products.

At the time of the June 4, 2014, site inspection, the facility was in operation. Site inspection activities included a site walkover, and process and product description, as well as review of active permits associated with the facility.

#### FACILITY DESCRIPTION

The Sandvik facility is located in a small industrial park in southeastern West Branch Michigan. The two buildings associated with Sandvik are located within the fenced property. Gates for the facility are located on the north and east sides of the facility, and an access road/drive is located along the southern property boundary, within the fenced area. Note that since the initial permit was obtained by GTE Valenite Corporation in 1986, expansion has occurred with respect to the buildings onsite. However, it appears that permits were received for processes associated with the expansions.

Tungsten and cobalt carbides reflect the predominant carbide products produced at the facility. Traditional ceramics utilizes inorganic, non-metallic materials and heat to create new products. Carbides are classified as non-oxide technical ceramics or advanced ceramics. Cemented carbides are metal matrix composites composed of at least two constituent parts, one being a metal and the other another material such as a ceramic or an organic compound (such as graphite). Powder metallurgy technology is used in the fabrication of carbides.

The facility uses raw materials to create a number of grades of Ready To Press (RTP) carbide powders, each formulation being specific to various applications. Sandvik representatives reported that they recycle all but the tiniest portion of materials associated with their carbide material production at all pre-sintering phases of activity, which has resulted in lower production costs. During production, the various grades of carbide products are separated for recycling using dust collectors and a color coded collection system. Production rates and product types are demand driven. Non-recyclable materials are properly disposed of through a licensed disposal company.

In Plant 620, raw materials are received in a powdered form (referred to as ATP), and are weighed and blended to meet the clients order in batches. The batches mixed with a polyethylene glycol or equivalent wax, are then transferred to the milling rooms where acetone is added to the batch mix in the mills to create slurry. The mills are kept cool using ethylene glycol in a closed loop system. The facility has both attritor and ball milling units onsite. Which type of milling unit is used is dependent on the product being produced.

The slurry is transferred using an inert gas to a heated (hot oils) and pressurized drying tower where the carbide powder is separated from the acetone via atomization spray dryers. The acetone is pumped to sedimentation tanks for recovery of any residual carbide powders, as well as acetone (via a scrubber capture system), both of which are recycled and reused in the process. The atomization spray dryers produce spherical powder granules, which represent the RTP.

The RTP is both a final product for the facility as well component used in the in-house production of both un-sintered (aka "green") and sintered products. RTP production is also prepared and shipped for use in production of carbide products at other facilities.

Engineered molds are filled with RTP, and pressed to create the green/un-sintered products. After unloading, these "green" products (also referred to as blanks) can be machined into shape, or sold as is depending on the client's order.

Sintering of green products is conducted in Plant 645. The sintering process is a multi-stage process. The initial stage of the run consists of dewaxing/debinding green products. At this stage, the binder is removed using pressurized hydrogen or argon gas, after which the binder is burnt off in a hydrogen flame. Later stages of sintering include removal of excess carbon by vacuum. Carbide metals are melted to form the hard carbide final product using an internal electric heating element. Two types of sintering furnaces [vacuum sinter and sinter Hot Isostatic Pressing (HIP) furnaces] are present onsite.

Potential sources of contaminants consisted of volatiles associated with acetone used in the slurry, fugitive leaks that may be associated with valves and fittings for process gas used (nitrogen, hydrogen and argon), and particulate matter (PM) generated during the various pre-sintering activities. Acetone is stored in an underground storage tank, and is piped directly to the milling, drying and recovery equipment, representing partially closed loop system. Sandvik personnel reported that as the acetone is directly piped in and out, loss is monitored by tracking replacement volumes purchased. The facility is anticipating changing to water based process in the not so distant future. The process is undergoing R&D at another facility.

Due to the fine nature of the ATP and RTP, PM is generated during production activities. A very limited amount of fine black PM was noted in isolated sections of the building(s), and is suspected to be the result of a limited amount of carbide PM that became suspended in the building atmosphere during production activities. During the site inspection activities dust collection devices/piping were noted at appropriate work stations/areas, and no notable collection of PM materials on work surfaces or production areas was identified. As previously indicated, Sandvik actively collects and recycles carbide particulates for reuse, minimizing emissions as well as production costs.

Sandvik personnel reported that employee health and safety is fundamental in their operations, and that they as a corporation have industrial hygiene standards more stringent than the federal government workplace standards.

The facility is ISO 14001 certified. As part of the management system, the facility operation and performance in a number of categories including environmental compliance is reviewed quarterly.

#### ASSOCIATED PERMITS

As previously indicated the AQD database identified 23 active permits associated with the site. Many of these permits were issued a number of years ago, and conditions associated with those permits were limited to general conditions associated with proper operation of equipment, installation and maintenance of pollution control equipment, restrictions regarding material substitutions and appropriate disposal of waste materials. These permits included:

- 126-94 – Carbide Parts Process and Hoffman Dust collection system
- 168-89A – Hydrogen Dewax furnaces and modified exhaust system
- 247-89A – Relocation of three Sintering Furnaces
- 326-86 - Waste Solvent still and associated transfer & Storage Equipment
- 485-92 – Isostatic Press with vent system and Torit dust collector

- 972-90A – Acetone Storage Tank
- 973-90 – Diaphragm pumps for acetone recirculation in attritor mills
- 975-90 – 2 spray dryer system
- 1245-90A – Hot-wall Box Furnace Relocation
- 1254-90 – Hydrogen Dewax Exht
- 1254-90A – 116 CF HIP Sinter furnace with exhausts

In addition to general conditions above the following permits also have opacity limits associated with the equipment and proper collection and disposal of air contaminants.

- 126-01A – Carbide Sintering Furnace – Sinter HIP #6
- 128-99 – 1 carbide sintering furnace
- 280-04 – Vent Grinding Operation
- 358-98 – Bandsaws, grinders and dust collectors
- 984-90D – Sinter furnace
- 1246-90 - Sedimentation Tank Dryer

The following permits have one or more permit conditions in addition to the general permit conditions which include but are not limited to emission limits and/or monthly record keeping requirements:

- 484-92 – Dry Powder Plant
- 705-89A – Relocation of 4 Sandblast cabinets
- 790-87A – Powder Processing Equipment
- 1246-90 – Sediment Tank Drying
- 1248-90 – Dust Collection System
- 1252-90 – Misc Press/Powder
- 1255-90 – Bakeout Oven Exhaust

The Facility has indicated an interest in utilizing any exemptions (R 336.1278 through R 336.1290) from permitting that may be applicable for their equipment and operations and will be evaluating them in the future for applicability. In addition, where possible, the company plans to change to equipment that would result in in-plant emissions below acceptable worker exposure limits.

#### COMPLIANCE EVALUATION

##### Operational Status –

During the June 4, 2014, tour the facility was in operation. General housekeeping for all work areas was excellent.

##### Material Usage Rates –

This facility is a fabrication/assembly facility. A limited number of unsintered products were observed at the time of the inspection. Production rates, and product types are demand driven, and reportedly have increased since the 2009 inspection.

As the sintering furnaces are electrically heated, material usage for the plant appears to be limited to ATP raw materials, propane (building heaters), ethylene glycol, acetone, liquid nitrogen, liquid hydrogen, argon gas and molding resins (monothane) for production activities.

Material usage records are maintained by the facility as part of general business and accounting practices. Records kept were determined to meet any applicable recordkeeping requirements, and are readily available upon request.

#### Operational Parameters & Prevention/Maintenance Plans –

Monitoring condition and proper operation of pollution control equipment, as well as production equipment is conducted as part of Sandvik's equipment specific prevention and maintenance plans. Per corporate policy, preventative maintenance plans were developed, and are maintained for all equipment, and indicate equipment specific monthly, quarterly and semi-annual inspection and maintenance activities. Completion dates and data generated during each activity are documented and provided to the corporate office. Additional maintenance and repairs that have been identified as a result of the planned activities are completed under separate "work orders".

In addition, Sandvik personnel report that product quality and equipment operation are monitored throughout the production process, to maintain the level of product quality, minimize production costs.

The Facility reports that since the July 2, 2009, site visit the facility has been shifting to Honeywell systems to record and monitor their equipment. A total transition had not yet been completed. Copies of any required operational data or maintenance activities were readily available.

#### Emission Point –

Sandvik reports that all stacks were constructed per the applicable permit, and are labeled with corresponding permit numbers. No modifications to stacks are of record since the July 2, 2009, site inspection. No visible emissions were noted from the stacks or process equipment associated with the site at the time of the June 4, 2014 inspection.

Emission limits were identified as special conditions for a select number of PTIs issued to the site. However, no mandatory requirements for confirmation emission testing were specified as part of the referenced permits. In addition, based on information obtained during the site inspection there appears to be no reason to believe present emissions exceed limits. Should supplemental data in the future indicate that emissions may vary from the established limits; further investigation/evaluation of emissions will be required.

Emission controls associated with the facility consist for the most part with PM controls and are either controlled by the Torit dust collectors or the hoffman dust collection system. The hoffman is the main dust collection system associated with Plant 645, the collected material of which is recycled in facility processes. Collection activities (referred to as "reclaim" by Sandvik personnel) are reported to be conducted multiple times daily.

Materials collected that cannot be reclaimed, are disposed of by a third party disposal company. Any non-recyclable materials are collected and regularly picked up for disposal. Manifests are available for review. The facility reports being on the line with respect to being a small vs large quantity hazardous waste generator status.

#### Monitoring and Testing –

No formal monitoring or testing requirements are required under the existing permits for the facility.

#### Record Keeping and Reporting –

Formal recordkeeping requirements for the facility are limited to monthly usage records required for a limited number of pieces of equipment. The required records are maintained as part of their business and accounting practices and are readily available for review.

No formal reporting in the way of annual emissions or semi annual/annual deviation reports are required under the present PTIs.

**Summary**

Based on information obtained and information reviewed as part of the June 4, 2014, site inspection, no compliance issues were noted. As previously noted a total of 23 PTIs are of record for the facility. The facility has indicated that they plan to evaluate the existing permits for potential exemption of equipment from permitting.

NAME

Sharon L. LeBlanc

DATE

7/15/14

SUPERVISOR

C. Hall