DRAFT
BAY AREA
2010 CLEAN AIR PLAN

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Section A

Stationary Source Measures

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT

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SSM 1 - Metal Melting Facilities

Brief Summary:
Limit emissions of organic compounds, fine particulates, toxic compounds and odors from foundry operations and metal melting facilities in the District.

Purpose:
Reduce organic compounds, fine particulates, toxic compounds and odor emissions.

Source Category:
Stationary

Regulatory Context and Background:
Foundries specialize in melting and casting metal into desired shapes. Foundry products are most often used in automobiles, truck parts, pipe and plumbing fixtures, train locomotives, airplanes and as metal pieces in other kinds of equipment. Die casting facilities melt metal and inject it into molds under pressure. In addition, some facilities melt metals from scrap to create specific alloys to be re-melted and cast at different locations, either in or out of the District.

Emissions produced by metal melting directly relate to the metal type, the furnace type and the molding technology used. Nonferrous foundries and steel foundries may produce hazardous emissions because of the lead, mercury, zinc, manganese, nickel, cadmium and other metals present.

Emissions of coarse and fine particulate come from mold making, pouring metal into molds, mold removal and any sand reclamation for re-use. Toxic compounds can also be emitted from fine sand particles from the shakeout (mold removal) step. Also, particulate matter is generated from receiving scrap metal for melting. Die casting uses molds, called tools, of machined steel for producing multiple casts, so little particulate matter is generated from the tool once manufactured. Metal melting and pouring can be the source of vaporized toxic compounds and odors can be generated from the organic binder systems used in mold making and from metal pouring and cooling.

Facilities in the District are currently regulated under Title V, the California ATCM for Non-Ferrous Foundries, and NESHAPS rules for Iron and Steel Foundries (40 CFR 63, subpart ZZZZZ), Aluminum, Copper and other Nonferrous Foundries (subpart EEEEE and ZZZZZZ), Secondary Aluminum Production (subpart RRR) and Electric Arc Furnace Steelmaking Facilities (subpart YYYYY). In addition, District standards governing particulate matter (Regulation 6, Rule 1) apply to these facilities and some are subject to the District's odor regulation (Regulation 7).

Implementation Actions:
The control measure would be implemented through the adoption of a new regulation targeted specifically at metal melting industries. The regulation would contemplate particulate matter control for the molding process, also consider controls on the metal melting, pouring and cooling, scrap receiving and processing and odor controls as appropriate. These would likely consist of baghouses. In addition, organic compounds (including odorous compounds) from these steps could be abated by carbon. Sand reclamation, which reduces waste from the facility, is typically done by burning, which generates fine particulate and odors. This could be abated by afterburner. Further requirements of the regulation could enhance capture of emissions through improved operating methods.

Emission Reductions:
Unknown at this time.

Emission Reduction Methodology:
TBD. Methodologies could include setting emission standards, work practice standards and management plans to reduce fugitive emissions.

Exposure Reduction:
TBD

Emission Reduction Trade-offs:
If afterburners were used to control PM and other compounds from sand reclamation, NOx and CO2 emissions would result.

Cost:
Unknown at this time.

Co-benefits:
None. The measure would directly target PM and VOC emissions.

Monitoring Mechanisms:
Source testing, parametric / CEM.

Issues/Impediments: The technology to implement the control measure is in place at some operations, however, cost may be an impediment for smaller businesses.

Sources:
1. National Emissions Standards for Iron and Steel Foundries (40 CFR, Part 63, Subpart EEEEE)
2. National Emissions Standards for Iron and Steel Foundries, Area Sources (40 CFR, Part 63, Subpart EEEEE)
3. Iron and Steel Foundries
4. Aluminum, Copper and other Nonferrous Foundries (40 CFR, Part 63, Subpart ZZZZZZ)

SSM 2 - Digital Printing

Brief Summary:
This control measure would reduce ROG emissions from digital printing operations by one of two approaches:

- Adopting VOC limits on inks and solvents used, or
- Adopting control technology requirements.

Purpose:
Reduce emissions of VOC from digital printing operations.

Source Category:
Area Source

Regulatory Context and Background:
District Regulation 8, Rule 20: Graphics Arts Printing and Coating Operations limits organic emissions from traditional graphic arts operations during printing, coating, adhesive, and cleaning activities. Traditional printing technologies include lithographic, letterpress, gravure, flexographic, and screen printing. VOC limits are further differentiated by the types of inks and substrates used during the printing process.

The digital printing (DP) is a fairly new, non-traditional printing process that is emerging virtually every segment of the graphic arts industry. In this process a digital image stored on a computer is converted into an image that can be printed on a wide variety of substrates besides paper, such as textiles; three dimensional objects, like ball bearings; and synthetic skin. This differs from traditional graphic arts printing, which uses fixed-image masters or "plates." One primary reason DP is gaining greater acceptance is that DP has a faster turnaround time because it requires considerably less setup time for each job compared to other printing processes. Furthermore, last minute revisions are easily carried out without having to make significant changes, and may have environmental advantages, such as reduced waste. The five basic types of digital printing technology are liquid inkjet printing; thermal wax printing; laser printing, including liquid electrophotographic printing; solid ink printing; and dye sublimation printing. Of all the digital printing operations, inkjet printing appears to be gaining the largest market share in the graphic arts industry on a world-wide basis. Although DP accounted for only about three percent of the total U.S. printing industry output in 1991, it is forecast to have at least a 21 percent market share by 2025.

Emissions from the DP industry are not regulated by the District's rule to control emissions from printing presses, Regulation 8, Rule 20, however the 2008 amendments to Regulation 8, Rule 20 require certain large commercial digital printing operations to keep records of the usage of ink and other VOC-containing materials. Staff has identified two DP technologies that are believed to have significant emissions, District-wide: liquid electrophotographic printing and solvent-based inkjet printing. Staff reviewed records on one large liquid

electrophotographic press and estimated that the VOC emissions were approximately 1 ton/year. Solvent-based inkjet printers can produce images on the widest formats in the printing industry and use inks that contain high VOC contents. Inkjet printing appears to be the most likely to emit significant ROG emissions.

Implementation Actions:
One option is to establish a limit for VOC emissions from DP facilities, such as Maryland's 100 pounds per day limit. Lower VOC inks may be able to be developed, although the necessary properties of inks for some types of DP may preclude low-VOC formulations. Add-on controls or equipment requirements could be developed to prevent emissions, or add-on controls could be required. Finally, emission limits could be established for each printing technology, allowing a combination of low-VOC materials, on-board controls and add-on controls, as necessary.

Emission Reductions:
TBD. It is estimated that 40 – 50 large, liquid electrophotographic presses may exist in the Bay Area. The number of large, commercial inkjet printers is not known.

Emission Reduction Methodology:
TBD

Exposure Reduction:
TBD

Emission Reductions Trade-offs:
Add on control equipment may require the use of electricity or natural gas, increasing GHGs.

Cost:
Unknown at this time. Some DP may reduce emissions through internal controls of ink usage, making ink available for re-use.

Co-benefits:
- Reduction in ROG emissions may reduce emissions of toxic organic compounds.

Monitoring Mechanisms:
Source testing, recordkeeping, parametric monitoring.

Issues/Impediments:
Unlike traditional printing, technical barriers to the development of low-VOC inks may exist due to the nature of how the DP creates images. Inkjet printing relies on ink with a very low viscosity to be sprayed through tiny nozzles. Electrophotographic printing relies on the polarity of ink molecules to be attracted to charged plates.

Sources:

1. EPA Office of Compliance sector Notebook Project: Profile of the Printing & Publishing Industry, 1995 http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/printpt1.pdf
2. EPA Design for the Environment Printing Industry Profile, http://www.p2pays.org/ref/01/00936/execsum.htm
3. Digital Printing: The Reference Handbook, 2004, Uri Levy & Gilles Biscos
4. Today's Digital Imaging: Version 5.0, 2005, Smart Papers
5. Conference call with Sandra Lowe-Leseth, Rule Developer, San Joaquin Valley Air Pollution Control District, 5/2/07
6. Code of Maryland Regulations: 26.11.19.18. 18 Control of Volatile Organic Compound Emissions from Screen Printing and Digital Imaging http://www.dsd.state.md.us/comar/26/26.11.19.18.htm