

Sand Reclamation Rules On the Rise

Incinerator emissions standards affect metalcasters processing sand onsite.

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The U.S. Environmental Protection Agency (EPA) recently informed the states they should be enforcing air quality regulations for equipment that processes sand and meets the regulatory definition of a dryer or calciner. EPA Region V—Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin—already has cited several

facilities for violations of New Source Performance Standards (NSPS), Subpart UUU (40 CFR Part 60).

In the second half of 2010, two metalcasters in Wisconsin were cited for failing to notify EPA about thermal sand reclaimers installed in the 1990s and the applicability of Subpart UUU. An Indiana metalcaster was cited in July 2011 and an Ohio facility was cited in June 2012. The facilities were required to

comply, in one case to perform a stack test and conduct daily visible emissions readings, as well as develop and implement a corrective action plan. EPA has not yet assessed penalties for Subpart UUU violations.

Metalcasters need to be aware of the regulation and its potential effect on their operations.

Regulatory Background

In 2008, EPA proposed a change to

SAND RECLAMATION BASICS

Thermal sand reclamation offers many benefits for metalcasters. These include the ability to dramatically reduce the purchase of newly mined sand as well as landfilling spent sand as waste. It eliminates the need to store mounds of spent sand onsite as it awaits disposal or, in some cases, reuse, most often in construction. Lower freight and disposal costs also offset the cost of energy used for thermal reclamation. Casting operations with these machines have reported additional perks such as a lower need for sand additives to prevent casting defects.

Sand can be reclaimed in three ways: mechanical, wet or thermal. The optimal result is sand with a grain size distribution comparable to new sand, the removal of all undesired material particles, the elimination of binder coatings and the reduction of fines to an acceptable level. While wet reclamation



Thermally reclaimed sand (bottom), is shown with new sand (left) and spent sand (right).

is an effective method for cleaning spent green sand, which is bonded with bentonite clay, the need for high volumes of water and the requirement to treat and clarify the water afterward can be a hindrance. Mechanical reclamation is sufficient for sand that is to be reused for green sand molds, but it does not produce a sand clean enough for use in coremaking or nobake molding. To achieve the greatest efficiency, a combination of thermal and mechanical reclamation is used for spent green sand. Chemically bonded sand in nobake operations requires only thermal processing for reuse.

Thermal units are either gas fired or electrical, and the temperature is maintained at a level to ensure the binders are removed without bonding to the sand particles. The fines and other waste particles are accumulated in dust collectors and disposed, and the reclaimed sand returns to the mixer on the molding line.

the language of the NSPS to exempt metalcasting facilities. But that step was never completed and at least one regional agency began enforcement.

In July 2011, EPA determined another regulation, the commercial and industrial solid waste incinerator standards (CISWI), does not apply to thermal sand reclamation units. At that time, the agency reportedly agreed it would not issue citations to casting

facilities for NSPS Subpart UUU violations, but would address the requirements only when facility air permits were up for renewal.

The American Foundry Society took part in a clarification meeting with EPA officials this February. AFS had lobbied for metalcasting facilities to be deemed exempt from Subpart UUU, citing the high costs associated with installing continuous monitoring

equipment, among other requirements. AFS reported EPA has determined Subpart UUU does apply to thermal sand reclamation equipment.

Monitor and Report

The regulation, originally intended to apply to mineral processing plants, affects the owner or operator of a unit constructed, modified or reconstructed after April 23, 1986, which meets

HISTORY OF THE RULE

April 1986 – NSPS 40 CFR Part 60, Subpart UUU Rule proposed

September 1992 – Final rule

1985 – EPA BID; foundries not listed as an affected industry

1991 – EPA Enabling Document; foundry SICs not listed

October 1999 – Tenn. asks EPA for clarification regarding Subpart UUU applicability to foundry operations

January 2000 – EPA says yes (constructed, reconstructed or modified after April 23, 1986)

August 2003 – AFS requests EPA revisit determination of applicability; EPA confirms previous determination

January 2004 – AFS tells EPA foundry calciners and dryers

do not meet the Subpart UUU definition for these units; EPA confirms previous determination

March 2006 – MDEQ Subpart UUU Enforcement Initiative

May 2006 – MDEQ puts Subpart UUU Enforcement Initiative on temporary hold; EPA Air Quality Staff and EPA Enforcement Staff meet to discuss relative positions; consider amending Subpart UUU to exempt foundries

April 2008 – EPA proposes new Subpart UUU language: Processes for thermal reclamation of industrial sand at metal foundries are exempt

April 2009 – EPA decides to take no further action regarding exemption of foundries from Subpart UUU

August 2010 – EPA Region V enforcement activities begin in metalcasting facilities.

Source: "Recent Developments in Regulation and Enforcement of Air Requirements for Thermal Sand Reclaimers and Sand Coolers/Dryers," presented at the 117th AFS Metalcasting Congress, April 2013



Thermal sand reclamation systems (two examples are pictured above and below) heat sand additives to combustion and separate the ash and sand fines from reusable sand particles.



the regulatory definition of a dryer or calciner. A mineral processing plant is defined as any facility that processes >50% mixtures of minerals, including industrial sand. A calciner is defined as equipment that removes chemically bound water or gases from minerals through direct or indirect heating; a dryer removes free water from minerals through direct or indirect heating. The regulation could be applied beyond thermal sand reclamation units. For example, sand reclaimed through the wet scrubbing process must be dried before reuse.

Equipment owners or operators must notify the EPA administrator no later than 30 days after construction of a unit that falls within the scope of the regulation and within 15 days of initial startup. Changes that can affect emissions also must be reported, and continuous monitoring is required to track those emissions.

The particulate standards are a particulate matter (PM) limit of 0.092 g/dscm (0.040 gr/dscf) for calciners

and dryers in series, and a PM limit of 0.057 g/dscm (0.025 gr/dscf) for dryers. To comply with the opacity monitoring requirements, facilities must install continuous opacity monitoring systems (COMS) or apply to EPA for approval of an alternative monitoring method.

“The rule establishes a 10% opacity limitation unless emissions are discharged through a wet scrubbing control device,” reported Dan Oman, P.E., Haley & Aldrich Inc., Ann Arbor, Mich., and Bryant Esch, environmental coordinator, Waupaca Foundry, Waupaca, Wis. They detailed the history of this regulation over the

past decade at the 117th Metalcasting Congress, held this April during CastExpo’13 in St. Louis.

“Subpart UUU’s particulate matter limitations are not particularly onerous compared to other limitations affecting metalcasters,” according to Oman and Esch, but they emphasized the importance of maintaining new control equipment performance levels as a preventive measure. “Records of all monitoring activities must be retained for at least two years,” they explained. “Written reports must be submitted semiannually of exceedances of control device required operating parameters.”

Following the decision on CISWI standards in 2011, AFS reported EPA will use emissions and performance data from thermal sand reclamation units as the basis for any new standards.

According to Oman and Esch, the NSPS rule’s preamble includes a discussion that emission sources generating less than 11 tons per year of emissions could be exempted from the monitoring requirements of Subpart UUU.

AFS is continuing to work with the EPA’s Office of Air Quality Planning and Standards. Meanwhile, Oman and Esch urged metalcasters to stay informed and contact AFS if cited for a violation. **MC**



Photo courtesy of Palmer Manufacturing & Supply

Thermal sand reclamation equipment is regulated under the New Source Performance Standards (NSPS), Subpart UUU (40 CFR Part 60).