Practical Application of Broken Bag Detector Technology for Compliance, Operation and Maintenance

Under the Steelmaking EAF NSPS and the Iron and Steel Foundry NESHAP

This article discusses the practical installation of broken bag detection technology for cost-effective compliance with the latest emission standards. A review of the current status of these rules and their application to EAFs and melting furnaces is provided.

On Oct. 16, 2002, the U.S. Environmental Protection Agency (USEPA) published a proposal to modify the New Source Performance Standards (NSPS) for electric arc furnaces to allow for the use of bag leak detection systems to be used in place of continuous opacity monitors on EAF baghouses with single stacks. While the USEPA has never finalized this rule,* they have made other proposals to utilize bag leak detection systems for monitoring baghouse performance. On April 22, 2004, the USEPA published a final rule promulgating a National Emission Standard for Hazardous Air Pollutants (NESHAP) for iron and steel foundries. While this rule, commonly known as the Foundry MACT, addresses a number of hazardous air pollutants from several different operating practices, this article will focus only on the proposal to include bag leak detection for monitoring the filter fabric baghouses at these operations.

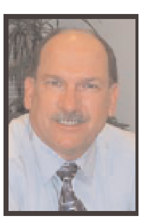
Auburn Note: *The Standard of Performance Update was finalized, effective February 22, 2005*

http://www.epa.gov/fedrgstr/EPA-AIR/2005/February/Day-22/a3360.htm

Iron and steel foundries utilize filter fabric baghouses for controlling the particulate-laden fume generated during melting operations. This particulate is composed primarily of iron oxides; however, it does contain some metal oxides that are considered hazardous air pollutants, depending on the nature of the scrap charged to the furnace. In the final NESHAP rule for iron and steel foundries, the USEPA states their conclusion that controlling particulate matter (PM) is the most effective way of controlling metal HAPs, with the possible exception of mercury, and that it is appropriate to use PM as a surrogate for metal HAPs. While steelmaking electric arc furnaces are not subject to MACT requirements, this industry has a long history of installing and updating large filter fabric baghouses for controlling the PM generated by the scrap melting process. This has resulted in an opacity limit of 3 percent from the baghouses, one of the most stringent opacity standards applied to any industrial operation.

In the authors' opinion, it is clear that a properly designed and maintained baghouse is an extremely efficient method to control PM from the melting operations in both of these industry sectors. It also appears that the USEPA feels that utilizing bag leak detection systems is the most effective method to provide continuous compliance monitoring for these baghouses.

This article compares the bag leak detection system requirements contained in the Oct. 16, 2002, proposed NSPS rule and the April 22, 2004, final NESHAP rule. In addition, this article discusses real-world experience with leak detection systems at two electric arc furnace facilities operated by IPSCO Steel in the U.S.



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Regulatory Requirements

It is important to note at the outset that these two rules are very different in their scope. The proposed EAF NSPS rule is very narrow in scope, addressing only the use of broken bag detectors as an alternative to continuous opacity monitors and only on single-stack baghouses. The Foundry NESHAP rule is broad in scope, covering a variety of pollutants at multiple emission sources located at an iron and steel foundry. For the purposes of this discussion, only the requirement for use of broken bag detectors contained in the Foundry NESHAP will be evaluated and compared to the proposed EAF NSPS rule.

Both the proposed NSPS rule and the final NESHAP rule have three basic requirements related to the installation and use of a broken bag detection (BBD) system. They are: (1) a minimum set of system design requirements; (2) a requirement to develop an operation and maintenance plan for the BBD system; and (3) corrective action requirements to respond to alarms generated by the broken bag detector. The similarity between the basic requirements outlined in both rules provides a good indication of what the USEPA believes is necessary to provide continuous compliance monitoring for baghouses used in the metals industry.

System Design Requirements

In defining a broken bag detection system, the USEPA recognizes that there are several different technologies that could be used. They include but are not necessarily limited to systems that operate based on triboelectric effect, electrodynamic effect, light scatter or light transmittance. Neither rule dictates which system to use, but both rules set as a minimum the requirement to be capable of continuously monitoring the *relative* particulate matter loadings in the exhaust from baghouses. The intent is to be capable of measuring changes in the relative particulate loadings to identify damaged bags or other types of upset conditions that occur in a baghouse. The following points are some of the basic design criteria that are listed in both the proposed NSPS rule and the final NESHAP rule:

- The system must be certified by the manufacturer to be capable of detecting particulate matter concentrations of 10 mg/cm^3 (0.0044 grains per actual cubic foot) or less.
- The system must provide an output of the relative particulate loading, and this output information must be continuously recorded by electronic or other means.
- The system must be equipped with an alarm system to detect increases in the relative particulate loadings above a setpoint. This setpoint is to be established in accordance with the site's operation and maintenance plan. Additionally, the alarm must be located so that it is audible by the appropriate plant personnel.
- When broken bag detection systems are installed on either positive- or negative-pressure baghouses with a stack, the broken bag detector system sensor must be located downstream of the baghouse and upstream of any wet scrubber.
- When multiple detectors are required, the system instrumentation and alarms may be shared among detectors.

Operation and Maintenance Plan Contents

Both rules include the requirement to develop a site-specific monitoring plan. These plans are subject to review and approval by the administrator or the delegated regulatory authority. Both rules also include a reference to a USEPA guidance document, "Filter Fabric Bag Leak Detection Guidance" (EPA-454/R-98-015), for assistance in developing the site-specific monitoring plan. However, the rules also require that the plans, at a minimum, address the following:

- Details on the installation of the broken bag detection system.
- A description of the operation of the broken bag detection system.
- A description of the maintenance procedures, including routine maintenance schedules and a spare parts list.
- A description of the method for recording and storage of the broken bag detection system outputs.
- A description of the initial and periodic adjustment of the broken bag detection system, including the method used to determine the alarm setpoint.

There are requirements referenced in both rules that set minimum specifications for the initial setup of the broken bag detection system. The initial setup must establish a baseline output utilizing the averaging and sensitivity of the system, creating set alarm levels and alarm delay times if applicable. Changes to this initial setup cannot be made without the approval of the administrator or the delegated regulatory authority. There is an exception to this in both rules that allows for changes to the initial setup to account for seasonal variations in temperature and humidity. These are allowed quarterly and must be described in the site-specific monitoring plan. The proposed EAF NSPS rule has another adjustment requirement that is driven by a separate requirement to conduct Method 9 visual opacity readings on the baghouse stack. The rule states that if a Method 9 reading indicates opacity greater than zero for more than 1 minute without a corresponding broken bag detection alarm, adjustments must be made to lower the alarm setpoint.

Corrective Action Requirements

While both rules require corrective actions be taken in response to a broken bag detection system alarm, there are some differences in the two rules that are related to record keeping and reporting requirements. These differences are primarily due to the different regulatory scope of the rules. Therefore, these differences will not be included in this evaluation. Both rules, however, do include discussions about response times to alarms generated by the broken bag detection system, and those actions that would be considered corrective actions to be taken in response to alarms. These requirements are the focus of this evaluation.

Response time to alarms is different in the two rules. The proposed EAF NSPS rule requires initiation of action to address the alarm within 30 minutes, and that the cause of the alarm be alleviated within 3 hours. Any time beyond the 3 hours will require notification of the administrator or the delegated regulatory authority. In the Foundry NESHAP, the operator must initiate corrective action to determine the cause of the alarm within 1 hour and initiate corrective actions to correct the cause of the alarm within 24 hours, completing these corrective actions as soon as practicable. Both rules have a list of what the USEPA believes are the minimum actions that must be included in any facility corrective action plan. They are as follows:

- Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other condition that may cause an increase in particulate emissions.
- Sealing off defective bags or filter media.
- Replacing defective bags or filter media, or otherwise repairing the control device.
- Sealing off a defective baghouse compartment.
- Cleaning the bag leak detection probe, or otherwise repairing the BBD system.
- Shutting down the process producing the particulate matter emissions.
- The Foundry NESHAP lists making a process change as a corrective action. This action is not listed in the EAF NSPS rule.

The following sections of this article describe the practical application of BBD technology to meet these regulatory requirements. The application guidelines are based on IPSCO's experience with both negative- and positive-pressure baghouses.

Facilities and Fume Control Systems Used by IPSCO

IPSCO has two EAF shops located in the U.S. that use BBD systems to monitor the integrity of the fabric filters in the respective emission control baghouses. One EAF shop is located near Montpelier, Iowa, and the other is located near Axis, Ala. (north of Mobile). The Montpelier Works EAF shop uses a negative-pressure baghouse (fans located after the baghouse), and the Mobile Works EAF shop uses a positive-pressure baghouse (fans located ahead of the baghouse). The respective EAF and fume control system basic specifications are outlined in Table 1.

The general configuration of the two EAF baghouses is described in Figures 1 and 2. The Montpelier Works baghouse (Figure 1) is a negative-pressure baghouse with a stack (continuous opacity monitor, or COM, required on a stack — EAF NSPS). The Mobile Works baghouse is a positive-pressure baghouse with a stack (COM required on a stack — EAF NSPS). A positive-pressure baghouse does not typically have a stack; rather, the exhaust is discharged through a ridge vent of some type. The particular circumstance at Mobile Works is associated with local regulations unique to Alabama. Both plants produce steel plate (discrete and coil) as the finished product.

To simplify the diagrams, the location of the fans is not illustrated. The location and design of the BBD system probes is discussed in a later section of this article.

Table 1

EAF and Baghouse General Specifications

Parameter	Montpelier	Mobile
EAF type	Twin shell DC electrode	Twin shell AC electrodes
EAF size	165 ton	175 ton
Baghouse type	Negative pressure	Positive pressure
Air volume (acfm)	980,000	1,600,000
Compartment no.	28	16
Cleaning mechanism	Pulse jet	Reverse air

BBD System Specifications

The BBD systems installed by IPSCO use the DC-energized type of probes. Table 2 summarizes the BBD system specifications for the two facilities. Specific locations for detector probes in the respective types of baghouses are discussed in the System Application section later in this article. The BBD system located at Montpelier Works was installed in August 2000, and the BBD system at the Mobile Works was installed in March 2001. Both facilities are greenfield installations, with Mobile Works being the more recent, having begun operations in November 2000.

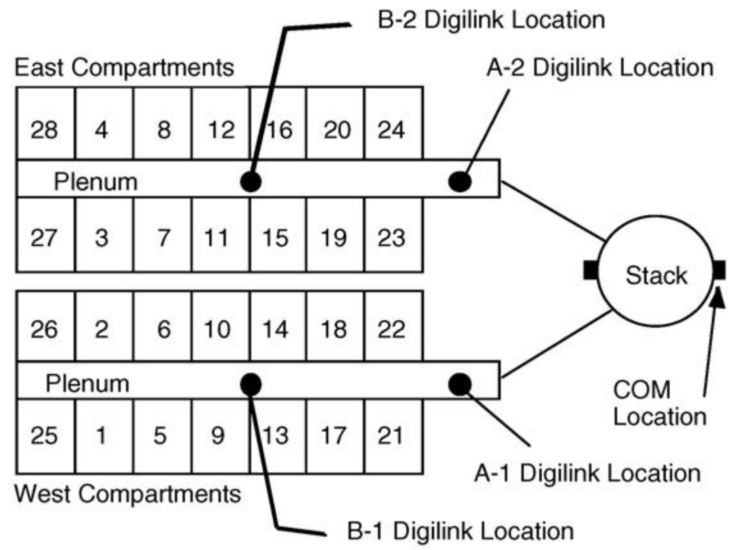
Triboelectric Monitoring Principle

The measurement principle of a triboelectric BBD system is based on measuring the small changes in electrical charge of an energized probe placed within the exhaust gas stream. Generally, there are two types of probe systems presently marketed in the U.S. Depending on the manufacturer, the system will use either DC or AC power for energizing the detector probe. AC-powered systems claim to have the triboelectric field affected by both particles striking the probe and those passing close to the detector. On the other hand, DC-powered systems claim that the majority of triboelectric effect is related to the particles striking the probe. In either case, it is the presence of particles that causes the triboelectric changes.

The probes are generally made of stainless steel or other metallic material that is energized with either AC or DC electrical voltage. The particulate present in the gas stream strikes the probe (or passes close enough to affect the probe), and the particles act to change the electric field of the probe. This mechanism is similar to the release of static electricity that has been accumulated in a person's clothing or on the skin. The small changes in the electric field associated with the passage of particles are measured in pico-amps. These pico-amp changes are the measurements that quantify the triboelectric signal.

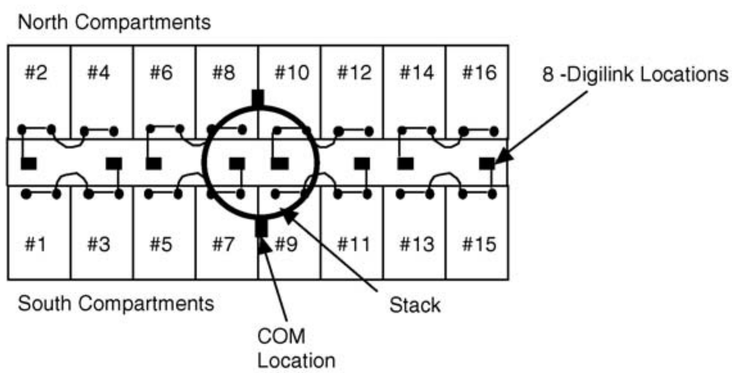
The triboelectric signal is an analog output that is displayed as a percent of scale. The absence of impacting or passing particles is measured as 0 percent, with the relative increase of particle presence (strikes or near passes) measured up to 100 percent of the scale. Because of the sensitivity of the measurement mechanism, the triboelectric BBD can detect particles as small as 2 microns in diameter.[2] These particles are

Figure 1



General arrangement of the Montpelier Works baghouse.

Figure 2



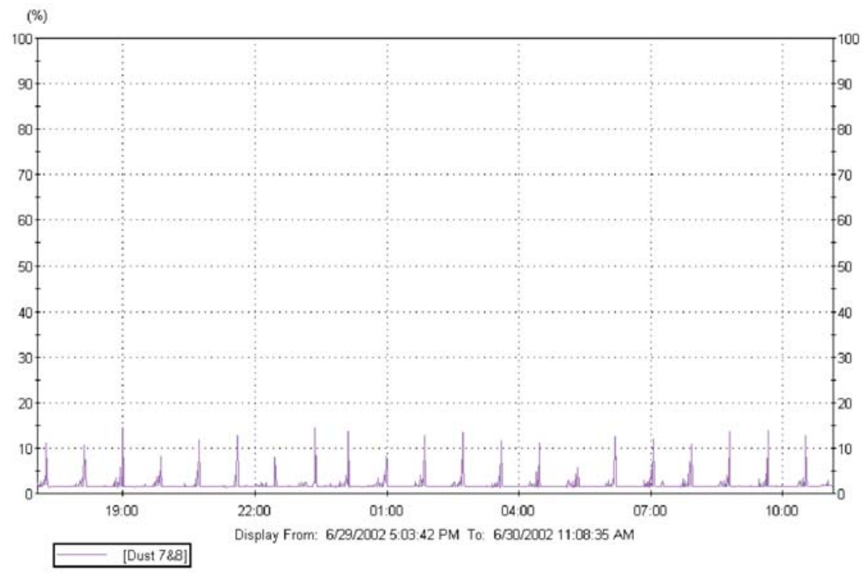
General arrangement of the Mobile Works baghouse.

Table 2

BBD System Specification Summary

Parameters	Montpelier	Mobile
Manufacturer	Auburn Systems LLC	Auburn Systems LLC
Model	Tribolink™	Tribolink™
Number of detector locations	4	8
Number of probe rods/location	2	4
Detector material of construction	316 stainless steel	316 stainless steel
Probe temperature range	−60 to 400°F	−60 to 400°F
Input/output interface	PC	PC
Operating system platform	Windows 98	Windows 98

Figure 3



Triboelectric signals: normal cleaning spikes in a positive-pressure baghouse.

invisible to the human eye and a continuous opacity monitor (COM).

The particle characteristics of size, shape and structure, as well as the quantity of particles present in the gas stream, affect the relative change in triboelectric signal. These factors have nothing to do with directly measuring the density or mass of the respective particle.

The BBD systems used by IPSCO employ the DC-based electrical power supply for the probes.

Emission Source and Effect on Triboelectric Signals

Since the triboelectric effect is dependent on changes in an electrical field, the base material composition of the particles has an effect on this measurement. Certain materials, such as metals, will have a greater effect proportionately on the triboelectric change than nonconducting materials. Since the measurements being tracked are relative (percent of scale), the output signal can be adjusted to fit a range that provides a signal that the operator can adjust to track the particles being removed by the control device at his location. Iron oxide particles, the majority portion of fume from EAF steelmaking and foundry furnaces, are a good triboelectric material. However, as noted earlier, there are several factors that affect the triboelectric signal. These include: shape, size, structure, quantity, velocity and chemical composition of the particles. These factors are independent variables that are unique to each emission source and fume control system.

The emission variability between sources is compensated for by adjusting the scale factor of the triboelectric system. Each detector (group of probes) sends a variable signal that is a measurement of the pico-amp changes affecting the probes. When the pico-amp effect of the particles is greater, the scale factor can be set lower and correspondingly adjusted if the effect is lower. The output measurement is a percent of the scale factor.

As an example, the scale factor for the Montpelier Works is 1,500 pico-amps (100 percent of scale = 1,500 pico-amps), while the scale factor at the Mobile Works is 250 pico-amps (100 percent of scale = 250 pico-amps). Both facilities produce the same type of steel product and have similar sources of raw materials; however, the design of a positive-pressure baghouse compared to a negative-pressure baghouse affects the velocity and quantity of particles passing the probes during normal operation. Even though the particles have the same basic chemistry, other independent variables affect the triboelectric system measurements at these locations. Correspondingly, each operating facility will have a unique triboelectric signature that will need to be evaluated in setting up the operating and alarm levels for the BBD system at that facility.

Figures 3 and 4 illustrate examples of real-time tracking of triboelectric signals for a probe detector on a positive- and negative-pressure baghouse, respectively. The negative-pressure baghouse signal in Figure 4 represents on-line cleaning, and the positive-pressure baghouse is off-line cleaning. The spikes shown on each of the signals are referred to as cleaning spikes and are associated with the release of dust that initially passes through a recently cleaned bag until the cake re-establishes on the surface of the fabric. In the case of the on-line cleaned row of bags (Figure 4), this spike is immediate and trails off over a short period of time. In the case of the off-line cleaned compartment (Figure 3), the spike is more discrete and drops off quickly. These figures illustrate the difference between signals of systems that are cleaned on-line (negative-pressure system) and off-line (positive-pressure system). However, the signals and the respective scale factors will vary from source to source, but the cleaning spike will be present in all systems. Monitoring of signal level and cleaning spikes will be discussed in a later section.

BBD System Application Considerations

Several factors should be evaluated when designing a BBD system to monitor a specific fume control system and emission source. The previous section explained the relative triboelectric uniqueness of each emission source. However, the successful and effective installation and operation of a BBD system needs to consider these additional factors:

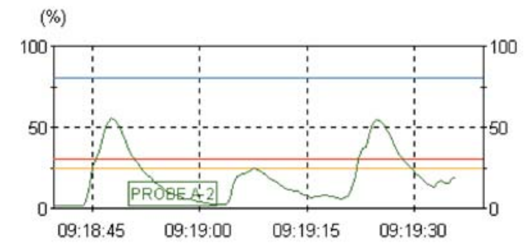
- The basic type of baghouse system ventilation: positive or negative airflow through the collector.
- The mechanism for cleaning the filter media (bags).
- Whether cleaning is done off-line or on-line.
- The degree of broken bag detection/identification: identification of the bag row or only the compartment.
- The location and number of probes.
- Environmental effects of temperature on the probes and the detectors.
- Signal output monitoring and control: use of PLC and HMI interfaces.
- Establishing the scale factor: determining what is a normal signal.
- Establishing the alarm levels: permit conditions that are reportable violations.
- Operator training.

Each of these considerations is discussed in more detail in the following sections.

Positive and Negative Flow Systems — Generally, the clean side airflow from the baghouse compartments is monitored by the triboelectric probes. A negative flow system discharges the air into a relatively small cross-section plenum that collects air from a line of compartments, and a positive-pressure system discharges air into a relative large cross-section plenum or directly to a ridge vent. The velocity of the particles in the negative-pressure plenum is typically much higher than that of particles discharging into a penthouse on top of a positive-pressure compartment. With higher velocity, the number of probes needed to monitor a given gas stream tends to decrease. A number of compartments in a negative-pressure plenum can be monitored by a single probe location, as indicated in Figure 1. In the case of a positive-pressure system, the individual compartments can discharge directly to the atmosphere through a relatively large cross-section (low-velocity) pathway. Figure 5 illustrates a typical positive-pressure baghouse compartment and the location for a monitoring probe(s).

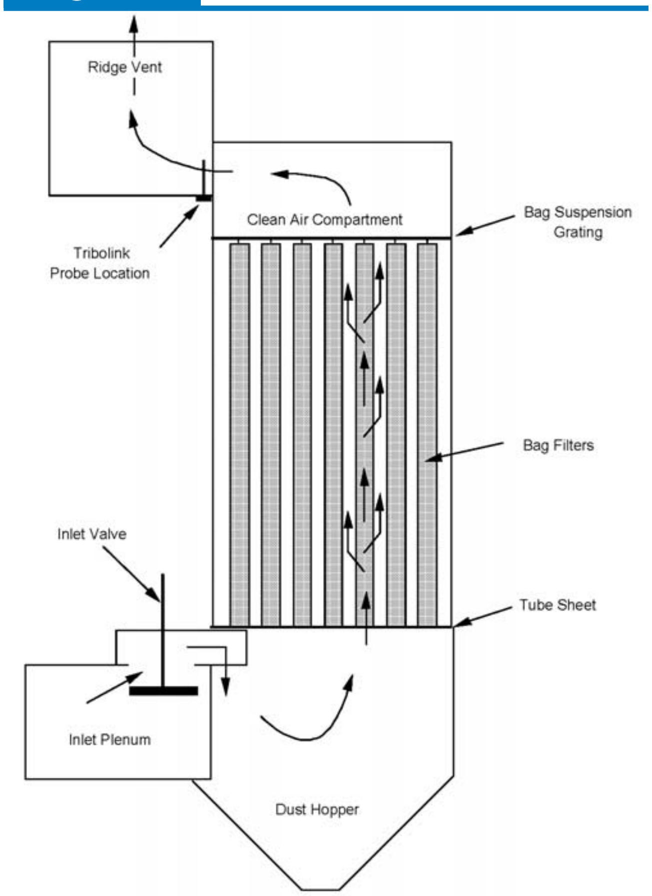
Cleaning Method — The cleaning methods for a metal fume baghouse generally use either pulse jet or reverse flow. Mechanical shaking is not typically used because of the abrasion created in bag folds that develop when the bag tensions are not kept tight. Reverse-air cleaning requires that the compartment being cleaned is isolated from the offgas stream so the compartment airflow can be reversed. Pulse-jet-cleaned units can be cleaned without isolating the compartment from the offgas. Alternatively, the pulse-jet baghouse can be cleaned off-line. This alternative for compartment isolation during cleaning will affect how the BBD system monitoring is set up. The operator of a pulse-jet-cleaning baghouse must determine whether his system will use compartment isolation or

Figure 4



Triboelectric signals: normal cleaning spikes in a negative-pressure baghouse.

Figure 5



Positive-pressure baghouse compartment probe location.

not during cleaning. The BBD system can be configured to meet either operating scenario.

On-line or Off-line Cleaning — As noted under the previous item, the mechanism of bag cleaning will to a great extent determine whether the baghouse can be operated on-line or off-line. The reverse-air-cleaning baghouse can be operated only in an off-line method. The pulse-jet method of cleaning uses a pulse of high pressure shot into the bag, and as the pulse travels the length of the bag, the collected dust is shaken from the bag surface as the pulse passes by. This is typically done a row at a time in the respective compartment. When on-line cleaning is used, several compartments can be set to have a particular sequence of rows fire at the same time. As an example, a baghouse with 10 compartments, 12 rows of bags per compartment, can clean compartments 1 and 3 on-line at the same time, provided that these compartments deliver offgas to a different plenum in order to avoid having mixed cleaning signals striking a probe during the cleaning cycle.

Off-line cleaning of a pulse jet baghouse generally reduces the number of probes needed to monitor the system. The ability to identify single rows with broken bags is not lost; however, the programming must be modified to make such determinations if desired by the operator. This consideration is discussed in the next section.

The number of probe groups for a reverse-air-cleaned baghouse (off-line cleaning required) can also be zone configured. However, the total number of compartments in the baghouse will directly affect how many zones can be established.

Degree of Broken Bag Location Detection — Ideally, it would be desirable if a BBD system could identify the specific bag that is leaking or broken. However, even though this could be done, the cost to accomplish it would be prohibitive. More cost-effective detection can be accomplished using a select number of locations, depending on the type of baghouse at the particular facility attempting to install BBD technology.

A facility with a reverse-air-cleaning, positive-pressure baghouse must use the off-line compartment cleaning method for this type of unit. Since the BBD system will be monitoring the exhaust characteristics of the compartment when it is returned to service after cleaning, it is monitoring the contribution of all the bags in that compartment. The system can identify the compartment containing a leaking bag or bags. It will require isolation of the compartment and entry by an operator to visually identify the bag or bags that need replacement or repair.

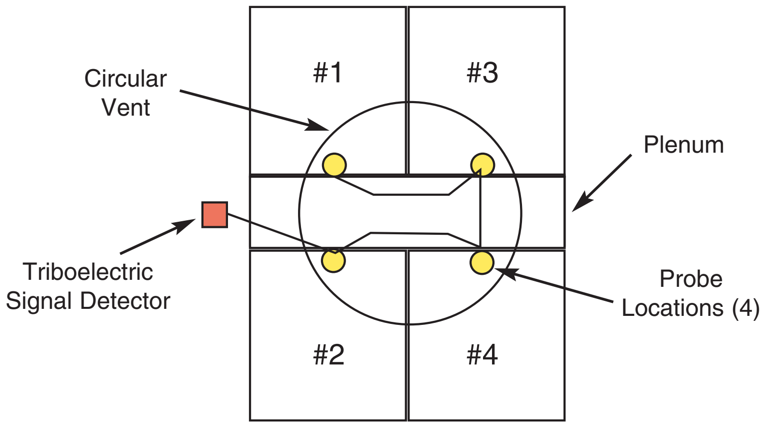
As noted in the previous section, a pulse-jet baghouse can be cleaned using either the on-line or off-line method. When cleaning on-line, the baghouse PLC cleaning information can be coordinated with the BBD signals to identify the particular row that contributed to an alarm signal at that probe location. This data can be sent to an alarm file for operator reference. An operator reading the alarm file can identify the particular row containing the broken bag or bags, thereby reducing the number of bags requiring visual inspection to only that row. In a compartment with 10 rows of 10 bags per row, the operator would need to inspect only 10 bags when the row is known. If only compartment identification were known, then all 100 bags would need to be visually inspected.

A pulse jet baghouse that cleans off-line can still identify the row of suspected leaking bags. However, this would require programming in the PLC to flag the compartment when it returned to service with an early warning alarm level, and designate this compartment for *on-line* cleaning during the next scheduled cleaning cycle. The method of row identification would be part of the programming during the on-line cleaning cycle. Once the row has been identified, the operator could make the visual inspection to locate the leaking bag or bags.

Probe Locations and Number — Location: Probe locations are determined by the number of zones into which a baghouse can be subdivided while detecting individual compartment offgas triboelectric signals during operating and cleaning cycles. The factors of on-line and off-line cleaning were discussed previously.

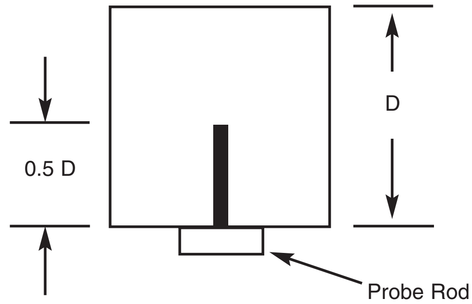
In a pulse-jet, negative-pressure baghouse, multiple compartments can be on-line cleaned in the same plenum, provided the plenum has multiple detector locations that can distinguish between the compartments being cleaned. In the case of the Montpelier Works baghouse, the two exhaust plenums have been divided into four zones. One compartment in any of these four groupings could simultaneously clean the following compartments: (1, 2, 5, 6, 9, 10, 25, 26); (13, 14, 17, 18, 21, 22); (4, 3, 7, 8, 11, 12, 27, 28); and (15, 16, 19, 20, 23, 24). As an example, compartments 1, 13, 4 and 15 could be on-line cleaned and be effectively monitored by the BBD system. However, two compartments in the same group could not be cleaned on-line, since the triboelectric probe could not distinguish between the output from compartments 1 and 2.

Figure 6



Organization of a circular ridge vent broken bag detector.

Figure 7



Negative-pressure plenum duct.

For a baghouse that will be cleaning on-line, the number of compartments simultaneously cleaning will directly affect the number of detector zones installed in the BBD system. Generally, the more cleaning zones there are, the more detectors are needed for the baghouse.

For positive-pressure baghouse systems, the design of the ridge vent will determine how many zones can be established. Baghouses can generally have two types of vents, either a continuous ridge vent (CRV) running along the centerline of the structure or a series of circular vents along the centerline, combining the exhaust gas from groups of compartments. As noted previously, only whole compartment exhaust gas can be monitored on positive-pressure baghouses.

In the case of circular vents, each of the compartments under a vent can be combined into a zone, since their exhaust gas will directly affect the visibility of the emissions from that vent. The actual number of probes will be determined by the geometry of the individual compartment exhaust to the vent plenum. For example, Figure 6 illustrates a four-compartment exhaust under a circular ridge vent. A total of four probes are combined in this zone. However, since the probes are linked in series to the triboelectric signal origination device (signal detector), the output is seen as a single signal. The baghouse PLC tracks which compartment is cleaning and identifies the cleaning spike alarm so the information can be sent to a data file for operator reference, or the compartment can be isolated until it is manually inspected and returned to service by the operator. This minimum programming will optimize the number of zones needed in the BBD system.

The CRV design of exhaust configuration can be optimized in a similar manner as the circular vent arrangement. The maximum number of compartments comprising a monitoring zone can be established by the owner/operator. However, the number of compartments contributing exhaust to a given length of CRV should be used to set the number of compartments per zone.

Each facility will need to be independently evaluated to meet the objectives of the owner/operator while developing a BBD system design that is effective and provides the lowest installation cost.

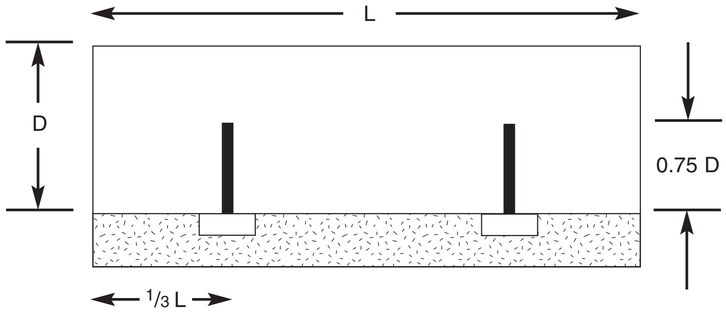
Number of Probes: The geometry of the exhaust plenum in a negative-pressure baghouse and the exhaust port geometry of a positive-pressure compartment will establish how many actual probe detector rods are installed. Since the probe rods are connected in series, the triboelectric signal detector sees the effect of each rod as a cumulative triboelectric change. The change of each rod is added to the next rod in the series, until the total change is measured by the triboelectric signal detector and transmitted as a relative 4–20 mA signal to the input/output board of the PLC.

For example, the configuration of probe rods illustrated in Figure 6 contains a total of four probe rods. However, the PLC sees only a single probe signal (the sum of the four probe rods' individual triboelectric changes) from the triboelectric signal detector for this zone.

Figure 7 illustrates the typical probe rod geometry in the plenum of a negative-pressure baghouse. The figure is a cross-section of the plenum duct. The probe's length should reach to the midpoint of the duct and be located on the centerline of the section.

Figure 8 illustrates the location of probe rods across the exhaust port of the clean room into the plenum beneath the CRV or circular vent. The figure is a cross-section looking back into the clean room of the compartment. Exhaust gas would be flowing from the page toward the reader. Generally, the lower velocity associated with the larger cross-section of

Figure 8



Positive-pressure compartment exhaust port.

the exhaust port requires several probe rods located across the port. The probe rods would be linked in series, and as noted previously, their triboelectric change is seen as a common signal.

These illustrations are not hard design parameters, but are presented to act as guidelines that can be used for the selection of the probe rod locations. Probe rod lengths are generally limited to 6 feet when using standard 316 stainless steel. Probe rods of greater length require special construction and materials to ensure that the rod does not flex under the air loading and its own weight. Alternative detector designs using other than probe rods are being developed by some manufacturers.

Temperature Effects on the Probe Rods and Detector Locations — The probe rods are generally not affected by temperature extremes. The ambient temperature range listed for the probe rods is –60 to 400°F. Most baghouses have offgas temperatures below 270°F, the upper temperature limit of polyester bags.

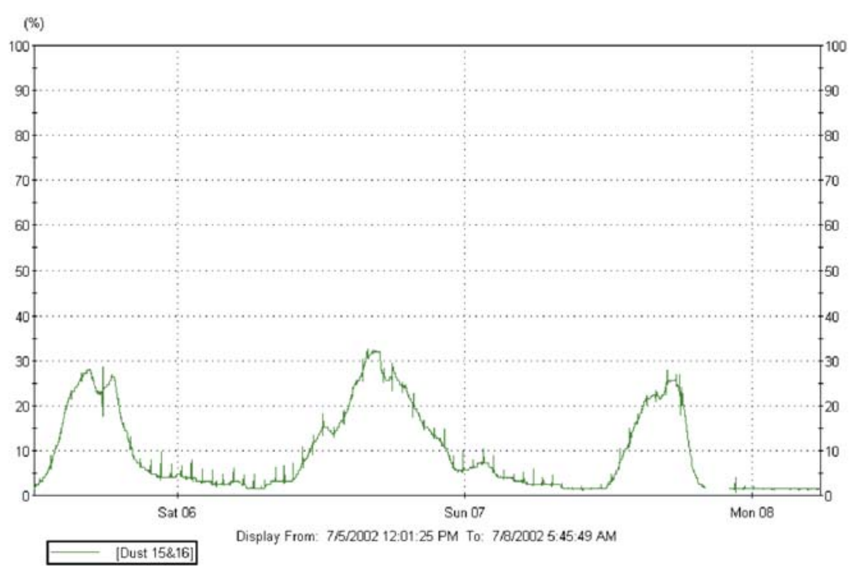
The triboelectric detector, on the other hand, is much more sensitive to temperature extremes. The operating range for the hardware of the detector is +20 to 160°F. Since the coaxial signal length from the last probe rod location to the detector is limited to 150 feet, the detector cannot be located at ground level on larger baghouses. Generally, the detector equipment is located at the penthouse or bag maintenance level of the baghouse. The detectors for multiple zones can be located in a central cabinet that can be either heated or cooled as necessary to maintain the equipment within the specification temperature range.

The location of the detectors on the sheet metal walls of the compartments, although a typical location, can present a temperature problem during summer in the warmer latitudes. An offgas temperature of +200°F can conduct a significant amount of heat through the sheet metal wall, especially when the ambient outside temperatures can exceed 100°F heat index on a daily basis. Cooling of the cabinet containing the detectors can present more of a challenge than heating. A small radiant heater or 100-watt light bulb in an insulated cabinet can provide sufficient heat during cold months, while chilled air will be necessary to cool the cabinet in seasonally high temperatures.

It is important to identify the manufacturer's temperature specification for the detector hardware, and plan to protect the equipment from the extremes in temperature that might be present in the baghouse environment. The output signal from the detector will not be reliable when it is operating outside of its temperature envelope. Figure 9 illustrates a triboelectric signal that has been affected by heat interference. The spikes in the illustration do not correspond to cleaning spikes.

Signal Output Monitoring — The triboelectric signal is generated on a real-time basis; typically two measurements per second are generated from the detector. This quantity of data is quite large, and real-time tracking is generally set at intervals that are based on fractions of a minute. The detector output varies and can be set to monitor only for an alarm level, or a real-time tracking of a 4–20 mA signal. The signal

Figure 9



Effect of heat interference on triboelectric signals.

can be received by a PLC or directly by a PC using proprietary software. A human machine interface (HMI) that uses the PLC or a PC can interface with the baghouse PLC to track compartment cleaning.

An interface between the BBD system and baghouse PLC can be set up to provide automatic visible emission protection by directing isolation of a compartment that exceeds a preset alarm level. This compartment would be returned to service only after the operator had made the necessary bag repairs and manually returned the compartment to service.

Determining Normal Signals and Scale Factor — As noted previously, each facility will have a unique triboelectric signal related to a number of variables. The identification of the normal triboelectric signal pattern can be established within a few hours of operation. The scale factor used to generate the real-time tracking and historic trend recording will be the same, and it is set to produce a signal pattern that has sufficient amplitude so that an operator observing the signals can readily identify cleaning spikes from the normal signal pattern. The normal cleaning spikes (those associated with no bag damage) should not exceed the 50–60 percent range of the scale. This will provide for sufficient visual amplitude while still keeping the signals on the scale. The scale factor applied to the signals will determine how this data is visually displayed.

The scale factor will also determine the amplitude of the normal on-line operating signal for each zone of the baghouse. The normal signal will have variability but should be set so that the signal is at least 10 percent of the scale. It is not useful to have the scale factor set so high that the normal signal is at 0 percent of the scale. Once the scale factor has been set to identify the normal operating triboelectric signature of the facility, the alarm levels can be established.

Even a system that provides only an alarm signal to the operator and does not track or record real-time data must establish the scale factor for normal operation.

Establishing Alarm Levels to Prevent Permit Condition Violations — Each facility construction or operating permit will establish some level of visual emissions (percent opacity) that cannot be exceeded without causing a violation of the permit. For a steelmaking EAF, the opacity level is set as low as 3 percent, and other sources can have the opacity set as high as 20 percent. This opacity level standard is a 6-minute average of visual observations by a trained observer or measurements made by a COM located on a discharge stack. Work done by the authors, and published previously, determined that the BBD systems using triboelectric signals were able to detect changes in particulate emissions at levels well below visibility, as detected by an observer or a COM.[3] As such, a BBD system is able to provide an operator with data that allows preventive maintenance to take place long before bag leaks develop into visible emission violations.

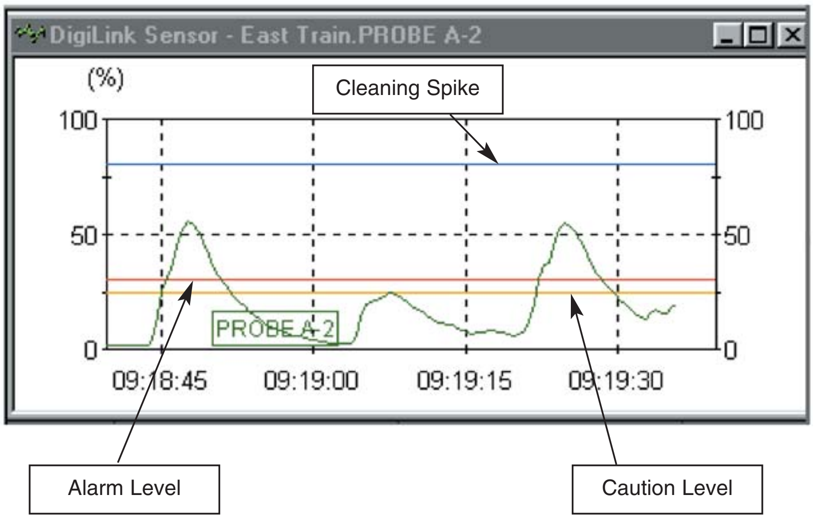
Each operator can select the type and level of alarms used in his system. The alarm levels used by IPSCO at its two facilities include a cleaning spike alarm, a caution level and an alarm level. Each of these signal levels was established as a result of regression analysis done on surrogate particle introduction testing performed at the respective facility. The visible emission observations and COM data were correlated to the triboelectric signals, and the resulting regression functions were used to set protective alarm levels during normal operation. These normal operating alarm levels track the real-time data during on-line operation of the baghouse, and they log the events to a data file for operator reference.

The Caution and Alarm Levels: The percent of scale ranges established by the regression function was set with the caution level at 25–29 percent and the alarm level at > 30 percent. The duration of the signal at the respective level was set at 1 minute as the basis for triggering the alarm. Periodic signals that reached these levels for less than a minute were ignored by the system. The rolling time period allowed for noise signals (an operator walking on the plenum, etc.) to be generated without creating false alarms.

Cleaning Spike Alarm: This alarm level was developed by evaluating the amplitude of the normal cleaning spikes associated with the return of a recently cleaned bag to online service. During the initial return to service, there is a brief interval of small particle passage (invisible to the COM or human eye) while the filtering cake layer is reestablished on the surface of the bag. By tracking the duration and amplitude of this spike, it was observed that weakened or partially penetrated bags could be detected well in advance of visible emission problems. This cleaning spike alarm level was created in the software and was set at 80 percent of scale. This refinement has been very helpful in maintaining a proactive program for early identification of broken bags. Figure 10 illustrates a triboelectric screen signal, with the alarm levels indicated for reference.

The signal screen in Figure 10 is from a negative-pressure, pulse-jet baghouse that is cleaning on-line. Depending on the individual operator's permit conditions and maximum level of opacity that determines a violation,

Figure 10



BBD system alarm levels.

surrogate testing can be done to establish protective alarm levels below the violation standard. However, this is not always necessary. Alarm levels can be set based on observation of the normal patterns and events that do result in exceedances.

The caution level is intended to give the operator an advance warning of rows or compartments that have begun to increase their signal from the normal baseline. This condition generally is an indication that a bag or bags have begun to leak at some small level. The operation program at IPSCO requires the operator to respond to the caution alarm as soon as possible and make the necessary investigation and corrective actions.

At the alarm level, the baghouse PLC sends an alarm signal to the alarm record file and triggers an alarm on the baghouse HMI screen and the EAF operator's HMI screen at the same time. The alarm level requires immediate operator response and corrective action.

A cleaning spike alarm is logged to the alarm file and announced on the baghouse operator's HMI screen. Investigation of the cleaning spike identified row or compartment is generally part of the maintenance "to do" list during the next scheduled outage for the meltshop. This proactive investigation and corrective action for cleaning spike alarms has identified problem bags long before a visible emission violation can occur.

It should also be noted that signal patterns can change over time, necessitating changes in the alarm levels. A change in the type or manufacturer of the bags used in the baghouse, and the age of the bags, will affect the normal signal characteristics.

Operator Training — Once the BBD system alarm and normal operating parameters have been established, the employees responsible for maintenance and operation of the baghouse system need to be trained to use the system. This will typically require both classroom and on-the-job training to provide the necessary information to establish operator confidence in the system. It is also important to assess operator feedback over time. Adjustments and improvements in the system can be made to enhance the BBD system's usefulness and reliability.

Quality Control and Quality Assurance Program

A written QC/QA program needs to be developed for the BBD system at a particular facility. This program should include the following considerations, at a minimum:

- The inspection frequency and cleaning of the probe rods.
- Visual inspection of the cables/conduit of the BBD system.
- Electrical calibration/verification of the system components at intervals recommended by the manufacturer.
- Backup hardware for the historic signal file records.
- The period of time that historic records should be maintained. Permits can contain minimum record retention requirements.
- Annual review of the BBD system by the manufacturer or a consultant engineer to determine whether changes need to be made in alarm levels or the system scale factor.
- The method of QC/QA record keeping.

A QC/QA program is a requirement of the standards, and specific facility permits may require specific actions. It is important to review the facility permit to ensure that any such requirements are included in the written QC/QA plan for the facility.

Operation and Maintenance Program

Several basic considerations should be determined by the owner/operator of the baghouse before finalizing the BBD system programming and interface with the baghouse PLC. These include the following:

- BBD system manufacturers provide dedicated software for application to a PC as the HMI interface. The BBD system can be effectively operated without this software; however, the decision of whether to apply this software should be made before programming of the system is begun.

- Will the BBD system operate from the baghouse PLC or have a dedicated PLC? The HMI software provided by manufacturers will typically provide a signal to interface with the baghouse PLC. If the decision is made to operate the BBD system from the baghouse PLC or provide a dedicated PLC to interface with the baghouse PLC, a consultant experienced in the PLC programming of the BBD PLC should be retained to write the necessary programs.
- The owner/operator will need to identify how many alarm levels will be part of the BBD system and how these levels will be interfaced with the baghouse PLC. The baghouse PLC can be programmed to respond to an alarm level by isolating the alarmed compartment until repairs are made.
- If the identification of leaking rows in a pulse-jet baghouse is desired, it will be necessary to interface with the baghouse PLC to cause this identification to be made. This interface programming will be different for on-line and off-line cleaning methods, but the cleaning data from the baghouse PLC must be integrated with the BBD system signals.
- Manufacturers provide a modem interface with their equipment that can be used for diagnostic analysis of the equipment. The owner/operator will need to determine whether to use this option if it is available.
- The data generated by the BBD system can be made available to a plant Ethernet system. A decision as to who should have access to this data internally will need to be made.
- Record keeping of the historic data is done electronically. The owner/operator should determine whether hardware backup is needed and the method of accomplishing such backup. IPSCO has installed dual hard drives for data storage.
- The historic data can be recorded at the level of measurements (two per second); however, that amount of data is quite large and not necessary. IPSCO has set a 5-second increment for tracking this data.

Conclusions

The mandatory use of a BBD system has become a requirement for iron and steel foundry operators, and it has been proposed as an option for EAF steelmaking operators. The application of this technology can prevent permit violations and optimize the performance of baghouse emission control systems, provided that the equipment design maximizes the technology to the type of system operated at the facility. Cost-effective equipment installation and control design can be accomplished using the considerations discussed in this article.

References

1. Federal register Vol. 69, No. 78, April 22, 2002, p. 21912.

2. Auburn Systems particle study on particle size detection, May 12, 2001.

3. Wesselman, J.C., and Askins, C.W., “Comparison of Continuous Opacity Monitor and Method 9 Observations to Triboelectric Broken Bag Detector Signals on an EAF Baghouse,” *AISE Steel Technology,* April 2002, pp. 53–64. ✦

This paper was presented at AISTech 2004 — The Iron & Steel Technology Conference and Exposition, Nashville, Tenn.

Standards of Performance for Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974, and on or Before August 17, 1983; and Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 17, 1983

[Federal Register: February 22, 2005 (Volume 70, Number 34)]
[Rules and Regulations]
[Page 8523-8534]
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ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 60
[OAR-2002-0049; FRL-7874-9]
RIN 2060-AJ68

Standards of Performance for Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974, and on or Before August 17, 1983; and Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 17, 1983

AGENCY: Environmental Protection Agency (EPA).
ACTION: Final rule; amendments.

SUMMARY: This action promulgates amendments to the new source performance standards for electric arc furnaces constructed after October 21, 1974, and on or before August 17, 1983, and the new source performance standards for electric arc furnaces constructed after August 17, 1983. The final amendments add alternative requirements for monitoring emissions from furnace exhausts and make minor editorial corrections.

EFFECTIVE DATE: February 22, 2005.

ADDRESSES: The EPA has established an official public docket for this action including both Docket No. OAR-2002-0049 and Docket No. A-79-33. All documents in the docket are listed in the EDOCKET index at http://www.epa.gov/edocket (or Docket No. A-79-33). Not all docket materials are available electronically. The materials in Docket No. A-79-33 are in hard copy form and are publicly available through the docket facility as set forth below. Although listed in the index, some information is not publicly available, i.e., confidential business information or other information whose disclosure is restricted by statute. Certain other information, such as copyrighted materials, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically in EDOCKET or in hard copy form at the New Source Performance Standards for Electric Arc Furnaces Docket, Docket ID No. OAR-2002-0049 (or A-79-33), EPA/DC, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air Docket is (202) 566-1742.

FOR FURTHER INFORMATION CONTACT: Mr. Kevin Cavender, Emission Standards Division, Office of Air Quality Planning and Standards (C439-02), Environmental Protection Agency, Research Triangle Park, NC 27711, telephone number (919) 541-2364, electronic mail (e-mail) address, cavender.kevin@epa.gov.

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does This Action Apply to Me?

Categories and entities potentially regulated by this action include:

Category	NAICS code \1\	Examples of regulated entities
Industry......................	331111	Steel manufacturing facilities that operate electric arc furnaces.
Federal government.............	....	Not affected.
State/local/tribal government..	....	Not affected.

\1\ North American Industry Classification System.

This description is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. To determine whether your facility is regulated by this action, you should examine the applicability criteria in 40 CFR 60.270 (for electric arc furnaces constructed after October 21, 1974, and on or before August 17, 1983) or 40 CFR 60.270a (for electric arc furnaces and argon-oxygen decarburization vessels constructed after August 7, 1983), as applicable. If you have any questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding FOR FURTHER INFORMATION CONTACT section.

B. Where Can I Get a Copy of This Document and Other Related Information?

In addition to being available in the docket, an electronic copy of today's final rule amendments will also be available on the Worldwide Web (WWW) through the Technology Transfer Network (TTN). Following the Administrator's signature, a copy of the final rule amendments will be placed on the TTN's policy and guidance page for proposed or promulgated rules at http://www.epa.gov/ttn/oarpg. The TTN provides information and technology exchange in various areas of air pollution control. If more information regarding the TTN is needed, call the TTN HELP line at (919) 541-5384.

C. What Are the Judicial Review Requirements?

Under section 307(b)(1) of the Clean Air Act (CAA), judicial review of the final rule amendments is available only by filing a petition for review in the U.S.

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Court of Appeals for the District of Columbia Circuit by April 25, 2005. Under section 307(d)(7)(B) of the CAA, only an objection to the final rule that was raised with reasonable specificity during the period for public comment can be raised during judicial review. Under section 307(b)(2) of the CAA, the requirements that are the subject of today's final rule amendments may not be challenged separately in civil or criminal proceedings brought by the EPA to enforce these requirements.

D. How Is This Document Organized?

The information in this preamble is organized as follows:

II. Background

A. What Is an Electric Arc Furnace?

An electric arc furnace (EAF) is a metallurgical furnace used to produce carbon and alloy steels. The input material to an EAF is typically 100 percent scrap steel. Cylindrical, refractory lined EAF are equipped with carbon electrodes to be raised or lowered through the furnace roof. With electrodes retracted, the furnace roof can be rotated to permit the charge of scrap steel by overhead crane. Alloying agents and fluxing materials usually are added through doors on the side of the furnace. Electric current is passed between the electrodes and through the scrap, generating arcing and the generation of enough heat to melt the scrap steel charge. After the melting and refining periods, impurities (in the form of a slag) and the refined steel are poured from the furnace.

The production of steel in an EAF is a batch process. Cycles, or heats, range from about 1\1/2\ to 5 hours to produce carbon steel and from 5 to 10 hours to produce alloy steel. Scrap steel is charged to begin a cycle, and alloying agents and slag forming materials are added for refining. Stages of each cycle normally are charging, melting, refining (which usually includes oxygen blowing), and tapping.

All of those operations generate particulate matter (PM) emissions. Emission control techniques involve an emission capture system and a gas cleaning system. Emission capture systems used in the industry include direct shell (fourth hole) evacuation, side draft hoods, combination hoods, canopy hoods, scavenger ducts, and furnace enclosures. Direct shell evacuation (DEC) consists of ductwork attached to a separate, or fourth hole, in the furnace roof which draws emissions to a gas cleaner. The DEC system works only when the furnace is up-right and the roof is in place. The side draft hoods collect furnace off gases from around the electrode holes and the work doors after the gases leave the furnace. The combination hood incorporates elements from the side draft and direct shell evacuation systems. Canopy hoods and scavenger ducts are used to address charging and tapping emissions. Baghouses are typically used as the gas cleaning system.

B. What Are the Current Requirements of the New Source Performance Standards for Electric Arc Furnaces?

The new source performance standards (NSPS) for EAF constructed after October 21, 1974, and on or before August 17, 1983 (40 CFR part 60, subpart AA) were first promulgated on September 23, 1975 (40 FR 43850). The NSPS for EAF constructed after August 17, 1983 (40 CFR part 60, subpart AAa) were first promulgated on October 31, 1984 (49 FR 43845). Both subparts limit the allowable PM concentration in the exhaust of an EAF emission control device to 12 milligrams per dry standard cubic meter (mg/dscm) or 0.0052 grains per dry standard cubic foot (gr/dscf). In addition to the PM emission limit, both subparts limit visible emissions from the EAF control device (typically a baghouse) to less than 3 percent opacity, as determined by EPA Method 9 of 40 CFR part 60, appendix A.

In both subparts, if the control device is equipped with a single stack, the owner or operator is required to install, calibrate, maintain, and operate a continuous opacity monitoring system (COMS). The owner or operator must report each 6-minute average COMS reading of 3 percent or greater as an excess emission. A COMS is not required on any modular or multiple-stack fabric filter if opacity readings are taken at least once per day during a melting and refining period, in accordance with EPA Method 9.

The subparts also contain requirements for the EAF capture systems. However, those requirements are not being amended by today's action. As such, we do not discuss the capture system requirements here.

C. Why Are We Amending the New Source Performance Standards?

We are amending the NSPS in response to a petition to reopen the NSPS filed by the American Iron and Steel Institute (AISI), the Speciality Steel Industry of North America (SSINA), and the Steel Manufacturers Association (SMA) (``the Petitioner''). In the request to reopen, the Petitioner argues that COMS are not capable of accurately monitoring opacity emissions from an EAF shop at the 3 percent excess emission threshold level, and that the EAF NSPS should be amended to address the technological shortcomings associated with COMS. In making this argument, the Petitioner points to our recent revision (65 FR 48914, August 10, 2000) to performance specification 1 (PS-1) for COMS (40 CFR part 60, appendix B) in which we acknowledge that there is potential for measurement error associated with COMS readings. On October 16, 2002 (67 FR 64014), in response to the petition, we proposed amendments to the NSPS that would allow bag leak detection systems as an alternative monitoring option. More information on the industry petition can be found in the preamble to the proposed amendments.

Today's final rule amendments reflect our full consideration of the petition, including all of the public comments received. The petition to reopen is granted to the extent provided in today's final action adding an alternative to COMS for monitoring emissions from EAF control devices. The petition is denied in all other respects. For the reasons stated in the response to comments below, we have determined that the alternatives suggested by the Petitioner are inappropriate, and that other measures, including the bag leak detection system monitoring alternative finalized today, adequately address its concerns about potential measurement error.

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III. Summary of the Final Amendments

A. What Is the New Alternative Monitoring Option?

The final rule amendments allow plants to use a bag leak detection system on all single stack fabric filters as an alternative monitoring option to COMS. Owners or operators are required to develop a site-specific monitoring plan describing how the system will be selected, installed, and operated, including how the alarm levels will be established. In the event a bag leak detection system alarm is triggered, the owner or operator must initiate corrective action to determine the cause of the alarm within 1 hour of the alarm and alleviate the cause of the alarm within 3 hours. An approved site-specific monitoring plan may allow more than 3 hours for alleviating a specified condition where an explanation is provided justifying a longer time period.

The owner or operator also must conduct an opacity observation at least once per day when the furnace is in the melting and refining period, in accordance with EPA Method 9 (40 CFR part 60, appendix A). All opacity observations greater than 3 percent opacity must be reported as a violation of the opacity standard. In addition, if the alarm on the bag leak detection system was not alarming during the time the opacity was observed to be greater than 3 percent, the alarm on the bag leak detection system must be lowered to a point that an alarm would have occurred during the observation.

B. What Editorial Corrections Are We Making?

Two typographical errors are corrected in the amendments. In 40 CFR 60.274(c) and in 40 CFR 60.274a(c), the references to paragraphs (b)(1) and (2) are corrected to refer to paragraph (b). The paragraphs (b)(1) and (2) of 40 CFR 60.274(c) and 40 CFR 60.274a(c) were incorporated into paragraph (b) during the last revision to the NSPS (64 FR 10105, March 2, 1999). In 40 CFR 60.274a(b), the reference to paragraph (d) is corrected to refer to paragraph (e).

In addition, 40 CFR 60.274a(d) and 40 CFR 60.274a(e) are revised to clarify that owners and operators may petition the Administrator to approve alternatives to the monitoring requirements specified in 40 CFR 60.274a(b), as well as alternatives to the monthly operational status inspections specified in 40 CFR 60.274a(d). These revisions do not change the rules requirements because owners and operators are currently allowed to petition for alternative monitoring requirements under 40 CFR 60.13(i) of the NSPS General Provisions (40 CFR part 60, subpart A).

IV. Response to Comments

We received a total of 20 comment letters on the proposed amendments from representatives of three industry trade associations, one State agency, one steelmaking company, the steelworkers labor union, three equipment vendors, and two private citizens. We offered to provide interested individuals the opportunity for oral presentations of data, views, or arguments concerning the proposed amendments, but a public hearing was not requested. Today's final rule amendments reflect our full consideration of all the comments received.

Comment: We received comments supporting bag leak detection systems as an alternative to COMS from two equipment vendors, representatives of three industry trade associations, and one steelmaker. Two vendors express support for bag leak detection systems based on comparative study results and the lower operation and maintenance costs. The industry commenters express support for this alternative monitoring system because of a reported potential for measurement error associated with COMS at levels below 10 percent opacity, which they believe is evidenced by the revisions to PS-1 for COMS (65 FR 48914, August 10, 2000).

We received comments opposing bag leak detection systems as an alternative to COMS from 11 members of one equipment vending firm, two private citizens, one State environmental agency, and representatives of the steelworker's union. These commenters do not agree that the proposed alternative is necessary because revisions to PS-1 (40 CFR part 60, appendix B) in EPA's 2002 ``Conditional Performance Specification for Measurement 0-10% Opacity'' (designed specifically for EAF) ensure accurate COMS measurements below 10 percent opacity. The conditional performance specification addresses the limitations of PS-1 and the technical problems described in the industry's study. In addition, a low-opacity COMS that meets PS-1 and the conditional performance specification has been installed and certified on EAF. The low-opacity COMS costs only 15 percent more than a standard COMS and is easy to use. One commenter also contends that EPA has not shown in the administrative record that steel mini-mills have been improperly burdened by enforcement actions based on erroneous opacity readings below 10 percent. Another stated that allowing the proposed alternative will increase emissions and noncompliance.

The commenters argue that plants cannot use bag leak detection systems to certify continuous compliance because they are not accurate enough and do not actually measure PM or opacity. In addition, Method 9 (40 CFR part 60, appendix B) cannot provide a reasonable check of bag leak detection systems because: (1) The method is good only at opacity levels of 7 to 8 percent; (2) COMS are necessary for some facilities where Method 9 is not applicable or accurate due to factors such as baghouse orientation or extreme southern latitudes, (3) the periodic readings are taken only once daily for 18 minutes during daylight hours and not during the operations that generate the most emissions, or (4) are subject to manipulation.

Response: We disagree with commenters that bag leak detectors are ineffective or inappropriate. We have required bag leak detection systems as monitoring systems in numerous national emission standards for hazardous air pollutants (NESHAP) developed under section 112 of the Clean Air Act (CAA). We are not aware of any States or EPA Regions with concerns about certifying continuous compliance for the numerous existing rules that utilize bag leak detection systems, and the commenters did not provide any specific information in support of their assertions. These systems have been demonstrated to be very effective at detecting leaks and bag failures on a continuing basis in many different applications. The systems provide timely information that can be used to reduce excess emissions that occur when unexpected leaks or failures occur.

Bag leak detection systems offer a viable and effective alternative to COMS for monitoring the performance of baghouses. While bag leak detection systems do not directly measure PM or opacity, they sense any increase in PM concentration at very low levels before emissions rise to a level that would result in observable opacity. Given the sensitivity of bag leak detection systems to changes in PM concentration, along with the daily Method 9 observations to verify the performance of the bag leak detection systems, allowing bag leak detections systems as an alternative to COMS will not increase emissions or noncompliance. In fact, the opposite is true. By requiring owners and operators to identify leaks quickly and to make prompt repairs, we expect facilities that elect to use the bag leak detection alternative will reduce emissions.

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Upon further review of the appropriateness of bag leak detection systems for the final rules, we became aware that the proposed minimum sensitivity of 10 milligrams per actual cubic meter (0.0044 grains per actual cubic foot) was near the level of the PM standard (12 mg/dscm or 0.0052 gr/dscf). However, based on consultation with vendors of bag leak detections systems, it was determined that standard bag leak detections systems are easily capable of measuring baseline emissions of 1 milligram per actual cubic meter or lower. As a result, we are lowering the minimum sensitivity to 1 milligram per actual cubic meter (0.00044 grains per actual cubic foot). This change does not represent a significant departure from our proposed amendments because it does not affect the selection or cost of the bag leak detection systems available to owners or operators, but merely provides a more accurate representation of the minimum sensitivity of existing bag leak detection systems.

We disagree that Method 9 observations are inadequate to verify the performance of the bag leak detection systems. Although the human eye may not be able to distinguish opacity to the nearest 1 percent opacity, Method 9 observations were used as a basis for the 3 percent opacity limit. Method 9 involves 15 second opacity readings that are recorded at discrete values to the nearest 5 percent opacity, i.e., values of either 0, 5, 10, or 15 percent, etc. Over a 6-minute period, Method 9 produces 24 readings that are used to develop the 6-minute average values. Method 9 readings were used to develop the original 3 percent opacity standard and continues to be the performance test method for determining compliance identified for these final rules as well as many others for measurement of opacity. As such, the proposed daily Method 9 observations are directly applicable and appropriate for the verification of the performance of the bag leak detection systems (as well as their direct use to assess compliance).

We do not agree that the commenter's concerns about limitations on the times that Method 9 may be conducted necessitate the use of COMS. Method 9 and 40 CFR 60.273(c) and 40 CFR 60.273a(c) specify the conditions under which the tests are to be conducted. Owners and operators must schedule and conduct the daily Method 9 reading such that these conditions are met. We do not know of any EAF facility that would be unable to meet the Method 9 requirements due to baghouse orientation and extreme southern latitude, and the commenter did not provide any specific information in support of their assertions. Also, the requirement to perform the Method 9 observation during melting and refining is consistent with the existing requirements for Method 9 observations on EAF stacks that are not equipped with COMS (40 CFR 60.273(c), 60.273a(c), 60.275(i) and 60.275a(i)).

The availability of low opacity COMS also does not warrant withholding bag leak detection systems as an alternative monitoring option. Although the installation and certification of new low-opacity COMS technology and the development of the conditional performance specification appear promising, additional steps are needed in the process before we can require their application. The conditional performance specification still must be approved as an alternative method or a revision to PS-1 before a source may use it to meet Federal requirements under 40 CFR part 60, 61, or 63. During that process, the specification is potentially subject to change based on the review of additional validation studies or on public comments as part of the process for adoption as an EPA test method or as a revision to PS-1. Nonetheless, an owner or operator who would prefer to use a low-opacity COMS could install a low-opacity COMS and certify it using PS-1, or apply to certify the low opacity COMS based on the conditional performance specification as an alternative monitoring option as allowed under the NSPS General Provisions (40 CFR part 60, appendix A).

Based on a review of public comments, we maintain that the bag leak detection systems provide a reasonable alternative to the COMS requirements.

Comment: Two industry commenters state that the bag leak detection system alternative does not resolve the potential measurement error associated with COMS readings at the 3 percent opacity level and thus does not resolve the petition to reopen the NSPS. The commenters cite statements in the rulemaking for PS-1 regarding the technological limitations of COMS, including a comment by an American Society for Testing and Materials (ASTM) representative that the ASTM standard for COMS (ASTM D6216-98), which is incorporated in PS-1, ensures accurate COMS measurements only at sources with opacity limits of 10 percent or greater. They also cite EPA's estimate of the upper range of potential measurement error of 4 percent opacity, and an industry study finding that COMS complying with PS-1 requirements have a potential error band of 7.5 percent.

The commenters stated that inaccurate data results in negative legal implications, such as exposure to inappropriate enforcement actions, hurdles to certifications of continuous compliance in the title V permitting program, and the triggering of additional excess emissions reports for false positive COMS readings. One commenter adds that false positive readings from COMS have occurred, as evidenced by simultaneous information from both COMS and Method 9 readings. The commenters stated that the proposed option does not resolve the industry's petition because it does not address the COMS error band issue. Not all facilities affected by the error band issue can replace COMS with bag leak detection systems due to costs, permit requirements, and the reluctance of EPA Regional Offices to approve the change. They request that EPA raise the excess reporting threshold to account for the error band, acknowledge that the COMS data within the error band are not credible evidence of opacity violations, or eliminate the COMS requirement in its entirety.

One commenter suggests that EPA retain the COMS requirements but require plants to report only the data that exceeds 10 percent opacity to address the error band issue. Opacity data less than 10 percent should not be recorded or reported.

Response: The alternatives suggested by the commenters do not provide adequate assurance and documentation that the opacity standard is being continuously maintained. Raising the excess reporting threshold would preclude the permitting authority and the public from obtaining information on any opacity exceedances falling below the new higher threshold (as high as 10 percent under the commenters' view) and thus undermine accountability to the 3 percent opacity standard. Eliminating the COMS requirement would result in the wholesale loss of continuous opacity measurements, even where exceedances are far above the potential error band.

The revisions to PS-1 explained that it was not appropriate to limit the applicability of PS-1 based on the level of the emission limit that would be measured. We determined that PS-1 should acknowledge the uncertainty associated with COMS measurements below 10 percent opacity and allow for consideration of the potential error (through statistical procedures or otherwise) when evaluating compliance with opacity standards below 10 percent. As commenters acknowledge,

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EPA conducted a very conservative analysis of the upper range of potential measurement error that may be associated with COMS meeting PS-1 and found the upper range of potential measurement error to be about 4 percent. We also noted that a ``properly operating and aligned COMS should experience measurement error significantly less than this magnitude.'' Thus, instead of broadly limiting the applicability of COMS, any uncertainty should be addressed on a case-by-case basis.

We note that while COMS is the required monitoring method (in the absence of a source choosing the alternative monitoring option finalized today), Method 9 remains the performance test method and, as such, is the benchmark against which other data are compared in determining source compliance.\1\ If the company believes the COMS data are not credible evidence of an opacity violation, it may dispute the materiality of such data in its compliance certification or excess emissions report.\2\ It may also challenge the relevance and accuracy of the COMS data in a judicial or administrative tribunal.\3\ Thus, it is not necessary or appropriate to make a broad determination that COMS data within the potential error band are not credible evidence of opacity violations.

\1\ See Credible Evidence Revisions (62 FR 8314, February 24, 1997) (``the reference tests remain the benchmark against which * * * other information will be evaluated.'').

\2\ See Natural Resources Defense Council v. EPA, 194 F.3d 130, 138 (D.C. Cir. 1999) (``[N]othing precludes an owner from adding a caveat to its certification to the effect that, while it is providing other evidence which EPA might find material, the submitter disputes its materiality and reserves the right to challenge the use of the evidence in court.'').

\3\ See 62 FR at 8322; Grand Canyon Trust v. Public Serv. Co. of New Mexico, 294 F. Supp. 2d 1246 (D.N.M. 2003).

In addition, the bag leak detection system alternative provides owners or operators who are concerned with the accuracy of COMS measurements the option to use bag leak detection systems instead of COMS. Case-by-case approval of this alternative monitoring method by EPA Regional Offices will no longer be necessary after the alternative is incorporated into the NSPS through today's final rule amendments.

Comment: Comments from the industry trade associations support the proposed alternative but oppose certain provisions. They suggest that: (1) Facilities should be allowed 1 hour (rather than 30 minutes) to initiate procedures to determine the cause of an alarm, (2) the proposed 3-hour limit for alleviating the cause of an alarm be replaced with ``as soon as practicable'' or ``within a reasonable time'' to account for scenarios that may take longer than 3 hours to identify and fix, and (3) facilities should not have to receive advance approval of their site-specific monitoring plan.

Response: A key and necessary component of the bag leak detection system alternative is the requirement to initiate corrective action and alleviate the cause of alarms as soon as possible. Providing specific time requirements makes the standard much clearer for both the regulators and the regulated community. Based on our experience with baghouses, bag leak detectors, and the various corrective actions that may be required, we determined that the 30-minute period to initiate corrective action was insufficient and should be revised to 1 hour. This change is consistent with the bag leak detection requirements we have promulgated in other rules.

We agree that the cause of the alarm should be alleviated as soon as practicable; however, the 3-hour limit is reasonable and necessary to ensure that corrective action needed to alleviate the cause of the alarm be taken to ensure timely action and to protect the environment. Most causes of an alarm can be fixed within the 3-hour limit. For example, modern baghouses have multiple compartments so that one compartment can be quickly isolated (i.e., taken out of service) to perform maintenance or to isolate a leaking bag without requiring the process to be shut down. Nonetheless, we have added a provision to the final rule amendments stating that, as part of the site-specific monitoring plan, the Administrator or delegated authority may approve such additional time as necessary to ensure corrective action as expeditiously as practicable where the owner or operator identifies the condition that could lead to an alarm and adequately explains why the 3-hour limit for the condition is not feasible. This adequately addresses those few scenarios where more than 3 hours is necessary to alleviate the cause of the alarm.

We are retaining the requirement to receive advance approval of site-specific monitoring plans. Pre-approval of the monitoring plans serves several purposes. First, it provides EPA an indication of which monitoring method the facility will use. Second, it ensures that the monitors will be properly installed for all applicable emission points. In addition, it provides the owner or operator some assurance that the proposed monitoring approach will be satisfactory and may avoid unnecessary expenditures if the monitoring approach was found to be inadequate after it was implemented.

Comment: One commenter proposed a change to 40 CFR 60.723(e)(6)(ii), which reads: ``opacity over zero percent would require an adjustment of the bag leak detection system alarm levels.'' The commenter stated this should read ``over three percent.''

Response: As discussed above, a Method 9 opacity observation is composed of 24 individual, 15 second opacity readings. Each individual reading is recorded in 5 percent increments. As such, any visible emissions would be recorded as 5 percent opacity or greater. Baghouses in good working condition control emissions to below the level that would result in visible emissions (i.e., zero percent). If visible emissions are observed from a baghouse, it is an indication that a leak has occurred, and the bag leak detection system should be adjusted to ensure the alarm sounds at that point or below.

Comment: One commenter stated the proposed amendment improperly relaxes monitoring requirements by allowing excursions from bag leak detection system operational parameters for up to 3 percent of facility operating hours. The commenter stated that this provision does not ensure continuous compliance with the opacity and particulate emission limits.

On the other hand, comments from industry trade associations oppose the 3 percent limit on alarms because: (1) It undermines the purpose of bag leak detection systems, which is to detect emissions before they become exceedances; and (2) the limit assumes that alarms equate to exceedances or that the alarms indicate poor operation. The number of alarms may reflect only how low a facility sets the alarm level, and the operating limit serves to increase the stringency of the emission limit. Instead, the commenter suggests that EPA adopt an alarm threshold above which plants would be required to implement a quality improvement plan or adopt a threshold of 5 percent as it has done in other rules. The proposed amendments should also describe more clearly how operating time is to be calculated and confirm what operations would constitute a startup, shutdown, or malfunction.

Response: We reconsidered the 3 percent limit on alarms for baghouse leak detection system alarms as applied to EAF. We have no data indicating that the 3 percent limit on alarms has been applied to these operations, and we have no firm basis for determining what level, if any, might be appropriate for these operations. We agree that the

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purpose of bag leak detection systems is to detect emissions before they become exceedances. For these reasons, we have dropped the 3 percent limit on alarms. However, it is important that corrective action be initiated promptly; consequently, we require that corrective actions be initiated within 1 hour of an alarm to ensure baghouses are well maintained and operated properly on a continuing basis. Excessive alarms are effectively limited by the general duty under 40 CFR 60.11(d) to maintain and operate air pollution control equipment in a manner consistent with good air pollution control practices for minimizing emissions.

In response to the comments, we have not included the following proposed provisions in the final rule amendments: (1) The definition of ``operating time'' in 40 CFR 60.271(p) and 60.271a, (2) the proposed operating limit in 40 CFR 63.273(g) and 63.273a(g), (3) associated provisions in 40 CFR 63.273(h) and 63.273a(h) for determining how to calculate the percentage of time the alarm sounds, and (4) associated recordkeeping and recording requirements in 40 CFR 63.276(e) and (f) and 40 CFR 63.276a(h)(4) and (i).

Comment: One commenter asks EPA to specify whether bag leak detection system records must be reported according to the requirements in 40 CFR 70.6(c) and 71.6(c) and whether the records may be used to establish violations under the NSPS credible evidence requirements in 40 CFR 60.11. Should EPA remove the 3 percent allowance for operation of the EAF and fume collection system while the bag leak detection system indicates bag leaks or pressure loss, the amendments should clarify that any system failures that cause an alarm are evidence of a violation.

Response: With regard to recordkeeping and reporting requirements under 40 CFR part 70, 40 CFR 70.6(c) and 71.6(c) clearly require that title V permits include recordkeeping and reporting provisions covering the bag leak detection system records in this NSPS (40 CFR 60.273(c), 60.273a(c), 60.276(e), and 60.276a(h)). The part 70 regulations state that title V permits must contain recordkeeping and reporting requirements consistent with 40 CFR 70.6(a)(3) and 71.6(a)(3), respectively. Those provisions further provide that the permit must incorporate ``all applicable recordkeeping requirements, including ``[r]ecords of required monitoring information,'' and ``all applicable reporting requirements.'' They also require ``[s]ubmittal of reports of any required monitoring at least every six months.''

Whether such records establish violations of the opacity limit will vary depending on the circumstances presented. As stated previously, the purpose of bag leak detection systems is to detect emissions before they become exceedances. Whether a particular alarm or exceedance can be used as credible evidence of such a violation depends upon the facts presented in each case. Additionally, as we stated in the preamble to the credible evidence rule, ``what evidence is credible and admissible will be determined by * * * taking into account how the evidence was gathered and the specifics of the emission standard and any associated reference method.'' (62 FR 8314, 8323, February 24, 1997).\4\

\4\ The Agency further explained that it would not issue lists of presumptively credible evidence, explaining that ``both judicial and administrative tribunals routinely make determinations concerning the admissibility and weight of evidence on a case-by-case basis.'' (See 62 FR 8316.) Such case-by-case evaluations would apply to data generated by bag leak detection systems.

Independent of whether a particular alarm or exceedance is credible evidence of a violation of the opacity limit, sources have a duty to comply with the baghouse leak detection system monitoring requirements where a source chooses such monitoring as an alternative to COMS, and failure to comply with the monitoring requirements could give rise to an enforcement action under section 113(a)(3) or section 304(a) of the CAA.

Comment: Comments from industry trade associations do not oppose the editorial corrections to 40 CFR 60.274(c) and 60.274a(c), but the commenter questions why the proposed wording of the regulatory text differs from the existing rule. The existing rule was amended on October 17, 2000, to read:

(c) When the owner or operator of an affected facility is required to demonstrate compliance with the standards under Sec. 63.272(a)(3) and at any other time that the Administrator may require (under section 114 of the CAA, as amended) either * * *.

The proposed regulatory text reads ``at any other time the Administrator may require that''. The industry commenters believe the location of the word ``that'' could change the meaning of the paragraph. The paragraph could be interpreted as allowing the Administrator to choose which of the three monitoring options a facility must follow. To clarify this issue, the word ``that'' should follow ``at any other time.''

Response: We did not intend to alter the placement of the word ``that'' in 40 CFR 60.274(c) and 60.274a(c). We have revised the placement of the word ``that'' in the final rule amendment to follow ``at any other time,'' as suggested by the commenter, to clarify that the Administrator does not choose which of the three monitoring options a facility must use.

V. Statutory and Executive Order Reviews

A. Executive Order 12866, Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the EPA must determine whether the regulatory action is ``significant'' and therefore subject to review by the Office of Management and Budget (OMB) and the requirements of the Executive Order. The Executive Order defines a ``significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

It has been determined that the final rule amendments are not a ``significant regulatory action'' under the terms of Executive Order 12866 and are, therefore, not subject to OMB review.

B. Paperwork Reduction Act

The information collection requirements in the final rule amendments have been submitted for approval to OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. The information collection requirements are not enforceable until OMB approves them.

The information requirements in the final rule amendments are based on notification, recordkeeping, and reporting requirements in the NSPS General Provisions (40 CFR part 60, subpart A), which are mandatory for all operators subject to NSPS. The records and reports required by these rule amendments are necessary for EPA to: (1) Identify new, modified, or reconstructed sources subject to the

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rule; (2) ensure that the rule requirements are being properly applied; and (3) ensure that the emission control devices are being properly operated and maintained on a continuous basis. Based on the reported information, EPA can decide which plants, records, or processes should be inspected. The recordkeeping and reporting requirements are specifically authorized by section 114 of the CAA (42 U.S.C. 7414). All information submitted to the EPA pursuant to the recordkeeping and reporting requirements for which a claim of confidentiality is made is safeguarded according to Agency policies in 40 CFR part 2, subpart B.

The annual increase to monitoring, recordkeeping, and reporting burden for the final rule amendments are estimated at 1,750 labor hours at a total cost of $96,145 nationwide, and the annual average increase in burden is 175 labor hours and $9,615 per source. The estimate of the increase in annual monitoring, recordkeeping, and reporting annual cost in the final rule amendment is higher than the estimate made in the proposal by $34,878, which is due to the use of a higher cost of labor estimate ($26.16/hr, $54.94/hr including overhead) than was used in the proposal ($16.67/hr, $35.01/hr including overhead). We estimate that there will be no increase in the annualized capital costs due to the final rule amendments. We estimate that the annualized costs associated with purchasing and installing a bag leak detection system are equal to the offsetting annualized cost savings associated with the discontinued use and periodic replacement of a COMS. In making the estimates, it was assumed that ten existing facilities currently required to install and operate COMS would elect to use the proposed alternative monitoring option. The cost estimates reflect increased costs associated with the installation and operation of a bag leak detection system and with daily opacity observations partially offset by the cost savings from no longer having to operate and maintain a COMS.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purpose of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control number for EPA's regulations in 40 CFR part 60 are listed in 40 CFR part 9. When this ICR is approved by OMB, the Agency will publish a technical amendment to 40 CFR part 9 in the Federal Register to display the OMB control number for the approved information collection requirements contained in these final rule amendments.

C. Regulatory Flexibility Analysis

The EPA has determined that it is not necessary to prepare a regulatory flexibility analysis in connection with the final rule amendments. For the purposes of assessing the economic impact of today's final rule amendments on small entities, small entity is defined as: (1) A small business according to U.S. Small Business Administration size standards for NAICS code 331111 having no more than 1,000 employees; (2) a small government jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and that is not dominant in its field.

After considering the economic impacts of today's final rule amendments on small entities, EPA has concluded that this action will not have a significant economic impact on a substantial number of small entities. In determining whether a rule has a significant economic impact on a substantial number of small entities, the impact of concern is any significant adverse economic impact on small entities since the primary purpose of the regulatory flexibility analyses is to identify and address regulatory alternatives ``which minimize any significant economic impact of the proposed rule on small entities'' (5 U.S.C. 603 and 604). Thus, an agency may conclude that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, or otherwise has a positive economic impact on all of the small entities subject to the rule.

The final rule amendments provide a new compliance option for all facilities (large or small) that is designed to increase flexibility. We have, therefore, concluded that today's final rule amendments will relieve regulatory burden for all small entities.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104-4, establishes requirements for Federal agencies to assess effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, the EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ``Federal mandates'' that may result in expenditures by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more in any 1 year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires the EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least-burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows the EPA to adopt an alternative other than the least-costly, most cost-effective, or least-burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before the EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

The EPA has determined that the final rule amendments do not contain a Federal mandate that may result in estimated costs of $100 million or more to either State, local, or tribal governments, in the aggregate, or to the private sector in any 1 year. The maximum total annualized costs of the final rule amendments for any year is estimated at less than $97,000. Thus, today's final rule amendments are not subject to sections 202 and 205 of the UMRA. The EPA has also determined

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that the final rule amendments contain no regulatory requirements that might significantly or uniquely affect small governments because they contain no requirements that apply to such governments or impose obligations upon them. Thus, today's final rule amendments are not subject to the requirements of section 203 of the UMRA.

E. Executive Order 13132: Federalism

Executive Order 13132 (64 FR 43255, August 10, 1999) requires EPA to develop an accountable process to ensure ``meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ``Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ``substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

The final rule amendments do not have federalism implications. They will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. None of the affected facilities are owned or operated by State governments, and the requirements of the final rule amendments will not supersede State regulations that are more stringent. Thus, Executive Order 13132 does not apply to the final rule amendments.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175 (59 FR 22951, November 9, 2000) requires EPA to develop an accountable process to ensure ``meaningful and timely input in the development of regulatory policies on matters that have tribal implications.''

The final rule amendments do not have tribal implications, as specified in Executive Order 13175. They will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes. No tribal governments own or operate an affected source. Thus, Executive Order 13175 does not apply to the final rule amendments.

G. Executive Order 13045: Protection of Children From Environmental Health & Safety Risks

Executive Order 13045 (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be ``economically significant,'' as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the EPA must evaluate the environmental health or safety effects of the planned rule on children and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

The EPA interprets Executive Order 13045 as applying only to those regulatory actions that are based on health or safety risks, such that the analysis required under section 5-501 of the Executive Order has the potential to influence the regulation. The final rule amendments are not subject to Executive Order 13045 because they are based on control technology and not on health or safety risks. No children's risk analysis was performed because the action only provides EAF owners and operators with an alternative monitoring option. Furthermore, the final rule amendments have been determined not to be ``economically significant'' as defined under Executive Order 12866.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

The final rule amendments are not subject to Executive Order 13211 (66 FR 28355, May 22, 2001) because they are not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) of 1995 (Pub. L. No. 104-113; 15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, business practices) developed or adopted by one or more voluntary consensus bodies. The NTTAA directs EPA to provide Congress, through annual reports to the OMB, with explanations when the Agency decides not to use available and applicable voluntary consensus standards. The final rule amendments do not involve voluntary consensus standards.

J. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. The EPA has submitted a report containing the final rule amendments and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United

States prior to the publication of the final rule amendments in today's Federal Register. The final rule amendments are not a ``major rule'' as defined by 5 U.S.C. 804(2).

List of Subjects in 40 CFR Part 60

Environmental protection, Administrative practice and procedures, Air pollution control, Intergovernmental relations, Reporting and recordkeeping requirements.

Dated: February 14, 2005.
Stephen L. Johnson,
Acting Administrator.

• For the reasons set out in the preamble, title 40, chapter I, part 60 of the Code of Federal Regulations is amended as follows:

PART 60--[AMENDED]

• 1. The authority citation for part 60 continues to read as follows:

Subpart AA--[Amended]

Authority: 42 U.S.C. 7401, et seq.

• 2. Section 60.271 is amended by adding new paragraph (o) to read as follows:

Sec. 60.271 Definitions.

* * * * *

(o) Bag leak detection system means a system that is capable of continuously monitoring relative particulate matter (dust) loadings in the exhaust of a baghouse to detect bag leaks and other conditions that result in increases in particulate loadings. A bag leak detection system includes, but is not limited to, an instrument that operates on triboelectric, electrodynamic, light scattering, light transmittance, or other effect to continuously monitor relative particulate matter loadings.

• 3. Section 60.273 is amended by revising paragraph (c) and adding new

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paragraphs (e), (f), and (g) to read as follows:

Sec. 60.273 Emission monitoring.

* * * * *

(c) A continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the control device(s) is not required on any modular, multi-stack, negative-pressure or positive-pressure fabric filter if observations of the opacity of the visible emissions from the control device are performed by a certified visible emission observer; or on any single-stack fabric filter if visible emissions from the control device are performed by a certified visible emission observer and the owner installs and continuously operates a bag leak detection system according to paragraph (e) of this section. Visible emission observations shall be conducted at least once per day for at least three 6-minute periods when the furnace is operating in the melting and refining period. All visible emissions observations shall be conducted in accordance with Method 9 of appendix A to this part. If visible emissions occur from more than one point, the opacity shall be recorded for any points where visible emissions are observed. Where it is possible to determine that a number of visible emission sites relate to only one incident of the visible emission, only one set of three 6-minute observations will be required. In that case, the Method 9 observations must be made for the site of highest opacity that directly relates to the cause (or location) of visible emissions observed during a single incident. Records shall be maintained of any 6-minute average that is in excess of the emission limit specified in Sec. 60.272(a).

* * * * *

(e) A bag leak detection system must be installed and continuously operated on all single-stack fabric filters if the owner or operator elects not to install and operate a continuous opacity monitoring system as provided for under paragraph (c) of this section. In addition, the owner or operator shall meet the visible emissions observation requirements in paragraph (c) of this section. The bag leak detection system must meet the specifications and requirements of paragraphs (e)(1) through (8) of this section.

(1) The bag leak detection system must be certified by the manufacturer to be capable of detecting particulate matter emissions at concentrations of 1 milligram per actual cubic meter (0.00044 grains per actual cubic foot) or less.

(2) The bag leak detection system sensor must provide output of relative particulate matter loadings and the owner or operator shall continuously record the output from the bag leak detection system using electronic or other means (e.g., using a strip chart recorder or a data logger.)

(3) The bag leak detection system must be equipped with an alarm system that will sound when an increase in relative particulate loading is detected over the alarm set point established according to paragraph (e)(4) of this section, and the alarm must be located such that it can be heard by the appropriate plant personnel.

(4) For each bag leak detection system required by paragraph (e) of this section, the owner or operator shall develop and submit to the Administrator or delegated authority, for approval, a site-specific monitoring plan that addresses the items identified in paragraphs (i) through (v) of this paragraph (e)(4). For each bag leak detection system that operates based on the triboelectric effect, the monitoring plan shall be consistent with the recommendations contained in the U.S. Environmental Protection Agency guidance document ``Fabric Filter Bag Leak Detection Guidance'' (EPA-454/R-98-015). The owner or operator shall operate and maintain the bag leak detection system according to the site-specific monitoring plan at all times. The plan shall describe:

(i) Installation of the bag leak detection system;

(ii) Initial and periodic adjustment of the bag leak detection system including how the alarm set-point will be established;

(iii) Operation of the bag leak detection system including quality assurance procedures;

(iv) How the bag leak detection system will be maintained including a routine maintenance schedule and spare parts inventory list; and

(v) How the bag leak detection system output shall be recorded and stored.

(5) The initial adjustment of the system shall, at a minimum, consist of establishing the baseline output by adjusting the sensitivity (range) and the averaging period of the device, and establishing the alarm set points and the alarm delay time (if applicable).

(6) Following initial adjustment, the owner or operator shall not adjust the averaging period, alarm set point, or alarm delay time without approval from the Administrator or delegated authority except as provided for in paragraphs (e)(6)(i) and (ii) of this section.

(i) Once per quarter, the owner or operator may adjust the sensitivity of the bag leak detection system to account for seasonal effects including temperature and humidity according to the procedures identified in the site-specific monitoring plan required under paragraphs (e)(4) of this section.

(ii) If opacities greater than zero percent are observed over four consecutive 15-second observations during the daily opacity observations required under paragraph (c) of this section and the alarm on the bag leak detection system does not sound, the owner or operator shall lower the alarm set point on the bag leak detection system to a point where the alarm would have sounded during the period when the opacity observations were made.

(7) For negative pressure, induced air baghouses, and positive pressure baghouses that are discharged to the atmosphere through a stack, the bag leak detection sensor must be installed downstream of the baghouse and upstream of any wet scrubber.

(8) Where multiple detectors are required, the system's instrumentation and alarm may be shared among detectors.

(f) For each bag leak detection system installed according to paragraph (e) of this section, the owner or operator shall initiate procedures to determine the cause of all alarms within 1 hour of an alarm. Except as provided for in paragraph (g) of this section, the cause of the alarm must be alleviated within 3 hours of the time the alarm occurred by taking whatever corrective action(s) are necessary. Corrective actions may include, but are not limited to the following:

(1) Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other condition that may cause an increase in particulate emissions;

(2) Sealing off defective bags or filter media;

(3) Replacing defective bags or filter media or otherwise repairing the control device;

(4) Sealing off a defective baghouse compartment;

(5) Cleaning the bag leak detection system probe or otherwise repairing the bag leak detection system; or

(6) Shutting down the process producing the particulate emissions.

(g) In approving the site-specific monitoring plan required in paragraph (e)(4) of this section, the Administrator or delegated authority may allow owners or operators more than 3 hours to alleviate specific conditions that cause an alarm if the owner or operator identifies the condition that could lead to an alarm in the monitoring plan,

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adequately explains why it is not feasible to alleviate the condition within 3 hours of the time the alarm occurred, and demonstrates that the requested additional time will ensure alleviation of the condition as expeditiously as practicable.

• 4. Section 60.274 is amended by revising the first sentence of paragraph (c) to read as follows:

Sec. 60.274 Monitoring of operations.

* * * * *

(c) When the owner or operator of an affected facility is required to demonstrate compliance with the standards under Sec. 60.272(a)(3) and at any other time that the Administrator may require (under section 114 of the CAA, as amended) either: the control system fan motor amperes and all damper positions, the volumetric flow rate through each separately ducted hood, or the volumetric flow rate at the control device inlet and all damper positions shall be determined during all periods in which a hood is operated for the purpose of capturing emissions from the affected facility subject to paragraph (b) of this section. * * *

* * * * *

• 5. Section 60.275 is amended by revising paragraph (i) to read as follows:

Sec. 60.275 Test methods and procedures.

* * * * *

(i) If visible emissions observations are made in lieu of using a continuous opacity monitoring system, as allowed for by Sec. 60.273(c), visible emission observations shall be conducted at least once per day for at least three 6-minute periods when the furnace is operating in the melting and refining period. All visible emissions observations shall be conducted in accordance with Method 9. If visible emissions occur from more than one point, the opacity shall be recorded for any points where visible emissions are observed. Where it is possible to determine that a number of visible emission sites relate to only one incident of the visible emission, only one set of three 6-minute observations will be required. In that case, the Method 9 observations must be made for the site of highest opacity that directly relates to the cause (or location) of visible emissions observed during a single incident. Records shall be maintained of any 6-minute average that is in excess of the emission limit specified in Sec. 60.272(a).

* * * * *

• 6. Section 60.276 is amended by adding new paragraph (e) to read as follows:

Sec. 60.276 Recordkeeping and reporting requirements.

* * * * *

(e) The owner or operator shall maintain the following records for each bag leak detection system required under Sec. 60.273(e):

(1) Records of the bag leak detection system output;

(2) Records of bag leak detection system adjustments, including the date and time of the adjustment, the initial bag leak detection system settings, and the final bag leak detection system settings; and

(3) An identification of the date and time of all bag leak detection system alarms, the time that procedures to determine the cause of the alarm were initiated, if procedures were initiated within 1 hour of the alarm, the cause of the alarm, an explanation of the actions taken, the date and time the cause of the alarm was alleviated, and if the alarm was alleviated within 3 hours of the alarm.

Subpart AAa--[Amended]

• 7. Section 60.271a is amended by adding, in alphabetical order, a definition for ``Bag leak detection system'' as follows:

Sec. 60.271a Definitions.

* * * * *

Bag leak detection system means a system that is capable of continuously monitoring relative particulate matter (dust) loadings in the exhaust of a baghouse to detect bag leaks and other conditions that result in increases in particulate loadings. A bag leak detection system includes, but is not limited to, an instrument that operates on triboelectric, electrodynamic, light scattering, light transmittance, or other effect to continuously monitor relative particulate matter loadings.

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• 8. Section 60.273a is amended by revising paragraph (c) and adding new paragraphs (e) and (f) to read as follows:

Sec. 60.273a Emission monitoring.

* * * * *

(c) A continuous monitoring system for the measurement of the opacity of emissions discharged into the atmosphere from the control device(s) is not required on any modular, multi-stack, negative-pressure or positive-pressure fabric filter if observations of the opacity of the visible emissions from the control device are performed by a certified visible emission observer; or on any single-stack fabric filter if visible emissions from the control device are performed by a certified visible emission observer and the owner installs and continuously operates a bag leak detection system according to paragraph (e) of this section. Visible emission observations shall be conducted at least once per day for at least three 6-minute periods when the furnace is operating in the melting and refining period. All visible emissions observations shall be conducted in accordance with Method 9. If visible emissions occur from more than one point, the opacity shall be recorded for any points where visible emissions are observed. Where it is possible to determine that a number of visible emission sites relate to only one incident of the visible emission, only one set of three 6-minute observations will be required. In that case, the Method 9 observations must be made for the site of highest opacity that directly relates to the cause (or location) of visible emissions observed during a single incident. Records shall be maintained of any 6-minute average that is in excess of the emission limit specified in Sec. 60.272a(a).

* * * * *

(e) A bag leak detection system must be installed and continuously operated on all single-stack fabric filters if the owner or operator elects not to install and operate a continuous opacity monitoring system as provided for under paragraph (c) of this section. In addition, the owner or operator shall meet the visible emissions observation requirements in paragraph (c) of this section. The bag leak detection system must meet the specifications and requirements of paragraphs (e)(1) through (8) of this section.

(1) The bag leak detection system must be certified by the

manufacturer to be capable of detecting particulate matter emissions at concentrations of 1 milligram per actual cubic meter (0.00044 grains per actual cubic foot) or less.

(2) The bag leak detection system sensor must provide output of relative particulate matter loadings and the owner or operator shall continuously record the output from the bag leak detection system using electronic or other means (e.g., using a strip chart recorder or a data logger.)

(3) The bag leak detection system must be equipped with an alarm system that will sound when an increase in relative particulate loading is detected over the alarm set point established according to paragraph (e)(4) of this section, and the alarm must be located such that it can be heard by the appropriate plant personnel.

(4) For each bag leak detection system required by paragraph (e) of this section,

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the owner or operator shall develop and submit to the Administrator or delegated authority, for approval, a site-specific monitoring plan that addresses the items identified in paragraphs (i) through (v) of this paragraph (e)(4). For each bag leak detection system that operates based on the triboelectric effect, the monitoring plan shall be consistent with the recommendations contained in the U.S. Environmental Protection Agency guidance document ``Fabric Filter Bag Leak Detection Guidance'' (EPA-454/R-98-015). The owner or operator shall operate and maintain the bag leak detection system according to the site-specific monitoring plan at all times. The plan shall describe the following:

(i) Installation of the bag leak detection system;

(ii) Initial and periodic adjustment of the bag leak detection system including how the alarm set-point will be established;

(iii) Operation of the bag leak detection system including quality assurance procedures;

(iv) How the bag leak detection system will be maintained including a routine maintenance schedule and spare parts inventory list; and

(v) How the bag leak detection system output shall be recorded and stored.

(5) The initial adjustment of the system shall, at a minimum, consist of establishing the baseline output by adjusting the sensitivity (range) and the averaging period of the device, and establishing the alarm set points and the alarm delay time (if applicable).

(6) Following initial adjustment, the owner or operator shall not adjust the averaging period, alarm set point, or alarm delay time without approval from the Administrator or delegated authority except as provided for in paragraphs (e)(6)(i) and (ii) of this section.

(i) Once per quarter, the owner or operator may adjust the sensitivity of the bag leak detection system to account for seasonal effects including temperature and humidity according to the procedures identified in the site-specific monitoring plan required under paragraphs (e)(4) of this section.

(ii) If opacities greater than zero percent are observed over four consecutive 15-second observations during the daily opacity observations required under paragraph (c) of this section and the alarm on the bag leak detection system does not sound, the owner or operator shall lower the alarm set point on the bag leak detection system to a point where the alarm would have sounded during the period when the opacity observations were made.

(7) For negative pressure, induced air baghouses, and positive pressure baghouses that are discharged to the atmosphere through a stack, the bag leak detection sensor must be installed downstream of the baghouse and upstream of any wet scrubber.

(8) Where multiple detectors are required, the system's instrumentation and alarm may be shared among detectors.

(f) For each bag leak detection system installed according to paragraph (e) of this section, the owner or operator shall initiate procedures to determine the cause of all alarms within 1 hour of an alarm. Except as provided for under paragraph (g) of this section, the cause of the alarm must be alleviated within 3 hours of the time the alarm occurred by taking whatever corrective action(s) are necessary. Corrective actions may include, but are not limited to, the following:

(1) Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other condition that may cause an increase in particulate emissions;

(2) Sealing off defective bags or filter media;

(3) Replacing defective bags or filter media or otherwise repairing the control device;

(4) Sealing off a defective baghouse compartment;

(5) Cleaning the bag leak detection system probe or otherwise repairing the bag leak detection system; and

(6) Shutting down the process producing the particulate emissions.

(g) In approving the site-specific monitoring plan required in paragraph (e)(4) of this section, the Administrator or delegated authority may allow owners or operators more than 3 hours to alleviate specific conditions that cause an alarm if the owner or operator identifies the condition that could lead to an alarm in the monitoring plan, adequately explains why it is not feasible to alleviate the condition within 3 hours of the time the alarm occurred, and demonstrates that the requested additional time will ensure alleviation of the condition as expeditiously as practicable.

• 9. Section 60.274a is amended by revising the first sentence of paragraph (b), revising the first sentence of paragraph (c), revising the first sentence of paragraph (d), and revising paragraph (e) to read as follows:

Sec. 60.274a Monitoring of operations.

* * * * *

(b) Except as provided under paragraph (e) of this section, the owner or operator subject to the provisions of this subpart shall check and record on a once-per-shift basis the furnace static pressure (if DEC system is in use, and a furnace static pressure gauge is installed according to paragraph (f) of this section) and either: check and record the control system fan motor amperes and damper position on a once-per-shift basis; install, calibrate, and maintain a monitoring device that continuously records the volumetric flow rate through each separately ducted hood; or install, calibrate, and maintain a monitoring device that continuously records the volumetric flow rate at the control device inlet and check and record damper positions on a once-per-shift basis.* * *

(c) When the owner or operator of an affected facility is required to demonstrate compliance with the standards under Sec. 60.272a(a)(3) and at any other time that the Administrator may require (under section 114 of the CAA, as amended) either: the control system fan motor amperes and all damper positions, the volumetric flow rate through each separately ducted hood, or the volumetric flow rate at the control device inlet and all damper positions shall be determined during all periods in which a hood is operated for the purpose of capturing emissions from the affected facility subject to paragraph (b) of this section. * * *

(d) Except as provided under paragraph (e) of this section, the owner or operator shall perform monthly operational status inspections of the equipment that is important to the performance of the total capture system (i.e., pressure sensors, dampers, and damper switches). * * *

(e) The owner or operator may petition the Administrator to approve any alternative to either the monitoring requirements specified in paragraph (b) of this section or the monthly operational status inspections specified in paragraph (d) of this section if the alternative will provide a continuous record of operation of each emission capture system.

* * * * *

• 10. Section 60.276a is amended by adding new paragraph (h) to read as follows:

Sec. 60.276a Recordkeeping and reporting requirements.

* * * * *

(h) The owner or operator shall maintain the following records for each bag leak detection system required under Sec. 60.273a(e):

(1) Records of the bag leak detection system output;

(2) Records of bag leak detection system adjustments, including the date

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and time of the adjustment, the initial bag leak detection system settings, and the final bag leak detection system settings; and

(3) An identification of the date and time of all bag leak detection system alarms, the time that procedures to determine the cause of the alarm were initiated, if procedures were initiated within 1 hour of the alarm, the cause of the alarm, an explanation of the actions taken, the date and time the cause of the alarm was alleviated, and if the alarm was alleviated within 3 hours of the alarm.

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