



Analysis:

Federal Regulation of Coke Ovens Under the National Emission Standards for Hazardous Air Pollutants Program

The following pages summarize the history of the regulation of hazardous air pollutants from coke ovens.

1. Regulation of benzene (1989)

From 1970 to 1990, EPA had discretion to identify hazardous air pollutants for regulation under the Clean Air Act. EPA exercised this discretion infrequently, identifying only seven hazardous air pollutants in the course of two decades. Benzene was one of them.

In 1989, EPA regulated emissions of benzene from coke by-product recovery plants through a National Emission Standard for Hazardous Air Pollutants (NESHAP). This is known as the subpart L regulations, located in Part 61 of the Code of Federal Regulations. By-product recovery plants attempt to recover coal tar derivatives from coal during the coking process, as opposed to burning off those chemicals. The discontinued coke ovens at Shenango and the current coke ovens at Clairton and Monessen are by-product recovery facilities.

The standard underlying the benzene NESHAP does not impose an actual numerical emissions limitation, which would be the optimal approach under this program. Rather, it states that an operator “shall enclose and seal all openings on each process vessel.” In addition, an operator “shall duct gases from each process vessel.” As compared with a numerical emissions limitation, this is a weaker form of regulation because it does not specify what level of emissions, if any, would be tantamount to a failure to “duct gases from each process vessel.” Rather, the standard relies on leak response requirements as a proxy for emissions control.

Moreover, the regulatory definition of a leak allows for significant concentrations of organic chemicals to be released, before requiring a response by the facility. The following table summarizes the levels of concentrations of organic chemicals that are allowed by the standard:

Equipment	What Qualifies as a Leak	Regulatory Authority
process vessels, storage tanks, and tar-intercepting sumps	organic chemical concentration more than 500 ppm above a background concentration	61.132(b)(1)
light-oil sumps	organic chemical concentration more than 500 ppm above a background concentration	61.133(c)(1)
naphthalene processing, final coolers, and final-cooling towers	(Zero emissions are allowed)	61.134
exhauster	volatile organic chemical concentration of 10,000 ppm or greater (unless facility qualifies for an exemption for an exhauster with an organic chemical concentration less than 500 ppm above a background concentration)	61.135(d)(1)

In the specific case of an exhauster, a facility could have emissions of organic chemicals as high as 10,000 ppm before it is required to respond to them as a “leak.”

EPA has not made any revision to these numerical allowances in over 25 years, since the time of the adoption of the standards in 1989.

Sources: 54 Fed. Reg. 38,044 (Sep. 14, 1989)
40 C.F.R. 61.130-61.139 (current regulations)
40 C.F.R. 61.132(a)(1) (enclosure and sealing of openings)
40 C.F.R. 61.132(a)(2) (ducting of gases)

2. Clean Air Act Amendments of 1990

In response to EPA's weak implementation of the program for hazardous air pollutants, Congress enacted a list of 189 hazardous air pollutants in the 1990 Amendments. Congress categorically identified "coke oven emissions" as a hazardous air pollutant, regardless of the number and identity of constituent hazardous air pollutants, of which there are many.

The 1990 Amendments directed EPA to identify categories of industrial sectors emitting hazardous air pollutants. For each category, EPA must set a standard based on the maximum achievable control technology (MACT). Typically, EPA sets this standard in terms of a numerical emissions limitation (e.g., x parts per million, y parts per billion), based on the performance of air pollution control equipment.

While Congress intended EPA to regulate hazardous air pollutants more aggressively than in the past, the 1990 Amendments limited EPA's authority with respect to coke ovens. Congress required EPA to promulgate regulations no less stringent than a certain percentage of leaking doors (8%), leaking lids (1%), leaking offtakes (5%), and a certain number of seconds of visible emissions per charge (16 seconds). (In terms of volume, the most significant of these emissions points are leaking doors). This is known as the MACT track for coke ovens. Congress required EPA to promulgate regulations by 1992, so that they would be effective by 1995.

It may seem odd that the basis for a NESHAP regulation should be an allowable numerical percentage of leaking equipment. Such an approach is not as stringent as the typical approach of identifying and measuring the concentration of particular air pollutants coming from a stack or vent, and subjecting them to controls to achieve a numerical emissions limitation. Unlike other industrial facilities where the "control" is an item of air pollution control equipment, the relevant "control" for coke oven facilities is simply a practice of allowing no more than a certain percentage of leaking doors. Actually, EPA could have developed more stringent regulations not tailored to predetermined percentages of leaking equipment. But it has typically framed its regulations for charging operations around such percentages.

It is not unusual for Congress to earmark a particular industrial sector for favorable treatment under the Clean Air Act. For example, in the 1990 Amendments Congress required scientific studies and a finding that regulation of hazardous air pollutants from the utility industry was “appropriate and necessary,” before EPA could regulate that industry. These statutory limitations delayed the regulation of hazardous air pollutants from the utility industry for over twenty years, until EPA promulgated the Mercury and Air Toxics Standard in 2012.

Similarly, Congress provided preferential treatment for coke ovens, delaying progress in regulating them under this program. Generally speaking, EPA must review standards for an industrial sector every eight years, and revise them, if appropriate. The decision whether to revise standards must be based on a Residual Risk Analysis. EPA must consider what is the residual risk to public health, following implementation of existing standards. But Congress allowed a deferral of compliance with revised standards for any coke oven facilities that elected to comply with an alternative and slightly more stringent set of standards (3% leaking doors, 1% leaking lids, 4% leaking oftakes, and 16 seconds of visible emissions per charge). This is known as the Lowest Achievable Emissions Rate (LAER) track, and it was based on the premise that these percentages of leaks were representative of facilities with the fewest emissions at that time.¹ For these LAER track facilities, Congress required EPA to promulgate regulations by 2007, to be effective by 2010.

¹ LAER is a concept borrowed from New Source Review, a different program. Under New Source Review in nonattainment areas, a facility must install not only the Best Available Control Technology (BACT), but also the technology reflecting the Lowest Achievable Emissions Rate (LAER). LAER refers to the lowest level of control achieved throughout the United States, and presumably is as stringent as, or more stringent than, BACT.

The following table compares the statutory standards for allowable concentrations of leaks for facilities under the MACT track and the LAER track:

	leaking doors	leaking lids	leaking offtakes	number of seconds of visible emissions per charge	Legal authority
MACT Track (less stringent)	8%	1%	5%	16 seconds	7412(d)(8)
LAER Track (more stringent)	3%	1%	4%	16 seconds	7412(i)(8)

The primary difference between the two tracks was that the percentage of allowable leaking doors was lowered from 8% to 3% for the LAER track, and the percentage of allowable leaking offtakes was lowered from 5% to 4% for the LAER track. In other respects, the two tracks were the same. For the LAER track, Congress actually allowed an exclusion for emissions during the period after the closing of self-sealing oven doors, which was not allowed under the MACT track. In that respect, the LAER requirements were less stringent than the MACT requirements.

In the 1990 Amendments, Congress also directed EPA to promulgate work practice regulations, which typically involve a method of operation, rather than an item of air pollution control equipment. While work practice regulations are authorized by the Clean Air Act where a numerical emissions limitation is not practical or feasible, they are problematic for the protection of public health because they are tied to existing ways of doing business, which may in fact be inherently polluting.

The result of the 1990 Amendments was that the timetables for compliance with regulations for coke ovens are far longer than those for other industrial sectors. There are three examples of this preferential treatment. First, MACT track facilities were entitled to a longer compliance schedule with respect to the

initial regulations. The normal compliance schedule for MACT standards is three years, which may be extended for up to two years for a particular facility, if an additional period is necessary for the installation of controls. Because EPA regulations were due on December 31, 1992, the normal compliance date would have been January 1, 1996. But MACT track facilities were given a compliance date of January 1, 1998, or two additional years.

Second, LAER track facilities were entitled to a longer period of review with respect to the Residual Risk Analysis, than facilities in other industrial sectors. Normally, EPA must review MACT standards every eight years, and revise them, if appropriate. But Congress directed EPA to review the standards for LAER track facilities by January 1, 2007, fourteen years after the deadline for the original regulations, December 31, 1992.²

Finally, LAER track facilities were entitled to a longer period of review with respect to revisions of the underlying MACT standards. Because the original regulations were due on December 31, 1992, MACT track facilities could expect a review of the regulations within eight years (January 1, 2001), and a compliance deadline three years after that, requiring compliance sometime around January 1, 2004. But LAER facilities were entitled to a deferral of compliance with these standards until January 1, 2020, a period of an additional sixteen years.

One might object that the consideration for these deferrals was the fact that LAER track facilities voluntarily undertook emissions reductions in the 1990s which were not required, and they were complying with a standard that was more stringent than the standards for MACT track facilities. This is true. But both standards were premised on the notion that a certain percentage of leaking doors, lids, and offtakes is acceptable. Meanwhile, air quality problems in Allegheny County have continued.

Real progress under these regulations will only happen when EPA forces the industry to develop more serious and effective ways of controlling coke oven emissions. The current state of the regulations does not provide such an incentive. The deadline for deferred compliance with Residual Risk Standards is

² The compliance date for those regulations was set at January 1, 2010, which is consistent with the general three-year compliance period for other industrial sectors.

January 1, 2020, less than four years away. Now is the time for EPA to be accomplish this, through standards that will apply across the board to all coke ovens throughout the United States.

- Sources:
- 42 U.S.C. 7475 (a)(4) (best available control technology for New Source Review)
 - 42 U.S.C. 7412 (d)(8)(A) (schedule for coke oven regulations)
 - 42 U.S.C. 7412 (i)(3) (general MACT compliance schedule)
 - 42 U.S.C. 7412 (i)(8)(A),(B),(C),(E) (coke oven compliance schedules)
 - 42 U.S.C. 7412 (i)(8)(B) (MACT track and LAER track)
 - 42 U.S.C. 7412 (i)(8)(B) (work practice regulations)
 - 42 U.S.C. 7412 (n)(1)(A) (preferred treatment for the utility industry)
 - 42 U.S.C. 7501 (3) (lowest achievable emission rate for New Source Review)

3. Regulations for Charging, Leaks, and Bypass Stacks (1993, 2005)

Consistent with the statute, in 1993 EPA promulgated a rule that reflected the two-track pathway to compliance with standards for charging, leaks, and bypass stacks. Under the MACT track, a by-product facility would be subject to a series of increasingly more stringent regulations in 1996 and 2003, but those regulations would still be tailored to percentages of allowable leaking doors, lids, offtake systems, and visible emissions per charge. Under the stricter LAER track, facilities would be subject to stricter regulations in 1998 and 2010, as compared with the 1996 and 2003 MACT track standards.

All coke oven facilities in the United States made the election to pursue the LAER track, except for four facilities, which stayed on the MACT track. The four MACT track facilities are (1) AK Steel in Middletown, Ohio, (2) AK Steel in Ashland, Kentucky, (3) Erie Coke in Erie, Pennsylvania, and (4) Tonawanda Coke in Tonawanda, New York. The Shenango, Clairton, and Monessen facilities in Allegheny County are all LAER track facilities.

In 2005, EPA revised the standard for the four MACT track facilities, based on a Residual Risk Analysis. Like the 1993 rule, this rule addressed charging, leaks, and bypass stacks. In this rule, EPA set the level of controls at the same level as the anticipated 2010 controls for the LAER track facilities. Nevertheless, these standards continued to be tailored to percentages of allowable leaking doors, lids, offtake systems, and visible emissions per charge.

Today, both LAER track facilities and MACT track facilities are now subject to the same set of standards, but the LAER track facilities are entitled to a deferment of any revised standard under a Residual Risk Analysis, until at least January 1, 2020. But that is less than four years away, and EPA rulemakings take a long time. Therefore, now is a good time for EPA to be thinking about the next revision of the NESHAP.

Moreover, EPA is long overdue for a review of that NESHAP for the four MACT track facilities. These facilities are not entitled to the statutory deferment, because they did not make the election to pursue the LAER track. More than eight years have passed since the time of the last final rule in April 2005.

Sources: 58 Fed. Reg. 57,898 (October 27, 1993)

40 C.F.R. 63.302

40 C.F.R. 63.304

40 U.S.C. 7412(f)(2)(A)

70 Fed. Reg. 19,992, 19,994, 20,013 (April 15, 2005)

4. Regulations for Pushing, Quenching, and Battery Stacks (2003)

In 2003, EPA promulgated regulations for pushing, quenching, and battery stacks. Pushing refers to the activity of moving coke out of an oven after cooking time is complete. This is typically done through a long instrument that pushes the coke from the front end of the battery through the back end of the battery. Quenching emissions are defined as those emissions arising out of the wet process of cooling the hot incandescent coke by direct contact with water. Battery stacks refer to vents associated with the flow of air pollutants from the combustion of the furnace gas to the ambient air.

Unlike the MACT standards promulgated in 1993 and revised in 2005, the 2003 standard is not tied to a percentage of leaking equipment. Rather, the rule contains numerical emissions limitations for pushing emissions control devices for the battery stack. However, these limitations only control particulate matter from the battery's underfiring system, and do not control particulate matter from the leaking doors, lids, and offtake systems.

Emissions limitations do not apply to fugitive emissions from pushing activities at by-product coke oven batteries with vertical flues. Those activities are subject to work practice standards, instead. Only if the average opacity is more than 30% (for an individual push for a short battery), or 35% (for an individual push for a tall battery), is corrective action required. Batteries with horizontal flues are not even subject to opacity requirements, but merely require a plan to eliminate or minimize incomplete coking.

Soaking emissions are defined as those emissions arising out of the dampering of an oven off the collecting main and venting to the atmosphere through an open standpipe, prior to pushing. They are subject to work practice standards, rather than emissions limitations. The regulations require a written work practice plan to include measures and procedures to train workers regarding their generation, and require a response to emissions from leaks and incomplete coking.

Quenching emissions are subject to work practice standards, rather than emissions limitations. EPA limits the pre-quenching chemical composition of the water, and requires the use and cleaning of baffles (flow-directing panels) on the

quench tower as a means of attracting and removing air pollutants from steam emissions.

EPA has not revised this rule since 2005. Because more than eight years have passed since the promulgation of the rule, the time is ripe for a review of this rule.

Sources: 68 Fed. Reg. 18,008, 18,008-18,013, 18,026-18,030 (April 14, 2003).

40 C.F.R. 63.7290 (emission limitations for control devices for pushing emissions)

40 C.F.R. 63.7291 (work practice standards for fugitive pushing emissions from by-product coke oven batteries with vertical flues, including opacity standards)

40 C.F.R. 63.7292 (work practice standards for fugitive pushing emissions from by-product coke oven batteries with horizontal flues, including plan requirements)

40 C.F.R. 63.7294 (work practice requirements for soaking emissions)

40 C.F.R. 63.7295 (work practice requirements for quenching emissions)

5. Need for further review in 2016

There are a number of reasons why EPA is long overdue for a review and revision of the rules for hazardous air pollutants from coke oven facilities.

- a. The eight-year period of review of all three sets of regulations has long passed.

EPA has not revised the benzene regulations since 1989, more than 25 years ago. EPA has not revised the regulations for charging operations since 2005, more than 10 years ago. EPA has not revised the regulations for quenching operations since 2005, more than 10 years ago.

- b. LAER track facilities in Allegheny County will have avoided a Residual Risk Analysis from 1993 until January 1, 2020.

In promulgating the two track approach in 1993, EPA conducted a general risk assessment for the entire coke oven industry. While EPA conducted a Residual Risk Analysis for the four MACT track facilities in 2005, it has not conducted a Residual Risk Analysis for the LAER track facilities, including the coke ovens in Allegheny County. This is due to the statutory deferral of compliance with revised standards, until January 1, 2020.

A Residual Risk Analysis is particularly important in Allegheny County because of the unique topography and meteorology of the Mon Valley. These are factors that must be considered, along with the physical and chemical properties of the hazardous air pollutants.

- c. The existing regulations for MACT track facilities and LAER track facilities were based on an outdated air modeling program.

EPA has revised its preferred air modeling program since the time of the promulgation of the standards and their revisions. Before 2005, the preferred air pollution model for industrial facilities was the Industrial Source Complex model. In 2005, EPA revised its Guideline on Air Quality Models to adopt a new model, AERMOD. But EPA has not revised the coke oven standards since that time.

6. Deficiencies in the EPA approach to coke ovens

- a. A standard based on a percentage of allowable leaking doors is not an optimal control technology. Even if such a standard leads to a reduction in emissions, it can still perpetuate poor air quality, as in the case of Allegheny County.
- b. Because EPA has tailored its pollution control requirements to a predetermined percentage of leaking doors, it has caused the concept of LAER (a New Source Review concept) to become so diluted as to lose its meaning.
- c. For New Source Review in nonattainment areas, the concept of LAER has a precise meaning. There, a new or modified source must meet the lowest achievable emissions rate throughout the United States. The premise is to hold a new or modified facility to the highest standards achievable.
- d. But as it has been applied in the case of the coke oven NESHAP, the lowest achievable emissions rate simply reflects a common manner of operation that allows a predetermined percentage of leaking doors, across the entire industry. This is not a stringent form of pollution control.
- e. Moreover, EPA synchronized the MACT standard with the LAER standard in 2010, causing LAER to lose any significance that it ever had, in this context.