NEBRASKA
DEPT. OF ENVIRONMENT AND ENERGY

Blanket Emission Limits – *When are they allowed?*

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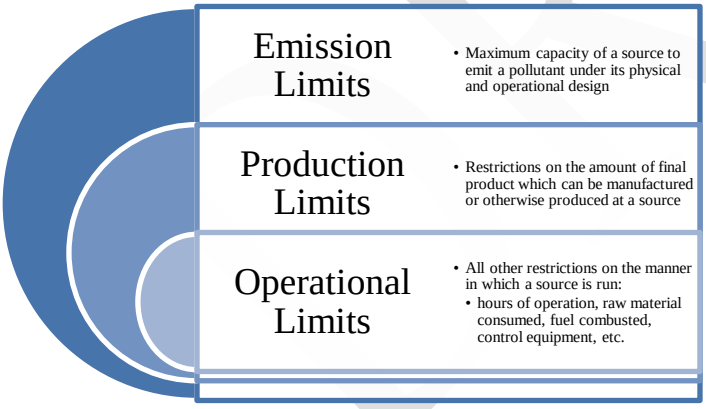
Summary

This guidance discusses the review process the Nebraska Department of Environment and Energy (the Department) uses to determine the practical enforceability of restrictions on potential to emit (PTE) and blanket tons per year (TPY) limits.

What are Blanket Emission Limits?

As a general term, "blanket emission limits", sometimes also referred to as "emissions caps", are those limits that limit emissions of a pollutant on a TPY basis (typically to avoid major source status), but lack associated operational and production limits.



The EPA's foundational guidance on limiting PTE in permits came as a result of the decision in the United States District Court case *United States v. Louisiana-Pacific Corporation (Louisiana-Pacific)*[1]. This guidance was issued by Terrell Hunt and John Seitz on June 13, 1989, (Seitz, 1989)[2] and serves as a starting point in understanding what types of limits are enforceable. In interpreting the decision from *Louisiana-Pacific*, Seitz (1989) states:

> *The Court held that Louisiana-Pacific's permit conditions which limited carbon monoxide emissions to 78 tons per year and volatile organic compounds to 101.5 tons per year should not be considered in determining "potential to emit" because these blanket emission limits did not reflect the type of permit conditions which restricted operations or production such as limits on hours of operation, fuel consumption, or final product.*
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> *… Judge Arraj found that blanket emission limits were not enforceable as a practical matter.*

Seitz (1989) provides a discussion of the terms "production limits" and "operational limits", and how they relate to PTE limitations consistent with *Louisiana-Pacific* [emphasis added]:

> *Emission limits are restrictions over a given period of time on the amount of a pollutant which may be emitted from a source into the outside air. Production limits are restrictions on the amount of final product which can be manufactured or otherwise produced at a source. Operational limits are all other restrictions on*

[1] United States v. Louisiana-Pacific Corp., Civil Action No. 86-A-1880 (D. Colo., Mar. 22, 1988)

[2] Terrell Hunt, Associate Enforcement Council, Office of Enforcement and Compliance Monitoring, and John Seitz, Director, Office of Air Quality Planning and Standards, "Guidance on Limiting Potential to Emit in New Source Permitting" (June 13, 1989)

the manner in which a source is run, including hours of operation, amount of raw material consumed, fuel combusted, or conditions which specify that the source must install and maintain add-on controls that operate at a specified emission rate or efficiency. All production and operational limits except for hours of operation are limits on a source's capacity utilization. Potential emissions are defined as the product of a source's emission rate at maximum operating capacity, capacity utilization, and hours of operation.

Prohibition on Blanket Emission Limits

In discussing the terms "production limits" and "operational limits", and how they relate to PTE limitations consistent with *Louisiana-Pacific*, Seitz (1989) states [emphasis added]:

> *To appropriately limit potential to emit consistent with the opinion in Louisiana-Pacific, all permits issued pursuant to 40 C.F.R. Sections 51.160, 51.166, 52.21 and 51.165 must contain a production or operational limitation in addition to the emission limitation in cases where the emission limitation does not reflect the maximum emissions of the source operating at full design capacity without pollution control equipment. Restrictions on production or operation that will limit potential to emit include limitations on quantities of raw materials consumed, fuel combusted, hours of operation, or conditions which specify that the source must install and maintain controls that reduce emissions to a specified emission rate or to a specified efficiency level.*
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> […]
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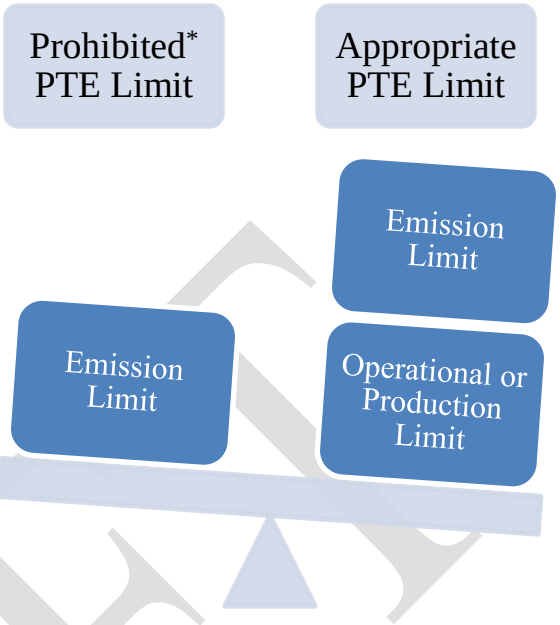
> ***An emission limitation alone would limit potential to emit only when it reflects the absolute maximum that the source could emit without controls or other operational restrictions. When a permit contains no limits on capacity utilization or hours of operation, the potential to emit calculation should assume operation at maximum design or achievable capacity (whichever is higher) and continuous operation (8760 hours per year).***



*Where the emission limit does not reflect the maximum emissions of the source operating at full design capacity without pollution control equipment.

The above statements are sometimes recognized as the EPA's "prohibition on using blanket emission limits to restrict potential to emit." Guidance from the EPA has clearly stated that, except for two specific circumstances, emission limitations must be accompanied by limits on capacity utilization or hours of operation in order to be considered restrictions on PTE.

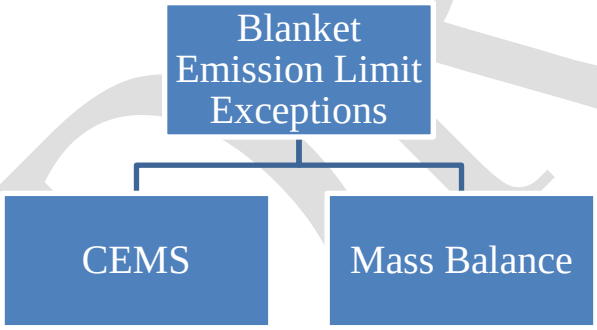
Exceptions to the Prohibition on Blanket Emission Limits

Seitz (1989) recognizes two exceptions to the prohibition on using blanket emission limits as restrictions on PTE [emphasis added]:

> *The particular circumstances of some individual sources make it difficult to state operating parameters for control equipment limits in a manner that is easily enforceable as a practical matter.* ***Therefore, there are two exceptions to the absolute prohibition on using blanket emission limits to restrict potential to emit****. If the permitting agency determines that setting operating parameters for control equipment is infeasible in a particular situation****, a federally enforceable permit containing short term emission limits (e.g. lbs per hour) would be sufficient to limit potential to emit, provided that such limits reflect the operation of the control equipment, and the permit includes***

requirements to install, maintain, and operate a continuous emission monitoring (CEM) system and to retain CEM data, and specifies that CEM data may be used to determine compliance with the emission limit.

Likewise, for volatile organic compound (VOC) surface coating operations where no add-on control is employed but emissions are restricted through limiting VOC contents and quantities of coatings used, emission limits may be used to restrict potential to emit under the following limited circumstances. If the permitting agency determines for a particular surface coating operation that operating and production parameters (e.g. gallons of coating, quantities produced) are not readily limited due to the wide variety of coatings and products and due to the unpredictable nature of the operation, ***emission limits coupled with a requirement to calculate daily emissions may be used to restrict potential to emit. The source must be required to keep the records necessary for this calculation, including daily quantities and the VOC content of each coating used. Emission limits may be used in this limited circumstance to restrict potential to emit since, in this case, emission limits are more easily enforceable than operating or production limits.***



The Department refers to these two general approaches as CEMS-based and mass balance-based methodologies. Subsequent EPA guidance has broadened the conditions under which EPA views these approaches as allowing for blanket emission limitations. A memo issued by John Rasnic on March 13, 1992 (Rasnic, 1992)[3] provides guidance on the application of emissions caps (another term for blanket emission limits) as part of a group limit. Under a group limit (sometimes referred to as a "bubble limit"), specified emission units are subject to a single limitation on emissions. Rasnic (1992) states:

However, in accordance with the 1989 potential to emit policy, when an emission limit is taken to restrict potential to emit, ***some type of continuous monitoring of compliance with that emission limit is required****. In the case Of SO2 emissions, the application of continuous emission monitors (CEMS) should be explored.* ***The use of a CEM equivalent may also be acceptable given that it provides a continuous assessment of emissions that is at least as reliable as a CEM. The appropriate means for monitoring or calculating emissions must be determined on a case by case basis by the permitting authority****. Use of an emission limit to restrict potential to emit SO2 at the refinery heaters, which are served by a common fuel line, is acceptable provided that emissions can be and are required to be readily and periodically determined or calculated. The continuous monitoring method described in your memorandum includes analyzing the sulfur content of the oil in the tank on a daily basis and measuring the oil used with continuous flow monitors as well as monitoring fuel usage at each heater as well as meeting a specified H2S content.*

In discussing a configuration where a CEMS is not feasible, Rasnic (1992) states:

With respect to Koch's request to use an emission limit rather than production or operation limits for the tank farm, as stated for the heaters, ***some type of continuous monitoring is required****. Since a CEM is not feasible for monitoring VOC emissions,* ***the permit must require a continuous assessment of emissions that is at least as reliable as a CEM****. The appropriate means for continually assessing emissions must be determined on a case by case basis by the permitting authority. Your memorandum states that CEMs would not be used to directly determine compliance with a VOC emission limit because none are available for this application.*

[3] John Rasnic, Director, Stationary Source Compliance Division, "Policy Determination on Limiting Potential to Emit for Koch Refining Company's Clean Fuels Project" (Mar. 13, 1992)

Compliance would instead be determined daily based on product density and volatility, product throughput per tank, and control efficiency per tank. We believe that if the source is willing to monitor and determine compliance daily, then the source could be allowed to use an emission cap to limit potential to emit. Otherwise, the maximum usage of the tank (both in volume and volatility) must be assumed in determining potential to emit.

Note that the statement that *"… a CEM is not feasible for monitoring VOC emissions…*" within Rasnic (1992) is a statement about the availability of a monitoring system for a specific application at the time the guidance was produced, and not a general statement about the capability of CEM systems today. Modern CEM systems are available for a range of pollutants, including VOC and HAP, for a variety of facility configurations.

The EPA provides further discussion of allowable mass balance-based methodologies in a 2005 guidance titled "Technical Guidance for Title V Permitting of Printing Facilities"[4]:

> *Limits on VOC emissions typically can be made enforceable as a practical matter. Where technically feasible, we encourage consideration of CEMS, which provide a direct measurement of the most critical parameter-emissions themselves. Where a CEMS is not appropriate, we have found that a "formula approach" can be used to determine VOC emissions in a practical, enforceable manner.*
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> *Consistent with the June 1989 guidance as clarified by the September 2, 1992 memo from John Rasnic to David Kee, we believe that the formula approach e.g., mass balance approach, is a form of a production or operational limit. The formula approach tracks the emissions and critical short term production and/or operating parameters, documenting a relationship between the parameters and emissions, and inputting the pertinent values into a formula to determine actual emissions from the source. The actual emissions can then be compared directly to the applicable PTE limit. For a source to qualify for the formula approach, its emissions should be capable of being accurately and replicably determined by application of the relevant formula. Thus, the formula approach requires establishing in the permit an explicit relationship between material usage, material properties, capture and control system performance, and/or production data as the basis for calculating actual emissions.*
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> […]
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> *In order to ensure practical enforceability of the formula approach, its use should be entirely nondiscretionary and replicable. That is, the formula necessarily yields a unique and repeatable outcome when the required information is input. In addition, the formula(e) should be identified and described in the NSR permit's terms and conditions. Any special cases also should be established in advance. The source's monitoring and tracking methodology also should be established and properly documented. That is, the inputs to the formula(e) should themselves be obtained through replicable procedures, and the operation of the formula(e) should replicably produce the emissions value that is to be compared to the source's emissions limit.*

In summary, the Department has determined that blanket emissions limits are not practically enforceable, unless accompanied by either a CEMS-based or mass balance-based methodology to determine actual emissions. This determination is supported by the finding in *Louisiana-Pacific* as well as in EPA guidance.

When are Blanket Emission Limits Allowed?

The Department has determined that blanket emissions limitations for the purposes of limiting PTE are only approvable in permits that require the use of CEMS-based or mass balance-based approaches. The following discussion will examine what situations these approaches are applicable to and what permit conditions are

[4] Stephen Page, Director, Office of Air Quality Planning and Standards, "Technical Guidance for Title V Permitting of Printing Facilities" (Jan. 28, 2005)

necessary to make these approaches practically enforceable. Within these permits, the blanket emissions limitation takes the form of a TPY limit with a 12 consecutive month averaging period, rolled monthly. The CEMS or mass balance approach is required in the permit as a practically enforceable methodology of demonstrating compliance with the TPY limit. A brief note is made about Plantwide Applicability Limitations (PAL), which restrict emissions from a facility on a TPY basis but are subject to different regulatory provisions and oversight than limits taken to restrict PTE.

Continuous Emissions Monitoring Systems

A CEMS is the total equipment system necessary for the determination of a pollutant emission rate using analyzer measurements and a conversion equation, graph, or computer program to produce results in units of the applicable emission limitation or standard.[5] These systems continuously monitor and record the concentration and quantity of a pollutant from an associated emission point (such as a stack at an industrial facility). In general, operating "continuously" means that the CEMS completes at least one cycle of data sampling, analyzing, and recording every 15 minutes.[6]

To consitute federally enforceable (e.g. legally and practical enforceable) limitations, a permit specifiying a CEMS requires several parts:

- The facility installs and operates equipment capable of continuously monitoring and recording pollutant concentration and exhaust gas flow rate;
- The facility follows a specified procedure (performance specification) to ensure proper installation, configuration, and calibration of the CEMS;
- The facility utilizes appropriate quality assurance procedures to validate the data reported by the CEMS; and
- Reporting and recordkeeping requirements for the CEMS.

Facilities utilizing a CEMS approach may be subject to fewer operational and monitoring permit requirements than they would if utilizing a mass balance approach or short-term (e.g. pounds per hour) emissions limitations. This is because a CEMS provides a continuous measurement of emissions with supporting conditions providing practical enforceability, so it is not necessary to place certain other operational conditions, such as those limiting throughput, or monitoring conditions, such as those ensuring that control equipment is functioning at the same level as prior performance testing.[7] Further, a facility that is minor for the Prevention of Significant Deterioration (PSD) program and that utilizes a CEMS can reduce the regulatory review and potential performance testing required when conducting "modifications"[8] at the facility, such as utilizing a different feedstock, incorporating new biological species, changing operating conditions, or adjusting control equipment parameters.

[5] Some discussions will draw distinction between the terms "Continuous Emissions Monitoring System" (CEMS) and "Continuous Emission Rate Monitors" (CERMS), where a CEMS measures pollutants on a concentration basis (e.g. parts per million of exhaust air) while a CERMS incorporates an exhaust gas flow monitor and measures pollutant emissions on a mass per unit time basis (e.g. pounds per hour). This discussion focuses solely on systems capable of recording mass per unit time emissions, but uses the term "CEMS" as the term is more commonly used in EPA guidance and Department communications.

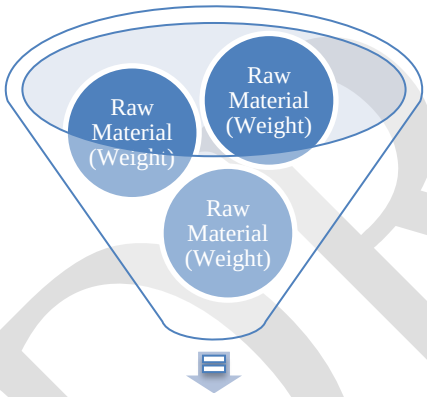
[6] See 40 CFR § 75.10(d)(1)

[7] This statement solely applies to limitations placed for the purposes of restricting PTE. If equipment at a facility is subject to certain regulatory programs, such as PSD BACT, it may be necessary to apply operational and monitoring restrictions to meet the separate requirements of these programs.

[8] Defined at 129 Neb. Admin. Code §§1-089. In part, "any physical change in, or change in method of operation of, an affected facility which increases the amount of any air pollutant…" 129 Neb. Admin. Code §§17-001 places a requirement on facilities that a construction permit must be obtained prior to making any modification that results in an increase in potential emissions over a specified threshold. When an emission unit is equipped with a CEMS and subject to a limit on PTE, a modification does not result in a change in potential emissions from that unit for the specific pollutant(s) measured by the CEMS.

Mass Balance Approaches

The 'Collins English Dictionary'[9] defines a mass balance as "a consideration of the input, output, and distribution of a substance between streams in a process or stage." As applied to limitations on PTE, a mass balance approach assumes the weight of raw materials going into a process equals the sum of the weight of the product and waste material leaving the process. In general, mass balance PTE calculations for volatile (those capable of evaporating at process conditions) pollutants assume that all regulated pollutants contained in the raw materials are emitted, while calculations for solid pollutants (particulate matter and metallic Hazardous Air Pollutants [HAP]) assume that pollutant emissions are equal to the mass difference between finished products and raw materials. This approach is usually utilized for uncontrolled processes that contain solvent evaporation, such as surface coating and printing operations, but may be used for sources where inputs from each affected emission point are measured and directly equated to outputs.



In a 2020 letter submitted as comment to a Title V (Class I) operating permit[10], EPA Region 7[11] describes the requirements for an enforceable mass balance approach:

> *Therefore, when a mass balance approach is used in a permit to measure compliance with emissions limits, all constant parameters that impacts the process must be tracked and measured. Specific input data must be recorded and their impacts on the process must be evaluated against a predetermined standard (e.g. performance testing/compliance testing, etc.) to determine what the final output emissions will be. These impacts must be predictable and reproduceable to show a consistent output within a narrow range or variability.*
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> *[…]*
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> *where there are many variables in the operating process that may affect emissions, the facility must be able to track all the variables used by the source in the manufacturing process if they choose to use a mass balance formula-based approach. The parameters of the variables need to be included in some type of tracking system, such as a spreadsheet developed by the source which included formulas to calculate the emissions produced using different variables (e.g. temperature variations, type of yeast or enzyme effect, scrubber flow rates, etc.) as the NDEE has described. The spreadsheet or tracking program needs to be able to account for the day-to-day variables or even hour-to- hour variables as the system is adjusted in order to make the permit practicably enforceable. The permit should require the tracking system/spreadsheet to be shared with the NDEE as needed to demonstrate compliance.*

In summary, under an enforceable mass balance approach each of the parameters that has an impact on the emissions produced by a process is required to be monitored and recorded by the facility. Changes to these parameters must have a known relationship with emissions that can be described by a reproducible mathematical formula.

[9] https://www.collinsdictionary.com/us/dictionary/english; Accessed 2/10/2021.

[10] Amy Algoe-Eakin, Chief - Air Permitting and Standards Branch, EPA Region 7, "Chief Ethanol Fuels, Inc. Draft Class I Operating Permit Comments" (July 10, 2020). Accessible on the Department's Public Records Search at http://dee.ne.gov/NDEQProg.nsf/OnWeb/PRS for DEQ Facility Number 58049

[11] EPA has ten regional offices which provide direct oversight of delegated state and local programs. Region 7 serves Iowa, Kansas, Missouri, Nebraska, and nine tribal nations.

Examples of Facilities with Mass Balance Limitations on a Tons per Year Basis

Evaporative Loss Product (e.g. Surface Coating, Fertilizer Additives)

Facilities that use evaporative loss raw materials are a prime candidate for TPY limits with compliance demonstrated by a mass balance approach. In this context "evaporative loss" is used to refer to materials, such as paints, solvents, and additives, that contain pollutants regulated as Volatile Organic Compounds (VOC) or HAP that are subject to evaporation as part of the production process. A 2005 EPA guidance titled "Technical Guidance for Title V Permitting of Printing Facilities"[12] discusses at length how to develop practically enforceable approaches for these types of facilities.

In general, evaporative loss product facilities that are subject to mass balance-based limits are subject to limitations on the total throughput of VOC or HAP-containing material and limitations on the maximum VOC or HAP-content (on a percent mass basis) of any specific material. Facilities are required to keep records, generally in the form of Safety Data Sheets (SDS) or equivalent, to verify the VOC and HAP content of materials used. These facilities are required to track material usage on at least a monthly basis, and prepare calculations showing that the total emissions of VOC and HAP, assuming full volatilization of the content of all materials used, are below specified limits.

Biological Systems

The necessity of being able to describe the relationship between operational parameters and emissions presents significant challenges in applying a mass balance approach to facilities that utilize biological processes. As noted above in the EPA Region 7 comment letter, within a mass balance approach the impact of changes in operational parameters on emissions "must be predictable and reproduceable to show a consistent output within a narrow range or variability." Review by Department personnel has identified significant variance in emissions as a result of changes in biological species (e.g. specific types of yeast and enzyme), chemical addition rate, composition of chemical addition, scrubber pressure differential, production rate, and ambient temperature. Refer to the Department guidance "Variability In Practice: Historical Emissions at Dry Mill Batch Fermentation Ethanol Plants" for an analytical evaluation of this variance. Further, the Department has noted that emissions from these processes are sensitive to changes in operating parameters of their control devices, as discussed in the Department guidance "Operational Parameter Requirements for Packed-Bed Wet Scrubbers Utilized for Gaseous Control."

At present, the Department is not aware of a mass balance formula-based approach for facilities that produce ethanol by a fermentation process that is capable of relating the variability in these parameters to emissions in a reproducible manner.

In a limited set of circumstances, the Department has approved of TPY limits based upon mass balance for facilities that include biological processes, such as annual emissions for Sulfur Dioxide (SO_2) from the flaring of biogas. In such cases, the output of the biological process is directly measured on a schedule required by the permit. For example, one such permit requires that the biogas be sampled on a monthly basis to determine the Hydrogen Sulfide (H_2S) concentration.[13] When tracking emissions, the permit requires that the facility assume complete conversion of sulfur bound in H_2S into the regulated pollutant SO_2.

Plantwide Applicability Limitations

A Plantwide Applicability Limitation (PAL) is an emission limitation, expressed in TPY, for a pollutant at a major stationary source that is enforceable as a practical matter and established source-wide. PAL requirements for Nebraska sources can be found in Title 129, Chapter 19, Section 011.

A PAL permit places a limit (or cap) on the annual emissions of a specified pollutant from a major source of air pollution. A PAL permit includes monitoring, reporting, and recordkeeping requirements to ensure that the source complies with the PAL annual emissions cap.

[12] Stephen Page, Director, Office of Air Quality Planning and Standards, "Technical Guidance for Title V Permitting of Printing Facilities" (Jan. 28, 2005)

[13] If H_2S composition is found to be below 80% of the worst-case (e.g. highest) concentration evaluated during permitting for twelve consecutive months, the permit provides allowance for the sampling frequency to be reduced to once every other month.

The ability to issue PAL permits was added to the CFR by the EPA in 2002 and subsequently incorporated into Title 129. The intent was to provide major sources a voluntary option that gave the flexibility to pursue modifications without undergoing a PSD review, while assuring environmental protection by locking-in the source at previously emitted pollution rates along with appropriate monitoring, recordkeeping, and reporting. At present, EPA and Nebraska regulations only provide for PAL permitting of major sources, and this type of permit is not available to facilities that are minor sources.

Full discussion of PAL permitting requirements are outside the scope of this discussion. Brief mention is made to note the level of oversight and additional recording and recordkeeping requirements necessary to ensure a source-wide limit is practically enforceable and protective of ambient air quality.