DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Air Quality

DOCUMENT NUMBER: 273-4000-005

TITLE: Compliance Assurance Policy for Continuous Emission Monitoring Systems (CEMS) on Combustion Units

EFFECTIVE DATE: April 1, 2009

AUTHORITY: 35 P.S. Sec. 4001-4005 (Air Pollution Control Act)

POLICY: Prescribes actions for emission, opacity, and data availability violations on combustion units.

PURPOSE:

The purpose of this policy is to establish uniform criteria for assessing monetary penalties for exceedances of emission standards and data availability requirements through an agreement rather than repeated criminal citations or civil penalty actions. The Department has found agreements to be an effective tool in resolving violations of standards for other problems without resorting to litigation. The benefit to the source owner is certainty in determining liabilities should violations occur.

DISCLAIMER:

The policies and procedures outlined in this guidance document are intended to supplement existing requirements. Nothing in the policies or procedures shall affect different statutory or regulatory requirements.

The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of the Department to give these rules that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

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LOCATION: Volume 02, Tab 24

COMPLIANCE ASSURANCE POLICY

FOR

CONTINUOUS EMISSION MONITORING SYSTEMS (CEMS)

ON

COMBUSTION UNITS

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR QUALITY

REVISION 2

EFFECTIVE APRIL 1, 2009

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SECTION 1: GENERAL CONCEPTS

I.   Scope

    A.   This policy addresses:

        1.   Exceedances of gaseous emission and visible emission (opacity) standards as indicated from certified Continuous Emission Monitoring Systems (CEMS); and

        2.   Exceedances of data availability requirements for obtaining such data.

    B.   The Department reserves the right to take enforcement action beyond that which is specified in this policy for, but not limited to, the following situations:

        1.   Emission exceedances that would result in imposition of a maximum penalty specified by this policy;

        2.   Data availability exceedances that would result in imposition of a maximum penalty specified by this policy;

        3.   Exceedances that demonstrate a chronic pattern;

        4.   A CEMS that has not been certified or for which certification has been rescinded;

        5.   Emissions that result in soiling beyond the property line;

        6.   Emission exceedances that contribute to violations of ambient air quality standards; or

        7.   Emission exceedances that result in the creation of air pollution.

II.   Applicability

    A.   This policy will apply beginning with the second quarter 2009 data.

    B.   This policy supercedes the "Enforcement Policy - CEMS and Coal Sampling/Analysis Systems" Revision No. 1 dated July 1, 1985.

    C.   This policy applies to combustion units required to install, maintain, and operate CEMS.

    D.   The Department may, within its discretion, apply this policy to other sources required to install, maintain, and operate CEMS that are not specifically covered by any Compliance Assurance Policy.

III.   Purpose

The purpose of this policy is to establish uniform criteria for assessing monetary penalties for exceedances of emission standards and data availability requirements through an agreement rather than repeated criminal citations or civil penalty actions. The Department has found agreements to be an effective tool in resolving violations of standards for other problems without resorting to litigation. The benefit to the source owner is certainty in determining liabilities should violations occur.

Source owners are not required to sign a Consent Order and Agreement or Consent Assessment of Civil Penalty to resolve past or future violations; however, the Department intends to take criminal and/or civil action to resolve exceedances of standards for which an agreement has not been reached. Generally, a Consent Order and Agreement will be used when corrective steps are needed, such as operational hardware changes or new CEMS installations. Otherwise, a Consent Assessment of Civil Penalty will be used to settle penalties indicated by this policy. The various leniency factors built into this policy are applicable only to agreement settlements. They have no applicability in adversarial litigation. This Policy should not be used to develop penalties for litigation or unilateral assessment; penalties should be developed for those purposes using applicable Department Policies that are specifically designed to apply the factors in Section 9.1 of the Air Pollution Control Act in assessing civil penalties, such as the Guidance for Application of Regional Civil Assessment Procedure, Document Number 273-4130-003.

As required by the Air Pollution Control Act, the Department considers the following during the process of determining a penalty to resolve violations: willfulness of the violation; damage to air, soil, water, or other natural resources of the Commonwealth or their uses; financial benefit to the person in consequence of the violation; deterrence of future violations; cost to the Department; size of the source or facility; compliance history of the source; severity and duration of the violation; degree of cooperation in resolving the violation; speed with which compliance is ultimately achieved; whether the violation was voluntarily reported; other factors unique to the owners or operator of the source or facility; and other relevant factors.

The provisions of this policy applied during the processing of quarterly reports take into account the size and nature of the source; the severity and duration of the violation; whether the violation was voluntarily reported; degree of cooperation in resolving the violation; deterrence of future violations; and the speed with which compliance is achieved. The remaining case-specific factors are considered by regional staff during their review and resolution of the violations, including willfulness of the violation; compliance history; damage to air, soil, water or other natural resources of the Commonwealth or their uses; financial benefit of non-compliance; cost to the Department; other factors unique to the owners or operator of the source or facility; and other relevant factors.

IV.   Penalties

A.   If violation criteria are exceeded, penalties will be assessed according to the following:

1.   Emission violation penalties will be assessed on a daily basis and totaled for the quarter; and

2.   Data availability violation penalties will be assessed on a quarterly basis.

B.   The following source factors for combustion unit sizes will be applied to all daily emission exceedance penalties and to all quarterly data availability exceedance penalties indicated in the penalty equations in this policy:

Combustion Unit Rated Capacity (million Btu/hr.)	Source Factor, F
< 500	1
500 - 999	2
1000 - 1999	3
2000 - 3999	4
4000 or more	5

When combined emissions from two or more combustion units are monitored by one CEMS, the source factor, F, is determined from the above table by the sum of the rated capacities.

C.   Penalty Adjustments

1.   The Regional Air Quality Program Manager may forgive a total facility penalty of $200 or less.

2.   Upon receiving adequate documentation from a source owner, the Regional Air Quality Program Manager may make penalty adjustments in accordance with the following:

   a.   Both emission and data availability penalties may be reduced in a multiple combustion unit situation with one CEMS when one or more combustion units are shut down. The source factor will be based upon the rated capacity of combustion units operating at the time of the violation.

   b.   Data availability penalty adjustments may be made under the following circumstances:

      i.   If a source owner demonstrates compliance with applicable emission standards by alternate means. The amount of the reduction depends on the degree of confidence with which compliance can be demonstrated.

      ii.   If the source owner demonstrates that the penalty was due to events or circumstances beyond the control of the source owner. The amount of the reduction depends on the extent to which the situation was uncontrollable.

      iii. If the source owner demonstrates that extraordinary measures were taken to minimize the outage and/or to prevent a recurrence of a similarly caused outage.

A previous data availability problem for which a penalty reduction has been granted may limit or preclude subsequent penalty reductions for similar problems.

3.   The Chief of the Division of Compliance and Enforcement may adjust any penalty. Requests for such adjustments must be referred through the appropriate Regional Air Quality Program Manager.

V.   Procedures

A.   Quarterly Report Submittals

    1.   Format

        a.   Data reports shall be submitted quarterly in the format specified by the Department during the Phase I review process. The Phase I review process is described in the "Continuous Source Monitoring Manual" (Manual).

        b.   Data Reports will be reviewed for errors that would render the data unacceptable (improper format, incorrect component identification, inconsistency between hourly and incident reports, incorrect units of measurement, improper data invalidation, improper use of codes, incompleteness, etc.). If errors are found during this initial data review, notice will be provided to the source owner that the report is unacceptable, advising the company of the necessary corrections, and requesting submittal of a corrected report.

        c.   Data reports that are determined to be unacceptable will not be considered valid submittals for purposes of compliance with report timeliness requirements of the Manual.

    2.   Time Limit

        a.   Data reports shall be submitted to the Division of Source Testing and Monitoring in Harrisburg within 30 days following the end of each calendar quarter as required in the Record Keeping and Reporting sections of the Manual.

    3.   Delinquent Reports

        a.   Acceptable data reports not submitted by the time limit indicated in A.2.a above will be considered delinquent.

        b.   Delinquent reports will be considered in violation of the reporting requirements specified in the Manual and subject to a penalty of $200 per day of delinquency per CEMS report. However, this penalty will be

forgiven for reports delinquent for seven or less days. That is, the penalty on the eighth day of delinquency would be $1600; on the ninth, $1800, etc.

B.   Significant Outages of a CEMS

Continuous periods of data unavailability exceeding 3 days should be reported to the appropriate regional office on the fourth day (or the next working day if the fourth day is on a weekend or a holiday).

SECTION 2: GASEOUS EMISSION CEMS PROVISIONS

I.   Emission Standards

Emission standards for combustion units are generally expressed from among the following:

A.   Hourly average-based maximums not to be exceeded, which include:

1.   n-hour block average

2.   n-hour rolling average, rolling by one hour

B.   Daily average maximum not to be exceeded at any time.

C.   Daily average not to be exceeded more than two days in any rolling 30-day period (2-in-30-day standard).

D.   Thirty-day rolling average, rolling by one day, not to be exceeded at any time.

E.   Other emission standards may be stipulated in a plan approval or operating permit or other applicable regulation.

II.   Data Availability Requirements

A.   Monitoring systems are required by 25 Pa. Code §139.101(12) to meet at least one of the following minimum data availability requirements unless other data availability requirements are stipulated elsewhere:

1.   In each calendar month, at least 90% of the time periods for which an emission standard or operational parameter applies shall be valid as set forth in the quality assurance section of the Manual.

2.   In each calendar quarter, at least 95% of the hours shall be valid as set forth in the quality assurance section of the Manual.

B.   Definitions and Clarifications

1.   As defined in the Manual, a valid hourly average must contain at least one valid data reading in each 15-minute quadrant during which the process was operating. Notwithstanding this requirement, if the process operated during more than one quadrant of the hour and if some data is unavailable as a result of the performance of calibration, quality assurance activities, preventive maintenance activities, or backups of data from the data acquisition and handling system, valid data readings from at least two points separated by a minimum of 15 minutes may be used.

2.   As defined in the Manual, a valid daily average must contain at least 18 valid hourly averages at any time during that daily time period.

3.   As defined in the Manual, a valid 30-day average must contain at least 23 valid daily averages.

4.   Days of process downtime will be considered to contain valid hours for this purpose.

5.   Invalid hours caused by Department-conducted audits (Level III or IV) will be considered valid hours for this purpose.

III.   Penalty Criteria

A.   Emission Criteria

Emission standard exceedances will be subject to a daily penalty assessment, if any of the following criteria are exceeded for the applicable standard for any day:

1.   An hourly block or hourly rolling average prescribed in the standard exceeds the standard.

2.   The daily average exceeds the daily standard.

3.   The daily average exceeds the 2-in-30-day standard and the number of daily averages in the previous 29 days that exceed the 2-in-30-day standard is more than one.

4.   The 30-day rolling average exceeds the 30-day rolling average standard.

B.   Invalid Data Criteria

Invalid data exceedances will be subject to penalty if more than 10.% of the averages in any month are invalid and more than 5.00% of the hours in the quarter are invalid. If both these criteria are met, only those months with more than 10.% of invalid averages are considered for penalty assessment.

IV.   Penalty Assessment

A.   Emission Penalties

1.   The total daily penalty for emission violations for the pollutant-units combination, E_d, is the sum of any hourly-based penalties and any daily-based penalties assessed for each applicable standard multiplied by the source factor for size, F:

$$E_d = F (B_b + B_r + B_1 + B_2 + B_{30})$$

a.   If there is a violation of an n-hour block emission standard, the base penalty, B_b, is determined from the equation below. N_d is the number of n-hour block averages exceeding the emission standard during that day times the number of hours, n, in each block.

b.   If there is a violation of an n-hour rolling emission standard, the base penalty, B_r, is determined from the equation below. N_d is the number of n-hour rolling averages exceeding the emission standard during that day.

c.   The base penalty, B_b or B_r, is determined from the following equation:

$$B = \$100 \times 2^{\left(\frac{N_d - 1}{4}\right)}$$

up to a maximum of \$3200
$(N_d \geq 21)$

Graphically that is:
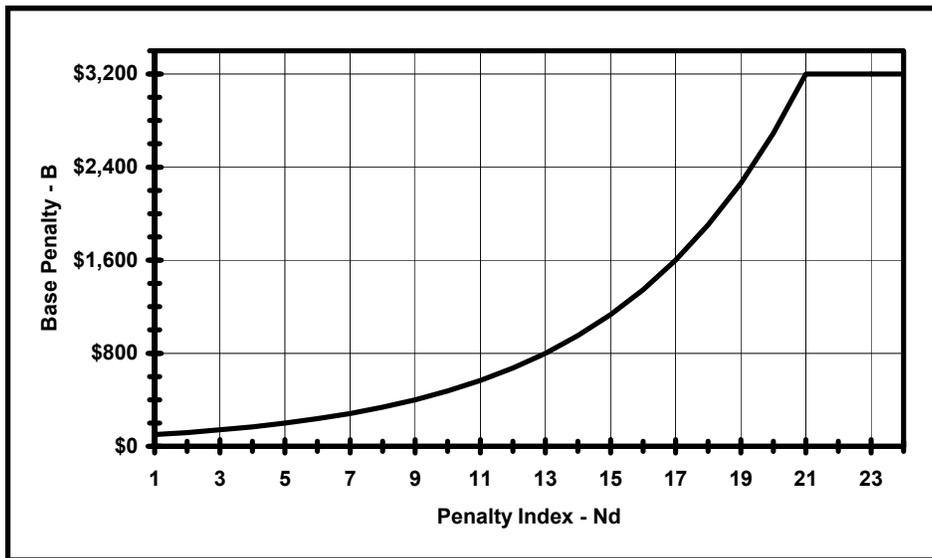
d.   If the daily violation criterion in III.A.2 of this section is met, the base penalty, B_1, is determined from the equation below by the daily average.

e.   If the 2-in-30-day violation criterion in III.A.3 of this section is met, the base penalty, B_2, is determined from the equation below by the average of all daily averages in the 30-day period, inclusively, that exceed the 2-in-30-day standard.

f.   If the 30-day average violation criterion in III.A.4 of this section is met, the base penalty, B_{30}, is determined from the equation below by the 30-day average including the current day.

g.   The base penalty, B_1, B_2, or B_{30}, is determined from the following equation:

$$B = \$100 \times 2^{\left[20\left(\frac{A}{S}-1\right)\right]}$$ up to a maximum of $3200

$(A/S \geq 1.25)$

Where: A = Emission Average

S = Emission Standard

Graphically that is:
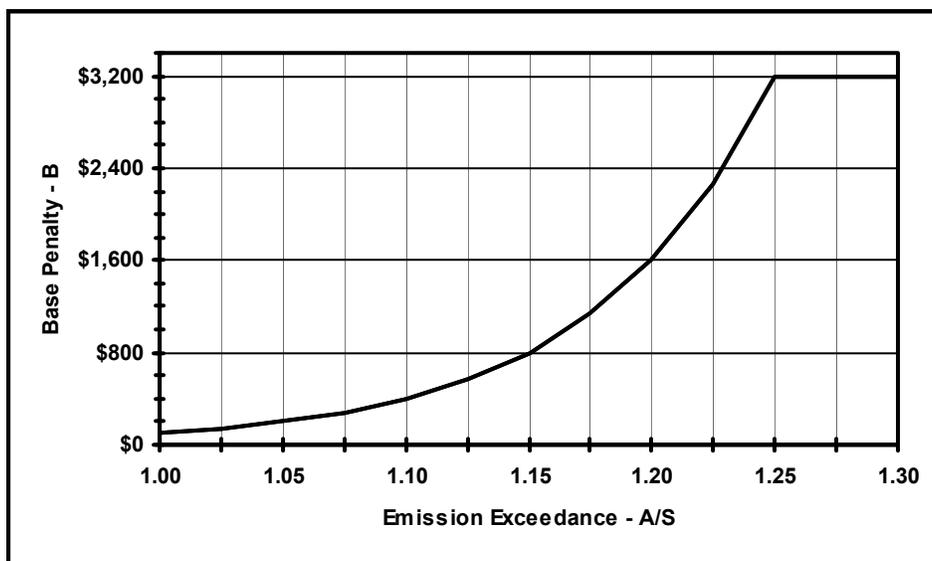
2.   The total quarterly emission penalty, E_q, is the sum of daily penalties, E_d, for all days, n, in the quarter:

$$E_q = \sum_{d=1}^{n} E_d$$

B.   Invalid Data Penalties

1.   The total quarterly penalty for invalid data violations for the pollutant-units combination, V_q, is the sum of any hourly-based penalties and any daily-based penalties assessed for each applicable standard multiplied by the source factor for size, F:
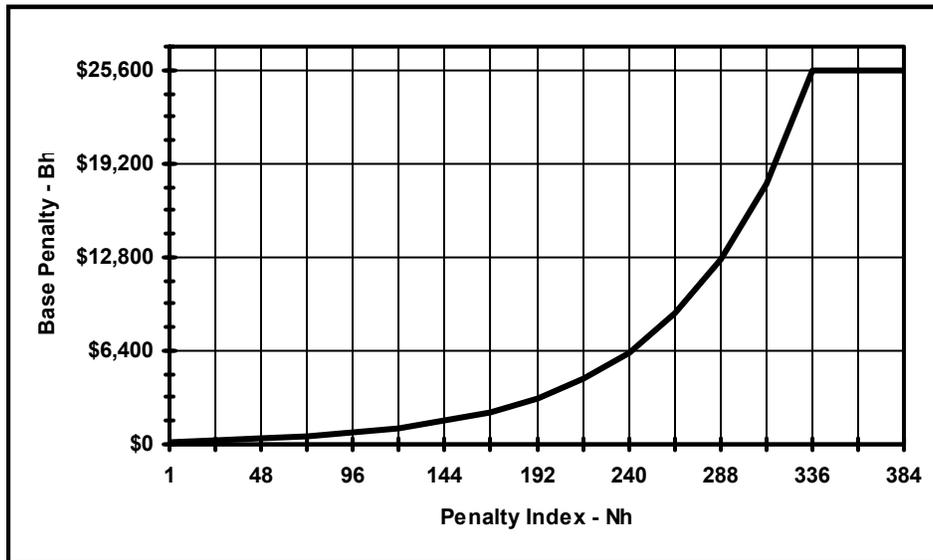
$$V_q = F (B_h + B_d)$$

a.   If there is an invalid data violation for an hourly-based average, the base penalty, B_h, is determined from the equation below. For each month subject to penalty assessment as defined in the criterion in III.B of this section, N_m is the number of invalid averages in excess of the 10% allowed. The sum of N_ms for all such months, M, in the quarter is the penalty index sum, N_h:

$$N_h = \sum_{m=1}^{M} N_m$$

The invalid data base penalty, B_h, is determined from the following equation:

$$B_h = \$200 \times 2^{\left(\frac{N_h - 1}{48}\right)}$$ up to a maximum of \$25,600 $(N_h \geq 337)$
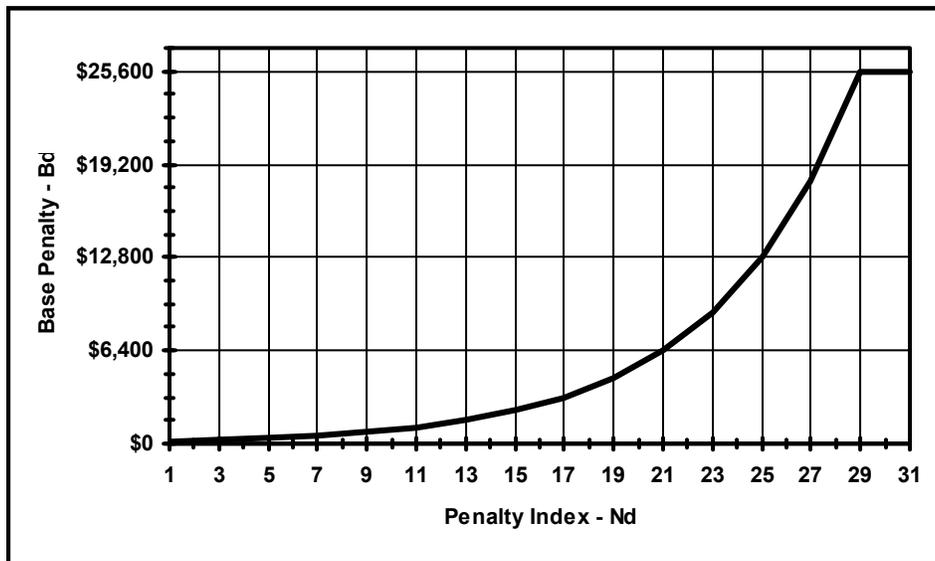
Graphically that is:

b.   If there is an invalid data violation for a daily-based average, the base penalty, B_d, is determined from the equation below. For each month subject to penalty assessment as defined in the criterion in III.B of this section, N_m is the number of invalid averages in excess of the 10% allowed. The sum of N_ms for all such months, M, in the quarter is the penalty index sum, N_d:

$$N_d = \sum_{m=1}^{M} N_m$$

The quarterly invalid data base penalty, B_d, is determined from the following equation by this total penalty index, N_d:

$$B_d = \$200 \times 2^{\left(\frac{N_d - 1}{4}\right)}$$ up to a maximum of \$25,600 $(N_d \geq 29)$

Graphically that is:

Base Penalty - Bd

$25,600

$19,200

$12,800

$6,400

$0

Penalty Index - Nd

1   3   5   7   9   11   13   15   17   19   21   23   25   27   29   31

C.   The total quarterly penalty, P_q, is the sum of the emission and invalid data penalties:

$$P_q = E_q + V_q$$

SECTION 3: VISIBLE EMISSION CEMS PROVISIONS

I.   Visible Emission Standards (Opacity)

     A.   Visible Emission Standards for sources pursuant to 25 Pa. Code §123.41 are exceeded if opacity is equal to or greater than:

          1.   "20% for a period or periods aggregating more than 3 minutes in any one hour; or"

          2.   "60% at any time."

     B.   Other opacity standards may be stipulated in a plan approval or operating permit or other applicable regulation.

II.   Data Availability Requirements

     A.   Opacity monitoring systems are required by 25 Pa. Code §139.103 to meet at least one of the following minimum data availability requirements unless other data availability requirements are stipulated elsewhere:

          1.   At least 90% of the hours in each calendar month shall be valid hours as set forth in the quality assurance section of the Manual.

          2.   At least 95% of the hours in each calendar quarter shall be valid hours as set forth in the quality assurance section of the Manual.

     B.   Definitions and Clarifications

          1.   As defined in the Manual, a valid hourly average must contain at least 75 percent of the segments of the hour corresponding to the minimum required cycle time (for measurement) during which the process was operating.

          2.   Hours of process downtime and invalid hours caused by Department conducted audits (Level III or IV) will be considered valid hours for this purpose.

III.   Penalty Criteria

     A.   Emission Criteria

     In recognition of the potential for some excess emissions during soot blowing, start-up, shutdown, and minor malfunctions, some excess emission times will not be subject to penalty. Adjustments will be made in accordance with the following:

          1.   Up to 0.500% of the operating time in a quarter will be available to reduce excess emission times.

a.   Up to 15.00% of this adjustment time will be applied to the daily excess emissions of the 60% opacity standard. No more than 30 minutes of adjustment may be applied to any day.

b.   The 85.00% of the adjustment time plus any remaining adjustment time from the 60% opacity adjustments will be applied to the daily excess emission times of the 20% opacity standard. No more than 2 hours of adjustment may be applied to any one day.

2.   After all adjustments in III.A.1 of this section are made, any remaining excess emission times are subject to penalty assessments.

B.   Invalid Data Criteria

Invalid data exceedances will be subject to penalty if more than 10.0% of the hours in any month are invalid <u>and</u> more than 5.00% of the hours in the quarter are invalid. If these criteria are met, only those months with more than 10.0% of invalid hours are considered for penalty assessment.

IV.   <u>Penalty Assessment</u>

A.   Emission Penalty

1.   The total daily penalty, E_d, is the sum of the daily penalties assessed for each of the two opacity standards:

$$E_d = E_{20} + E_{60}$$

a.   For each hour, the excess time when the opacity is between 20% and 100% inclusive, t_{20}, is considered for penalty assessment. The total daily excess time, T_{20}, is the sum of all t_{20}s in that day. That is:

$$T_{20} = \sum_{i=1}^{H_{20}} (t_{20})_i$$

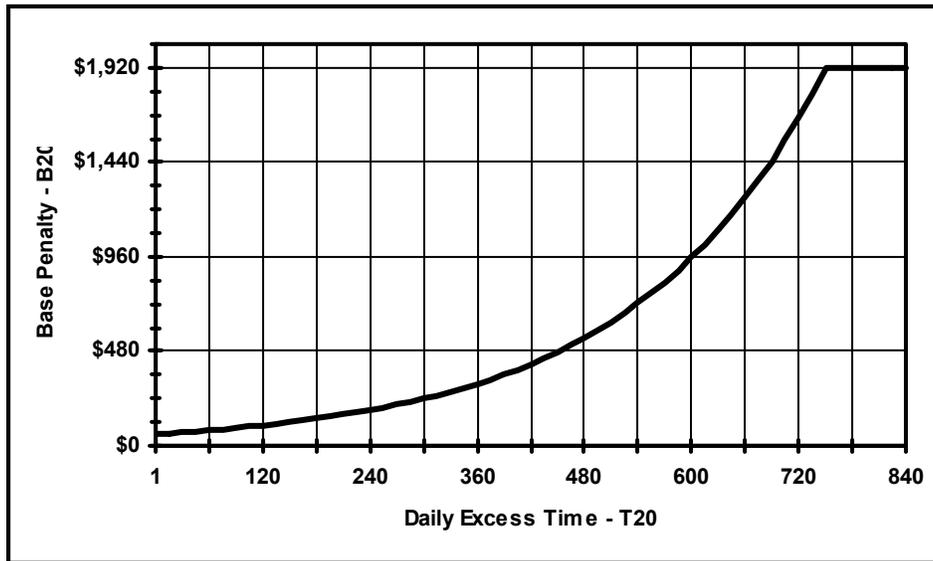Where: H_{20} = hours in the day when a 20% opacity exceedance occurred.

      t_{20} = minutes, in excess of the 3 allowed, in the ith hour when the opacity was between 20% and 100% inclusive.

i.   The base penalty, B_{20}, is determined from the following equation by this T_{20}:

$$B_{20} = \$60 \times 2^{\left(\frac{T_{20}-1}{150}\right)}$$

      up to a maximum of $1920 ($T_{20} \geq 751$ minutes)

Graphically that is:

ii. The source factor for size, F, is applied to this B_{20} to yield E_{20}:

$$E_{20} = F\ B_{20}$$

b. For each hour, the time when the opacity is between 60% and 100% inclusive, t_{60}, is considered for penalty assessment. The total daily time, T_{60}, is the sum of all t_{60}s in that day. That is:

$$T_{60} = \sum_{i=1}^{H_{60}} (t_{60})_i$$

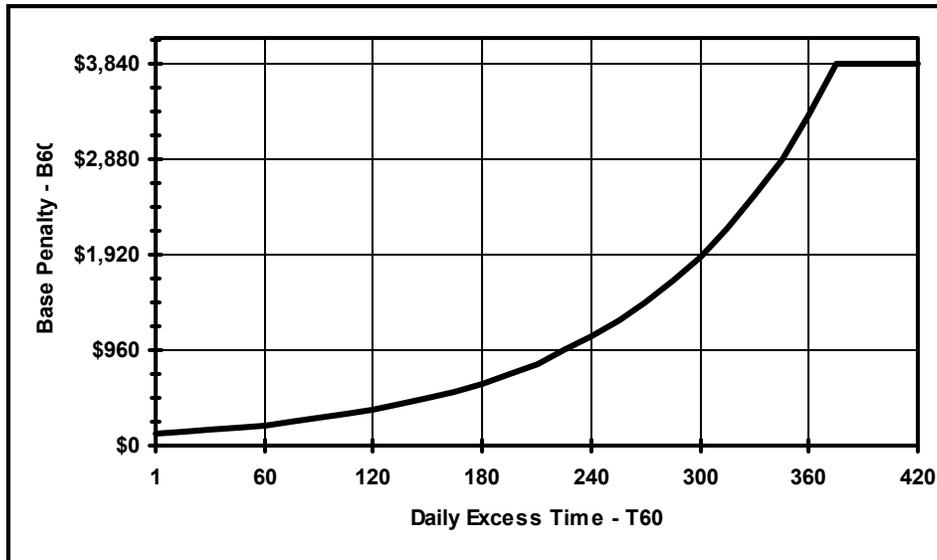Where: H_{60} = hours in the day when a 60% opacity exceedance occurred.

t_{60} = minutes in the ith hour when the opacity was between 60% and 100% inclusive.

i. The base penalty, B_{60}, is determined from the following equation by this T_{60}:

$$B_{60} = \$120 \times 2^{\left(\frac{T_{60} - 1}{75}\right)}$$ up to a maximum of \$3840
($T_{60} \geq 376$ minutes)

Graphically that is:

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ii.   The source factor for size, F, is applied to this B_{60} to yield E_{60}:

$$E_{60} = F\ B_{60}$$

2.   Penalty Adjustments (for III.A above)

After all E_{60} and E_{20} penalties have been calculated for the quarter, penalty adjustments are made by first adjusting the T_{60} and T_{20} times according to the techniques below. Adjusted penalties are then calculated using the adjusted T_{60} and T_{20} values.

If during any adjustment, the adjusted penalty is unchanged (i.e. the original excess time is too high for the limited adjustment time to make any differences), the excess time for that day is not adjusted. That is, adjustment times are only applied when the resulting adjusted penalty is reduced.

The total 0.500% adjustment time in minutes, A, is given by:

$$A = \frac{0.500}{100}\ (n \times 24 - H_D)\ 60$$

Where: n = days in the quarter, and
              H_D = hours of process down in the quarter.

a.   Adjustment technique for T_{60}s

The 15% adjustment time available, A_{60}, is given by:

$$A_{60} = \frac{15.00}{100}\ A$$

Adjustments will be made beginning with the first T_{60} value in the quarter and will continue chronologically until either the entire adjustment time, A_{60}, is used or there are no more T_{60}s to adjust. The 30-minute daily limit applies to all T_{60} adjustments.

b.   Adjustment technique for T_{20}s

The adjustment time available, A_{20}, is given by:

$$A_{20} = \frac{85.00}{100} A + A'_{60}$$

Where: A'_{60} = any remaining A_{60} after adjusting all T_{60}s.

Adjustments are made beginning with the first T_{20} value in the quarter and will continue chronologically until either all available adjustment time, A_{20}, is used or there are no more T_{20}s to adjust. The 120-minute daily limit applies to all T_{20} adjustments.

3.   The total quarterly emission penalty E_q is the sum of the daily penalties, E_d, for all days, n, in the quarter:

$$E_q = \sum_{d=1}^{n} E_d$$

B.   Invalid Data Penalties

For each month subject to penalty assessment as defined in the criterion in III.B of this section, N_m is the number of invalid hours in excess of the 10% allowed. The sum of N_ms for all such months, M, in the quarter is the penalty index sum, N_q:
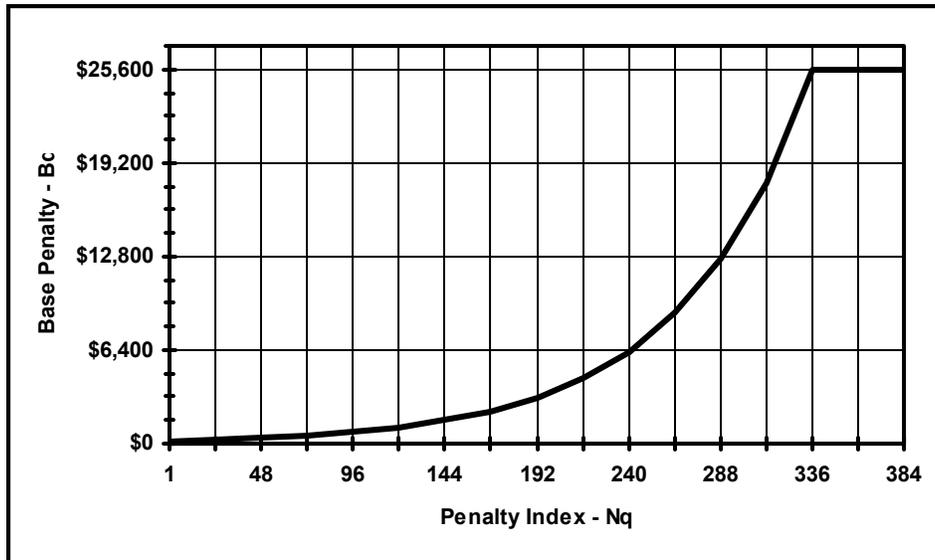
$$N_q = \sum_{m=1}^{M} N_m$$

1.   The quarterly invalid data base penalty, B_q, is determined from the following equation by this total penalty index, N_q:

$$B_q = \$200 \times 2^{\left(\frac{N_q - 1}{48}\right)}$$ up to a maximum of \$25,600
$$(N_q \geq 337)$$

Graphically that is:

Base Penalty - Bc

$25,600

$19,200

$12,800

$6,400

$0

1   48   96   144   192   240   288   336   384

Penalty Index - Nq

2.   The source factor for size, F, is applied to this B_q to yield the total invalid data penalty, V_q:

$$V_q = F\,B_q$$

C.   The total opacity quarterly penalty, P_q, is the sum of the emission and invalid data penalties:

$$P_q = E_q + V_q$$

APPENDIX

CEMS QUARTERLY REPORT CODING CLARIFICATIONS FOR COMBUSTION UNITS

Code definitions:

Starting up (03)
The period of increasing fuel firing commencing at the start-up air flow level and ending when the unit reaches the minimum sustainable load.

Shutting down (04)
The period of declining fuel firing commencing at the minimum sustainable load and ending upon reaching the start-up air flow.

Process Down (13)
Used for hours when the process is not operating AND the pollutant is not being emitted. For opacity, the process is considered down when the source is not operating and the air flow is less than needed for startup of the source. For SO_2, the process is considered down when no sulfur-bearing fuel is being burned. For NO_x, the process is considered down when no combustion is occurring.

DEP Conducted Audit (22)

Invalid time caused by a Level III or IV audit of the CEMS conducted by DEP.

Note: Should unusual location conditions create interpretive problems using these codes, the appropriate regional office should be contacted for resolution assistance.

Term definitions:

Start-up Air
The air flow typically established in the unit just prior to ignition of the first fuel fired.

Minimum Sustainable Load
The minimum load at which a unit can be operated over an extended period of time.