Engineer JOHN STANDARD
Date 3/28/79

Reviewer
Date

Approved: Chief, Engineering
Investigation Section J. Kutchu
Date 1/30/79

CHECKLIST SUPPORTING

FINDINGS OF VIOLATION

I. BACKGROUND

A. Name

CATERPILLAR TRACTOR COMPANY - JOLIET PLANT

B. Plant Location, State, County

P.O. BOX 504
JOLIET, ILLINOIS - WILL COUNTY

C. Description of Violating Source(s)

(1) BOILER #2 - COAL FIRED - 100 MMBTU/HR, ACTUAL HEAT INPUT.
(2) BOILER #3 - COAL FIRED - 125 MMBTU/HR, ACTUAL HEAT INPUT.

D. Pollutant and Applicable Rule

PARTICULATES - ILL. RULE 203 (g)(1)(A), BOTH BOILERS

E. Ambient Air Status (Attainment, Non Attainment, Unclassified)

NON ATTAINMENT

F. Name, Title and Address of Plant Manager and Corporation President

W. O'DONOHUE
PLANT ENGINEER
P.O. BOX 504
JOLIET, ILLINOIS 60434

ROBERT GILMORE
PRESIDENT
CATERPILLAR TRACTOR
100 N.E. ADAMS
PEORIA, ILLINOIS
61629

II. EMISSION CALCULATIONS

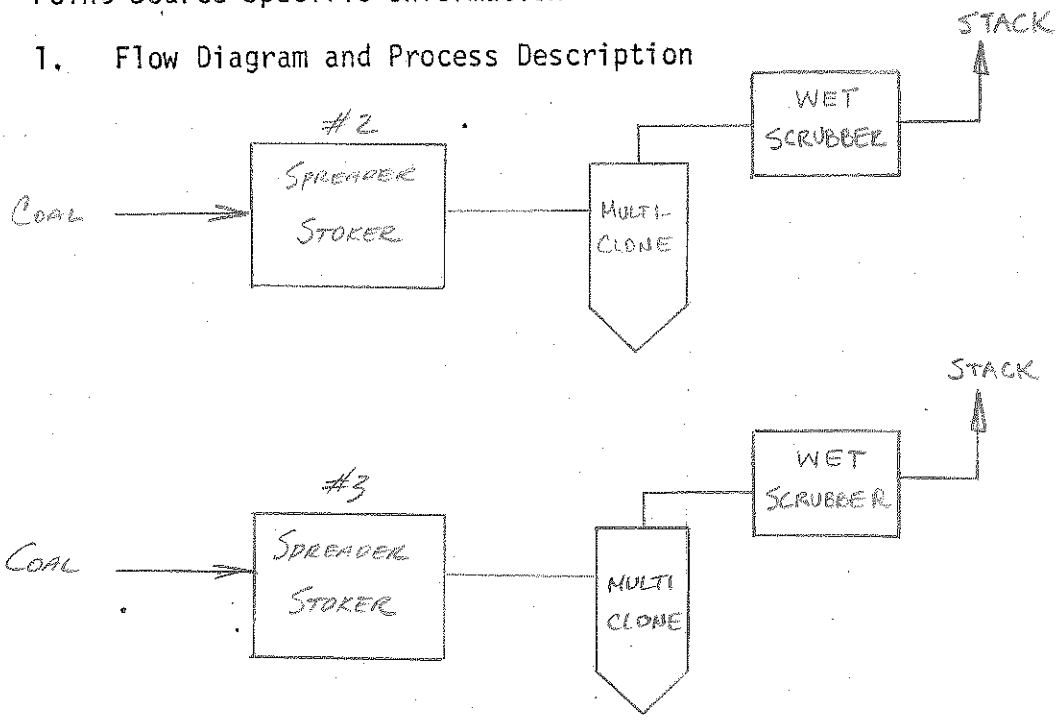
A. Summary

Point Source	Rule	Emissions (Units of Rule) $\left[\frac{Lb}{MMBTU}\right]$ Actual	Allowed	Emissions T/Y Actual	Allowed
BOILER #2	203(g)(1)(A)	0.155	0.1	15.0	9.7
BOILER #3	203(g)(1)(A)	0.188	0.1	19.7	10.5
				34.7	20.2

Note: Above emissions based on stack test data of March 29 and 30, 1977.

B. Point Source Specific Information

1. Flow Diagram and Process Description



2. Photographs

NONE

3. Calculations of Mass Rate Violation (Based on 114 data and emission factor.)

a. Summary of Process Data
(e.g., process weight rate, gas flow rate, emission concentrations, gas conditions, emission factor)

Boiler #2

spreader stoker unit

bituminous coal: consumption = 9267 $\frac{Tc}{yr}$

heat content = 21.6 $\frac{MMBTU}{Tc}$

ash content = 10.1%

Air cleaning equipment: 96.5% operating efficiency.

Emission factor (Table 1.1-2, AP-42) = 13 A $\frac{lb_p}{Tc}$

Boiler #3

spreader stoker unit

bituminous coal: consumption = 9762 $\frac{Tc}{yr}$

heat content = 21.6 $\frac{MMBTU}{Tc}$

ash content = 10.1%

air cleaning equipment: 96.5% operating efficiency.

Emission factor (Table 1.1-2, AP-42) = 13 A $\frac{lb_p}{Tc}$

b. Calculation of Actual Emissions (Units of Rule and Tons/Year)

Boiler #2

$$E_p = 13(10.1)\frac{lb_p}{Tc} \times 21.6\frac{Tc}{MMBTU} \times (1 - 0.965) = 0.21\frac{lb_p}{MMBTU}$$

$$\frac{Tp}{yr} = 0.21\frac{lb_p}{MMBTU} \times 21.6\frac{MMBTU}{Tc} \times 9267\frac{Tc}{yr} \times \frac{Tp}{2000\,lb_p} = 21.0\frac{Tp}{yr}$$

Boiler #3

$$E_p = 13(10.1)\frac{lb_p}{T_c} \times \frac{T_c}{21.6\ MMBTU} \times (1-0.965) = 0.21\ \frac{lb_p}{MMBTU}$$

$$\frac{T_p}{yr} = 0.21\ \frac{lb_p}{MMBTU} \times 21.6\ \frac{MMBTU}{T_c} \times 9762\ \frac{T_c}{yr} \times \frac{T_p}{2000\ lb_p} = 22.1\ \frac{T_p}{yr}$$

c. Calculation of Allowable Emissions

Illinois Rule 203(g)(1)(A):

Allowable emissions $= 0.1\ \frac{lb_p}{MMBTU}$

Boiler #2

$$0.1\ \frac{lb_p}{MMBTU} \times 21.6\ \frac{MMBTU}{T_c} \times 9267\ \frac{T_c}{yr} \times \frac{T_p}{2000\ lb_p} = 10.0\ T/yr$$

Boiler #3

$$0.1\ \frac{lb_p}{MMBTU} \times 21.6\ \frac{MMBTU}{T_c} \times 9762\ \frac{T_c}{yr} \times \frac{T_p}{2000\ lb_p} = 10.5\ T/yr$$

ADDITIONAL CALCULATIONS

Annual Particulate Emissions based on stack tests of March 29 and 30, 1977.

Boiler #2

Heat content = 10,435 $\frac{BTU}{lb_c}$ (Avg. 3 tests)

$$10435 \frac{BTU}{lb_c} \times \frac{2000\ lb_c}{T_c} \times \frac{MMBTU}{10^6 BTU} = 20.87 \frac{MMBTU}{T_c}$$

$$\text{Actual Emissions} = 0.155 \frac{lb_p}{MMBTU} \times 20.87 \frac{MMBTU}{T_c} \times 9267 \frac{T_c}{yr} \times \frac{T_p}{2000\ lb_p} = 15.0 \frac{T_p}{yr}$$

$$\text{Allowable Emissions} = 15.0 \times \frac{0.1}{0.155} = 9.7 \frac{T_p}{yr}$$

Boiler #3

Heat content = 10,722 $\frac{BTU}{lb_c}$ (Avg. 2 tests)

$$10,722 \frac{BTU}{lb_c} \times 2000 \frac{lb_c}{T_c} \times \frac{MMBTU}{10^6 BTU} = 21.44 \frac{MMBTU}{T_c}$$

$$\text{Actual Emissions} = 0.188 \frac{lb_p}{MMBTU} \times 21.44 \frac{MMBTU}{T_c} \times 9762 \frac{T_c}{yr} \times \frac{T_p}{2000\ lb_p} = 19.7 \frac{T_p}{yr}$$

$$\text{Allowable Emissions} = 19.7 \times \frac{0.1}{0.188} = 10.5 \frac{T_p}{yr}$$

d. Summary of Stack Test Data

Boiler #2

Particulate Emissions = 0.155 $\frac{lb}{MMBTU}$ (Avg. 3 tests)

Boiler #3

Particulate Emissions = 0.188 $\frac{lb}{MMBTU}$ (Avg. 2 tests)

e. Problems with Data or Emission Factor or Stack Tests

Major problem is that the Illinois Supreme Court has held Rule 203(g)(1) to be unenforceable by the State Agency. Further, there is a federal decision that casts doubt on the enforceability by the federal government. In other words, there are no applicable reqs, at this time.

4. Summary of Visible Emission Violation

a. Rule

ILLINOIS RULE 203(b)

b. Summary of Observations

Boilers #2 and #3 both in compliance based on V.E. report by S&A (11/7/78).

c. Problems with Data

None

d. Pertinent O&M Observations

None

e. Supplementary Data from Local/State Agencies

attached

III. REMEDIES

A. Appropriate Control Systems

Collection efficiency of air cleaning equipment on boilers 2 and 3 is given as 96.5%. Based on stack test data, the required collection efficiency for boiler #2 is 97.7% and 98.1% for boiler #3. Replacing the multiclones with ESP's should give required efficiency.

1. Acceptable Control Alternatives

The possibility of increasing the efficiency of the existing system should be investigated. An example would be increasing the pressure drop across the multiclones to the maximum design value, if possible. However, operating and maintenance costs should be considered.

2. System Proposed by Source (evaluation of proposal)

Dave Beck of Caterpillar feels that a considerable amt. of particulate mass is due to scrubber carryover and generation of sulfuric acid mist. Baghouse is under construction followed by SO_2 absorber.

3. Approximate Cost of Compliance

To be calculated at later date.

4. Anticipated Siting Problems

According to Dave Beck of Caterpillar, there would be siting problems replacing the multiclones with ESP's due to lack of available space.

5. Likelihood of Meeting Deadline for DCO

N/A

A. History

1. Federal Contacts with Source (attach telephone memo)

2. Federal Contacts with State and Local Agencies

a. Is this source on a State or Local Compliance Schedule?
No. Since regs. are unenforceable. Permits have been denied for Boilers #2 and #3.

- does it require compliance by date certain?

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- does the order provide for milestone dates?

—

- do you believe that installation of the proposed control system can result in compliance?

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- does it require continuous monitoring?

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b. Is the State/Local Agency negotiating with this source?

No

c. Has the State/Local Agency filed suit?

No

IV. PRELIMINARY WITNESS LIST

JOHN STANDARD - USEPA Region V

V. ATTACHMENTS

A. Trip Reports (including process description, observations, recommentations)

none

B. Stack Tests with S&A Evaluation

attached

C. V.E. Observation Reports

attached

D. 114 Response

attached

E. Telephone Memos

none

F. Other Information Relevant to Finds.

none