11 APR 1989

Visible Emissions Observation at Chemetco
Foundry, Hartford, Illinois (AFH114:HI)

Gerald R. Golubski, Environmental Engineer
Central District Office (5SCDO)

Engineering Section (5AC)
ATTN: Sharon Freeman (5AC)

THRU: Willie H. Harris, Chief
Central District Office (5SCDO)

On March 10, 1989, visible emissions observations were made off-site at the subject facility. This inspection is pursuant to Mr. John Gaitskill's request (priority 2-49-89) for inspections during this FY. Prior to arriving at Chemetco, a brief meeting was held that morning at the Illinois EPA's Collinsville office. Attending were Messrs. Jeff Benkenek and John Justice of the Illinois EPA. A background review of the facility was completed. Also discussed were ideal locations for Method 9 observations. Due to sun positioning, it appeared that visible emissions observations could be made before noon on the East side of the foundry and afternoon the West side of the foundry could be read.

Two hours of uninterrupted visible emissions from the East side of the roof top monitor was taken and one hour of visible emissions were taken on the West end of the roof top monitor that day. Since these observations were made off-site the facility operators were not contacted.

Morning Observation

Beginning at 10:00 a.m., two hours of continuous visible emissions observations were made on a plume derived from the roof top monitor. It should noted, I read only the visible emissions from the roof top monitor, and not a mixed plume from the stacks.

As indicated in the attached V.E. forms, significant plume opacity (>70%) occurred between 10:45 a.m. to 11:00 p.m. and again between approximately 11:30 a.m. till Noon. Also, evident were visible emissions from the four stacks above the roofline. However, no visible emissions from the stacks were recorded on an evaluation form, since they appeared to be non-continuous and emitted significantly less emissions than the roof top monitor.

Afternoon Observations

Beginning at 12:45 p.m. one hour of visible emissions from the West side of the foundry were made. Approximately 15 minutes of significant emissions (>70%) were observed. As noted in the attached visible emissions forms, both high opacity black and white smoke emissions were present. Due to a rising plume from the rooftop monitor it was difficult to obtain meaningful visible emissions readings on the four stacks.

During the afternoon observation, it was witnessed by me that a high level of trucking activity was occurring. Every several minutes, trucks were entering and leaving the foundry. Moreover, several truck loads of copper molds were transported off-site, on flat bed trucks during the time of this one hour observation. I was apparently reported by these truckers to the facility's security staff, who then immediately drove across the street to question me about my reasons for observing their facility. I identified myself as a U.S. EPA inspector, and they immediately returned to the plant.

If you have any questions concerning this inspection report, please call me at 886-1968.

Attachments

5SCDO:GGOLUBSKI:gw:3-28-89:DISK T:FINAL

GG
3/29/89.

WAW 4/11

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, Hartford ILLINOIS

Source: Roof TOP MONITOR

Regulation: Illinois

Evaluator's Report

On MARCH 10, 1989, visible emission evaluation began at 12:40pm, and continued for 60 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 1 | 12:40 - 12:45 | 78.75 | 1 | 23 |
| 2 | 12:46 - 12:51 | 27.08 | 4 | 3 |
| 3 | 12:52 - 12:57 | 19.58 | 0 | 0 |
| 4 | 12:58 - 1:03 | 15.41 | 3 | 0 |
| 5 | 1:04 - 1:09 | 52.08 | 2 | 11 |
| 6 | 1:10 - 1:15 | 7.08 | 0 | 0 |
| 7 | 1:16 - 1:21 | 3.95 | 0 | 0 |
| 8 | 1:22 - 1:27 | 31.87 | 2 | 5 |
| 9 | 1:28 - 1:33 | 13.54 | 1 | 0 |
| 10 | 1:34 - 1:39 | 10.00 | 0 | 0 |

Readings ranged from 0 to 100 % opacity.

Meteorological Conditions: Cloud Cover CLEAR.

Ambient Temperature 45 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golabski

Name: GERALD R. GOLABSKI

Title: ENVIRONMENTAL ENGINEER.

Office: US EPA - REGION V - ESD/CDD

Date of Last Certification: OCT. 11, 1988

Initials of person who summarized data:

# VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility: CHEMETCO, Hartford, Illinois

DATE: MARCH 10, 1989

Observer: G. GOLUBSKI

Source: Roof Top monitor

Observation Point: ON highway 3 S.W. of plant

Distance From: ~~200~~ FT (400 FT)

Direction From: S.W.

Source Height: 60 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | Southerly 10-15 mph | Same |
| Wind Speed | " " | |
| Sky condition | Clear | |
| Background | Blue Sky | |
| Ambient Temperature °F | 45 | |
| Humidity (high-low) | Low | |
| Color of Emissions | White/Black Smoke | |
| Reading Conditions | Good | |

Plant Representatives: NONE

State/Local Agency Representatives: NONE

Observation Began 12:40 pm Ended 1:40 pm (T)

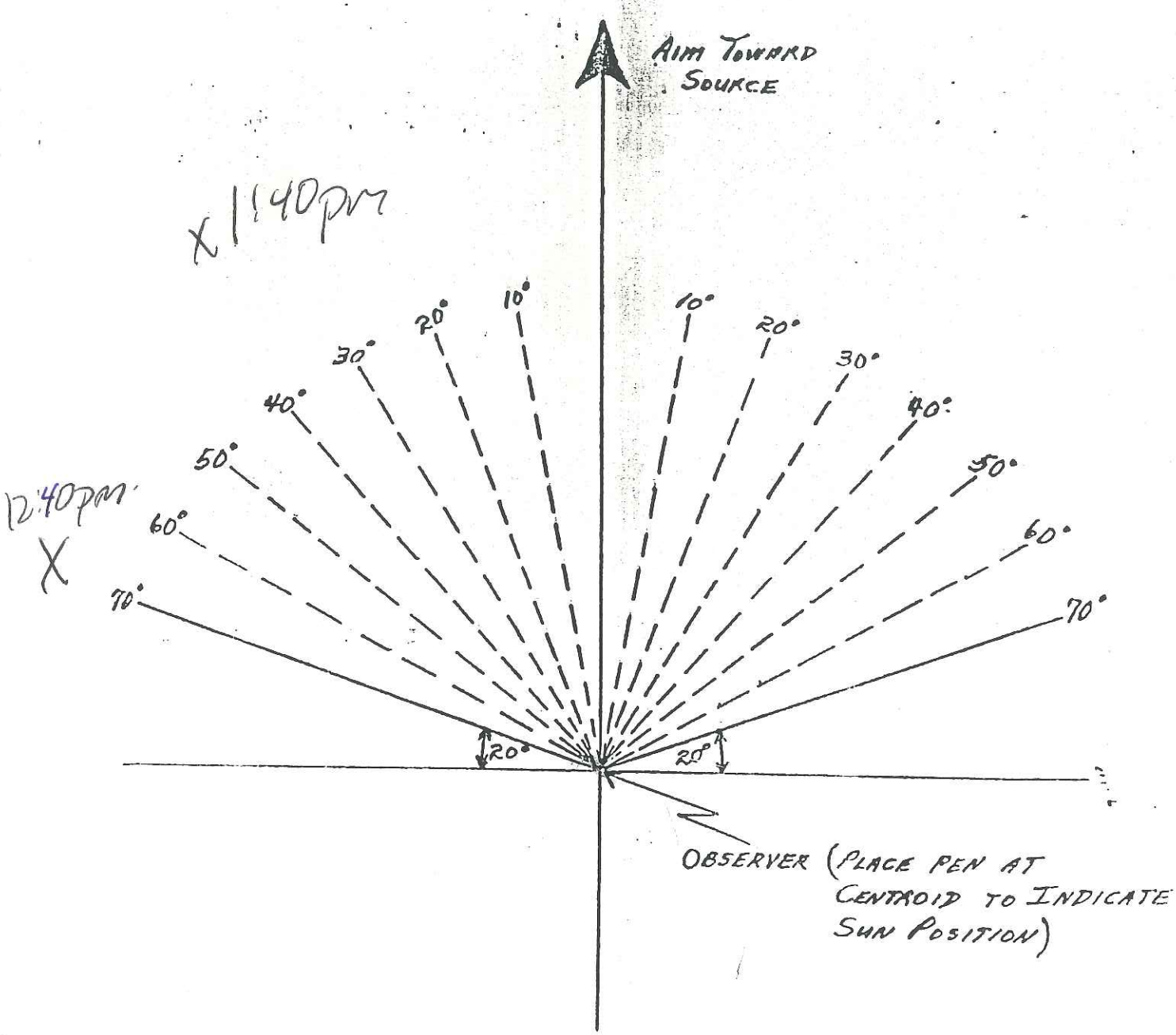
Remarks: INTERMITTANT VISIBLE EMISSIONS from four STACKS NEXT TO Roof TOP MONITOR

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 80 | 80 | 80 | 80 | White | 30 | 10 | 10 | 10 | 10 | |
| 1 | 80 | 80 | 80 | 80 | Smoke | 31 | 10 | 10 | 10 | 10 | |
| 2 | 80 | 80 | 80 | 80 | ← | 32 | 10 | 5 | 5 | 10 | |
| 3 | 80 | 80 | 80 | 80 | | 33 | 5 | 5 | 5 | 5 | |
| 4 | 80 | 80 | 80 | 80 | | 34 | 5 | 5 | 5 | 5 | |
| 5 | 80 | 80 | 80 | 80 | | 35 | 5 | 5 | 5 | 5 | |
| 6 | 80 | 80 | 60 | 60 | | 36 | 5 | 5 | 5 | 5 | |
| 7 | 80 | 60 | 40 | 10 | | 37 | 5 | 5 | 5 | 5 | |
| 8 | 10 | 10 | 10 | 10 | | 38 | 5 | 5 | 5 | 5 | |
| 9 | 10 | 10 | 10 | 10 | | 39 | 5 | 5 | 5 | 5 | |
| 10 | 10 | 10 | 10 | 10 | | 40 | 5 | 5 | 5 | 0 | |
| 11 | 10 | 10 | 20 | 20 | | 41 | 0 | 0 | 0 | 0 | |
| 12 | 20 | 20 | 20 | 20 | | 42 | 0 | 100 | 100 | 100 | Black Smoke |
| 13 | 20 | 20 | 20 | 20 | | 43 | 100 | 80 | 60 | 40 | |
| 14 | 20 | 20 | 20 | 20 | | 44 | 20 | 10 | 5 | 5 | |
| 15 | 20 | 20 | 20 | 20 | | 45 | 5 | 5 | 5 | 5 | |
| 16 | 20 | 20 | 20 | 20 | | 46 | 5 | 10 | 10 | 20 | |
| 17 | 20 | 20 | 20 | 10 | | 47 | 20 | 20 | 20 | 20 | |
| 18 | 10 | 10 | 10 | 10 | | 48 | 20 | 40 | 30 | 30 | |
| 19 | 10 | 10 | 40 | 40 | | 49 | 20 | 10 | 10 | 20 | |
| 20 | 40 | 20 | 20 | 20 | | 50 | 10 | 10 | 10 | 10 | |
| 21 | 10 | 10 | 10 | 10 | | 51 | 10 | 10 | 10 | 10 | |
| 22 | 10 | 10 | 10 | 10 | | 52 | 10 | 10 | 5 | 5 | |
| 23 | 10 | 10 | 10 | 10 | | 53 | 5 | 10 | 10 | 10 | |
| 24 | 10 | 10 | 10 | 10 | | 54 | 10 | 10 | 10 | 10 | |
| 25 | 20 | 10 | 10 | 10 | | 55 | 10 | 10 | 10 | 10 | |
| 26 | 10 | 60 | 80 | 80 | Black | 56 | 10 | 10 | 10 | 10 | |
| 27 | 100 | 100 | 100 | 100 | Smoke ← | 57 | 10 | 10 | 10 | 10 | |
| 28 | 100 | 100 | 80 | 80 | | 58 | 10 | 10 | 10 | 10 | |
| 29 | 70 | 60 | 30 | 10 | End Black Smoke | 59 | 10 | 10 | 10 | 10 | |

Observer's Signature: Gerald R. Golubski

Last Certification Date: Oct. 11, 1988

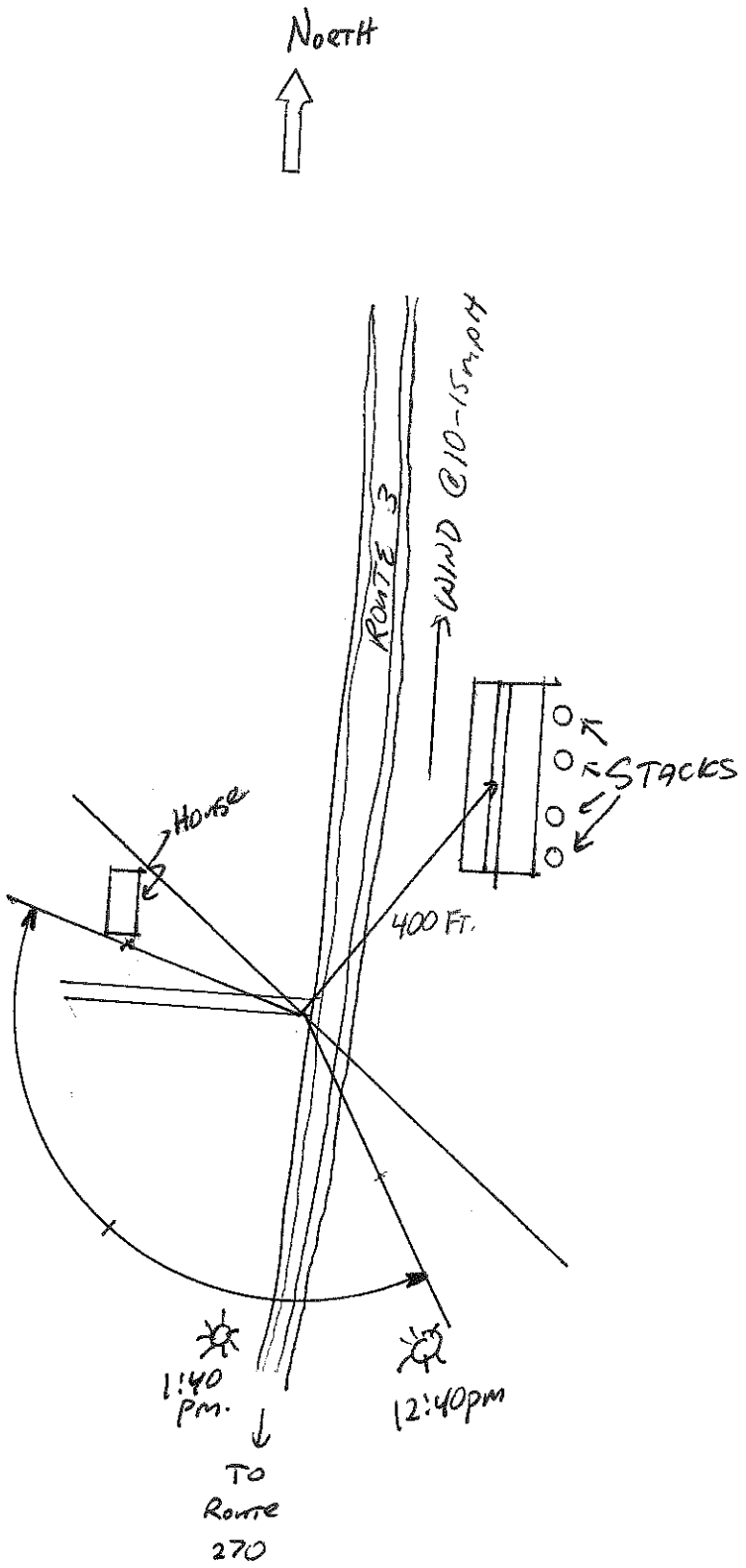
Observer's Affiliation: US EPA - Region V - ESD/CAD




CHEMETCO
HARTFORD, ILLINOIS

G. GOLUBSKI

MARCH, 10, 1989




CHEMETCO
MARCH 10, 1989
OBSERVER: G. GOLUBSKI
US EPA-REGION V

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, Hartford, ILLINOIS

Source: Roof top monitor

Regulation: Illinois

Evaluator's Report

On MARCH 10, 1989, visible emission evaluation began at 10:00 AM, and continued for 120 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 1 | 10:00 am - 10:05 | 42.91 | 11 | 2 |
| 2 | 10:06 - 10:11 | 24.16 | 4 | 0 |
| 3 | 10:12 - 10:17 | 43.33 | 7 | 4 |
| 4 | 10:18 - 10:23 | 28.75 | 5 | 1 |
| 5 | 10:24 - 10:29 | 22.91 | 1 | 0 |
| 6 | 10:30 - 10:35 | 42.08 | 15 | 0 |
| 7 | 10:36 - 10:41 | 49.17 | 9 | 7 |
| 8 | 10:42 - 10:47 | 57.91 | 3 | 11 |
| 9 | 10:48 - 10:53 | 76.67 | 8 | 16 |
| 10 | 10:54 - 10:59 | 68.75 | 3 | 21 |

Readings ranged from 10 to 100 % opacity.

Meteorological Conditions: Cloud Cover CLEAR.

Ambient Temperature 40 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - REGION V - ESD/CDO

Date of Last Certification: Oct. 11, 1988

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility: CHEMETCO
HARTFORD, ILLINOIS

Date: MARCH 10, 1989
Observer: G. GOLUBSKI

Source: ROOF TOP MONITOR

Observation Point: ON ROADWAY SOUTHEAST OF PLANT

Distance From: 2600 FT
Direction From: SE.
Source Height: 60 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | SOUTHERLY | SAME |
| Wind Speed | 10-15 MPH | |
| Sky condition | BLUE SKY-CLEAR | |
| Background | BLUE SKY | |
| Ambient Temperature °F | 40 | |
| Humidity (high-low) | LOW | |
| Color of Emissions | WHITE | |
| Reading Conditions | GOOD | ✓ |

Plant Representatives:
NONE

State/Local Agency Representatives:
NONE

Observation
Began 10:00 AM Ended 11:00 AM
( T)

Remarks:
NOTE: VISIBLE EMISSIONS WERE ALSO EVIDENT FROM ALL FOUR STACKS NEXT TO ROOF MONITOR.

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 60 | 60 | 60 | 60 | | 30 | 30 | 40 | 40 | 40 | |
| 1 | 60 | 70 | 70 | 60 | | 31 | 40 | 40 | 50 | 50 | |
| 2 | 60 | 60 | 60 | 60 | | 32 | 40 | 30 | 30 | 30 | |
| 3 | 40 | 30 | 30 | 30 | | 33 | 30 | 20 | 30 | 30 | |
| 4 | 20 | 20 | 20 | 20 | | 34 | 30 | 50 | 60 | 60 | |
| 5 | 20 | 20 | 20 | 20 | | 35 | 60 | 60 | 60 | 60 | |
| 6 | 20 | 20 | 20 | 20 | | 36 | 60 | 60 | 60 | 70 | |
| 7 | 20 | 20 | 20 | 20 | | 37 | 60 | 60 | 40 | 40 | |
| 8 | 20 | 20 | 20 | 10 | | 38 | 30 | 30 | 20 | 10 | |
| 9 | 10 | 10 | 10 | 10 | BLACK SMOKE → | 39 | 10 | 60 | 60 | 80 | |
| 10 | 20 | 20 | 20 | 20 | | 40 | 80 | 80 | 80 | 70 | |
| 11 | 50 | 60 | 60 | 60 | | 41 | 70 | 30 | 10 | 10 | |
| 12 | 60 | 60 | 80 | 60 | | 42 | 10 | 10 | 10 | 10 | |
| 13 | 20 | 20 | 20 | 20 | | 43 | 20 | 20 | 20 | 20 | |
| 14 | 20 | 20 | 20 | 20 | | 44 | 20 | 40 | 60 | 60 | |
| 15 | 20 | 20 | 20 | 60 | WHITE SMOKE | 45 | 80 | 90 | 90 | 90 | |
| 16 | 60 | 80 | 80 | 80 | → | 46 | 100 | 80 | 100 | 100 | |
| 17 | 60 | 60 | 40 | 40 | | 47 | 90 | 90 | 90 | 90 | |
| 18 | 40 | 40 | 60 | 80 | | 48 | 90 | 90 | 90 | 90 | |
| 19 | 60 | 30 | 30 | 30 | | 49 | 100 | 90 | 90 | 80 | |
| 20 | 30 | 30 | 30 | 20 | | 50 | 80 | 80 | 80 | 80 | |
| 21 | 20 | 40 | 30 | 30 | | 51 | 80 | 80 | 80 | 60 | |
| 22 | 10 | 10 | 10 | 10 | | 52 | 60 | 60 | 60 | 80 | |
| 23 | 10 | 20 | 10 | 10 | | 53 | 60 | 60 | 60 | 60 | |
| 24 | 20 | 20 | 20 | 20 | | 54 | 70 | 70 | 70 | 70 | |
| 25 | 20 | 20 | 20 | 20 | | 55 | 70 | 70 | 80 | 80 | |
| 26 | 20 | 20 | 20 | 20 | | 56 | 80 | 70 | 70 | 70 | |
| 27 | 10 | 20 | 20 | 30 | | 57 | 70 | 70 | 70 | 70 | |
| 28 | 30 | 30 | 20 | 20 | | 58 | 70 | 70 | 80 | 80 | |
| 29 | 40 | 30 | 30 | 30 | | 59 | 80 | 40 | 40 | 40 | |

Observer's Signature: Gerald R. Golubski
Last Certification Date: OCT. 11, 1988
Observer's Affiliation: US EPA - REGION V - ESD/QQO

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, Hartford, ILLINOIS

Source: Roof Top monitor

Regulation: Illinois

Evaluator's Report

On MARCH 10, 1989, visible emission evaluation began at 10:00 AM, and continued for 120 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 11 | 11:00 - 11:05 | 42.91 | 11 | 2 |
| 12 | 11:06 - 11:11 | 24.16 | 4 | 0 |
| 13 | 11:12 - 11:17 | 43.33 | 9 | 4 |
| 14 | 11:18 - 11:23 | 28.75 | 5 | 1 |
| 15 | 11:24 - 11:29 | 22.91 | 0 | 0 |
| 16 | 11:30 - 11:35 | 42.08 | 15 | 0 |
| 17 | 11:36 - 11:41 | 49.16 | 9 | 7 |
| 18 | 11:42 - 11:47 | 57.91 | 3 | 12 |
| 19 | 11:48 - 11:53 | 76.67 | 8 | 16 |
| 20 | 11:54 - 11:59 | 68.75 | 3 | 21 |

Readings ranged from 10 to 100 % opacity.

Meteorological Conditions: Cloud Cover CLEAR.

Ambient Temperature 40 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - REGION V - ESD/CDO

Date of Last Certification: OCT. 11, 1988

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility CHEMETCO
Hartford, ILLINOIS

DATE: MARCH 10, 1989
Observer: G. GOLUBSKI

Source: ROOF TOP MONITOR

Observation Point: ON ROADWAY SOUTHEAST of PLANT

Distance From: 2600 FT.
Direction From: S.E.
Source Height: 60 FT.

| | Initial | Final |
|---|---|---|
| Wind Direction | Southerly | SAME |
| Wind Speed | 10-15 MPH | |
| Sky Condition | CLEAR. | |
| Background | Blue Sky | |
| Ambient Temperature °F | 40 | |
| Humidity (high-low) | LOW | |
| Color of Emissions | White | |
| Reading Conditions | GOOD | |

Plant Representatives:
NONE

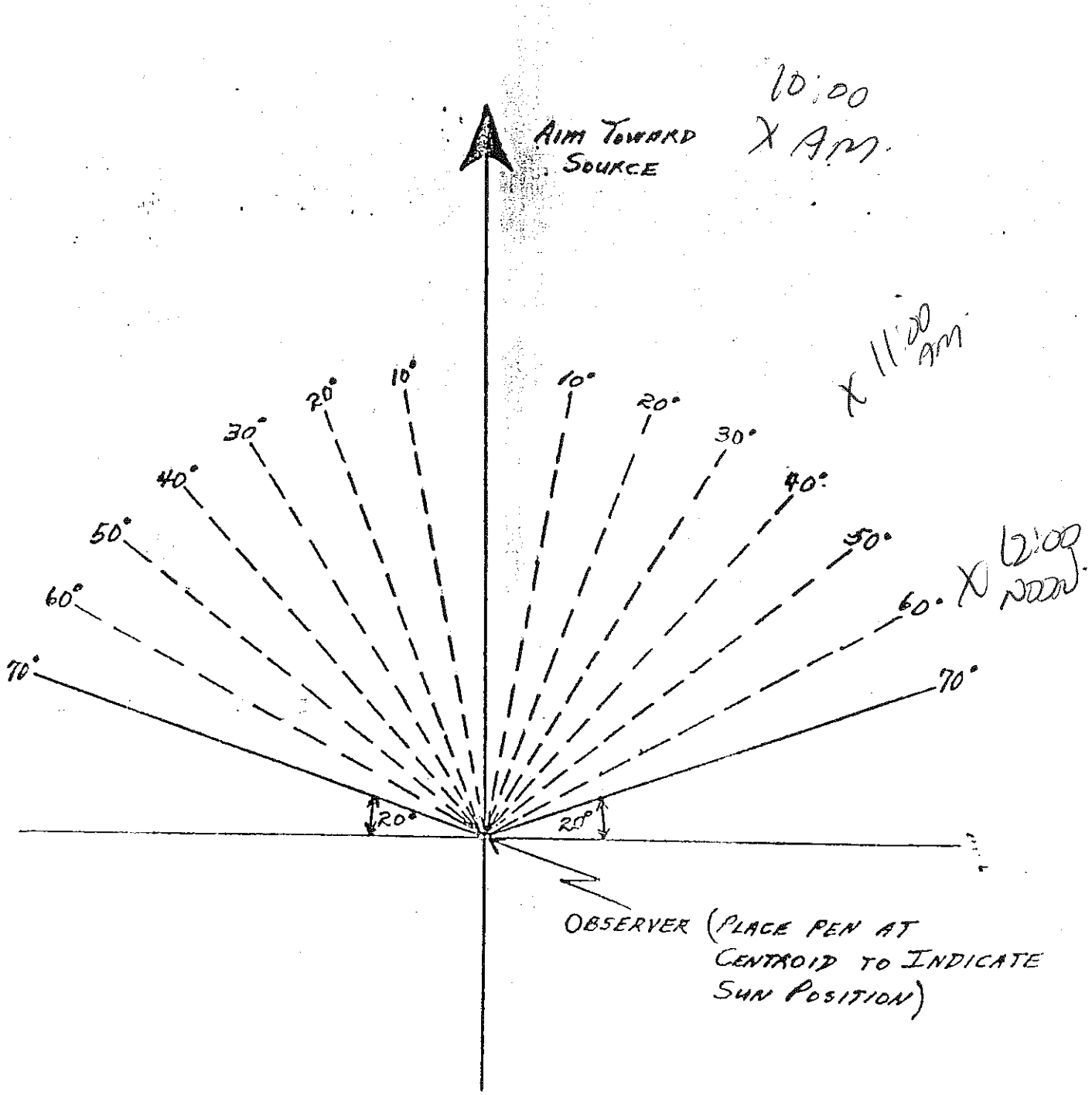
State/Local Agency Representatives:
NONE

Observation
Began 11:00 am Ended 12:00 noon
( T)

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 60 | 60 | 60 | 70 | | 30 | 10 | 10 | 10 | 10 | |
| 1 | 70 | 40 | 40 | 50 | White Smoke | 31 | 30 | 50 | 70 | 70 | |
| 2 | 40 | 40 | 40 | 60 | → | 32 | 70 | 80 | 80 | 80 | |
| 3 | 60 | 70 | 60 | 70 | | 33 | 80 | 80 | 80 | 80 | |
| 4 | 70 | 70 | 40 | 20 | | 34 | 80 | 80 | 90 | 90 | |
| 5 | 20 | 10 | 10 | 10 | | 35 | 100 | 100 | 100 | 100 | |
| 6 | 10 | 10 | 10 | 10 | | 36 | 100 | 100 | 100 | 100 | |
| 7 | 10 | 10 | 10 | 10 | | 37 | 80 | 80 | 80 | 80 | |
| 8 | 10 | 10 | 10 | 10 | | 38 | 90 | 90 | 90 | 90 | |
| 9 | 40 | 50 | 50 | 50 | | 39 | 90 | 90 | 90 | 90 | |
| 10 | 50 | 40 | 40 | 70 | | 40 | 90 | 90 | 90 | 90 | |
| 11 | 70 | 60 | 50 | 50 | | 41 | 90 | 100 | 90 | 100 | |
| 12 | 40 | 40 | 30 | 30 | | 42 | 90 | 90 | 100 | 90 | |
| 13 | 30 | 30 | 30 | 30 | | 43 | 90 | 90 | 90 | 90 | |
| 14 | 20 | 20 | 10 | 10 | | 44 | 90 | 100 | 100 | 100 | |
| 15 | 10 | 10 | 10 | 10 | | 45 | 100 | 100 | 100 | 100 | |
| 16 | 20 | 20 | 10 | 10 | | 46 | 100 | 100 | 100 | 100 | |
| 17 | 20 | 20 | 20 | 20 | | 47 | 100 | 100 | 100 | 100 | |
| 18 | 20 | 30 | 30 | 30 | | 48 | 100 | 90 | 90 | 90 | |
| 19 | 20 | 20 | 30 | 30 | | 49 | 100 | 100 | 100 | 100 | |
| 20 | 30 | 30 | 30 | 30 | | 50 | 100 | 90 | 90 | 90 | |
| 21 | 30 | 30 | 30 | 40 | | 51 | 100 | 100 | 100 | 90 | |
| 22 | 20 | 20 | 20 | 40 | | 52 | 90 | 90 | 90 | 90 | |
| 23 | 40 | 30 | 30 | 30 | | 53 | 90 | 90 | 90 | 100 | |
| 24 | 30 | 30 | 40 | 40 | | 54 | 100 | 90 | 90 | 100 | |
| 25 | 30 | 30 | 30 | 100 | BLACK | 55 | 100 | 100 | 90 | 90 | |
| 26 | 100 | 90 | 90 | 90 | ← SMOKE | 56 | 90 | 90 | 90 | 90 | |
| 27 | 80 | 80 | 70 | 50 | | 57 | 90 | 100 | 100 | 90 | |
| 28 | 50 | 30 | 20 | 10 | | 58 | 90 | 90 | 90 | 90 | |
| 29 | 10 | 10 | 10 | 10 | | 59 | 60 | 30 | 20 | 20 | |

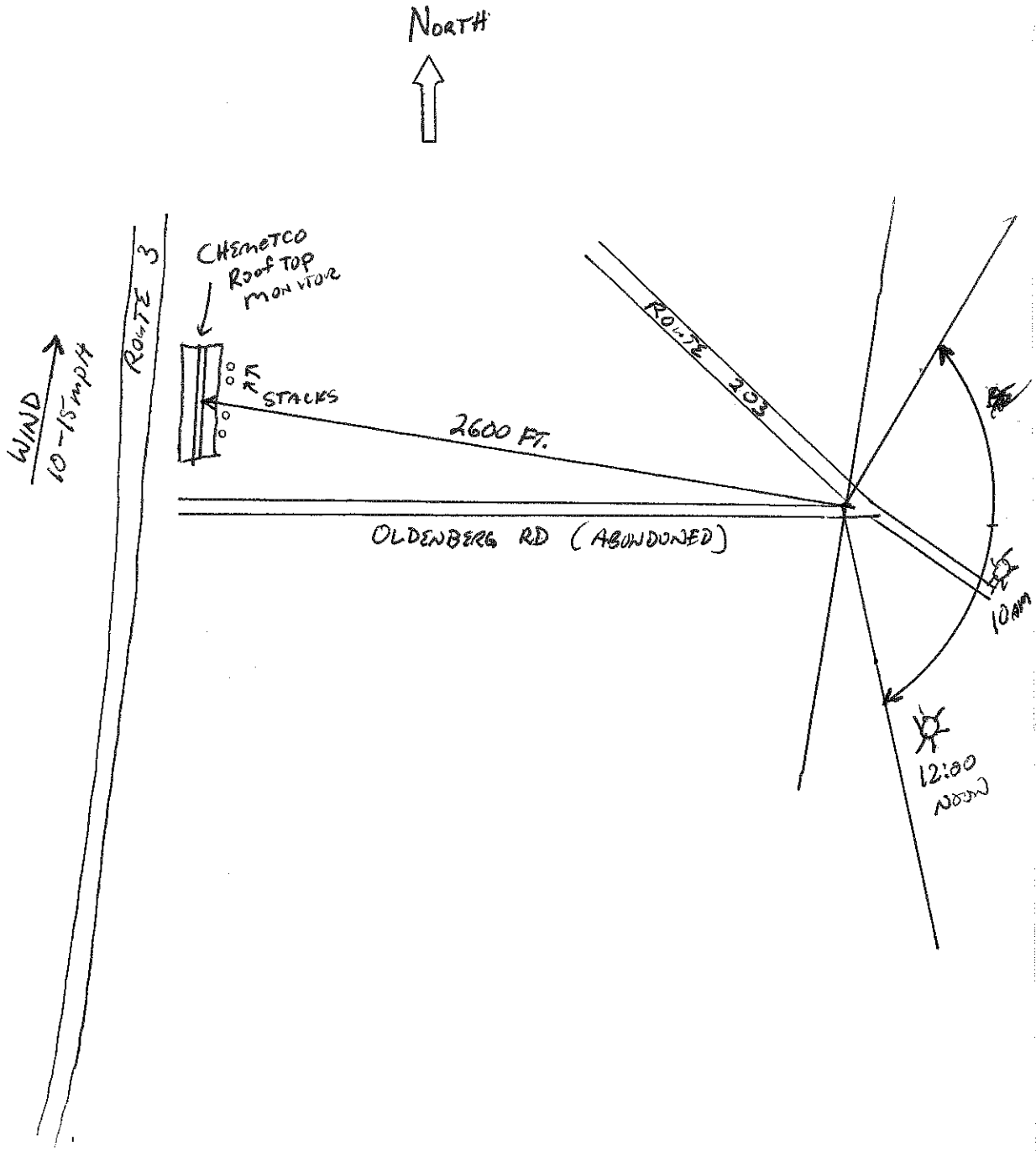
Observer's Signature Gerald B. Golubski
Last Certification Date OCT. 11, 1988
Observer's Affiliation U.S. EPA - REGION V - ESD/CCO




CHEMETCO

MARCH 10, 1989

G. GOLUBSKI




CHEMETCO
MARCH 10, 1989

OBSERVER: G. GOLUBSKI
US EPA- REGION V

6 JUN 1989
Visible Emissions Observations at Chemetco
Foundry, Hartford, Illinois (AFH114:H3) (AFH114:H4)

Gerald R. Golubski, Environmental Engineer
Central District Office (5SCDO)

Engineering Section (5AC)
ATTN: Sharon Freeman (5AC)

THRU: Willie H. Harris, Chief
Central District Office (5SCDO)

On May 9 and 10, 1989, visible emissions observations were made off-site at the subject facility. This inspection is pursuant to Mr. John Gaitskill's request (priority 2-49-89) for inspections during this FY. Since these readings were taken from approximately 2:30 p.m. to 5:30 p.m., the environmental manager, Ms. Michelle Reznack was not present at the conclusion of these readings. However, the attached computer print-out detailing plant operations at the time of the inspection were provided by her. The Illinois EPA (Collinsville Office) was notified that inspections were to be completed on these days, however, they did not participate.

May 9th Visible Emissions Observations

Beginning at 2:35 p.m. and continuing for the next three hours, visible emissions from the roof top monitor (west side) were observed and recorded by this U.S. EPA inspector. Approximately 8 minutes of significant emissions (greater than 60 percent opacity) were observed during the first hour. Approximately six minutes of significant emissions during the second hour were observed. Only one minute of significant emissions were observed during the remaining hour. As in previous inspections, the four stacks adjacent to the east side of the roof had only intermittant emissions throughout this three hour period (perhaps a few minutes each hour). No attempt was made to record these emissions due to their intermittant emissions.

May 10th Visible Emissions Observations

Beginning at 2:20 p.m. and continuing for the next three hours, visible emissions from the same roof top monitor were observed. During the first hour approximately four minutes of significant emissions (80 to 100 percent) were present. Photographs were taken at 3:26 p.m. showing a significant plume from the roof top monitor. During

the second hour approximately twenty minutes of significant emissions were observed. Several photographs detailing these emissions are attached to this inspection report for your review. Finally, during the remaining hour only one minute of significant emissions were noted.

Attached to this inspection report is a computer copy provided by the company. This copy details the events that were occurring inside the company at the time of the inspection. Also attached to this transmittal are copies of the visible emissions observation sheets, summary sheets, and sun diagrams.

If you have any questions concerning this inspection report, please call me at 886-1968.

Attachments

5SCDO:GGOLUBSKI:gw:5-23-89:DISK U:FINAL

5/30/89

BT 6/5/89

JPS for WHS 6/6/89

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, HARTFORD ILLINOIS

Source: ROOF TOP MONITOR

Regulation: Illinois

Evaluator's Report

On May 9, 1989, visible emission evaluation began at 2:35 pm, and continued for 180 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 1 | 2:35 pm - 2:40 pm | 34.58 | 9 | 3 |
| 2 | 2:41 pm - 2:46 pm | 36.25 | 3 | 8 |
| 3 | 2:47 pm - 2:52 pm | 6.25 | 0 | 0 |
| 4 | 2:53 pm - 2:58 pm | 10.00 | 2 | 0 |
| 5 | 2:59 pm - 3:04 pm | 51.25 | 2 | 11 |
| 6 | 3:05 pm 3:10 pm | 30.00 | 9 | 0 |
| 7 | 3:11 pm - 3:16 pm | 17.91 | 2 | 0 |
| 8 | 3:17 pm - 3:22 pm | 20.83 | 0 | 0 |
| 9 | 3:23 pm - 3:28 pm | 9.17 | 0 | 0 |
| 10 | 3:29 pm - 3:34 pm | 0.00 | 0 | 0 |

Readings ranged from 0 to 80 % opacity.

Meteorological Conditions: Cloud Cover Cloudy.

Ambient Temperature 65 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD. R GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - Region V - ESD/CDO

Date of Last Certification: April 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility CHEMETCO
NEAR HARTFORD, ILLINOIS

Date: May 9, 1989.

Observer: G. GOLUBSKI

Source: Roof top monitor (WEST SIDE)

Observation Point: on highway 3 Southwest of facility.

Distance From: 350 FT.

Direction From: SOUTH WEST

Source Height: 80 FT.

| | Initial | Final |
|---|---|---|
| Wind Direction | NORTHERLY | SAME |
| Wind Speed | 15-20 mph | 10-15 mph |
| Sky Condition | Cloudy | SAME |
| Background | Clouds | |
| Ambient Temperature °F | 65 | |
| Humidity (high-low) | HIGH | |
| Color of Emissions | WHITE | |
| Reading Conditions | GOOD | |

Plant Representatives:

State/Local Agency Representatives:
NONE.

Observation
Began 2:35 PM Ended 3:35 p.m.
(E T)

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Commen |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 60 | 60 | 70 | 70 | | 30 | 20 | 20 | 20 | 20 | |
| 1 | 70 | 40 | 40 | 40 | | 31 | 20 | 20 | 30 | 30 | |
| 2 | 50 | 50 | 50 | 50 | | 32 | 40 | 40 | 20 | 20 | |
| 3 | 30 | 30 | 20 | 20 | | 33 | 10 | 0 | 10 | 10 | |
| 4 | 10 | 10 | 10 | 10 | | 34 | 10 | 60 | 60 | 60 | |
| 5 | 10 | 10 | 10 | 10 | | 35 | 40 | 40 | 60 | 60 | |
| 6 | 10 | 10 | 70 | 70 | | 36 | 40 | 40 | 10 | 10 | |
| 7 | 70 | 70 | 70 | 70 | | 37 | 20 | 20 | 10 | 10 | |
| 8 | 70 | 70 | 60 | 60 | | 38 | 10 | 10 | 10 | 10 | |
| 9 | 60 | 30 | 20 | 20 | | 39 | 10 | 10 | 10 | 10 | |
| 10 | 10 | 10 | 10 | 10 | | 40 | 20 | 20 | 20 | 20 | |
| 11 | 0 | 0 | 0 | 0 | | 41 | 30 | 30 | 20 | 20 | |
| 12 | 0 | 0 | 0 | 0 | | 42 | 30 | 30 | 20 | 20 | |
| 13 | 0 | 20 | 0 | 0 | | 43 | 20 | 20 | 30 | 30 | |
| 14 | 0 | 10 | 10 | 10 | | 44 | 30 | 30 | 30 | 30 | |
| 15 | 30 | 30 | 10 | 10 | | 45 | 30 | 30 | 20 | 20 | |
| 16 | 10 | 10 | 0 | 0 | | 46 | 20 | 20 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | | 47 | 10 | 10 | 10 | 10 | |
| 18 | 0 | 0 | 0 | 0 | | 48 | 10 | 10 | 30 | 10 | |
| 19 | 0 | 0 | 0 | 0 | | 49 | 10 | 10 | 20 | 20 | |
| 20 | 10 | 10 | 10 | 10 | | 50 | 20 | 10 | 10 | 10 | |
| 21 | 10 | 10 | 10 | 10 | | 51 | 10 | 10 | 10 | 10 | |
| 22 | 10 | 40 | 40 | 10 | | 52 | 10 | 0 | 0 | 0 | |
| 23 | 10 | 10 | 20 | 20 | | 53 | 0 | 0 | 0 | 0 | |
| 24 | 10 | 20 | 60 | 60 | | 54 | 0 | 0 | 0 | 0 | |
| 25 | 70 | 10 | 10 | 10 | | 55 | 0 | 0 | 0 | 0 | |
| 26 | 70 | 70 | 80 | 80 | | 56 | 0 | 0 | 0 | 0 | |
| 27 | 80 | 80 | 80 | 80 | | 57 | 0 | 0 | 0 | 0 | |
| 28 | 80 | 80 | 40 | 40 | | 58 | 0 | 0 | 0 | 0 | |
| 29 | 40 | 40 | 20 | 20 | | 59 | 0 | 0 | 0 | 0 | |

Observer's Signature Gerald R. Golubski

Last Certification Date April 11, 1989

Observer's Affiliation US EPA - REGION V - ESD/CDO

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, Hartford Illinois

Source: Roof Top monitor

Regulation: Illinois

Evaluator's Report

On May 9, 1989, visible emission evaluation began at 2:35pm, and continued for 180 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 11 | 3:35 pm - 3:40pm | 0.00 | 0 | 0 |
| 12 | 3:41 pm - 3:46 pm | 9.17 | 0 | 2 |
| 13 | 3:47 pm - 3:52 pm | 3.75 | 0 | 0 |
| 14 | 3:53 pm - 3:58 pm | 3.33 | 0 | 0 |
| 15 | 3:59 pm - 4:04 pm | 5.41 | 0 | 0 |
| 16 | 4:05 pm - 4:10 pm | 7.50 | 0 | 0 |
| 17 | 4:11 pm - 4:16 pm | 2.91 | 0 | 0 |
| 18 | 4:17 pm - 4:22 pm | 6.67 | 2 | 0 |
| 19 | 4:23 pm - 4:28 pm | 34.58 | 15 | 0 |
| 20 | 4:29 pm - 4:34 pm | 62.50 | 7 | 15 |

Readings ranged from 0 to 90 % opacity.

Meteorological Conditions: Cloud Cover Cloudy.

Ambient Temperature 65 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - Region V - ESD/CDO

Date of Last Certification: April 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Date: May 9, 1989

Observer: G. GOLUBSKI

Facility: CHEMETCO NEAR Hartford, ILLINOIS

Source: Roof top monitor. (WEST SIDE)

Observation Point: ON highway 3 SOUTHWEST of facility.

Distance From: 350 FT.

Direction From: SOUTHWEST

Source Height: 80 ft

| | Initial | Final |
|---|---|---|
| Wind Direction | NORTHERLY | Same |
| Wind Speed | 10-15 mph | ↓ |
| Sky Condition | Cloudy | ↓ |
| Background | Clouds | ↓ |
| Ambient Temperature °F | 65 | ↓ |
| Humidity (high-low) | High | ↓ |
| Color of Emissions | White | ↓ |
| Reading Conditions | GOOD | ↓ |

Plant Representatives:

State/Local Agency Representatives: NONE.

Observation Began 3:35 pm Ended 4:35 pm (CST)

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | | 30 | 30 | 30 | 10 | 10 | |
| 1 | 0 | 0 | 0 | 0 | | 31 | 10 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | | 32 | 0 | 0 | 0 | 0 | |
| 3 | 0 | 0 | 0 | 0 | | 33 | 0 | 0 | 0 | 0 | |
| 4 | 0 | 0 | 0 | 0 | | 34 | 0 | 0 | 10 | 10 | |
| 5 | 0 | 0 | 0 | 0 | | 35 | 10 | 20 | 20 | 20 | |
| 6 | 0 | 0 | 0 | 0 | | 36 | 10 | 10 | 10 | 10 | |
| 7 | 0 | 0 | 0 | 0 | | 37 | 10 | 10 | 10 | 0 | |
| 8 | 0 | 0 | 0 | 0 | | 38 | 0 | 0 | 0 | 0 | |
| 9 | 80 | 80 | 20 | 20 | | 39 | 0 | 0 | 0 | 0 | |
| 10 | 10 | 10 | 0 | 0 | | 40 | 0 | 0 | 0 | 0 | |
| 11 | 0 | 0 | 0 | 0 | | 41 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | | 42 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | | 43 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | | 44 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 30 | 30 | 30 | | 45 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | | 46 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | | 47 | 30 | 30 | 60 | 40 | |
| 18 | 0 | 0 | 0 | 0 | | 48 | 40 | 40 | 50 | 50 | |
| 19 | 0 | 0 | 0 | 0 | | 49 | 40 | 40 | 50 | 50 | |
| 20 | 0 | 0 | 0 | 0 | | 50 | 30 | 30 | 40 | 10 | |
| 21 | 0 | 0 | 0 | 0 | | 51 | 0 | 0 | 40 | 40 | |
| 22 | 0 | 0 | 0 | 0 | | 52 | 40 | 10 | 0 | 60 | |
| 23 | 10 | 10 | 30 | 30 | | 53 | 60 | 60 | 20 | 30 | |
| 24 | 10 | 0 | 0 | 0 | | 54 | 40 | 40 | 30 | 30 | |
| 25 | 10 | 10 | 10 | 10 | | 55 | 70 | 70 | 70 | 70 | Black |
| 26 | 10 | 10 | 10 | 10 | | 56 | 70 | 70 | 70 | 70 | Smoke |
| 27 | 10 | 10 | 10 | 10 | | 57 | 80 | 80 | 90 | 90 | " |
| 28 | 0 | 0 | 0 | 0 | | 58 | 40 | 40 | 80 | 80 | |
| 29 | 0 | 0 | 0 | 0 | | 59 | 80 | 60 | 40 | 40 | |

Observer's Signature: Gerald R. Golubski

Last Certification Date: APRIL 11, 1989

Observer's Affiliation: US EPA - REGION V - ESD/CDD

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, Hartford Illinois

Source: Roof Top Monitor.

Regulation: Illinois

Evaluator's Report

On May 9, 1989, visible emission evaluation began at 2:35pm, and continued for 180 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 21 | 4:35pm - 4:40 pm | 15.00 | 4 | 0 |
| 22 | 4:41 pm - 4:46 pm | 0.00 | 0 | 0 |
| 23 | 4:47 pm - 4:52 pm | 19.58 | 1 | 5 |
| 24 | 4:53 pm - 4:58 pm | 1.25 | 0 | 0 |
| 25 | 4:59 pm - 5:04 pm | 0.00 | 0 | 0 |
| 26 | 5:05 pm - 5:10 pm | 2.50 | 0 | 0 |
| 27 | 5:11 pm - 5:16 pm | 2.91 | 0 | 0 |
| 28 | 5:17 pm - 5:22 pm | 4.58 | 0 | 0 |
| 29 | 5:23 pm - 5:28 pm | 4.17 | 0 | 0 |
| 30 | 5:29 pm - 5:34 pm | 0.00 | 0 | 0 |

Readings ranged from 0 to 80 % opacity.

Meteorological Conditions: Cloud Cover Cloudy.

Ambient Temperature 65 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R Golubski

Name: GERALD. R GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - Region V - ESD/CDO

Date of Last Certification: April 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility CHEMETCO
NEAR HARTFORD, ILLINOIS

Date: May 9, 1989.
Observer: G. GOLUBSKI

Source: Roof TOP MONITOR (WEST SIDE)

Observation Point: ON highway 3 SOUTHWEST of facility.

Distance From: 350 FT.
Direction From: SOUTHWEST
Source Height: ~ 80 FT.

| | Initial | Final |
|---|---|---|
| Wind Direction | NORTHERLY | SAME |
| Wind Speed | 10-15 MPH. | |
| Sky Condition | Cloudy | |
| Background | clouds | |
| Ambient Temperature °F | 65 | |
| Humidity (high-low) | HIGH | |
| Color of Emissions | WHITE/BLACK | |
| Reading Conditions | GOOD | |

Plant Representatives:

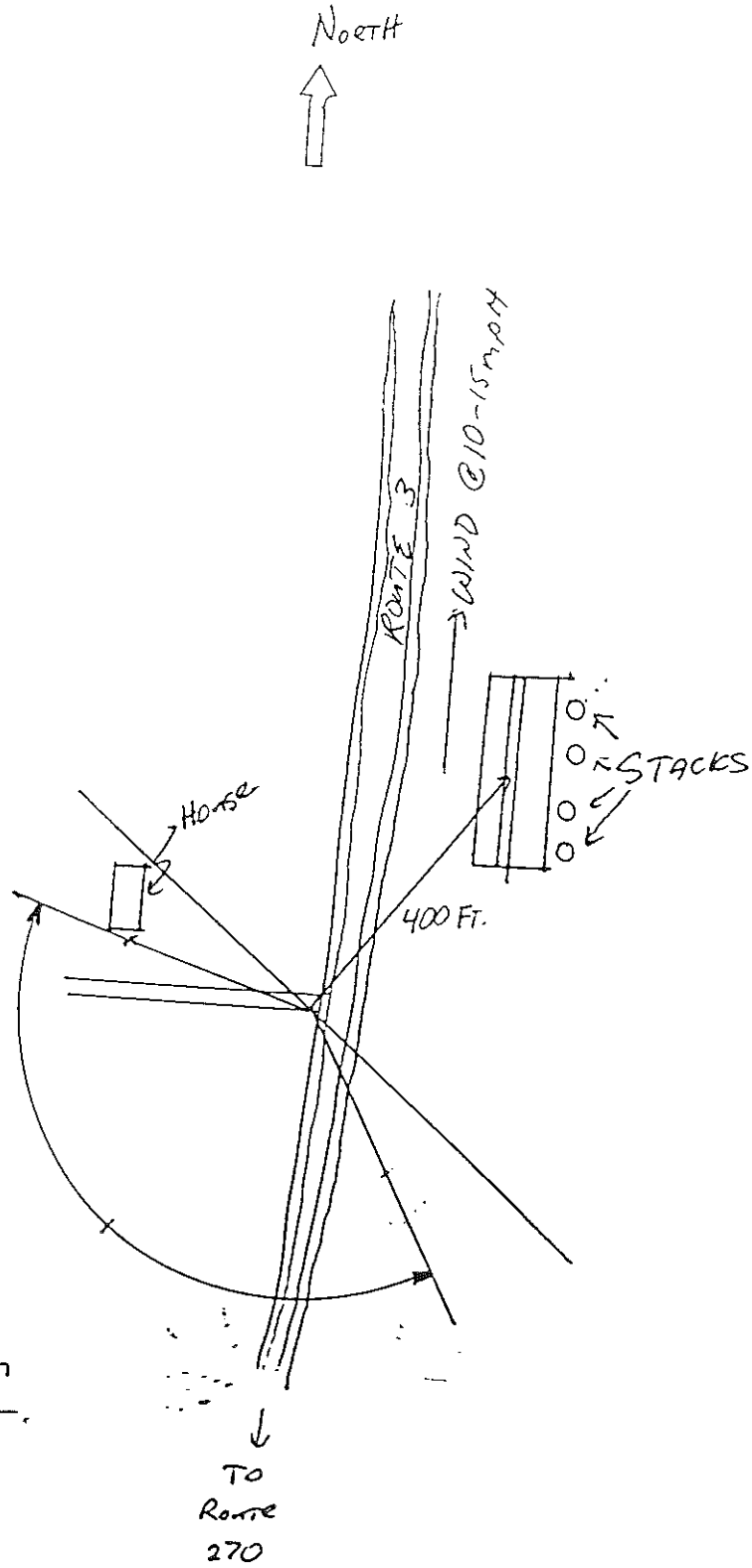
State/Local Agency Representatives:
NONE

Observation
Began 4:35pm Ended 5:35pm
(= T)

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 40 | 40 | 10 | 10 | | 30 | 0 | 0 | 0 | 0 | |
| 1 | 0 | 0 | 0 | 60 | | 31 | 0 | 0 | 0 | 0 | |
| 2 | 60 | 30 | 30 | 30 | | 32 | 0 | 0 | 0 | 0 | |
| 3 | 10 | 10 | 10 | 10 | | 33 | 0 | 0 | 0 | 0 | |
| 4 | 10 | 0 | 0 | 0 | | 34 | 0 | 10 | 30 | 20 | |
| 5 | 0 | 0 | 0 | 0 | | 35 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | | 36 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | | 37 | 10 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | | 38 | 10 | 10 | 10 | 10 | |
| 9 | 0 | 0 | 0 | 0 | | 39 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | | 40 | 0 | 0 | 10 | 10 | |
| 11 | 0 | 0 | 0 | 0 | | 41 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | | 42 | 0 | 0 | 0 | 0 | |
| 13 | 80 | 80 | 80 | 80 | | 43 | 0 | 20 | 30 | 10 | |
| 14 | 80 | 40 | 20 | 10 | | 44 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | | 45 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | | 46 | 10 | 10 | 10 | 0 | |
| 17 | 0 | 0 | 0 | 0 | | 47 | 0 | 0 | 10 | 10 | |
| 18 | 0 | 0 | 0 | 0 | | 48 | 20 | 10 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | | 49 | 0 | 20 | 20 | 0 | |
| 20 | 0 | 0 | 0 | 0 | | 50 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 10 | 10 | | 51 | 0 | 0 | 0 | 0 | |
| 22 | 10 | 0 | 0 | 0 | | 52 | 10 | 10 | 10 | 0 | |
| 23 | 0 | 0 | 0 | 0 | | 53 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | | 54 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | | 55 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | | 56 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | | 57 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | | 58 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | | 59 | 0 | 0 | 0 | 0 | |

Observer's Signature Gerald R. Golubski
Last Certification Date April 11, 1989
Observer's Affiliation US EPA REGION V - ESD/OD




NOTE: NO SUN DIAGRAM
DUE TO OVERCAST.

CHEMETCO
May 9 1989
OBSERVER: G. GOLUBSKI
US EPA-REGION V

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, HARTFORD, ILLINOIS

Source: ROOF TOP MONITOR

Regulation: Illinois

Evaluator's Report

On May 10, 1989, visible emission evaluation began at 2:20pm, and continued for 180 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 1 | 2:20 pm - 2:25 pm | 9.58 | 0 | 0 |
| 2 | 2:26 pm - 2:31 pm | 0.83 | 0 | 0 |
| 3 | 2:32 pm - 2:37 pm | 0.00 | 0 | 0 |
| 4 | 2:38 pm - 2:43 pm | 0.00 | 0 | 0 |
| 5 | 2:44 pm - 2:49 pm | 12.91 | 4 | 0 |
| 6 | 2:50 pm - 2:55 pm | 23.54 | 7 | 0 |
| 7 | 2:56 pm - 3:01 pm | 0.41 | 0 | 0 |
| 8 | 3:02 pm - 3:07 pm | 12.51 | 0 | 3 |
| 9 | 3:08 pm - 3:13 pm | 45.21 | 0 | 10 |
| 10 | 3:14 pm - 3:19 pm | 15.83 | 1 | 3 |

Readings ranged from 0 to 100 % opacity.

Meteorological Conditions: Cloud Cover CLEAR.

Ambient Temperature 70 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - Region V - ESD/CAO

Date of Last Certification: APRIL 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility CHEMETCO near Hartford, ILLINOIS

Date: May 10, 1989

Observer: G. Golubski

Source: Roof top monitor (WEST SIDE)

Observation Point: on highway 3 Southwest of facility

Distance From: 350 FT

Direction From: Southwest

Source Height: ~ 80 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | NORTHERLY | SAME |
| Wind Speed | 10-15 MPH | |
| Sky Condition | CLEAR | |
| Background | Blue Sky | |
| Ambient Temperature °F | 70 | |
| Humidity (high-low) | Low | |
| Color of Emissions | WHITE | |
| Reading Conditions | GOOD | |

Plant Representatives:

State/Local Agency Representatives:
NONE

Observation
Began 2:20pm (= T) Ended 3:20 p.m.

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 10 | 10 | 10 | 10 | | 30 | 20 | 30 | 30 | 30 | |
| 1 | 10 | 20 | 20 | 20 | | 31 | 30 | 40 | 40 | 40 | |
| 2 | 10 | 10 | 10 | 10 | | 32 | 40 | 40 | 20 | 50 | |
| 3 | 10 | 10 | 10 | 10 | | 33 | 50 | 20 | 20 | 20 | |
| 4 | 5 | 5 | 5 | 5 | | 34 | 10 | 10 | 10 | 5 | |
| 5 | 5 | 5 | 5 | 5 | | 35 | 5 | 5 | 0 | 0 | |
| 6 | 5 | 5 | 5 | 5 | | 36 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | | 37 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | | 38 | 0 | 0 | 0 | 0 | |
| 9 | 0 | 0 | 0 | 0 | | 39 | 0 | 0 | 0 | 0 | |
| 10 | 0 | 0 | 0 | 0 | | 40 | 0 | 0 | 5 | 5 | |
| 11 | 0 | 0 | 0 | 0 | | 41 | 0 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | | 42 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | | 43 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 0 | 0 | 0 | | 44 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | | 45 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | | 46 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | | 47 | 40 | 80 | 80 | 100 | |
| 18 | 0 | 0 | 0 | 0 | | 48 | 100 | 100 | 100 | 80 | |
| 19 | 0 | 0 | 0 | 0 | | 49 | 30 | 10 | 80 | 10 | |
| 20 | 0 | 0 | 0 | 0 | | 50 | 10 | 10 | 10 | 10 | |
| 21 | 0 | 0 | 0 | 0 | | 51 | 5 | 5 | 5 | 5 | |
| 22 | 0 | 0 | 0 | 0 | | 52 | 5 | 5 | 5 | 100 | Pic 1,2,3 |
| 23 | 0 | 0 | 0 | 0 | | 53 | 100 | 100 | 100 | 100 | |
| 24 | 0 | 0 | 0 | 0 | | 54 | 10 | 10 | 10 | 5 | |
| 25 | 0 | 0 | 0 | 0 | | 55 | 5 | 5 | 5 | 0 | |
| 26 | 0 | 0 | 0 | 0 | | 56 | 0 | 0 | 5 | 0 | |
| 27 | 0 | 20 | 20 | 20 | | 57 | 0 | 0 | 80 | 80 | |
| 28 | 20 | 40 | 40 | 50 | | 58 | 80 | 60 | 20 | 5 | |
| 29 | 40 | 20 | 20 | 20 | | 59 | 0 | 0 | 0 | 0 | |

Observer's Signature Gerald R. Golubski

Last Certification Date April 11, 1989

Observer's Affiliation US EPA-Region V-ESD/CDO

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, HARTFORD ILLINOIS

Source: ROOF TOP MONITOR

Regulation: Illinois

Evaluator's Report

On May 10, 1989, visible emission evaluation began at 2:20pm, and continued for 180 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 11 | 3:20pm - 3:25pm | 3.75 | 0 | 0 |
| 12 | 3:26pm - 3:31pm | 91.25 | 0 | 24 |
| 13 | 3:32pm - 3:37pm | 56.46 | 0 | 14 |
| 14 | 3:38pm - 3:43pm | 10.83 | 0 | 0 |
| 15 | 3:44pm - 3:49pm | 9.37 | 0 | 0 |
| 16 | 3:50pm - 3:55pm | 66.67 | 6 | 13 |
| 17 | 3:56pm - 4:01pm | 54.58 | 14 | 7 |
| 18 | 4:02pm - 4:07pm | 14.17 | 0 | 1 |
| 19 | 4:08pm - 4:13pm | 41.46 | 1 | 9 |
| 20 | 4:14pm - 4:19pm | 4.37 | 0 | 0 |

Readings ranged from 0 to 100 % opacity.

Meteorological Conditions: Cloud Cover CLEAR.

Ambient Temperature 70 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - Region V - ESD/CDO

Date of Last Certification: April 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility CHEMETCO
NEAR Hartford, ILLINOIS

Date: May 10, 1989.
Observer: G. GOLUBSKI

Source: Roof Top MONITOR (WEST SIDE)

Observation Point: ON highway 3 SOUTHWEST of facility.

Distance From: 350 FT.
Direction From: SOUTHWEST.
Source Height: ~ 80 FT.

| | Initial | Final |
|---|---|---|
| Wind Direction | NORTHERLY. | SAME |
| Wind Speed | 10-15 mph | ↓ |
| Sky Condition | CLEAR | ↓ |
| Background | Blue SKY | ↓ |
| Ambient Temperature °F | 70 | ↓ |
| Humidity (high-low) | LOW | ↓ |
| Color of Emissions | White | ↓ |
| Reading Conditions | GOOD | ↓ |

Plant Representatives:

State/Local Agency Representatives:
NONE

Observation
Began 3:20pm. Ended 4:20p.m.
(= T)

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | | 30 | 10 | 10 | 20 | 20 | |
| 1 | 0 | 0 | 0 | 0 | | 31 | 20 | 40 | 40 | 40 | |
| 2 | 0 | 0 | 0 | 0 | | 32 | 40 | 60 | 60 | 80 | |
| 3 | 0 | 0 | 10 | 10 | | 33 | 100 | 100 | 100 | 100 | |
| 4 | 10 | 10 | 10 | 5 | | 34 | 100 | 100 | 100 | 100 | Pic 7 |
| 5 | 5 | 10 | 10 | 10 | | 35 | 100 | 90 | 90 | 80 | |
| 6 | 100 | 100 | 100 | 100 | Pic 4,5 | 36 | 80 | 80 | 80 | 60 | |
| 7 | 100 | 100 | 100 | 80 | Pic 6 | 37 | 60 | 60 | 60 | 60 | |
| 8 | 100 | 100 | 80 | 80 | | 38 | 20 | 20 | 40 | 40 | |
| 9 | 80 | 80 | 80 | 80 | | 39 | 70 | 60 | 80 | 80 | |
| 10 | 80 | 100 | 100 | 90 | | 40 | 80 | 60 | 40 | 40 | |
| 11 | 90 | 90 | 90 | 90 | | 41 | 40 | 40 | 40 | 20 | |
| 12 | 90 | 90 | 90 | 90 | | 42 | 20 | 20 | 20 | 10 | |
| 13 | 90 | 90 | 90 | 90 | | 43 | 10 | 10 | 10 | 5 | |
| 14 | 90 | 90 | 90 | 90 | | 44 | 5 | 5 | 10 | 20 | |
| 15 | 90 | 90 | 20 | 10 | | 45 | 20 | 5 | 5 | 5 | |
| 16 | 10 | 10 | 10 | 5 | | 46 | 5 | 5 | 5 | 0 | |
| 17 | 5 | 5 | 10 | 10 | | 47 | 5 | 10 | 30 | 100 | |
| 18 | 5 | 5 | 5 | 5 | | 48 | 100 | 100 | 100 | 100 | Pic 8,9 |
| 19 | 5 | 5 | 5 | 5 | | 49 | 100 | 100 | 100 | 80 | 10, |
| 20 | 10 | 10 | 10 | 10 | | 50 | 10 | 5 | 5 | 5 | |
| 21 | 10 | 10 | 10 | 10 | | 51 | 5 | 5 | 5 | 5 | |
| 22 | 10 | 10 | 30 | 30 | | 52 | 5 | 5 | 5 | 5 | |
| 23 | 10 | 10 | 10 | 30 | | 53 | 40 | 70 | 30 | 10 | |
| 24 | 30 | 10 | 10 | 10 | | 54 | 10 | 20 | 20 | 10 | |
| 25 | 10 | 30 | 10 | 10 | | 55 | 5 | 5 | 5 | 5 | |
| 26 | 5 | 5 | 5 | 5 | | 56 | 5 | 5 | 0 | 0 | |
| 27 | 20 | 10 | 10 | 5 | | 57 | 0 | 0 | 0 | 0 | |
| 28 | 10 | 10 | 10 | 10 | | 58 | 0 | 10 | 5 | 0 | |
| 29 | 0 | 0 | 0 | 0 | | 59 | 0 | 0 | 0 | 0 | |

Observer's Signature Gerald R. Golubski
Last Certification Date APRIL 11, 1989
Observer's Affiliation US EPA. REGION V-ESD/CAO

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO, Hartford Illinois

Source: Roof top monitor

Regulation: Illinois

Evaluator's Report

On May 10, 1989, visible emission evaluation began at 2:20 pm; and continued for 180 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C__T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 21 | 4:20 pm – 4:25 pm | 1.87 | 0 | 0 |
| 22 | 4:26 pm – 4:31 pm | 0.00 | 0 | 0 |
| 23 | 4:32 pm – 4:37 pm | 3.12 | 0 | 0 |
| 24 | 4:38 pm – 4:43 pm | 0.41 | 0 | 0 |
| 25 | 4:44 pm – 4:49 pm | 0.00 | 0 | 0 |
| 26 | 4:50 pm – 4:55 pm | 0.00 | 0 | 0 |
| 27 | 4:56 pm – 5:01 pm | 15.41 | 3 | 1 |
| 28 | 5:02 pm – 5:07 pm | 0.00 | 0 | 0 |
| 29 | 5:08 pm – 5:13 pm | 11.87 | 0 | 0 |
| 30 | 5:14 pm – 5:19 pm | 0.83 | 0 | 0 |

Readings ranged from 0 to 80 % opacity.

Meteorological Conditions: Cloud Cover Clear.

Ambient Temperature 70 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - Region V - ESD/CDD

Date of Last Certification: April 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility CHEMETCO
NEAR HARTFORD, ILLINOIS

Date: MAY 10, 1989
Observer: G. GOLUBSKI

Source: ROOF TOP MONITOR. (WEST SIDE)

Observation Point: ON highway 3 SOUTHWEST of facility

Distance From: 350 FT.
Direction From: SOUTHWEST
Source Height: 80 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | NORTHERLY | SAME |
| Wind Speed | 10-15 mph | |
| Sky Condition | CLEAR | |
| Background | Blue Sky | |
| Ambient Temperature °F | 70 | |
| Humidity (high-low) | LOW | |
| Color of Emissions | WHITE | |
| Reading Conditions | GOOD | |

Plant Representatives:

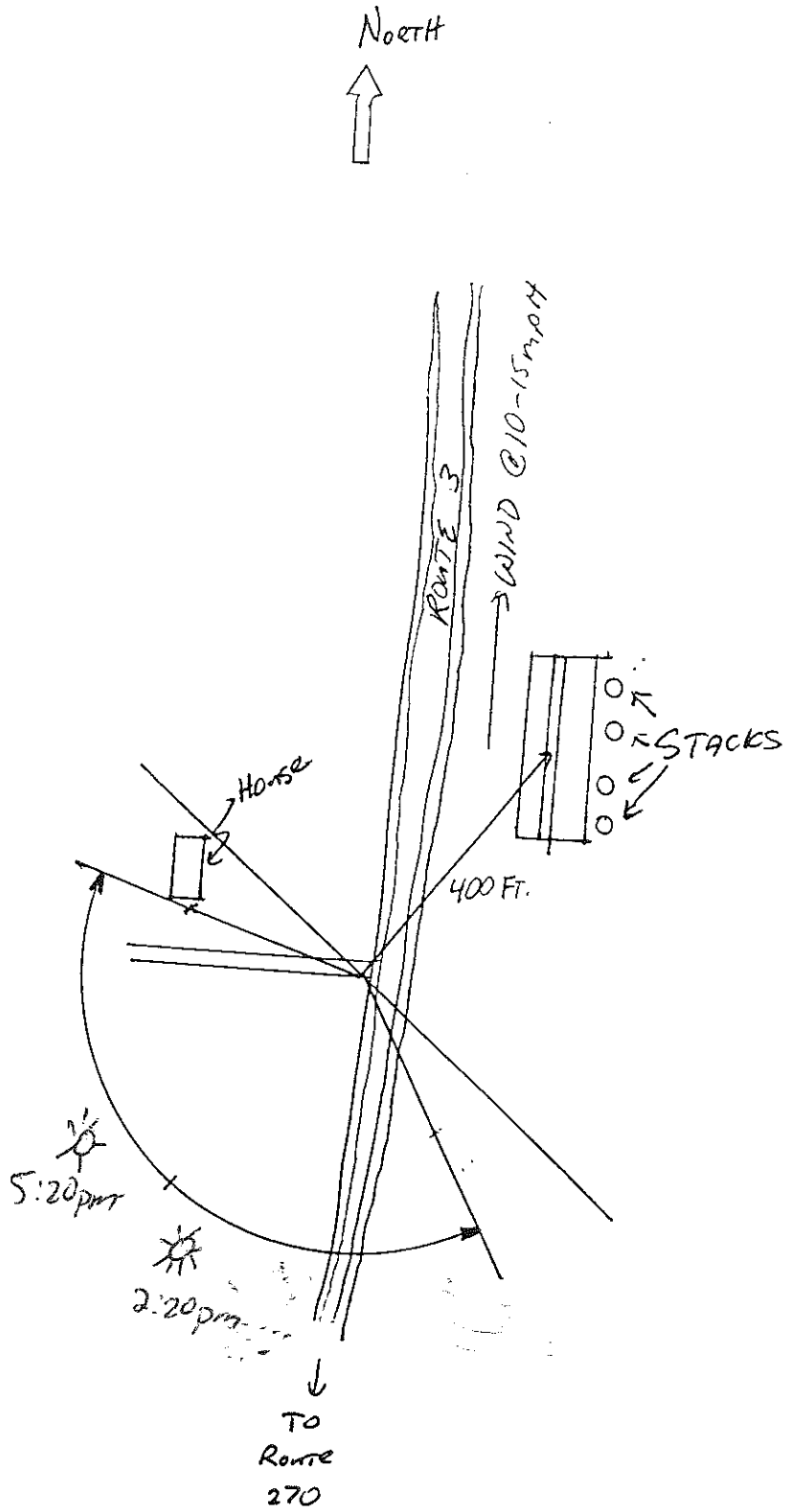
State/Local Agency Representatives:
NONE

Observation
Began 4:20pm Ended 5:20pm
(= T)

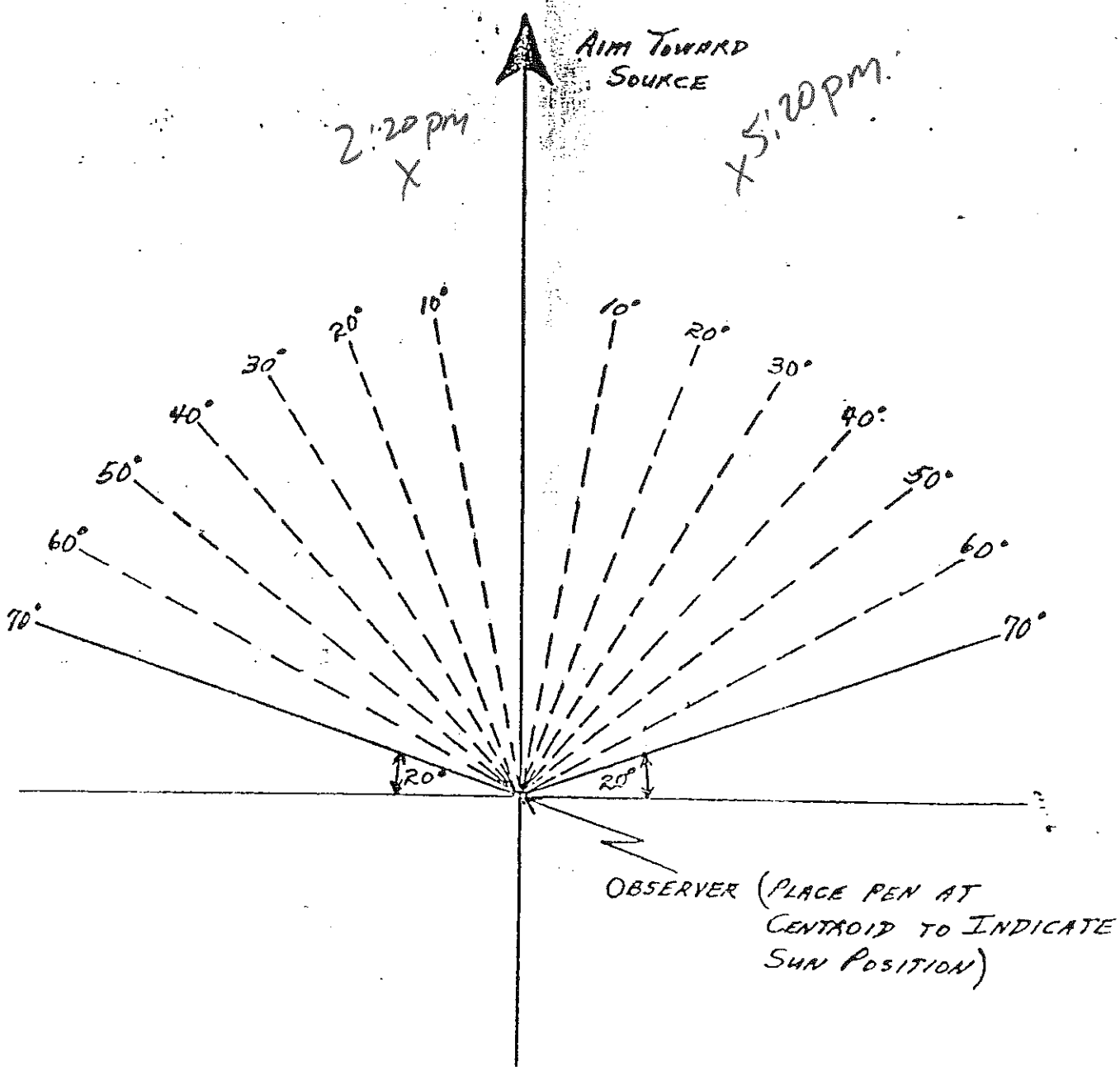
Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | | 30 | 0 | 0 | 0 | 0 | |
| 1 | 0 | 0 | 0 | 0 | | 31 | 0 | 0 | 0 | 0 | |
| 2 | 0 | 0 | 0 | 0 | | 32 | 0 | 0 | 0 | 0 | |
| 3 | 5 | 5 | 10 | 5 | | 33 | 0 | 0 | 0 | 0 | |
| 4 | 5 | 5 | 5 | 5 | | 34 | 0 | 0 | 0 | 0 | |
| 5 | 0 | 0 | 0 | 0 | | 35 | 0 | 0 | 0 | 0 | |
| 6 | 0 | 0 | 0 | 0 | | 36 | 0 | 0 | 0 | 0 | |
| 7 | 0 | 0 | 0 | 0 | | 37 | 0 | 0 | 0 | 0 | |
| 8 | 0 | 0 | 0 | 0 | | 38 | 10 | 20 | 20 | 40 | |
| 9 | 0 | 0 | 0 | 0 | | 39 | 60 | 80 | 40 | 30 | |
| 10 | 0 | 0 | 0 | 0 | | 40 | 20 | 20 | 20 | 5 | |
| 11 | 0 | 0 | 0 | 0 | | 41 | 5 | 0 | 0 | 0 | |
| 12 | 0 | 0 | 0 | 0 | | 42 | 0 | 0 | 0 | 0 | |
| 13 | 0 | 0 | 0 | 0 | | 43 | 0 | 0 | 0 | 0 | |
| 14 | 0 | 5 | 5 | 5 | | 44 | 0 | 0 | 0 | 0 | |
| 15 | 5 | 5 | 10 | 10 | | 45 | 0 | 0 | 0 | 0 | |
| 16 | 10 | 10 | 5 | 5 | | 46 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | | 47 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | | 48 | 0 | 0 | 10 | 10 | |
| 19 | 0 | 0 | 0 | 0 | | 49 | 10 | 10 | 10 | 10 | |
| 20 | 0 | 5 | 5 | 0 | | 50 | 10 | 30 | 30 | 30 | |
| 21 | 0 | 0 | 0 | 0 | | 51 | 10 | 10 | 10 | 20 | |
| 22 | 0 | 0 | 0 | 0 | | 52 | 20 | 5 | 5 | 10 | |
| 23 | 0 | 0 | 0 | 0 | | 53 | 10 | 10 | 10 | 5 | |
| 24 | 0 | 0 | 0 | 0 | | 54 | 5 | 5 | 5 | 5 | |
| 25 | 0 | 0 | 0 | 0 | | 55 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | | 56 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | | 57 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | | 58 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | | 59 | 0 | 0 | 0 | 0 | |

Observer's Signature Gerald R. Golubski
Last Certification Date April 11, 1989
Observer's Affiliation US EPA - REGION V - ESD/CDD




CHEMETCO
May 10, 1989
OBSERVER: G. GOLABSKI
US EPA-REGION V




CHEMETCO
May 10, 1989
G. GOLUBSKI

Chemetco
FIRST IN PEOPLE — QUALITY — SERVICE
P.O. BOX 187 • ALTON, ILLINOIS 62002

May 22, 1989

Mr. Gerald R. Golubski, P.E.
Environmental Engineer
United States Environmental Protection Agency
Region V
Environmental Services Division
536 South Clark Street
Chicago, Illinois 60605

Dear Mr. Golubski,

Enclosed please find the operations data that you have requested for the dates of May 9 and 10, 1989.

If I can be of any further help or you require more information, please do not hesitate to call me at 618-254-4381. If I cannot personally answer your question, I will put you in touch with the person who will be able to.

Sincerely,

Michelle Reznack

Michelle Reznack
Environmental Manager

cc: file
enclosures

RECEIVED
MAY 24 1989
CENTRAL
DISTRICT OFFICE

WORKSTATION 194 - USER MLR - REZNACK, MICHELLE 219CRE

8:03:26 AM MONDAY MAY 22, 1989

```
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                                EVENT SUMMARY                                     * 1*
* 2*   .-----------------.-----------.-----------.-----------.-----------.            * 2*
* 3*     5709  HEAT  TYP       4           2           1           3                  * 3*
* 4*   -----------------+-----------+-----------+-----------+-----------              * 4*
* 5*     11:05   560  BRZ                                          CHARGE             * 5*
* 6*     11:05   310  REF   SLAG OFF                                                  * 6*
* 7*     11:13   310  REF   REF CU SAMP                                               * 7*
* 8*     11:15   560  BRZ                                          SLAG TRANS         * 8*
* 9*     11:25   310  REF   TAP METAL                                                 * 9*
*10*     11:40   560  BRZ                                          SAMP RED.#1        *10*
* 1*     11:45   560  BRZ                                          BLOW TAP #1        * 1*
* 2*     11:50   311  SME   CHARGE                                                    * 2*
* 3*     12:20   560  BRZ                                          CHARGE             * 3*
* 4*     12:25  1312  REF                 T.H. METAL                                 * 4*
* 5*     12:40   560  BRZ                                          SAMP RED.#1        * 5*
* 6*     12:45   560  BRZ                                          BLOW TAP #1        * 6*
* 7*     13:10   311  SME   T.H. METAL                                                * 7*
* 8*     13:15   560  BRZ                                          CHARGE             * 8*
* 9*     13:20   191  SME                                CHARGE                       * 9*
*20*     14:05  1312  REF                 SLAG OFF                                   *20*
* 1*     14:10  1312  REF                 REF CU SAMP                                * 1*
* 2*     14:10   560  BRZ                                          SAMP RED.#2        * 2*
* 3*   '-----------------------------------------------------------------------'      * 3*
* 4*      FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3     * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
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WORKSTATION 194 - USER MLR - REINACK, MICHELLE 219CRE

8:03:38 AM MONDAY MAY 22, 1989

```
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                                  EVENT SUMMARY                                   * 1*
* 2*   .-------------.-------------.-------------.-------------.-------------.        * 2*
* 3*     S/09  HEAT  TYP        4            2            1            3               * 3*
* 4*   ------------+------------+------------+------------+------------                * 4*
* 5*    14:10  1312  REF                REF CU SAMP                                    * 5*
* 6*    14:10   560  BRI                                          SAMP RED.#2          * 6*
* 7*    14:15   191  SME                                  SLAG TRANS                   * 7*
* 8*    14:15  1312  REF                CHARGE                                         * 8*
* 9*    14:20   560  BRI                                          TAP 2ND MTL          * 9*
*10*    14:21   560  BRI                                          WRAP-UP             *10*
* 1*    15:00   191  SME                                  CHARGE                       * 1*
* 2*    15:05  1312  REF                SLAG OFF                                       * 2*
* 3*    15:05   561  SME                                          CHARGE               * 3*
* 4*    15:10  1312  REF                TAP METAL                                      * 4*
* 5*    15:15   311  SME   SLAG OFF                                                    * 5*
* 6*    15:20   311  SME   SAMP BL CU                                                  * 6*
* 7*    15:20   312  SME   SLAG TRANS                                                  * 7*
* 8*    15:40  1313  REF                CHARGE                                         * 8*
* 9*    15:41  1313  REF                CHARGE                                         * 9*
*20*    15:42  1313  REF                CHARGE                                         *20*
* 1*    15:43  1313  REF                CHARGE                                         * 1*
* 2*    15:44  1313  REF                CHARGE                                         * 2*
* 3*   '-------------------------------------------------------------------------'    * 3*
* 4*     FOR DETAIL        PF4 - FCE 4    PF2 - FCE 2    PF1 - FCE 1    PF3 - FCE 3   * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
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WORKSTATION 194 - USER MLR - REZNACK, MICHELLE 219CRE

8:03:48 AM MONDAY MAY 22, 1989

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*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                                EVENT SUMMARY                                     * 1*
* 2*   .----------------.-----------.-----------.-----------.-----------.             * 2*
* 3*     15/09  HEAT  TYP       4           2           1           3                 * 3*
* 4*   ----------------+-----------+-----------+-----------+-----------               * 4*
* 5*     15:44  1313  REF                CHARGE                                       * 5*
* 6*     15:45  1313  REF                CHARGE                                       * 6*
* 7*     16:00   312  SME   CHARGE                                                    * 7*
* 8*     16:01   312  SME   CHARGE                                                    * 8*
* 9*     17:30   191  SME                            SLAG OFF                         * 9*
*10*     17:30   561  SME                                        SLAG OFF            *10*
* 1*     17:40   191  SME                            TAP BLK CU                       * 1*
* 2*     17:45   561  SME                                        SAMP BL CU          * 2*
* 3*     17:50   562  SME                                        METAL TRANS         * 3*
* 4*     17:55   192  SME                            CHARGE                           * 4*
* 5*     17:56   192  SME                            CHARGE                           * 5*
* 6*     17:57   192  SME                            CHARGE                           * 6*
* 7*     17:58   192  SME                            CHARGE                           * 7*
* 8*     17:59   192  SME                            CHARGE                           * 8*
* 9*     18:00   562  SME                                        CHARGE              * 9*
*20*     19:00   312  SME   SLAG TRANS                                                *20*
* 1*     19:10   562  SME                                        SMELT TRANS         * 1*
* 2*     19:10   312  SME   TAP BLK CU                                                * 2*
* 3*   '-----------------------------------------------------------------------'     * 3*
* 4*      FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3    * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
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WORKSTATION 194 - USER MLR - REZNACK, MICHELLE 219CRE

8:04:29 AM MONDAY MAY 22, 1989

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*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                                EVENT SUMMARY                                     * 1*
* 2*   .----------------.-------------.-------------.-------------.-------------.     * 2*
* 3*     5/10  HEAT  TYP        4             2             1             3           * 3*
* 4*   ----------------+-------------+-------------+-------------+-------------       * 4*
* 5*    12:40   194  BRZ                                CHARGE                         * 5*
* 6*    12:40   566  SME                                              SLAG OFF         * 6*
* 7*    12:55   566  SME                                              SAMP BL CU       * 7*
* 8*    13:00   194  BRZ                                SAMP RED.#2                    * 8*
* 9*    13:00   567  SME                                              CHARGE           * 9*
*10*    13:10  1315  REF                 SLAG OFF                                     *10*
* 1*    13:20  1315  REF                 CHARGE                                       * 1*
* 2*    13:25   194  BRZ                                SAMP RED.#2                    * 2*
* 3*    13:25   567  SME                                              SLAG TRANS       * 3*
* 4*    13:35   194  BRZ                                SAMP RED.#2                    * 4*
* 5*    13:35  1315  REF                 REF CU SAMP                                  * 5*
* 6*    13:40   194  BRZ                                CHARGE                         * 6*
* 7*    13:42   319  SME   CHARGE                                                      * 7*
* 8*    14:30   194  BRZ                                SAMP RED.#2                    * 8*
* 9*    14:40  1315  REF                 SLAG OFF                                     * 9*
*20*    14:45  1315  REF                 REF CU SAMP                                  *20*
* 1*    14:45   567  SME                                              SLAG OFF         * 1*
* 2*    14:55   568  SME                                              SLAG TRANS       * 2*
* 3*   '-----------------------------------------------------------------------------'  * 3*
* 4*     FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3      * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
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WORKSTATION 194 - USER MLR - REZNACK, MICHELLE 219CRE

8:04:46 AM MONDAY MAY 22, 1989

```
**********************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
**********************************************************************************
*  *                                                                             *  *
* 1*                              EVENT SUMMARY                                  * 1*
* 2*   .----------------.-----------.-----------.-----------.-----------.        * 2*
* 3*     5/10  HEAT  TYP        4           2           1           3             * 3*
* 4*   ----------------+-----------+-----------+-----------+-----------          * 4*
* 5*     14:55   568  SME                                        SLAG TRANS       * 5*
* 6*     15:15   194  BRZ                            TAP 2ND MTL                  * 6*
* 7*     15:15  1315  REF                 CHARGE                                  * 7*
* 8*     15:16   194  BRZ                            WRAP-UP                      * 8*
* 9*     16:00   195  SME                            CHARGE                       * 9*
*10*     16:01   195  SME                            CHARGE                       *10*
* 1*     16:02   195  SME                            CHARGE                       * 1*
* 2*     16:03   195  SME                            CHARGE                       * 2*
* 3*     16:04   195  SME                            CHARGE                       * 3*
* 4*     16:40   568  SME                                        SLAG OFF         * 4*
* 5*     16:45   568  SME                                        SAMP BL CU       * 5*
* 6*     16:55   569  SME                                        CHARGE           * 6*
* 7*     17:00  1315  REF                 SLAG OFF                                * 7*
* 8*     17:05  1315  REF                 REF CU SAMP                             * 8*
* 9*     17:20  1315  REF                 CHARGE                                  * 9*
*20*     17:20   569  SME                                        SLAG TRANS       *20*
* 1*     17:35   195  SME                            SLAG OFF                     * 1*
* 2*     18:10   319  SME   SLAG OFF                                              * 2*
* 3*   '----------------------------------------------------------------'         * 3*
* 4*     FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3 * 4*
*  *                                                                             *  *
**********************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
**********************************************************************************
```

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION V

Central ~~DISTRICT OFFICE~~

STATE NOTIFICATION OF INSPECTION

Authority: ✓ SECTION 114(d)(1)-CLEAN AIR ACT, AS AMENDED

____ CWA, ____ TSCA, ____ RCRA, ____ SWDA

Source Name: CHEMETCO

Address:

City: ALTON

State: ILLINOIS

Person Notified: John Justice

Title: (618) 346-5120

Organization: ILL EPA - COLLINSVILLE office

Date of Notification: May 3, 1989

Planned Date of Inspection: May 9, 1989

Purpose of Inspection (compliance monitoring, Enforcement Division request etc.)

Scope: VEO

Person Giving Notice: G. Golubski

Title: Env. Eng.

Organization: US EPA - Region V

G. Golubski
(signature)

ESD/CDD
(organization)

6 JUN 1989

Visible Emissions Observations at Chemetco
Foundry, Hartford, Illinois (AFH114:H2)

Gerald R. Golubski, Environmental Engineer
Central District Office (5SCDO)

Engineering Section (5AC)
ATTN: Sharon Freeman (5AC)

THRU: Willie H. Harris, Chief
Central District Office (5SCDO)

On April 24, 1989, visible emissions observations were made off-site at the subject facility. This inspection is pursuant to Mr. John Gaitskill's request (priority 2-49-89) for inspections during this FY. Representing the facility was Ms. Michelle L. Reznack, environmental manager. The Illinois EPA (Collinsville Office) was notified that an inspection was to take place at this time, however, they did not participate.

Three Hours of Visible Observations

Beginning at 2:15 p.m. and continuing for three uninterrupted hours continuous visible emissions observations were made on the west side of the foundry plant. As indicated in the attached visible emissions observations sheets significant emissions occurred from 2:15 p.m. to 2:28 p.m., 2:42 p.m. to 2:45 p.m., 2:52 p.m. to 3:00 p.m., a few brief moments during the second hour (3:15 to 4:15 p.m.) and finally between 4:19 p.m. to 4:23 p.m.. Attached to this inspection report are photographs taken at the time indicated (they are also noted on the visible emissions observation sheets).

Please note that the attached visible emissions observations are made on emissions from the west side of the foundry. No attempt was made to read the four stacks in the background, since they appeared to be emitting only a very few minutes each hour and their emissions were significantly less than the emissions from the roof top monitor.

Also provided with this inspection report is a computer copy of the events occurring at the time of the visible observations. As explained by Ms. Resnack all four foundries were operating at this time.

If you have any questions concerning this inspection report, please call me at 886-1968.

Attachments

5SCDO:GGOLUBSKI:gw:5-23-89:DISK U:FINAL

JPS for WHH 6/6/89

BT 6/5/89

5/30/89

Chemetco
FIRST IN PEOPLE — QUALITY — SERVICE
P.O. BOX 187 • ALTON, ILLINOIS 62002

April 27, 1989

Mr. Gerald R. Golubski, P.E.
Environmental Engineer
United States Environmental Protection Agency
Region V
Environmental Services Division
536 South Clark Street
Chicago, Illinois 60605

Dear Mr. Golubski,

Enclosed please find the operations data that you requested on your recent visit here on April 24, 1989 for that date and an earlier one, March 10, 1989. Also attached are copies of malfunction reports filed with Illinois Environmental Protection Agency for Furnace No. 1 on the 24th.

If I can be of any further help or you require more information, please do not hesitate to call me at 618-254-4381. If I cannot personally answer your question, I will put you in touch with the person who will be able to.

Sincerely,

Michelle Reznack

Michelle Reznack
Environmental Manager

cc: file
enclosures

WORKSTATION 191 - USER MLR - REZNACK, MICHELLE 219CRE

5:20:18 PM MONDAY APRIL 24, 1989

```
*****************************************************************
****          1         2         3         4         5         6
**** 123456789012345678901234567890123456789012345678901234567890123
*****************************************************************
*  *
* 1*                                EVENT SUMMARY
* 2*    .-----------------.-------------.-------------.------------
* 3*      4/24  HEAT  TYP        4             2             1
* 4*    -----------------+-------------+-------------+------------
* 5*     10:50  1267  REF                   CHARGE
* 6*     10:50   477  SME
* 7*     10:50   236  BRZ   BLOW TAP #1
* 8*     10:51   101  SME                                CHARGE
* 9*     10:51  1267  REF                   CHARGE
*10*     10:52   101  SME                                CHARGE
* 1*     11:05   477  SME
* 2*     11:10   236  BRZ   CHARGE
* 3*     12:15   236  BRZ   CHARGE
* 4*     12:35  1267  REF                   SLAG OFF
* 5*     12:35   477  SME
* 6*     12:43  1267  REF                   REF CU SAMP
* 7*     12:50   101  SME                                SMELT TRANS
* 8*     12:50  1267  REF                   CHARGE
* 9*     12:50   477  BRZ
*20*     13:00   236  BRZ   SAMP RED.#2
* 1*     13:15   236  BRZ   TAP 2ND MTL
* 2*     13:35  1267  REF                   SLAG OFF
* 3*    '-----------------------------------------------------------
* 4*      FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1
*  *
*****************************************************************
****          1         2         3         4         5         6
**** 123456789012345678901234567890123456789012345678901234567890123
*****************************************************************
```

Ref = Refining

Sms: Smelting

Brz = Bronzing

WORKSTATION 211 - USER MLR - REZNACK, MICHELLE 219CRE

4:06:41 PM THURSDAY APRIL 27, 1989

```
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                 *  *
* 1*                                EVENT SUMMARY                                    * 1*
* 2*   .-----------------.-----------.-----------.-----------.-----------.           * 2*
* 3*     3/10  HEAT  TYP       4           2           1           3                 * 3*
* 4*   -----------------+-----------+-----------+-----------+-----------             * 4*
* 5*     9:30     1  SME   T.H. METAL                                                 * 5*
* 6*     9:40   675  BRZ                                CHARGE                       * 6*
* 7*    10:25     1  SME   SLAG OFF                                                   * 7*
* 8*    10:35     1  SME   TAP BLK CU                                                 * 8*
* 9*    10:45   237  SME                                            METAL TRANS       * 9*
*10*    10:50     2  SME   CHARGE                                                     *10*
* 1*    11:00  1141  REF                 SLAG OFF                                    * 1*
* 2*    11:10  1141  REF                 REF CU SAMP                                 * 2*
* 3*    11:15   675  BRZ                                SAMP RED.#2                  * 3*
* 4*    11:15  1141  REF                 CHARGE                                      * 4*
* 5*    11:15   237  SME                                            SLAG TRANS        * 5*
* 6*    11:16  1141  REF                 CHARGE                                      * 6*
* 7*    11:30   675  BRZ                                CHARGE                       * 7*
* 8*    12:00   675  BRZ                                SAMP RED.#2                  * 8*
* 9*    12:05   675  BRZ                                TAP 2ND MTL                  * 9*
*20*    12:06   675  BRZ                                WRAP-UP                      *20*
* 1*    12:15   237  SME                                            SLAG TRANS        * 1*
* 2*    12:30   237  SME                                            TAP BLK CU        * 2*
* 3*   '-----------------------------------------------------------------------'     * 3*
* 4*     FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3     * 4*
*  *                                                                                 *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
```

WORKSTATION 211 - USER MLR - REZNACK, MICHELLE 219CRE

4:06:49 PM THURSDAY APRIL 27, 1989

```
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                                EVENT SUMMARY                                     * 1*
* 2*   .-----------------.-------------.-------------.-------------.-------------.    * 2*
* 3*     3/10  HEAT  TYP        4             2             1             3          * 3*
* 4*   -----------------+-------------+-------------+-------------+-------------    * 4*
* 5*    12:30   237  SME                                            TAP BLK CU       * 5*
* 6*    12:30     2  SME   SMELT TRANS                                               * 6*
* 7*    12:45  1141  REF                 SLAG OFF                                   * 7*
* 8*    12:50   676  SME                                METAL TRANS                  * 8*
* 9*    13:00  1141  REF                 TAP METAL                                  * 9*
*10*    13:00   238  BRZ                                            SLAG TRANS       *10*
* 1*    13:10   676  SME                                CHARGE                       * 1*
* 2*    13:11   238  BRZ                                            CHARGE           * 2*
* 3*    14:30     2  SME   SLAG OFF                                                  * 3*
* 4*    14:35  1142  REF                 CHARGE                                     * 4*
* 5*    14:36  1142  REF                 CHARGE                                     * 5*
* 6*    14:37  1142  REF                 CHARGE                                     * 6*
* 7*    14:40     2  SME   SAMP BL CU                                               * 7*
* 8*    14:45   676  SME                                SLAG OFF                     * 8*
* 9*    14:45     3  SME   CHARGE                                                    * 9*
*20*    14:46     3  SME   CHARGE                                                    *20*
* 1*    15:00   676  SME                                TAP BLK CU                   * 1*
* 2*    15:15   676  SME                                DELAY                        * 2*
* 3*   '-----------------------------------------------------------------------'    * 3*
* 4*      FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3   * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
```

WORKSTATION 211 - USER MLR - REZNACK, MICHELLE 219CRE

4:06:58 PM THURSDAY APRIL 27, 1989

```
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                                EVENT SUMMARY                                     * 1*
* 2*   .----------------.-------------.-------------.-------------.-------------.     * 2*
* 3*     3/10  HEAT  TYP        4             2             1             3           * 3*
* 4*   ----------------+-------------+-------------+-------------+-------------       * 4*
* 5*    15:15   676  SME                                DELAY                          * 5*
* 6*    15:15  1142  REF                 METAL TRANS                                  * 6*
* 7*    15:30   238  BRZ                                            SAMP RED.#1        * 7*
* 8*    15:40   238  BRZ                                            CHARGE             * 8*
* 9*    16:15     3  SME   TAP BLK CU                                                  * 9*
*10*    16:20  1142  REF                 METAL TRANS                                  *10*
* 1*    16:30   238  BRZ                                            SAMP RED.#1        * 1*
* 2*    16:30     4  SME   CHARGE                                                      * 2*
* 3*    17:00   238  BRZ                                            SAMP RED.#1        * 3*
* 4*    17:15   238  BRZ                                            BLOW TAP #1        * 4*
* 5*    17:35   677  SME                                CHARGE                         * 5*
* 6*    17:45  1142  REF                 T.H. METAL                                   * 6*
* 7*    18:08  1142  REF                 REF CU SAMP                                  * 7*
* 8*    18:10  1142  REF                 SLAG OFF                                     * 8*
* 9*    18:15     4  SME   SLAG TRANS                                                  * 9*
*20*    18:25  1142  REF                 CHARGE                                       *20*
* 1*    18:30  1142  REF                 REF CU SAMP                                  * 1*
* 2*    19:30  1142  REF                 SLAG OFF                                     * 2*
* 3*   '----------------------------------------------------------------------'       * 3*
* 4*     FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3      * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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WORKSTATION 211 - USER MLR - REZNACK, MICHELLE 219CRE

4:11:15 PM THURSDAY APRIL 27, 1989

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*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*   DATE    4/24/89          CHEMETCO ENVIRONMENTAL MANAGEMENT                     * 1*
* 2*   REPORT B                        UPSET CONDITION REPORT                          * 2*
* 3*                                                                                  * 3*
* 4*   DEPARTMENT  FOUNDRY          EQUIPMENT/LOCATION #1 AAF.                         * 4*
* 5*                                                                                  * 5*
* 6*   DATE BEGAN   42489      TIME BEGAN  1145   DATE END  112489     TIME END  1430  * 6*
* 7*             DAYS HRS  MIN                                                        * 7*
* 8*   DURATION        2   45      QUANTITY OF EMISSIONS  MINIMAL                      * 8*
* 9*                                                                                  * 9*
*10*   NATURE OF EMISSIONS  SMELT FUMES                                               *10*
* 1*                                                                                  * 1*
* 2*   MALFUNCTION  #1 FAN DOWN TO CHANGE                                             * 2*
* 3*                                                                                  * 3*
* 4*   CAUSE   LOST OUT BOARD BEARING ON FAN IT LOCKED UP                             * 4*
* 5*                                                                                  * 5*
* 6*   CORRECTIVE ACTIONS  RAN FURNACE WITH MIN. SLOW RPM.                            * 6*
* 7*                                                                                  * 7*
* 8*   MITIGATING ACTION TAKEN                                                        * 8*
* 9*                                                                                  * 9*
*20*   COMMENTS  HAD TO CONTINUE HEAT OR RISK DAMAGING FURNACE LINING WITH SKULL UP    *20*
* 1*                                                                                  * 1*
* 2*   REPORT BY  JHM                                                                 * 2*
* 3*                                                                                  * 3*
* 4*                      PRESS ENTER KEY TO PAGE,   PF 16 TO EXIT                    * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
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WORKSTATION 211 - USER MLR - REZNACK, MICHELLE 219CRE

4:11:40 PM THURSDAY APRIL 27, 1989

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                                                                                                  1         2         3         4         5         6         7         8
                                                                                         12345678901234567890123456789012345678901234567890123456789012345678901234567890
                                                                                         ********************************************************************************
                                                                                         ****                                                                         ****
                                                                                         **** CHEMETCO ENVIRONMENTAL MANAGEMENT                                       ****
                                                                                         ********************************************************************************
                                                                                         *  *
                                                                                         * 1*
                                                                                         * 2*
                                                                                         * 3*
                                                                                         * 4*
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                                                                                         *10*
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                                                                                         * 9*
                                                                                         *20*
                                                                                         * 1*
                                                                                         * 2*
                                                                                         * 3*
                                                                                         * 4*
                                                                                         *  *
                                                                                         ********************************************************************************
                                                                                         ****                                                                         ****
                                                                                         **** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
                                                                                         ********************************************************************************
```

CHEMETCO ENVIRONMENTAL MANAGEMENT
UPSET CONDITION REPORT

DATE 4/24/89

REPORT C

EQUIPMENT/LOCATION AAF FAN #1 FCE

DEPARTMENT FOUNDRY

TIME END 1600

TIME BEGAN 1431 DATE END 42489

DATE BEGAN 42489

QUANTITY OF EMISSIONS LIGHT

| | DAYS | HRS | MIN |
|---|---|---|---|
| DURATION | | 1 | 29 |

NATURE OF EMISSIONS LIGHT

MALFUNCTION BAD AAF FAN

CAUSE BUILD UP ON BLADES

CORRECTIVE ACTIONS REPLACE FAN

MITIGATING ACTION TAKEN

COMMENTS

REPORT BY RON

PRESS ENTER KEY TO PAGE, PF 16 TO EXIT

WORKSTATION 211 - USER MLR - REZNACK, MICHELLE 219CRE

4:08:12 PM THURSDAY APRIL 27, 1989

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*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                                EVENT SUMMARY                                     * 1*
* 2*   .----------------.-----------.-----------.-----------.-----------.             * 2*
* 3*     4/24  HEAT  TYP       4           2           1           3                  * 3*
* 4*   ----------------+-----------+-----------+-----------+-----------               * 4*
* 5*    13:15   236  BRZ  TAP 2ND MTL                                                 * 5*
* 6*    13:20   236  BRZ  WRAP-UP                                                     * 6*
* 7*    13:35  1267  REF                SLAG OFF                                      * 7*
* 8*    13:45   237  SME  CHARGE                                                      * 8*
* 9*    13:46   237  SME  CHARGE                                                      * 9*
*10*    14:00   477  BRZ                                          SLAG TRANS          *10*
* 1*    14:03  1267  REF                TAP METAL                                     * 1*
* 2*    15:00   101  SME                            SLAG OFF                          * 2*
* 3*    15:00  1268  REF                CHARGE                                        * 3*
* 4*    15:00   237  SME  SLAG OFF                                                    * 4*
* 5*    15:10   101  SME                            SAMP BL CU                        * 5*
* 6*    17:00   478  BRZ                                          CHARGE              * 6*
* 7*    17:45   237  SME  TAP BLK CU                                                  * 7*
* 8*    18:00   102  SME                            CHARGE                            * 8*
* 9*    18:00  1268  REF                CHARGE                                        * 9*
*20*    18:00   478  BRZ                                          SAMP RED.#1         *20*
* 1*    18:02   102  SME                            METAL TRANS                       * 1*
* 2*    18:05   478  BRZ                                          BLOW TAP #1         * 2*
* 3*   '-----------------------------------------------------------------------'      * 3*
* 4*      FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3     * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
```

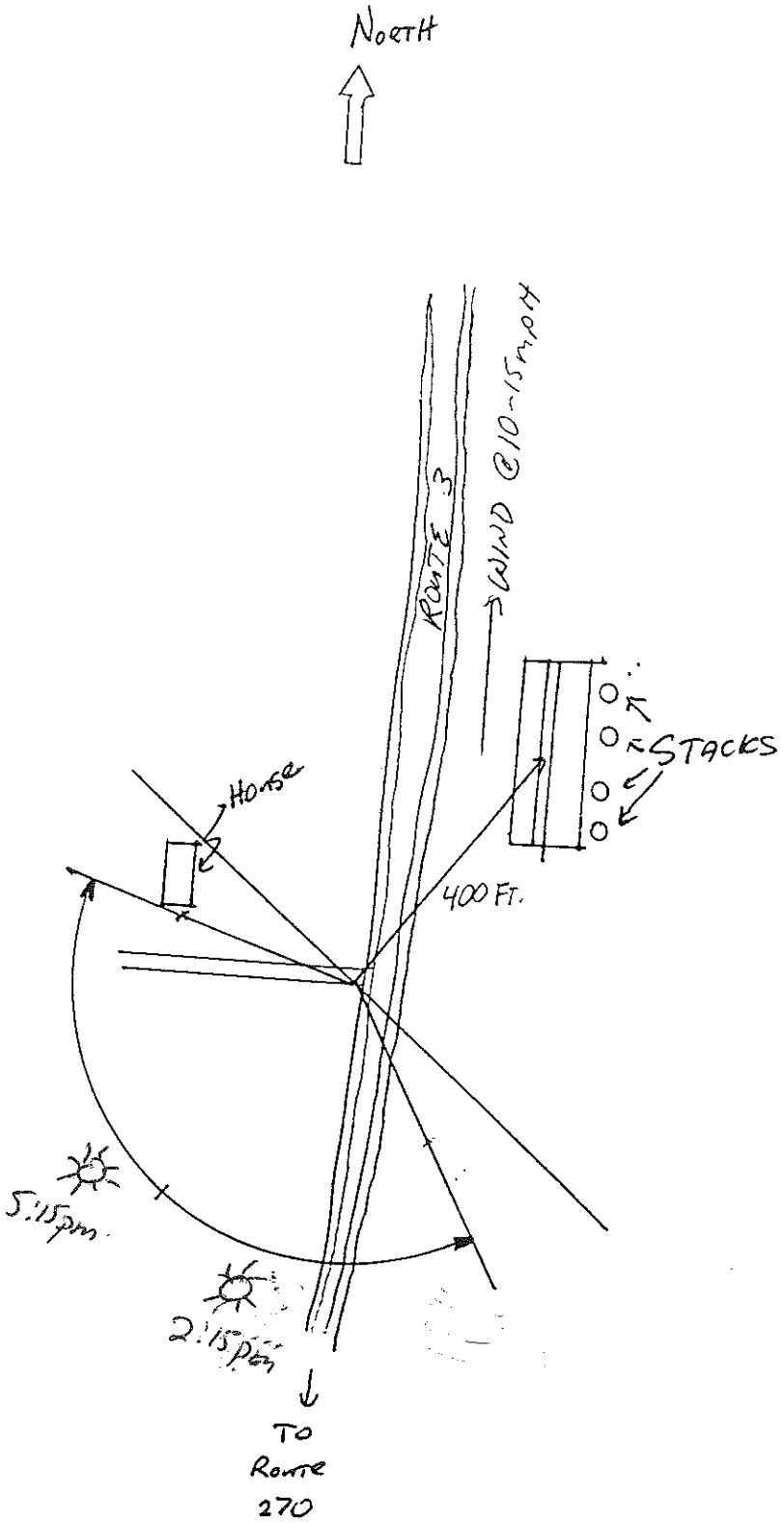
WORKSTATION 211 - USER MLR - REZNACK, MICHELLE 219CRE

4:08:05.PM THURSDAY APRIL 27, 1989

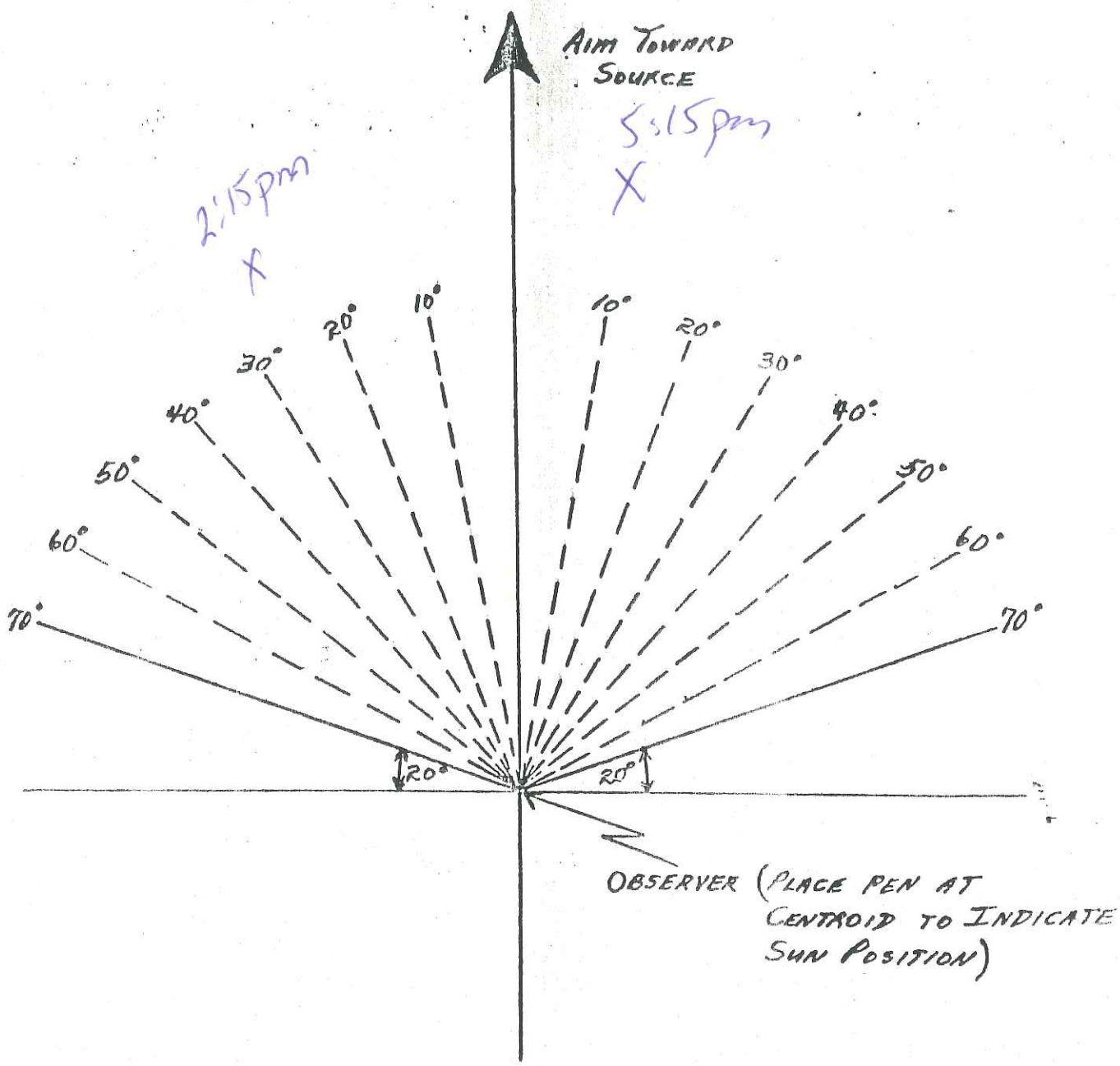
EVENT SUMMARY

| 4/24 | HEAT | TYP | 4 | 2 | 1 | 3 |
|---|---|---|---|---|---|---|
| 10:45 | 236 | BRZ | SAMP RED.#1 | CHARGE | | SLAG TRANS |
| 10:50 | 1267 | REF | | | | |
| 10:50 | 477 | SME | | | | |
| 10:50 | 236 | BRZ | BLOW TAP #1 | | CHARGE | |
| 10:51 | 101 | SME | | CHARGE | CHARGE | T.H. METAL |
| 10:51 | 1267 | REF | | | | |
| 10:52 | 101 | SME | | | | |
| 11:05 | 477 | SME | | | | |
| 11:10 | 236 | BRZ | CHARGE | | | |
| 12:15 | 236 | BRZ | CHARGE | SLAG OFF | | SLAG TRANS |
| 12:35 | 1267 | REF | | | | |
| 12:35 | 477 | SME | | REF CU SAMP | SMELT TRANS | |
| 12:43 | 1267 | REF | | | | |
| 12:50 | 101 | SME | | CHARGE | | SLAG TRANS |
| 12:50 | 1267 | REF | | | | |
| 12:50 | 477 | BRZ | | | | |
| 13:00 | 236 | BRZ | SAMP RED.#2 | | | |
| 13:15 | 236 | BRZ | TAP 2ND MTL | | | |

FOR DETAIL PF4 - FCE 4 PF2 - FCE 2 PF1 - FCE 1 PF3 - FCE 3




CHEMETCO
APRIL 24, 1989
OBSERVER: G. GOLABSKI
US EPA-REGION V




CHEMETCO

OBSERVER: G. GOLUBSKI
DATE: APRIL 24, 1989

# VISIBLE EMISSION EVALUATOR'S REPORT TO ENFORCEMENT

Source Identification

Facility: CHEMETCO, Hartford Illinois

Source: Roof Top monitor

Regulation: Illinois Rule 202 (b)

Evaluator's Report

On April 24, 1989, visible emission evaluation began at 2:15 pm, and continued for 180 minutes.

SUMMARY OF READINGS

| Set Number | Time Start - End (__T) | Opacity Average | READINGS >30 to 60% | READINGS > 60% |
|---|---|---|---|---|
| 1 | 2:15pm - 2:20pm | 27.5 | 0 | 24 |
| 2 | 2:21pm - 2:26pm | 78.33 | 2 | 22 |
| 3 | 2:27pm - 2:32pm | 22.50 | 8 | 0 |
| 4 | 2:33pm - 2:38pm | 3.75 | 0 | 0 |
| 5 | 2:39pm - 2:44pm | 17.29 | 4 | 0 |
| 6 | 2:45pm - 2:50pm | 6.67 | 0 | 0 |
| 7 | 2:51pm - 2:56pm | 70.41 | 7 | 14 |
| 8 | 2:57pm - 3:02pm | 26.67 | 7 | 0 |
| 9 | 3:03pm - 3:08pm | 29.17 | 6 | 0 |
| 10 | 3:09pm - 3:14pm | 27.08 | 2 | 0 |

Readings ranged from 0 to 80 % opacity.

Meteorological Conditions: Cloud Cover Partly Cloudy

Ambient Temperature 85 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - Region V - ESD/CDO

Date of Last Certification: April 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility: CHEMETCO
NEAR HARTFORD, ILLINOIS

Date: APRIL 24, 1989

Observer: G. GOLABSKI

Source: ROOF TOP MONITOR (WEST SIDE)

Observation Point: ON SIDEROAD AND RTE 3 SOUTHWEST of Facility

Distance From: 350 FT.

Direction From: SOUTHWEST

Source Height: ~ 80 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | SOUTH | SAME |
| Wind Speed | 10-15 mph | |
| Sky Condition | Partly Cloudy | |
| Background | Blue Sky/Clouds | |
| Ambient Temperature °F | 85 | |
| Humidity (high-low) | LOW | |
| Color of Emissions | WHITE | |
| Reading Conditions | GOOD | |

Plant Representatives:

State/Local Agency Representatives: NONE

Observation
Began 2:15 pm Ended 3:15 pm
(= T)

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 70 | 70 | 80 | 80 | | 30 | 5 | 5 | 0 | 0 | |
| 1 | 70 | 70 | 70 | 70 | | 31 | 0 | 0 | 10 | 10 | |
| 2 | 80 | 80 | 80 | 80 | | 32 | 15 | 15 | 10 | 5 | |
| 3 | 80 | 80 | 80 | 80 | | 33 | 5 | 5 | 5 | 5 | |
| 4 | 80 | 80 | 80 | 80 | Pic 1,2,3 | 34 | 5 | 5 | 5 | 5 | |
| 5 | 80 | 80 | 80 | 80 | | 35 | 10 | 10 | 10 | 10 | |
| 6 | 80 | 80 | 80 | 80 | | 36 | 10 | 10 | 10 | 80 | |
| 7 | 80 | 80 | 80 | 80 | | 37 | 80 | 80 | 80 | 80 | Pic 6,7 |
| 8 | 80 | 80 | 80 | 80 | | 38 | 80 | 80 | 80 | 80 | Black Smoke |
| 9 | 80 | 80 | 80 | 80 | | 39 | 60 | 60 | 60 | 50 | " |
| 10 | 80 | 60 | 60 | 80 | Pic 4 | 40 | 60 | 60 | 60 | 70 | Pic 8,9,10 |
| 11 | 80 | 80 | 80 | 80 | | 41 | 70 | 70 | 80 | 80 | Pic 11 |
| 12 | 60 | 60 | 60 | 60 | | 42 | 60 | 60 | 30 | 40 | Black Smoke |
| 13 | 60 | 40 | 40 | 40 | | 43 | 40 | 40 | 30 | 30 | White Smoke |
| 14 | 10 | 10 | 10 | 10 | | 44 | 50 | 50 | 30 | 30 | |
| 15 | 10 | 5 | 5 | 5 | | 45 | 10 | 10 | 20 | 20 | |
| 16 | 5 | 5 | 5 | 10 | | 46 | 20 | 10 | 10 | 10 | |
| 17 | 10 | 0 | 10 | 10 | | 47 | 10 | 10 | 10 | 10 | |
| 18 | 5 | 5 | 5 | 5 | | 48 | 20 | 20 | 40 | 40 | |
| 19 | 5 | 5 | 5 | 0 | | 49 | 50 | 50 | 50 | 50 | |
| 20 | 0 | 5 | 5 | 5 | | 50 | 20 | 20 | 20 | 20 | |
| 21 | 5 | 5 | 5 | 5 | | 51 | 30 | 30 | 20 | 20 | |
| 22 | 5 | 5 | 5 | 5 | | 52 | 20 | 20 | 20 | 20 | |
| 23 | 0 | 0 | 0 | 0 | | 53 | 30 | 30 | 30 | 30 | |
| 24 | 0 | 0 | 0 | 0 | | 54 | 30 | 40 | 40 | 30 | |
| 25 | 0 | 0 | 0 | 0 | | 55 | 15 | 15 | 20 | 20 | |
| 26 | 0 | 0 | 40 | 40 | | 56 | 20 | 20 | 30 | 30 | |
| 27 | 40 | 40 | 30 | 30 | Pic 5 | 57 | 20 | 20 | 30 | 30 | |
| 28 | 20 | 30 | 30 | 30 | | 58 | 30 | 30 | 30 | 30 | |
| 29 | 30 | 30 | 20 | 5 | | 59 | 30 | 30 | 30 | 30 | |

Observer's Signature: Gerald R. [illegible]

Last Certification Date: APRIL 11, 1989

Observer's Affiliation: US EPA-REGION V-ESD/CO

# VISIBLE EMISSION EVALUATOR'S REPORT TO ENFORCEMENT

Source Identification

Facility: CHEMETCO, Hartford, ILLINOIS

Source: ROOF TOP MONITOR

Regulation: Illinois Rule 202 (b)

Evaluator's Report

On APRIL 24, 1989, visible emission evaluation began at 2:15 pm, and continued for 120 minutes.

SUMMARY OF READINGS

| Set Number | Time Start - End (__T) | Opacity Average | READINGS >30 to 60% | READINGS >60% |
|---|---|---|---|---|
| 11 | 2:15 pm - 3:20 pm | 20.83 | 1 | 0 |
| 12 | 3:21 pm - 3:26 pm | 17.71 | 5 | 0 |
| 13 | 3:27 pm - 3:32 pm | 8.95 | 0 | 0 |
| 14 | 3:33 pm - 3:38 pm | 8.33 | 0 | 0 |
| 15 | 3:39 pm - 3:44 pm | 24.16 | 0 | 0 |
| 16 | 3:45 pm - 3:50 pm | 25.41 | 3 | 0 |
| 17 | 3:51 pm - 3:56 pm | 10.00 | 0 | 0 |
| 18 | 3:57 pm - 4:02 pm | 7.91 | 0 | 0 |
| 19 | 4:03 pm - 4:08 pm | 9.58 | 0 | 0 |
| 20 | 4:09 pm - 4:14 pm | 17.91 | 0 | 0 |

Readings ranged from 5 to 40 % opacity.

Meteorological Conditions: Cloud Cover Partly Cloudy

Ambient Temperature 85 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - REGION V - ESD/CDD

Date of Last Certification: April 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Date: APRIL 24, 1989

Observer: G. GOLUBSKI

Facility: CHEMETCO NEAR HARTFORD, ILLINOIS

Source: ROOF TOP MONITOR (WEST SIDE)

Observation Point: ON SIDEROAD AND RTE 3 SOUTHWEST OF FACILITY

Distance From: 350 FT

Direction From: SOUTHWEST

Source Height: ~ 80 FT.

| | Initial | Final |
|---|---|---|
| Wind Direction | SOUTH | SAME |
| Wind Speed | 10-15 mph | |
| Sky Condition | Partly Cloudy | |
| Background | Blue Sky/Clouds | |
| Ambient Temperature °F | 85 | |
| Humidity (high-low) | LOW | |
| Color of Emissions | WHITE/BLK SMOKE | |
| Reading Conditions | GOOD | |

Plant Representatives:

State/Local Agency Representatives: NONE

Observation Began 3:15 pm Ended 4:15 pm (= T)

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 30 | 30 | 30 | 30 | White Smoke | 30 | 30 | 30 | 30 | 40 | |
| 1 | 20 | 20 | 20 | 20 | " | 31 | 40 | 40 | 30 | 30 | |
| 2 | 30 | 10 | 10 | 10 | " | 32 | 30 | 30 | 30 | 30 | |
| 3 | 10 | 10 | 10 | 20 | Black Smoke | 33 | 30 | 30 | 30 | 30 | |
| 4 | 10 | 10 | 20 | 20 | | 34 | 30 | 10 | 10 | 10 | |
| 5 | 30 | 30 | 30 | 40 | " | 35 | 10 | 10 | 10 | 10 | |
| 6 | 40 | 40 | 40 | 40 | White Smoke | 36 | 10 | 10 | 10 | 10 | |
| 7 | 40 | 30 | 30 | 30 | | 37 | 10 | 10 | 10 | 10 | |
| 8 | 30 | 10 | 10 | 10 | | 38 | 10 | 10 | 10 | 10 | |
| 9 | 10 | 5 | 5 | 5 | | 39 | 10 | 10 | 10 | 10 | |
| 10 | 5 | 10 | 10 | 5 | | 40 | 10 | 10 | 10 | 10 | |
| 11 | 5 | 5 | 5 | 5 | | 41 | 10 | 10 | 10 | 10 | |
| 12 | 5 | 10 | 10 | 10 | | 42 | 10 | 10 | 10 | 10 | |
| 13 | 10 | 10 | 10 | 10 | | 43 | 10 | 10 | 10 | 10 | |
| 14 | 10 | 10 | 10 | 10 | | 44 | 10 | 10 | 10 | 10 | |
| 15 | 5 | 5 | 5 | 5 | | 45 | 10 | 10 | 5 | 5 | |
| 16 | 10 | 10 | 10 | 10 | | 46 | 5 | 5 | 5 | 5 | |
| 17 | 10 | 10 | 10 | 10 | | 47 | 5 | 5 | 5 | 5 | |
| 18 | 10 | 10 | 10 | 10 | | 48 | 10 | 20 | 20 | 20 | |
| 19 | 10 | 10 | 10 | 10 | | 49 | 10 | 10 | 10 | 10 | |
| 20 | 10 | 10 | 10 | 10 | | 50 | 5 | 5 | 5 | 5 | |
| 21 | 10 | 10 | 5 | 5 | | 51 | 5 | 5 | 5 | 5 | |
| 22 | 5 | 5 | 5 | 5 | | 52 | 5 | 5 | 5 | 5 | |
| 23 | 5 | 5 | 10 | 10 | | 53 | 5 | 5 | 20 | 20 | |
| 24 | 10 | 10 | 10 | 10 | | 54 | 20 | 20 | 30 | 20 | |
| 25 | 10 | 20 | 20 | 20 | | 55 | 30 | 30 | 20 | 20 | |
| 26 | 20 | 30 | 30 | 30 | | 56 | 20 | 20 | 20 | 20 | |
| 27 | 30 | 30 | 30 | 30 | | 57 | 20 | 20 | 20 | 20 | |
| 28 | 30 | 30 | 30 | 30 | | 58 | 10 | 10 | 10 | 10 | |
| 29 | 30 | 30 | 30 | 30 | | 59 | 10 | 10 | 10 | 10 | |

Observer's Signature: Gerald R. Golubski

Last Certification Date: APRIL 11, 1989

Observer's Affiliation: US EPA - REGION V - ESD/OD

# VISIBLE EMISSION EVALUATOR'S REPORT TO ENFORCEMENT

Source Identification

Facility: CHEMETCO, Hartford, Illinois

Source: Roof Top monitor

Regulation: Illinois Rule 202 (b)

Evaluator's Report

On April 24, 1989, visible emission evaluation began at 2:15 pm, and continued for 180 minutes.

SUMMARY OF READINGS

| Set Number | Time Start - End (__T) | Opacity Average | READINGS | |
|---|---|---|---|---|
| | | | >30 to 60% | > 60% |
| 21 | 4:15pm - 4:20pm | 35.41 | 3 | 5 |
| 22 | 4:21pm - 4:26pm | 39.58 | 4 | 6 |
| 23 | 4:27pm - 4:32pm | 1.87 | 0 | 0 |
| 24 | 4:33pm - 4:38pm | 11.25 | 4 | 0 |
| 25 | 4:39pm - 4:44pm | 0.00 | 0 | 0 |
| 26 | 4:45pm - 4:50pm | 0.00 | 0 | 0 |
| 27 | 4:51pm - 4:56pm | 0.00 | 0 | 0 |
| 28 | 4:57pm - 5:02pm | 0.00 | 0 | 0 |
| 29 | 5:03pm - 5:08pm | 0.00 | 0 | 0 |
| 30 | 5:09pm - 5:14pm | 0.00 | 0 | 0 |

Readings ranged from 0 to 80 % opacity.

Meteorological Conditions: Cloud Cover mostly cloud

Ambient Temperature 85 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Gerald R. Golubski

Name: GERALD R. GOLUBSKI

Title: ENVIRONMENTAL ENGINEER

Office: US EPA - Region V - ESD/CDD

Date of Last Certification: April 11, 1989

Initials of person who summarized data:

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Date: APRIL 24, 1989

Observer: G. GOLUBSKI

Facility CHEMETCO NEAR HARTFORD, ILLINOIS

Source: ROOF TOP MONITOR (WEST SIDE)

Observation Point: ON SIDEROAD AND RTE 3 SOUTHWEST of facility

Distance From: 350 FT.

Direction From: SOUTH WEST

Source Height: 80 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | SOUTH | SAME |
| Wind Speed | 10-15 MPH | |
| Sky Condition | MOSTLY CLEAR | |
| Background | BLUE SKY | |
| Ambient Temperature °F | 85 | |
| Humidity (high-low) | LOW | |
| Color of Emissions | WHITE/BLACK | |
| Reading Conditions | GOOD | |

Plant Representatives:

State/Local Agency Representatives: NONE

Observation Began 4:15 pm Ended 5:15 pm (= T)

Remarks:

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comme |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 20 | 20 | 20 | 20 | | 30 | 0 | 0 | 0 | 0 | |
| 1 | 20 | 20 | 20 | 20 | | 31 | 0 | 0 | 0 | 0 | |
| 2 | 10 | 10 | 10 | 10 | | 32 | 0 | 0 | 0 | 0 | |
| 3 | 10 | 20 | 20 | 20 | | 33 | 0 | 0 | 0 | 0 | |
| 4 | 60 | 60 | 60 | 80 | P.C | 34 | 0 | 0 | 0 | 0 | |
| 5 | 80 | 80 | 80 | 80 | 12, 13, 14 | 35 | 0 | 0 | 0 | 0 | |
| 6 | 80 | 80 | 80 | 80 | | 36 | 0 | 0 | 0 | 0 | |
| 7 | 80 | 80 | 60 | 60 | | 37 | 0 | 0 | 0 | 0 | |
| 8 | 60 | 40 | 20 | 20 | | 38 | 0 | 0 | 0 | 0 | |
| 9 | 20 | 20 | 20 | 20 | | 39 | 0 | 0 | 0 | 0 | |
| 10 | 20 | 20 | 20 | 20 | | 40 | 0 | 0 | 0 | 0 | |
| 11 | 20 | 10 | 10 | 10 | | 41 | 0 | 0 | 0 | 0 | |
| 12 | 5 | 5 | 5 | 5 | | 42 | 0 | 0 | 0 | 0 | |
| 13 | 5 | 5 | 5 | 5 | | 43 | 0 | 0 | 0 | 0 | |
| 14 | 5 | 0 | 0 | 0 | | 44 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | | 45 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | | 46 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | | 47 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | | 48 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | | 49 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | | 50 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | | 51 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 60 | 60 | WHITE | 52 | 0 | 0 | 0 | 0 | |
| 23 | 60 | 60 | 20 | 10 | SMOKE | 53 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | | 54 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | | 55 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | | 56 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | | 57 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | | 58 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | | 59 | 0 | 0 | 0 | 0 | |

Observer's Signature Gerald R. Golubski

Last Certification Date APRIL 11, 1989

Observer's Affiliation US EPA - REGION V - ES

CHEMETCO
April 24, 1989

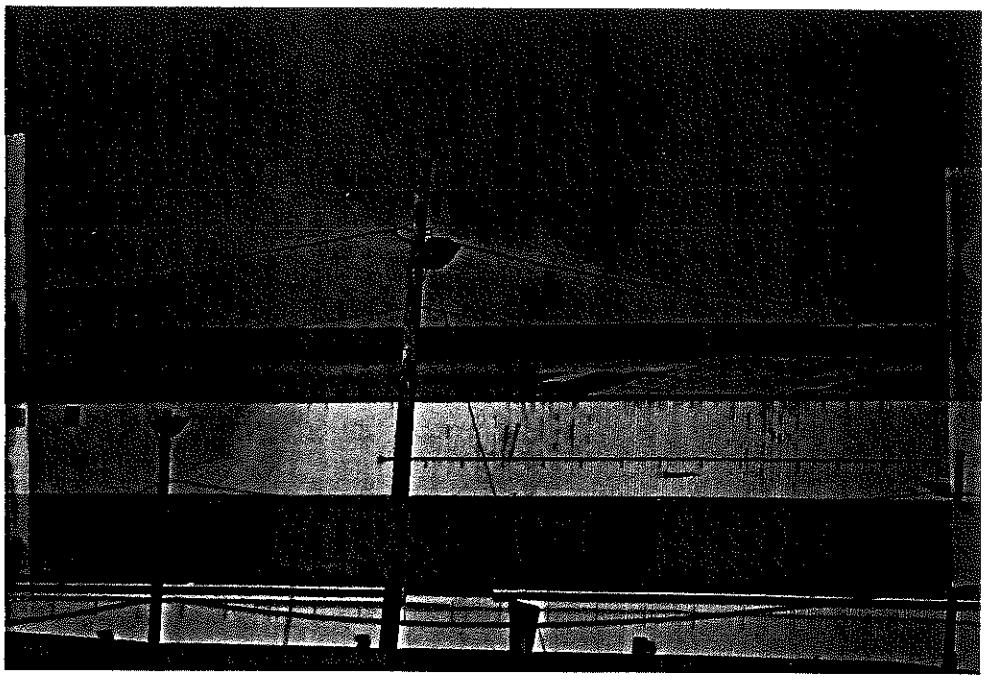


Fig 13 North End of Roof Top Monitor at 4:20 pm.

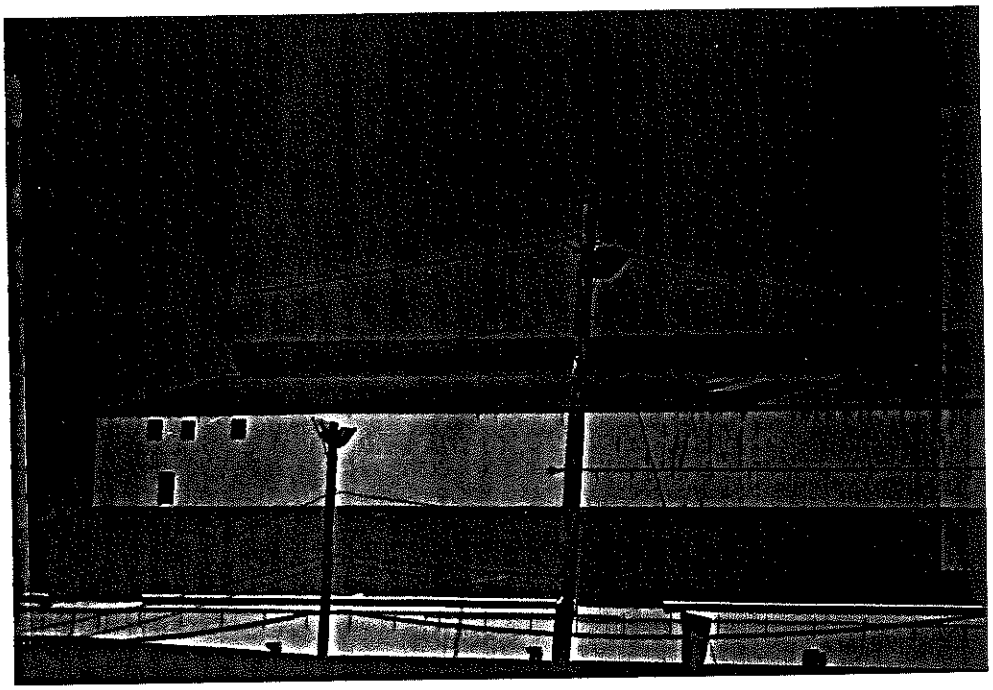


Fig 14. North End of Roof Top Monitor at 4:20 pm

CHEMETCO
April 24, 1989

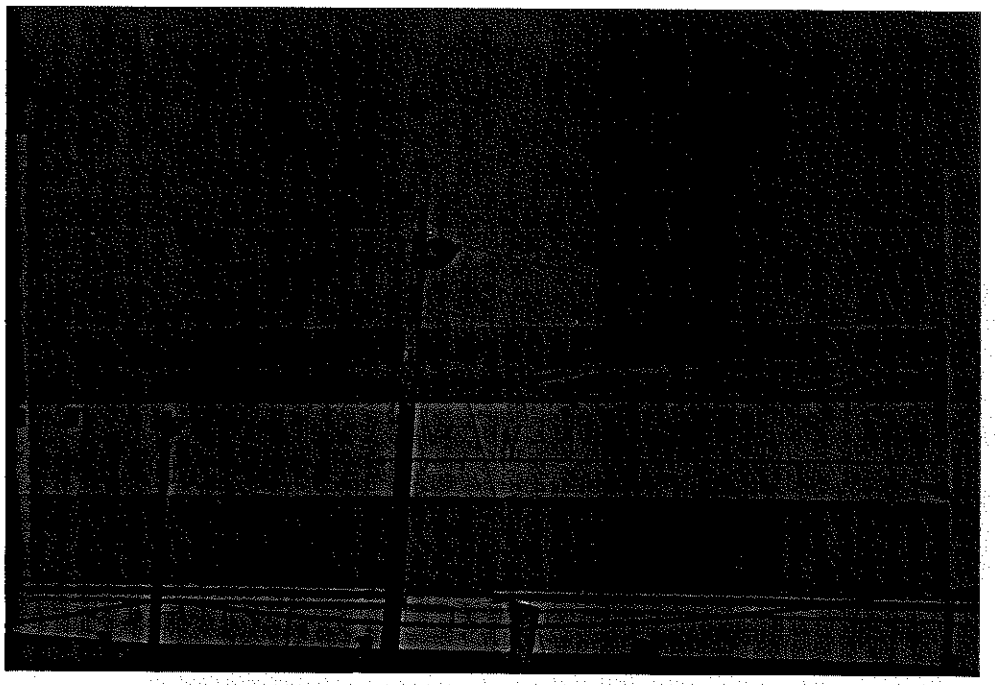


Fig 13 North End of Roof Top Monitor at 4:20 pm.

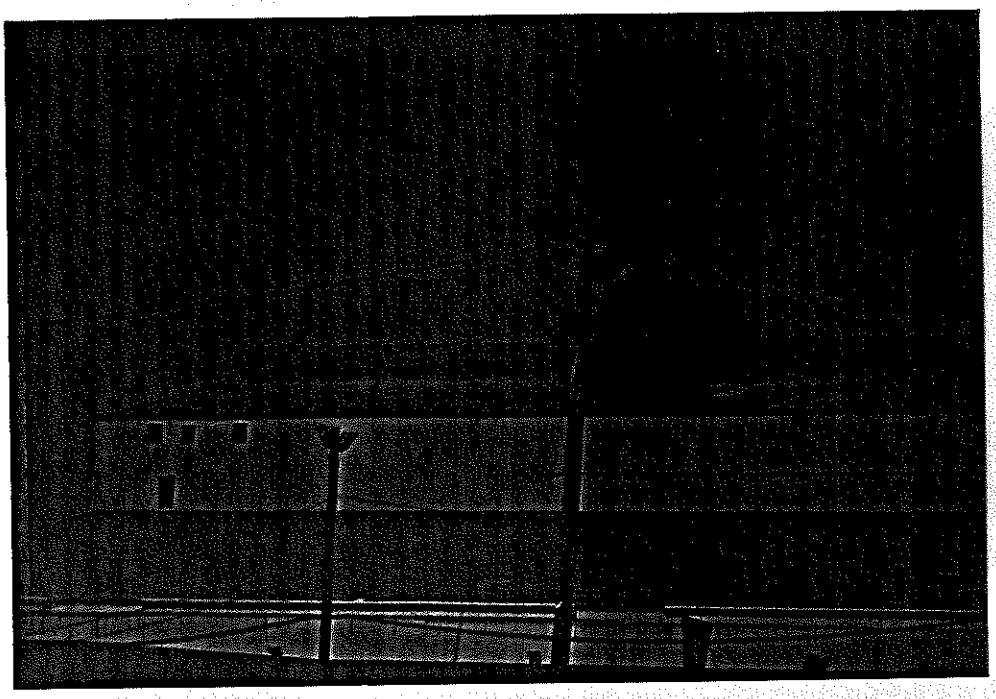


Fig 14. North End of Roof Top Monitor at 4:20 pm

CHEMETCO
April 24, 1989.

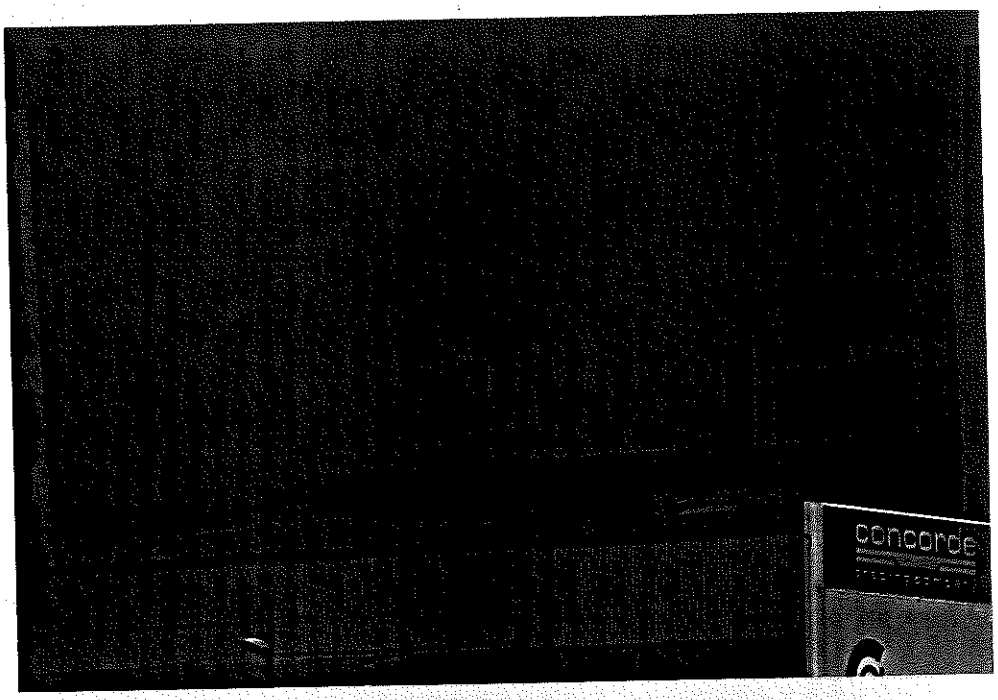



Fig 11. Roof top monitor at 2:56 pm

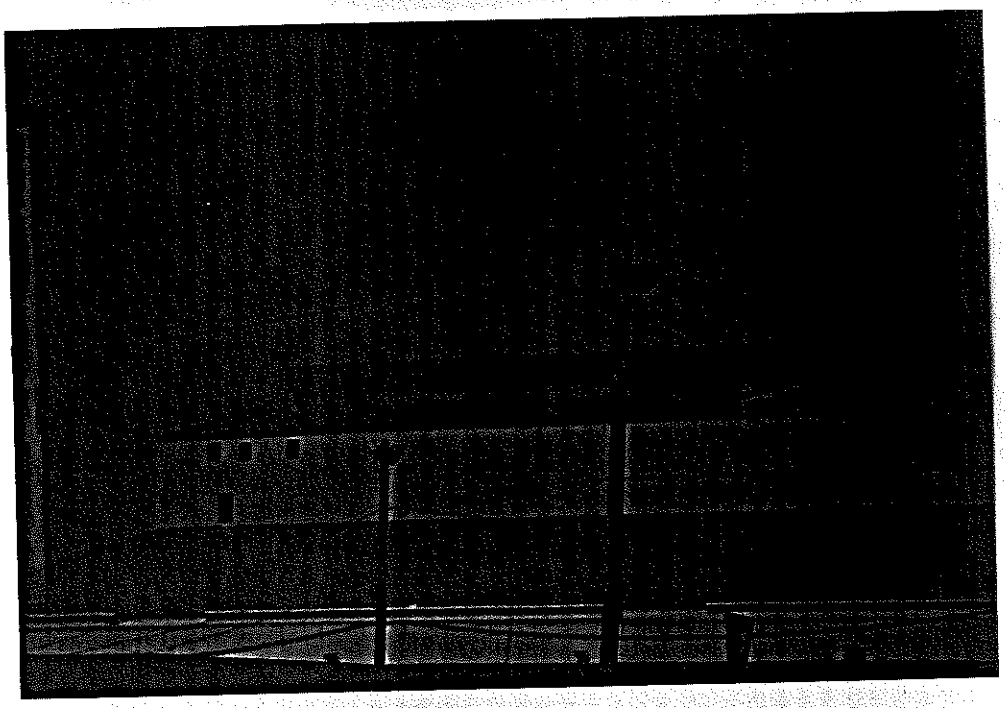


Fig 12 North end of Roof top monitor at 4:20pm.

CHEMETCO
April 24, 1989

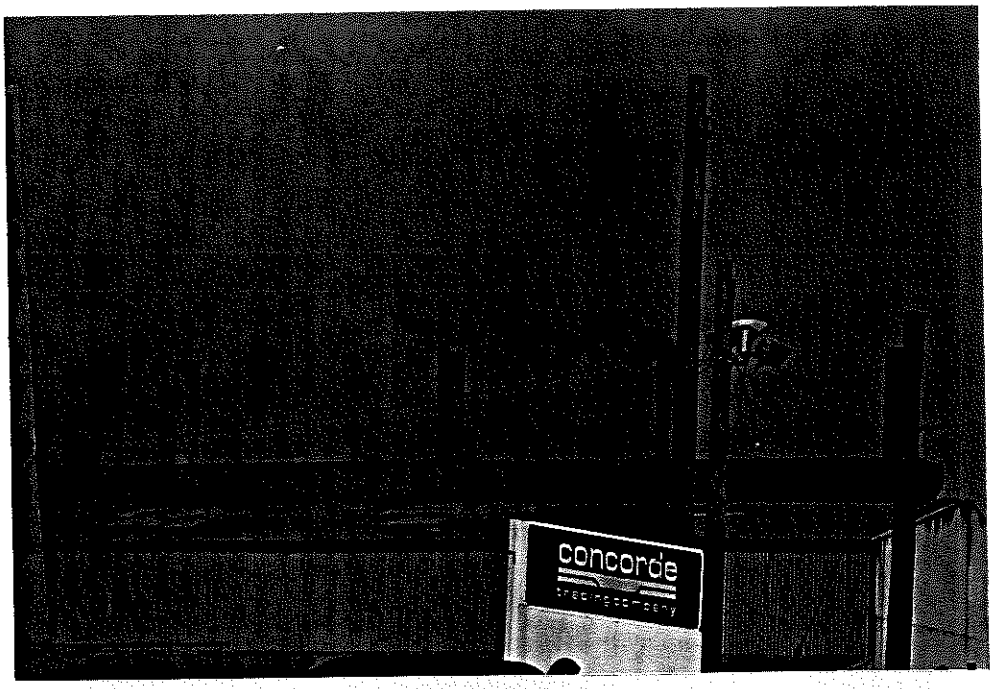



Fig 9 Exhaust stack and south end of Roof Top monitor.
at 2:55 pm

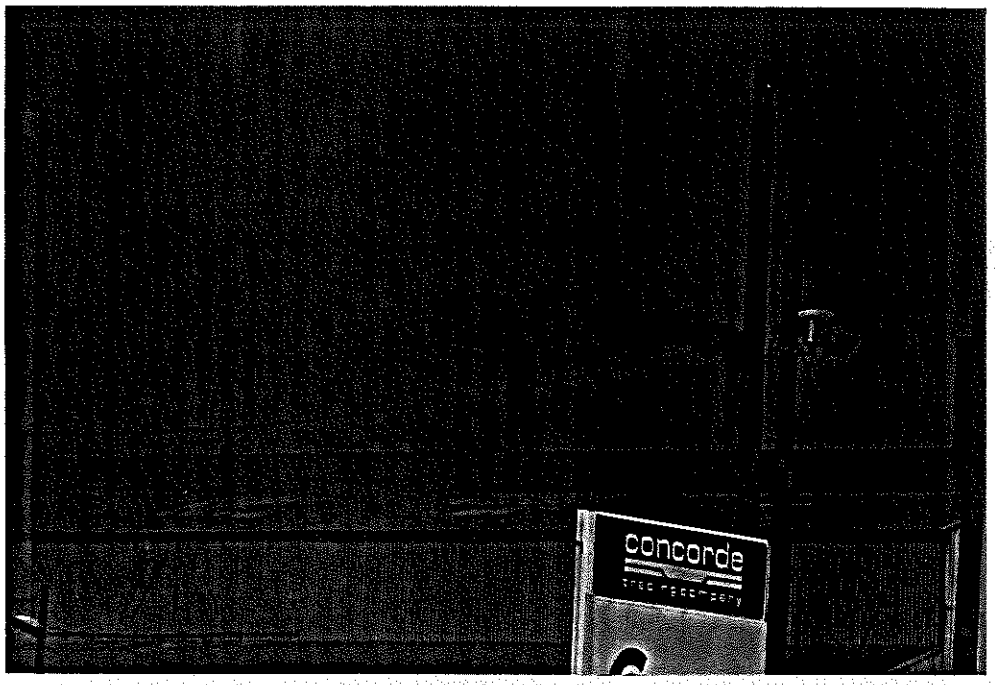



Fig 10 Exhaust stack and South end of Roof Top monitor
at 2:55 pm

CHEMETCO
April 24, 1989.

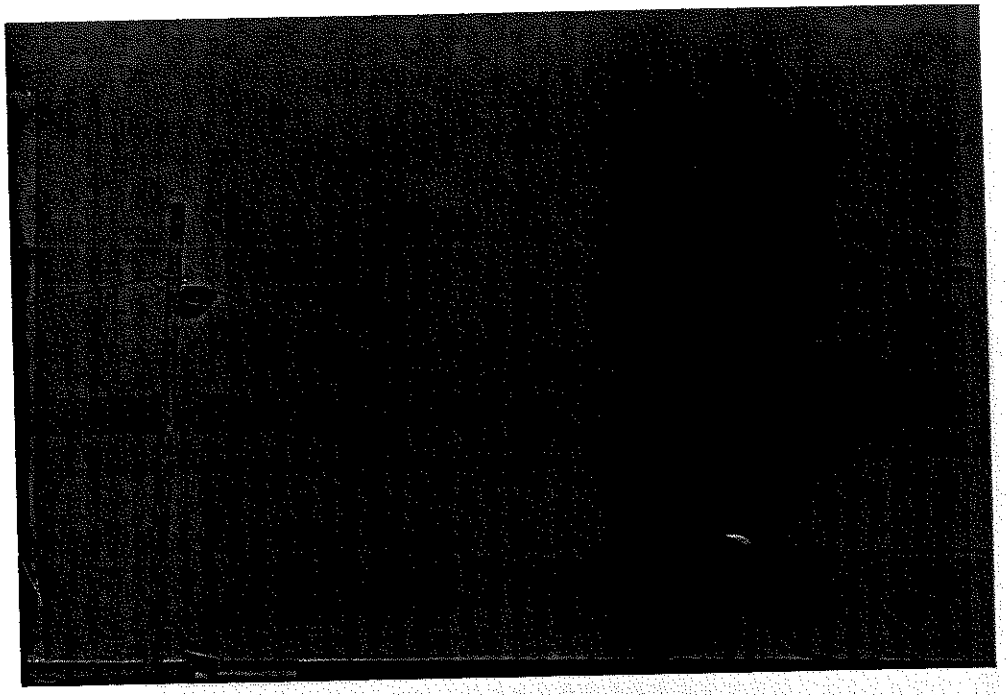


Fig. 7 Roof top monitor at 2:52 pm (Black smoke)

Fig 8 Exhaust stack and South end of Roof top monitor at 2:55pm.

CHEMETCO
April 24, 1989

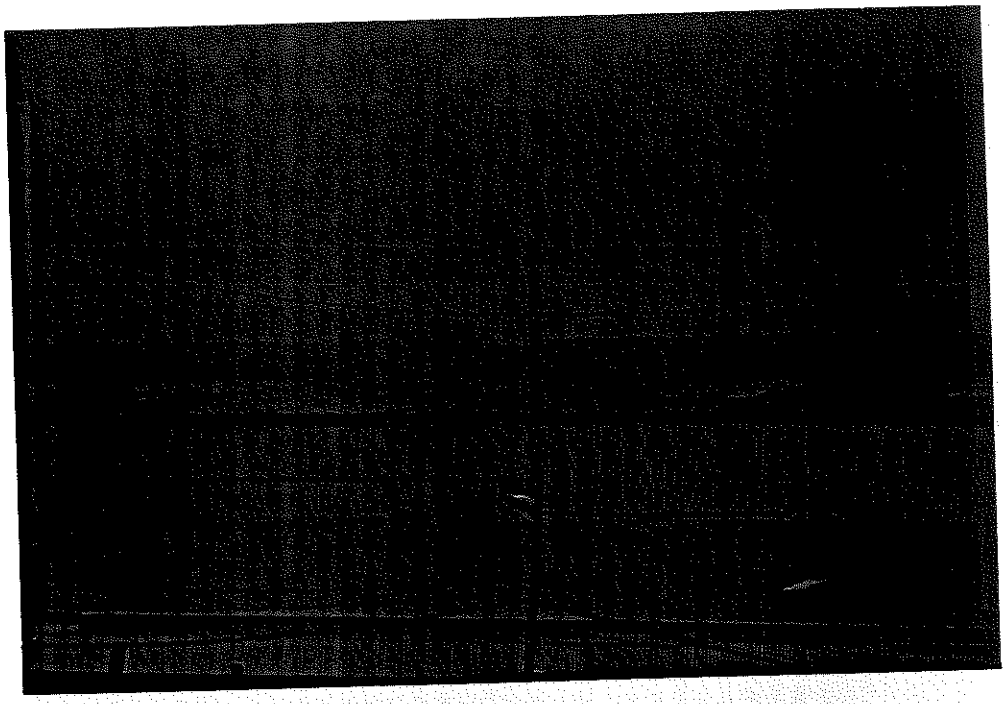


Fig 5 Roof top monitor at 2:42 pm.

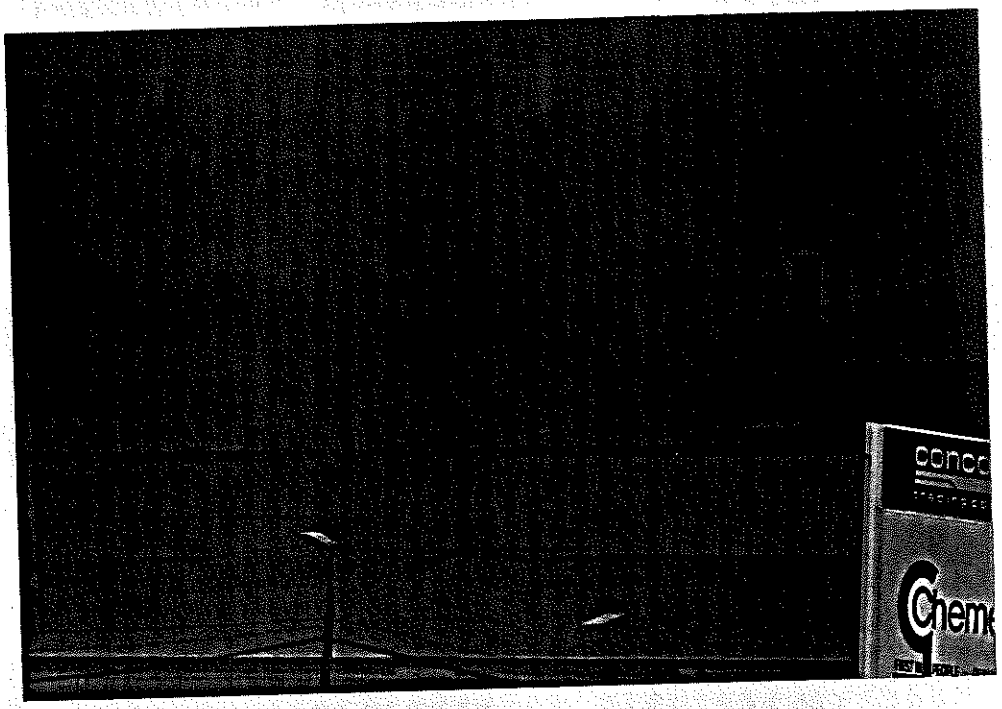


Fig. 6. Roof top monitor at 2:52 pm. (Black smoke)

CHEMETCO
April 24, 1989

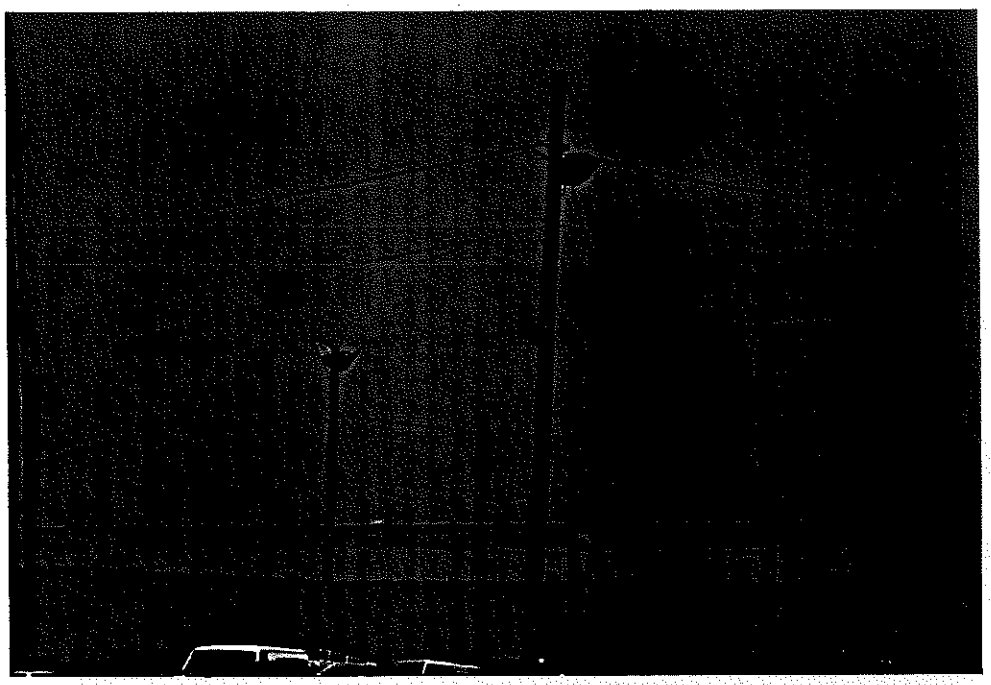


Fig 3 Roof top monitor at 2:19 pm.

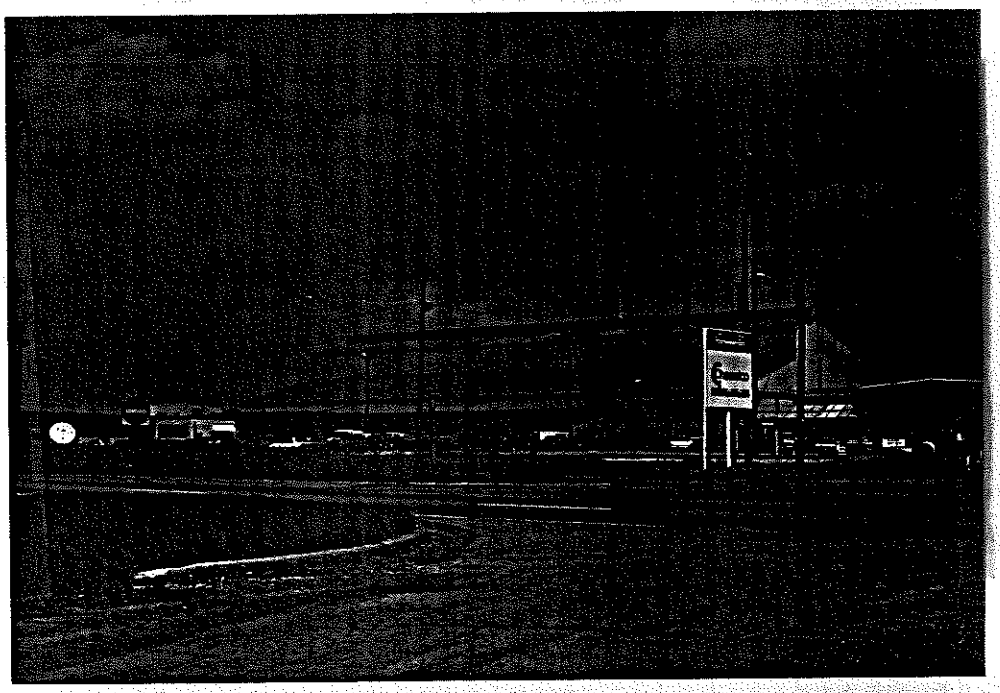


Fig 4 photograph of entire foundry 2:25 pm.

CHEMETCO
APRIL 24, 1989

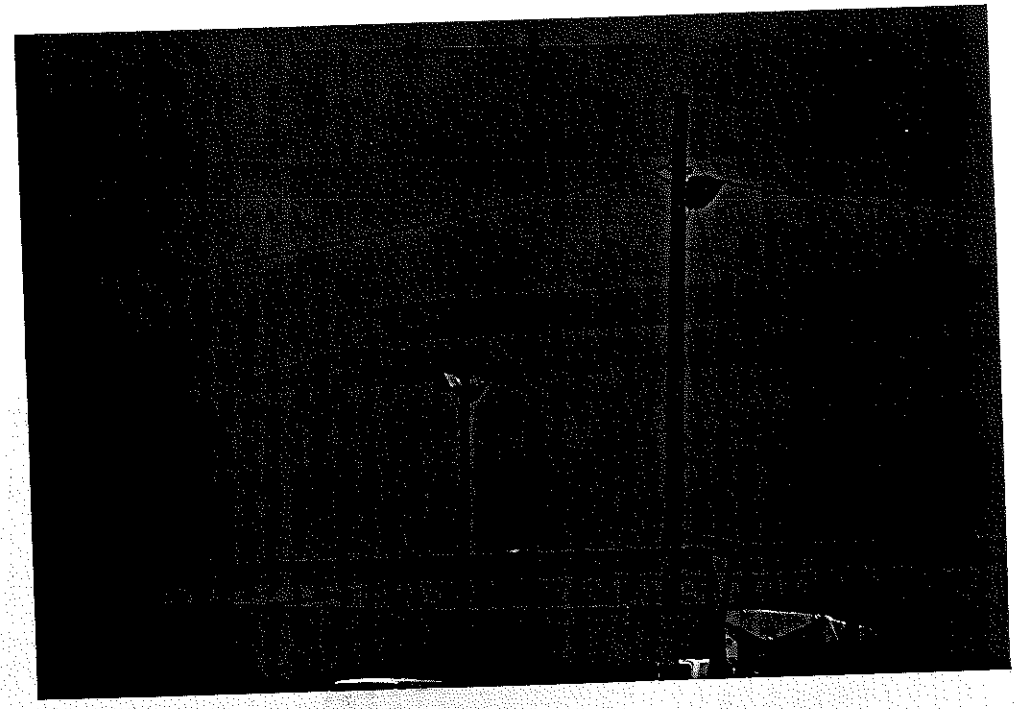


Fig 1 Roof TOP MONITOR AT 2:19 pm

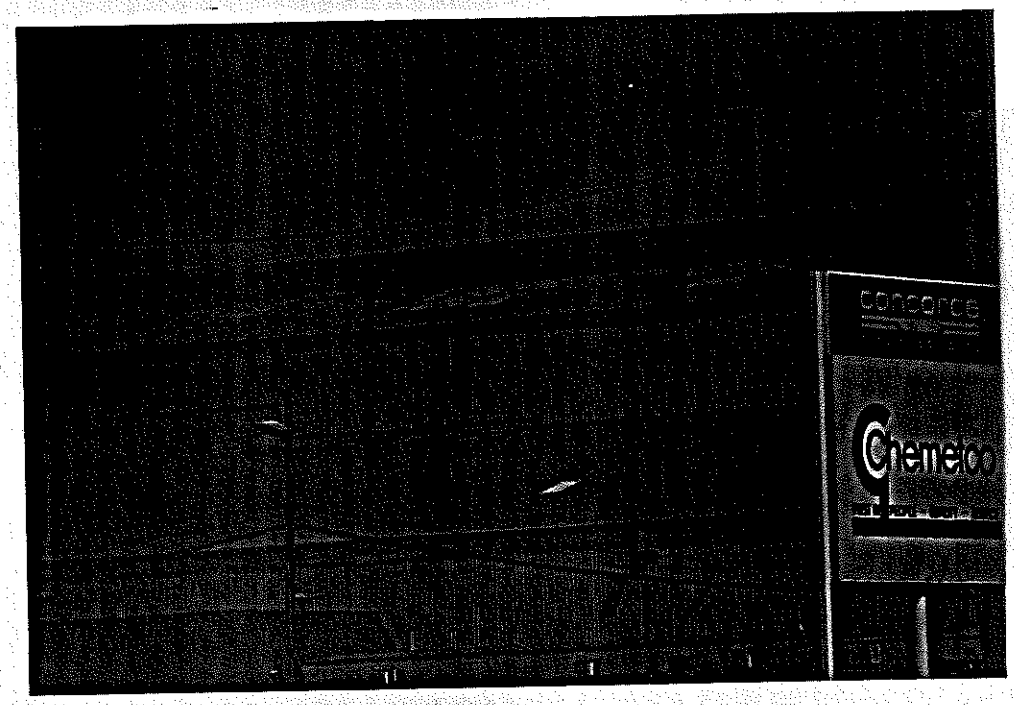



Fig 2 Roof TOP MONITOR AT 2:19 pm.

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION V

Central ~~DISTRICT~~ OFFICE

STATE NOTIFICATION OF INSPECTION

Authority: ✓ SECTION 114(d)(1)-CLEAN AIR ACT, AS AMENDED

____ CWA, ____ TSCA, ____ RCRA, ____ SWDA

Source Name: CITGO PETCO

Address:

City: Hart Ford

State: ILLINOIS

Person Notified: John Justice

Title: Collinsville office

Organization: ILL EPA

Date of Notification: April 10, 1989

Planned Date of Inspection: ~~May 9~~ April 24, 1989

Purpose of Inspection (compliance monitoring, Enforcement Division request etc.)

Scope: VEO

Person Giving Notice: G. Golubski

Title: ENV. ENGR.

Organization: US EPA - REGION V

G. Golubski
(signature)

ESD/CDO
(organization)

10 OCT 1989

Chemetco Foundry, Hartford, Illinois
(2-85-89) (AFH114:K7)

Basim Dihu, Environmental Engineer
Central District Office (5SCDO)

Larry Kertcher, Chief
Air Compliance Branch (5ACB)

ATTN: Sharon Freeman (5ACB)

THRU: Willie H. Harris, Chief
Central District Office (5SCDO)

Acting on John Gaitskill's request of September 5, 1989, the subject facility was visited on September 28, 1989, to conduct the first of the three requested inspections relative to the TSP Compliance Investigation. Specifically, the request was to: 1) observe visible emissions for one hour from the roof monitor; 2) observe visible emissions for one hour from each stack; and 3) verify production rates and time of charging and tapping at each furnace. The Illinois Environmental Protection Agency was notified of the date and time of this inspection, but did not participate.

Off Site Observations

On September 28, 1989, prior to entry into the facility visible emission observations were made at the following sources:

1 - Roof Monitor Emissions

Roof monitor emissions were observed by the writer for a period of one hour between 10:35 a.m. and 11:35 a.m. in accordance to Method 9, to assess compliance with Illinois Rule 202(b). The Illinois Rules specify that emission of smoke or other particulate matter from any such emission source may have an opacity greater than 30%, but less than 60% for a period or periods aggregating eight minutes in any 60 minute period. As shown by the attached observations and summary sheets, 87 readings exceeded 60% opacity.

2 - Scrubber Stacks

a) Visible emission observations were observed from the North stack for a period of one hour between 11:41 a.m. and 12:41 p.m. in accordance with Method 9 to assess Compliance with Illinois Rule 202 (b). As shown by the attached observation and summary sheets, 82 readings exceeded 60% opacity.

b) Visible emission observations were observed from the South stack for a period of one hour between 12:42 p.m. and 1:42 p.m. in accordance with Method 9 to assess Compliance with Illinois Rule 202 (b). As shown by the attached observation and summary sheets, 127 readings exceeded 60% opacity.

c) Informal visible emission observations were made between 10:30 a.m. and 1:45 p.m. from the two middle stacks. The estimated range of opacities were 0-20%.

On Site Observations

At 2:00 p.m., I entered the facility and met with Jeff Zorger.

Significant inspection findings are listed below:

1 - According to Mr. Jeff Zorger, the facility is under a Consent Decree with the Illinois Environmental Protection Agency.

2 - The facility is planning to install a baghouse on the furnaces by July 1, 1990.

3 - Attached to this inspection report is a computer printout copy provided by the company. This copy details the events that were occurring inside the company at the time of the inspection.

4 - Attached to this inspection report is a copy of the Consent Decree.

5 - Also attached to this transmittal are copies of the visible emissions observation sheets, summary sheets, and sun diagrams.

If you have any questions concerning this inspection report, please call me at 886-6242.

Attachments

5SCDO:BDIHU:gw:10-6-89:DISK #1:FINAL

BD 10-6

BT 10/6/89 W 10/10/89

#.2

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION V

CENTRAL DISTRICT OFFICE

STATE NOTIFICATION OF INSPECTION

Authority: X SECTION 114(d)(1)-CLEAN AIR ACT, AS AMENDED

____ CWA, ____ TSCA, ____ RCRA, ____ SWDA

Source Name CHEMETCO

Address

City HARTFORD

State ILL.

Person Notified JOHN JUSTICE

Title CHIEF AIR POLLUTION SECTION COLLINSVILLE OFFICE

Organization IEPA

Date of Notification 9-15-89

Planned Date of Inspection 9-28-89

Purpose of Inspection (compliance monitoring, Enforcement Division request etc.)

TSP Compl

Scope TSP Comp.

Person Giving Notice BASIM DIHU

Title ENV. ENG.

Organization CENTRAL DISTRICT OFFICE

Basim Dihu
(signature)

CDO
(organization)

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMET CO HARTFORD, ILL

Source: SECONDARY COPPER SMELTER - THE SOUTH STACK

Regulation: Illinois Rule 202(b)

Evaluator's Report

On 9-28, 1989, visible emission evaluation began at 12:42 pm, and continued for 60 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 1 | 12:42 pm - 12:48 pm | 85.83 | 0 | 24 |
| 2 | 12:48 pm - 12:54 pm | 71.67 | 0 | 24 |
| 3 | 12:54 pm - 1:00 pm | 65.83 | 7 | 17 |
| 4 | 1:00 pm - 1:06 pm | 69.79 | 0 | 24 |
| 5 | 1:06 pm - 1:12 pm | 58.75 | 7 | 13 |
| 6 | 1:12 pm - 1:18 pm | 27.50 | 9 | 0 |
| 7 | 1:18 pm - 1:24 pm | 26.67 | 7 | 0 |
| 8 | 1:24 pm - 1:30 pm | 37.92 | 1 | 7 |
| 9 | 1:30 pm - 1:36 pm | 68.21 | 2 | 12 |
| 10 | 1:36 pm - 1:42 pm | 63.75 | 2 | 6 |

Readings ranged from 15 to 90 % opacity.

Meteorological Conditions: Cloud Cover CLEAR.

Ambient Temperature 70 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Basim Dihy

Name: BASIM DIHY

Title: ENV. ENG

Office: CDO

Date of Last Certification: 4-10-89

Initials of person who summarized data: EO

VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Date: 9-28-89

Observer: BASIM DIHU

Source: SECONDARY COPPER SMELTER- THE SOUTH STACK

Observation Point: OFF OF OLDENBERG RD

Distance From: 350 YARD

Direction From: SE

Source Height: 85 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | S | — |
| Wind Speed | 2-7 MPH | — |
| Sky Condition | CLEAR some clouds | — |
| Background | BLUE SKY | — |
| Ambient Temperature °F | 70 | — |
| Humidity (high-low) | Medium | — |
| Color of Emissions | WHITE | — |
| Reading Conditions | GOOD | — |

Plant Representatives: NONE

State/Local Agency Representatives: NONE

Observation Began 12:42pm Ended 1:42PM (F T)

Remarks: (*) Emissions from the roof monitor cover the stack. Blocked my view

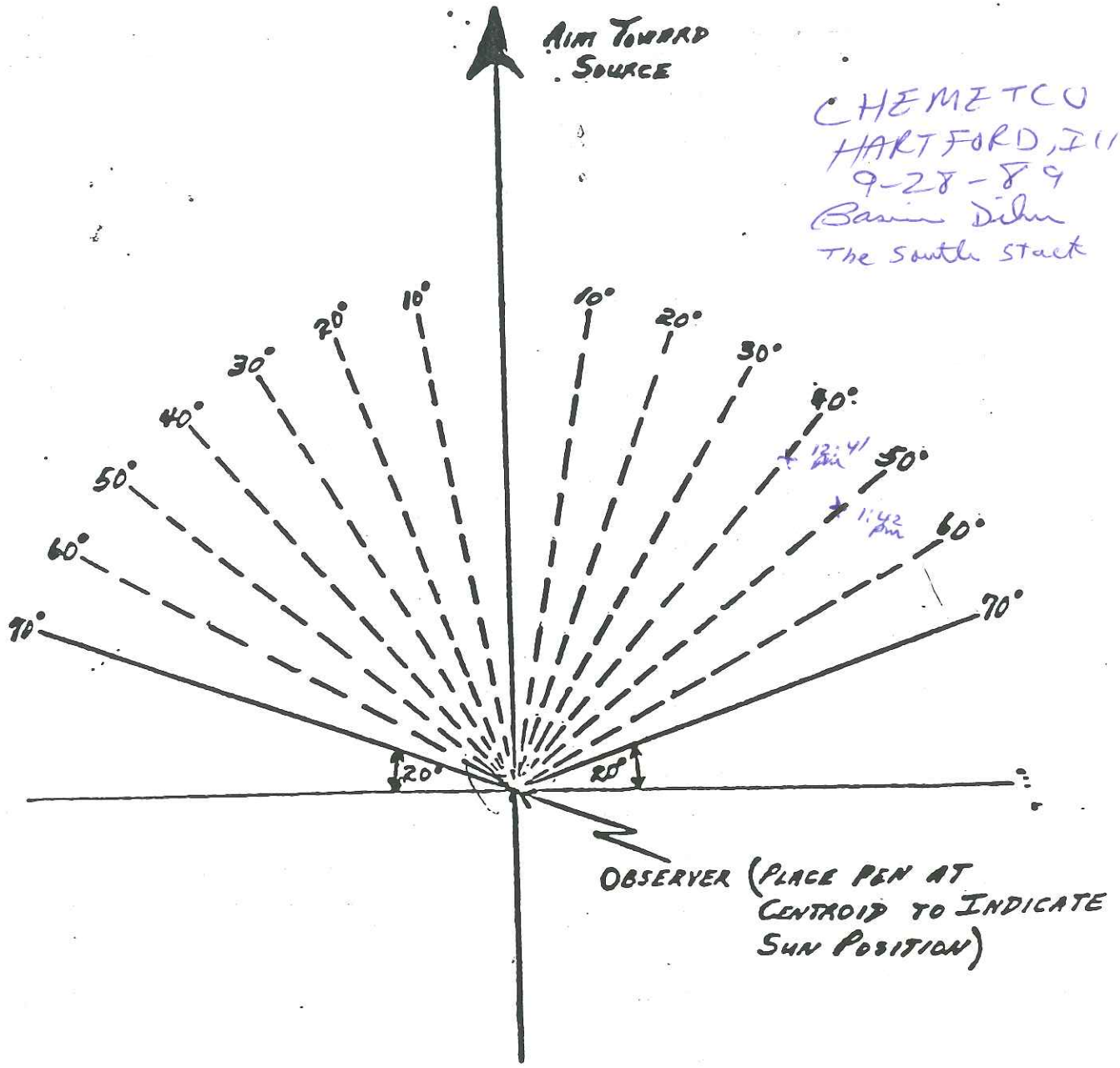
Facility CHEMETCO HARTFORD, IL

| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 90 | 90 | 90 | 90 | | 30 | 20 | 20 | 20 | 25 | |
| 1 | 90 | 90 | 90 | 90 | | 31 | 20 | 25 | 25 | 20 | |
| 2 | 85 | 85 | 85 | 80 | | 32 | 15 | 15 | 15 | 15 | |
| 3 | 90 | 85 | 85 | 90 | | 33 | 15 | 15 | 15 | 35 | |
| 4 | 90 | 80 | 80 | 80 | | 34 | 40 | 40 | 45 | 45 | |
| 5 | 80 | 80 | 85 | 80 | | 35 | 45 | 45 | 45 | 40 | |
| 6 | 80 | 80 | 80 | 80 | | 36 | 45 | 40 | 35 | 35 | |
| 7 | 80 | 70 | 70 | 70 | | 37 | 35 | 35 | 35 | 30 | |
| 8 | 70 | 70 | 70 | 70 | | 38 | 30 | 20 | 20 | 20 | |
| 9 | 70 | 70 | 70 | 70 | | 39 | 20 | 20 | 20 | 20 | |
| 10 | 70 | 70 | 70 | 70 | | 40 | 25 | 25 | 25 | 25 | |
| 11 | 70 | 70 | 65 | 65 | | 41 | 20 | 20 | 20 | 20 | |
| 12 | 65 | 70 | 70 | 70 | | 42 | 20 | 20 | 20 | 20 | |
| 13 | 70 | 70 | 70 | 70 | | 43 | 25 | 20 | 20 | 20 | |
| 14 | 65 | 65 | 60 | 60 | | 44 | 20 | 20 | 20 | 20 | Heavy white Emission from |
| 15 | 60 | 60 | 60 | 60 | | 45 | 25 | 25 | 25 | 30 | the roof monitor |
| 16 | 60 | 65 | 65 | 65 | | 46 | 40 | 80 | 80 | 80 | |
| 17 | 70 | 70 | 70 | 70 | | 47 | 70 | 70 | 70 | 70 | |
| 18 | 70 | 70 | 70 | 70 | | 48 | 70 | 70 | 70 | 70 | |
| 19 | 70 | 70 | 70 | 70 | | 49 | * | * | * | * | |
| 20 | 65 | 65 | 65 | 65 | | 50 | * | * | * | * | |
| 21 | 70 | 65 | 65 | 65 | | 51 | * | * | 70 | 70 | |
| 22 | 70 | 70 | 75 | 75 | | 52 | 70 | 70 | 70 | 70 | |
| 23 | 75 | 75 | 75 | 75 | | 53 | 70 | 60 | 65 | 60 | |
| 24 | 70 | 70 | 65 | 70 | Heavy white Emission | 54 | 60 | 65 | 65 | 60 | |
| 25 | 75 | 75 | 75 | 65 | from the roof monitor | 55 | 65 | 65 | 65 | 65 | |
| 26 | 65 | 65 | 70 | 70 | | 56 | * | * | * | * | |
| 27 | 60 | 60 | 60 | 60 | | 57 | * | * | * | * | |
| 28 | 60 | 60 | 60 | 65 | | 58 | * | * | * | * | |
| 29 | 25 | 25 | 15 | 25 | | 59 | * | * | * | * | |

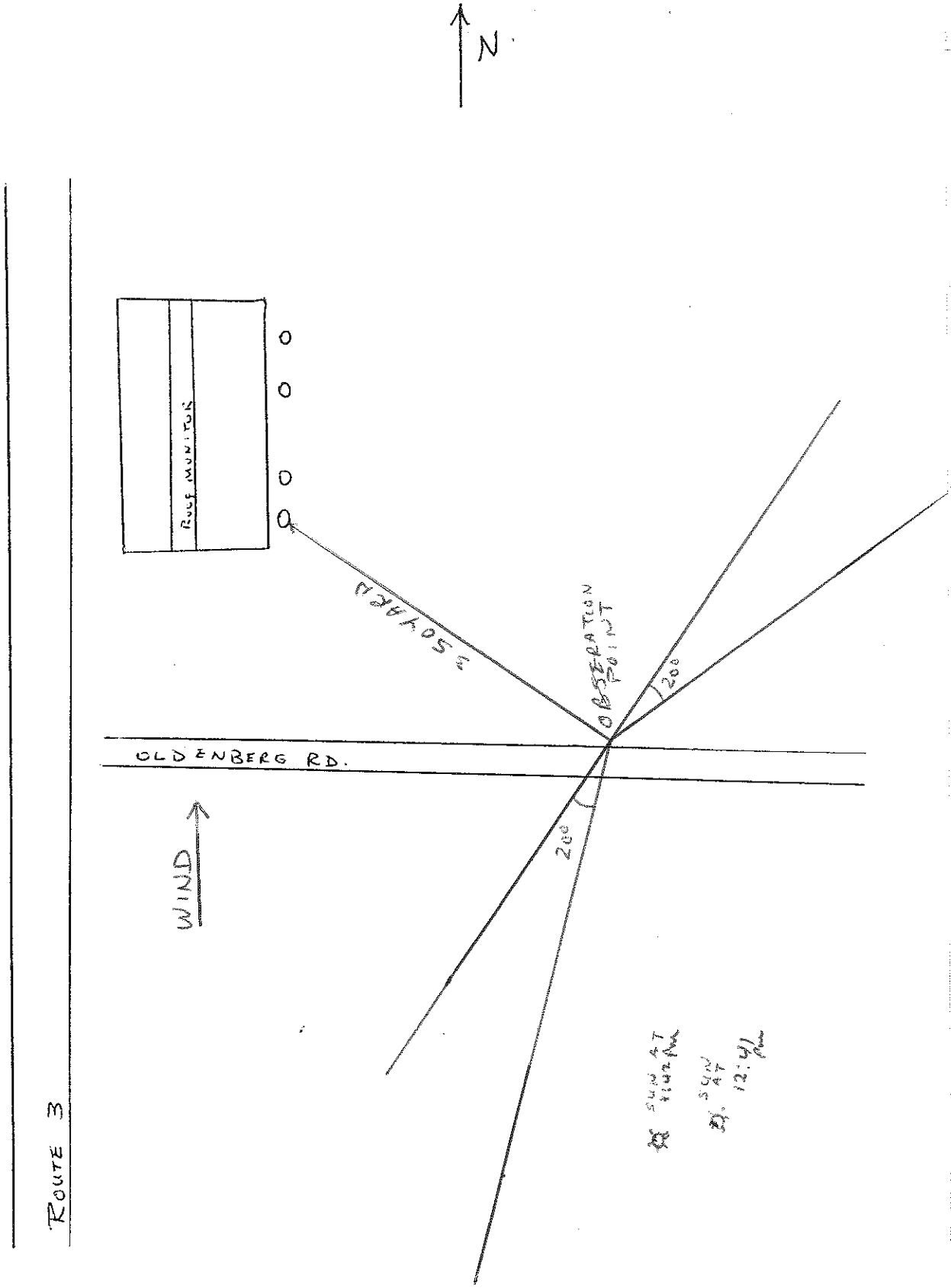
Observer's Signature Basim Dihu

Last Certification Date 4-10-89

Observer's Affiliation USEPA / CDO




CHEMETCO
HARTFORD, Ill
9-28-89
Basin Dike
The South Stack




CHEMETCO
HARTFORD, ILL

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO HARTFORD, ILL

Source: SECONDARY COPPER SMELTER - ROOF MONITOR EMISSIONS

Regulation: Illinois RULE 202 (b)

Evaluator's Report

On 9-28, 1989, visible emission evaluation began at 10:35 Am, and continued for 60 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 1 | 10:35Am - 10:41Am | 78.5 | 0 | 24 |
| 2 | 10:41Am - 10:47Am | 61.04 | 11 | 13 |
| 3 | 10:47Am - 10:53Am | 45.00 | 24 | 0 |
| 4 | 10:53Am - 10:59Am | 42.08 | 20 | 0 |
| 5 | 10:59Am - 11:05Am | 3.96 | 0 | 0 |
| 6 | 11:05Am - 11:11Am | 25.42 | 1 | 4 |
| 7 | 11:11Am - 11:17Am | 19.79 | 0 | 0 |
| 8 | 11:17Am - 11:23AM | 41.25 | 0 | 7 |
| 9 | 11:23Am - 11:29Am | 95.21 | 0 | 24 |
| 10 | 11:29Am - 11:35Am | 63.75 | 9 | 15 |

Readings ranged from 0 to 100 % opacity.

Meteorological Conditions: Cloud Cover CLEAR.

Ambient Temperature 65 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Basim Dihu

Name: BASIM DIHU

Title: ENV ENG.

Office: CDO

Date of Last Certification: 4-10-89

Initials of person who summarized data: BD

# VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Facility: CHEMETCO

HARTFORD, ILL

Date: 9-28-89

Observer: BASIM DIHU

Source: SECONDARY COPPER SMELTER - ROOF MONITOR EMISSIONS

Observation Point: OFF OF OLDENBERG ROAD

Distance From: 350 YARD

Direction From: SE

Source Height: 80 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | S | → |
| Wind Speed | 2-7MPH | → |
| Sky Condition | CLEAR | → |
| Background | BLUE SKY | → |
| Ambient Temperature °F | 65 | → |
| Humidity (high-low) | Medium | → |
| Color of Emissions | WHITE | → |
| Reading Conditions | GOOD | → |

Plant Representatives: NONE

State/Local Agency Representatives: NONE

Observation Began 10:35AM - Ended 11:35AM (= T)

Remarks:

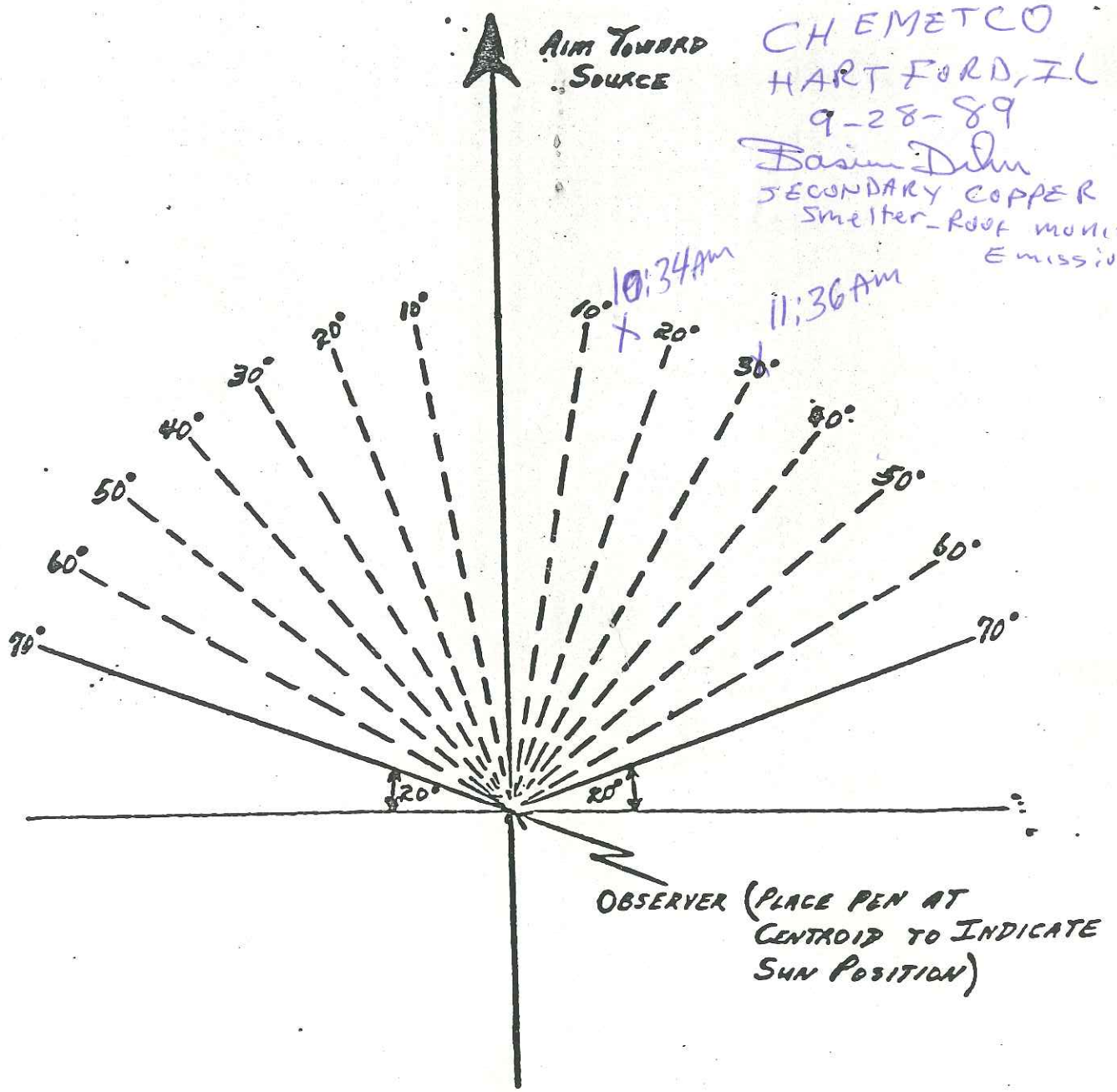
| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 70 | 80 | 80 | 80 | EMISSIONS FROM NORTH | 30 | 5 | 5 | 5 | 5 | WHITE |
| 1 | 80 | 80 | 85 | 85 | SIDE OF THE ROOF MONITOR | 31 | 5 | 5 | 5 | 5 | |
| 2 | 90 | 90 | 90 | 90 | WHITE TO BROWN EMISSION | 32 | 5 | 5 | 5 | 5 | |
| 3 | 90 | 90 | 85 | 85 | | 33 | 5 | 5 | 5 | 5 | |
| 4 | 80 | 65 | 65 | 65 | | 34 | 10 | 10 | 10 | 90 | SOUTH TO middle monitor |
| 5 | 65 | 65 | 65 | 65 | | 35 | 90 | 90 | 80 | 60 | middle monitor |
| 6 | 70 | 65 | 65 | 65 | | 36 | 30 | 20 | 15 | 15 | |
| 7 | 65 | 65 | 65 | 65 | | 37 | 20 | 25 | 25 | 25 | SOUTH monitor WHITE TO BROWN |
| 8 | 60 | 60 | 60 | 65 | | 38 | 25 | 25 | 20 | 15 | |
| 9 | 65 | 65 | 65 | 65 | | 39 | 15 | 15 | 25 | 25 | |
| 10 | 60 | 60 | 60 | 55 | | 40 | 20 | 20 | 20 | 15 | |
| 11 | 50 | 50 | 50 | 50 | | 41 | 15 | 15 | 15 | 15 | |
| 12 | 60 | 50 | 50 | 45 | | 42 | 10 | 10 | 10 | 15 | |
| 13 | 45 | 45 | 45 | 45 | | 43 | 15 | 15 | 15 | 15 | |
| 14 | 50 | 50 | 45 | 45 | WHITE | 44 | 15 | 15 | 15 | 15 | |
| 15 | 40 | 40 | 40 | 40 | | 45 | 25 | 25 | 25 | 25 | |
| 16 | 40 | 40 | 40 | 45 | | 46 | 25 | 100 | 100 | 100 | NORTH WHITE TO YELLOW |
| 17 | 45 | 45 | 45 | 45 | | 47 | 100 | 100 | 100 | 100 | |
| 18 | 40 | 40 | 40 | 45 | | 48 | 100 | 100 | 100 | 100 | |
| 19 | 45 | 45 | 45 | 50 | WHITE | 49 | 100 | 100 | 100 | 100 | WHITE |
| 20 | 45 | 45 | 50 | 45 | NORTH | 50 | 100 | 100 | 100 | 100 | |
| 21 | 45 | 45 | 45 | 45 | side | 51 | 100 | 100 | 100 | 100 | |
| 22 | 50 | 50 | 50 | 45 | | 52 | 95 | 90 | 90 | 80 | |
| 23 | 30 | 25 | 25 | 20 | | 53 | 80 | 80 | 85 | 85 | |
| 24 | 15 | 5 | 5 | 0 | | 54 | 85 | 80 | 80 | 80 | |
| 25 | 0 | 0 | 0 | 0 | | 55 | 70 | 70 | 70 | 70 | |
| 26 | 0 | 0 | 5 | 5 | WHITE NORTH side | 56 | 65 | 65 | 65 | 50 | |
| 27 | 5 | 5 | 5 | 5 | | 57 | 60 | 65 | 65 | 65 | |
| 28 | 5 | 5 | 5 | 5 | | 58 | 65 | 60 | 50 | 50 | |
| 29 | 5 | 5 | 5 | 5 | | 59 | 50 | 50 | 50 | 50 | |

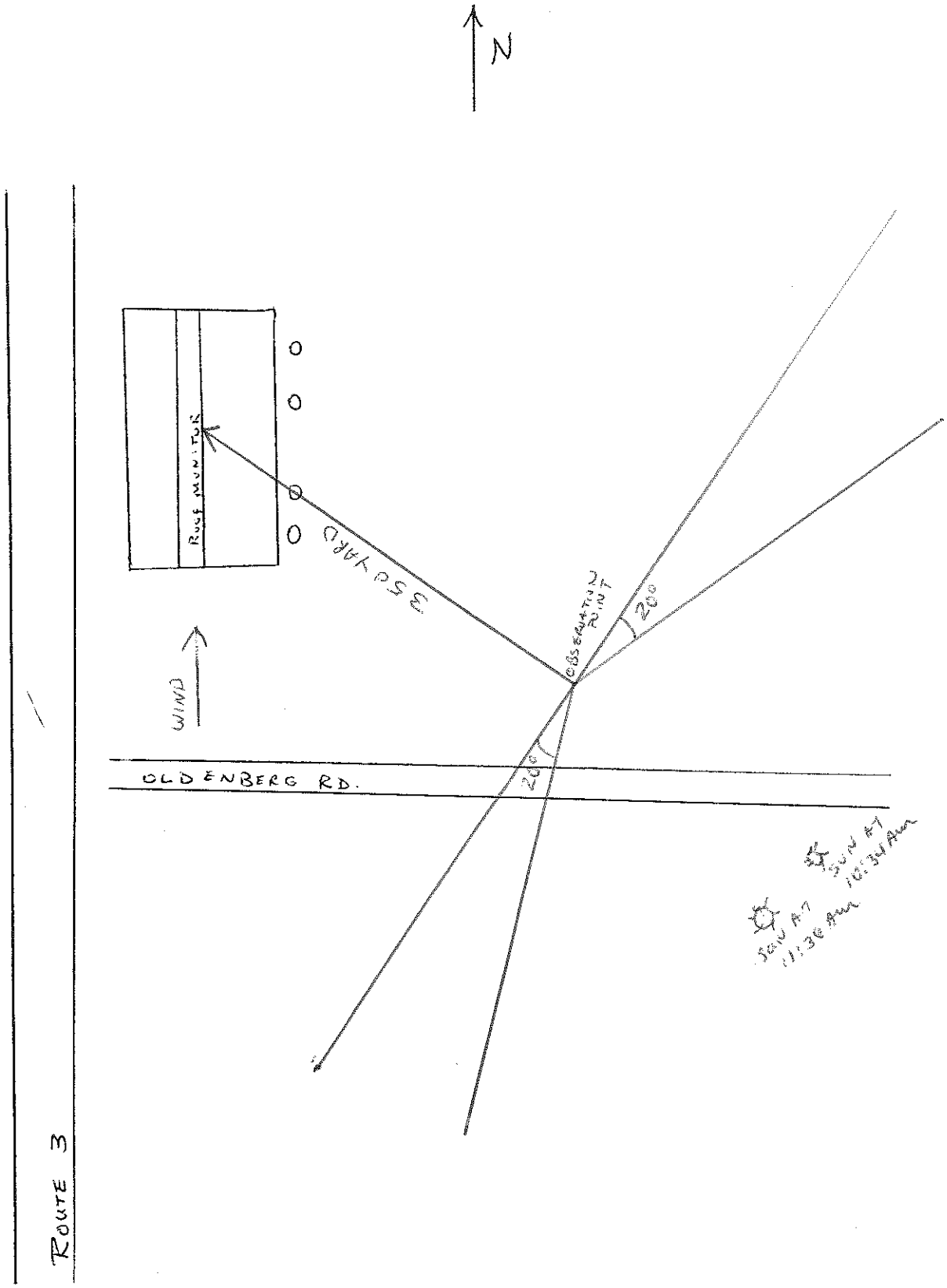
Observer's Signature: Basim Dihu

Last Certification Date: 4-10-89

Observer's Affiliation: USEPA / CDO

CHEMETCO
HARTFORD, IL
9-28-89
Basim Dihu
SECONDARY COPPER
Smelter_Roof monitor
Emissions






CHEMETCO
HARTFORD, ILL

SUMMARY OF VISIBLE EMISSION OBSERVATIONS - USEPA, REGION V

Source Identification

Facility: CHEMETCO HARTFORD, IL

Source: SECONDARY COPPER SMELTER - THE NORTH STACK

Regulation: Illinois RULE 202.(b)

Evaluator's Report

On 9-28, 1989, visible emission evaluation began at 11:41AM, and continued for 66 minutes.

SUMMARY OF READINGS

| Set Number | Time Start-End C T | Opacity Average | Readings >30% to 60% | Readings >60% |
|---|---|---|---|---|
| 1 | 11:41Am-11:47Am | 49.29 | 21 | 0 |
| 2 | 11:47Am-11:53Am | 49.58 | 0 | 4 |
| 3 | 11:53Am-11:59Am | 80.00 | 0 | 2 |
| 4 | 11:59Am-12:05pm | 80.00 | 0 | 24 |
| 5 | 12:05pm-12:11pm | 77.08 | 0 | 24 |
| 6 | 12:11pm-12:17pm | 30.42 | 0 | 8 |
| 7 | 12:17pm-12:23pm | 71.67 | 0 | 20 |
| 8 | 12:23pm-12:29pm | 16.88 | 0 | 0 |
| 9 | 12:29pm-12:35pm | 8.96 | 0 | 0 |
| 10 | 12:35pm-12:41pm | 3.86 | 0 | 0 |

Readings ranged from 0 to 90 % opacity.

Meteorological Conditions: Cloud Cover SCATTERED.

Ambient Temperature 70 °F.

Evaluation Conditions: Excellent _____ Good ✓ Fair _____

Name and qualification of expert witness to attest to above:

Signature: Basim Dihu

Name: BASIM DIHU

Title: ENV. ENG

Office: CDO

Date of Last Certification: 4-10-89

Initials of person who summarized data: BD

# VISIBLE EMISSIONS EVALUATION FORM - USEPA REGION V

Date: SEPt. 28, 1989

Observer: BASIM DIHU

Facility CHEMETCO

HARTFORD, ILL

Source: SECONDARY COPPER SMELTER- THE NORTH STACK

Observation Point: OFF OF OLDENBERG RD

Distance From: 350 YARD

Direction From: SE

Source Height: 85 FT

| | Initial | Final |
|---|---|---|
| Wind Direction | S | — |
| Wind Speed | 2-7 MPH | — |
| Sky Condition | SCATTERD | — |
| Background | SKY (BLUE) | |
| Ambient Temperature °F | 70 | 70 |
| Humidity (high-low) | — | — |
| Color of Emissions | WHITE | — |
| Reading Conditions | GOOD | — |

Plant Representatives:

State/Local Agency Representatives:

Observation

Began 11:41AM - Ended 12:41pm

(= T)

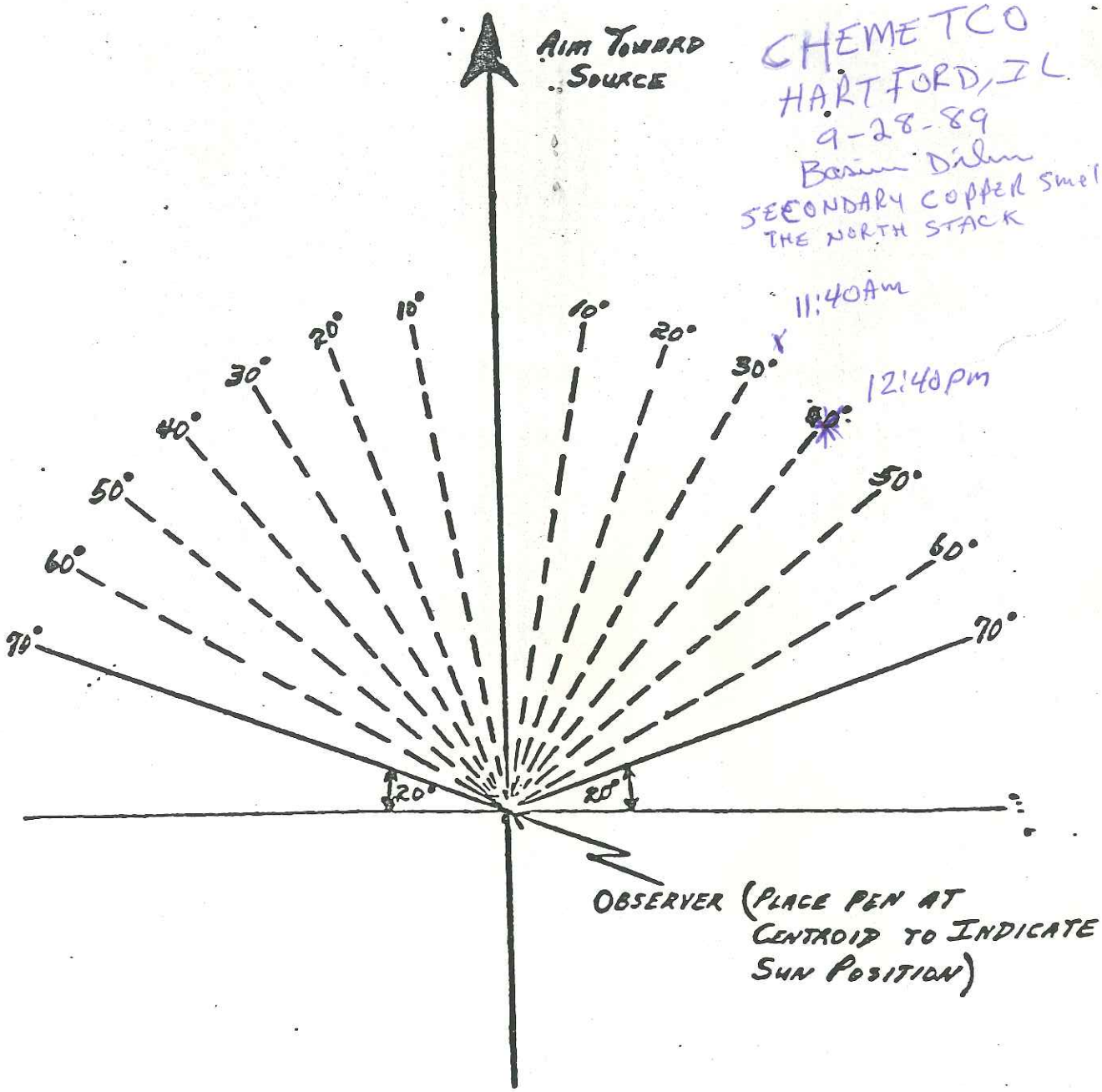
Remarks: (*) EMISSIONS FROM THE ROOF MONITOR ~~BLOCKED~~ COVER THE STACK - BLOCKED MY VIEW

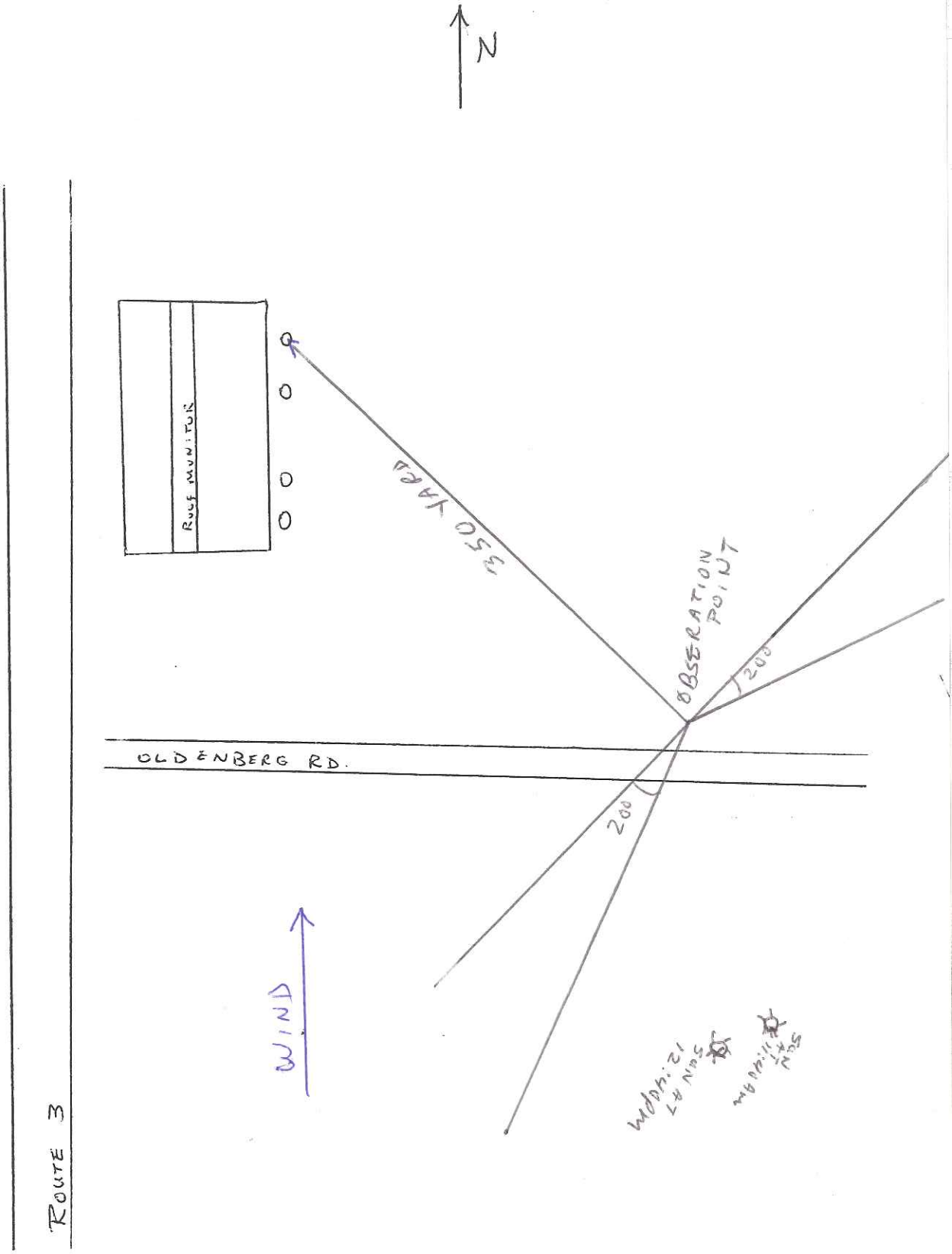
| Sec / Min | 0 | 15 | 30 | 45 | Comments | Sec / Min | 0 | 15 | 30 | 45 | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 45 | 45 | 50 | 45 | | 30 | 75 | 80 | 75 | 75 | |
| 1 | 55 | 45 | 45 | 45 | | 31 | 15 | 10 | 5 | 5 | |
| 2 | 45 | 45 | 50 | 55 | | 32 | 5 | 5 | 5 | 5 | |
| 3 | 55 | 50 | 55 | 55 | | 33 | 5 | 5 | 5 | 5 | |
| 4 | 50 | 50 | 50 | 50 | | 34 | 5 | 5 | 5 | 10 | |
| 5 | 50 | * | * | * | | 35 | 70 | 80 | 85 | 90 | |
| 6 | * | * | * | * | | 36 | 90 | 90 | 80 | 85 | |
| 7 | * | * | * | * | | 37 | 90 | 90 | 90 | 90 | |
| 8 | * | * | * | * | | 38 | 80 | 80 | 80 | 80 | |
| 9 | 20 | 25 | 25 | 25 | | 39 | 80 | 80 | 80 | 85 | |
| 10 | 25 | 25 | 25 | 25 | | 40 | 80 | 80 | 85 | 80 | |
| 11 | 100 | 100 | 100 | 100 | | 41 | 15 | 15 | 10 | 5 | |
| 12 | * | * | * | * | | 42 | 5 | 5 | 5 | 5 | |
| 13 | * | * | * | * | | 43 | 5 | 0 | 0 | 5 | |
| 14 | * | * | * | * | | 44 | 20 | 30 | 30 | 25 | |
| 15 | * | * | * | * | | 45 | 20 | 20 | 25 | 25 | |
| 16 | * | * | * | * | | 46 | 25 | 30 | 30 | 25 | |
| 17 | * | * | 80 | 80 | | 47 | 20 | 20 | 15 | 15 | |
| 18 | 80 | 80 | 80 | 75 | | 48 | 20 | 15 | 15 | 15 | |
| 19 | 75 | 80 | 75 | 75 | | 49 | 15 | 10 | 10 | 5 | |
| 20 | 75 | 75 | 80 | 80 | | 50 | 5 | 5 | 0 | 0 | |
| 21 | 80 | 80 | 80 | 80 | | 51 | 10 | 5 | 5 | 5 | |
| 22 | 80 | 85 | 85 | 85 | | 52 | 5 | 10 | 10 | 10 | |
| 23 | 85 | 85 | 85 | 80 | | 53 | 10 | 10 | 10 | 10 | HEAVEY BLACK EMISSION |
| 24 | 75 | 70 | 70 | 70 | | 54 | * | * | * | * | FROM the roof monitor |
| 25 | 70 | 70 | 70 | 75 | | 55 | * | * | 10 | 10 | |
| 26 | 80 | 80 | 80 | 80 | | 56 | 5 | 5 | 5 | 5 | |
| 27 | 75 | 75 | 80 | 80 | | 57 | 5 | 5 | 5 | 5 | |
| 28 | 85 | 85 | 80 | 80 | | 58 | 5 | 0 | 0 | 0 | |
| 29 | 80 | 80 | 80 | 80 | | 59 | 5 | 0 | 0 | 0 | |

Observer's Signature Basim Dihu

Last Certification Date 4-10-89

Observer's Affiliation USEPA/CDO


AIM TOWARD SOURCE
CHEMETCO
HARTFORD, IL
9-28-89
Basim Dilsu
SECONDARY COPPER Smelter
THE NORTH STACK
11:40Am
12:40pm
10°
20°
30°
40°
50°
60°
70°
20°
OBSERVER (PLACE PEN AT CENTROID TO INDICATE SUN POSITION)




CHEMETCO
HARTFORD, ILL

WORKSTATION 195 - USER MLR - REZNACK, MICHELLE 219CRE

1:42:38 PM FRIDAY SEPTEMBER 29, 1989

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*****************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901 ****
*****************************************************************************
*  *                                                                        *  *
* 1*                                EVENT SUMMARY                           * 1*
* 2*   .----------------.-----------.-----------.-----------.-----------.   * 2*
* 3*     9/28  HEAT  TYP        4          2          1          3         * 3*
* 4*   ----------------+-----------+-----------+-----------+-----------    * 4*
* 5*    13:15   902  SME                                CHARGE             * 5*
* 6*    13:15   526  SME                                           SLAG OFF * 6*
* 7*    13:18   902  SME                                CHARGE             * 7*
* 8*    13:20   691  BRZ                BLOW TAP #1                        * 8*
* 9*    14:05   902  SME                                T.H. METAL         * 9*
*10*    14:05   738  REF   SLAG OFF                                        *10*
* 1*    14:15   902  SME                                SLAG TRANS         * 1*
* 2*    14:15   691  BRZ                CHARGE                             * 2*
* 3*    14:40   691  BRZ                SAMP RED.#1                        * 3*
* 4*    14:40   738  REF   TAP METAL                                       * 4*
* 5*    15:00   902  SME                                SLAG TRANS         * 5*
* 6*    15:00   739  REF   CHARGE                                          * 6*
* 7*    15:01   739  REF   CHARGE                                          * 7*
* 8*    15:02   739  REF   CHARGE                                          * 8*
* 9*    15:10   526  SME                                           TAP BLK CU * 9*
*20*    15:15   902  SME                                TAP BLK CU         *20*
* 1*    15:15   691  BRZ                BLOW TAP #1                        * 1*
* 2*    15:15   739  REF   SMELT TRANS                                     * 2*
* 3*   '----------------------------------------------------------------'  * 3*
* 4*      FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3   * 4*
*  *                                                                        *  *
*****************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901 ****
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WORKSTATION 195 - USER MLR - REZNACK, MICHELLE 219CRE

1:42:45 PM FRIDAY SEPTEMBER 29, 1989

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*****************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************
*  *                                                                          *  *
* 1*                              EVENT SUMMARY                               * 1*
* 2*   .----------------.-----------.-----------.-----------.-----------.    * 2*
* 3*     9/28  HEAT  TYP       4           2           1           3         * 3*
* 4*   ----------------+-----------+-----------+-----------+-----------     * 4*
* 5*     15:15   902  SME                                TAP BLK CL          * 5*
* 6*     15:15   691  BRZ                BLOW TAP #1                         * 6*
* 7*     15:15   739  REF   SMELT TRANS                                      * 7*
* 8*     15:30   739  REF   METAL TRANS                                      * 8*
* 9*     15:35   903  SME                                METAL TRANS         * 9*
*10*     15:40   903  SME                                T.H. METAL          *10*
* 1*     15:45   527  SME                                            DELAY   * 1*
* 2*     16:10   903  SME                                CHARGE              * 2*
* 3*     16:45   691  BRZ                CHARGE                              * 3*
* 4*     17:10   739  REF   SLAG OFF                                         * 4*
* 5*     17:15   903  SME                                SLAG TRANS          * 5*
* 6*     17:18   739  REF   REF CL SAMP                                      * 6*
* 7*     17:40   691  BRZ                SAMP RED.#2                         * 7*
* 8*     18:00   691  BRZ                SAMP RED.#2                         * 8*
* 9*     18:30   903  SME                                SLAG TRANS          * 9*
*20*     18:30   692  SME                CHARGE                              *20*
* 1*     18:40   692  SME                SMELT TRANS                         * 1*
* 2*     18:40   739  REF   SLAG OFF                                         * 2*
* 3*   '-----------------------------------------------------------------'   * 3*
* 4*       FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3   * 4*
*  *                                                                          *  *
*****************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************
```

WORKSTATION 195 - USER MLR - REZNACK, MICHELLE 219CRE

1:42:53 PM FRIDAY SEPTEMBER 29, 1989

## EVENT SUMMARY

| 9/28 | HEAT | TYP | 4 | 2 | 1 | 3 |
|---|---|---|---|---|---|---|
| 18:40 | 692 | SME | | SMELT TRANS | | |
| 18:40 | 739 | REF | SLAG OFF | | | |
| 18:45 | 903 | SME | | | TAP BLK CL | |
| 18:45 | 739 | REF | REF CL SAMP | | | |
| 18:55 | 527 | BRZ | | | | SLAG TRANS |
| 18:56 | 527 | SME | | | | METAL TRANS |
| 19:05 | 904 | SME | | | CHARGE | |
| 19:20 | 527 | BRZ | | | | CHARGE |
| 19:20 | 739 | REF | CHARGE | | | |
| 19:21 | 739 | REF | CHARGE | | | |
| 19:45 | 904 | SME | | | CHARGE | |
| 20:15 | 527 | BRZ | | | | SAMP REC.A1 |
| 20:25 | 739 | REF | SLAG OFF | | | |
| 20:30 | 527 | BRZ | | | | CHARGE |
| 20:30 | 739 | REF | TAP METAL | | | |
| 20:45 | 527 | BRZ | | | | SLAG TRANS |
| 20:50 | 692 | SME | | CHARGE | | |
| 21:20 | 692 | SME | | SAMPLE SLAG | | |

FOR DETAIL PF4 - FCE 4 PF2 - FCE 2 PF1 - FCE 1 PF3 - FCE 3

WORKSTATION 195 - USER MLR - REZNACK, MICHELLE 219CRE

1:42:31 PM FRIDAY SEPTEMBER 29, 1989

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*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                                EVENT SUMMARY                                     * 1*
* 2*   .----------------.-----------.-----------.-----------.-----------.             * 2*
* 3*     9/28  HEAT  TYP        4           2           1           3                 * 3*
* 4*   ----------------+-----------+-----------+-----------+-----------               * 4*
* 5*    11:25   901  SME                                  CHARGE                       * 5*
* 6*    11:45   525  BRZ                                                TAP 2ND MTL     * 6*
* 7*    11:46   525  BRZ                                                WRAP-UP         * 7*
* 8*    11:50   901  SME                                  SAMPLE SLAG                  * 8*
* 9*    11:50   526  SME                                                CHARGE          * 9*
*10*    11:52   526  SME                                                CHARGE          *10*
* 1*    12:00   901  SME                                  CHARGE                       * 1*
* 2*    12:10   691  BRZ                      CHARGE                                   * 2*
* 3*    12:15   738  REF   SLAG OFF                                                    * 3*
* 4*    12:25   901  SME                                  SAMPLE SLAG                  * 4*
* 5*    12:25   738  REF   CHARGE                                                      * 5*
* 6*    12:30   691  BRZ                      SLAG TRANS                               * 6*
* 7*    12:45   901  SME                                  SLAG OFF                     * 7*
* 8*    12:45   738  REF   REF CL SAMP                                                 * 8*
* 9*    13:00   901  SME                                  TAP BLK CL                   * 9*
*20*    13:00   691  BRZ                      SAMP RED.#1                              *20*
* 1*    13:10   526  SME                                                METAL TRANS     * 1*
* 2*    13:15   902  SME                                  CHARGE                       * 2*
* 3*   '----------------------------------------------------------------------'        * 3*
* 4*     FOR DETAIL        PF4 - FCE 4   PF2 - FCE 2   PF1 - FCE 1   PF3 - FCE 3      * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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WORKSTATION 155 - USER MLR - REZNACK, MICHELLE 215CRE

2:04:37 PM FRIDAY SEPTEMBER 29, 1989

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*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*   DATE   9/28/89        CHEMETCO ENVIRONMENTAL MANAGEMENT                        * 1*
* 2*   REPORT B                    UPSET CONDITION REPORT                             * 2*
* 3*                                                                                  * 3*
* 4*   DEPARTMENT  FOUNDRY        EQUIPMENT/LOCATION #1 AAF FAN                        * 4*
* 5*                                                                                  * 5*
* 6*   DATE BEGAN   92889     TIME BEGAN  1130   DATE END   92889     TIME END  1430  * 6*
* 7*             DAYS HRS  MIN                                                        * 7*
* 8*   DURATION        3          QUANTITY OF EMISSIONS  MINIMAL                       * 8*
* 9*                                                                                  * 9*
*10*   NATURE OF EMISSIONS  SLAG REDUCTION                                            *10*
* 1*                                                                                  * 1*
* 2*   MALFUNCTION  #1 AAF                                                            * 2*
* 3*                                                                                  * 3*
* 4*   CAUSE   INBOARD BEARING OVERHEATED                                             * 4*
* 5*                                                                                  * 5*
* 6*   CORRECTIVE ACTIONS  REPLAIN FAN AND ADDED OIL                                  * 6*
* 7*                                                                                  * 7*
* 8*   MITIGATING ACTION TAKEN  REDUCED FIRING RATES TO MINIMIZE SMOKE                 * 8*
* 9*                                                                                  * 9*
*20*   COMMENTS                                                                        *20*
* 1*                                                                                  * 1*
* 2*   REPORT BY  ROY                                                                 * 2*
* 3*                                                                                  * 3*
* 4*                     PRESS ENTER KEY TO PAGE,   PF 16 TO EXIT                     * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
```

Chemetco
FIRST IN PEOPLE — QUALITY — SERVICE
P.O. BOX 187 • ALTON, ILLINOIS 62002

November 1, 1990

Mr. John McGuire
United States Environmental Protection Agency
Region V -- Central District Office
536 S. Clark Street
Chicago, Illinois 60605

Dear Mr. McGuire,

Following, please find the furnace charge reports for this morning's furnace activities as per your request.

If you need any other information, please write to me at the above letterhead address or call me at 618-254-4381, Ext. 219.

Sincerely,

Michelle Reznack

Michelle Reznack
Environmental Manager

Enclosures
cc: Mark C. Schlueter, IEPA Field Office
file

RECEIVED
NOV 13 1992

Chemetco

FIRST IN PEOPLE — QUALITY — SERVICE

REGULATION DEVELOPMENT BRANCH
U.S. EPA, REGION V

P.O. BOX 187 • ALTON, ILLINOIS 62002

Mailed Certified No. 896 689 050

November 10, 1992

RECEIVED
NOV 13 1992
IEPA—DAPC—SPFLD.

Mr. Don Sutton, Manager
Bureau of Air
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62794-9276

RE: Compliance Testing
Chemetco, Inc. -- Madison County

Dear Mr. Sutton,

Enclosed please find three (3) copies of the stack testing report for the Chemetco facility in Hartford, Illinois. Included with the copies of Fugro-McClelland test report are results from the scrubber water testing and a table summarizing all the test results, the process weight rates and the allowable emission rates. Appendix J of the test report contains the process weight rate calculations.

Chemetco has additional supporting data to be provided to the Agency for the determination of compliance but Chemetco agreed to provide the test results themselves within two weeks after receiving them. We received the report on October 27, 1992. Chemetco maintains it has clearly passed the stack tests although there is a single test run which is above the allowable limit. That is the second run on Furnace No. 3. Chemetco believes this test result should be totally disregarded as it is obviously skewed, 200% higher than the average of all the other test results, and statistically out of bounds. The average emission for Furnace No. 3, including that run, are still well within acceptable limits as well. The enclosed table illustrates this. We have no explanation for the one skewed result, especially since nothing different was done to the furnace during the three separate runs.

If you have any questions, please do not hesitate to phone Michelle Reznack at 618-254-4381, Ext. 219 or write me at the above letterhead address.

Sincerely,

David A. Hoff
President

Enclosures
cc: R. Emmett Fitzgerald, Counsel for Chemetco, Inc.
Michelle Reznack, Environmental Coordinator
file

STATISTICAL ANALYSIS
Compliance Testing
Chemetco, Inc.

| Furnace | Run Number | Emissions (lb/hr) Allowable | Actual | Average | Standard Deviation |
|---|---|---|---|---|---|
| No. 1 | 1 | 9.3149 | 3.6178 | | |
| | 2 | | 6.6429 | 5.1304 | 2.139 |
| No. 1 | 1 | 14.5783 | 7.9554 | | |
| | 2 | | 6.7175 | | |
| | 3 | | 4.8601 | 6.511 | 1.557 |
| No. 2 | 1 | 13.7353 | 7.6851 | | |
| | 2 | | 8.4381 | | |
| | 3 | | 7.2669 | 7.7967 | 0.594 |
| No. 3 | 1 | 15.3218 | 8.7200 | | |
| | 2 | | 16.3306 | | |
| | 3 | | 10.7465 | 11.9324 | 3.941 |
| No. 4 | 1 | 15.6802 | 8.3246 | | |
| | 2 | | 8.7661 | | |
| | 3 | | 3.5981 | 6.8963 | 2.865 |
| | | | Overall: | 7.8336 | 3.169 |

## 1.0 INTRODUCTION

Fugro-McClelland Environmental was contracted by Chemetco's Hartford, Illinois facility to conduct source emissions testing on four furnace scrubber stacks for total particulate matter (PM), lead (Pb), oxygen ($O_2$), carbon dioxide ($CO_2$), and opacity. Testing was conducted during the week of September 22, 1992, by Fugro-McClelland Environmental, St Louis, Missouri. Particulate and lead emissions testing was conducted following the procedures outlined in USEPA Methods for "Isokinetic Particulate Matter (PM) and Lead Emissions" testing (USEPA Method 12). Additionally, USEPA Methods 1, 2, 3, 4, and 9, as published in 40 CFR, Part 60, Appendix A, were used for the determination of sample and velocity traverses, stack gas velocity and volumetric flow rates, oxygen ($O_2$) and carbon dioxide ($CO_2$) concentrations, molecular weight of stack gas, moisture, and visible emissions, respectively. All samples were collected during 1-hour testing periods and all methods were conducted concurrently. Three test runs were performed on each source with the exception of two additional test runs performed on furnace No. 1 during the smelting/slag treatment with dust injection which was conducted on September 23, 1992.

This report presents the results of the emissions testing for total particulate matter, lead, and opacity. Flue gas moisture concentrations, velocity, molecular weight, and volumetric flow rates, oxygen, and carbon dioxide concentrations are also reported for each test run. Copies of raw field data, example calculations, and other pertinent information are included in the appendices of this report.

## 2.0 SUMMARY OF EMISSIONS RESULTS

Total particulate matter emissions ranged from 3.6 pounds per hour to 16.3. Total lead emissions ranged from 0.31 pounds per hour to 6.26 pounds per hour. A summary of the particulate matter and lead emissions is presented in Tables 2-2 through Table 2-6. A summary of the opacity test results is presented in Table 2-7. The testing schedule is outlined in Table 2-1. Complete particulate matter test results are included in Tables 6-1 through Table 6-5 in Section 6 of this report. Appendix A contains copies of the field data sheets and Appendix B presents the particulate and lead laboratory analysis. The chain of custody forms are presented in Appendix C. The calibration gas certifications are presented in Appendix D. Appendix E presents the equipment calibration records and Appendix F contains example calculations from Test #1, Stack #2, 9/22/92.

## 3.0 PURPOSE OF REPORT

Fugro-McClelland Environmental was contracted by the Chemetco Corporation to perform emissions testing on four furnace scrubber stacks at Chemetco's facility located in Hartford, Illinois. Fugro-McClelland Environmental performed emissions testing to determine total particulate matter, lead, oxygen, carbon dioxide concentrations, emission rates, and opacity readings.

## 4.0 ACTIVITIES DURING THE TESTING

Fugro-McClelland Environmental performed the emissions testing on the furnace scrubber stacks during the week of September 22, 1992 at Chemetco's facility located in Hartford, Illinois. Messrs Christopher Dawdy, Robert Folle, Steven Dillard, and Robert Suda performed the testing for Fugro-McClelland Environmental. Ms Michelle Reznack, Environmental Coordinator for the Chemetco Corporation, was responsible for scheduling and coordinating testing activities for Chemetco. Mr Fred Smith, Jeff Benbenek and Mark Schlueter,

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3.0 PURPOSE OF REPORT . . . . . 1

4.0 ACTIVITIES DURING THE TESTING . . . . . 1

5.0 TEST METHODS AND PROCEDURES . . . . . 2
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  - 5.1.2 Sample Recovery . . . . . 3
  - 5.1.3 Analytical Procedures . . . . . 4
  - 5.1.4 Oxygen ($O_2$) and Carbon Dioxide ($CO_2$) Sampling . . . . . 4
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representing IEPA, were present and observed the testing. Resumes of the field sampling crew are presented in Appendix K.

## 5.0 TEST METHODS AND PROCEDURES

USEPA Method 12 was used to determine total particulate matter and lead concentrations from the effluent of each furnace. EPA Method 9 was used to determine and record opacity readings.

### 5.1 Field Procedures and Equipment for Particulate and Lead Sampling (EPA Method 12).

#### 5.1.1 Sampling

The sampling equipment consists of the following:

1. Pitot Assembly

   a. Nozzel – Glass with a sharp, tapered leading edge.

   b. Probe – Stainless steel sheath with a 5/8-in. O.D. glass liner wrapper with nichrome wire; rheostat controlled and capable of maintaining a temperature of 250 degrees F +/- 25 degrees F.

   c. Pitot – Type "S" constructed and attached to probe according to specifications outlined in the 'code of Federal Regulations, Chapter I, Title 40, Part 60, Appendix A, Method 2'.

   d. Orsat Probe – Stainless steel 1/4-in. tubing attached to pitot tube in an interference-free arrangement.

   e. Thermocouple – Type "K" attached to the pitot tube such that the tip has no contact with the metal and does not interfere with the pitot tube face openings.

2. Filter Holder – Borosilicate glass with a Teflon fritted filter support and Teflon sealing gasket.

3. Filter Heating Assembly – Controlled heating element in aluminum module attached to end of probe; capable of maintaining 250 degrees F +/- 25 degrees F.

4. Impingers – Four glass impingers connected in series with glass ball joint fittings and placed in an ice bath. The first, third, and fourth impingers were of the modified Greenburg-Smith design. The second impinger was of the Greenburg-Smith design with a standard tip. Final gas exit temperature was measured to within +/- 5 degrees F with a thermometer immersed in the gas stream.

5. Control Box – Module containing the vacuum gauge, leak-free pump, thermometer capable of measuring temperature to within +/- 5 degrees F, dry gas meter with a minimum of 2% accuracy,

glass sample bottle for analysis of lead. Approximately 30 ml of 0.1N HN03 was used to rinse each of the impingers. This was conducted two times. This rinse was added to the impinger catch container. All glassware connecting the impingers were wiped free of silicone grease and rinsed twice with 0.1N HN03 and added to the sample container. A 200 ml sample of the 0.1N HN03 was retained as a field blank.

### 5.1.3 Analytical Procedures

The filter and any loose particulate matter was transferred from the filter container to a clean, tared glass weighing dish. The filter was placed in a desiccator for 24 hours and weighed to a constant weight. The original weight of the filter was deducted, and the weight gain recorded to the nearest 0.1 mg.

The "prefilter" wash and blank acetone solutions were transferred to individual clean, tared beakers, then evaporated to dryness and desiccated to a constant weight. The weight gain of the "prefilter" was adjusted for the blank and recorded to the nearest 0.1 mg. The silica gel was weighed, and the weight gain was recorded to the nearest 0.1 gram to calculate a moisture gain along with the volume gain of the first four impingers.

### 5.1.4 Oxygen ($O_2$) and Carbon Dioxide ($CO_2$) Sampling

As required by EPA Method 3 (40 CFR 60, Appendix A), oxygen and carbon dioxide samples were collected by an integrated bag system for analysis. The sampling system consists of a stainless steel probe, flexible sample line from the probe to a vinyl bag enclosed in a rigid container. The collected sample was then analyzed using an electronic gas analyzer.

The sampling procedure consists of the following leak check and sampling techniques. Prior to sampling, the bag was leak-checked at 2 to 4 in. of water. The inlet was plugged, and a vacuum of 10 in. of Hg was created. The outlet of the pump was then plugged and the pump was turned off. The vacuum was observed for 30 seconds to determine any leakage. The vacuum held steady for at least 30 seconds and the leak test was acceptable. The sample line was then purged with stack gas and the bag was connected. Sampling was conducted at an appropriate constant rate at the same traverse points and for the same length of time as the other testing parameters were tested. At the conclusion of the run, the pump was turned off and the bag sealed.

After leak-checking and calibrating the gas analyzer, an average value for each sample was determined. The gas was analyzed utilizing a Horiba Model CMA-331A oxygen ($O_2$) and carbon dioxide ($CO_2$) gas analyzer until two values were obtained that fell within the specified variance of the gas tested. Data were recorded on the field data sheets, and the bag was evacuated for the next sample run. The oxygen and carbon dioxide analyzer was calibrated with known concentrations of certified nitrogen ($N_2$) for zero span and $O_2/CO_2$ of known certified concentrations of Protocol-1 calibration gas for upscale span and drift calibrations. The analyzers were calibrated before and after each test run. Calibration gas certificates are presented in the appendix of this report. Horiba analyzer specifications are outlined in Table 5-1. Complete oxygen and carbon dioxide test results are presented in Tables 6-1 through 6-5. Figure 5-2 illustrates the collection system utilized.

TABLE 2-1
Testing Schedule

| Date | Source | Condition | Method | Run # | Run Duration |
|---|---|---|---|---|---|
| 9/22/92 | #2 | Refining | EPA 12 | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| | | | EPA 12/9 | 3 | 1 hour |
| 9/23/92 | #4 | Refining | EPA 12 | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| | | | EPA 12/9 | 3 | 1 hour |
| 9/23/92 | #1 | Smelting/Slag Treatment with Dust Injection | EPA 12/9 | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| 9/24/92 | #1 | Refining | EPA 12 | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| | | | EPA 12/9 | 3 | 1 hour |
| 9/25/92 | #3 | Smelting/Slag Treatment | EPA 12/9* | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| | | | EPA 12/9 | 3 | 1 hour |

*Roof vent only – EPA Method 9, visible emissions

EPA Method 9 for visible emissions was conducted concurrently with Method 12 on furnace stack and roof vent as indicated.

# TABLE 2-3

## Particulate and Lead Emissions Summary

| TEST RUN #: (STACK # 4) | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| DATE | SEPTEMBER 23, 1992 | SEPTEMBER 23, 1992 | SEPTEMBER 23, 1992 | ---- |
| START TIME | 712 | 912 | 1058 | |
| STOP TIME | 832 | 1018 | 1209 | ---- |
| CONDENSATE COLLECTED (ml) | 51.70 | 49.60 | 44.30 | 48.53 |
| MOISTURE (%) | 5.31 | 5.88 | 5.35 | 5.51 |
| O2 (%) | 20.03 | 19.80 | 20.70 | 20.1777 |
| CO2 (%) | 1.07 | 1.40 | 1.00 | 1.1557 |
| DRY,STD.SAMPLE VOLUME(dscf) | 43.3928 | 37.3772 | 36.8762 | 39.2154 |
| VELOCITY (ft./sec) | 29.65 | 25.76 | 25.24 | 26.89 |
| ACTUAL FLOW RATE (acfm) | 31803.46 | 27634.74 | 27075.58 | 28837.93 |
| Dry,Std.Vol.Flow Rate (dscfm) | 26794.54 | 22952.70 | 22690.41 | 24145.88 |
| % ISOKINETIC | 98.35 | 98.90 | 98.70 | 98.65 |
| PARTICULATE CATCH (mg) | 101.90 | 107.90 | 44.20 | 84.6667 |
| PARTICULATE CATCH (grams/dscf) | 0.0023 | 0.0029 | 0.0012 | 0.0021 |
| PARTICULATE CONC. (grains/dscf) | 0.0023 | 0.0029 | 0.0012 | 0.0021 |
| PART. EMISSION RATE (lb/hour) | 8.3246 | 8.7661 | 3.5981 | 6.8963 |
| LEAD CONC. (mg) | 19.7290 | 32.8290 | 6.4050 | 19.6543 |
| LEAD CONC.(grams/dscf) | 0.000455 | 0.000878 | 0.000174 | 0.000502 |
| LEAD CONC. (grains/dscf) | 0.007015 | 0.013552 | 0.002680 | 0.007749 |
| LEAD CONC. (lb/dscf) | 1.00E-06 | 1.94E-06 | 3.83E-07 | 1.11E-06 |
| LEAD EMISSIONS (lb/hour) | 1.611735 | 2.667133 | 0.521405 | 1.600091 |

# TABLE 2-5

## Particulate and Lead Emissions Summary

| TEST RUN #: (STACK #1) | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| DATE | SEPTEMBER 24, 1992 | SEPTEMBER 24, 1992 | SEPTEMBER 24, 1992 | ---- |
| START TIME | 713 | 906 | 1120 | |
| STOP TIME | 825 | 1012 | 12.33 | ---- |
| CONDENSATE COLLECTED (ml) | 62.40 | 55.90 | 34.80 | 51.03 |
| MOISTURE (%) | 6.80 | 6.60 | 4.16 | 5.85 |
| O2 (%) | 19.7000 | 19.5000 | 20.5000 | 19.9000 |
| CO2 (%) | 0.8670 | 1.4000 | 0.7330 | 1.0000 |
| DRY,STD.SAMPLE VOLUME(dscf) | 40.2630 | 37.2469 | 37.7156 | 38.4085 |
| VELOCITY (ft./sec) | 26.66 | 25.12 | 25.46 | 25.75 |
| ACTUAL FLOW RATE (acfm) | 28590.86 | 26941.00 | 27311.20 | 27614.35 |
| Dry,Std.Vol.Flow Rate (dscfm) | 23482.76 | 22093.56 | 23091.76 | 22889.36 |
| % ISOKINETIC | 104.13 | 102.38 | 99.19 | 101.90 |
| PARTICULATE CATCH (mg) | 103.10 | 85.60 | 60.00 | 82.90 |
| PARTICULATE CONC.(grams/dscf) | 0.0052 | 0.0044 | 0.0029 | 0.0042 |
| PARTICULATE CONC. (grains/dscf) | 0.0394 | 0.0354 | 0.0245 | 0.0331 |
| PART. EMISSION RATE (lb/hour) | 7.9554 | 6.7175 | 4.8601 | 6.5110 |
| LEAD CONC. Total mg. | 4.0370 | 27.3540 | 3.8970 | 11.7627 |
| LEAD CONC.(grams/dscf) | 0.000100 | 0.000734 | 0.000103 | 0.000313 |
| LEAD CONC. (grains/dscf) | 0.001547 | 0.011332 | 0.001594 | 0.004824 |
| LEAD CONC. (lb/dscf) | 2.21E-07 | 1.62E-06 | 2.28E-07 | 6.89E-07 |
| LEAD EMISSIONS (lb/hour) | 0.311503 | 2.146623 | 0.315665 | 0.924597 |

TABLE 5-2

Visible Emissions – EPA Method 9
Test Results

| Readings Source | Run # | Date | Time | Average Opacity for Highest Period | % of Reading Above | Range of Opacity Minimum | Range of Opacity Maximum |
|---|---|---|---|---|---|---|---|
| Stack #2 | 2 | 9/22/92 | 813-915 | 10 | 10% = 1 | 0 | 15 |
| Roof Vent | 2 | 9/22/92 | 815-918 | 0 | 0% = 0 | 0 | 0 |
| Stack #2 | 3 | 9/22/92 | 945-1058 | 20 | 20% = 5 | 0 | 25 |
| Roof Vent | 3 | 9/22/92 | 950-1100 | 5 | 5% = 0 | 0 | 5 |
| Stack #4 | 2 | 9/23/92 | 908-1013 | 25 | 25% = 7 | 0 | 30 |
| Roof Vent | 2 | 9/23/92 | 912-1018 | 5 | 0% = 3 | 0 | 5 |
| Stack #4 | 3 | 9/23/92 | 1055-1207 | 15 | 15% = 0 | 0 | 15 |
| Roof Vent | 3 | 9/23/92 | 1058-1208 | 0 | 0% = 0 | 0 | 0 |
| Stack #1 | 1 | 9/23/92 | 1410-1538 | 20 | 20% = 10 | 0 | 35 |
| Roof Vent | 1 | 9/23/92 | 1410-1542 | 5 | 5% = 0 | 0 | 5 |
| Stack #1 | 2 | 9/24/92 | 0906-1018 | 15 | 15% = 18 | 0 | 20 |
| Roof Vent | 2 | 9/24/92 | 0907-1012 | 0 | 0% = 3 | 0 | 5 |
| Stack #1 | 3 | 9/24/92 | 1117-1230 | 10 | 10% = 0 | 0 | 10 |
| Roof Vent | 3 | 9/24/92 | 1120-1233 | 0 | 0% = 8 | 0 | 5 |
| Roof Vent Only | 1 | 9/25/92 | 921-1027 | 5 | 5% = 13 | 0 | 15 |
| Stack #3 | 2 | 9/25/92 | 1122-1225 | 25 | 25% = 7 | 0 | 35 |
| Roof Vent | 2 | 9/25/92 | 1124-1228 | 0 | 0% = 15 | 0 | 5 |
| Stack #3 | 3 | 9/25/92 | 1252-1353 | 5 | 5% = 20 | 0 | 10 |
| Roof Vent | 3 | 9/25/92 | 1254-1400 | 5 | 5% = 0 | 0 | 5 |

# TABLE 6-2

## Particulate Matter Emission Summary

PLANT: CHEMETCO, INC.
CITY, STATE: HARTFORD, ILL.
STACK: STACK #4

PARTICULATE MATTER EMISSIONS

| Run Number | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Date of Run | | SEPTEMBER 23, 1992 | | |
| Starting Time (hours) | 712 | 912 | 1058 | |
| Ending Time (hours) | 832 | 1018 | 1209 | |
| Net Time of Run (minutes) | 60 | 60 | 60 | |
| Number of Points | 24 | 24 | 24 | |
| Barometric Pressure (in. Hg) | 30.35 | 30.42 | 30.42 | |
| Static Pressure (in. H20) | -0.28 | -0.28 | -0.28 | |
| Stack Pressure (in. Hg) | 30.33 | 30.40 | 30.40 | 30.38 |
| Average Delta H (in. H20) | 1.8500 | 1.3917 | 1.3354 | 1.5257 |
| Average Delta P (in,H2o) | 0.2454 | 0.1829 | 0.1767 | 0.2017 |
| Meter Pressure (in. Hg) | 30.49 | 30.52 | 30.52 | 30.51 |
| Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 | 0.84 |
| Meter Box Number (STL#) | 2 | 2 | 2 | |
| Y-Factor | 0.9989 | 0.9989 | 0.9989 | |
| Stack Diameter (in.) | 57.25 | 57.25 | 57.25 | |
| Stack Cross Sectional Area (ft2) | 17.876330 | 17.876330 | 17.876330 | 17.876330 |
| Nozzle Diameter (inches) | 0.300 | 0.300 | 0.300 | |
| Nozzle Area (ft2) | 0.00049087 | 0.0004908 | 0.000490873 | 0.000490873 |
| Meter Temperature (F) | 78.042 | 83.833 | 87.792 | 83.222 |
| Stack Temperature (F) | 141.542 | 147.917 | 145.875 | 145.111 |
| Volume of Gas Sample (acf) | 43.4450 | 37.7800 | 37.5500 | 39.5917 |
| Dry, Std. Gas Sample Volume (dscf) | 43.3928 | 37.377 | 36.876 | 39.2154 |
| Condensate Collected (mL) | 51.70 | 49.60 | 44.30 | 48.53 |
| Moisture Concentration (%) | 5.31 | 5.88 | 5.35 | 5.51 |
| Carbon Dioxide Concentration (%) | 1.067 | 1.400 | 1.000 | 1.156 |
| Oxygen Concentration (%) | 20.033 | 19.800 | 20.700 | 20.178 |
| Carbon Monoxide Concentration (%) | 0.000 | 0.000 | 0.000 | 0.000 |
| Nitrogen Conc. Dry (gas balance) | 78.900 | 78.800 | 78.300 | 78.667 |
| Molecular Weight, Dry (lb/lb-mole) | 28.9720 | 29.0160 | 28.9880 | 28.9920 |
| Molecular Weight, Wet (lb/lb-mole) | 28.3894 | 28.3684 | 28.3999 | 28.3859 |
| SQRT Delta P Avg., Pitot (in. H20) | 0.494000 | 0.427326 | 0.419617 | 0.446981 |
| Avg. Velocity, Stack Gas (ft/sec) | 29.6514 | 25.7647 | 25.2434 | 26.8865 |
| Actual Flow Rate (acfm) | 31803.464 | 27634.741 | 27075.579 | 28837.928 |
| Dry, Std. Vol. Flow Rate (dscfm) | 26794.539 | 22952.702 | 22690.412 | 24145.884 |
| % Isokinetic | 98.35 | 98.90 | 98.70 | 98.65 |
| Total Filter Catch (mg) | 74.20 | 96.00 | 29.70 | 66.63 |
| Total Wash Catch (mg) | 27.70 | 11.90 | 14.50 | 18.03 |
| Total Catch (mg) | 101.90 | 107.90 | 44.20 | 84.67 |
| Particulate Conc. (grams/dscf) | 0.0023 | 0.0029 | 0.0012 | 0.0021 |
| Particulate Conc. (grains/dscf) | 0.0362 | 0.0445 | 0.0185 | 0.0330 |
| Particulate Concentration (lb/dscf) | 5.18E-06 | 6.37E-06 | 2.64E-06 | 4.73E-06 |
| Particulate Emission Rate (lb/hr) | 8.3246 | 8.7661 | 3.5981 | 6.8963 |

# TABLE 6-4

## Particulate Matter Emission Summary

PLANT: CHEMETCO, INC.
CITY, STATE: HARTFORD, ILL.
STACK: STACK #1

PARTICULATE MATTER EMISSIONS

| Run Number | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Date of Run | | SEPTEMBER 24, 1992 | | |
| Starting Time (hours) | 713 | 906 | 1120 | |
| Ending Time (hours) | 825 | 1012 | 12.33 | |
| Net Time of Run (minutes) | 60.00 | 60.00 | 60.00 | |
| Number of Points | 24.00 | 24.00 | 24.00 | |
| Barometric Pressure (in. Hg) | 30.24 | 30.34 | 30.34 | |
| Static Pressure (in. H2O) | -0.29 | -0.29 | -0.29 | |
| Stack Pressure (in. Hg) | 30.22 | 30.32 | 30.32 | 30.29 |
| Average Delta H (in. H2O) | 1.5175 | 1.3833 | 1.3846 | 1.4285 |
| Average Delta P (in,H2o) | 0.1958 | 0.1733 | 0.1800 | 0.1831 |
| Meter Pressure (in. Hg) | 30.35 | 30.44 | 30.44 | 30.41 |
| Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 | 0.84 |
| Meter Box Number (STL#) | 2 | 2.00 | 2.00 | |
| Y-Factor | 1.00 | 1.00 | 1.00 | |
| Stack Diameter (in.) | 57.25 | 57.25 | 57.25 | |
| Stack Cross Sectional Area (ft2) | 17.876330 | 17.876330 | 17.876330 | 17.876330 |
| Nozzle Diameter (inches) | 0.300 | 0.300 | 0.300 | |
| Nozzle Area (ft2) | 0.00049087 | 0.00049087 | 0.00049087 | 0.00049087 |
| Meter Temperature (F) | 73.125 | 86.167 | 84.958 | 81.417 |
| Stack Temperature (F) | 145.125 | 149.375 | 146.458 | 146.986 |
| Volume of Gas Sample (acf) | 40.1200 | 37.9100 | 38.3020 | 38.7773 |
| Dry, Std. Gas Sample Volume (dscf) | 40.2630 | 37.247 | 37.716 | 38.4085 |
| Condensate Collected (mL) | 62.40 | 55.90 | 34.80 | 51.03 |
| Moisture Concentration (%) | 6.80 | 6.60 | 4.16 | 5.85 |
| Carbon Dioxide Concentration (%) | 0.867 | 1.400 | 0.733 | 1.000 |
| Oxygen Concentration (%) | 19.700 | 19.500 | 20.500 | 19.900 |
| Carbon Monoxide Concentration (%) | 0.000 | 0.000 | 0.000 | 0.000 |
| Nitrogen Conc. Dry (gas balance) | 79.433 | 79.100 | 78.767 | 79.100 |
| Molecular Weight, Dry (lb/lb-mole) | 28.9267 | 29.0040 | 28.9373 | 28.9560 |
| Molecular Weight, Wet (lb/lb-mole) | 28.1838 | 28.2779 | 28.4820 | 28.3146 |
| SQRT Delta P Avg., Pitot (in. H2O) | 0.440370 | 0.414884 | 0.423113 | 0.426122 |
| Avg. Velocity, Stack Gas (ft/sec) | 26.6562 | 25.1179 | 25.4631 | 25.7457 |
| Actual Flow Rate (acfm) | 28590.861 | 26940.999 | 27311.198 | 27614.353 |
| Dry, Std. Vol. Flow Rate (dscfm) | 23482.761 | 22093.563 | 23091.763 | 22889.362 |
| % Isokinetic | 104.13 | 102.38 | 99.19 | 101.90 |
| Total Filter Catch (mg) | 70.10 | 65.00 | 23.50 | 52.87 |
| Total Wash Catch (mg) | 33.00 | 20.60 | 36.50 | 30.03 |
| Total Catch (mg) | 103.10 | 85.60 | 60.00 | 82.90 |
| Particulate Conc. (grams/dscf) | 0.0052 | 0.0044 | 0.0029 | 0.0042 |
| Particulate Conc. (grains/dscf) | 0.0394 | 0.0354 | 0.0245 | 0.0331 |
| Particulate Concentration (lb/dscf) | 5.65E-06 | 5.07E-06 | 3.51E-06 | 4.74E-06 |
| Particulate Emission Rate (lb/hr) | 7.9554 | 6.7175 | 4.8601 | 6.5110 |

EMISSION RATE CALCULATION

09/24/92 Furnace 1 -- REFINE

| TIME | MATERIAL/ACTION | IN | OUT |
|---|---|---|---|
| 07:10 | Cold Charge 23-1 | 30000 | |
| 07:11 | Pot Slag | 10000 | |
| 07:20 | Cold Charge 23-1 | 30000 | |
| 07:21 | Cold Charge 23-1 | 30000 | |
| 07:22 | Lime | 3000 | |
| 09:00 | Cold Charge 23-1 | 47660 | |
| 11:35 | Taphole metal | 90000 | |
| 12:25 | Black Copper | 80000 | |
| 13:15 | Slag off refine slag(Off Burner) | | 45000 |
| 13:58 | Tap Metal to Holding Furnace | | 245000 |

Left in Furnace: 30,660 lbs.

| | | |
|---|---|---|
| | 320660 | 290000 |

| | | |
|---|---|---|
| TOTAL TONNAGE: | 160.33 | Tons |
| HEAT TIME: | 6.08 | Hours |
| PROCESS WEIGHT RATE: | 26.37 | Tons/hour |

EMISSION RATE CALCULATION

09/22/92 Furnace 2 -- REFINE

| TIME | MATERIAL/ACTION | IN | OUT |
|---|---|---|---|
| 06:25 | Cold Charge 21-3 | 30000 | |
| 06:26 | Pot Slag | 12000 | |
| 06:45 | Cold Charge 21-3 | 30000 | |
| 06:55 | Cold Charge 21-3 | 40000 | |
| 06:56 | Lime | 3000 | |
| 08:15 | Cold Charge | 38780 | |
| 08:16 | Sand | 2000 | |
| 10:10 | Taphole metal | 85000 | |
| 10:25 | No. 2 Copper | 25000 | |
| 12:40 | Black Copper metal | 80000 | |
| 13:45 | Slag Off Refine Slag(off Burner) | | 70000 |
| 14:45 | Tap metal | | 230000 |
| | | 345780 | 300000 |

Left in Furnace: 45,780 lbs

TOTAL TONNAGE: 172.89 Tons
HEAT TIME: 7.33 Hours
PROCESS WEIGHT RATE: 23.59 Tons/hour

EMISSION RATE CALCULATION

09/23/92 Furnace 4 -- REFINE

| TIME | MATERIAL/ACTION | IN | OUT |
|---|---|---|---|
| 07:20 | Cold Charge 22-1 | 30000 | |
| 07:21 | Pot Slag | 10000 | |
| 07:35 | Cold Charge 22-1 | 30000 | |
| 07:50 | Cold Charge 22-1 | 30000 | |
| 09:05 | Cold Charge 22-1 | 30000 | |
| 09:06 | Lime | 3000 | |
| 09:15 | Cold Charge 22-1 | 19480 | |
| 11:15 | Black Copper | 100000 | |
| 11:25 | Taphole metal | 80000 | |
| 12:50 | Slag off Refine Slag | | 35000 |
| 12:51 | Slag Off Refine Slag (Off Burner) | | 30000 |
| 13:05 | Tap metal | | 235000 |
| | Left in Furnace: 32480 lbs | | |
| | | 332480 | 300000 |

TOTAL TONNAGE: 166.24 Tons

HEAT TIME: 5.5 Hours

PROCESS WEIGHT RATE: 30.23 Tons/hour

Chemetco
FIRST IN PEOPLE — QUALITY — SERVICE
P.O. BOX 187 • ALTON, ILLINOIS 62002

Mailed Certified No. 896 689 050

November 10, 1992

RECEIVED
NOV 13 1992
REGULATION DEVELOPMENT BRANCH
U.S. EPA, IEPA-DAPC-SPFLD.
COLLINSVILLE OFFICE

Mr. Don Sutton, Manager
Bureau of Air
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62794-9276

RE: Compliance Testing
Chemetco, Inc. -- Madison County

Dear Mr. Sutton,

Enclosed please find three (3) copies of the stack testing report for the Chemetco facility in Hartford, Illinois. Included with the copies of Fugro-McClelland test report are results from the scrubber water testing and a table summarizing all the test results, the process weight rates and the allowable emission rates. Appendix J of the test report contains the process weight rate calculations.

Chemetco has additional supporting data to be provided to the Agency for the determination of compliance but Chemetco agreed to provide the test results themselves within two weeks after receiving them. We received the report on October 27, 1992. Chemetco maintains it has clearly passed the stack tests although there is a single test run which is above the allowable limit. That is the second run on Furnace No. 3. Chemetco believes this test result should be totally disregarded as it is obviously skewed, 200% higher than the average of all the other test results, and statistically out of bounds. The average emission for Furnace No. 3, including that run, are still well within acceptable limits as well. The enclosed table illustrates this. We have no explanation for the one skewed result, especially since nothing different was done to the furnace during the three separate runs.

If you have any questions, please do not hesitate to phone Michelle Reznack at 618-254-4381, Ext. 219 or write me at the above letterhead address.

Sincerely,

David A. Hoff
President

Enclosures
cc: R. Emmett Fitzgerald, Counsel for Chemetco, Inc.
Michelle Reznack, Environmental Coordinator
file

# COMPLIANCE TESTING SUMMARY

| SOURCE | MODE | PARAMETER | STACK RESULTS CONCENTRATION | EMISSION RATE | PROCESS WEIGHT RATE | ALLOWABLE EMISSIONS |
|---|---|---|---|---|---|---|
| Fce. No. 1 | Dust | Particulate | 0.02609 gr/dscf | 5.130356 lbs/hr | 11.40 tons/hr | 9.3149 lbs/hr |
| | | Lead | 1.4E-06 " | 1.917011 lbs/hr | | NA |
| | | TSS | 0.747 g/l | | | |
| | | TDS | 100.915 g/l | | | |
| | | pH | 6.87 | | | |
| Fce. No.1 | Refine | Particulate | 0.0331 gr/dscf | 6.5110 lbs/hr | 26.37 tons/hr | 14.5783 lbs/hr |
| | | Lead | 6.89E-07 " | 0.924597 lbs/hr | | NA |
| | | TSS | 0.790 g/l | | | |
| | | TDS | 87.01 g/l | | | |
| | | pH | 8.71 | | | |
| Fce. No. 2 | Refine | Particulate | 0.0373 gr/dscf | 7.7967 lbs/hr | 23.59 tons/hr | 13.7353 lbs/hr |
| | | Lead | 1.07E-06 " | 1.554464 lbs/hr | | NA |
| | | TSS | 0.667 g/l | | | |
| | | TDS | 77.76 g/l | | | |
| | | pH | 6.96 | | | |
| Fce. No. 3 | S/ST | Particulate | 0.0600 gr/dscf | 11.9324 lbs/hr | 28.94 tons/hr | 15.3218 lbs/hr |
| | | Lead | 2.40E-06 " | 3.334746 lbs/hr | | NA |
| | | TSS | 1.23 g/l | | | |
| | | TDS | 88.87 g/l | | | |
| | | pH | 7.53 | | | |
| Fce. No. 4 | Refine | Particulate | 0.0021 gr/dscf | 6.8963 lbs/hr | 30.23 tons/hr | 15.6802 lbs/hr |
| | | Lead | 1.11E-06 " | 1.60091 lbs/hr | | NA |
| | | TSS | 0.730 g/l | | | |
| | | TDS | 90.78 g/l | | | |
| | | pH | 7.98 | | | |

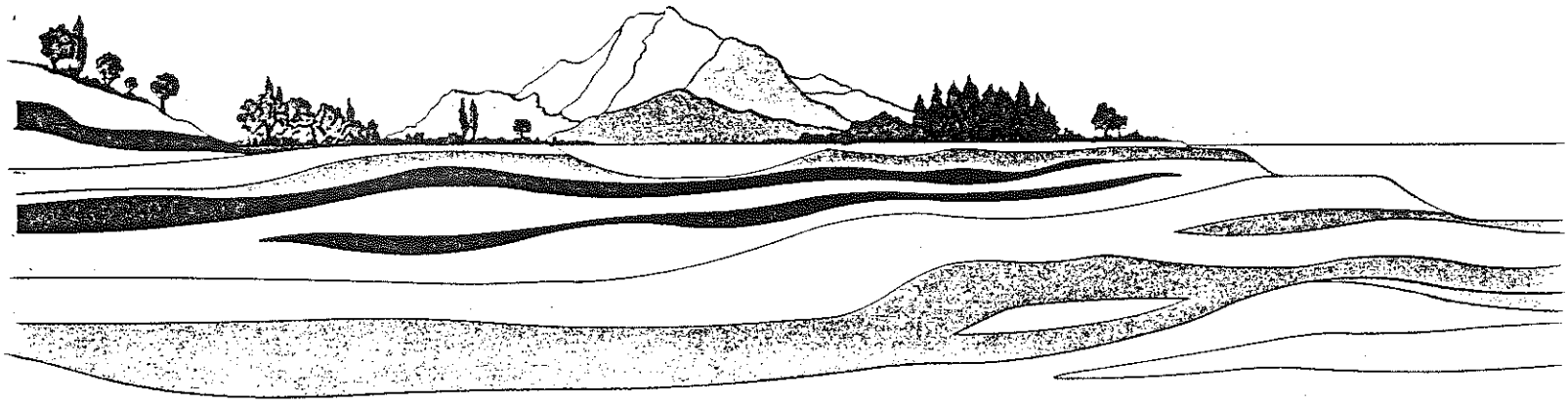
STATISTICAL ANALYSIS
Compliance Testing
Chemetco, Inc.

| Furnace | Run Number | Emissions (lb/hr) Allowable | Actual | Average | Standard Deviation |
|---|---|---|---|---|---|
| No. 1 | 1 | 9.3149 | 3.6178 | | |
| | 2 | | 6.6429 | 5.1304 | 2.139 |
| No. 1 | 1 | 14.5783 | 7.9554 | | |
| | 2 | | 6.7175 | | |
| | 3 | | 4.8601 | 6.511 | 1.557 |
| No. 2 | 1 | 13.7353 | 7.6851 | | |
| | 2 | | 8.4381 | | |
| | 3 | | 7.2669 | 7.7967 | 0.594 |
| No. 3 | 1 | 15.3218 | 8.7200 | | |
| | 2 | | 16.3306 | | |
| | 3 | | 10.7465 | 11.9324 | 3.941 |
| No. 4 | 1 | 15.6802 | 8.3246 | | |
| | 2 | | 8.7661 | | |
| | 3 | | 3.5981 | 6.8963 | 2.865 |
| | | | Overall: | 7.8336 | 3.169 |

FUGRO-McCLELLAND ENVIRONMENTAL

# PARTICULATE, OPACITY, AND LEAD TESTING
# CHEMETCO, INC
# HARTFORD, ILLINOIS

CHEMETCO, INC



FUGRO-McCLELLAND (MIDWEST), INC.

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Tel: (314) 428-8880
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October 26, 1992
Report 0801-1456

Ms Michelle Reznack
Environmental Coordinator
Chemetco, Inc
P O Box 67
Hartford, Illinois 62048

Dear Ms Reznack:

Fugro-McClelland Environmental is pleased to submit our final report for the emissions testing conducted on furnaces 1, 2, 3, and 4 at Chemetco's facility located in Hartford, Illinois.

This report describes the test conducted on September 22 through September 25, 1992 by Fugro-McClelland Environmental of St Louis, Missouri. The test parameters included total particulate matter, lead, and visible emissions (opacity).

Please feel free to call me if you have any questions regarding this report.

Sincerely,

FUGRO-McCLELLAND ENVIRONMENTAL
Division of Fugro-McClelland (Midwest), Inc

Robert F. Folle

Robert F Folle
Air Quality Scientist

Christopher N Dawdy
Manager, Air Quality Group

RFF:CND:JKB:ab

Reviewed by:

J. Kevin Brown

J Kevin Brown, PE
Vice President

Copies Submitted (4)

cc: Steve Dillard

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## 1.0 INTRODUCTION

Fugro-McClelland Environmental was contracted by Chemetco's Hartford, Illinois facility to conduct source emissions testing on four furnace scrubber stacks for total particulate matter (PM), lead (Pb), oxygen ($O_2$), carbon dioxide ($CO_2$), and opacity. Testing was conducted during the week of September 22, 1992, by Fugro-McClelland Environmental, St Louis, Missouri. Particulate and lead emissions testing was conducted following the procedures outlined in USEPA Methods for "Isokinetic Particulate Matter (PM) and Lead Emissions" testing (USEPA Method 12). Additionally, USEPA Methods 1, 2, 3, 4, and 9, as published in 40 CFR, Part 60, Appendix A, were used for the determination of sample and velocity traverses, stack gas velocity and volumetric flow rates, oxygen ($O_2$) and carbon dioxide ($CO_2$) concentrations, molecular weight of stack gas, moisture, and visible emissions, respectively. All samples were collected during 1-hour testing periods and all methods were conducted concurrently. Three test runs were performed on each source with the exception of two additional test runs performed on furnace No. 1 during the smelting/slag treatment with dust injection which was conducted on September 23, 1992.

This report presents the results of the emissions testing for total particulate matter, lead, and opacity. Flue gas moisture concentrations, velocity, molecular weight, and volumetric flow rates, oxygen, and carbon dioxide concentrations are also reported for each test run. Copies of raw field data, example calculations, and other pertinent information are included in the appendices of this report.

## 2.0 SUMMARY OF EMISSIONS RESULTS

Total particulate matter emissions ranged from 3.6 pounds per hour to 16.3. Total lead emissions ranged from 0.31 pounds per hour to 6.26 pounds per hour. A summary of the particulate matter and lead emissions is presented in Tables 2-2 through Table 2-6. A summary of the opacity test results is presented in Table 2-7. The testing schedule is outlined in Table 2-1. Complete particulate matter test results are included in Tables 6-1 through Table 6-5 in Section 6 of this report. Appendix A contains copies of the field data sheets and Appendix B presents the particulate and lead laboratory analysis. The chain of custody forms are presented in Appendix C. The calibration gas certifications are presented in Appendix D. Appendix E presents the equipment calibration records and Appendix F contains example calculations from Test #1, Stack #2, 9/22/92.

## 3.0 PURPOSE OF REPORT

Fugro-McClelland Environmental was contracted by the Chemetco Corporation to perform emissions testing on four furnace scrubber stacks at Chemetco's facility located in Hartford, Illinois. Fugro-McClelland Environmental performed emissions testing to determine total particulate matter, lead, oxygen, carbon dioxide concentrations, emission rates, and opacity readings.

## 4.0 ACTIVITIES DURING THE TESTING

Fugro-McClelland Environmental performed the emissions testing on the furnace scrubber stacks during the week of September 22, 1992 at Chemetco's facility located in Hartford, Illinois. Messrs Christopher Dawdy, Robert Folle, Steven Dillard, and Robert Suda performed the testing for Fugro-McClelland Environmental. Ms Michelle Reznack, Environmental Coordinator for the Chemetco Corporation, was responsible for scheduling and coordinating testing activities for Chemetco. Mr Fred Smith, Jeff Benbenek and Mark Schlueter,

representing IEPA, were present and observed the testing. Resumes of the field sampling crew are presented in Appendix K.

## 5.0 TEST METHODS AND PROCEDURES

USEPA Method 12 was used to determine total particulate matter and lead concentrations from the effluent of each furnace. EPA Method 9 was used to determine and record opacity readings.

### 5.1 Field Procedures and Equipment for Particulate and Lead Sampling (EPA Method 12).

#### 5.1.1 Sampling

The sampling equipment consists of the following:

1. Pitot Assembly

   a. Nozzel – Glass with a sharp, tapered leading edge.

   b. Probe – Stainless steel sheath with a 5/8-in. O.D. glass liner wrapper with nichrome wire; rheostat controlled and capable of maintaining a temperature of 250 degrees F +/- 25 degrees F.

   c. Pitot – Type "S" constructed and attached to probe according to specifications outlined in the 'code of Federal Regulations, Chapter I, Title 40, Part 60, Appendix A, Method 2'.

   d. Orsat Probe – Stainless steel 1/4-in. tubing attached to pitot tube in an interference-free arrangement.

   e. Thermocouple – Type "K" attached to the pitot tube such that the tip has no contact with the metal and does not interfere with the pitot tube face openings.

2. Filter Holder – Borosilicate glass with a Teflon fritted filter support and Teflon sealing gasket.

3. Filter Heating Assembly – Controlled heating element in aluminum module attached to end of probe; capable of maintaining 250 degrees F +/- 25 degrees F.

4. Impingers – Four glass impingers connected in series with glass ball joint fittings and placed in an ice bath. The first, third, and fourth impingers were of the modified Greenburg-Smith design. The second impinger was of the Greenburg-Smith design with a standard tip. Final gas exit temperature was measured to within +/- 5 degrees F with a thermometer immersed in the gas stream.

5. Control Box – Module containing the vacuum gauge, leak-free pump, thermometer capable of measuring temperature to within +/- 5 degrees F, dry gas meter with a minimum of 2% accuracy,

valves and related equipment as required to maintain an isokinetic sampling rate and to determine sample volume.

6. Nomograph – To determine isokinetic sampling rate.

A schematic of the sampling train is shown in Figure 5-1.

Prior to leaving the laboratory, glass filters were numbered for identification purposes, heated for 2 hours at 220 degrees F, desiccated for 2 hours, and preweighed to the nearest 0.1 mg.

Upon arrival at the sampling site, the control box was leak-checked from the pump to the orifice at 5 to 7 in. of water.

The sampling train was prepared in the following manner: 100 ml of 0.1 N HN03 was added to each of the first two impingers, the third impinger was left empty to act as a moisture trap, and 250 grams of silica gel was added to the final impinger. After assembling the train with the pitot tube as shown on the schematic, the system was leak-checked by plugging the inlet to the probe nozzel and pulling a 15-in. mercury vacuum. A leakage rate not to exceed 0.02 cfm is considered acceptable. The pitot tube system was also leak-checked at a 2 to 3 in. of water, and any leaks found were corrected.

The probe nozzle size and moisture content was derived from a preliminary velocity and temperature traverse measurement. Sampling points within the duct were selected in accordance with EPA Method 1 (40 CFR 60, Appendix A). The sampling probe was attached and the heater was adjusted to provide a gas temperature of approximately 248 degrees F, +/- 25 degrees F.

The filter heating system was turned on, and ice was placed around the impingers. After a suitable warmup period, the nozzle was placed at the first traverse point with the flow adjusted to isokinetic conditions. Using calculated sampling points and sampling times, the probe was repositioned to the next traverse point, and isokinetic sampling was re-established. This was accomplished for each point along the traverse until the run was completed. Readings were taken at each traverse point and at the calculated time interval. At the conclusion of each run, the pump was turned off and the final readings were recorded. A final leak check of the sampling system was performed, as previously described at the highest vacuum encountered during the test run. A leak check of the pitot system was also repeated.

### 5.1.2 Sample Recovery

The volume of liquid in the first four impingers was measured and recorded on the field data sheet to calculate moisture gain. The probe, nozzle, and all sample-exposed surfaces were washed with acetone and put into a clean glass sample bottle marked "prefilter". A brush was used to loosen any adhering particulate matter, and subsequent washings were put into the "prefilter" container. The filter was carefully removed from the teflon support and placed in its original container. Any filter material that adhered to the filter support surfaces was carefully removed and transferred to its original container. A sample of the acetone used in washing the probe was saved as a blank for laboratory analysis. The contents of the impingers were transferred to a clean

glass sample bottle for analysis of lead. Approximately 30 ml of 0.1N HN03 was used to rinse each of the impingers. This was conducted two times. This rinse was added to the impinger catch container. All glassware connecting the impingers were wiped free of silicone grease and rinsed twice with 0.1N HN03 and added to the sample container. A 200 ml sample of the 0.1N HN03 was retained as a field blank.

### 5.1.3 Analytical Procedures

The filter and any loose particulate matter was transferred from the filter container to a clean, tared glass weighing dish. The filter was placed in a desiccator for 24 hours and weighed to a constant weight. The original weight of the filter was deducted, and the weight gain recorded to the nearest 0.1 mg.

The "prefilter" wash and blank acetone solutions were transferred to individual clean, tared beakers, then evaporated to dryness and desiccated to a constant weight. The weight gain of the "prefilter" was adjusted for the blank and recorded to the nearest 0.1 mg. The silica gel was weighed, and the weight gain was recorded to the nearest 0.1 gram to calculate a moisture gain along with the volume gain of the first four impingers.

### 5.1.4 Oxygen ($O_2$) and Carbon Dioxide ($CO_2$) Sampling

As required by EPA Method 3 (40 CFR 60, Appendix A), oxygen and carbon dioxide samples were collected by an integrated bag system for analysis. The sampling system consists of a stainless steel probe, flexible sample line from the probe to a vinyl bag enclosed in a rigid container. The collected sample was then analyzed using an electronic gas analyzer.

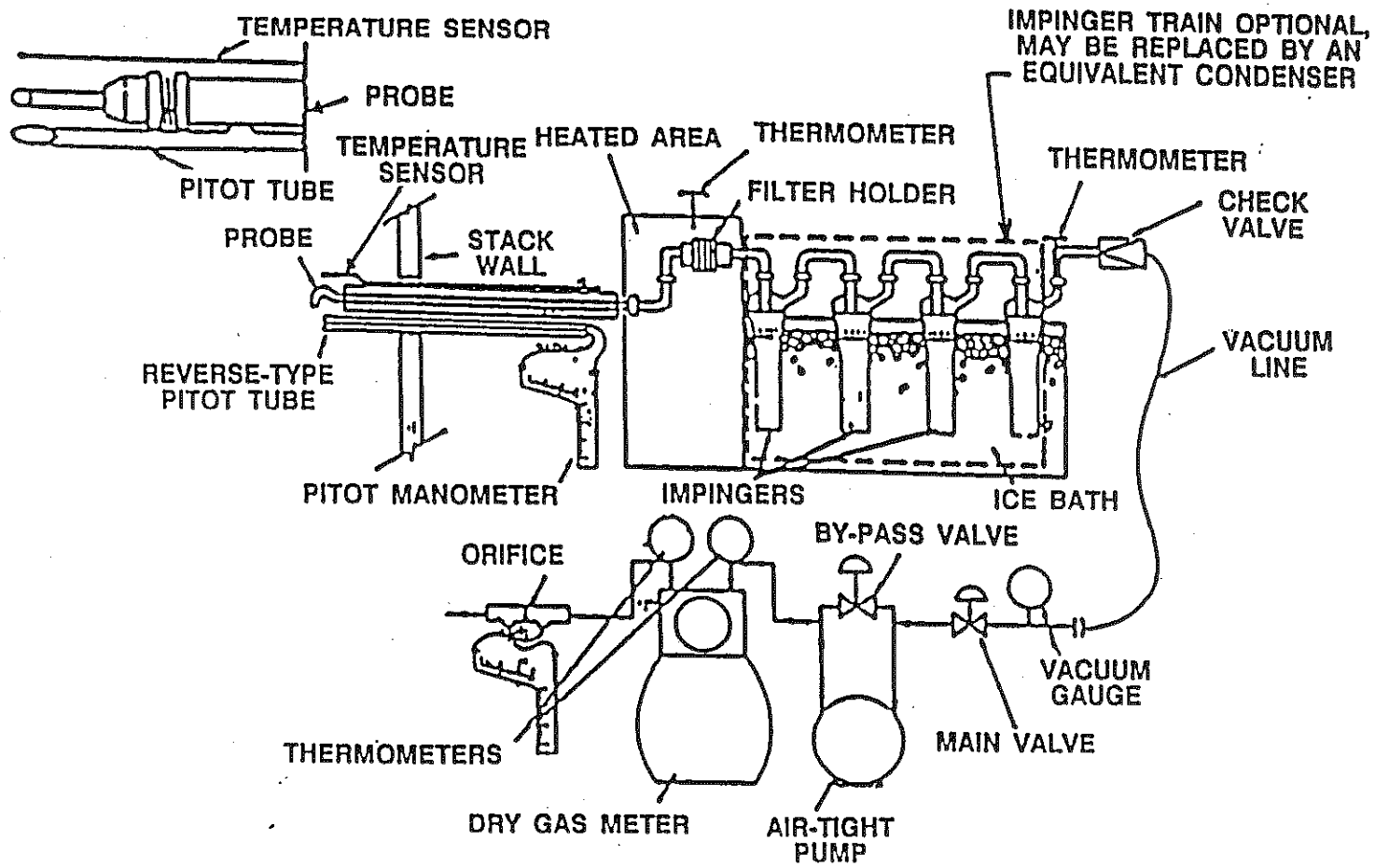
The sampling procedure consists of the following leak check and sampling techniques. Prior to sampling, the bag was leak-checked at 2 to 4 in. of water. The inlet was plugged, and a vacuum of 10 in. of Hg was created. The outlet of the pump was then plugged and the pump was turned off. The vacuum was observed for 30 seconds to determine any leakage. The vacuum held steady for at least 30 seconds and the leak test was acceptable. The sample line was then purged with stack gas and the bag was connected. Sampling was conducted at an appropriate constant rate at the same traverse points and for the same length of time as the other testing parameters were tested. At the conclusion of the run, the pump was turned off and the bag sealed.

After leak-checking and calibrating the gas analyzer, an average value for each sample was determined. The gas was analyzed utilizing a Horiba Model CMA-331A oxygen ($O_2$) and carbon dioxide ($CO_2$) gas analyzer until two values were obtained that fell within the specified variance of the gas tested. Data were recorded on the field data sheets, and the bag was evacuated for the next sample run. The oxygen and carbon dioxide analyzer was calibrated with known concentrations of certified nitrogen ($N_2$) for zero span and $O_2/CO_2$ of known certified concentrations of Protocol-1 calibration gas for upscale span and drift calibrations. The analyzers were calibrated before and after each test run. Calibration gas certificates are presented in the appendix of this report. Horiba analyzer specifications are outlined in Table 5-1. Complete oxygen and carbon dioxide test results are presented in Tables 6-1 through 6-5. Figure 5-2 illustrates the collection system utilized.

## 5.2 Visible Emissions – EPA Method 9; Determination of the Opacity of Emissions from Stationary Sources

USEPA Method 9 was conducted to determine visible emissions from the four furnace stacks and building roof vent during the compliance air emissions testing. Table 5-2 outlines the schedule and results from the visible emissions monitoring conducted from September 22 through September 25, 1992 at the Chemetco facility located in Hartford, Illinois.

FIGURES




SOURCE: ENVIRONMENT REPORTER

Figure 5-1
PARTICULATE AND LEAD SAMPLING TRAIN
EPA METHOD 12

FUGRO McClelland

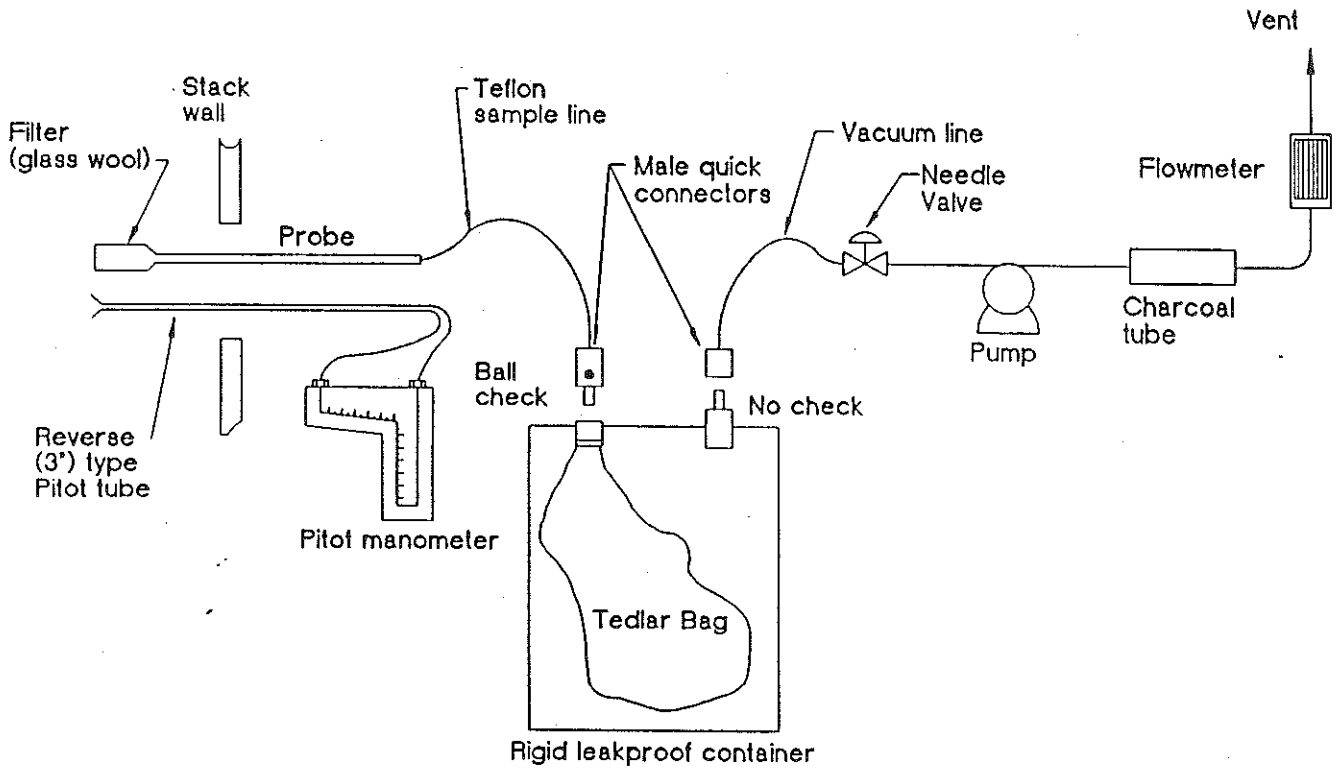



Figure 5-2

INTEGRATED BAG SAMPLING TRAIN

Source: Environment Reporter

FUGRO ⊡ McClelland

# TABLES

TABLE 2-1
Testing Schedule

| Date | Source | Condition | Method | Run # | Run Duration |
|---|---|---|---|---|---|
| 9/22/92 | #2 | Refining | EPA 12 | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| | | | EPA 12/9 | 3 | 1 hour |
| 9/23/92 | #4 | Refining | EPA 12 | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| | | | EPA 12/9 | 3 | 1 hour |
| 9/23/92 | #1 | Smelting/Slag Treatment with Dust Injection | EPA 12/9 | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| 9/24/92 | #1 | Refining | EPA 12 | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| | | | EPA 12/9 | 3 | 1 hour |
| 9/25/92 | #3 | Smelting/Slag Treatment | EPA 12/9* | 1 | 1 hour |
| | | | EPA 12/9 | 2 | 1 hour |
| | | | EPA 12/9 | 3 | 1 hour |

*Roof vent only – EPA Method 9, visible emissions

EPA Method 9 for visible emissions was conducted concurrently with Method 12 on furnace stack and roof vent as indicated.

# TABLE 2-2

## Particulate and Lead Emissions Summary

| TEST RUN #: (STACK # 2) | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| DATE | SEPTEMBER 22, 1992 | SEPTEMBER 22, 1992 | SEPTEMBER 22, 1992 | ---- |
| START TIME | 626 | 814 | 949 | |
| STOP TIME | 736 | 917 | 1057 | ---- |
| CONDENSATE COLLECTED (ml) | 73.50 | 94.50 | 52.50 | 73.50 |
| MOISTURE (%) | 8.03 | 6.81 | 5.90 | 6.91 |
| O2 (%) | 19.7000 | 20.4000 | 20.4330 | 20.1777 |
| CO2 (%) | 1.2000 | 0.7000 | 0.8700 | 0.9233 |
| DRY,STD.SAMPLE VOLUME(dscf) | 39.5984 | 60.9046 | 39.3879 | 46.6303 |
| VELOCITY (ft./sec) | 27.84 | 27.83 | 27.73 | 27.80 |
| ACTUAL FLOW RATE (acfm) | 29860.19 | 29850.10 | 29742.18 | 29817.49 |
| Dry,Std.Vol.Flow Rate (dscfm) | 24010.71 | 24323.60 | 24584.92 | 24306.41 |
| % ISOKINETIC | 100.16 | 97.32 | 97.30 | 98.26 |
| PARTICULATE CATCH (grams) | 0.0958 | 0.1597 | 0.088 | 0.1145 |
| PARTICULATE CATCH (mg) | 95.8000 | 159.70 | 88.00 | 114.5000 |
| PARTICULATE CONC. (grains/dscf) | 0.0373 | 0.0404 | 0.0344 | 0.0373 |
| PART. EMISSION RATE (lb/hour) | 7.6851 | 8.4381 | 7.2669 | 7.7967 |
| LEAD CONC. Total mg. | 18.8190 | 43.4040 | 10.4190 | 24.2140 |
| LEAD CONC.(grams/dscf) | 0.000475 | 0.000713 | 0.000265 | 0.000484 |
| LEAD CONC. (grains/dscf) | 0.007333 | 0.010996 | 0.004082 | 0.007470 |
| LEAD CONC. (lb/dscf) | 1.05E-06 | 1.57E-06 | 5.83E-07 | 1.07E-06 |
| LEAD EMISSIONS (lb/hour) | 1.509674 | 2.293333 | 0.860384 | 1.554464 |

# TABLE 2-3

## Particulate and Lead Emissions Summary

| TEST RUN #: (STACK # 4) | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| DATE | SEPTEMBER 23, 1992 | SEPTEMBER 23, 1992 | SEPTEMBER 23, 1992 | ---- |
| START TIME | 712 | 912 | 1058 | |
| STOP TIME | 832 | 1018 | 1209 | ---- |
| CONDENSATE COLLECTED (ml) | 51.70 | 49.60 | 44.30 | 48.53 |
| MOISTURE (%) | 5.31 | 5.88 | 5.35 | 5.51 |
| O2 (%) | 20.03 | 19.80 | 20.70 | 20.1777 |
| CO2 (%) | 1.07 | 1.40 | 1.00 | 1.1557 |
| DRY,STD.SAMPLE VOLUME(dscf) | 43.3928 | 37.3772 | 36.8762 | 39.2154 |
| VELOCITY (ft./sec) | 29.65 | 25.76 | 25.24 | 26.89 |
| ACTUAL FLOW RATE (acfm) | 31803.46 | 27634.74 | 27075.58 | 28837.93 |
| Dry,Std.Vol.Flow Rate (dscfm) | 26794.54 | 22952.70 | 22690.41 | 24145.88 |
| % ISOKINETIC | 98.35 | 98.90 | 98.70 | 98.65 |
| PARTICULATE CATCH (mg) | 101.90 | 107.90 | 44.20 | 84.6667 |
| PARTICULATE CATCH (grams/dscf) | 0.0023 | 0.0029 | 0.0012 | 0.0021 |
| PARTICULATE CONC. (grains/dscf) | 0.0023 | 0.0029 | 0.0012 | 0.0021 |
| PART. EMISSION RATE (lb/hour) | 8.3246 | 8.7661 | 3.5981 | 6.8963 |
| LEAD CONC. (mg) | 19.7290 | 32.8290 | 6.4050 | 19.6543 |
| LEAD CONC.(grams/dscf) | 0.000455 | 0.000878 | 0.000174 | 0.000502 |
| LEAD CONC. (grains/dscf) | 0.007015 | 0.013552 | 0.002680 | 0.007749 |
| LEAD CONC. (lb/dscf) | 1.00E-06 | 1.94E-06 | 3.83E-07 | 1.11E-06 |
| LEAD EMISSIONS (lb/hour) | 1.611735 | 2.667133 | 0.521405 | 1.600091 |

# TABLE 2-4

## Particulate and Lead Emissions Summary

| TEST RUN #: (STACK # 1) | 1 | 2 | AVERAGE |
|---|---|---|---|
| DATE | SEPTEMBER 23, 1992 | SEPTEMBER 23, 1992 | ---- |
| START TIME | 1411 | 1642 | |
| STOP TIME | 1541 | 1750 | ---- |
| CONDENSATE COLLECTED (ml) | 58.20 | 36.90 | 47.5500 |
| MOISTURE (%) | 6.61 | 4.64 | 5.6238 |
| O2 (%) | 20.0000 | 19.7000 | 19.8500 |
| CO2 (%) | 0.8000 | 1.2000 | 1.0000 |
| DRY,STD.SAMPLE VOLUME(dscf) | 38.7033 | 35.7175 | 37.2104 |
| VELOCITY (ft./sec) | 26.02 | 25.52 | 25.7700 |
| ACTUAL FLOW RATE (acfm) | 27912.42 | 27368.29 | 27640.3539 |
| Dry,Std.Vol.Flow Rate (dscfm) | 22809.46 | 22933.60 | 22871.5311 |
| % ISOKINETIC | 103.05 | 94.58 | 98.8167 |
| PARTICULATE CATCH (mg) | 46.40 | 78.20 | 62.30 |
| PARTICULATE CONC. (grams/dscf) | 0.0012 | 0.0017 | 0.0014 |
| PARTICULATE CONC. (grains/dscf) | 0.0185 | 0.0337 | 0.026090 |
| PART. EMISSION RATE (lb/hour) | 3.6178 | 6.6429 | 5.130356 |
| LEAD CONC. Total mg. | 19.59 | 27.15 | 23.371500 |
| LEAD CONC.(grams/dscf) | 0.000506 | 0.000760 | 0.000422 |
| LEAD CONC. (grains/dscf) | 0.007810 | 0.011731 | 0.009770 |
| LEAD CONC. (lb/dscf) | 1.12E-06 | 1.68E-06 | 1.40E-06 |
| LEAD EMISSIONS (lb/hour) | 1.5274 | 2.3067 | 1.917011 |

# TABLE 2-5

## Particulate and Lead Emissions Summary

| TEST RUN #: (STACK #1) | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| DATE | SEPTEMBER 24, 1992 | SEPTEMBER 24, 1992 | SEPTEMBER 24, 1992 | ---- |
| START TIME | 713 | 906 | 1120 | |
| STOP TIME | 825 | 1012 | 12.33 | ---- |
| CONDENSATE COLLECTED (ml) | 62.40 | 55.90 | 34.80 | 51.03 |
| MOISTURE (%) | 6.80 | 6.60 | 4.16 | 5.85 |
| O2 (%) | 19.7000 | 19.5000 | 20.5000 | 19.9000 |
| CO2 (%) | 0.8670 | 1.4000 | 0.7330 | 1.0000 |
| DRY,STD.SAMPLE VOLUME(dscf) | 40.2630 | 37.2469 | 37.7156 | 38.4085 |
| VELOCITY (ft./sec) | 26.66 | 25.12 | 25.46 | 25.75 |
| ACTUAL FLOW RATE (acfm) | 28590.86 | 26941.00 | 27311.20 | 27614.35 |
| Dry,Std.Vol.Flow Rate (dscfm) | 23482.76 | 22093.56 | 23091.76 | 22889.36 |
| % ISOKINETIC | 104.13 | 102.38 | 99.19 | 101.90 |
| PARTICULATE CATCH (mg) | 103.10 | 85.60 | 60.00 | 82.90 |
| PARTICULATE CONC.(grams/dscf) | 0.0052 | 0.0044 | 0.0029 | 0.0042 |
| PARTICULATE CONC. (grains/dscf) | 0.0394 | 0.0354 | 0.0245 | 0.0331 |
| PART. EMISSION RATE (lb/hour) | 7.9554 | 6.7175 | 4.8601 | 6.5110 |
| LEAD CONC. Total mg. | 4.0370 | 27.3540 | 3.8970 | 11.7627 |
| LEAD CONC.(grams/dscf) | 0.000100 | 0.000734 | 0.000103 | 0.000313 |
| LEAD CONC. (grains/dscf) | 0.001547 | 0.011332 | 0.001594 | 0.004824 |
| LEAD CONC. (lb/dscf) | 2.21E-07 | 1.62E-06 | 2.28E-07 | 6.89E-07 |
| LEAD EMISSIONS (lb/hour) | 0.311503 | 2.146623 | 0.315665 | 0.924597 |

# TABLE 2-6

## Particulate and Lead Emissions Summary

| TEST RUN #: (STACK #3) | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| DATE | SEPTEMBER 25, 1992 | SEPTEMBER 25, 1992 | SEPTEMBER 25, 1992 | ---- |
| START TIME | 921 | 1123 | 1254 | |
| STOP TIME | 1027 | 1227 | 1358 | ---- |
| CONDENSATE COLLECTED (ml) | 83.50 | 81.60 | 71.50 | 78.87 |
| MOISTURE (%) | 8.93 | 8.99 | 7.56 | 8.49 |
| O2 (%) | 20.50 | 18.40 | 20.20 | 19.70 |
| CO2 (%) | 0.50 | 2.30 | 0.60 | 1.13 |
| DRY,STD.SAMPLE VOLUME(dscf) | 40.0809 | 38.9044 | 41.1270 | 40.0374 |
| VELOCITY (ft./sec) | 28.30 | 27.24 | 28.71 | 28.08 |
| ACTUAL FLOW RATE (acfm) | 30351.08 | 29212.63 | 30795.55 | 30119.75 |
| Dry,Std.Vol.Flow Rate (dscfm) | 23864.12 | 22673.29 | 24291.46 | 23609.62 |
| % ISOKINETIC | 102.00 | 104.21 | 102.82 | 103.01 |
| PARTICULATE CATCH (mg) | 110.70 | 211.80 | 92.00 | 138.1667 |
| PARTICULATE CONC. (grams/dscf) | 0.0028 | 0.0054 | 0.0035 | 0.0039 |
| PARTICULATE CONC. (grains/dscf) | 0.0425 | 0.0838 | 0.0536 | 0.0600 |
| PART. EMISSION RATE (lb/hour) | 8.7200 | 16.3306 | 10.7465 | 11.9324 |
| LEAD CONC. Total mg. | 23.4190 | 81.2290 | 24.2690 | 42.9723 |
| LEAD CONC.(grams/dscf) | 0.000584 | 0.002088 | 0.000590 | 0.001087 |
| LEAD CONC. (grains/dscf) | 0.009016 | 0.032216 | 0.009105 | 0.016779 |
| LEAD CONC. (lb/dscf) | 1.29E-06 | 4.60E-06 | 1.30E-06 | 2.40E-06 |
| LEAD EMISSIONS (lb/hour) | 1.844746 | 6.263057 | 1.896436 | 3.334746 |

## TABLE 5-1

### Continuous Emissions Monitoring (CEM) System, Oxygen ($O_2$) and Carbon Dioxide ($CO_2$) Analyzer Performance Specifications

| PARAMETER: | O2 | CO2 |
|---|---|---|
| ANALYZER | HORIBA | HORIBA |
| MODEL | CMA-331A | CMA-331A |
| TYPE | PARAMAGNETIC | NDIR |
| RANGE | 0-25 % | 0-25% |
| REPEATABILITY * | +/- .5% Full scale (FS) | +/- .5% Full scale (FS) |
| DRIFT (ZERO)<br>DRIFT (SPAN) | +/- 1% FS/per week<br>+/- 2% FS per week | +/- 1% FS/per week<br>+/- 2% FS per week |
| RESPONSE TIME | 90% FS < 1 MINUTE | 90% FS < 1 MINUTE |
| ACCURACY | +/- 1% FS | +/- 1% FS |
| INPUT POWER | 110-115 V.A.C./60 HZ. | 110-115 V.A.C./60 HZ. |

SOURCE: FUGRO - McCLELLAND ENVIRONMENTAL, 1992

## TABLE 5-2

### Visible Emissions – EPA Method 9
### Test Results

| Readings Source | Run # | Date | Time | Average Opacity for Highest Period | % of Reading Above | Range of Opacity Minimum | Range of Opacity Maximum |
|---|---|---|---|---|---|---|---|
| Stack #2 | 2 | 9/22/92 | 813-915 | 10 | 10% = 1 | 0 | 15 |
| Roof Vent | 2 | 9/22/92 | 815-918 | 0 | 0% = 0 | 0 | 0 |
| Stack #2 | 3 | 9/22/92 | 945-1058 | 20 | 20% = 5 | 0 | 25 |
| Roof Vent | 3 | 9/22/92 | 950-1100 | 5 | 5% = 0 | 0 | 5 |
| Stack #4 | 2 | 9/23/92 | 908-1013 | 25 | 25% = 7 | 0 | 30 |
| Roof Vent | 2 | 9/23/92 | 912-1018 | 5 | 0% = 3 | 0 | 5 |
| Stack #4 | 3 | 9/23/92 | 1055-1207 | 15 | 15% = 0 | 0 | 15 |
| Roof Vent | 3 | 9/23/92 | 1058-1208 | 0 | 0% = 0 | 0 | 0 |
| Stack #1 | 1 | 9/23/92 | 1410-1538 | 20 | 20% = 10 | 0 | 35 |
| Roof Vent | 1 | 9/23/92 | 1410-1542 | 5 | 5% = 0 | 0 | 5 |
| Stack #1 | 2 | 9/24/92 | 0906-1018 | 15 | 15% = 18 | 0 | 20 |
| Roof Vent | 2 | 9/24/92 | 0907-1012 | 0 | 0% = 3 | 0 | 5 |
| Stack #1 | 3 | 9/24/92 | 1117-1230 | 10 | 10% = 0 | 0 | 10 |
| Roof Vent | 3 | 9/24/92 | 1120-1233 | 0 | 0% = 8 | 0 | 5 |
| Roof Vent Only | 1 | 9/25/92 | 921-1027 | 5 | 5% = 13 | 0 | 15 |
| Stack #3 | 2 | 9/25/92 | 1122-1225 | 25 | 25% = 7 | 0 | 35 |
| Roof Vent | 2 | 9/25/92 | 1124-1228 | 0 | 0% = 15 | 0 | 5 |
| Stack #3 | 3 | 9/25/92 | 1252-1353 | 5 | 5% = 20 | 0 | 10 |
| Roof Vent | 3 | 9/25/92 | 1254-1400 | 5 | 5% = 0 | 0 | 5 |

# TABLE 6-1

## Particulate Matter Emission Summary

PLANT: CHEMETCO, INC.
CITY, STATE: HARTFORD, ILL.
STACK: STACK #2

PARTICULATE MATTER EMISSIONS

| Run Number | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Date of Run | SEPTEMBER 22, 1992 | | | |
| Starting Time (hours) | 626 | 814 | 949 | |
| Ending Time (hours) | 736 | 917 | 1057 | |
| Net Time of Run (minutes) | 60 | 60 | 60 | |
| Number of Points | 24 | 24 | 24 | |
| Barometric Pressure (in. Hg) | 29.95 | 30.00 | 30.02 | |
| Static Pressure (in. H2O) | -0.18 | -0.18 | -0.18 | |
| Stack Pressure (in. Hg) | 29.94 | 29.99 | 30.01 | 29.98 |
| Average Delta H (in. H2O) | 1.5833 | 3.9042 | 1.5750 | 2.3542 |
| Average Delta P (in,H2o) | 0.2096 | 0.2104 | 0.2104 | 0.2101 |
| Meter Pressure (in. Hg) | 30.07 | 30.29 | 30.14 | 30.16 |
| Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 | 0.84 |
| Meter Box Number (STL#) | 2 | 2 | 2 | |
| Y-Factor | 0.9989 | 0.9989 | 0.9989 | |
| Stack Diameter (in.) | 57.25 | 57.25 | 57.25 | |
| Stack Cross Sectional Area (ft2) | 17.876330 | 17.876330 | 17.876330 | 17.87633033 |
| Nozzle Diameter (inches) | 0.300 | 0.375 | 0.300 | |
| Nozzle Area (ft2) | 0.00049087 | 0.000766990 | 0.000490873 | 0.000582912 |
| Meter Temperature (F) | 84.167 | 97.875 | 95.500 | 92.514 |
| Stack Temperature (F) | 144.208 | 145.208 | 142.792 | 144.069 |
| Volume of Gas Sample (acf) | 40.6570 | 63.6410 | 41.1880 | 48.4953 |
| Dry, Std. Gas Sample Volume (dscf) | 39.5984 | 60.905 | 39.388 | 46.6303 |
| Condensate Collected (mL) | 73.50 | 94.50 | 52.50 | 73.50 |
| Moisture Concentration (%) | 8.03 | 6.81 | 5.90 | 6.91 |
| Carbon Dioxide Concentration (%) | 1.200 | 0.700 | 0.870 | 0.923 |
| Oxygen Concentration (%) | 19.700 | 20.400 | 20.433 | 20.178 |
| Carbon Monoxide Concentration (%) | 0.000 | 0.000 | 0.000 | 0.000 |
| Nitrogen Conc. Dry (gas balance) | 79.100 | 78.900 | 78.697 | 78.899 |
| Molecular Weight, Dry (lb/lb-mole) | 28.9800 | 28.9280 | 28.9565 | 28.9548 |
| Molecular Weight, Wet (lb/lb-mole) | 28.0978 | 28.1842 | 28.3097 | 28.1972 |
| SQRT Delta P Avg., Pitot (in. H2O) | 0.457418 | 0.457970 | 0.458397 | 0.457928 |
| Avg. Velocity, Stack Gas (ft/sec) | 27.8396 | 27.8302 | 27.7296 | 27.7998 |
| Actual Flow Rate (acfm) | 29860.189 | 29850.100 | 29742.178 | 29817.489 |
| Dry, Std. Vol. Flow Rate (dscfm) | 24010.707 | 24323.600 | 24584.918 | 24306.409 |
| % Isokinetic | 100.16 | 97.32 | 97.30 | 98.26 |
| Total Filter Catch (mg) | 64.70 | 124.30 | 48.70 | 79.23 |
| Total Wash Catch (mg) | 31.10 | 35.40 | 39.30 | 35.27 |
| Total Catch (mg) | 95.80 | 159.70 | 88.00 | 114.50 |
| Particulate Conc. (grams/dscf) | 0.0024 | 0.0026 | 0.0022 | 0.0024 |
| Particulate Conc. (grains/dscf) | 0.0373 | 0.0404 | 0.0344 | 0.0373 |
| Particulate Concentration (lb/dscf) | 5.33E-06 | 5.78E-06 | 4.93E-06 | 5.35E-06 |
| Particulate Emission Rate (lb/hr) | 7.6851 | 8.4381 | 7.2669 | 7.7967 |

# TABLE 6-2

## Particulate Matter Emission Summary

PLANT: CHEMETCO, INC.
CITY, STATE: HARTFORD, ILL.
STACK: STACK #4

PARTICULATE MATTER EMISSIONS

| Run Number | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Date of Run | SEPTEMBER 23, 1992 | | | |
| Starting Time (hours) | 712 | 912 | 1058 | |
| Ending Time (hours) | 832 | 1018 | 1209 | |
| Net Time of Run (minutes) | 60 | 60 | 60 | |
| Number of Points | 24 | 24 | 24 | |
| Barometric Pressure (in. Hg) | 30.35 | 30.42 | 30.42 | |
| Static Pressure (in. H2O) | -0.28 | -0.28 | -0.28 | |
| Stack Pressure (in. Hg) | 30.33 | 30.40 | 30.40 | 30.38 |
| Average Delta H (in. H2O) | 1.8500 | 1.3917 | 1.3354 | 1.5257 |
| Average Delta P (in,H2o) | 0.2454 | 0.1829 | 0.1767 | 0.2017 |
| Meter Pressure (in. Hg) | 30.49 | 30.52 | 30.52 | 30.51 |
| Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 | 0.84 |
| Meter Box Number (STL#) | 2 | 2 | 2 | |
| Y-Factor | 0.9989 | 0.9989 | 0.9989 | |
| Stack Diameter (in.) | 57.25 | 57.25 | 57.25 | |
| Stack Cross Sectional Area (ft2) | 17.876330 | 17.876330 | 17.876330 | 17.876330 |
| Nozzle Diameter (inches) | 0.300 | 0.300 | 0.300 | |
| Nozzle Area (ft2) | 0.00049087 | 0.0004908 | 0.000490873 | 0.000490873 |
| Meter Temperature (F) | 78.042 | 83.833 | 87.792 | 83.222 |
| Stack Temperature (F) | 141.542 | 147.917 | 145.875 | 145.111 |
| Volume of Gas Sample (acf) | 43.4450 | 37.7800 | 37.5500 | 39.5917 |
| Dry, Std. Gas Sample Volume (dscf) | 43.3928 | 37.377 | 36.876 | 39.2154 |
| Condensate Collected (mL) | 51.70 | 49.60 | 44.30 | 48.53 |
| Moisture Concentration (%) | 5.31 | 5.88 | 5.35 | 5.51 |
| Carbon Dioxide Concentration (%) | 1.067 | 1.400 | 1.000 | 1.156 |
| Oxygen Concentration (%) | 20.033 | 19.800 | 20.700 | 20.178 |
| Carbon Monoxide Concentration (%) | 0.000 | 0.000 | 0.000 | 0.000 |
| Nitrogen Conc. Dry (gas balance) | 78.900 | 78.800 | 78.300 | 78.667 |
| Molecular Weight, Dry (lb/lb-mole) | 28.9720 | 29.0160 | 28.9880 | 28.9920 |
| Molecular Weight, Wet (lb/lb-mole) | 28.3894 | 28.3684 | 28.3999 | 28.3859 |
| SQRT Delta P Avg., Pitot (in. H2O) | 0.494000 | 0.427326 | 0.419617 | 0.446981 |
| Avg. Velocity, Stack Gas (ft/sec) | 29.6514 | 25.7647 | 25.2434 | 26.8865 |
| Actual Flow Rate (acfm) | 31803.464 | 27634.741 | 27075.579 | 28837.928 |
| Dry, Std. Vol. Flow Rate (dscfm) | 26794.539 | 22952.702 | 22690.412 | 24145.884 |
| % Isokinetic | 98.35 | 98.90 | 98.70 | 98.65 |
| Total Filter Catch (mg) | 74.20 | 96.00 | 29.70 | 66.63 |
| Total Wash Catch (mg) | 27.70 | 11.90 | 14.50 | 18.03 |
| Total Catch (mg) | 101.90 | 107.90 | 44.20 | 84.67 |
| Particulate Conc. (grams/dscf) | 0.0023 | 0.0029 | 0.0012 | 0.0021 |
| Particulate Conc. (grains/dscf) | 0.0362 | 0.0445 | 0.0185 | 0.0330 |
| Particulate Concentration (lb/dscf) | 5.18E-06 | 6.37E-06 | 2.64E-06 | 4.73E-06 |
| Particulate Emission Rate (lb/hr) | 8.3246 | 8.7661 | 3.5981 | 6.8963 |

# TABLE 6-3

## Particulate Matter Emission Summary

PLANT: CHEMETCO, INC.
CITY, STATE: HARTFORD, ILL.
STACK: STACK #1

PARTICULATE MATTER EMISSIONS

| Run Number | 1 | 2 | Average |
|---|---|---|---|
| Date of Run | | SEPTEMBER 23, 1992 | |
| Starting Time (hours) | 1411 | 1642 | |
| Ending Time (hours) | 1541 | 1750 | |
| Net Time of Run (minutes) | 60 | 60 | |
| Number of Points | 24 | 24 | |
| Barometric Pressure (in. Hg) | 30.38 | 30.34 | |
| Static Pressure (in. H2O) | -0.24 | -0.24 | |
| Stack Pressure (in. Hg) | 30.36 | 30.32 | 30.34 |
| Average Delta H (in. H2O) | 1.4729 | 1.4292 | 1.45 |
| Average Delta P (in,H2o) | 0.1850 | 0.1800 | 0.1825 |
| Meter Pressure (in. Hg) | 30.49 | 30.45 | 30.47 |
| Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 |
| Meter Box Number (STL#) | 2 | 2 | |
| Y-Factor | 0.9989 | 0.9989 | |
| Stack Diameter (in.) | 57.25 | 57.25 | |
| Stack Cross Sectional Area (ft2) | 17.876330 | 17.876330 | 17.876330 |
| Nozzle Diameter (inches) | 0.300 | 0.300 | |
| Nozzle Area (ft2) | 0.00049087 | 0.0004908 | 0.00049087 |
| Meter Temperature (F) | 82.000 | 114.125 | 98.06 |
| Stack Temperature (F) | 152.333 | 148.958 | 150.65 |
| Volume of Gas Sample (acf) | 39.0320 | 38.2100 | 38.62 |
| Dry, Std. Gas Sample Volume (dscf) | 38.7033 | 35.717 | 37.21 |
| Condensate Collected (mL) | 58.20 | 36.90 | 47.55 |
| Moisture Concentration (%) | 6.61 | 4.64 | 5.62 |
| Carbon Dioxide Concentration (%) | 0.800 | 1.200 | 1.00 |
| Oxygen Concentration (%) | 20.000 | 19.700 | 19.85 |
| Carbon Monoxide Concentration (%) | 0.000 | 0.000 | 0.00 |
| Nitrogen Conc. Dry (gas balance) | 79.200 | 79.100 | 79.150 |
| Molecular Weight, Dry (lb/lb-mole) | 28.9280 | 28.9800 | 28.95 |
| Molecular Weight, Wet (lb/lb-mole) | 28.2056 | 28.4708 | 28.34 |
| SQRT Delta P Avg., Pitot (in. H2O) | 0.428563 | 0.423069 | 0.43 |
| Avg. Velocity, Stack Gas (ft/sec) | 26.0236 | 25.5163 | 25.77 |
| Actual Flow Rate (acfm) | 27912.420 | 27368.288 | 27640.35 |
| Dry, Std. Vol. Flow Rate (dscfm) | 22809.463 | 22933.600 | 22871.53 |
| % Isokinetic | 103.05 | 94.58 | 98.82 |
| Total Filter Catch (mg) | 32.80 | 74.00 | 53.4000 |
| Total Wash Catch (mg) | 13.60 | 4.20 | 8.9000 |
| Total Catch (mg) | 46.40 | 78.20 | 62.3000 |
| Particulate Conc. (grams/dscf) | 0.0012 | 0.0022 | 0.0017 |
| Particulate Conc. (grains/dscf) | 0.0185 | 0.0337 | 0.0261 |
| Particulate Concentration (lb/dscf) | 2.64E-06 | 4.83E-06 | 3.74E-06 |
| Particulate Emission Rate (lb/hr) | 3.6178 | 6.6429 | 5.1304 |

# TABLE 6-4

## Particulate Matter Emission Summary

PLANT: CHEMETCO, INC.
CITY, STATE: HARTFORD, ILL.
STACK: STACK #1

PARTICULATE MATTER EMISSIONS

| Run Number | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Date of Run | SEPTEMBER 24, 1992 | | | |
| Starting Time (hours) | 713 | 906 | 1120 | |
| Ending Time (hours) | 825 | 1012 | 12.33 | |
| Net Time of Run (minutes) | 60.00 | 60.00 | 60.00 | |
| Number of Points | 24.00 | 24.00 | 24.00 | |
| Barometric Pressure (in. Hg) | 30.24 | 30.34 | 30.34 | |
| Static Pressure (in. H2O) | -0.29 | -0.29 | -0.29 | |
| Stack Pressure (in. Hg) | 30.22 | 30.32 | 30.32 | 30.29 |
| Average Delta H (in. H2O) | 1.5175 | 1.3833 | 1.3846 | 1.4285 |
| Average Delta P (in,H2o) | 0.1958 | 0.1733 | 0.1800 | 0.1831 |
| Meter Pressure (in. Hg) | 30.35 | 30.44 | 30.44 | 30.41 |
| Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 | 0.84 |
| Meter Box Number (STL#) | 2 | 2.00 | 2.00 | |
| Y-Factor | 1.00 | 1.00 | 1.00 | |
| Stack Diameter (in.) | 57.25 | 57.25 | 57.25 | |
| Stack Cross Sectional Area (ft2) | 17.876330 | 17.876330 | 17.876330 | 17.876330 |
| Nozzle Diameter (inches) | 0.300 | 0.300 | 0.300 | |
| Nozzle Area (ft2) | 0.00049087 | 0.00049087 | 0.00049087 | 0.00049087 |
| Meter Temperature (F) | 73.125 | 86.167 | 84.958 | 81.417 |
| Stack Temperature (F) | 145.125 | 149.375 | 146.458 | 146.986 |
| Volume of Gas Sample (acf) | 40.1200 | 37.9100 | 38.3020 | 38.7773 |
| Dry, Std. Gas Sample Volume (dscf) | 40.2630 | 37.247 | 37.716 | 38.4085 |
| Condensate Collected (mL) | 62.40 | 55.90 | 34.80 | 51.03 |
| Moisture Concentration (%) | 6.80 | 6.60 | 4.16 | 5.85 |
| Carbon Dioxide Concentration (%) | 0.867 | 1.400 | 0.733 | 1.000 |
| Oxygen Concentration (%) | 19.700 | 19.500 | 20.500 | 19.900 |
| Carbon Monoxide Concentration (%) | 0.000 | 0.000 | 0.000 | 0.000 |
| Nitrogen Conc. Dry (gas balance) | 79.433 | 79.100 | 78.767 | 79.100 |
| Molecular Weight, Dry (lb/lb-mole) | 28.9267 | 29.0040 | 28.9373 | 28.9560 |
| Molecular Weight, Wet (lb/lb-mole) | 28.1838 | 28.2779 | 28.4820 | 28.3146 |
| SQRT Delta P Avg., Pitot (in. H2O) | 0.440370 | 0.414884 | 0.423113 | 0.426122 |
| Avg. Velocity, Stack Gas (ft/sec) | 26.6562 | 25.1179 | 25.4631 | 25.7457 |
| Actual Flow Rate (acfm) | 28590.861 | 26940.999 | 27311.198 | 27614.353 |
| Dry, Std. Vol. Flow Rate (dscfm) | 23482.761 | 22093.563 | 23091.763 | 22889.362 |
| % Isokinetic | 104.13 | 102.38 | 99.19 | 101.90 |
| Total Filter Catch (mg) | 70.10 | 65.00 | 23.50 | 52.87 |
| Total Wash Catch (mg) | 33.00 | 20.60 | 36.50 | 30.03 |
| Total Catch (mg) | 103.10 | 85.60 | 60.00 | 82.90 |
| Particulate Conc. (grams/dscf) | 0.0052 | 0.0044 | 0.0029 | 0.0042 |
| Particulate Conc. (grains/dscf) | 0.0394 | 0.0354 | 0.0245 | 0.0331 |
| Particulate Concentration (lb/dscf) | 5.65E-06 | 5.07E-06 | 3.51E-06 | 4.74E-06 |
| Particulate Emission Rate (lb/hr) | 7.9554 | 6.7175 | 4.8601 | 6.5110 |

# TABLE 6-5

## Particulate Matter Emission Summary

PLANT: CHEMETCO, INC.
CITY, STATE: HARTFORD, ILL.
STACK: STACK #3

PARTICULATE MATTER EMISSIONS

| Run Number | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Date of Run | SEPTEMBER 25, 1992 | | | |
| Starting Time (hours) | 921 | 1123 | 1254 | |
| Ending Time (hours) | 1027 | 1227 | 1358 | |
| Net Time of Run (minutes) | 60 | 60 | 60 | |
| Number of Points | 24 | 24 | 24 | |
| Barometric Pressure (in. Hg) | 30.20 | 30.20 | 30.18 | |
| Static Pressure (in. H2O) | -0.24 | -0.24 | -0.24 | |
| Stack Pressure (in. Hg) | 30.18 | 30.18 | 30.16 | 30.18 |
| Average Delta H (in. H2O) | 1.6208 | 1.5208 | 1.7063 | 1.6160 |
| Average Delta P (in,H2o) | 0.2133 | 0.1963 | 0.2179 | 0.2092 |
| Meter Pressure (in. Hg) | 30.32 | 30.31 | 30.31 | 30.31 |
| Pitot Tube Coefficient | 0.84 | 0.84 | 0.84 | 0.84 |
| Meter Box Number (STL#) | 2 | 2 | 2 | |
| Y-Factor | 0.9989 | 0.9989 | 0.9989 | |
| Stack Diameter (in.) | 57.25 | 57.25 | 57.25 | |
| Stack Cross Sectional Area (ft2) | 17.876330 | 17.876330 | 17.876330 | 17.87633033 |
| Nozzle Diameter (inches) | 0.300 | 0.300 | 0.300 | |
| Nozzle Area (ft2) | 0.00049087 | 0.000490873 | 0.000490873 | 0.000490873 |
| Meter Temperature (F) | 85.750 | 89.042 | 90.708 | 88.500 |
| Stack Temperature (F) | 156.917 | 164.583 | 163.750 | 161.750 |
| Volume of Gas Sample (acf) | 40.9280 | 39.9760 | 42.3970 | 41.1003 |
| Dry, Std. Gas Sample Volume (dscf) | 40.0809 | 38.904 | 41.127 | 40.0374 |
| Condensate Collected (mL) | 83.50 | 81.60 | 71.50 | 78.87 |
| Moisture Concentration (%) | 8.93 | 8.99 | 7.56 | 8.49 |
| Carbon Dioxide Concentration (%) | 0.500 | 2.300 | 0.600 | 1.133 |
| Oxygen Concentration (%) | 20.500 | 18.400 | 20.200 | 19.700 |
| Carbon Monoxide Concentration (%) | 0.203 | 0.000 | 0.000 | 0.068 |
| Nitrogen Conc. Dry (gas balance) | 78.797 | 79.300 | 79.200 | 79.099 |
| Molecular Weight, Dry (lb/lb-mole) | 28.9568 | 29.1040 | 28.9040 | 28.9883 |
| Molecular Weight, Wet (lb/lb-mole) | 27.9784 | 28.1062 | 28.0792 | 28.0546 |
| SQRT Delta P Avg., Pitot (in. H2O) | 0.461025 | 0.442007 | 0.465890 | 0.456307 |
| Avg. Velocity, Stack Gas (ft/sec) | 28.2973 | 27.2359 | 28.7117 | 28.0816 |
| Actual Flow Rate (acfm) | 30351.082 | 29212.626 | 30795.550 | 30119.753 |
| Dry, Std. Vol. Flow Rate (dscfm) | 23864.121 | 22673.285 | 24291.465 | 23609.624 |
| % Isokinetic | 102.00 | 104.21 | 102.82 | 103.01 |
| Total Filter Catch (mg) | 94.70 | 196.60 | 74.20 | 121.83 |
| Total Wash Catch (mg) | 16.00 | 15.20 | 17.80 | 16.33 |
| Total Catch (mg) | 110.70 | 211.80 | 92.00 | 138.17 |
| Particulate Conc. (grams/dscf) | 0.0028 | 0.0054 | 0.0022 | 0.0035 |
| Particulate Conc. (grains/dscf) | 0.0425 | 0.0838 | 0.0344 | 0.0536 |
| Particulate Concentration (lb/dscf) | 6.09E-06 | 1.20E-05 | 4.93E-06 | 7.68E-06 |
| Particulate Emission Rate (lb/hr) | 8.7200 | 16.3306 | 7.1891 | 10.7465 |

# APPENDIX A

## Field Data Sheets

Page of

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-2 | Barometric Pressure: 29.95 |
| Location: HARTFORD, IL | Cold Box No.: STL-2 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK # 2 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: 5-1 | Filter No.: 92503 |
| Date: 9-22-92 | Pitot Coefficient: .84 | Ambient Temp.: 67 |
| Run Number: 1 | DGMC Factor: .9989 | Static Pressure: -.18 |
| Operator: C Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.53 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W-1 | 0 | 943.234 | .25 | | 1.88 | 1.9 | 137 | 239 | 251 | 60 | 73 | 5.5 |
| 2 | 2.5 | 945.152 | .22 | | 1.66 | 1.7 | 142 | 240 | 251 | 59 | 73 | 5.0 |
| 3 | 5.0 | 946.901 | .23 | | 1.73 | 1.7 | 144 | 239 | 251 | 59 | 74 | 5.0 |
| 4 | 7.5 | 948.653 | .23 | | 1.73 | 1.7 | 144 | 239 | 251 | 56 | 75 | 5.0 |
| 5 | 10.0 | 950.404 | .22 | | 1.66 | 1.7 | 146 | 240 | 252 | 56 | 76 | 5.0 |
| 6 | 12.5 | 952.275 | .22 | | 1.66 | 1.7 | 146 | 240 | 251 | 56 | 79 | 5.0 |
| 7 | 15.0 | 953.866 | .21 | | 1.58 | 1.6 | 146 | 239 | 253 | 58 | 80 | 5.0 |
| 8 | 17.5 | 955.555 | .19 | | 1.43 | 1.4 | 141 | 240 | 247 | 58 | 81 | 4.5 |
| 9 | 20.0 | 957.152 | .19 | | 1.43 | 1.4 | 146 | 238 | 247 | 57 | 82 | 4.5 |
| 10 | 22.5 | 958.705 | .19 | | 1.43 | 1.4 | 144 | 239 | 246 | 57 | 83 | 4.5 |
| 11 | 25.0 | 960.274 | .18 | | 1.355 | 1.35 | 142 | 239 | 244 | 57 | 83 | 4.5 |
| 12 | 27.5 | 961.877 | .18 | | 1.355 | 1.35 | 142 | 239 | 245 | 57 | 85 | 4.5 |
| | 30.0 | 963.417 | | | | | | | | | | |
| Total/Avg. | | 90.657 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 160 | 100 | 60 |
| Second Impinger | 100 | 100 | 0 |
| Third Impinger | 0 | 0 | 0 |
| Silica Gel | 263.5 | 250 | 13.5 |
| | | Total Condensate | 73.50 |

Flue Gas Analysis

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 19.7 | 1.2 | | |
| 2 | 19.7 | 1.2 | | |
| 3 | 19.7 | 1.2 | | |
| AVG | 19.7 | 1.2 | | |

COMMENTS:

START 6:26 STOP 6:43 START 6:46

STOP 6:51:30 START 6:53:30

STOP 7:36

Pretest Leak Check @ 15 "Hg for .001 CFM

Postest Leak Check @ 15 "Hg for .001 CFM

STACK 7
RUN 1

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-1 | 0 | 963.417 | .20 | | 1.506 | 1.5 | 134 | 235 | 235 | 59 | 84 | 5.0 |
| 2 | 2.5 | 965.020 | .20 | | 1.506 | 1.5 | 144 | 231 | 230 | 53 | 85 | 5.0 |
| 3 | 5.0 | 966.660 | .20 | | 1.506 | 1.5 | 144 | 228 | 231 | 53 | 85 | 5.0 |
| 4 | 7.5 | 968.355 | .20 | | 1.506 | 1.5 | 146 | 230 | 234 | 53 | 86 | 5.0 |
| 5 | 10.0 | 970.099 | .21 | | 1.58 | 1.6 | 148 | 233 | 235 | 55 | 87 | 5.5 |
| 6 | 12.5 | 971.704 | .22 | | 1.66 | 1.7 | 148 | 235 | 236 | 56 | 89 | 5.5 |
| 7 | 15.0 | 973.400 | .22 | | 1.66 | 1.7 | 149 | 238 | 235 | 57 | 90 | 6.0 |
| 8 | 17.5 | 975.212 | .22 | | 1.73 | 1.7 | 149 | 238 | 236 | 59 | 92 | 6.0 |
| 9 | 20.0 | 976.924 | .22 | | 1.66 | 1.7 | 149 | 238 | 238 | 58 | 93 | 6.0 |
| 10 | 22.5 | 978.688 | .22 | | 1.66 | 1.7 | 148 | 239 | 239 | 58 | 95 | 6.0 |
| 11 | 25.0 | 980.500 | .20 | | 1.506 | 1.5 | 142 | 240 | 241 | 59 | 95 | 5.5 |
| 12 | 27.5 | 982.311 | .20 | | 1.506 | 1.5 | 140 | 240 | 239 | 58 | 95 | 5.5 |
| | 30.0 | 983.891 | | $\sqrt{0.457}$ | | | $\overline{144}$ | | | | | |
| Total/Avg | | | | | | | | | | | | |

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-1 | Barometric Pressure: 20.00 |
| Location: HARTFORD, IL | Cold Box No.: STL-1 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK #2 | Console No.: STL-2 | Nozzle Diameter, in: .375 |
| Project No.: | Pitot No.: S-2 | Filter No.: 92511 |
| Date: 9-22-92 | Pitot Coefficient: .84 | Ambient Temp.: |
| Run Number: 2 | DGMC Factor: .9889 | Static Pressure: -.18 |
| Operator: C Dowdy | Meter ΔH@: 2.0202 | K Factor: 18.55 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | √ΔP | Orifice Pressure Differential ("H2O) Calc. | Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 984.253 | .23 | | 4.26 | 4.3 | 150 | 229 | 230 | 55 | 87 | 5.0 |
| 2 | 2.5 | 986.443 | .24 | | 4.45 | 4.5 | 148 | 231 | 232 | 44 | 86 | 5.0 |
| 3 | 5.0 | 990.321 | .24 | | 4.45 | 4.5 | 149 | 231 | 234 | 47 | 89 | 5.0 |
| 4 | 7.5 | 992.429 | .25 | | 4.64 | 4.6 | 148 | 229 | 234 | 50 | 91 | 6.0 |
| 5 | 10.0 | 995.281 | .23 | | 4.26 | 4.3 | 148 | 229 | 237 | 52 | 93 | 6.0 |
| 6 | 12.5 | 998.030 | .25 | | 4.64 | 4.6 | 148 | 230 | 233 | 54 | 95 | 6.0 |
| 7 | 15.0 | 000.995 | .23 | | 4.26 | 4.3 | 148 | 231 | 235 | 54 | 97 | 6.0 |
| 8 | 17.5 | 003.414 | .21 | | 3.89 | 3.9 | 148 | 232 | 237 | 55 | 98 | 6.0 |
| 9 | 20.0 | 006.472 | .21 | | 3.89 | 3.9 | 148 | 233 | 237 | 55 | 99 | 6.0 |
| 10 | 22.5 | 009.247 | .22 | | 4.08 | 4.1 | 147 | 240 | 238 | 55 | 100 | 6.0 |
| 11 | 25.0 | 011.872 | .19 | | 3.52 | 3.5 | 139 | 240 | 238 | 55 | 100 | 5.5 |
| 12 | 27.5 | 014.421 | .19 | | 3.52 | 3.5 | 132 | 236 | 238 | 56 | 101 | 5.5 |
| | 30.0 | 016.982 | | | | | | | | | | |
| Total/Avg. | | 63.641 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 283 | 100 | 83 |
| Second Impinger | 100 | 100 | 0 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 261.5 | 250 | 11.5 |
| Total Condensate | | | 94.5 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 20.4 | .7 | | |
| 2 | 20.4 | .7 | | |
| 3 | 20.4 | .7 | | |
| AVG | 20.4 | .7 | | |

**COMMENTS:**

START 8:14 PORT CHANGE 8:54

RESTART 8:47 STOP 917

Pretest Leak Check @ 15 "Hg for .006 CFM

Postest Leak Check @ 12 "Hg for .004 CFM

STA 2
RUN 2

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-1 | 0 | 016.982 | .20 | | 3.71 | 3.7 | 141 | 230 | 235 | 59 | 96 | 5.5 |
| 2 | 2.5 | 019.500 | .18 | | 3.33 | 3.3 | 145 | 231 | 234 | 52 | 98 | 5.0 |
| 3 | 5.0 | 22.011 | .19 | | 3.52 | 3.5 | 145 | 232 | 236 | 52 | 99 | 5.5 |
| 4 | 7.5 | 24.522 | .17 | | 3.15 | 3.15 | 145 | 237 | 237 | 53 | 100 | 5.0 |
| 5 | 10.0 | 26.910 | .17 | | 3.15 | 3.15 | 145 | 234 | 236 | 54 | 100 | 5.0 |
| 6 | 12.5 | 29.352 | .19 | | 3.52 | 3.5 | 145 | 235 | 236 | 54 | 101 | 5.5 |
| 7 | 15.0 | 31.810 | .22 | | 4.08 | 4.1 | 146 | 237 | 236 | 54 | 102 | 6.0 |
| 8 | 17.5 | 34.632 | .19 | | 3.52 | 3.5 | 145 | 237 | 237 | 54 | 102 | 5.5 |
| 9 | 20.0 | 37.120 | .24 | | 4.45 | 4.5 | 145 | 222 | 237 | 55 | 103 | 6.0 |
| 10 | 22.5 | 39.902 | .20 | | 3.71 | 3.7 | 145 | 232 | 238 | 53 | 104 | 6.0 |
| 11 | 25.0 | 42.600 | .20 | | 3.71 | 3.7 | 143 | 236 | 237 | 56 | 104 | 6.0 |
| 12 | 27.5 | 45.321 | .21 | | 3.89 | 3.9 | 142 | 234 | 236 | 55 | 104 | 6.0 |
| | 30 | 47.894 | | 0.457 | | | | | | | | |
| Total/Avg. | | | | | | | | | | | | |

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| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-2 | Barometric Pressure: 30.02 |
| Location: HARTFORD, IL | Cold Box No.: STL-2 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK 2 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: 5-1 | Filter No.: 92505 |
| Date: 9-22-92 | Pitot Coefficient: .84 | Ambient Temp.: |
| Run Number: 3 | DGMC Factor: .9989 | Static Pressure: -.18 |
| Operator: C. Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.53 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 48.202 | .22 | | 1.66 | 1.6 | 148 | 235 | 231 | 63 | 90 | 4.0 |
| 2 | 2.5 | 49.901 | .21 | | 1.58 | 1.6 | 148 | 232 | 231 | 50 | 90 | 4.0 |
| 3 | 5.0 | 51.801 | .22 | | 1.66 | 1.6 | 148 | 232 | 232 | 50 | 90 | 4.0 |
| 4 | 7.5 | 53.422 | .22 | | 1.66 | 1.6 | 150 | 237 | 232 | 50 | 90 | 4.0 |
| 5 | 10.0 | 55.140 | .23 | | 1.73 | 1.7 | 150 | 239 | 233 | 52 | 92 | 4.5 |
| 6 | 12.5 | 57.221 | .24 | | 1.80 | 1.8 | 149 | 237 | 233 | 53 | 93 | 5.0 |
| 7 | 15.0 | 58.700 | .22 | | 1.66 | 1.6 | 149 | 239 | 237 | 54 | 94 | 4.5 |
| 8 | 17.5 | 60.522 | .19 | | 1.43 | 1.4 | 149 | 240 | 239 | 55 | 95 | 4.0 |
| 9 | 20 | 62.110 | .19 | | 1.43 | 1.4 | 149 | 239 | 238 | 56 | 96 | 4.0 |
| 10 | 22.5 | 63.640 | .20 | | 1.506 | 1.5 | 149 | 238 | 238 | 56 | 96 | 4.0 |
| 11 | 25.0 | 65.401 | .20 | | 1.506 | 1.5 | 140 | 232 | 235 | 55 | 95 | 4.0 |
| 12 | 27.5 | 67.197 | .19 | | 1.43 | 1.4 | 140 | 233 | 235 | 54 | 95 | 4.5 |
| | 30 | 68.738 | | | | | | | | | | |
| Total/Avg. | | 41.188 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 245 | 100 | 45.0 |
| Second Impinger | 100 | 100 | 0 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 257.5 | 250 | 7.5 |
| Total Condensate | | | 52.5 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 20.4 | 1.0 | 0 | |
| 2 | 20.5 | .8 | 0 | |
| 3 | 20.4 | .8 | 0 | |
| AVG | 20.433 | 0.87 | 0 | |

**COMMENTS:**

START TIME: 9:49 STOP 10:12

START TIME 10:15

PORT CHANGE 10:23 START 10:27

STOP : 10:57

Pretest Leak Check @ 17 "Hg for 0.001 CFM

Postest Leak Check @ 15 "Hg for 0.001 CFM

RUN- 3

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N- 1 | 0 | 68.738 | .23 | | 1.88 | 1.7 | 140 | 236 | 242 | 60 | 94 | 4.0 |
| 2 | 2.5 | 70.409 | .21 | | 1.58 | 1.6 | 141 | 236 | 242 | 56 | 95 | 4.0 |
| 3 | 5.0 | 72.145 | .20 | | 1.506 | 1.5 | 141 | 242 | 239 | 51 | 96 | 4.0 |
| 4 | 7.5 | 73.842 | .20 | | 1.506 | 1.5 | 141 | 243 | 239 | 51 | 96 | 4.0 |
| 5 | 10.0 | 75.515 | .19 | | 1.43 | 1.4 | 141 | 245 | 235 | 51 | 97 | 4.0 |
| 6 | 12.5 | 77.200 | .20 | | 1.506 | 1.5 | 141 | 245 | 236 | 51 | 98 | 4.0 |
| 7 | 15.0 | 78.921 | .22 | | 1.66 | 1.7 | 142 | 239 | 235 | 51 | 99 | 4.5 |
| 8 | 17.5 | 80.171 | .22 | | .66 | 1.7 | 142 | 239 | 236 | 51 | 99 | 5.0 |
| 9 | 20.0 | 82.428 | .24 | | 1.80 | 1.8 | 141 | 239 | 235 | 52 | 100 | 5.0 |
| 10 | 22.5 | 84.197 | .23 | | 1.73 | 1.7 | 140 | 249 | 237 | 52 | 100 | 5.0 |
| 11 | 25.0 | 85.937 | .20 | | 1.506 | 1.5 | 140 | 249 | 236 | 52 | 101 | 4.5 |
| 12 | 27.5 | 87.672 | .20 | | 1.506 | 1.5 | 138 | 250 | 236 | 52 | 101 | 4.5 |
| | 30 | 89.390 | | .459 | | | 144 | | | | | |
| Total/Avg. | | | | | | | | | | | | |

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| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-2 | Barometric Pressure: 30.35 |
| Location: HARTFORD, IL | Cold Box No.: STL-2 | Stack Diameter, in: 57.25 |
| Source I.D.: Stack #4 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: 5-2 | Filter No.: 92402 |
| Date: 9-23-92 | Pitot Coefficient: .84 | Ambient Temp.: 48 |
| Run Number: 1 | DGMC Factor: .9989 | Static Pressure: -0.28 |
| Operator: C. Dandy | Meter ΔH@: 2.0202 | K Factor: 7.53 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-1 | 0 | 92.553 | 0.28 | | 2.1084 | 2.10 | 124 | 231 | 233 | 48 | 63 | 5 |
| 2 | 2.5 | 94.470 | 0.28 | | 2.1084 | 2.10 | 137 | 228 | 230 | 42 | 62 | 5 |
| 3 | 5.0 | 96.280 | 0.30 | | 2.259 | 2.3 | 134 | 229 | 231 | 43 | 64 | 5 |
| 4 | 7.5 | 98.490 | 0.30 | | 2.259 | 2.3 | 139 | 231 | 231 | 43 | 66 | 5 |
| 5 | 10.0 | 100.195 | 0.30 | | 2.259 | 2.3 | 142 | 232 | 232 | 44 | 67 | 5 |
| 6 | 12.5 | 102.234 | 0.23 | | 1.73 | 1.7 | 141 | 236 | 231 | 45 | 69 | 5 |
| 7 | 15.0 | 104.482 | 0.23 | | 1.73 | 1.7 | 143 | 235 | 232 | 46 | 71 | 5 |
| 8 | 17.5 | 105.782 | 0.20 | | 1.506 | 1.5 | 149 | 234 | 233 | 46 | 72 | 4.5 |
| 9 | 20.0 | 107.501 | 0.25 | | 1.88 | 1.9 | 154 | 234 | 234 | 47 | 74 | 5.0 |
| 10 | 22.5 | 109.211 | 0.24 | | 1.81 | 1.8 | 152 | 234 | 235 | 47 | 75 | 5.0 |
| 11 | 25.0 | 111.021 | 0.20 | | 1.506 | 1.5 | 145 | 235 | 236 | 47 | 76 | 5.0 |
| 12 | 27.5 | 112.792 | 0.15 | | 1.13 | 1.1 | 144 | 233 | 235 | 48 | 78 | 4.0 |
| | 30.0 | 114.277 | | | | | | | | | | |
| Total/Avg. | | 43.445 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 242 | 100 | 42 |
| Second Impinger | 100 | 100 | 0 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 259.7 | 250 | 9.7 |
| Total Condensate | | | 51.70 |

Flue Gas Analysis

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 20.0 | 1.1 | | |
| 2 | 20.0 | 1.1 | | |
| 3 | 20.1 | 1.0 | | |
| AVG | 20.033 | 1.067 | 0 | |

COMMENTS:

START: 0712

PORT CHANGE 8:00

STOPP 8:32

Pretest Leak Check @ 15 "Hg for .001 CFM

Postest Leak Check @ 12 "Hg for .002 CFM

STACK
RUN 1

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) | | Orifice Pressure Differential ("H2O) | | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) | | | | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ΔP | √ΔP | Calc. | Actual | | Probe | Filter Box | Last Impinger | Dry Gas Meter | |
| W- 1 | 0 | 114.277 | .25 | | 1.88 | 1.9 | 143 | 232 | 234 | 47 | 77 | 5.0 |
| 2 | 2.5 | 116.242 | .22 | | 1.66 | 1.7 | 144 | 234 | 235 | 46 | 78 | 5.0 |
| 3 | 5.0 | 117.934 | .22 | | 1.66 | 1.7 | 144 | 235 | 235 | 45 | 79 | 5.0 |
| 4 | 7.5 | 119.642 | .25 | | 1.88 | 1.9 | 142 | 233 | 235 | 45 | 80 | 5.0 |
| 5 | 10.0 | 121.400 | .23 | | 1.73 | 1.7 | 141 | 233 | 234 | 46 | 81 | 5.0 |
| 6 | 12.5 | 123.152 | .25 | | 1.88 | 1.9 | 141 | 233 | 234 | 46 | 82 | 5.0 |
| 7 | 15.0 | 124.967 | .27 | | 2.033 | 2.0 | 140 | 231 | 235 | 46 | 83 | 5.5 |
| 8 | 17.5 | 126.493 | .30 | | 2.26 | 2.3 | 140 | 233 | 234 | 47 | 84 | 5.5 |
| 9 | 20.0 | 128.779 | .25 | | 1.88 | 1.9 | 141 | 234 | 236 | 48 | 85 | 6.0 |
| 10 | 22.5 | 130.642 | .23 | | 1.73 | 1.7 | 141 | 233 | 234 | 48 | 85 | 5.0 |
| 11 | 25.0 | 132.842 | .23 | | 1.73 | 1.7 | 138 | 233 | 235 | 49 | 86 | 5.0 |
| 12 | 27.5 | 134.421 | .23 | | 1.73 | 1.7 | 138 | 234 | 235 | 49 | 86 | 5.0 |
| | | 135.998 | | | | | | | | | | |
| | | | .245 | | .4940 | 1.850 | | | | | | |
| Total/Avg. | | | | | | | | | | | | |

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FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-1 | Barometric Pressure: 30.42 |
| Location: HARTFORD | Cold Box No.: STL-1 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK 4 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: 5-1 | Filter No.: 92510 |
| Date: 9-23-92 | Pitot Coefficient: .84 | Ambient Temp.: |
| Run Number: 2 | DGMC Factor: .9989 | Static Pressure: -.24 |
| Operator: C. Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.53 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-1 | 0 | 136.392 | .20 | | 1.51 | 1.5 | 143 | 226 | 232 | 55 | 76 | 3.0 |
| 2 | 2.5 | 138.000 | .20 | | 1.51 | 1.5 | 141 | 230 | 232 | 51 | 76 | 3.0 |
| 3 | 5.0 | 139.621 | .18 | | 1.36 | 1.4 | 145 | 232 | 233 | 52 | 76 | 3.0 |
| 4 | 7.5 | 141.172 | .18 | | 1.36 | 1.4 | 148 | 233 | 233 | 46 | 77 | 3.0 |
| 5 | 10.0 | 142.700 | .15 | | 43 | 1.1 | 150 | 236 | 232 | 47 | 78 | 3.0 |
| 6 | 12.5 | 144.217 | .18 | | 1.36 | 1.4 | 151 | 237 | 233 | 47 | 79 | 3.0 |
| 7 | 15.0 | 145.727 | .18 | | 1.36 | 1.4 | 151 | 238 | 233 | 47 | 79 | 3.0 |
| 8 | 17.5 | 147.308 | .20 | | 1.51 | 1.5 | 151 | 235 | 235 | 48 | 81 | 3.0 |
| 9 | 20.0 | 149.011 | .20 | | 1.51 | 1.5 | 151 | 238 | 235 | 49 | 83 | 3.0 |
| 10 | 22.5 | 151.117 | .20 | | 1.51 | 1.5 | 151 | 234 | 236 | 49 | 84 | 3.0 |
| 11 | 25.0 | 152.417 | .15 | | 1.13 | 1.1 | 151 | 239 | 237 | 49 | 85 | 3.0 |
| 12 | 27.5 | 153.814 | .18 | | 1.36 | 1.4 | 148 | 235 | 237 | 50 | 86 | 3.0 |
| | 30 | 155.337 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Total/Avg. | | 37.780 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 145 | 100 | 45 |
| Second Impinger | 100 | 100 | 0 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 254.6 | 250 | 4.6 |
| | | Total Condensate | 49.60 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 19.8 | 1.4 | 0 | |
| 2 | 19.8 | 1.4 | 0 | |
| 3 | 19.8 | 1.4 | 0 | |
| AVG | 19.8 | 1.4 | 0 | |

**COMMENTS:**

START 9:12 STOP 9:14:30 START 9:16:30

PORT CHANGE 9:44 START 9:48

STOP 10:18

Pretest Leak Check @ 15 "Hg for .000 CFM

Postest Leak Check @ 12 "Hg for .001 CFM

RUN 2

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W-1 | 0 | 155.337 | .18 | | 1.36 | 1.4 | 139 | 238 | 235 | 53 | 82 | 3.0 |
| 2 | 2.5 | 156.930 | .18 | | 1.36 | 1.4 | 138 | 238 | 236 | 49 | 85 | 3.0 |
| 3 | 5.0 | 158.501 | .17 | | 1.28 | 1.3 | 144 | 235 | 235 | 48 | 85 | 3.0 |
| 4 | 7.5 | 160.100 | .20 | | 1.50 | 1.50 | 149 | 239 | 235 | 48 | 86 | 3.0 |
| 5 | 10.0 | 161.702 | .20 | | 1.50 | 1.50 | 150 | 239 | 235 | 48 | 87 | 3.0 |
| 6 | 12.5 | 163.312 | .19 | | 1.43 | 1.4 | 150 | 235 | 235 | 49 | 88 | 3.0 |
| 7 | 15.0 | 164.982 | .17 | | 1.28 | 1.3 | 151 | 236 | 236 | 49 | 88 | 3.0 |
| 8 | 17.5 | 166.588 | .17 | | 1.28 | 1.3 | 151 | 238 | 235 | 49 | 89 | 3.0 |
| 9 | 20.0 | 168.441 | .20 | | 1.50 | 1.50 | 150 | 239 | 235 | 50 | 90 | 3.0 |
| 10 | 22.5 | 170.052 | .18 | | 1.36 | 1.4 | 149 | 241 | 236 | 50 | 90 | 3.0 |
| 11 | 25.0 | 172.001 | .18 | | 1.36 | 1.4 | 149 | 243 | 237 | 51 | 91 | 3.0 |
| 12 | 27.5 | 172.800 | .17 | | 1.28 | 1.3 | 149 | 243 | 236 | 51 | 91 | 3.0 |
| | 30.0 | 174.172 | | .427 | | 1.392 | | | | | | |
| Total/Avg | | | | | | | | | | | | |

Page of

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: Chemetco | Hot Box No.: STL-2 | Barometric Pressure: 30.42 |
| Location: HARTFORD | Cold Box No.: STL-2 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK 4 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: 5-2 | Filter No.: |
| Date: 9-23-12 | Pitot Coefficient: .84 | Ambient Temp.: |
| Run Number: 3 | DGMC Factor: .9989 | Static Pressure: -.28 |
| Operator: C. Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.53 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-1 | 0 | 174.465 | .20 | | 1.506 | 1.5 | 145 | 245 | 232 | 60 | 81 | 3.5 |
| 2 | 2.5 | 176.101 | .20 | | 1.506 | 1.5 | 145 | 245 | 232 | 52 | 81 | 3.5 |
| 3 | 5.0 | 177.636 | .18 | | 1.35 | 1.4 | 145 | 239 | 234 | 54 | 81 | 3.5 |
| 4 | 7.5 | 179.300 | .17 | | 1.28 | 1.3 | 146 | 242 | 232 | 52 | 81 | 3.0 |
| 5 | 10.0 | 180.872 | .15 | | 1.13 | 1.1 | 146 | 242 | 233 | 52 | 81 | 3.0 |
| 6 | 12.5 | 182.374 | .16 | | 1.20 | 1.2 | 147 | 243 | 234 | 54 | 84 | 3.0 |
| 7 | 15.0 | 183.810 | .18 | | 1.35 | 1.4 | 148 | 244 | 243 | 54 | 86 | 3.0 |
| 8 | 17.5 | 185.402 | .19 | | 1.43 | 1.4 | 147 | 239 | 243 | 56 | 86 | 3.0 |
| 9 | 20.0 | 186.901 | .18 | | 1.35 | 1.4 | 146 | 239 | 243 | 54 | 86 | 3.0 |
| 10 | 22.5 | 188.741 | .15 | | 1.13 | 1.1 | 140 | 239 | 239 | 54 | 87 | 3.0 |
| 11 | 25.0 | 190.030 | .14 | | 1.054 | 1.05 | 140 | 239 | 239 | 55 | 88 | 3.0 |
| 12 | 27.5 | 191.584 | .17 | | 1.28 | 1.3 | 139 | 237 | 235 | 56 | 89 | 3.0 |
| | 30 | 192.931 | | | | | | | | | | |
| Total/Avg. | | 37.55 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 125 | 100 | 25 |
| Second Impinger | 110 | 100 | 10 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 259.3 | 250 | 9.3 |
| | | Total Condensate | 44.30 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 20.7 | 1.0 | 0 | |
| 2 | 20.7 | 1.0 | | |
| 3 | 20.7 | 1.0 | | |
| AVG | 20.7 | 1.0 | 0 | |

**COMMENTS:**

START 10:58 STOP 11:03 START: 11:07
STOP 11:19 START 11:22:30 STOP 11:36
START 11:39 STOP 12:09

Pretest Leak Check @ 15 "Hg for .004 CFM
Postest Leak Check @ 15 "Hg for .004 CFM

.CR
RUN 3

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W-1 | 0 | 192.931 | .20 | | 1.506 | 1.5 | 148 | 242 | 239 | 58 | 87 | 3.0 |
| 2 | 2.5 | 194.522 | .20 | | 1.506 | 1.5 | 148 | 243 | 239 | 58 | 87 | 3.0 |
| 3 | 5.0 | 196.143 | .18 | | 1.36 | 1.4 | 149 | 246 | 236 | 55 | 88 | 3.0 |
| 4 | 7.5 | 197.741 | .17 | | 1.28 | 1.3 | 149 | 239 | 235 | 56 | 89 | 3.0 |
| 5 | 10.0 | 199.301 | .15 | | 1.13 | 1.1 | 149 | 242 | 236 | 57 | 90 | 3.0 |
| 6 | 12.5 | 200.812 | .16 | | 1.2 | 1.2 | 149 | 239 | 236 | 58 | 92 | 3.0 |
| 7 | 15.0 | 202.290 | .19 | | 1.43 | 1.4 | 149 | 241 | 234 | 59 | 92 | 3.5 |
| 8 | 17.5 | 204.372 | .22 | | 1.656 | 1.7 | 149 | 241 | 236 | 58 | 93 | 4.0 |
| 9 | 20.0 | 205.600 | .18 | | 1.36 | 1.4 | 148 | 243 | 235 | 59 | 93 | 3.5 |
| 10 | 22.5 | 207.241 | .20 | | 1.506 | 1.5 | 143 | 245 | 236 | 60 | 94 | 3.5 |
| 11 | 25.0 | 208.905 | .17 | | 1.28 | 1.3 | 143 | 244 | 236 | 60 | 95 | 3.5 |
| 12 | 27.5 | 210.510 | .15 | | 1.13 | 1.1 | 143 | 241 | 236 | 61 | 96 | 3.5 |
| | 30.0 | 212.015 | | .43575 | | 1.34 | | | | | | |
| Total/Avg. | | | | | | | | | | | | |

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-2 | Barometric Pressure: 30.38 |
| Location: HARTFORD, IL | Cold Box No.: STL-2 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK 1 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: S-1 | Filter No.: 92354 |
| Date: 9-23-92 | Pitot Coefficient: .84 | Ambient Temp.: 65 |
| Run Number: 1 | DGMC Factor: .9989 | Static Pressure: -.24 |
| Operator: C. Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.94 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W-1 | 0 | 212.362 | .25 | | 1.985 | 2.00 | 151 | 245 | 254 | 58 | 74 | 5.0 |
| 2 | 2.5 | 214.032 | .18 | | 1.43 | 1.4 | 152 | 253 | 251 | 51 | 74 | 4.0 |
| 3 | 5.0 | 215.711 | .15 | | 1.19 | 1.2 | 152 | 259 | 255 | 48 | 75 | 3.5 |
| 4 | 7.5 | 217.218 | .15 | | 1.19 | 1.2 | 155 | 262 | 253 | 49 | 76 | 3.5 |
| 5 | 10.0 | 218.735 | .15 | | 1.19 | 1.2 | 153 | 261 | 254 | 50 | 78 | 3.5 |
| 6 | 12.5 | 220.200 | .13 | | 1.03 | 1.05 | 152 | 263 | 255 | 51 | 79 | 3.5 |
| 7 | 15.0 | 221.650 | .19 | | 1.51 | 1.50 | 152 | 262 | 255 | 52 | 79 | 4.0 |
| 8 | 17.5 | 223.263 | .20 | | 1.59 | 1.60 | 151 | 259 | 257 | 62 | 79 | 4.0 |
| 9 | 20.0 | 224.900 | .20 | | 1.59 | 1.60 | 147 | 262 | 255 | 54 | 80 | 4.5 |
| 10 | 22.5 | 226.614 | .21 | | 1.67 | 1.70 | 147 | 259 | 256 | 52 | 82 | 5.0 |
| 11 | 25.0 | 228.313 | .15 | | 1.19 | 1.20 | 146 | 246 | 256 | 53 | 82 | 4.5 |
| 12 | 27.5 | 229.900 | .15 | | 1.19 | 1.20 | 146 | 259 | 255 | 55 | 82 | 4.0 |
| | 30.0 | 231.322 | | | | | | | | | | |
| Total/Avg. | | 39.032 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 150 | 100 | 50 |
| Second Impinger | 102 | 100 | 2 |
| Third Impinger | | | |
| Silica Gel | 266.2 | 260 | 6.2 |
| Total Condensate | | | 58.2 |

Flue Gas Analysis

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 20.0 | .8 | 0 | |
| 2 | 20.0 | .8 | | |
| 3 | 20.0 | .8 | | |
| AVG | 20.0 | .8 | 0 | |

COMMENTS:

START 1411 STOPPED 2:28:45 START 1435
DUST FEED LINE PLUGGED ~ 7 MINUTES STOP: 1442
START 1449 PORT CHANGE DUST LINE PLUGGED
START 15:11 STOP 1541

Pretest Leak Check @ 15 "Hg for .000 CFM
Postest Leak Check @ 12 "Hg for .006 CFM

RUN 1

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head (" H2O) ΔP | Velocity Head (" H2O) √ΔP | Orifice Pressure Differential (" H2O) Calc. | Orifice Pressure Differential (" H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum (" Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S-1 | 0 | 231.322 | .22 | | 1.75 | 1.75 | 149 | 257 | 254 | 65 | 79 | 4.0 |
| 2 | 2.5 | 232.854 | .22 | | 1.75 | 1.75 | 158 | 259 | 253 | 52 | 80 | 5.0 |
| 3 | 5.0 | 234.543 | .22 | | 1.75 | 1.75 | 155 | 259 | 255 | 50 | 82 | 5.0 |
| 4 | 7.5 | 236.341 | .22 | | 1.75 | 1.75 | 154 | 259 | 255 | 50 | 83 | 5.0 |
| 5 | 10.0 | 238.172 | .21 | | 1.67 | 1.70 | 155 | 257 | 255 | 52 | 85 | 5.5 |
| 6 | 12.5 | 240.001 | .21 | | 1.67 | 1.70 | 154 | 256 | 256 | 53 | 86 | 5.5 |
| 7 | 15.0 | 241.762 | .19 | | 1.51 | 1.50 | 154 | 258 | 255 | 54 | 87 | 5.0 |
| 8 | 17.5 | 243.437 | .18 | | 1.43 | 1.4 | 155 | 260 | 256 | 54 | 88 | 4.5 |
| 9 | 20.0 | 245.045 | .15 | | 1.19 | 1.2 | 158 | 259 | 254 | 55 | 89 | 4.0 |
| 10 | 22.5 | 246.625 | .15 | | 1.19 | 1.2 | 158 | 258 | 256 | 55 | 89 | 4.0 |
| 11 | 25.0 | 248.176 | .19 | | 1.51 | 1.5 | 151 | 254 | 256 | 55 | 90 | 4.5 |
| 12 | 27.5 | 249.802 | .17 | | 1.349 | 1.3 | 151 | 256 | 256 | 55 | 90 | 4.5 |
| | 30 | 251.394 | | .42856 | | 1.472 | 152.3 | | | | 82 | |
| Total/Avg. | | | | | | | | | | | | |

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FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: Chemtco | Hot Box No.: STL-1 | Barometric Pressure: 30.34 |
| Location: Hartford, IL | Cold Box No.: STL-1 | Stack Diameter, In: 57.25 |
| Source I.D.: STACK 1 | Console No.: STL-2 | Nozzle Diameter, In: .300 |
| Project No.: | Pitot No.: S-2 | Filter No.: 92352 |
| Date: 9-23-92 | Pitot Coefficient: .84 | Ambient Temp.: 67 |
| Run Number: 2 | DGMC Factor: .9989 | Static Pressure: -.24 |
| Operator: C. Dandy | Meter ΔH@: 2.0202 | K Factor: 7.94 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S-1 | 0 | 251.790 | .20 | | 1.59 | 1.6 | 140 | 256 | 253 | 62 | 76 | 4.0 |
| 2 | 2.5 | 253.372 | .20 | | 1.59 | 1.6 | 138 | 254 | 254 | 60 | 77 | 4.0 |
| 3 | 5.0 | 249.999 | .17 | | 1.350 | 1.35 | 147 | 249 | 253 | 60 | 77 | 3.5 |
| 4 | 7.5 | 256.521 | .16 | | 1.27 | 1.3 | 154 | 248 | 254 | 57 | 78 | 3.5 |
| 5 | 10.0 | 258.056 | .18 | | 1.429 | 1.4 | 153 | 248 | 255 | 58 | 79 | 3.5 |
| 6 | 12.5 | 259.672 | .19 | | 1.51 | 1.5 | 154 | 246 | 256 | 60 | 81 | 4.0 |
| 7 | 15.0 | 261.381 | .20 | | 1.59 | 1.6 | 153 | 250 | 256 | 61 | 83 | 4.0 |
| 8 | 17.5 | 263.011 | .22 | | 1.7468 | 1.75 | 154 | 248 | 256 | 62 | 84 | 4.5 |
| 9 | 20.0 | 264.700 | .22 | | 1.7468 | 1.75 | 154 | 248 | 256 | 61 | 85 | 4.5 |
| 10 | 22.5 | 266.611 | .22 | | 1.7468 | 1.75 | 152 | 248 | 258 | 63 | 87 | 4.5 |
| 11 | 25.0 | 268.200 | .21 | | 1.67 | 1.7 | 152 | 248 | 258 | 64 | 88 | 4.5 |
| 12 | 27.5 | 270.000 | .20 | | 1.59 | 1.6 | 151 | 252 | 258 | 63 | 89 | 4.5 |
| | 30.0 | 271.671 | | | | | | | | | | |
| Total/Avg. | | 38.21 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 130 | 100 | 30 |
| Second Impinger | 0 | 100 | 0 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 266.2 | 259.3 | 6.9 |
| | | Total Condensate | 36.9 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 19.7 | 1.2 | 0 | |
| 2 | 19.7 | 1.2 | | |
| 3 | 19.7 | 1.2 | | |
| AVG | 19.7 | 1.2 | 0 | |

**COMMENTS:**

START TIME: 16:42 STOP 4:49:30

START 16:45 STOP 1648 START 1649

PORT CHANGE 5:14:30 START 1720

STOP : 17:50

Pretest Leak Check @ 15 "Hg for 0.001 CFM

Postest Leak Check @ 15 "Hg for 0.001 CFM

STACK 1
RUN 2

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W-1 | 0 | 271.671 | .17 | | 1.35 | 1.35 | 138 | 248 | 256 | 65 | 84 | 3.5 |
| 2 | 2.5 | 273.220 | .17 | | 1.35 | 1.35 | 135 | 250 | 252 | 60 | 86 | 4.0 |
| 3 | 5.0 | 274.780 | .19 | | 1.51 | 1.50 | 145 | 248 | 253 | 59 | 86 | 4.0 |
| 4 | 7.5 | 276.410 | .18 | | 1.429 | 1.40 | 145 | 251 | 257 | 58 | 87 | 4.0 |
| 5 | 10.0 | 278.010 | .19 | | 1.51 | 1.50 | 149 | 251 | 255 | 59 | 88 | 4.0 |
| 6 | 12.5 | 279.670 | .17 | | 1.35 | 1.35 | 152 | 250 | 253 | 60 | 89 | 4.0 |
| 7 | 15.0 | 281.140 | .16 | | 1.27 | 1.30 | 152 | 250 | 257 | 61 | 90 | 3.5 |
| 8 | 17.5 | 282.670 | .13 | | 1.03 | 1.0 | 153 | 250 | 257 | 61 | 91 | 3.0 |
| 9 | 20.0 | 284.150 | .13 | | 1.03 | 1.0 | 152 | 250 | 257 | 61 | 90 | 3.0 |
| 10 | 22.5 | 285.680 | .16 | | 1.27 | 1.30 | 148 | 250 | 257 | 62 | 91 | 3.0 |
| 11 | 25.0 | 287.030 | .13 | | 1.03 | 1.0 | 151 | 250 | 255 | 62 | 91 | 3.0 |
| 12 | 27.5 | 288.510 | .17 | | 1.35 | 1.35 | 151 | 248 | 256 | 62 | 92 | 3.0 |
| | 30.0 | 290.000 | | | | | | | | | | |
| | | | | CNP .4080 / .4231 | | 1.429 | 148.875 | | | | | |
| Total/Avg | | | | | | | | | | | | |

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: Chemetco | Hot Box No.: STL-1 | Barometric Pressure: 30.34 |
| Location: Hartford, IL | Cold Box No.: STL-1 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK 1 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: S-1 | Filter No.: 92502 |
| Date: 9-24-92 | Pitot Coefficient: .84 | Ambient Temp.: 50 |
| Run Number: 1 | DGMC Factor: .9989 | Static Pressure: -.29 |
| Operator: C. Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.94 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S-1 | 0 | 290.353 | .23 | | 1.83 | 1.8 | 136 | 254 | 252 | 44 | 61 | 5.0 |
| 2 | 2.5 | 292.122 | .24 | | 1.91 | 1.9 | 143 | 253 | 252 | 41 | 62 | 5.0 |
| 3 | 5.0 | 293.901 | .24 | | 1.91 | 1.9 | 146 | 251 | 252 | 40 | 63 | 5.0 |
| 4 | 7.5 | 295.737 | .25 | | 1.99 | 2.00 | 146 | 250 | 252 | 41 | 64 | 5.0 |
| 5 | 10.0 | 297.611 | .25 | | 1.99 | 2.00 | 146 | 251 | 252 | 41 | 66 | 5.0 |
| 6 | 12.5 | 299.384 | .26 | | 2.06 | 2.10 | 148 | 255 | 252 | 42 | 67 | 6.0 |
| 7 | 15.0 | 301.511 | .22 | | 1.75 | 1.75 | 148 | 254 | 254 | 42 | 69 | 6.0 |
| 8 | 17.5 | 303.144 | .20 | | 1.588 | 1.6 | 146 | 247 | 252 | 43 | 70 | 5.0 |
| 9 | 20.0 | 304.892 | .19 | | 1.51 | 1.5 | 149 | 247 | 255 | 43 | 71 | 5.0 |
| 10 | 22.5 | 306.549 | .19 | | 1.51 | 1.5 | 140 | 247 | 252 | 44 | 73 | 5.0 |
| 11 | 25.0 | 308.241 | .19 | | 1.51 | 1.5 | 140 | 248 | 255 | 44 | 75 | 5.0 |
| 12 | 27.5 | 309.800 | .20 | | 1.588 | 1.6 | 141 | 247 | 253 | 44 | 76 | 5.0 |
| | 30.0 | 311.496 | | | | | | | | | | |
| Total/Avg. | | 40.12 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 150 | 100 | 50 |
| Second Impinger | 100 | 100 | 0 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 272.4 | 260 | 12.4 |
| Total Condensate | | | 62.4 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 19.7 | .9 | 0 | |
| 2 | 19.7 | .9 | | |
| 3 | 19.7 | .8 | | |
| AVG | 19.7 | 0.867 | 0 | |

**COMMENTS:**

START: 713 STOP 721 START 7:23
STOP 7:28 START 7:30 PORT CHANGE
START 755 STOP: 825

Pretest Leak Check @ 15 "Hg for .000 CFM
Postest Leak Check @ 14 "Hg for .000 CFM

ICK
RUN 1

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W-1 | 0 | 311.496 | .17 | | 1.349 | 1.35 | 146 | 249 | 254 | 47 | 72 | 5.0 |
| 2 | 2.5 | 313.100 | .17 | | 1.349 | 1.35 | 148 | 247 | 252 | 44 | 73 | 4.5 |
| 3 | 5.0 | 314.818 | .13 | | 1.081 | 1.0 | 148 | 248 | 252 | 43 | 75 | 4.0 |
| 4 | 7.5 | 316.233 | .14 | | 1.111 | 1.1 | 149 | 249 | 255 | 44 | 75 | 3.5 |
| 5 | 10.0 | 317.645 | .14 | | 1.111 | 1.1 | 148 | 248 | 253 | 44 | 76 | 3.5 |
| 6 | 12.5 | 319.082 | .14 | | 1.111 | 1.1 | 148 | 248 | 255 | 44 | 77 | 3.5 |
| 7 | 15.0 | 320.521 | .22 | | 1.75 | 1.75 | 149 | 250 | 256 | 45 | 79 | 5.0 |
| 8 | 17.5 | 322.219 | .20 | | 1.56 | 1.6 | 148 | 250 | 255 | 45 | 80 | 5.0 |
| 9 | 20.0 | 323.901 | .22 | | 1.75 | 1.75 | 146 | 251 | 255 | 46 | 81 | 5.5 |
| 10 | 22.5 | 325.601 | .19 | | 1.51 | 1.5 | 142 | 254 | 256 | 46 | 82 | 5.5 |
| 11 | 25.0 | 327.482 | .17 | | 1.349 | 1.35 | 142 | 252 | 256 | 47 | 84 | 5.0 |
| 12 | 27.5 | 329.001 | .15 | | 1.191 | 1.2 | 140 | 252 | 257 | 47 | 84 | 4.5 |
| | 30.0 | 330.473 | | | | | | | | | | |
| | | | .19892 | .14037 | | 1.562 | 145.1 | | | | 78.5 | |
| Total/Avg. | | | | | | | | | | | | |

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: Chemetco | Hot Box No.: STL-2 | Barometric Pressure: 30.34 |
| Location: Hartford, IL | Cold Box No.: STL-2 | Stack Diameter, in: 37.25 |
| Source I.D.: STACK 1 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: S-2 | Filter No.: 92351 |
| Date: 9-24-92 | Pitot Coefficient: .84 | Ambient Temp.: |
| Run Number: 2 | DGMC Factor: .9989 | Static Pressure: -.29 |
| Operator: C. Dandy | Meter ΔH@: 2.0202 | K Factor: 7.94 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W-1 | 0 | 330.984 | .17 | | 1.35 | 1.35 | 147 | 228 | 249 | 54 | 75 | 2.0 |
| 2 | 2.5 | 332.611 | .15 | | 1.A1 | 1.2 | 152 | 248 | 252 | 44 | 76 | 2.0 |
| 3 | 5.0 | 334.031 | .14 | | 1.112 | 1.1 | 156 | 246 | 251 | 46 | 75 | 2.0 |
| 4 | 7.5 | 335.511 | .13 | | 1.03 | 1.0 | 152 | 250 | 253 | 44 | 77 | 2.0 |
| 5 | 10.0 | 337.011 | .13 | | 1.03 | 1.0 | 152 | 249 | 253 | 45 | 79 | 2.0 |
| 6 | 12.5 | 338.221 | .14 | | 1.1 | 1.1 | 151 | 250 | 256 | 46 | 80 | 2.0 |
| 7 | 15.0 | 339.617 | .15 | | 1.19 | 1.2 | 151 | 251 | 255 | 46 | 81 | 2.0 |
| 8 | 17.5 | 341.175 | .20 | | 1.588 | 1.6 | 148 | 251 | 256 | 47 | 83 | 3.0 |
| 9 | 20.0 | 342.772 | .20 | | 1.588 | 1.6 | 147 | 250 | 252 | 48 | 84 | 2.5 |
| 10 | 22.5 | 344.451 | .19 | | 1.51 | 1.5 | 145 | 252 | 260 | 48 | 86 | 3.0 |
| 11 | 25.0 | 346.210 | .15 | | 1.19 | 1.2 | 147 | 250 | 250 | 49 | 87 | 3.0 |
| 12 | 27.5 | 347.712 | .19 | | 1.51 | 1.5 | 142 | 252 | 261 | 49 | 88 | 3.5 |
| | 30.0 | 349.183 | | | | | | | | | | |
| Total/Avg. | | 37.91 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 150 | 100 | 50 |
| Second Impinger | 0 | 100 | 0 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 265.9 | 260 | 5.9 |
| | | Total Condensate | 55.9 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 19.5 | 1.4 | .00 | |
| 2 | 19.5 | 1.4 | .00 | |
| 3 | 19.5 | 1.4 | .00 | |
| AVG | 19.5 | 1.4 | 0.0 | |

**COMMENTS:**

START : 906 STOP 9:11 START 9:13:30

STOP : 939 / START 9:42 STOP 10:12

Pretest Leak Check @ 15 "Hg for .008 CFM

Postest Leak Check @ 14 "Hg for .007 CFM

RUN 2

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S-1 | 0 | 349.183 | .2 | | 1.588 | 1.6 | 145 | 252 | 256 | 53 | 85 | 3.0 |
| 2 | 2.5 | 350.981 | .2 | | 1.588 | 1.6 | 149 | 250 | 256 | 51 | 88 | 3.0 |
| 3 | 5.0 | 352.558 | .22 | | 1.747 | 1.75 | 151 | 250 | 258 | 51 | 89 | 3.0 |
| 4 | 7.5 | 354.495 | .21 | | 1.674 | 1.7 | 151 | 250 | 257 | 52 | 90 | 3.0 |
| 5 | 10.0 | 356.120 | .21 | | 1.674 | 1.7 | 152 | 251 | 257 | 53 | 91 | 3.0 |
| 6 | 12.5 | 357.862 | .21 | | 1.674 | 1.7 | 152 | 252 | 258 | 53 | 92 | 3.0 |
| 7 | 15.0 | 359.617 | .20 | | 1.588 | 1.6 | 152 | 251 | 258 | 53 | 93 | 3.0 |
| 8 | 17.5 | 361.294 | .15 | | 1.19 | 1.2 | 152 | 252 | 255 | 54 | 93 | 3.0 |
| 9 | 20.0 | 362.844 | .15 | | 1.19 | 1.2 | 152 | 251 | 259 | 53 | 93 | 3.0 |
| 10 | 22.5 | 364.447 | .16 | | 1.27 | 1.3 | 149 | 250 | 256 | 53 | 94 | 3.0 |
| 11 | 25.0 | 365.892 | .15 | | 1.19 | 1.2 | 146 | 250 | 255 | 53 | 94 | 3.0 |
| 12 | 27.5 | 367.399 | .16 | | 1.27 | 1.3 | 144 | 251 | 258 | 53 | 95 | 3.0 |
| | 30 | 368.894 | | | | | | | | | | |
| | | | .17213 | | √ΔP = .41489 | 1.383 | 149.4 | | | | 86.2 | |
| Total/Avg | | | | | | | | | | | | |

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-1 | Barometric Pressure: 30.34 |
| Location: HARTFORD, IL | Cold Box No.: STL-1 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK 1 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: S-1 | Filter No.: 92504 |
| Date: 9-24-92 | Pitot Coefficient: .84 | Ambient Temp.: |
| Run Number: 3 | DGMC Factor: .9989 | Static Pressure: -.29 |
| Operator: C Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.70 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 369.136 | .22 | | 1.694 | 1.7 | 144 | 248 | 253 | 60 | 79 | 4.0 |
| 2 | 2.5 | 370.901 | .20 | | 1.54 | 1.5 | 146 | 249 | 253 | 58 | 79 | 4.0 |
| 3 | 5.0 | 372.561 | .20 | | 1.54 | 1.5 | 147 | 247 | 253 | 52 | 79 | 4.0 |
| 4 | 7.5 | 374.284 | .20 | | 1.54 | 1.5 | 148 | 249 | 256 | 49 | 80 | 4.0 |
| 5 | 10.0 | 375.931 | .22 | | 1.69 | 1.7 | 148 | 249 | 254 | 49 | 82 | 4.0 |
| 6 | 12.5 | 377.672 | .21 | | 1.62 | 1.6 | 149 | 246 | 255 | 49 | 83 | 4.0 |
| 7 | 15.0 | 379.401 | .21 | | 1.62 | 1.6 | 149 | 247 | 256 | 49 | 85 | 4.0 |
| 8 | 17.5 | 381.135 | .18 | | 1.386 | 1.4 | 149 | 252 | 254 | 49 | 86 | 3.5 |
| 9 | 20.0 | 382.779 | .18 | | 1.386 | 1.4 | 149 | 250 | 256 | 49 | 86 | 3.5 |
| 10 | 22.5 | 384.301 | .17 | | 1.31 | 1.3 | 141 | 248 | 255 | 50 | 86 | 3.5 |
| 11 | 25.0 | 385.852 | .17 | | 1.31 | 1.3 | 141 | 251 | 254 | 49 | 86 | 3.5 |
| 12 | 27.5 | 387.401 | .17 | | 1.31 | 1.3 | 140 | 250 | 255 | 49 | 87 | 3.5 |
| | 30.0 | 388.923 | | | | | | | | | | |
| Total/Avg. | | 38.302 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 130 | 100 | 30 |
| Second Impinger | 0 | 100 | 0 |
| Third Impinger | | 264.4 | 0 |
| Silica Gel | 269.8 | 264 | 4.8 |
| Total Condensate | | | 34.8 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 20.5 | .8 | 0 | |
| 2 | 20.5 | .7 | | |
| 3 | 20.5 | .7 | | |
| AVG | 20.5 | 0.733 | 0 | |

**COMMENTS:**

START 1120 STOP 11:41 START 11:42:30

PORT CHANGE

START 11:56 STOP 1206:30 START 12:09:30

STOP 12:22 START 12:25:45 STOP 12:33:30

Pretest Leak Check @ 15 "Hg for .002 CFM

Postest Leak Check @ 14 "Hg for .002 CFM

RUN 3

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) | | Orifice Pressure Differential ("H2O) | | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) | | | | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ΔP | √ΔP | Calc. | Actual | | Probe | Filter Box | Last Impinger | Dry Gas Meter | |
| 1 | 0 | 388.923 | .17 | | 1.309 | 1.3 | 145 | 249 | 258 | 85 | 85 | 3.5 |
| 2 | 2.5 | 390.421 | .16 | | 1.23 | 1.2 | 146 | 249 | 256 | 51 | 86 | 3.5 |
| 3 | 5.0 | 391.932 | .16 | | 1.23 | 1.2 | 146 | 249 | 252 | 51 | 86 | 3.5 |
| 4 | 7.5 | 393.440 | .13 | | 1.001 | 1.0 | 147 | 250 | 257 | 52 | 87 | 3.5 |
| 5 | 10.0 | 394.851 | .12 | | .924 | .93 | 147 | 250 | 258 | 52 | 86 | 3.5 |
| 6 | 12.5 | 396.277 | .18 | | 1.386 | 1.4 | 146 | 250 | 258 | 54 | 86 | 3.5 |
| 7 | 15.0 | 397.702 | .19 | | 1.463 | 1.5 | 148 | 249 | 254 | 53 | 87 | 4.0 |
| 8 | 17.5 | 399.401 | .19 | | 1.463 | 1.5 | 149 | 253 | 255 | 53 | 88 | 4.0 |
| 9 | 20.0 | 401.020 | .19 | | 1.463 | 1.5 | 148 | 252 | 256 | 55 | 88 | 4.0 |
| 10 | 22.5 | 402.668 | .20 | | 1.54 | 1.5 | 146 | 253 | 258 | 56 | 87 | 4.0 |
| 11 | 25.0 | 404.389 | .15 | | 1.155 | 1.2 | 148 | 250 | 257 | 55 | 87 | 3.5 |
| 12 | 27.5 | 405.932 | .15 | | 1.155 | 1.2 | 148 | 252 | 255 | 54 | 88 | 4.0 |
| | 30 | 407.438 | .179025 | .4231 | | 1.384 | 146.5 | | | | 84.96 | |
| Total/Avg. | | | | | | | | | | | | |

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: Chemetco | Hot Box No.: STL-1 | Barometric Pressure: 30.20 |
| Location: HARTFORD, IL | Cold Box No.: STL-1 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK 3 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: S-8L | Filter No.: |
| Date: 9-25-92 | Pitot Coefficient: .84 | Ambient Temp.: 66 |
| Run Number: 1 | DGMC Factor: .9989 | Static Pressure: -.24 |
| Operator: C. Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.78 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W-1 | 0 | 407.843 | .25 | | 1.945 | 1.95 | 149 | 246 | 254 | 62 | 73 | 4.5 |
| 2 | 2.5 | 409.640 | .24 | | 1.556 | 1.6 | 153 | 248 | 253 | 52 | 74 | 5.0 |
| 3 | 5.0 | 411.392 | .25 | | 1.945 | 1.95 | 154 | 246 | 253 | 52 | 74 | 5.0 |
| 4 | 7.5 | 413.133 | .24 | | 1.556 | 1.6 | 154 | 249 | 254 | 53 | 76 | 5.0 |
| 5 | 10.0 | 414.900 | .24 | | 1.556 | 1.6 | 158 | 250 | 255 | 54 | 79 | 5.0 |
| 6 | 12.5 | 416.714 | .22 | | 1.7116 | 1.7 | 158 | 251 | 256 | 56 | 81 | 5.0 |
| 7 | 15.0 | 418.317 | .23 | | 1.789 | 1.8 | 157 | 250 | 256 | 56 | 82 | 5.0 |
| 8 | 17.5 | 420.101 | .20 | | 1.556 | 1.6 | 157 | 251 | 255 | 57 | 83 | 5.5 |
| 9 | 20.0 | 421.911 | .18 | | 1.40 | 1.4 | 158 | 251 | 257 | 58 | 85 | 5.0 |
| 10 | 22.5 | 423.524 | .16 | | 1.2448 | 1.25 | 149 | 252 | 257 | 59 | 86 | 4.5 |
| 11 | 25.0 | 425.109 | .16 | | 1.245 | 1.25 | 149 | 252 | 256 | 60 | 87 | 4.5 |
| 12 | 27.5 | 426.614 | .19 | | 1.478 | 1.5 | 153 | 249 | 255 | 59 | 86 | 5.0 |
| | 30.0 | 428.194 | | | | | | | | | | |
| Total/Avg. | | 40.928 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 165 | 100 | 65 |
| Second Impinger | 105 | 100 | 5 |
| Third Impinger | | | |
| Silica Gel | 273.5 | 260 | 13.5 |
| | | Total Condensate | 83.5 |

Flue Gas Analysis

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 20.5 | .5 | .21 | |
| 2 | 20.5 | .5 | .20 | |
| 3 | 20.5 | .5 | .20 | |
| AVG | 20.5 | .5 | .203 | |

COMMENTS:

START 9:21 STOP 9:26 START 9:29:30

STOP PORT CHANGE 9:54:20 START 9:57

STOP 10:27

Pretest Leak Check @ 15 "Hg for .009 CFM

Postest Leak Check @ 12 "Hg for .008 CFM

Ru
STACK 3

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N-1 | 0 | 428.194 | .24 | | 1.556 | 1.6 | 153 | 252 | 256 | 60 | 86 | 5.0 |
| 2 | 2.5 | 429.884 | .23 | | 1.789 | 1.8 | 159 | 254 | 252 | 58 | 87 | 5.5 |
| 3 | 5.0 | 431.635 | .23 | | 1.789 | 1.8 | 159 | 252 | 258 | 55 | 89 | 5.5 |
| 4 | 7.5 | 433.418 | .22 | | 1.7116 | 1.7 | 160 | 252 | 257 | 54 | 89 | 5.5 |
| 5 | 10.0 | 435.130 | .22 | | 1.7116 | 1.7 | 161 | 252 | 257 | 55 | 91 | 5.5 |
| 6 | 12.5 | 436.904 | .22 | | 1.7116 | 1.7 | 160 | 252 | 258 | 56 | 91 | 5.5 |
| 7 | 15.0 | 438.642 | .21 | | 1.63 | 1.6 | 161 | 254 | 261 | 57 | 92 | 5.5 |
| 8 | 17.5 | 440.513 | .21 | | 1.63 | 1.6 | 161 | 253 | 259 | 57 | 92 | 5.5 |
| 9 | 20.0 | 442.071 | .20 | | 1.56 | 1.6 | 162 | 253 | 259 | 58 | 93 | 5.5 |
| 10 | 22.5 | 443.888 | .20 | | 1.56 | 1.6 | 161 | 254 | 257 | 58 | 94 | 5.5 |
| 11 | 25.0 | 445.484 | .19 | | 1.478 | 1.5 | 161 | 253 | 258 | 58 | 94 | 5.5 |
| 12 | 27.5 | 447.111 | .19 | | 1.478 | 1.5 | 159 | 254 | 258 | 58 | 94 | 5.6 |
| | 30.0 | 448.771 | | | | | | | | | | |
| | | | .2125 | .46102 | | 1.620 | 156.9 | | | | 85.75 | |
| Total/Avg. | | | | | | | | | | | | |

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-2 | Barometric Pressure: 30.20 |
| Location: HARTFORD, IL | Cold Box No.: STL 2 | Stack Diameter, in: 37.25 |
| Source I.D.: STACK 3 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: 5-2 | Filter No.: 92504 |
| Date: 9-25-92 | Pitot Coefficient: .84 | Ambient Temp.: |
| Run Number: 2 | DGMC Factor: .9989 | Static Pressure: -.24 |
| Operator: C. Dawdy | Meter ΔH@: 2.0202 | K Factor: 7.78 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 451.027 | .20 | | 1.556 | 1.6 | 162 | 247 | 254 | 64 | 81 | 2.0 |
| 2 | 2.5 | 452.641 | .20 | | 1.556 | 1.6 | 162 | 249 | 256 | 60 | 81 | 2.0 |
| 3 | 5.0 | 454.401 | .23 | | 1.789 | 1.8 | 167 | 251 | 255 | 60 | 81 | 2.5 |
| 4 | 7.5 | 456.242 | .22 | | 1.7116 | 1.7 | 167 | 251 | 258 | 60 | 83 | 2.5 |
| 5 | 10.0 | 457.951 | .22 | | 1.7116 | 1.7 | 167 | 251 | 259 | 61 | 84 | 2.5 |
| 6 | 12.5 | 459.744 | .20 | | 1.556 | 1.6 | 169 | 250 | 259 | 61 | 86 | 2.5 |
| 7 | 15.0 | 461.380 | .18 | | 1.40 | 1.4 | 165 | 250 | 257 | 61 | 87 | 2.5 |
| 8 | 17.5 | 463.117 | .18 | | 1.40 | 1.4 | 165 | 251 | 257 | 60 | 88 | 2.5 |
| 9 | 20.0 | 464.755 | .18 | | 1.40 | 1.4 | 166 | 253 | 257 | 61 | 89 | 2.5 |
| 10 | 22.5 | 466.317 | .17 | | 1.32 | 1.3 | 167 | 254 | 257 | 60 | 90 | 2.5 |
| 11 | 25.0 | 468.000 | .14 | | 1.08 | 1.1 | 166 | 254 | 257 | 60 | 90 | 2.5 |
| 12 | 27.5 | 469.572 | .18 | | 1.40 | 1.4 | 166 | 255 | 256 | 60 | 91 | 3.0 |
| | 30.0 | | | | | | | | | | | |
| Total/Avg. | | 39.976 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 160 | 100 | 60 |
| Second Impinger | 110 | 100 | 10 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 281.6 | 270.0 | 11.6 |
| | | Total Condensate | 81.6 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 18.4 | 2.3 | | |
| 2 | 18.4 | 2.3 | | |
| 3 | 18.4 | 2.3 | | |
| AVG | 18.4 | 2.3 | | |

**COMMENTS:**

START 11:23 PORT CHANGE 11:53

STOP 12:27

Pretest Leak Check @ 15 "Hg for .005 CFM

Postest Leak Check @ 10 "Hg for .004 CFM

STA 3
9-25-92

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual (ΔH) | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 470.868 | .22 | | 1.7116 | 1.7 | 164 | 251 | 259 | 60 | 88 | 3.5 |
| 2 | 2.5 | 472.591 | .21 | | 1.6338 | 1.6 | 167 | 251 | 258 | 60 | 89 | 3.5 |
| 3 | 5.0 | 474.302 | .23 | | 1.789 | 1.8 | 165 | 253 | 258 | 59 | 90 | 4.0 |
| 4 | 7.5 | 476.172 | .22 | | 1.7116 | 1.7 | 165 | 251 | 256 | 58 | 91 | 4.0 |
| 5 | 10.0 | 477.973 | .23 | | 1.789 | 1.8 | 166 | 251 | 260 | 58 | 92 | 4.0 |
| 6 | 12.5 | 479.517 | .22 | | 1.7116 | 1.7 | 166 | 252 | 260 | 58 | 93 | 4.0 |
| 7 | 15.0 | 481.317 | .21 | | 1.6338 | 1.6 | 167 | 252 | 252 | 58 | 93 | 4.5 |
| 8 | 17.5 | 483.045 | .21 | | 1.6338 | 1.6 | 162 | 251 | 259 | 59 | 94 | 4.5 |
| 9 | 20.0 | 484.775 | .18 | | 1.4004 | 1.4 | 161 | 252 | 258 | 59 | 94 | 4.5 |
| 10 | 22.5 | 486.413 | .16 | | | 1.2 | 159 | 253 | 259 | 60 | 94 | 4.0 |
| 11 | 25.0 | 488.011 | .16 | | | 1.2 | 160 | 253 | 260 | 60 | 94 | 4.0 |
| 12 | 27.5 | 489.502 | .16 | | | 1.2 | 161 | 252 | 260 | 60 | 94 | 4.0 |
| | 30.0 | 491.003 | | | | | | | | | | |
| | | | .854 | .4420 | | 1.520 | 164.7 | | | | 89.04 | |
| Total/Avg. | | | | | | | | | | | | |

Page of

FUGRO McClelland

| | | | |
|---|---|---|---|
| Client: CHEMETCO | Hot Box No.: STL-1 | Barometric Pressure: 30.18 |
| Location: HARTFORD, IL | Cold Box No.: STL-1 | Stack Diameter, in: 57.25 |
| Source I.D.: STACK 3 | Console No.: STL-2 | Nozzle Diameter, in: .300 |
| Project No.: | Pitot No.: S-1 | Filter No.: |
| Date: 9-25-92 | Pitot Coefficient: .84 | Ambient Temp.: |
| Run Number: 3 | DGMC Factor: .9989 | Static Pressure: -.24 |
| Operator: C. DAWDY | Meter ΔH@: 2.0202 | K Factor: 7.78 |

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) ΔP | Velocity Head ("H2O) √ΔP | Orifice Pressure Differential ("H2O) Calc. | Orifice Pressure Differential ("H2O) Actual | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) Probe | Filter Box | Last Impinger | Dry Gas Meter | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 491.268 | .25 | | 1.945 | 1.95 | 165 | 251 | 255 | 65 | 83 | 5.0 |
| 2 | 2.5 | 493.172 | .22 | | 2.10 | 2.1 | 164 | 250 | 253 | 55 | 83 | 5.0 |
| 3 | 5.0 | 495.066 | .24 | | 2.02 | 2.0 | 165 | 250 | 252 | 53 | 85 | 5.0 |
| 4 | 7.5 | 497.077 | .24 | | 1.867 | 1.9 | 165 | 251 | 252 | 53 | 85 | 5.0 |
| 5 | 10.0 | 498.871 | .24 | | 1.867 | 1.9 | 166 | 253 | 257 | 56 | 87 | 5.0 |
| 6 | 12.5 | 500.742 | .23 | | 1.789 | 1.8 | 168 | 252 | 257 | 56 | 88 | 5.0 |
| 7 | 15.0 | 502.533 | .23 | | 1.789 | 1.8 | 166 | 253 | 257 | 56 | 89 | 5.0 |
| 8 | 17.5 | 504.317 | .20 | | 1.556 | 1.6 | 164 | 252 | 255 | 57 | 90 | 4.5 |
| 9 | 20.0 | 506.094 | .20 | | 1.556 | 1.6 | 164 | 252 | 255 | 57 | 91 | 4.5 |
| 10 | 22.5 | 507.811 | .20 | | 1.556 | 1.6 | 160 | 252 | 256 | 57 | 91 | 4.5 |
| 11 | 25.0 | 509.577 | .17 | | 1.322 | 1.3 | 157 | 253 | 257 | 58 | 91 | 4.0 |
| 12 | 27.5 | 511.100 | .23 | | 1.789 | 1.8 | 162 | 254 | 256 | 58 | 91 | 5.0 |
| | 30.0 | 512.841 | | | | | | | | | | |
| Total/Avg. | | 42.397 | | | | | | | | | | |

| | Final Weights | Initial Weights | Weight Gained |
|---|---|---|---|
| First Impinger | 165 | 100 | 65 |
| Second Impinger | 105 | 100 | 5 |
| Third Impinger | | 0 | 0 |
| Silica Gel | 275.5 | 264 | 11.5 |
| Total Condensate | | | 71.5 |

**Flue Gas Analysis**

| Trial | $O_2$ | $CO_2$ | CO | $N_2$ |
|---|---|---|---|---|
| 1 | 20.2 | .6 | 0 | |
| 2 | 20.2 | .6 | | |
| 3 | 20.2 | .6 | | |
| AVG | 20.2 | .6 | 0 | |

**COMMENTS:**

START : 1254 PORT CHANGE : 13:24

START : 13:27 STOP 13:58

Pretest Leak Check @ 15 "Hg for .002 CFM

Postest Leak Check @ 9.5 "Hg for .000 CFM

S...K 3
9-25-92

| Port and Traverse Point No. | Sample Time | Dry Gas Meter Reading | Velocity Head ("H2O) | | Orifice Pressure Differential ("H2O) | | Stack Gas Temperature (°F) | Sample Train Temperatures (°F) | | | | Vacuum ("Hg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ΔP | √ΔP | Calc. | Actual | | Probe | Filter Box | Last Impinger | Dry Gas Meter | |
| 1 | 0 | 512.841 | .20 | | 1.556 | 1.4 | 166 | 252 | 260 | 60 | 91 | 5.0 |
| 2 | 2.5 | 514.679 | .20 | | 1.556 | 1.6 | 166 | 252 | 260 | 59 | 91 | 5.0 |
| 3 | 5.0 | 516.222 | .26 | | 2.0228 | 2.0 | 164 | 250 | 258 | 55 | 91 | 5.5 |
| 4 | 7.5 | 518.111 | .24 | | 1.867 | 1.9 | 165 | 250 | 259 | 56 | 93 | 5.0 |
| 5 | 10.0 | 519.984 | .23 | | 1.789 | 1.8 | 164 | 250 | 256 | 57 | 93 | 5.0 |
| 6 | 12.5 | 521.874 | .22 | | 1.7116 | 1.7 | 166 | 250 | 258 | 57 | 94 | 5.5 |
| 7 | 15.0 | 523.621 | .21 | | 1.6338 | 1.6 | 166 | 251 | 258 | 58 | 95 | 5.0 |
| 8 | 17.5 | 525.421 | .21 | | 1.6338 | 1.6 | 166 | 251 | 259 | 58 | 95 | 5.0 |
| 9 | 20.0 | 527.117 | .19 | | 1.4782 | 1.5 | 160 | 251 | 257 | 57 | 95 | 5.0 |
| 10 | 22.5 | 528.744 | .19 | | 1.4782 | 1.5 | 160 | 252 | 257 | 57 | 95 | 5.0 |
| 11 | 25.0 | 530.427 | .19 | | 1.4782 | 1.5 | 161 | 252 | 258 | 58 | 95 | 5.0 |
| 12 | 27.5 | 532.072 | .17 | | 1.323 | 1.3 | 160 | 252 | 259 | 59 | 95 | 5.0 |
| | 30 | 533.665 | | | | | | | | | | |
| | | | .2000 | √.447256 | | 1.706 | 163.75 | | | | 90.708 | |
| Total/Avg. | | | | | | | | | | | | |

FUGRO McClelland

Company _____ Project _____

Test Location _____ Date _____

Traverse Point Determination — Circular Stacks

Stack Inside Diameter (57.25") 4.77 feet

Is diameter greater than 12 inches? Yes / No

Distance Upstream from Disturbance ____ ft ____ diameters

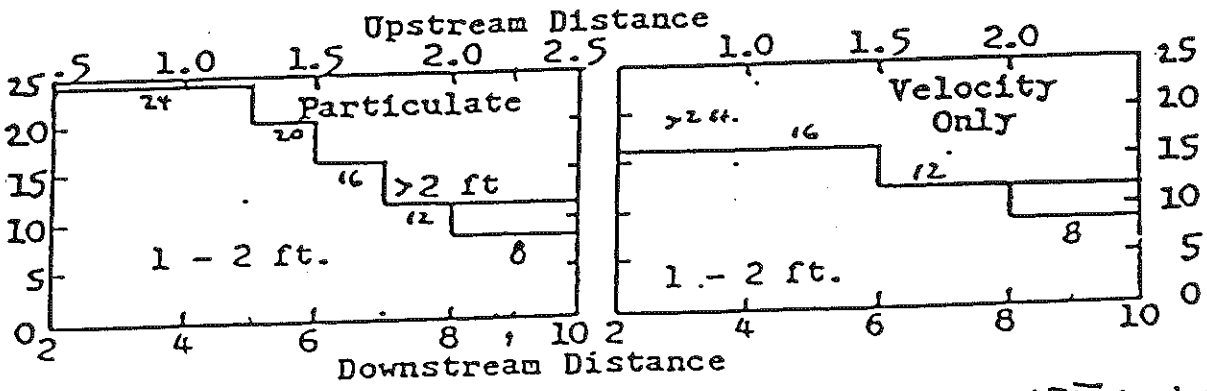
Distance Downstream from Disturbance ____ ft ____ diameters

Are the ports greater than two diameters downstream and one-half diameter upstream from disturbances? Yes / No

Number of Traverse Points Required (as shown in 40CFR60, Appendix A, Method 1) 24 points

Number of Traverse Points per Diameter 12

Minimum Number of Traverse Points




Port Extension Length 1.75 inches

| Point No. | % of ID From Wall | Distance To Inside Wall | Distance To Outside Port Edge |
|---|---|---|---|
| 1 | 2.1 | 1.20 | 2.95 |
| 2 | 6.7 | 3.84 | 5.59 |
| 3 | 11.8 | 6.76 | 8.51 |
| 4 | 17.7 | 10.13 | 11.88 |
| 5 | 25.0 | 14.31 | 16.06 |
| 6 | 35.6 | 20.38 | 22.13 |
| 7 | 64.4 | 36.87 | 38.62 |
| 8 | 75.0 | 42.94 | 44.69 |
| 9 | 82.3 | 47.12 | 48.87 |
| 10 | 88.2 | 50.49 | 52.24 |
| 11 | 93.3 | 53.41 | 55.16 |
| 12 | 97.9 | 56.05 | 57.8 |

# APPENDIX B

## Laboratory Analysis

FUGRO McClelland

# LABORATORY ANALYSIS

PROJECT NAME: Chemetco

PROJECT NUMBER: 0801-1456

DATE SAMPLED: Sept. 22-25, 1992

DATE ANALYZED: Oct. 1

ANALYZED BY: Steve Dillard

ALL ANALYSIS PERFORMED WITHIN GUIDELINES SET BY EPA FEDERAL REGISTER, THURSDAY, AUGUST 18, 1977, PART II -

| | | | |
|---|---|---|---|
| RUN NO. 1 Stack 2 | RUN NO. 2 Stack 2 | RUN NO. 3 Stack 2 | RUN NO. 1 Stack 4 |
| BEAKER NO. 92-304 | BEAKER NO. 92-305 | BEAKER NO. 92-306 | BEAKER NO. 92-307 |
| BEAKER VOL. 300 ml | BEAKER VOL. 300 ml | BEAKER VOL. 300 ml | BEAKER VOL. 300 ml |
| FINAL WT. 68.6948 g | FINAL WT. 68.6937 g | FINAL WT. 68.3820 g | FINAL WT. 68.1310 g |
| TARE WT. 68.6620 g | TARE WT. 68.6566 g | TARE WT. 68.3410 g | TARE WT. 68.1016 g |
| WT. GAIN 32.8 mg | WT. GAIN 37.1 mg | WT. GAIN 41.0 mg | WT. GAIN 29.4 mg |
| BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg |
| NET WT. 31.1 mg | NET WT. 35.4 mg | NET WT. 39.3 mg | NET WT. 27.7 mg |
| FILTER NO. 92503 | FILTER NO. 92511 | FILTER NO. 92505 | FILTER NO. 92402 |
| FINAL WT. 0.4098 g | FINAL WT. 0.4738 g | FINAL WT. 0.3935 g | FINAL WT. 0.4006 g |
| TARE WT. 0.3451 g | TARE WT. 0.3495 g | TARE WT. 0.3448 g | TARE WT. 0.3264 g |
| WT. GAIN 64.7 mg | WT. GAIN 124.3 mg | WT. GAIN 48.7 mg | WT. GAIN 74.2 mg |
| BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg |
| NET WT. 64.7 mg | NET WT. 124.3 mg | NET WT. 48.7 mg | NET WT. 74.2 mg |
| TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. |
| FILTER 64.7 mg | FILTER 124.3 mg | FILTER 48.7 mg | FILTER 74.2 mg |
| WASH 31.1 mg | WASH 35.4 mg | WASH 39.3 mg | WASH 27.7 mg |
| TOTAL 95.8 mg | TOTAL 159.7 mg | TOTAL 88.0 mg | TOTAL 101.9 mg |

FUGRO McClelland

# LABORATORY ANALYSIS

PROJECT NAME: Chemetco

PROJECT NUMBER: 0801-1456

DATE SAMPLED: Sept. 22-25, 1992

DATE ANALYZED: Oct. 1

ANALYZED BY: Steve Dillard

ALL ANALYSIS PERFORMED WITHIN GUIDELINES SET BY EPA FEDERAL REGISTER, THURSDAY, AUGUST 18, 1977, PART II -

| | | | |
|---|---|---|---|
| RUN NO. 2 Stack 4 | RUN NO. 3 Stack 4 | RUN NO. 1 Stack 1 | RUN NO. 2 Stack 1 |
| BEAKER NO. 92-309 | BEAKER NO. 92-310 | BEAKER NO. 92-308 | BEAKER NO. 92-311 |
| BEAKER VOL. 300 ml | BEAKER VOL. 300 ml | BEAKER VOL. 300 ml | BEAKER VOL. 300 ml |
| FINAL WT. 68.3167 g | FINAL WT. 68.5486 g | FINAL WT. 67.9814 g | FINAL WT. 68.4723 g |
| TARE WT. 68.3031 g | TARE WT. 68.5324 g | TARE WT. 67.9661 g | TARE WT. 68.4664 g |
| WT. GAIN 13.6 mg | WT. GAIN 16.2 mg | WT. GAIN 15.3 mg | WT. GAIN 5.9 mg |
| BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg |
| NET WT. 11.9 mg | NET WT. 14.5 mg | NET WT. 13.6 mg | NET WT. 4.2 mg |
| FILTER NO. 92510 | FILTER NO. 92400 | FILTER NO. 92354 | FILTER NO. 92352 |
| FINAL WT. 0.4357 g | FINAL WT. 0.3528 g | FINAL WT. 0.3723 g | FINAL WT. 0.4105 g |
| TARE WT. 0.3397 g | TARE WT. 0.3231 g | TARE WT. ~~0.3440~~ 0.3395 g R77 | TARE WT. 0.3365 g |
| WT. GAIN 96.0 mg | WT. GAIN 29.7 mg | WT. GAIN ~~28.3~~ 32.80 mg R77 | WT. GAIN 74.0 mg |
| BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg |
| NET WT. 96.0 mg | NET WT. 29.7 mg | NET WT. ~~28.3~~ 32.8 mg R77 | NET WT. 74.0 mg |
| TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. |
| FILTER 96.0 mg | FILTER 29.7 mg | FILTER ~~28.3~~ 32.80 mg R77 | FILTER 74.0 mg |
| WASH 11.9 mg | WASH 14.5 mg | WASH 13.6 mg | WASH 4.2 mg |
| TOTAL 107.9 mg | TOTAL 44.2 mg | TOTAL ~~41.9~~ 46.40 R77 mg | TOTAL 78.2 mg |

FUGRO McClelland

# LABORATORY ANALYSIS

PROJECT NAME: Chemetco

PROJECT NUMBER: 0801-1456

DATE SAMPLED: Sept. 22-25, 1992

DATE ANALYZED: Oct. 1

ANALYZED BY: Steve Dillard

ALL ANALYSIS PERFORMED WITHIN GUIDELINES SET BY EPA FEDERAL REGISTER, THURSDAY, AUGUST 18, 1977, PART II -

| | | | |
|---|---|---|---|
| RUN NO. 1 Stack 1 | RUN NO. 2 Stack 1 | RUN NO. 3 Stack 1 | RUN NO. 1 Stack 3 |
| BEAKER NO. 92-312 | BEAKER NO. 92-313 | BEAKER NO. 92-314 | BEAKER NO. 92-315 |
| BEAKER VOL. 300 ml | BEAKER VOL. 300 ml | BEAKER VOL. 300 ml | BEAKER VOL. 300 ml |
| FINAL WT. 68.1561 g | FINAL WT. 68.2083 g | FINAL WT. 68.1113 g | FINAL WT. 67.9464 g |
| TARE WT. 68.1214 g | TARE WT. 68.1860 g | TARE WT. 68.0731 g | TARE WT. 67.9287 g |
| WT. GAIN 34.7 mg | WT. GAIN 22.3 mg | WT. GAIN 38.2 mg | WT. GAIN 17.7 mg |
| BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg |
| NET WT. 33.0 mg | NET WT. 20.6 mg | NET WT. 36.5 mg | NET WT. 16.0 mg |
| FILTER NO. 92502 | FILTER NO. 92351 | FILTER NO. 92504 | FILTER NO. 92401 |
| FINAL WT. 0.4141 g | FINAL WT. 0.4017 g | FINAL WT. 0.3747 g | FINAL WT. 0.4243 g |
| TARE WT. 0.3440 g | TARE WT. 0.3367 g | TARE WT. 0.3512 g | TARE WT. 0.3296 g |
| WT. GAIN 70.1 mg | WT. GAIN 65.0 mg | WT. GAIN 23.5 mg | WT. GAIN 94.7 mg |
| BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg |
| NET WT. 70.1 mg | NET WT. 65.0 mg | NET WT. 23.5 mg | NET WT. 94.7 mg |
| TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. |
| FILTER 70.1 mg | FILTER 65.0 mg | FILTER 23.5 mg | FILTER 94.7 mg |
| WASH 33.0 mg | WASH 20.6 mg | WASH 36.5 mg | WASH 16.0 mg |
| TOTAL 103.1 mg | TOTAL 85.6 mg | TOTAL 60.0 mg | TOTAL 110.7 mg |

FUGRO ◊ McClelland

# LABORATORY ANALYSIS

PROJECT NAME: Chemetco

PROJECT NUMBER: 0801-1456

DATE SAMPLED: Sept. 22-25, 1992

DATE ANALYZED: Oct. 2

ANALYZED BY: Steve Dillard

ALL ANALYSIS PERFORMED WITHIN GUIDELINES SET BY EPA FEDERAL REGISTER, THURSDAY, AUGUST 18, 1977, PART II -

| | | | |
|---|---|---|---|
| RUN NO. 2 Stack 3 | RUN NO. 3 Stack 3 | RUN NO. Blank | RUN NO. |
| BEAKER NO. 92-316 | BEAKER NO. 92-317 | BEAKER NO. 92-318 | BEAKER NO. |
| BEAKER VOL. 300 ml | BEAKER VOL. 300 ml | BEAKER VOL. 300 ml | BEAKER VOL. ml |
| FINAL WT. 68.6656 g | FINAL WT. 49.8294 g | FINAL WT. 49.4638 g | FINAL WT. g |
| TARE WT. 68.6487 g | TARE WT. 49.8099 g | TARE WT. 49.4621 g | TARE WT. g |
| WT. GAIN 16.9 mg | WT. GAIN 19.5 mg | WT. GAIN 1.7 mg | WT. GAIN mg |
| BLK. CORR. 1.7 mg | BLK. CORR. 1.7 mg | BLK. CORR. – mg | BLK. CORR. mg |
| NET WT. 15.2 mg | NET WT. 17.8 mg | NET WT. 1.7 mg | NET WT. mg |
| FILTER NO. 92514 | FILTER NO. 92501 | FILTER NO. | FILTER NO. |
| FINAL WT. 0.5468 g | FINAL WT. 0.3982 g | FINAL WT. g | FINAL WT. g |
| TARE WT. 0.3502 g | TARE WT. 0.3240 g | TARE WT. g | TARE WT. g |
| WT. GAIN 196.6 mg | WT. GAIN 74.2 mg | WT. GAIN mg | WT. GAIN mg |
| BLK. GAIN 0.0 mg | BLK. GAIN 0.0 mg | BLK. GAIN mg | BLK. GAIN mg |
| NET WT. 196.6 mg | NET WT. 74.2 mg | NET WT. mg | NET WT. mg |
| TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. | TOTAL PARTICULATE WTS. |
| FILTER 196.6 mg | FILTER 74.2 mg | FILTER mg | FILTER mg |
| WASH 15.2 mg | WASH 17.8 mg | WASH mg | WASH mg |
| TOTAL 211.8 mg | TOTAL 92.0 mg | TOTAL mg | TOTAL mg |

# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-001 Respectfully Submitted:

RUN 1 - STACK 2 1-A, 1-B, 1-C

Date Sampled 09/22/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 18819* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

SGS Member of the SGS Group (Société Générale de Surveillance)

# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-002

Respectfully Submitted:
RCM

RUN 2 - STACK 2 2-A, 2-B, 2-C

Date Sampled 09/22/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 43404* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-002

Respectfully Submitted:

RCMurphy

RUN 2 - STACK 2 2-A, 2-B, 2-C

Date Sampled 09/22/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Matrix Spike (% Recovery) | 103.4 | ---- | % | MTD12 | 10/13/92 14:00 RP |

Matrix spike performed by method of additions as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-003

Respectfully Submitted:

RFM-TG

RUN 3 - STACK 2 3-A, 3-B, 3-C

Date Sampled 09/22/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 10419* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
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## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-004 Respectfully Submitted:

RCM

RUN 1 - STACK 4 4-A, 4-B, 4-C

Date Sampled 09/23/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 19729* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-005

Respectfully Submitted:

RCM

RUN 2 - STACK 4 5-A, 5-B, 5-C

Date Sampled 09/23/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Matrix Spike (% Recovery) | 103.6 | ---- | % | MTD12 | 10/13/92 14:00 RP |

Matrix spike performed by method of additions as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

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## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-005

Respectfully Submitted: R C M

RUN 2 - STACK 4 5-A, 5-B, 5-C

Date Sampled 09/23/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 32829* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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3M LAR-TTL

# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-006

Respectfully Submitted:

RCM

RUN 3 - STACK 4 6-A, 6-B, 6-C

Date Sampled 09/23/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 6405* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-007

Respectfully Submitted:

RCM

RUN 1 - STACK 1 7-A, 7-B, 7-C

Date Sampled 09/23/92
Date Received 10/09/92

Sampled by CLIENT

101592 1539

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 19589* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-008

Respectfully Submitted:

RCM-TL

RUN 2 - STACK 1 8-A, 8-B, 8-C

Date Sampled 09/24/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Matrix Spike (% Recovery) | 98.4 | ---- | % | MTD12 | 10/13/92 14:00 RP |

Matrix spike performed by method of additions as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

SGS Member of the SGS Group (Société Générale de Surveillance)

# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-008

Respectfully Submitted:

RUN 2 - STACK 1 8-A, 8-B, 8-C

Date Sampled 09/24/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 27154* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

SGS Member of the SGS Group (Société Générale de Surveillance)

# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-009

Respectfully Submitted:

RCMurphy

RUN 1 - STACK 1 9-A, 9-B, 9-C

Date Sampled 09/24/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 4037* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

SGS Member of the SGS Group (Societé Générale de Surveillance)

# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-010

Respectfully Submitted: RCM

RUN 2 - STACK 1 10-A, 10-B, 10-C

Date Sampled 09/24/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Matrix Spike (% Recovery) | 98.8 | ---- | % | MTD12 | 10/13/92 14:00 RP |

Matrix spike performed by method of additions as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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3M LAR-TTL

# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-010

Respectfully Submitted:

RCM

RUN 2 - STACK 1 10-A, 10-B, 10-C

Date Sampled 09/24/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 27354* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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LAR-TTL

# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-011 Respectfully Submitted:

RCM

RUN 3 - STACK 1 11-A, 11-B, 11-C

Date Sampled 09/24/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 3897* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-012 Respectfully Submitted:

RUN 1 - STACK 3 12-A, 12-B, 12-C

Date Sampled 09/25/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 23419* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-013

Respectfully Submitted:
RCM

RUN 2 - STACK 3 13-A, 13-B, 13-C

Date Sampled 09/25/92
Date Received 10/09/92

101592 1602

Sampled by CLIENT

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 81229* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

A DIVISION OF COMMERCIAL TESTING & ENGINEERING CO.

## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-013

Respectfully Submitted:

RUN 2 - STACK 3 13-A, 13-B, 13-C

Date Sampled 09/25/92
Date Received 10/09/92

Sampled by CLIENT

101592 1602

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Matrix Spike (% Recovery) | 96.9 | ---- | -% | MTD12 | 10/13/92 14:00 RP |

Matrix spike performed by method of additions as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
4440 GLEN ESTE-WITHAMSVILLE ROAD, SUITE 900, CINCINNATI, OHIO 45245 — TELEPHONE 513-752-9696

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# TECHNICAL TESTING LABORATORIES

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## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-014 Respectfully Submitted:

RCM

RUN 3 - STACK 3 14-A, 14-B, 14-C

Date Sampled 09/25/92
Date Received 10/09/92

Sampled by CLIENT

101592 1602

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 24269* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

NOTE: Results reflect subtraction of the blank.

Reference Method 12, 40 CFR, Part 60, Appendix A.

*Analytical Result is the average of three determinations as specified in Method 12.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
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## LABORATORY ANALYSIS REPORT

Robert F. Folle
FUGRO-McCLELLAND ENVIRONMENTAL

Laboratory Number 292-10-0207-015 Respectfully Submitted:

FB 15-A, 15-B, 15-C

Date Sampled 09/25/92
Date Received 10/09/92

Sampled by CLIENT

101592 1503

Determination of Inorganic Lead
Emissions from Stationary Sources

| PARAMETER | RESULT | MDL | UNITS | METHOD | ANALYZED DATE/TIME/ANALYST |
|---|---|---|---|---|---|
| Lead | 21.0* | 3.0 | UG | MTD12 | 10/13/92 14:00 RP |

Reference Method 12, 40 CFR, Part 60, Appendix A.

1258 GREENBRIER STREET, CHARLESTON, WEST VIRGINIA 25311 — TELEPHONE 304-346-0725
4643 BENSON AVENUE, BALTIMORE, MARYLAND 21227 — TELEPHONE 410-247-7400
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10-0207-001 / 015

# CHAIN OF CUSTODY RECORD

| PROJECT NO. | PROJECT NAME | LOCATION |
|---|---|---|
| 1456 | Chemetco | HARTFORD, IL |

| SAMPLE IDENTIFICATION | DATE | TIME | ANALYSES REQUESTED A | B | C | D | E | F | SAMPLE TYPE (Water, Soil, etc.) | CONTAINERS/ PRESERVATIVES G | H | I | J | K | L | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-A | 9-22 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 1 - STACK 2 001 |
| 1-B | 9-22 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " 002 |
| 1-C | 9-22 | | ✓ | | | | | | .1N Nitric | | | ✓ | | | | " " 003 |
| 2-A | 9-22 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 2 - STACK 2 004 |
| 2-B | 9-22 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " 005 |
| 2-C | 9-22 | | ✓ | | | | | | .1 N Nitric | | | ✓ | | | | " " 006 |
| 3-A | 9-22 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 3 - STACK 2 007 |
| 3-B | 9-22 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " 008 |
| 3-C | 9-22 | | ✓ | | | | | | .1 N NITRIC | | | ✓ | | | | " " 009 |
| 4-A | 9-23 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 1 - STACK 4 010 |
| 4-B | 9-23 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " 011 |
| 4-C | 9-23 | | ✓ | | | | | | .1N NITRIC | | | ✓ | | | | " " 012 |
| 5-A | 9-23 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 2 - STACK 4 013 |
| 5-B | 9-23 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " 014 |
| 5-C | 9-23 | | ✓ | | | | | | .1 N NITRIC | | | ✓ | | | | " " 015 |
| | | | ✓ | | | | | | | | | | | | | |

| Relinquished By (signature) | Date | Time | Received By (signature) |
|---|---|---|---|
| [signature] | 10-8-92 | 4:00 | FED EX |
| FED EX | 10-8-92 | 1000 | [signature] |

| Analyses Requested | Containers/ Preservatives |
|---|---|
| A LEAD/MIX | G FILTER/PETRI |
| B | H RESIDUE/BEAKER |
| C | I .1 N Nitric / JAR |
| D | J |
| E | K |

Turner & McClelland
9921 St Charles Rock
St Ann, MO 63074
Phone: 314-228-8880
Fax: 314-228-8719

10-207-016/030

# CHAIN OF CUSTODY RECORD

PROJECT NO. 1456

PROJECT NAME Chemetco

LOCATION HARTFORD, IL

| SAMPLE IDENTIFICATION | DATE | TIME | ANALYSES REQUESTED A | B | C | D | E | F | SAMPLE TYPE (Water, Soil, etc.) | CONTAINERS/ PRESERVATIVES G | H | I | J | K | L | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6-A | 9-23 | | ✓ | | | | | | | ✓ | | | | | | RUN 3 - STACK 4 016 |
| 6-B | 9-23 | | ✓ | | | | | | | | ✓ | | | | | " " 017 |
| 6-C | 9-23 | | ✓ | | | | | | | | | ✓ | | | | " " 018 |
| 7-A | 9-23 | | ✓ | | | | | | | ✓ | | | | | | RUN 1 - STACK 1 019 |
| 7-B | 9-23 | | ✓ | | | | | | | | ✓ | | | | | " " 020 |
| 7-C | 9-23 | | ✓ | | | | | | | | | ✓ | | | | " " 021 |
| 8-A | 9-23 | | ✓ | | | | | | | ✓ | | | | | | RUN 2 - STACK 1 022 |
| 8-B | 9-23 | | ✓ | | | | | | | | ✓ | | | | | " " 023 |
| 8-C | 9-23 | | ✓ | | | | | | | | | ✓ | | | | " " 024 |
| 9-A | 9-24 | | ✓ | | | | | | | ✓ | | | | | | RUN 1 - STACK 1 025 |
| 9-B | 9-24 | | ✓ | | | | | | | | ✓ | | | | | " " 026 |
| 9-C | 9-24 | | ✓ | | | | | | | | | ✓ | | | | " " 027 |
| 10-A | 9-24 | | ✓ | | | | | | | ✓ | | | | | | RUN 2 - STACK 1 028 |
| 10-B | 9-24 | | ✓ | | | | | | | | ✓ | | | | | " " 029 |
| 10-C | 9-24 | | ✓ | | | | | | | | | ✓ | | | | " " 030 |

| Relinquished By (signature) | Date | Time | Received By (signature) |
|---|---|---|---|
| [signature] | 10-8-92 | 4:00 | FED EX |
| FED EX | 10-9-92 | 1100 | [signature] |

Analyses Requested
A LEAD/M12
B
C
D
E

Containers/ Preservatives
G FILTER/PETRI
H RESIDUE/BEAKER
I 1N NITRIC/JAR
J
K

Turner & McClelland
9921 St Charles Rock
St Ann, MO 63074
Phone: 314-228-8880
Fax: 314-228-8719

10-0207-031/045

# CHAIN OF CUSTODY RECORD

| PROJECT NO. | PROJECT NAME | LOCATION |
|---|---|---|
| 1456 | Chemtco | HARTFORD, IL |

| SAMPLE IDENTIFICATION | DATE | TIME | ANALYSES REQUESTED A | B | C | D | E | F | SAMPLE TYPE (Water, Soil, etc.) | CONTAINERS/ PRESERVATIVES G | H | I | J | K | L | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-A | 9-24 | | ✓ | | | | | | | ✓ | | | | | | RUN 3 - Stack 1 031 |
| 11-B | 9-24 | | ✓ | | | | | | | | ✓ | | | | | " - " 032 |
| 11-C | 9-24 | | ✓ | | | | | | | | | ✓ | | | | " - " 033 |
| 12-A | 9-25 | | ✓ | | | | | | | ✓ | | | | | | RUN 1 - Stack 3 034 |
| 12-B | 9-25 | | ✓ | | | | | | | | ✓ | | | | | " " 035 |
| 12-C | 9-25 | | ✓ | | | | | | | | | ✓ | | | | " " 036 |
| 13-A | 9-25 | | ✓ | | | | | | | ✓ | | | | | | RUN 2 Stack 3 037 |
| 13-B | 9-25 | | ✓ | | | | | | | | ✓ | | | | | " " 038 |
| 13-C | 9-25 | | ✓ | | | | | | | | | ✓ | | | | " " 039 |
| 14-A | 9-25 | | ✓ | | | | | | | ✓ | | | | | | RUN 3 Stack 3 040 |
| 14-B | 9-25 | | ✓ | | | | | | | | ✓ | | | | | " " 041 |
| 14-C | 9-25 | | ✓ | | | | | | | | | ✓ | | | | " " 042 |
| 15-A | 9-25 | | ✓ | | | | | | | ✓ | | | | | | FB 043 |
| 15-B | 9-25 | | ✓ | | | | | | | | ✓ | | | | | FB 044 |
| 15-C | 9-25 | | ✓ | | | | | | | | | ✓ | | | | FB 045 |

| Relinquished By (signature) | Date | Time | Received By (signature) |
|---|---|---|---|
| [signature] | 10-8-92 | 4:00 | FED EX |
| FED EX | 10-9-92 | 1000 | [signature] |

| Analyses Requested | Containers/ Preservatives |
|---|---|
| A LEAD / M12 | G FILTER / PETRI |
| B | H RESIDUE / BEAKER |
| C | I 1:1 N Nitric / JAR |
| D | J |
| E | K |

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St Ann, MO 63074
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Fax: 314-228-8719

# APPENDIX C

## Chain of Custody

# CHAIN OF CUSTODY RECORD

PROJECT NO. 1456 | PROJECT NAME Chemetco | LOCATION HARTFORD, IL

| SAMPLE IDENTIFICATION | DATE | TIME | ANALYSES REQUESTED A | B | C | D | E | F | SAMPLE TYPE (Water, Soil, etc.) | CONTAINERS/ PRESERVATIVES G | H | I | J | K | L | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-A | 9-22 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 1 - STACK 2 |
| 1-B | 9-22 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " |
| 1-C | 9-22 | | ✓ | | | | | | .1N Nitric | | | ✓ | | | | " " |
| 2-A | 9-22 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 2 - STACK 2 |
| 2-B | 9-22 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " |
| 2-C | 9-22 | | ✓ | | | | | | .1 N Nitric | | | ✓ | | | | " " |
| 3-A | 9-22 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 3 - STACK 2 |
| 3-B | 9-22 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " |
| 3-C | 9-22 | | ✓ | | | | | | .1 N NITRIC | | | ✓ | | | | " " |
| 4-A | 9-23 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 1 - STACK 4 |
| 4-B | 9-23 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " |
| 4-C | 9-23 | | ✓ | | | | | | .1N NITRIC | | | ✓ | | | | " " |
| 5-A | 9-23 | | ✓ | | | | | | FILTER | ✓ | | | | | | RUN 2 - STACK 4 |
| 5-B | 9-23 | | ✓ | | | | | | RESIDUE | | ✓ | | | | | " " |
| 5-C | 9-23 | | ✓ | | | | | | .1 N NITRIC | | | ✓ | | | | " " |
| | | | ✓ | | | | | | | | | | | | | |

| Relinquished By (signature) | Date | Time | Received By (signature) |
|---|---|---|---|
| [signature] | 10-8-92 | 4:00 | FED EX |
| FED EX | | | |

Analyses Requested
A LEAD/MIZ
B
C
D
E
F

Containers/ Preservatives
G FILTER/PETRI
H RESIDUE/BEAKER
I .1 N Nitric / JAR
J
K
L

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St Ann, MO 63074
Phone: 314-228-8880
Fax: 314-228-8719

CHCUSTFM SYD

# CHAIN OF CUSTODY RECORD

PROJECT NO. 1456 | PROJECT NAME Chemetco | LOCATION HARTFORD, IL

| SAMPLE IDENTIFICATION | DATE | TIME | ANALYSES REQUESTED A | B | C | D | E | F | SAMPLE TYPE (Water, Soil, etc.) | CONTAINERS/ PRESERVATIVES G | H | I | J | K | L | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6-A | 9-23 | | ✓ | | | | | | | ✓ | | | | | | RUN 3 - STACK 4 |
| 6-B | 9-23 | | ✓ | | | | | | | | ✓ | | | | | " " |
| 6-C | 9-23 | | ✓ | | | | | | | | | ✓ | | | | " " |
| 7-A | 9-23 | | ✓ | | | | | | | ✓ | | | | | | RUN 1 - STACK 1 |
| 7-B | 9-23 | | ✓ | | | | | | | | ✓ | | | | | " " |
| 7-C | 9-23 | | ✓ | | | | | | | | | ✓ | | | | " " |
| 8-A | 9-23 | | ✓ | | | | | | | ✓ | | | | | | RUN 2 - STACK 1 |
| 8-B | 9-23 | | ✓ | | | | | | | | ✓ | | | | | " " |
| 8-C | 9-23 | | ✓ | | | | | | | | | ✓ | | | | " " |
| 9-A | 9-24 | | ✓ | | | | | | | ✓ | | | | | | RUN 1 - STACK 1 |
| 9-B | 9-24 | | ✓ | | | | | | | | ✓ | | | | | " " |
| 9-C | 9-24 | | ✓ | | | | | | | | | ✓ | | | | " " |
| 10-A | 9-24 | | ✓ | | | | | | | ✓ | | | | | | RUN 2 - STACK 1 |
| 10-B | 9-24 | | ✓ | | | | | | | | ✓ | | | | | " " |
| 10-C | 9-24 | | ✓ | | | | | | | | | ✓ | | | | " " |
| | | | | | | | | | | | | | | | | |

| Relinquished By (signature) | Date | Time | Received By (signature) |
|---|---|---|---|
| [signature] | 10-8-92 | 4:00 | FED EX |
| FED EX | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Analyses Requested
A LEAD/M12
B
C
D
E
F

Containers/ Preservatives
G FILTER/PETRI
H RESIDUE/BEAKER
I .1N NITRIC/JAR
J
K
L

Tuerro & McClelland
9921 St Charles Rock Rd.
St Ann, MO 63074
Phone: 314-228-8880
Fax: 314-228-8719

CHCUSTDY

# CHAIN OF CUSTODY RECORD

| PROJECT NO. | PROJECT NAME | LOCATION |
|---|---|---|
| 1456 | Chemtco | HARTFORD, IL |

| SAMPLE IDENTIFICATION | DATE | TIME | ANALYSES REQUESTED A | B | C | D | E | F | SAMPLE TYPE (Water, Soil, etc.) | CONTAINERS/ PRESERVATIVES G | H | I | J | K | L | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11-A | 9-24 | | ✓ | | | | | | | ✓ | | | | | | RUN 3 - Stack 1 |
| 11-B | 9-24 | | ✓ | | | | | | | | ✓ | | | | | " - " |
| 11-C | 9-24 | | ✓ | | | | | | | | | ✓ | | | | " - " |
| 12-A | 9-25 | | ✓ | | | | | | | ✓ | | | | | | RUN 1 - Stack 3 |
| 12-B | 9-25 | | ✓ | | | | | | | | ✓ | | | | | " " |
| 12-C | 9-25 | | ✓ | | | | | | | | | ✓ | | | | " " |
| 13-A | 9-25 | | ✓ | | | | | | | ✓ | | | | | | RUN 2 Stack 3 |
| 13-B | 9-25 | | ✓ | | | | | | | | ✓ | | | | | " " |
| 13-C | 9-25 | | ✓ | | | | | | | | | ✓ | | | | " " |
| 14-A | 9-25 | | ✓ | | | | | | | ✓ | | | | | | RUN 3 Stack 3 |
| 14-B | 9-25 | | ✓ | | | | | | | | ✓ | | | | | " " |
| 14-C | 9-25 | | ✓ | | | | | | | | | ✓ | | | | " " |
| 15-A | 9-25 | | ✓ | | | | | | | ✓ | | | | | | FB |
| 15-B | 9-25 | | ✓ | | | | | | | | ✓ | | | | | FB |
| 15-C | 9-25 | | ✓ | | | | | | | | | ✓ | | | | FB |
| | | | | | | | | | | | | | | | | |

| Relinquished By (signature) | Date | Time | Received By (signature) |
|---|---|---|---|
| [signature] | 10-8-92 | 4:00 | FED EX |
| FED EX | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| Analyses Requested | Containers/ Preservatives |
|---|---|
| A LEAD / M12 | G FILTER / PETRI |
| B | H RESIDUE / BEAKER |
| C | I .1 N Nitric / JAR |
| D | J |
| E | K |
| F | L |

TUERD & McClelland
9921 St Charles Rock Rd.
St Ann, MO 63074
Phone: 314-228-8880
Fax: 314-228-8719

CHCLUSTFM SYC

# APPENDIX D

## Calibration Gas Certifications

# Scott Specialty Gases

a division of Scott Environmental Technology, Inc.

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Shipped From : Scott Troy

Our Project # : 536151

Your P.O. # : 1476

Expiration Date : 10-30-93

Cylinder Number ALM-014617

Cylinder Pressure 1900 psig

1 of 1 Component(s)

Customer :
FUGRO MCCLELLAND
9921 ST. CHARLES ROCK RD.
ST. ANN, MO. 63074

#### CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES ####
PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Protocol # 1 — Procedure # G1

File # PO-3112

Certified Accuracy 1 % NBS Traceable

| COMPONENT | CERTIFIED CONC. | REFERENCE STD: SRM # (CRM #) | REFERENCE STD: CYLINDER NUMBER | REFERENCE STD: CONC. | GAS ANALYZER: MAKE/MODEL/SERIAL # | GAS ANALYZER: LAST CALIBRATION DATE | ANALYTICAL PRINCIPLE |
|---|---|---|---|---|---|---|---|
| OXYGEN | 12.05 % | 2659 | AAL-18571 | 20.67 % | BECKMAN/755/1001192 | 3-25-92 | PARAMAGNETIC |
| | | 2658 | AAL-18521 | 10.08 % | | | |

BALANCE GAS : NITROGEN

EPA PROTOCOL

ANALYSIS — DATE : 4-30-92

| ZERO GAS (mV) | TEST GAS (mV) | RESULTS % | REFERENCE GAS CONC. | REFERENCE GAS (mV) | RESULTS % |
|---|---|---|---|---|---|
| 0.00 | 57.20 | 12.05 | 20.67 % | 98.20 | 20.67 |
| 0.00 | 57.20 | 12.05 | | 98.20 | 20.67 |
| 0.00 | 57.20 | 12.05 | | 98.20 | 20.67 |

CALCULATED RESULTS 12.05, 12.05, 12.05

AVERAGE : 12.05 %

CALIBRATION CURVE — 1 st DEGREE

| SRM # (CRM #) | CONC. % | SPLIT PT (%) | DVM (mV) | FITTED VALUE | PERCENT ERROR |
|---|---|---|---|---|---|
| 2659 | 20.67 | 100 | 98.20 | 20.67 | -0.00 |
| 2658 | 10.08 | 49 | 47.80 | 10.08 | -0.02 |
| GMIS | 9.994 | 48 | 47.20 | 9.951 | -0.43 |
| GMIS | 6.018 | 29 | 28.40 | 6.000 | -0.30 |
| GMIS | 3.007 | 15 | 14.10 | 2.995 | -0.41 |
| | 0.0000 | 0 | 0.00 | 0.0000 | 0.00 |
| | | 0 | | 0.00 | 0.00 |
| 2658 | 10.08 | LOW | 47.80 | 10.08 | -0.02 |
| 2659 | 20.67 | HIGH | 98.20 | 20.67 | -0.00 |

: GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : L Doran

Approved By : C Shapiro

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost

# Scott Specialty Gases

a division of Scott Environmental Technology, Inc.

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Shipped From : Scott Troy

Our Project # : 536151

Your P.O. # : 1476

Expiration Date : 10-30-93

Cylinder Number AAL-4557

Cylinder Pressure 1900 psig

1 of 1 Component(s)

Customer :
FUGRO MCCLELLAND
9921 ST. CHARLES ROCK RD.
ST. ANN, MO. 63074

#### CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES ####
PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Protocol # 1 — Procedure # G1

File # PO-3113

Certified Accuracy 1 % NBS Traceable

| COMPONENT | CERTIFIED CONC. | REFERENCE STD: SRM # (CRM #) | REFERENCE STD: CYLINDER NUMBER | REFERENCE STD: CONC. | GAS ANALYZER: MAKE/MODEL/SERIAL # | GAS ANALYZER: LAST CALIBRATION DATE | ANALYTICAL PRINCIPLE |
|---|---|---|---|---|---|---|---|
| OXYGEN | 18.19 % | 2659 | AAL-18571 | 20.67 % | BECKMAN/755/1001192 | 3-25-92 | PARAMAGNETIC |
| | | 2658 | AAL-18521 | 10.08 % | | | |

BALANCE GAS : NITROGEN

EPA PROTOCOL

ANALYSIS — DATE : 4-30-92

| ZERO GAS (mV) | TEST GAS (mV) | RESULTS % | REFERENCE GAS CONC. | REFERENCE GAS (mV) | RESULTS % |
|---|---|---|---|---|---|
| 0.00 | 86.40 | 18.19 | 20.67 % | 98.20 | 20.67 |
| 0.00 | 86.40 | 18.19 | | 98.20 | 20.67 |
| 0.00 | 86.40 | 18.19 | | 98.20 | 20.67 |

CALCULATED RESULTS 18.19, 18.19, 18.19

AVERAGE : 18.19 %

CALIBRATION CURVE — 1 st DEGREE

| SRM # (CRM #) | CONC. % | SPLIT PT (%) | DVM (mV) | FITTED VALUE | PERCENT ERROR |
|---|---|---|---|---|---|
| 2659 | 20.67 | 100 | 98.20 | 20.67 | -0.00 |
| 2658 | 10.08 | 49 | 47.80 | 10.08 | -0.02 |
| GMIS | 9.994 | 48 | 47.20 | 9.951 | -0.43 |
| GMIS | 6.018 | 29 | 28.40 | 6.000 | -0.30 |
| GMIS | 3.007 | 15 | 14.10 | 2.995 | -0.41 |
| | 0.0000 | 0 | 0.00 | 0.0000 | 0.00 |
| | | 0 | | 0.00 | 0.00 |
| 2658 | 10.08 | LOW | 47.80 | 10.08 | -0.02 |
| 2659 | 20.67 | HIGH | 98.20 | 20.67 | -0.00 |

: GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : T Dorr

Approved By : L Shapiro

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost

# Scott Specialty Gases

a division of Scott Environmental Technology, Inc.

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Shipped from : Scott Michigan

Our Project # : 336151

Your P.O. # : 1476

Expiration Date : 10-30-93

Cylinder Number : AAL-5523

Cylinder Pressure 1900 psig

1 of 1 Component(s)

Customer :
FUGRO MCCLELLAND
9921 ST. CHARLES ROCK RD.
ST. ANN, MO. 63074

## CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES

PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Protocol # 1

Procedure # G1

File # PO-3110

Certified Accuracy 1 % NBS Traceable

### ANALYZED CYLINDER

| COMPONENT | CERTIFIED CONC. |
|---|---|
| CARBON DIOXIDE | 12.19 % |

BALANCE GAS : NITROGEN

### REFERENCE STD

| SRM # (CRM #) | CYLINDER NUMBER | CONC. |
|---|---|---|
| 1675 | ALM-001324 | 14.02 % |
| GMIS* | ALM-004805 | 18.35 % |
| GMIS | XA-1793 | 5.013 % |

### INSTRUMENTATION

| INSTR/MODEL/SERIAL # | LAST CALIBRATION DATE | ANALYTICAL PRINCIPLE |
|---|---|---|
| HORIBA PIR-2000 | 4-20-92 | NON-DISPERSIVE INFRARED |

EPA PROTOCOL

### ANALYSIS

DATE : 4-30-92

| ZERO GAS (mV) | TEST GAS (mV) | RESULTS % | REFERENCE GAS CONC. | (mV) | RESULTS % |
|---|---|---|---|---|---|
| 0.00 | 101.00 | 12.20 | 14.02 % | 110.50 | 14.03 |
| 0.00 | 101.00 | 12.20 | | 110.50 | 14.03 |
| 0.00 | 101.00 | 12.20 | | 110.50 | 14.03 |

CALCULATED RESULTS 12.19, 12.19, 12.19

AVERAGE : 12.19 %

### CALIBRATION CURVE 3 rd DEGREE

| SRM # (CRM #) | CONC. % | SPLIT PT (%) | DVM (mV) | FITTED VALUE | PERCENT ERROR |
|---|---|---|---|---|---|
| GMIS | 18.35 | 100 | 130.00 | 18.34 | -0.00 |
| 1675 | 14.02 | 76 | 110.50 | 14.03 | 0.08 |
| GMIS | 9.999 | 55 | 88.30 | 9.992 | -0.07 |
| GMIS | 5.013 | 27 | 52.30 | 5.017 | 0.07 |
| | 0.0000 | 0 | 0.00 | 0.0000 | 0.00 |
| | | 0 | | 0.0000 | 0.00 |
| | | 0 | | 0.00 | 0.00 |
| GMIS | 5.013 | LOW | 52.30 | 5.017 | 0.07 |
| 1675 | 14.02 | HIGH | 110.50 | 14.03 | 0.08 |

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : T. Moran

Approved By : L. Shapiro

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost

# Scott Specialty Gases

a division of Scott Environmental Technology, Inc.

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Shipped From : Scott Michigan

Our Project # : 536151

Your P.O. # : 1476

Expiration Date : 10-30-93

Cylinder Number : ALM-013045

Cylinder Pressure 1900 psig

1 of 1 Component(s)

Customer :
FUGRO MCCLELLAND
9921 ST. CHARLES ROCK RD.
ST. ANN, MO. 63074

* * * * CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES * * * *
PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Protocol # 1

Procedure # G1

File # PO-3111

Certified Accuracy 1 % NBS Traceable

| ANALYZED CYLINDER | | REFERENCE STD | | | INSTRUMENTATION | | |
|---|---|---|---|---|---|---|---|
| COMPONENT | CERTIFIED CONC. | SRM # (CRM #) | CYLINDER NUMBER | CONC. | INSTR/MODEL/SERIAL # | LAST CALIBRATION DATE | ANALYTICAL PRINCIPLE |
| CARBON DIOXIDE | 18.33 % | 1675 | ALM-001324 | 14.02 % | HORIBA PIR-2000 | 4-20-92 | NON-DISPERSIVE INFRARED |
| | | GMIS# | ALM-004805 | 18.35 % | | | |
| | | GMIS | XA-1793 | 5.013 % | | | |

BALANCE GAS : NITROGEN

ANALYSIS DATE : 4-30-92

| ZERO GAS (mV) | TEST GAS (mV) | RESULTS % | REFERENCE GAS CONC. | (mV) | RESULTS % |
|---|---|---|---|---|---|
| 0.00 | 129.90 | 18.32 | 18.35 % | 130.00 | 18.34 |
| 0.00 | 129.90 | 18.32 | | 130.00 | 18.34 |
| 0.00 | 129.90 | 18.32 | | 130.00 | 18.34 |

CALCULATED RESULTS 18.33
18.33
18.33

AVERAGE : 18.33 %

CALIBRATION CURVE 3 rd DEGREE

| SRM # (CRM #) | CONC. % | SPLIT PT (%) | DVM (mV) | FITTED VALUE | PERCENT ERROR |
|---|---|---|---|---|---|
| GMIS | 18.35 | 100 | 130.00 | 18.34 | -0.00 |
| 1675 | 14.02 | 76 | 110.50 | 14.03 | 0.08 |
| GMIS | 9.999 | 55 | 88.30 | 9.992 | -0.07 |
| GMIS | 5.013 | 27 | 52.30 | 5.017 | 0.07 |
| | 0.0000 | 0 | 0.00 | 0.0000 | 0.00 |
| | | 0 | | 0.0000 | 0.00 |
| | | 0 | | 0.00 | 0.00 |
| GMIS | 5.013 | LOW | 52.30 | 5.017 | 0.07 |
| 1675 | 14.02 | HIGH | 110.50 | 14.03 | 0.08 |

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : F. Doran

Approved By : L. Shapiro

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without

# APPENDIX E

## Equipment Calibrations

nutech CORPORATION

(919) 544-8535

COPY

# CALIBRATION SHEET

Customer : Fugro-McClelland
Date : 5/1/92

Serial : 80572

| CALCULATION DATA FOR RUN : | 1 | 2 | 3 |
|---|---|---|---|
| 1. Barometric Pressure, P(B): | 29.92 | 29.92 | 29.92 |
| 2. Orifice Setting, Delta H : | 0.75 | 2.00 | 6.00 |
| 3. Finial Reading (Test) : | 71.098 | 82.096 | 92.833 |
| 4. Initial Reading (Test) : | 60.934 | 71.320 | 82.595 |
| 5. Volume, V(T) Cubic Feet : | 10.164 | 10.776 | 10.238 |
| 6. Temp Initial T(T(I)) F : | 75 | 76 | 77 |
| 7. Temp Finial T(T(F)) F : | 76 | 77 | 77 |
| 8. Finial Reading (Box) : | 70.891 | 82.008 | 92.778 |
| 9. Initial Reading (Box) : | 60.600 | 71.100 | 82.506 |
| 10. Volume, V(B) Cubic Feet : | 10.291 | 10.908 | 10.272 |
| 11. Temp Initial T(B(I)) F : | 77 | 81 | 85 |
| 12. Temp Final T(B(F)) F : | 80 | 85 | 90 |
| 13. Elapsed Time, Minutes : | 22.0 | 14.5 | 8.0 |
| Delta H(a) : | 1.9825 | 2.0337 | 2.0444 |
| Gamma : | 0.9914 | 0.9950 | 1.0014 |

Calibration Performed By : Chris A. Dehn

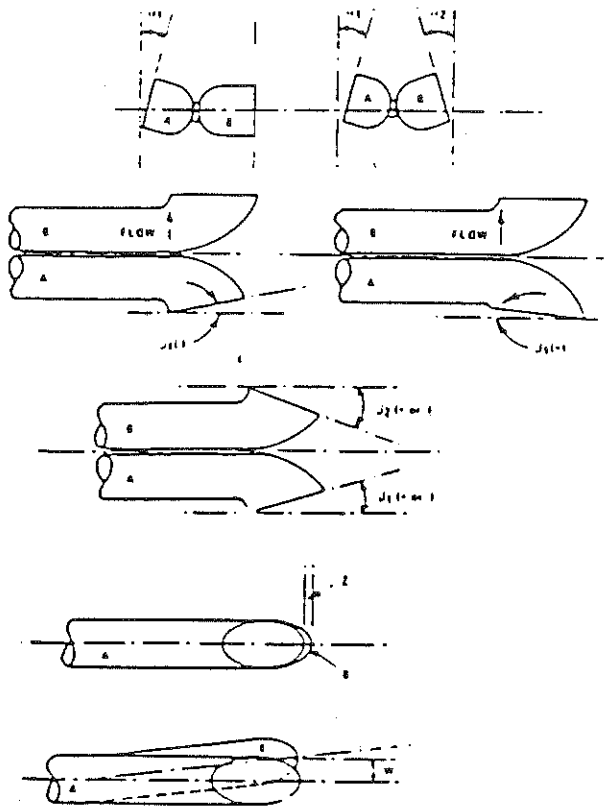
4022 Stirrup Creek Road • Suite 325 • Durham, N.C. 27703 • (800) 637-6312 • FAX (919) 544-3770

FUGRO McClelland

TYPE S PITOT TUBE CALIBRATION

PITOT TUBE SS 3A

DATE 8-3-92

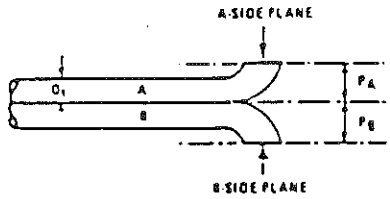



Are $a_1$ and $a_2$ < 10°? Yes No

Are $B_1$ and $B_2$ < 5°? Yes No

Is Z < 1/8 inch? Yes No

Is W < 1/32 inch? Yes No




External tube diameter ($D_t$) .26

Is $D_t$ between 3/16 and 3/8 in.? Yes No

Base-to-opening plane distances:

$P_A$ .375

$P_B$ .375

Does $P_A = P_b$ ? Yes No

Is $1.05\ D_t \leq P \leq 1.50\ D_t$ ?

.273 ≤ .375 ≤ .370 Yes No

When pitot tube is part of an assembly:

Is the thermocouple 2 inches behind the pitot tube opening? Yes No

Does the pitot tube extend 3 inches beyond the compression fitting on the nozzle? Yes No

Is the distance between the nozzle and the pitot tube more than 3/4 inch when a ½ inch nozzle is in place? Yes No

If any answer is no, the pitot tube must be calibrated in a wind tunnel against a standard type pitot tube.

If all answers are yes, the pitot tube may be assigned a baseline coefficient of 0.84.

Assigned Baseline Coefficient .84

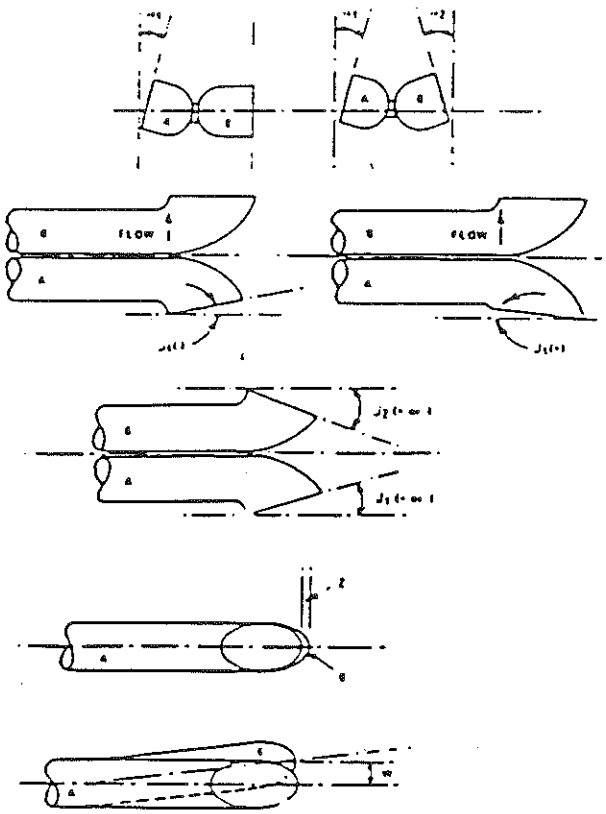
Signature Robert Y. Fowler

FUGRO ⊡ McClelland

TYPE S PITOT TUBE CALIBRATION

PITOT TUBE SS 3B

DATE 8-3-92

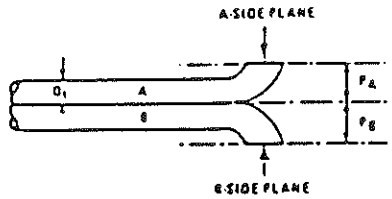



Are $a_1$ and $a_2$ < 10°? (Yes) No

Are $B_1$ and $B_2$ < 5°? (Yes) No

Is Z < 1/8 inch? (Yes) No

Is W < 1/32 inch? (Yes) No




External tube diameter ($D_t$) .26

Is $D_t$ between 3/16 and 3/8 in.? (Yes) No

Base-to-opening plane distances:

$P_A$ .375

$P_B$ .375

Does $P_A = P_b$ ? (Yes) No

Is $1.05\ D_t \leq P \leq 1.50\ D_t$ ?

.273 ≤ .375 ≤ .390 (Yes) No

When pitot tube is part of an assembly:

Is the thermocouple 2 inches behind the pitot tube opening? (Yes) No

Does the pitot tube extend 3 inches beyond the compression fitting on the nozzle? (Yes) No

Is the distance between the nozzle and the pitot tube more than 3/4 inch when a ½ inch nozzle is in place? (Yes) No

If any answer is no, the pitot tube must be calibrated in a wind tunnel against a standard type pitot tube.

If all answers are yes, the pitot tube may be assigned a baseline coefficient of 0.84.

Assigned Baseline Coefficient .84

Signature Robert T. Tillie

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 8-23-92 Thermocouple number 3

Ambient temperature 31 °C Barometric pressure 29.90 in. Hg

Calibrator SCD Reference: mercury-in-glass Fisher Scientific

other

| Reference point number | Source[a] (specify) | Reference thermometer temperature, °C | Thermocouple potentiometer temperature, °C | Temperature difference,[b] % |
|---|---|---|---|---|
| 0° | ice water | 1° | 1° | 0.0 |
| 100° | boiling water | 100.1° | 100.0° | 0.001 |
| — | boiling oil | 225° | 225° | 0.0 |
| | | | | |
| 0° | ice water | 1° | 1.1° | −0.001 |
| 100° | boiling water | 100° | 100.2° | −0.002 |
| — | boiling oil | 226.5° | 226.7° | −0.002 |

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °C} + 273) - (\text{test thermom temp, °C} + 273)}{\text{ref temp, °C} + 273}\right] 100 \leq 1.5\%.$

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 8-23-92 Thermocouple number 4

Ambient temperature 31 °C Barometric pressure 29.90 in. Hg

Calibrator SCD Reference: mercury-in-glass Fisher Scientific

other _____

| Reference point number | Source[a] (specify) | Reference thermometer temperature, °C | Thermocouple potentiometer temperature, °C | Temperature difference,[b] % |
|---|---|---|---|---|
| 0° | ice water | 1° | 1.5° | -0.005 |
| 100° | boiling water | 100° | 100.2 | -0.002 |
| — | boiling oil | 229° | 230.2° | -0.012 |
| 0° | ice water | 1° | 1.3° | -0.003 |
| 100° | boiling water | 100° | 100.3° | -0.003 |
| — | boiling oil | 227° | 227.9° | -0.009 |

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °C} + 273) - (\text{test thermom temp, °C} + 273)}{\text{ref temp, °C} + 273}\right] 100 \leq 1.5\%.$

# METHOD 5: PROBE NOZZLE FIELD CALIBRATION DATA

TUGRO McClelland

| | |
|---|---|
| Nozzle Identification Number: STL 0.30 | |
| Client: CHEMETCO | Project No.: 0801-1456 |
| Source: Furnace 1, 2, 3 & 4 | Date: 9-22-92 |
| Analyst: RTT | Micrometer: STL1 |
| Scale: Inches | Tolerence: |

## CALIBRATION DATA

| Trial Number | Run 1 | Run | Run 3 | Run |
|---|---|---|---|---|
| 1 | 0.300 | | 0.300 | |
| 2 | 0.300 | | 0.300 | |
| 3 | 0.300 | | 0.300 | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| AVERAGE | 0.300 | | 0.300 | |

Comments:

# METHOD 5: PROBE NOZZLE FIELD CALIBRATION DATA

FUGRO McClelland

| | |
|---|---|
| Nozzle Identification Number: STL0.375 | |
| Client: CHEMETCO | Project No.: 0801-1456 |
| Source: Furnace 1, 2, 3 & 4 | Date: 9-22-92 |
| Analyst: RTT | Micrometer: |
| Scale: Inches | Tolerence: |

## CALIBRATION DATA

| Trial Number | Run 2 | Run | Run | Run |
|---|---|---|---|---|
| 1 | 0.375 | | | |
| 2 | 0.375 | | | |
| 3 | 0.375 | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |
| 10 | | | | |
| AVERAGE | 0.375 | | | |

Comments:

# APPENDIX F

Example Calculations, Run #1, Stack #2, 9/22/92

MOISTURE CONTENT DETERMINATION
EPA Method 4 Calculations
TEST RUN #1

| Parameter | | Definition | Unit |
|---|---|---|---|
| Pm | - | Absolute Meter Pressure | in. Hg. |
| Po | - | Average Meter Orifice Differential Pressure | in. H20 |
| Pstd | - | Absolute Standard Barometric Pres{29.92} | in. Hg. |
| Pb | - | Absolute Barometric Pressure | in. Hg. |
| k | - | Standard Volume H20 Vapor/Unit Weight Liquid Constant = 0.04715 cu. ft./g | ft./g |
| Tm(F) | - | Average meter Temperature Degrees F: | degrees (F) - |
| Tm | - | Average Meter Temperature Degrees R: | degrees (R) |
| Tstd | - | Absolute Standard Temperature (528 R) | degrees (R) |
| Y | - | Dry Gas Meter Correction Factor | dimensionless |
| Vlcg | - | Total condensate Collected | grams/ml H20 |
| Vm | - | Metered Dry Sample Gas Volume | dcf |
| Vmstd | - | Volume of Water Vapor Collected at Standard Conditions (528 R, 1 atmosphere | scf |
| Bws | - | Moisture Content (mole fraction) | mole fraction |
| Bwd | - | Moisture Content (% Volume) | % volume |

TEST DATA
RUN # 1

| | | | |
|---|---|---|---|
| Pb | 29.95 | Y | 0.9989 |
| Vm | 40.657 | Tm(F) | 84.166666 |
| Vlcg | 73.5 | Tm | 544.16666 |
| Tstd | 528 | Po | 1.5833333 |
| Pstd | 29.92 | k | 0.04715 |

MOISTURE DETERMINATION CALCULATIONS:

---

1. Meter Pressure:

Pm = (Po/13.6)+Pb
Pm = 1.583333333 divided by 13.6 + 29.95
= 30.06642156 in. Hg.

2. Standard Meter Volume:

$$Vmstd = \frac{17.64*Vm*Y*Pm}{Tm}$$

Vmstd =

$$\frac{17.64 * 40.657 * 0.9989 * 30.06642156}{544.1666666}$$

= 39.58272881 dscf

3. Meter Temperature:

Tm=Tm(F)+460
Tm = 84.16666666 + 460 = 544.1666666 Deg. (R)

4. Standard Water Volume:

Vwstd = k*vlcg
Vwstd = 0.04715 * 73.5 = 3.465525 scf

5a. Moisture Content:

$$Bws = \frac{Vwstd}{Vwstd+Vmstd}$$

$$Bws = \frac{3.465525}{3.465525 + 39.58272881}$$

= 0.080503265 mole frac.

5b. Bwd = Bws*100
Bwd = 0.080503265 * 100 = 8.050326535 % H2O

5c. Dry Gas Fraction:

Fdg = 1 - 0.080503265 = 0.919496734 FDG

---

VELOCITY AND VOLUMETRIC FLOWRATE DETERMINATION
EPA METHOD 2 CALCULATIONS
TEST RUN #1

| Parameter | Definition | | Units |
|---|---|---|---|
| Cp | - Pitot Tube Coefficient | | dimensionless |
| Vs | - Gas Stream Velocity | | ft./second |
| Qsd | - Volumetric Flow Rate at Standard Condition,Dry Basis | | dscfm |
| Qact | - Actual Volumetric Flow Rate, Wet Basis | | acfm |
| Bws | - Moisture Content | | mole fraction |
| Dp | - Average Square Root of Velocity Head | | in. H20 |
| Pb | - Absolute Barometric Pressure | | in. Hg. |
| Kp | - Constant=89.49(ft)(lb/lb-mol)(in.Hg^0.5)/(s)(R) | | in.H20 |
| Ts | - Absolute Gas Stream Temperature (R) | | Degrees (R) |
| Ms | - Sample Gas Molecular Weight, Wet | | lb/lb-mole |
| Sp | - Static Pressure of Gas Stream | | in. H20 |
| Abs | - Absolute Standard Temperature | 528 | degrees R |
| Sd | - Stack Diameter | | in. |
| Csa | - Stack Cross-sectional Area | | ft2 |
| Ps | - Absolute Stack Gas Pressure | | in. Hg. |
| Sm | - Conversion Factor | 60 | sec/min |
| Pi | - Constant Ratio | 3.141592654 | dimensionless |
| Dn | - Nozzle Diameter | | in. |
| An | - Nozzle Area | | ft.2 |
| Tstd | - Absolute Standard Temperature (528) (R) | | degrees R |

TEST DATA
TEST RUN #1

| | | | |
|---|---|---|---|
| Ms | 28.0978 | Cp | 0.84 |
| Bws | 0.0805 | Pb | 29.95 |
| Sp | -0.18 | Ts | 604.20833 |
| Sd | 57.25 | Dp | 0.4574 |
| Tstd | 528 | Dn | 0.3 |

## VELOCITY AND VOLUMETRIC FLOWRATE CALCULATIONS:

1. Stack Pressure:

Ps = Pb+(Sp/13.6)

Ps= 29.95 + -0.18 / 13.6
= 29.93676470 in. Hg.

2. Velocity of Stack Gas:

Vs=85.49 *Cp*Dp*[( SQRT[(Ts)/(Ps*Ms)] 24.580649 29.00269795
Vs=85.49*0.384231225 * 0.847529757
= 27.83959603 ft./sec.

3. Stack Cross-sectional Area:

Csa = (pi)[(Sd)^2]/[(4)(144)]
Csa=3.141592654 * 3277.5625 divided by 576
= 17.87633034 ft.2

4a. Volumetric Flowrate, Wet Basis:

Qact = (Vs*Csa)*60
Qact= 27.83959603 * 1072.579820
= 29860.18890 acfm

4b. Volumetric Flowrate at Standard Conditions, Dry Basis:

$$Qsd = \frac{(Qact)(1-Bws(Tstd)(Ps)}{(Ts)(29.92)} =$$

$$Qsd = \frac{29860.18890 * 0.919496734 * 15806.61176}{18077.91333}$$

= 24006.74219 dscfm

MOLECULAR WEIGHT DETERMINATION
EPA METHOD 3 CALCULATIONS
TEST RUN # 1

| Parameter | | Definition | Units |
|---|---|---|---|
| Md | - | Sample Gas Molecular Weight, Dry Basis | lb/lb-mole |
| Ms | - | Sample Gas Molecular Weight, Wet Basis | lb/lb-mole |
| Bws | - | Moisture Content | mole fraction |
| %O2 | - | Oxygen (O2) Concentration, Dry Basis | % volume |
| %CO2 | - | Carbon Dioxide (CO2) Concentration, Dry Basis | % volume |
| %CO | - | Carbon Monoxide (CO) Concentration, Dry Basis | % volume |
| %N2 | - | Nitrogen (N2) Concentration, D(gas balance) | % volume |
| 0.32 | - | Molecular Weight of Oxygen (O2) divided by 100 | lb/lb-mole |
| 0.44 | - | Molecular Weight of Carbon Dioxide (CO2) / by 100 | lb/lb-mole |
| 0.28 | - | Molecular Weight of Carbon Monoxide (CO) / by 100 | lb/lb-mole |
| 0.28 | - | Molecular Weight of Nitrogen (N2) divided by 100 | lb/lb-mole |
| 18.00 | - | Molecular Weight of Water | lb/lb-mole |

TEST DATA
TEST RUN #1

| | | | |
|---|---|---|---|
| Bws | 0.0805 | %N2 | 79.1 |
| %O2 | 19.7 | | |
| %CO2 | 1.2 | | |
| %CO | 0 | | |

1. MOLECULAR WEIGHT, DRY:

Md = 0.44*%CO2+0.32*%O2+0.28*%N2+%CO

| | | | | | | |
|---|---|---|---|---|---|---|
| 0.528 | + | 6.304 | + | 22.148 | + | 0 |

Md = 28.9800 lb/lb-mole

2. MOLECULAR WEIGHT, WET:

Ms = Md*(1-Bws)+18.00*Bws

| | | | | |
|---|---|---|---|---|
| 28.98 | * | 0.919496734 | + | 1.449058776 |

Ms = 28.0961 lb/lb-mole

PARTICULATE MATTER EMISSION DETERMINATION
EPA METHOD 5 CALCULATIONS
TEST RUN # 1

| Parameter | | Definition | Units |
|---|---|---|---|
| Fdg | - | (1-Bws) | fraction |
| I | - | Percent of Isokinetic Sampling | % |
| Ts | - | Absolute Average Stack Gas Temperature | degrees R |
| Vmstd | - | Volume of Stack Gas Sampled, Corrected to Dry, Standard Conditions | dscf |
| Vs | - | Stack Gas Velocity | ft./second |
| T | - | Sample Time Interval | minutes |
| An | - | Cross-Sectional Area of Sampling Nozzle | ft.2 |
| Ps | - | Absolute Stack Gas Pressure | in. Hg |
| Dn | - | Sampling Nozzle Diameter | inches |
| Pi | - | Constant (3.141592654) | dimensionless |
| K2 | - | Conversion Factor (144) | in.2/ft.2 |
| K3 | - | Conversion Factor (0.002669) | in. Hg-ft.3/ml-R |
| K4 | - | Conversion Factor (17.64) | deg.R/in. Hg - |
| 1.67 | - | Conversion Factor | %-sec/min |

TEST DATA
TEST RUN #1

| | | | |
|---|---|---|---|
| Bws | 0.0805 | | |
| Vs | 27.8396 | Ts | 604.20833 |
| Vlcg | 73.5000 | Ps | 29.9368 |
| K3 | 0.0027 | T | 60 |
| K4 | 0.0945 | Dn | 0.3000 |
| Fdg | 0.9195 | Vmstd | 39.5827 |

1. Nozzle Area:

An=(Dn/24)^2*Pi
An= 0.00015625 * 3.1415926
An = = 0.00049087 ft.2

2. I = ISOKINETICS (%):

$$\frac{0.0945*Ts*Vmstd}{Ps*Vs*An*T*Fdg}$$

An*T*Fdg =0.027081414

$$\frac{0.0945}{29.93676} * \frac{604.2083333}{27.83959603} * \frac{39.582728}{0.0270814}$$

= 100.13 % I

PARTICULATE MATTER EMISSION DETERMINATION
EPA METHOD 5 CALCULATIONS
TEST RUN # 1

| Parameter | | Definition | Units |
|---|---|---|---|
| Pc | - | Total Particulate Catch | mg |
| Pg | - | Total Particulate (mg/1000) | grams |
| Vmstd | - | Volume of Stack Gas Sampled, Corrected to Dry, Standard Conditions | dscf |
| Cs | - | Concentration of Particulate in Stack Gas, Corrected to Dry, Standard Conditions (grams/dscf) | gm/dscf |
| Cg | - | Concentration of Particulate Matter (grains) | gr/dscf |
| Pcs | - | Concentration of Particulate (lb/hour) | lb/hour |
| K3 | - | Conversion Factor (15.43) | gr/gm |
| Qsd | - | Stack Gas Volumetric Flow Rate, Corrected to Dry, Standard Conditions | dscf/min |
| K2 | - | Conversion Factor (0.002205) | lb/gm |
| K1 | - | Conversion Factor (0.001) | gm/mg |
| K4 | - | Conversion Factor (60) | min/hour |
| Pe | - | Particulate Matter Emission Rate | lb/hour |

TEST DATA
TEST RUN #1

| | | | |
|---|---|---|---|
| Pc | 95.8 | K4 | 60 |
| Pg | 0.0958 | Qsd | 24006.742 |
| Vmstd | 39.5827 | K1 | 0.001 |
| K2 | 0.002205 | K3 | 15.43 |

PARTICULATE MATTER EMISSIONS CALCULATIONS:

---

1a. Total Particulate Catch :

Cs = Pg/Vmstd

0.0958 / 39.58272881

Cs = 0.0024 grams/dscf

1b. Cg = K3*Cs

15.43 * 0.002420247

Cg = 0.0373 grains/dscf

1c. Pcs = K2*Cs

0.002205 * 0.002420247

Pcs = 0.00000534 lb/dscf

1d. Pe = K4 * Pcs * Qsd

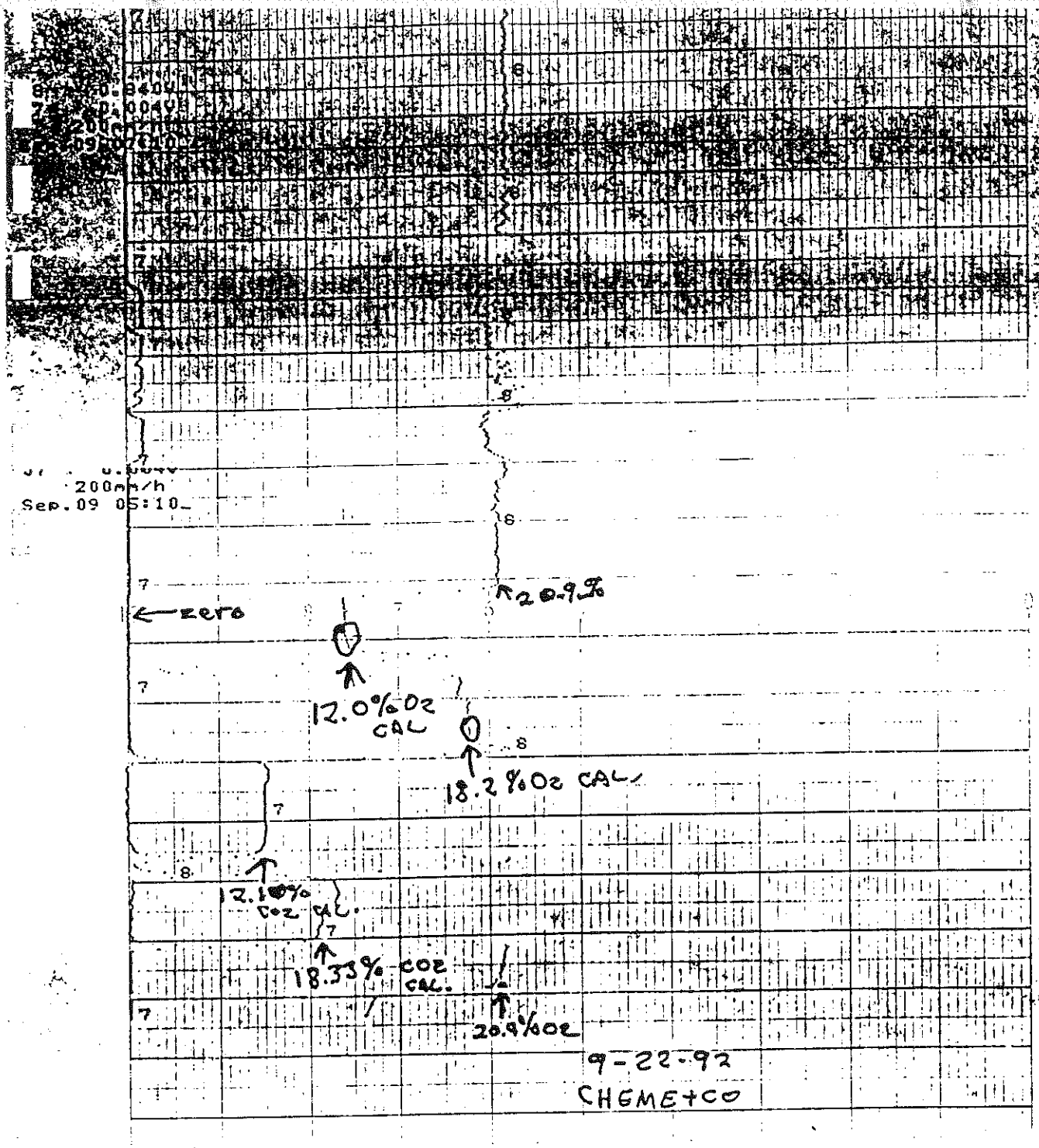
60 * 0.000005336 * 24006.74219

Pe = 7.6869 lbs/hour Total Particulate Emissions.

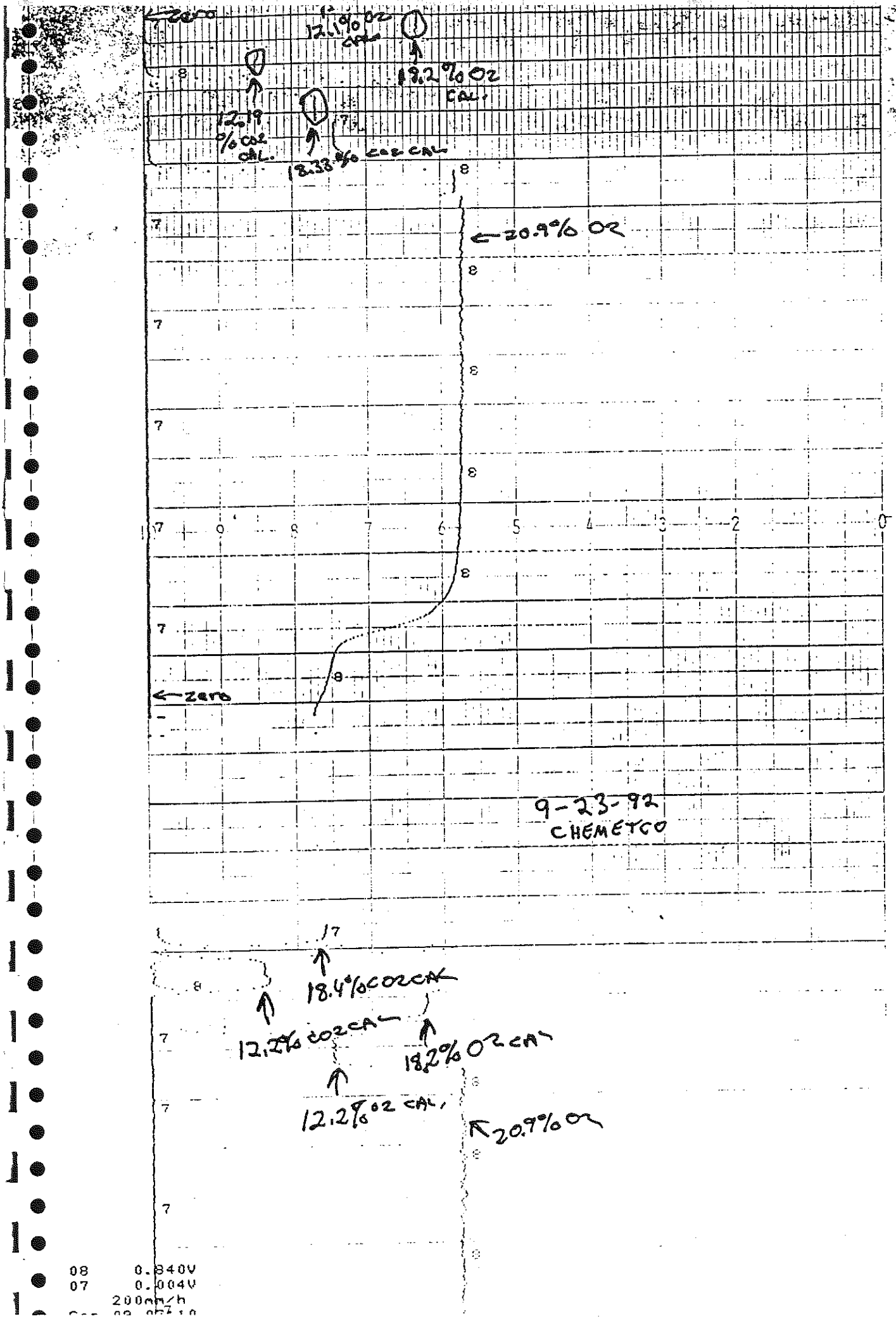
---

# APPENDIX G

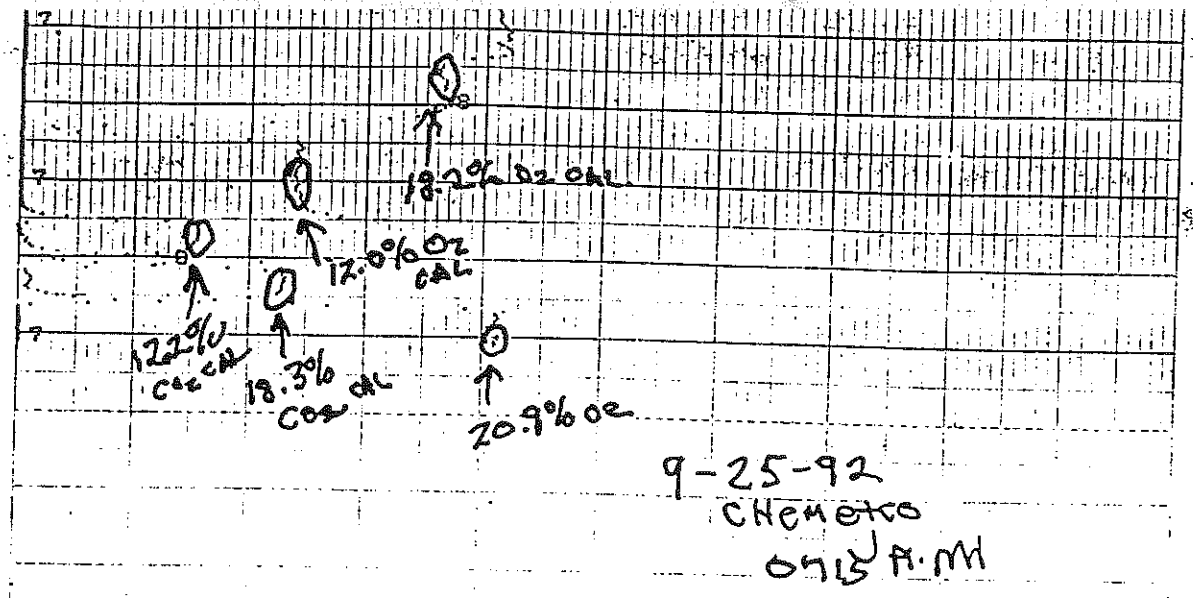
## CEM Data (Strip Charts)



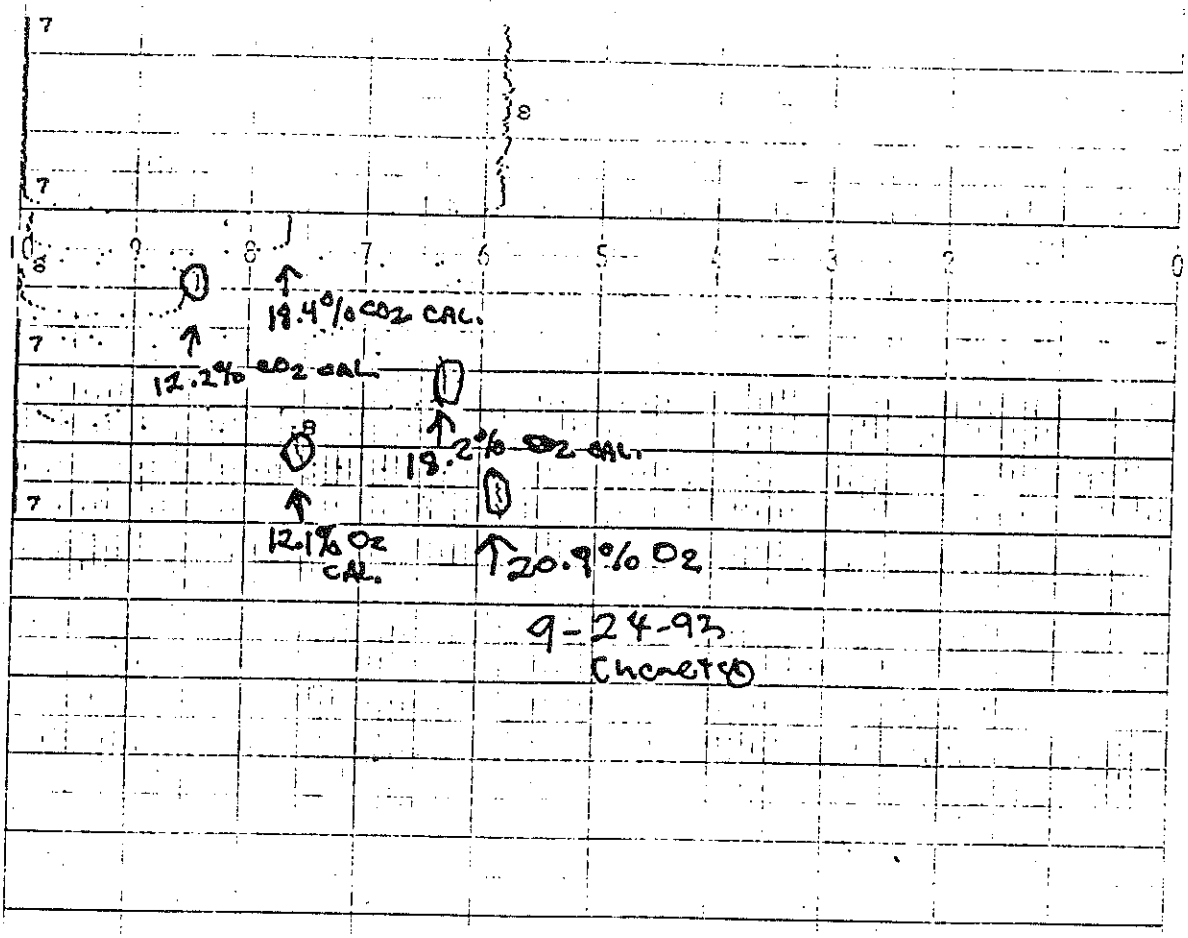

ENGINEERING, INC. OMS00.ZFP




VEGA ENGINEERING, INC.
OM1500-7FP

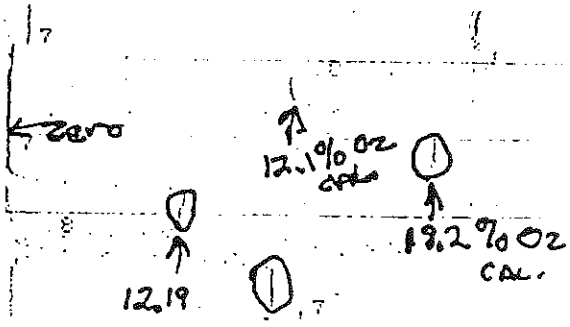



9-25-92
CHEMETCO
0715 A.M

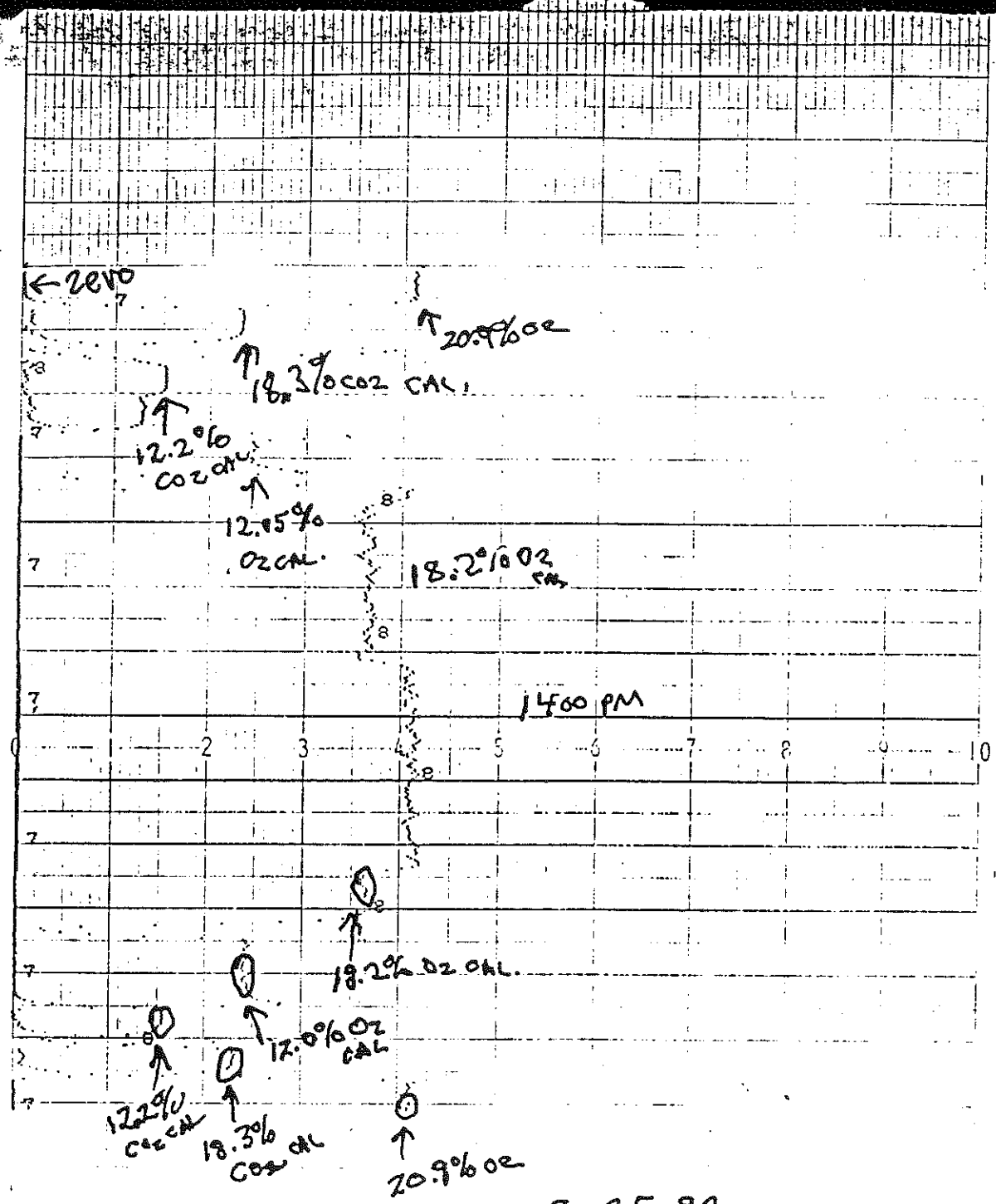



9-24-92
Chemetco

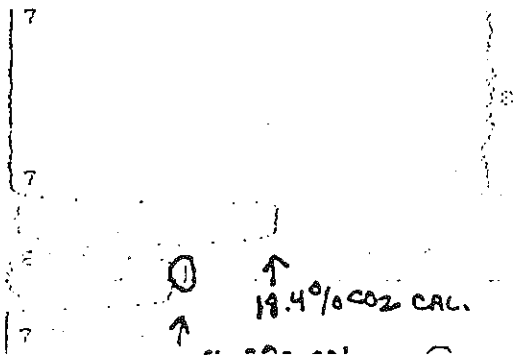
08 20V 0.000V 2.000V
09 SKIP
10 SKIP
11 SKIP
12 SKIP
13 SKIP




OMEGA ENGINEERING, INC.
01:500-ZFP




9-25-92
Chemetco
0715 A.M.




OMEGA ENGINEERING INC

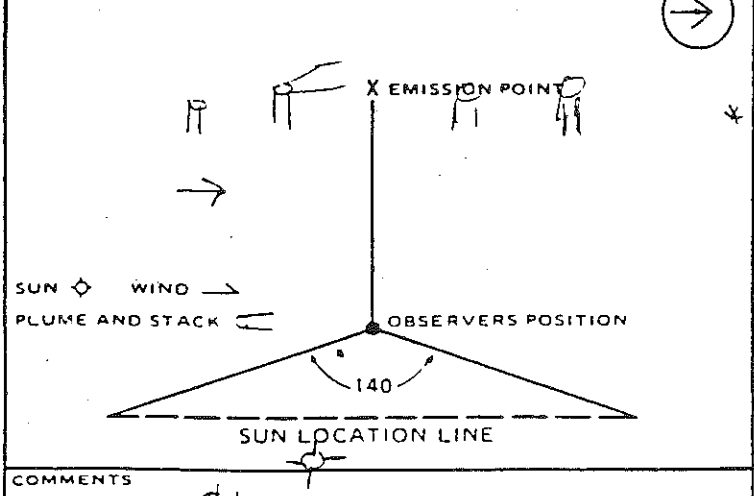
# APPENDIX H

## Visual Emissions Observation Forms

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco, INC. |
| ADDRESS | P.O. Box 67 |
| | Hartford, ILL |
| CITY | Hartford |
| STATE | ILL |
| ZIP | 62048 |
| PHONE | 618254-4381 |
| SOURCE ID NUMBER | |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | ✓ |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT | START Furnace STACK STOP ✓ |
| HEIGHT ABOVE GROUND LEVEL | START 120' STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | START 120' STOP ✓ |
| DISTANCE FROM OBSERVER | START 350' STOP ✓ |
| DIRECTION FROM OBSERVER | START WEST STOP ✓ |
| DESCRIBE EMISSIONS | START gray plume STOP ✓ |
| EMISSION COLOR | START gray STOP ✓ |
| PLUME TYPE: | CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐ |
| WATER DROPLETS PRESENT: | NO ☒ YES ☐ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START STACK EXIT STOP ✓ |
| DESCRIBE BACKGROUND | START Dark gray OVERCAST STOP ✓ |
| BACKGROUND COLOR | START gray STOP ✓ |
| SKY CONDITIONS | START overcast STOP ✓ |
| WIND SPEED | START ~10-15 STOP ✓ |
| WIND DIRECTION | START S STOP ✓ |
| AMBIENT TEMP. | START 75 STOP ✓ |
| WET BULB TEMP. | — |
| RH, percent | — |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-21-92 | 0856 | 10:12 |

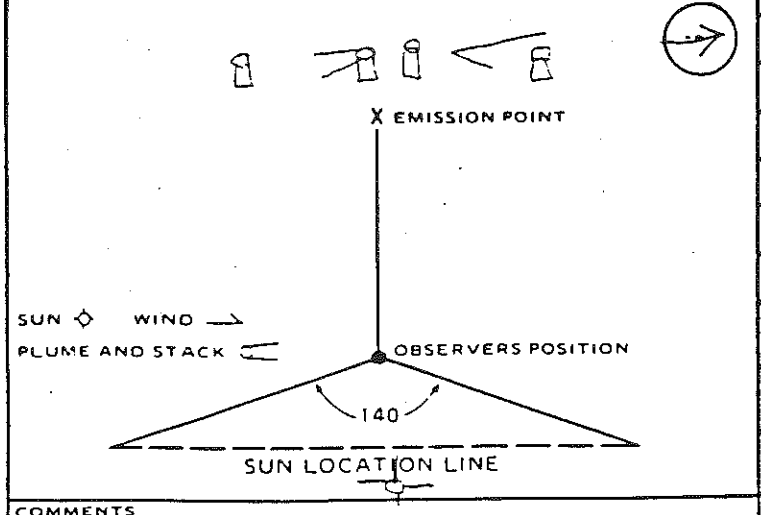
| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 0 | 0 | 10 | 31 | 0 | 5 | 5 | 5 |
| 2 | 0 | 0 | 0 | 5 | 32 | 10 | 5 | 0 | 5 |
| 3 | 0 | 5 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 5 |
| 5 | 0 | 0 | 10 | 5 | 35 | 5 | 5 | 0 | 10 |
| 6 | 0 | 0 | 0 | 0 | 36 | 5 | 5 | 0 | [illegible] |
| 7 | 5 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 5 | 38 | 0 | 5 | 0 | [illegible] |
| 9 | 5 | 5 | 5 | 0 | 39 | 0 | 0 | 0 | 0 |
| 10 | 5 | 5 | 5 | 10 | 40 | 0 | 0 | 0 | 0 |
| 11 | 5 | 10 | 10 | 15 | 41 | 5 | 5 | 5 | 10 |
| 12 | 5 | 0 | 5 | 0 | 42 | 5 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 5 | 10 | 5 | 15 |
| 14 | 0 | 0 | 0 | 0 | 44 | 10 | 5 | 5 | 5 |
| 15 | 0 | 0 | 0 | 0 | 45 | 10 | 15 | 10 | 15 |
| 16 | 0 | 0 | 0 | 0 | 46 | 15 | 20 | 15 | 15 |
| 17 | 5 | 0 | 0 | 0 | 47 | 15 | 20 | 20 | 15 |
| 18 | 0 | 0 | 5 | 5 | 48 | 15 | 15 | 15 | 20 |
| 19 | 5 | 5 | 10 | 5 | 49 | 25 | 20 | 20 | 25 |
| 20 | 15 | 10 | 15 | 5 | 50 | 25 | 15 | 15 | 15 |
| 21 | 5 | 10 | 15 | 10 | 51 | 10 | 5 | 0 | 0 |
| 22 | 5 | 5 | 5 | 5 | 52 | 0 | 0 | 0 | 0 |
| 23 | 5 | 5 | 10 | 5 | 53 | 0 | 0 | 0 | 0 |
| 24 | 5 | 5 | 5 | 10 | 54 | 0 | 5 | 0 | 5 |
| 25 | 5 | 5 | 5 | 5 | 55 | 5 | 5 | 5 | 5 |
| 26 | 0 | 5 | 10 | 5 | 56 | 5 | 5 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | | | | |
| 28 | 0 | 0 | 0 | 0 | 58 | | | | |
| 29 | 0 | 0 | 0 | 0 | 59 | | | | |
| 30 | 0 | 0 | 0 | 0 | 60 | | | | |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 15 |
| NUMBER OF READINGS ABOVE | 15 WERE 9 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 25 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Folle |
| OBSERVER'S SIGNATURE | Robert F. Folle |
| DATE | 9-21-92 |
| ORGANIZATION | Fugro - McClelland Environmental |
| CERTIFIED BY | Eastern Technical Associates |
| DATE | 9-3, 1992 |
| VERIFIED BY | |
| DATE | |
| COMMENTS | Run #1 |
| I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS | |
| SIGNATURE | |
| TITLE | |
| DATE | |

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco, INC |
| ADDRESS | P.O. Box 67 |
| | Hartford, ILL |
| CITY | HARTFORD |
| STATE | ILL |
| ZIP | 62048 |
| PHONE | 618-254-4381 |
| SOURCE ID NUMBER | STACK #2 |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | ✓ |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT | START 120' Steel STACK STOP |
| HEIGHT ABOVE GROUND LEVEL | START 110' STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | START 110' STOP ✓ |
| DISTANCE FROM OBSERVER | START 360' STOP ✓ |
| DIRECTION FROM OBSERVER | START W STOP W |
| DESCRIBE EMISSIONS | START GRAY ✓ STOP GRAY |
| EMISSION COLOR | START GRAY STOP ✓ |
| PLUME TYPE: | CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ |
| WATER DROPLETS PRESENT: | NO ☒ YES ☐ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START exit STOP ✓ |
| DESCRIBE BACKGROUND | START gray cloud STOP Blue Sky |
| BACKGROUND COLOR | START GRAY STOP Blue |
| SKY CONDITIONS | START P. cloudy STOP P. cloudy |
| WIND SPEED | START ~10-15 STOP ~5-12 |
| WIND DIRECTION | START N-NW STOP N-NW |
| AMBIENT TEMP. | START 60 STOP 60 |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-22-92 | 0813 | 0915 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 5 | 5 | 5 | 10 |
| 2 | 0 | 5 | 0 | 5 | 32 | 10 | 5 | 10 | 5 |
| 3 | 5 | 10 | 5 | 5 | 33 | 5 | 5 | 0 | 0 |
| 4 | 10 | 10 | 10 | 5 | 34 | 5 | 5 | 5 | 0 |
| 5 | 5 | 5 | 5 | 5 | 35 | 0 | 0 | 0 | 0 |
| 6 | 5 | 5 | 5 | 5 | 36 | 0 | 0 | 0 | 5 |
| 7 | 0 | 0 | 0 | 0 | 37 | 5 | 5 | 10 | 5 |
| 8 | 0 | 0 | 0 | 0 | 38 | 10 | 10 | 5 | 5 |
| 9 | 0 | 0 | 0 | 0 | 39 | 10 | 10 | 10 | 10 |
| 10 | 0 | 0 | 0 | 5 | 40 | 10 | 10 | 5 | 5 |
| 11 | 0 | 0 | 0 | 0 | 41 | 10 | 10 | 10 | 5 |
| 12 | 0 | 0 | 0 | 0 | 42 | 5 | 5 | 10 | 10 |
| 13 | 0 | 0 | 0 | 5 | 43 | 5 | 5 | 10 | 5 |
| 14 | 10 | 5 | 0 | 5 | 44 | 0 | 0 | 0 | 0 |
| 15 | 5 | 5 | 0 | 5 | 45 | 0 | 0 | 0 | 0 |
| 16 | 5 | 10 | 5 | 10 | 46 | 0 | 0 | 0 | 0 |
| 17 | 5 | 5 | 5 | 5 | 47 | 0 | 0 | 0 | 0 |
| 18 | 0 | 5 | 10 | 10 | 48 | 0 | 0 | 0 | 0 |
| 19 | 10 | 10 | 5 | 10 | 49 | 0 | 0 | 0 | 0 |
| 20 | 15 | 10 | 5 | 5 | 50 | 0 | 0 | 0 | 0 |
| 21 | 5 | 5 | 5 | 5 | 51 | 5 | 5 | 5 | 5 |
| 22 | 5 | 5 | 5 | 5 | 52 | 5 | 0 | 0 | 5 |
| 23 | 0 | 0 | 0 | 0 | 53 | 5 | 5 | 5 | 10 |
| 24 | 5 | 5 | 5 | 5 | 54 | 10 | 10 | 10 | 5 |
| 25 | 10 | 5 | 5 | 10 | 55 | 10 | 5 | 5 | 5 |
| 26 | 5 | 10 | 10 | 10 | 56 | 5 | 5 | 5 | 5 |
| 27 | 10 | 10 | 10 | 5 | 57 | 0 | 0 | 5 | 5 |
| 28 | 10 | 10 | 10 | 5 | 58 | 0 | 0 | 0 | 0 |
| 29 | 10 | 10 | 5 | 5 | 59 | 0 | 0 | 0 | 0 |
| 30 | 5 | 5 | 5 | 5 | 60 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 10 |
| NUMBER OF READINGS ABOVE | 10 % WERE 1 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 15 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Fuller |
| OBSERVER'S SIGNATURE | Robert F. Fuller |
| DATE | 9-22-92 |
| ORGANIZATION | Fuller-Mossbarger Environmental |
| CERTIFIED BY | Esterline Technical Associates |
| DATE | 9-3-93 |
| VERIFIED BY | |
| DATE | |

COMMENTS

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

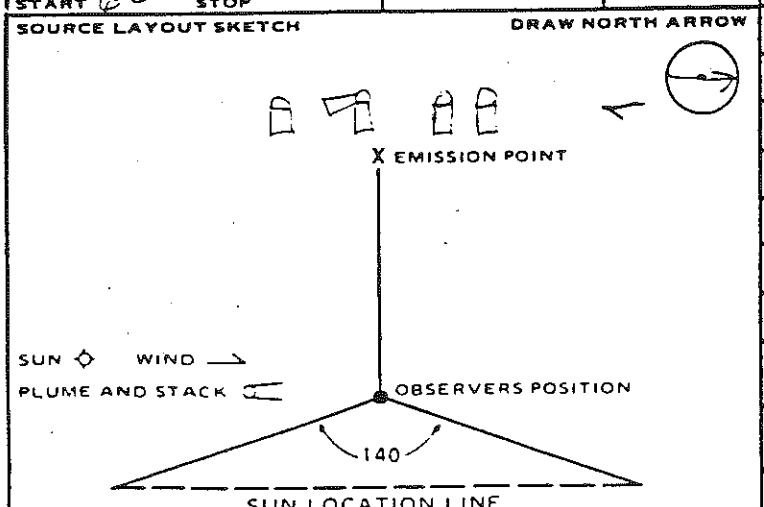
TITLE

DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco, INC. |
| ADDRESS | P.O. Box 67 |
| | Hartford |
| CITY | Hartford |
| STATE | ILL |
| ZIP | 62048 |
| PHONE | 618-254-4381 |
| SOURCE ID NUMBER | STACK #2 |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | Refining |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT | START 120' steel stack STOP |
| HEIGHT ABOVE GROUND LEVEL | START 10 STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | START 120 STOP ✓ |
| DISTANCE FROM OBSERVER | START 360' STOP ✓ |
| DIRECTION FROM OBSERVER | START W STOP ✓ |
| DESCRIBE EMISSIONS | START grey STOP ✓ |
| EMISSION COLOR | START gray STOP ✓ |
| PLUME TYPE: | CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐ |
| WATER DROPLETS PRESENT: | NO ☒ YES ☐ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START Exit STOP ✓ |
| DESCRIBE BACKGROUND | START Blue sky STOP ✓ |
| BACKGROUND COLOR | START Blue STOP ✓ |
| SKY CONDITIONS | START clear STOP ✓ |
| WIND SPEED | START ~8-15 STOP ✓ |
| WIND DIRECTION | START NW STOP ✓ |
| AMBIENT TEMP. | START 60 STOP ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-22-92 | 0945 | 1058 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5 | 5 | 5 | 5 | 31 | 5 | 5 | 5 | 5 |
| 2 | 5 | 10 | 5 | 5 | 32 | 10 | 10 | 15 | 10 |
| 3 | 5 | 5 | 5 | 5 | 33 | 10 | 5 | 10 | 10 |
| 4 | 0 | 5 | 5 | 10 | 34 | 10 | 5 | 5 | 10 |
| 5 | 5 | 5 | 5 | 0 | 35 | 10 | 10 | 10 | 10 |
| 6 | 0 | 0 | 5 | 5 | 36 | 10 | 15 | 15 | 10 |
| 7 | 10 | 5 | 5 | 5 | 37 | 10 | 10 | 10 | 5 |
| 8 | 0 | 5 | 5 | 5 | 38 | 10 | 10 | 5 | 5 |
| 9 | 5 | 0 | 0 | 5 | 39 | 5 | 5 | 10 | 15 |
| 10 | 5 | 5 | 10 | 15 | 40 | 10 | 5 | 0 | 5 |
| 11 | 20 | 20 | 25 | 20 | 41 | 5 | 5 | 0 | 5 |
| 12 | 15 | 10 | 10 | 5 | 42 | 5 | 5 | 5 | 0 |
| 13 | 5 | 0 | 5 | 10 | 43 | 5 | 5 | 5 | 5 |
| 14 | 10 | 15 | 10 | 15 | 44 | 5 | 5 | 5 | 5 |
| 15 | 10 | 10 | 10 | 10 | 45 | 10 | 20 | 25 | 20 |
| 16 | 10 | 15 | 10 | 15 | 46 | 20 | 20 | 15 | 15 |
| 17 | 5 | 5 | 5 | 10 | 47 | 15 | 15 | 15 | 10 |
| 18 | 10 | 10 | 5 | 5 | 48 | 10 | 15 | 15 | 15 |
| 19 | 10 | 5 | 5 | 10 | 49 | 15 | 20 | 20 | 20 |
| 20 | 5 | 5 | 10 | 5 | 50 | 20 | 20 | 20 | 25 |
| 21 | 10 | 10 | 5 | 0 | 51 | 20 | 20 | 25 | 25 |
| 22 | 0 | 0 | 0 | 0 | 52 | 20 | 20 | 15 | 15 |
| 23 | 0 | 0 | 0 | 0 | 53 | 15 | 10 | 10 | 10 |
| 24 | 0 | 5 | 10 | 15 | 54 | 15 | 10 | 10 | 10 |
| 25 | 15 | 10 | 20 | 15 | 55 | 5 | 5 | 10 | 10 |
| 26 | 15 | 15 | 20 | 25 | 56 | 5 | 5 | 10 | 5 |
| 27 | 20 | 20 | 15 | 20 | 57 | 5 | 10 | 5 | 10 |
| 28 | 15 | 15 | 15 | 15 | 58 | 5 | 10 | 15 | 10 |
| 29 | 20 | 15 | 15 | 20 | 59 | 15 | 15 | 15 | 20 |
| 30 | 15 | 15 | 10 | 15 | 60 | 20 | 15 | 15 | 15 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 20 |
| NUMBER OF READINGS ABOVE | 20 % WERE 5 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 25 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Fuller |
| OBSERVER'S SIGNATURE | Robert F. Fuller |
| DATE | 9-22-92 |
| ORGANIZATION | Fuller-Mostardi Env |
| CERTIFIED BY | Eastern technical Associates |
| DATE | 9-3-92 |
| VERIFIED BY | |
| DATE | |

COMMENTS: Stop at 23/15 to add to furnace

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

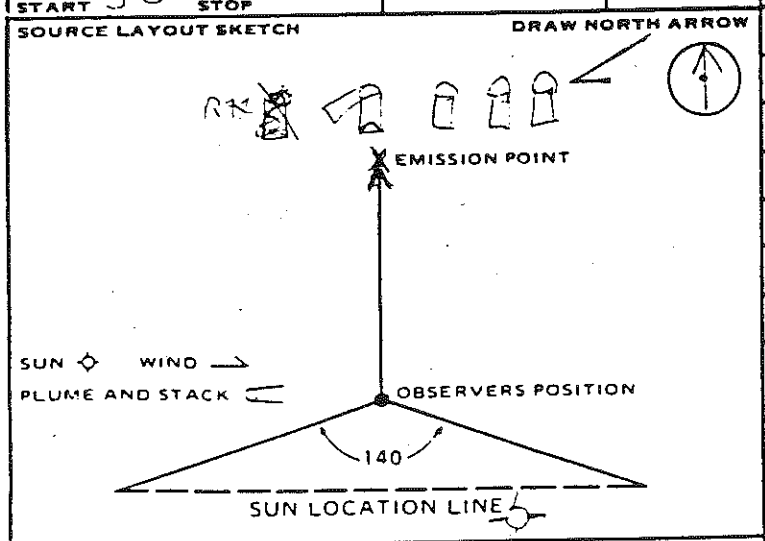
TITLE

DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco, Inc |
| ADDRESS | P.O. Box 67 |
| CITY | Hartford |
| STATE | ILL. |
| ZIP | 62048 |
| PHONE | 618-254-4381 |
| SOURCE ID NUMBER | |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | ✓ |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT START | Exit from 120' steel stack #4 |
| STOP | |
| HEIGHT ABOVE GROUND LEVEL START | 120' |
| STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER START | 120' |
| STOP | ✓ |
| DISTANCE FROM OBSERVER START | 450' |
| STOP | ✓ |
| DIRECTION FROM OBSERVER START | NW |
| STOP | ✓ |
| DESCRIBE EMISSIONS START | 120' steel stack gray plume |
| STOP | |
| EMISSION COLOR START | gray |
| STOP | ✓ |
| PLUME TYPE: CONTINUOUS | ☒ |
| FUGITIVE ☐ INTERMITTENT | ☐ |
| WATER DROPLETS PRESENT: NO | ☒ |
| YES | ☐ |
| IF WATER DROPLET PLUME: ATTACHED | ☐ |
| DETACHED | ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | Exit |
| STOP | |
| DESCRIBE BACKGROUND START | Clear Blue Sky |
| STOP | |
| BACKGROUND COLOR START | Blue |
| STOP | ✓ |
| SKY CONDITIONS START | Clear |
| STOP | ✓ |
| WIND SPEED START | ~8-12 |
| STOP | ✓ |
| WIND DIRECTION START | NE |
| STOP | ✓ |
| AMBIENT TEMP. START | 50 |
| STOP | ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-23-92 | 0908 | 1013 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 10 | 10 | 10 | 10 |
| 2 | 0 | 5 | 5 | 5 | 32 | 15 | 15 | 15 | 20 |
| 3 | 0 | 0 | 0 | 0 | 33 | 20 | 15 | 15 | 15 |
| 4 | 0 | 0 | 0 | 0 | 34 | 15 | 15 | 10 | 15 |
| 5 | 0 | 5 | 5 | 5 | 35 | 15 | 20 | 15 | 15 |
| 6 | 10 | 10 | 15 | 20 | 36 | 15 | 15 | 10 | 10 |
| 7 | 20 | 25 | 20 | 20 | 37 | 10 | 15 | 10 | 10 |
| 8 | 15 | 20 | 25 | 20 | 38 | 15 | 15 | 20 | 25 |
| 9 | 20 | 20 | 15 | 15 | 39 | 25 | 25 | 20 | 25 |
| 10 | 15 | 10 | 10 | 20 | 40 | 20 | 20 | 25 | 25 |
| 11 | 25 | 25 | 20 | 25 | 41 | 25 | 20 | 20 | 25 |
| 12 | 20 | 20 | 25 | 25 | 42 | 20 | 20 | 20 | 20 |
| 13 | 20 | 25 | 30 | 30 | 43 | 20 | 25 | 25 | 30 |
| 14 | 30 | 25 | 25 | 20 | 44 | 30 | 30 | 25 | 25 |
| 15 | 20 | 20 | 20 | 15 | 45 | 30 | 30 | 25 | 25 |
| 16 | 15 | 15 | 15 | 20 | 46 | 25 | 25 | 25 | 25 |
| 17 | 20 | 15 | 15 | 15 | 47 | 25 | 25 | 25 | 20 |
| 18 | 15 | 20 | 20 | 15 | 48 | 20 | 20 | 20 | 20 |
| 19 | 10 | 10 | 10 | 15 | 49 | 15 | 15 | 10 | 10 |
| 20 | 15 | 15 | 10 | 10 | 50 | 15 | 15 | 10 | 10 |
| 21 | 15 | 15 | 20 | 15 | 51 | 10 | 15 | 10 | 15 |
| 22 | 15 | 20 | 20 | 20 | 52 | 10 | 10 | 15 | 10 |
| 23 | 25 | 25 | 20 | 20 | 53 | 15 | 15 | 10 | 10 |
| 24 | 25 | 20 | 15 | 20 | 54 | 10 | 10 | 15 | 15 |
| 25 | 20 | 20 | 20 | 20 | 55 | 20 | 20 | 15 | 15 |
| 26 | 25 | 20 | 20 | 20 | 56 | 10 | 10 | 15 | 15 |
| 27 | 25 | 25 | 20 | 20 | 57 | 10 | 10 | 15 | 10 |
| 28 | 25 | 25 | 20 | 20 | 58 | 10 | 10 | 10 | 10 |
| 29 | 20 | 20 | 25 | 25 | 59 | 10 | 15 | 15 | 10 |
| 30 | 20 | 20 | 20 | 25 | 60 | 10 | 10 | 15 | 10 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 25 |
| NUMBER OF READINGS ABOVE | 25 % WERE 7 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 30 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Fette |
| OBSERVER'S SIGNATURE | Robert F. Fette |
| DATE | 9-23-92 |
| ORGANIZATION | Fugro-McClelland Environmental |
| CERTIFIED BY | EA Stern Technical Associates |
| DATE | 9-21-95 |
| VERIFIED BY | |
| DATE | |

COMMENTS

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SIGNATURE

TITLE

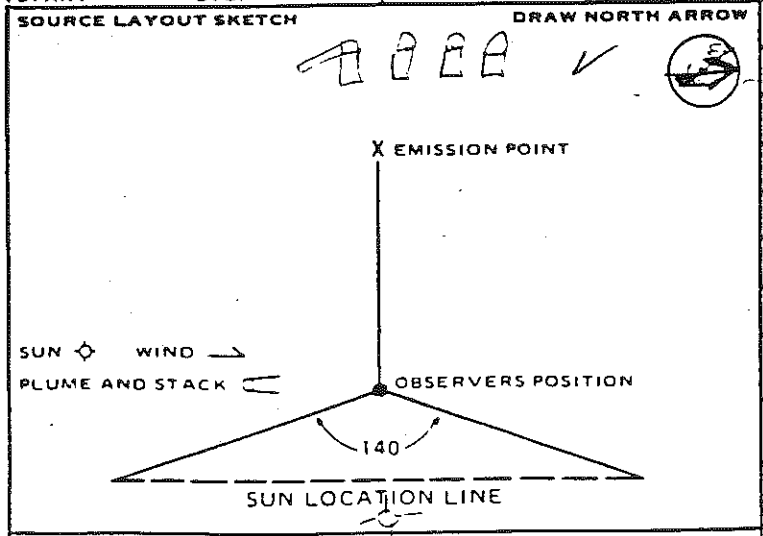
DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Champion, INC. |
| ADDRESS | P.O. Box 67 |
| CITY | Hartford |
| STATE | ILL |
| ZIP | 62048 |
| PHONE | 618-254-4381 |
| SOURCE ID NUMBER | |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | ✓ |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT START | 120' |
| STOP | ✓ |
| HEIGHT ABOVE GROUND LEVEL START | 5' |
| STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER START | 120' |
| STOP | ✓ |
| DISTANCE FROM OBSERVER START | 450' |
| STOP | ✓ |
| DIRECTION FROM OBSERVER START | NW |
| STOP | ✓ |
| DESCRIBE EMISSIONS START | |
| STOP | |
| EMISSION COLOR START | GRAY |
| STOP | ✓ |
| PLUME TYPE: CONTINUOUS | X |
| FUGITIVE | ☐ |
| INTERMITTENT | ☐ |
| WATER DROPLETS PRESENT: NO | X |
| YES | ☐ |
| IF WATER DROPLET PLUME: ATTACHED | ☐ |
| DETACHED | ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | EXIT |
| STOP | ✓ |
| DESCRIBE BACKGROUND START | Clear blue sky |
| STOP | |
| BACKGROUND COLOR START | Blue |
| STOP | ✓ |
| SKY CONDITIONS START | Clear |
| STOP | ✓ |
| WIND SPEED START | ~8-15 |
| STOP | ✓ |
| WIND DIRECTION START | NE |
| STOP | ✓ |
| AMBIENT TEMP. START | 55 |
| STOP | ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-23-92 | 1055 | 1207 |

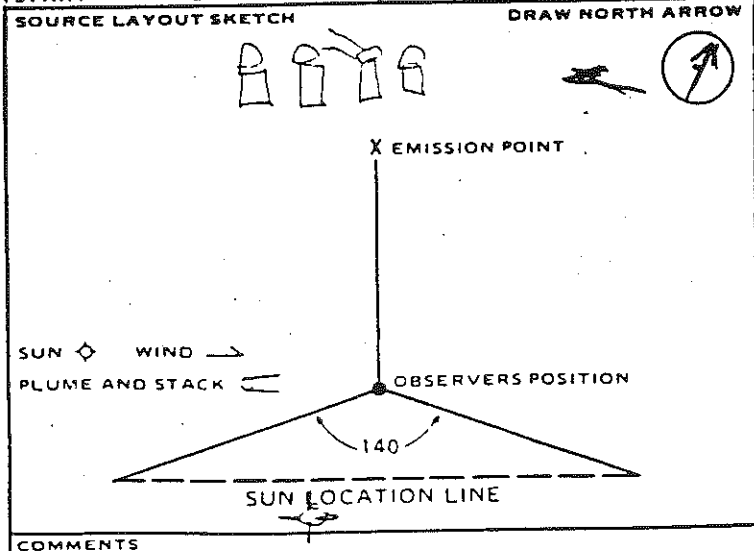
| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 5 | 5 |
| 2 | 10 | 15 | 10 | 10 | 32 | 5 | 5 | 5 | 10 |
| 3 | 5 | 10 | 10 | 10 | 33 | 10 | 10 | 10 | 10 |
| 4 | 10 | 10 | 5 | 5 | 34 | 5 | 5 | 10 | 5 |
| 5 | 5 | 10 | 5 | 5 | 35 | 5 | 10 | 10 | 10 |
| 6 | 0 | 0 | 0 | 0 | 36 | 10 | 10 | 5 | 5 |
| 7 | 0 | 0 | 0 | 0 | 37 | 10 | 10 | 10 | 5 |
| 8 | 0 | 0 | 0 | 0 | 38 | 5 | 5 | 5 | 5 |
| 9 | 0 | 0 | 0 | 0 | 39 | 5 | 5 | 5 | 5 |
| 10 | 0 | 0 | 0 | 0 | 40 | 5 | 0 | 0 | 5 |
| 11 | 0 | 0 | 10 | 10 | 41 | 5 | 5 | 10 | 5 |
| 12 | 10 | 5 | 5 | 0 | 42 | 5 | 10 | 10 | 5 |
| 13 | 0 | 5 | 5 | 5 | 43 | 5 | 5 | 10 | 10 |
| 14 | 5 | 5 | 5 | 5 | 44 | 10 | 5 | 5 | 5 |
| 15 | 0 | 0 | 0 | 5 | 45 | 10 | 5 | 10 | 5 |
| 16 | 5 | 0 | 0 | 0 | 46 | 5 | 10 | 10 | 5 |
| 17 | 0 | 5 | 0 | 0 | 47 | 5 | 10 | 5 | 10 |
| 18 | 0 | 0 | 0 | 0 | 48 | 10 | 5 | 15 | 10 |
| 19 | 0 | 0 | 0 | 0 | 49 | 5 | 10 | 10 | 5 |
| 20 | 5 | 0 | 5 | 5 | 50 | 5 | 10 | 10 | 10 |
| 21 | 5 | 5 | 5 | 5 | 51 | 5 | 10 | 5 | 5 |
| 22 | 5 | 5 | 5 | 10 | 52 | 10 | 10 | 5 | 5 |
| 23 | 15 | 15 | 10 | 10 | 53 | 5 | 5 | 5 | 5 |
| 24 | 10 | 15 | 10 | 15 | 54 | 5 | 5 | 5 | 5 |
| 25 | 10 | 15 | 10 | 10 | 55 | 5 | 10 | 10 | 10 |
| 26 | 10 | 15 | 10 | 10 | 56 | 5 | 0 | 5 | 5 |
| 27 | 10 | 15 | 15 | 15 | 57 | 5 | 5 | 0 | 5 |
| 28 | 15 | 10 | 15 | 15 | 58 | 5 | 10 | 5 | 0 |
| 29 | 15 | 15 | 15 | 10 | 59 | 5 | 5 | 5 | 5 |
| 30 | 15 | 15 | 15 | 10 | 60 | 5 | 5 | 5 | 10 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 15 |
| NUMBER OF READINGS ABOVE | 15 % WERE 0 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 15 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Fuller |
| OBSERVER'S SIGNATURE | Robert F. Fuller |
| DATE | 9-23-92 |
| ORGANIZATION | Fuller-Mendell and Associates |
| CERTIFIED BY | Environmental Technical Services |
| DATE | 9-3-92 |
| VERIFIED BY | |
| DATE | |
| COMMENTS | |
| I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS SIGNATURE | |
| TITLE | |
| DATE | |

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco, INC. |
| ADDRESS | P.O. Box 67 |
| CITY | Hartford |
| STATE | ILL |
| ZIP | 62048 |
| PHONE | 618-254-4381 |
| SOURCE ID NUMBER | |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | ✓ |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT | START STACK #1 exit STOP |
| HEIGHT ABOVE GROUND LEVEL | START 120' STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | START 120' STOP ✓ |
| DISTANCE FROM OBSERVER | START 450' STOP ✓ |
| DIRECTION FROM OBSERVER | START NW STOP ✓ |
| DESCRIBE EMISSIONS | START gray/white STOP ✓ |
| EMISSION COLOR | START gray/white STOP ✓ |
| PLUME TYPE: | CONTINUOUS X FUGITIVE ☐ INTERMITTENT ☐ |
| WATER DROPLETS PRESENT: | NO X YES ☐ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START Exit STOP |
| DESCRIBE BACKGROUND | START Blue STOP |
| BACKGROUND COLOR | START Blue STOP ✓ |
| SKY CONDITIONS | START clear STOP ✓ |
| WIND SPEED | START ~8-15 STOP ✓ |
| WIND DIRECTION | START NE STOP ✓ |
| AMBIENT TEMP. | START 65 STOP ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-23-92 | 2:10 | 3:38 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 5 | 0 | 0 | 31 | 10 | 10 | 10 | 10 |
| 2 | 0 | 0 | 0 | 0 | 32 | 10 | 10 | 10 | 10 |
| 3 | 0 | 5 | 5 | 10 | 33 | 5 | 0 | 0 | 5 |
| 4 | 10 | 10 | 5 | 5 | 34 | 5 | 5 | 5 | 5 |
| 5 | 5 | 10 | 10 | 5 | 35 | 5 | 5 | 0 | 0 |
| 6 | 5 | 5 | 10 | 10 | 36 | 0 | 0 | 0 | 0 |
| 7 | 10 | 10 | 10 | 5 | 37 | 0 | 0 | 0 | 0 |
| 8 | 10 | 15 | 10 | 10 | 38 | 0 | 0 | 0 | 0 |
| 9 | 10 | 15 | 15 | 15 | 39 | 0 | 0 | 5 | 5 |
| 10 | 15 | 20 | 15 | 10 | 40 | 5 | 5 | 0 | 5 |
| 11 | 5 | 5 | 5 | 5 | 41 | 10 | 5 | 10 | 10 |
| 12 | 5 | 5 | 5 | 0 | 42 | 5 | 5 | 10 | 10 |
| 13 | 0 | 0 | 0 | 0 | 43 | 5 | 5 | 5 | 10 |
| 14 | 5 | 5 | 10 | 10 | 44 | 5 | 0 | 0 | 5 |
| 15 | 10 | 10 | 10 | 10 | 45 | 5 | 5 | 5 | 10 |
| 16 | 5 | 5 | 5 | 10 | 46 | 5 | 10 | 10 | 10 |
| 17 | 15 | 20 | 20 | 20 | 47 | 10 | 10 | 0 | 15 |
| 18 | 20 | 15 | 5 | 5 | 48 | 10 | 5 | 10 | 10 |
| 19 | 10 | 10 | 10 | 10 | 49 | 10 | 15 | 10 | 15 |
| 20 | 5 | 5 | 10 | 5 | 50 | 25 | 25 | 30 | 35 |
| 21 | 5 | 10 | 5 | 5 | 51 | 30 | 30 | 30 | 25 |
| 22 | 5 | 5 | 10 | 10 | 52 | 25 | 25 | 20 | 20 |
| 23 | 5 | 10 | 10 | 10 | 53 | 20 | 20 | 15 | 20 |
| 24 | 10 | 10 | 10 | 10 | 54 | 15 | 15 | 15 | 5 |
| 25 | 10 | 10 | 10 | 10 | 55 | 0 | 0 | 0 | 0 |
| 26 | 10 | 5 | 5 | 5 | 56 | 0 | 0 | 0 | 5 |
| 27 | 5 | 5 | 10 | 5 | 57 | 5 | 5 | 0 | 0 |
| 28 | 0 | 0 | 5 | 10 | 58 | 0 | 0 | 10 | 15 |
| 29 | 10 | 5 | 5 | 5 | 59 | 15 | 15 | 10 | 15 |
| 30 | 5 | 5 | 5 | 5 | 60 | 15 | 10 | 10 | 10 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 20 |
| NUMBER OF READINGS ABOVE | 20 WERE 10 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 35 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Falle |
| OBSERVER'S SIGNATURE | Robert F. Falle |
| DATE | 9-23-92 |
| ORGANIZATION | Fagan - Mechanical Environmental |
| CERTIFIED BY | Eastern Technical Assoc. |
| DATE | 9-5-92 |
| VERIFIED BY | |
| DATE | |

COMMENTS

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SIGNATURE

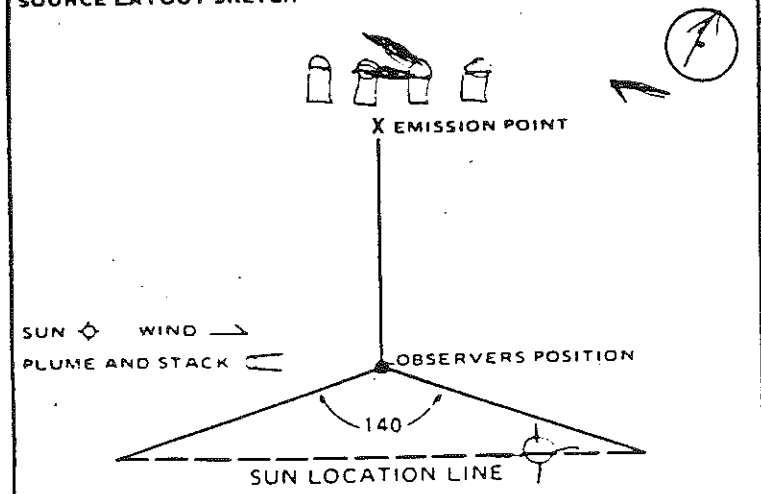
TITLE

DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco, INC. |
| ADDRESS | P.O. Box 67 |
| CITY | Hart Ford |
| STATE | ILL |
| ZIP | 62048 |
| PHONE | 618-254-4391 |
| SOURCE ID NUMBER | |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | ✓ |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT START | 120' STACK |
| DESCRIBE EMISSION POINT STOP | Exit ✓ |
| HEIGHT ABOVE GROUND LEVEL START | 120 |
| HEIGHT ABOVE GROUND LEVEL STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER START | 120' |
| HEIGHT RELATIVE TO OBSERVER STOP | ✓ |
| DISTANCE FROM OBSERVER START | 450' |
| DISTANCE FROM OBSERVER STOP | ✓ |
| DIRECTION FROM OBSERVER START | NW |
| DIRECTION FROM OBSERVER STOP | ✓ |
| DESCRIBE EMISSIONS START | over Plume |
| DESCRIBE EMISSIONS STOP | ✓ |
| EMISSION COLOR START | GRAY |
| EMISSION COLOR STOP | |
| PLUME TYPE: CONTINUOUS | ☒ |
| FUGITIVE ☐ INTERMITTENT | ☐ |
| WATER DROPLETS PRESENT: NO | ☒ |
| WATER DROPLETS PRESENT: YES | ☐ |
| IF WATER DROPLET PLUME: ATTACHED | ☐ |
| IF WATER DROPLET PLUME: DETACHED | ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | Exit |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP | |
| DESCRIBE BACKGROUND START | Blue Sky |
| DESCRIBE BACKGROUND STOP | |
| BACKGROUND COLOR START | Blue |
| BACKGROUND COLOR STOP | ✓ |
| SKY CONDITIONS START | Clear |
| SKY CONDITIONS STOP | ✓ |
| WIND SPEED START | ~5-8 |
| WIND SPEED STOP | ✓ |
| WIND DIRECTION START | NE |
| WIND DIRECTION STOP | ✓ |
| AMBIENT TEMP. START | 55 |
| AMBIENT TEMP. STOP | ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-24-92 | 0906 | 1018 |

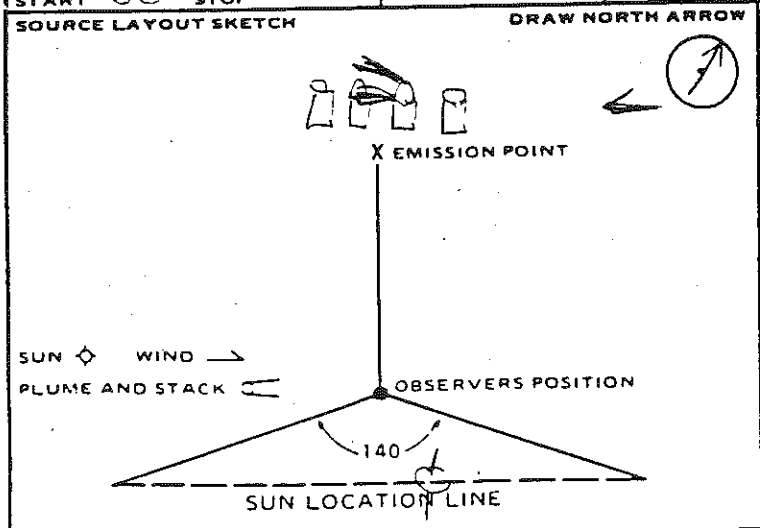
| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 5 | 0 | 0 | 31 | 10 | 10 | 15 | 15 |
| 2 | 5 | 5 | 10 | 10 | 32 | 15 | 15 | 15 | 10 |
| 3 | 15 | 15 | 10 | 10 | 33 | 15 | 10 | 15 | 15 |
| 4 | 15 | 20 | 20 | 15 | 34 | 15 | 10 | 15 | 10 |
| 5 | 15 | 15 | 20 | 20 | 35 | 15 | 10 | 15 | 15 |
| 6 | 0 | 0 | 0 | 0 | 36 | 10 | 15 | 15 | 10 |
| 7 | 0 | 0 | 10 | 10 | 37 | 15 | 15 | 15 | 10 |
| 8 | 10 | 10 | 10 | 10 | 38 | 15 | 15 | 15 | 15 |
| 9 | 10 | 15 | 10 | 10 | 39 | 10 | 15 | 10 | 10 |
| 10 | 10 | 10 | 10 | 5 | 40 | 10 | 15 | 15 | 15 |
| 11 | 5 | 5 | 5 | 5 | 41 | 15 | 15 | 10 | 15 |
| 12 | 5 | 5 | 5 | 5 | 42 | 15 | 10 | 10 | 10 |
| 13 | 10 | 10 | 10 | 10 | 43 | 10 | 10 | 10 | 15 |
| 14 | 5 | 5 | 10 | 10 | 44 | 15 | 15 | 15 | 15 |
| 15 | 10 | 10 | 10 | 5 | 45 | 15 | 15 | 15 | 15 |
| 16 | 10 | 10 | 10 | 5 | 46 | 15 | 15 | 15 | 20 |
| 17 | 5 | 10 | 5 | 5 | 47 | 10 | 15 | 10 | 10 |
| 18 | 5 | 5 | 5 | 5 | 48 | 15 | 10 | 15 | 15 |
| 19 | 5 | 5 | 10 | 10 | 49 | 15 | 10 | 10 | 15 |
| 20 | 10 | 10 | 10 | 10 | 50 | 15 | 10 | 10 | 10 |
| 21 | 5 | 5 | 5 | 10 | 51 | 15 | 10 | 15 | 15 |
| 22 | 10 | 10 | 10 | 10 | 52 | 15 | 15 | 15 | 20 |
| 23 | 10 | 15 | 10 | 10 | 53 | 15 | 20 | 20 | 20 |
| 24 | 10 | 15 | 15 | 10 | 54 | 20 | 20 | 15 | 15 |
| 25 | 15 | 10 | 10 | 10 | 55 | 15 | 15 | 15 | 15 |
| 26 | 15 | 15 | 10 | 15 | 56 | 15 | 15 | 15 | 15 |
| 27 | 10 | 15 | 15 | 10 | 57 | 15 | 20 | 15 | 15 |
| 28 | 10 | 15 | 15 | 10 | 58 | 15 | 15 | 15 | 20 |
| 29 | 10 | 15 | 15 | 15 | 59 | 20 | 20 | 20 | 15 |
| 30 | 15 | 10 | 10 | 10 | 60 | 20 | 20 | 20 | 10 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 15 |
| NUMBER OF READINGS ABOVE | 15 % WERE 18 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 20 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Folle |
| OBSERVER'S SIGNATURE | Robert F. Folle |
| DATE | 9-24-92 |
| ORGANIZATION | Fuqua McClelland Environmental |
| CERTIFIED BY | Express Holiday Inn, Alton, Illinois |
| DATE | 9-3-92 |
| VERIFIED BY | |
| DATE | |
| COMMENTS | |
| I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS | |
| SIGNATURE | |
| TITLE | |
| DATE | |

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemfco, INC |
| ADDRESS | P.O. Box 67 |
| CITY | Hartford |
| STATE | ILL |
| ZIP | 62048 |
| PHONE | 618-254-4381 |
| SOURCE ID NUMBER | |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | ✓ |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT | START 120' steel STACK #1 STOP |
| HEIGHT ABOVE GROUND LEVEL | START 120' STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | START 120' STOP ✓ |
| DISTANCE FROM OBSERVER | START 450' STOP ✓ |
| DIRECTION FROM OBSERVER | START NW STOP ✓ |
| DESCRIBE EMISSIONS | START gray plume STOP ✓ |
| EMISSION/COLOR | START gray STOP ✓ |
| PLUME TYPE: | CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐ |
| WATER DROPLETS PRESENT: | NO ☒ YES ☐ ✓ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START Exit STOP |
| DESCRIBE BACKGROUND | START Blue sky STOP |
| BACKGROUND COLOR | START Blue STOP ✓ |
| SKY CONDITIONS | START clear STOP ✓ |
| WIND SPEED | START ~5-8 STOP ✓ |
| WIND DIRECTION | START NE STOP ✓ |
| AMBIENT TEMP. | START 60 STOP ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-24-92 | 1217 | 1230 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 5 | 5 | 0 | 32 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 |
| 6 | 0 | 5 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 5 | 10 | 37 | 0 | 0 | 0 | 0 |
| 8 | 10 | 10 | 5 | 5 | 38 | 0 | 0 | 0 | 0 |
| 9 | 5 | 10 | 10 | 10 | 39 | 0 | 0 | 0 | 0 |
| 10 | 10 | 10 | 10 | 5 | 40 | 0 | 0 | 0 | 0 |
| 11 | 5 | 5 | 5 | 5 | 41 | 0 | 0 | 0 | 0 |
| 12 | 10 | 10 | 10 | 10 | 42 | 0 | 0 | 0 | 0 |
| 13 | 10 | 10 | 10 | 10 | 43 | 0 | 0 | 0 | 0 |
| 14 | 5 | 5 | 5 | 10 | 44 | 0 | 0 | 0 | 0 |
| 15 | 5 | 5 | 5 | 5 | 45 | 5 | 5 | 5 | 5 |
| 16 | 5 | 5 | 5 | 5 | 46 | 5 | 5 | 5 | 5 |
| 17 | 0 | 5 | 5 | 5 | 47 | 5 | 5 | 5 | 5 |
| 18 | 10 | 10 | 10 | 5 | 48 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 49 | 0 | 5 | 5 | 5 |
| 20 | 0 | 0 | 0 | 0 | 50 | 5 | 5 | 0 | 0 |
| 21 | 0 | 0 | 0 | 0 | 51 | 5 | 5 | 5 | 5 |
| 22 | 0 | 0 | 0 | 0 | 52 | 5 | 5 | 5 | 5 |
| 23 | 0 | 0 | 0 | 0 | 53 | 5 | 5 | 5 | 5 |
| 24 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 5 |
| 25 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 5 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 5 | 5 |
| 27 | 0 | 0 | 0 | 0 | 57 | 10 | 10 | 10 | 10 |
| 28 | 0 | 0 | 0 | 0 | 58 | 10 | 10 | 10 | 10 |
| 29 | 0 | 5 | 5 | 0 | 59 | 10 | 10 | 10 | 10 |
| 30 | 5 | 5 | 0 | 0 | 60 | 10 | 10 | 10 | 10 |

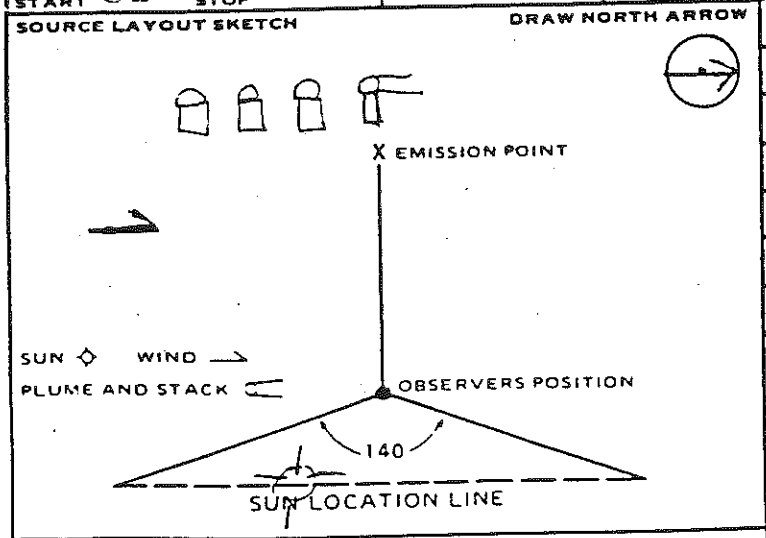
| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 10 |
| NUMBER OF READINGS ABOVE | 10 WERE 0 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 10 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Folle |
| OBSERVER'S SIGNATURE | Robert F. Folle |
| DATE | 9-24-92 |
| ORGANIZATION | Fugro-McClelland Environmental |
| CERTIFIED BY | Environmental Technical Associates |
| DATE | 9-3-92 |
| VERIFIED BY | |
| DATE | |
| COMMENTS | Process down after 1245 |
| I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS | |
| SIGNATURE | |
| TITLE | |
| DATE | |

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemtco, INC. |
| ADDRESS | P.O. Box 67 |
| CITY | Hartford |
| STATE | Ill |
| ZIP | 62048 |
| PHONE | 618-254-4381 |
| SOURCE ID NUMBER | |
| PROCESS EQUIPMENT | Furnace |
| OPERATING MODE | Smelting |
| CONTROL EQUIPMENT | Scrubber |
| OPERATING MODE | ✓ |
| DESCRIBE EMISSION POINT | START Stack Exit STOP ✓ |
| HEIGHT ABOVE GROUND LEVEL | START 120' STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | START 120' STOP ✓ |
| DISTANCE FROM OBSERVER | START 360' STOP ✓ |
| DIRECTION FROM OBSERVER | START W STOP ✓ |
| DESCRIBE EMISSIONS | START gray plume STOP ✓ |
| EMISSION COLOR | START gray STOP |
| PLUME TYPE: CONTINUOUS X | FUGITIVE ☐ INTERMITTENT ☐ |
| WATER DROPLETS PRESENT: | NO X YES ☐ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START STACK EXIT STOP |
| DESCRIBE BACKGROUND | START gray + white clouds STOP |
| BACKGROUND COLOR | START grey STOP ✓ |
| SKY CONDITIONS | 90% overcast START STOP ✓ |
| WIND SPEED | START ~5-8 STOP ✓ |
| WIND DIRECTION | START S STOP ✓ |
| AMBIENT TEMP. | START 65 STOP ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-25-92 | 1122 | 1225 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 10 | 10 | 10 | 31 | 0 | 0 | 0 | 0 |
| 2 | 10 | 10 | 10 | 10 | 32 | 5 | 10 | 10 | 10 |
| 3 | 10 | 10 | 10 | 10 | 33 | 15 | 15 | 10 | 10 |
| 4 | 5 | 10 | 15 | 15 | 34 | 10 | 10 | 10 | 10 |
| 5 | 15 | 15 | 15 | 10 | 35 | 10 | 10 | 10 | 15 |
| 6 | 15 | 15 | 15 | 15 | 36 | 15 | 15 | 15 | 15 |
| 7 | 15 | 15 | 15 | 15 | 37 | 15 | 15 | 15 | 15 |
| 8 | 15 | 10 | 10 | 10 | 38 | 10 | 10 | 10 | 10 |
| 9 | 15 | 15 | 15 | 15 | 39 | 10 | 15 | 15 | 15 |
| 10 | 15 | 15 | 25 | 25 | 40 | 15 | 20 | 20 | 15 |
| 11 | 25 | 25 | 30 | 30 | 41 | 20 | 20 | 20 | 20 |
| 12 | 35 | 35 | 30 | 25 | 42 | 25 | 25 | 25 | 20 |
| 13 | 25 | 25 | 25 | 25 | 43 | 25 | 25 | 25 | 25 |
| 14 | 25 | 25 | 25 | 25 | 44 | 25 | 20 | 20 | 15 |
| 15 | 20 | 25 | 20 | 15 | 45 | 15 | 10 | 10 | 10 |
| 16 | 15 | 15 | 10 | 15 | 46 | 15 | 15 | 15 | 15 |
| 17 | 15 | 20 | 20 | 15 | 47 | 25 | 20 | 20 | 20 |
| 18 | 15 | 15 | 15 | 15 | 48 | 20 | 20 | 25 | 25 |
| 19 | 15 | 15 | 5 | 10 | 49 | 25 | 25 | 25 | 25 |
| 20 | 10 | 10 | 5 | 5 | 50 | 15 | 15 | 15 | 15 |
| 21 | 5 | 5 | 5 | 10 | 51 | 10 | 10 | 10 | 25 |
| 22 | 10 | 10 | 15 | 10 | 52 | 25 | 25 | 30 | 30 |
| 23 | 10 | 10 | 15 | 15 | 53 | 25 | 25 | 25 | 25 |
| 24 | 15 | 10 | 10 | 15 | 54 | 25 | 25 | 20 | 20 |
| 25 | 15 | 15 | 15 | 10 | 55 | 20 | 15 | 15 | 10 |
| 26 | 10 | 10 | 10 | 10 | 56 | 5 | 5 | 5 | 10 |
| 27 | 5 | 5 | 0 | 5 | 57 | 10 | 15 | 20 | 10 |
| 28 | 5 | 5 | 5 | 10 | 58 | 0 | 5 | 5 | 5 |
| 29 | 5 | 5 | 5 | 0 | 59 | 0 | 0 | 5 | 10 |
| 30 | 0 | 5 | 5 | 5 | 60 | 15 | 15 | 15 | 15 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 25 |
| NUMBER OF READINGS ABOVE | 25 WERE 7 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 35 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Folle |
| OBSERVER'S SIGNATURE | Robert F. Folle |
| DATE | 9-25-92 |
| ORGANIZATION | Fagan-Macdonald Environmental |
| CERTIFIED BY | Easterday Technical Associates |
| DATE | 9-3-92 |
| VERIFIED BY | |
| DATE | |

COMMENTS

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

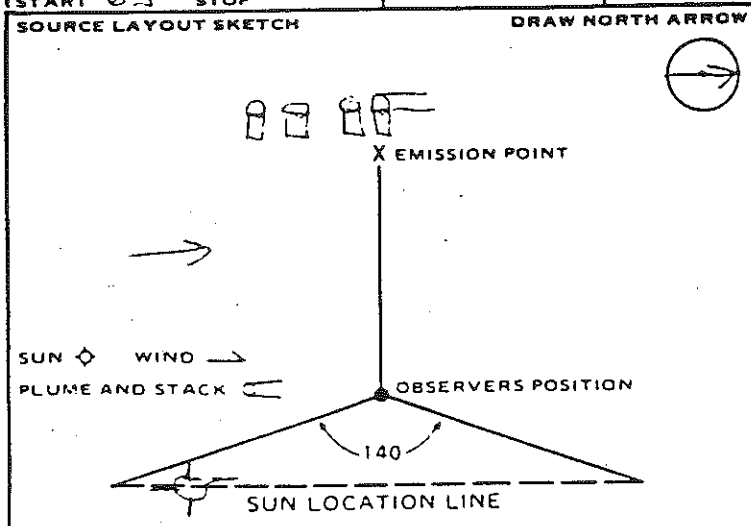
TITLE

DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco, INC. |
| ADDRESS | P.O. BOX 67 |
| CITY | Hartford |
| STATE | ILL. |
| ZIP | 62048 |
| PHONE | 618-254-4381 |
| SOURCE ID NUMBER | |
| PROCESS EQUIPMENT | NATURAL GAS + O2 FURNACE |
| OPERATING MODE | SMELTING |
| CONTROL EQUIPMENT | WET SCRUBBER |
| OPERATING MODE | NORMAL |
| DESCRIBE EMISSION POINT | START 120' STACK STOP ✓ |
| HEIGHT ABOVE GROUND LEVEL | START 120' STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | START 120' STOP ✓ |
| DISTANCE FROM OBSERVER | START ~360' STOP ✓ |
| DIRECTION FROM OBSERVER | START W STOP ✓ |
| DESCRIBE EMISSIONS | START grey PLUME STOP ✓ |
| EMISSION COLOR | START grey STOP ✓ |
| PLUME TYPE: | CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐ |
| WATER DROPLETS PRESENT: | NO ☒ YES ☐ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START STACK EXIT STOP ✓ |
| DESCRIBE BACKGROUND | START gray clouds STOP ✓ |
| BACKGROUND COLOR | START gray STOP ✓ |
| SKY CONDITIONS | START 90% OVERCAST STOP ✓ |
| WIND SPEED | START ~8-12 STOP ✓ |
| WIND DIRECTION | START S STOP ✓ |
| AMBIENT TEMP. | START 65 STOP ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9-25-92 | 1252 | 1:53 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10 | 10 | 10 | 10 | 31 | 5 | 5 | 5 | 5 |
| 2 | 5 | 5 | 0 | 0 | 32 | 5 | 5 | 5 | 5 |
| 3 | 0 | 0 | 5 | 5 | 33 | 5 | 5 | 5 | 5 |
| 4 | 5 | 5 | 5 | 5 | 34 | 5 | 5 | 5 | 0 |
| 5 | 5 | 5 | 5 | 5 | 35 | 0 | 0 | 0 | 0 |
| 6 | 5 | 10 | 10 | 5 | 36 | 0 | 0 | 0 | 0 |
| 7 | 5 | 5 | 5 | 5 | 37 | 5 | 5 | 5 | 5 |
| 8 | 5 | 5 | 5 | 5 | 38 | 10 | 5 | 5 | 0 |
| 9 | 5 | 5 | 5 | 5 | 39 | 0 | 5 | 5 | 0 |
| 10 | 5 | 5 | 5 | 5 | 40 | 0 | 0 | 0 | 0 |
| 11 | 5 | 5 | 5 | 5 | 41 | 0 | 0 | 0 | 0 |
| 12 | 5 | 5 | 5 | 5 | 42 | 0 | 0 | 0 | 0 |
| 13 | 5 | 5 | 5 | 5 | 43 | 0 | 0 | 5 | 5 |
| 14 | 10 | 10 | 5 | 5 | 44 | 5 | 5 | 5 | 5 |
| 15 | 5 | 5 | 5 | 5 | 45 | 5 | 5 | 5 | 5 |
| 16 | 5 | 5 | 5 | 5 | 46 | 5 | 5 | 5 | 5 |
| 17 | 5 | 5 | 0 | 0 | 47 | 5 | 5 | 5 | 5 |
| 18 | 5 | 5 | 5 | 5 | 48 | 5 | 5 | 5 | 0 |
| 19 | 5 | 5 | 5 | 5 | 49 | 0 | 0 | 0 | 0 |
| 20 | 5 | 10 | 10 | 10 | 50 | 0 | 0 | 0 | 0 |
| 21 | 5 | 5 | 5 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 0 | 0 | 5 | 0 | 53 | 0 | 5 | 5 | 5 |
| 24 | 0 | 0 | 5 | 5 | 54 | 5 | 5 | 5 | 5 |
| 25 | 5 | 5 | 10 | 10 | 55 | 5 | 5 | 5 | 5 |
| 26 | 5 | 5 | 5 | 5 | 56 | 0 | 0 | 0 | 0 |
| 27 | 5 | 5 | 5 | 5 | 57 | 5 | 5 | 5 | 5 |
| 28 | 5 | 5 | 5 | 5 | 58 | 5 | 10 | 10 | 10 |
| 29 | 0 | 0 | 0 | 0 | 59 | 10 | 5 | 10 | 10 |
| 30 | 0 | 0 | 0 | 0 | 60 | 5 | 5 | 5 | 5 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 5 |
| NUMBER OF READINGS ABOVE | 5 % WERE 20 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 10 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Robert F. Fellx |
| OBSERVER'S SIGNATURE | Robert F. Fellx |
| DATE | 9-25-92 |
| ORGANIZATION | Fluor-McClelland Environmental |
| CERTIFIED BY | EASTERN TECHNICAL ASSOCIATES |
| DATE | 9-3-92 |
| VERIFIED BY | |
| DATE | |
| COMMENTS | |
| I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS | |
| SIGNATURE | |
| TITLE | |
| DATE | |

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | |
| CITY | Alton |
| STATE | Illinois |
| ZIP | |
| PHONE | |
| SOURCE ID NUMBER | Roof vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | dust collector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT START | roof vent |
| DESCRIBE EMISSION POINT STOP | ✓ |
| HEIGHT ABOVE GROUND LEVEL START | 100' |
| HEIGHT ABOVE GROUND LEVEL STOP | 100' |
| HEIGHT RELATIVE TO OBSERVER START | 100' |
| HEIGHT RELATIVE TO OBSERVER STOP | ✓ |
| DISTANCE FROM OBSERVER START | 400' |
| DISTANCE FROM OBSERVER STOP | 420' |
| DIRECTION FROM OBSERVER START | WEST |
| DIRECTION FROM OBSERVER STOP | WEST |
| DESCRIBE EMISSIONS START | gas/smoke |
| DESCRIBE EMISSIONS STOP | ✓ |
| EMISSION COLOR START | blue/white |
| EMISSION COLOR STOP | ✓ |
| PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ | |
| WATER DROPLETS PRESENT: NO ☒ YES ☐ | |
| IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ | |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | middle |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP | ✓ |
| DESCRIBE BACKGROUND START | Cloudy w/ some blue sky |
| DESCRIBE BACKGROUND STOP | ✓ |
| BACKGROUND COLOR START | GREY |
| BACKGROUND COLOR STOP | ✓ |
| SKY CONDITIONS START | Partly Cldy |
| SKY CONDITIONS STOP | ✓ |
| WIND SPEED START | 10-15 mph |
| WIND SPEED STOP | 15-20 gusty |
| WIND DIRECTION START | NW |
| WIND DIRECTION STOP | ✓ |
| AMBIENT TEMP. START | 68 |
| AMBIENT TEMP. STOP | 65 |
| WET BULB TEMP. | |
| RH, percent | |

| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9/22/92 | 8:15 | 9:18 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 0 | 0 | 48 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 49 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 |

AVERAGE OPACITY FOR HIGHEST PERIOD: 0

NUMBER OF READINGS ABOVE: 0 % WERE [illegible]

RANGE OF OPACITY READINGS: 0 MINIMUM 0 MAXIMUM

OBSERVER'S NAME (PRINT): Steve Dillard

OBSERVER'S SIGNATURE: Steve Dillard

DATE: 9/22/92

ORGANIZATION: Fugro McClelland Environmental

CERTIFIED BY: St. Louis Air Pollution Control

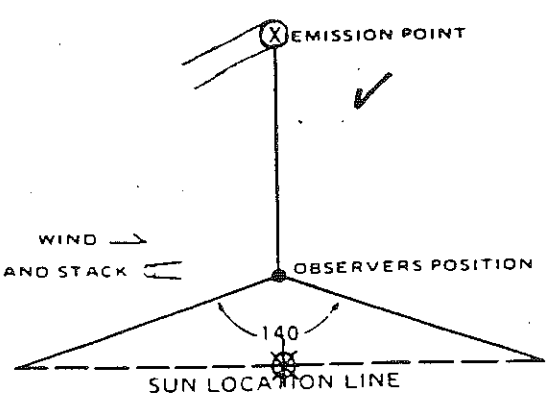
DATE: 4/16/92

VERIFIED BY:

DATE:

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW




COMMENTS

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SIGNATURE

TITLE

DATE

# VISIBLE EMISSION OBSERVATION FORM

SOURCE NAME: Chemetco

ADDRESS:

CITY: Alton | STATE: Illinois | ZIP:

PHONE: | SOURCE ID NUMBER: roof vent

PROCESS EQUIPMENT: furnace | OPERATING MODE: ON

CONTROL EQUIPMENT: dust collector | OPERATING MODE: ON

DESCRIBE EMISSION POINT
START: roof vent STOP: ✓

HEIGHT ABOVE GROUND LEVEL: 100' START STOP ✓ | HEIGHT RELATIVE TO OBSERVER: 100' START STOP ✓

DISTANCE FROM OBSERVER: 400' START STOP ✓ | DIRECTION FROM OBSERVER: W START STOP ✓

DESCRIBE EMISSIONS
START: gas/smoke STOP: ✓

EMISSION COLOR: Blue/white START STOP ✓ | PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☒ YES ☐ | IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START: Middle STOP: ✓

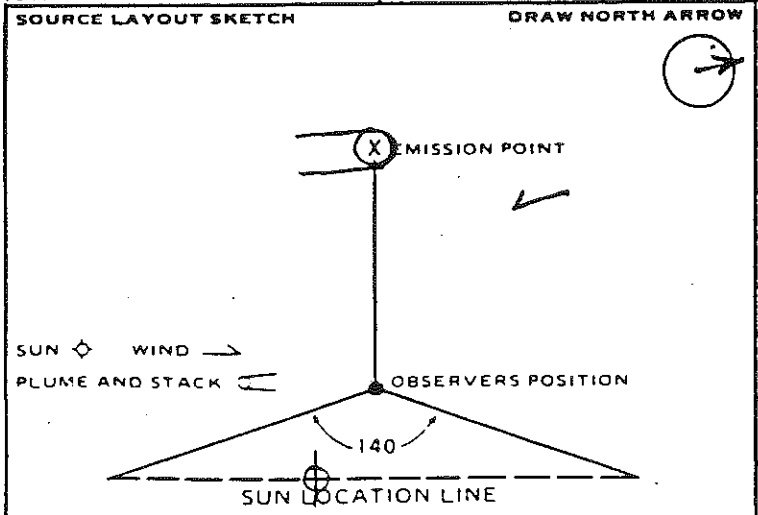
DESCRIBE BACKGROUND
Blue sky & Red dust collector START STOP ✓

BACKGROUND COLOR: Blue & Red START STOP – | SKY CONDITIONS: Sunny START STOP ✓

WIND SPEED: 15-20 START STOP – | WIND DIRECTION: N START STOP ✓

AMBIENT TEMP.: 60 START STOP – | WET BULB TEMP.: | RH, percent:

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




OBSERVATION DATE: 9/22/92 | START TIME: 9:50 | STOP TIME: 11:00

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 5 |
| 3 | 0 | 5 | 5 | 5 | 33 | 0 | 0 | 0 | 0 |
| 4 | 5 | 5 | 5 | 5 | 34 | 0 | 0 | 0 | 0 |
| 5 | 5 | 5 | 5 | 0 | 35 | 0 | 0 | 5 | 0 |
| 6 | 5 | 5 | 5 | 5 | 36 | 0 | 0 | 0 | 0 |
| 7 | 5 | 5 | 5 | 5 | 37 | 5 | 0 | 0 | 0 |
| 8 | 5 | 0 | 5 | 5 | 38 | 0 | 0 | 0 | 0 |
| 9 | 5 | 5 | 5 | 5 | 39 | 0 | 5 | 5 | 0 |
| 10 | 0 | 5 | 0 | 5 | 40 | 0 | 0 | 0 | 0 |
| 11 | 5 | 5 | 5 | 5 | 41 | 5 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 5 | 42 | 0 | 5 | 0 | 0 |
| 13 | 5 | 5 | 5 | 0 | 43 | 0 | 0 | 5 | 0 |
| 14 | 0 | 5 | 5 | 0 | 44 | 0 | 0 | 0 | 0 |
| 15 | 5 | 0 | 5 | 0 | 45 | 0 | 5 | 5 | 5 |
| 16 | 5 | 5 | 0 | 5 | 46 | 0 | 0 | 5 | 0 |
| 17 | 0 | 0 | 5 | 5 | 47 | 0 | 0 | 0 | 0 |
| 18 | 5 | 5 | 0 | 0 | 48 | 5 | 0 | 0 | 0 |
| 19 | 0 | 5 | 0 | 0 | 49 | 0 | 5 | 0 | 0 |
| 20 | 0 | 5 | 0 | 0 | 50 | 0 | 0 | 0 | 5 |
| 21 | 0 | 0 | 5 | 0 | 51 | 0 | 0 | 5 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 5 | 0 | 5 |
| 23 | 0 | 0 | 0 | 5 | 53 | 0 | 0 | 0 | 0 |
| 24 | 0 | 5 | 0 | 0 | 54 | 0 | 5 | 5 | 0 |
| 25 | 0 | 5 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| 26 | 5 | 0 | 0 | 5 | 56 | 0 | 0 | 5 | 0 |
| 27 | 0 | 0 | 5 | 0 | 57 | 5 | 0 | 0 | 5 |
| 28 | 0 | 0 | 0 | 0 | 58 | 5 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 5 | 0 | 0 |
| 30 | 5 | 0 | 0 | 0 | 60 | 0 | 0 | 5 | 0 |

AVERAGE OPACITY FOR HIGHEST PERIOD: 5 | NUMBER OF READINGS ABOVE: 5 % WERE 0

RANGE OF OPACITY READINGS: 0 MINIMUM 5 MAXIMUM

OBSERVER'S NAME (PRINT): Steve Dillard

OBSERVER'S SIGNATURE: Steve Dillard | DATE: 9/22/92

ORGANIZATION: Fugro McClelland Environmental

CERTIFIED BY: St. Louis Air Pollution Control | DATE: 4/16/92

VERIFIED BY: | DATE:

COMMENTS:

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

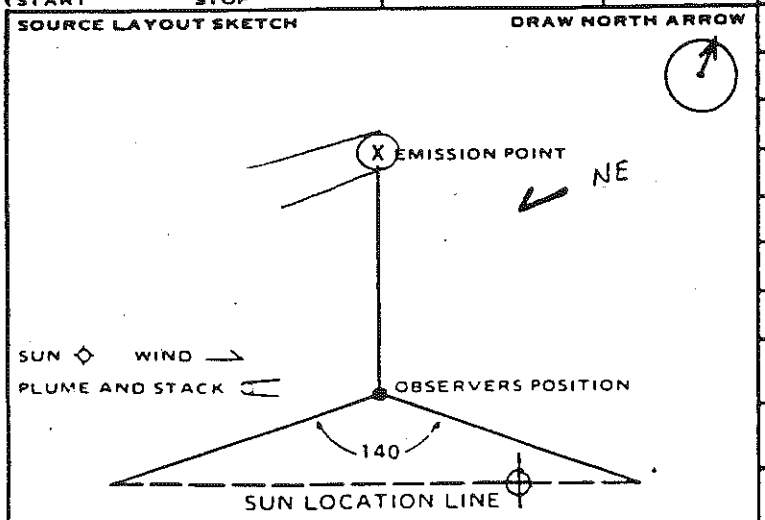
SIGNATURE:

TITLE: | DATE:

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | |
| CITY | Alton |
| STATE | Illinois |
| ZIP | |
| PHONE | |
| SOURCE ID NUMBER | Roof vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | dust collector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT START | roof vent |
| DESCRIBE EMISSION POINT STOP | ✓ |
| HEIGHT ABOVE GROUND LEVEL START | 100' |
| HEIGHT ABOVE GROUND LEVEL STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER START | 100' |
| HEIGHT RELATIVE TO OBSERVER STOP | ✓ |
| DISTANCE FROM OBSERVER START | 450' |
| DISTANCE FROM OBSERVER STOP | ✓ |
| DIRECTION FROM OBSERVER START | NW |
| DIRECTION FROM OBSERVER STOP | ✓ |
| DESCRIBE EMISSIONS START | gas/smoke |
| DESCRIBE EMISSIONS STOP | |
| EMISSION COLOR START | blue/white |
| EMISSION COLOR STOP | ✓ |
| PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ | |
| WATER DROPLETS PRESENT: NO ☒ YES ☐ | |
| IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ | |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | Middle |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP | ✓ |
| DESCRIBE BACKGROUND START | red dustcollector/blue sky |
| DESCRIBE BACKGROUND STOP | ✓ |
| BACKGROUND COLOR START | blue/red |
| BACKGROUND COLOR STOP | — |
| SKY CONDITIONS START | Clear |
| SKY CONDITIONS STOP | ✓ |
| WIND SPEED START | 8-12 |
| WIND SPEED STOP | — |
| WIND DIRECTION START | NE |
| WIND DIRECTION STOP | ✓ |
| AMBIENT TEMP. START | 50 |
| AMBIENT TEMP. STOP | — |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9/23/92 | 9:12 | 10:18 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 5 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 0 | 5 | 0 | 0 | 47 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 0 | 0 | 48 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 5 | 0 | 49 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 5 |
| NUMBER OF READINGS ABOVE | 0 % WERE 3 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 5 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Steve Dillard |
| OBSERVER'S SIGNATURE | Steve Dillard |
| DATE | 9/23/92 |
| ORGANIZATION | Fugro McClelland Environmental |
| CERTIFIED BY | St. Louis Air Pollution Control |
| DATE | 4/16/92 |
| VERIFIED BY | |
| DATE | |

COMMENTS

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

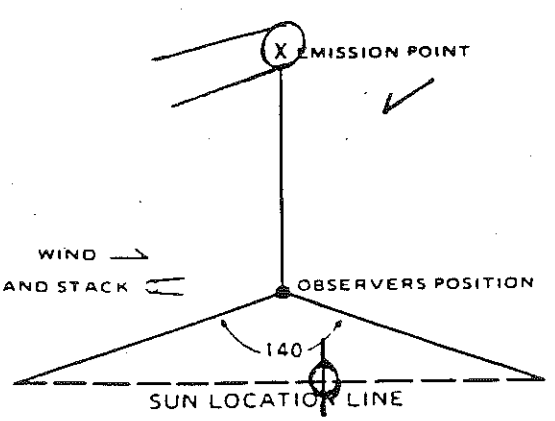
TITLE

DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | |
| CITY | Alton |
| STATE | Illinois |
| ZIP | |
| PHONE | |
| SOURCE ID NUMBER | Roof vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | dust collector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT | START roof vent STOP ✓ |
| HEIGHT ABOVE GROUND LEVEL | 100' START STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | 100' START STOP ✓ |
| DISTANCE FROM OBSERVER | 450' START STOP ✓ |
| DIRECTION FROM OBSERVER | NW START STOP ✓ |
| DESCRIBE EMISSIONS | START gas/smoke STOP ✓ |
| EMISSION COLOR | blue/white START STOP ✓ |
| PLUME TYPE: | CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ |
| WATER DROPLETS PRESENT: | NO ☒ YES ☐ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START middle STOP ✓ |
| DESCRIBE BACKGROUND | START red dustcollector blue sky STOP ✓ |
| BACKGROUND COLOR | blue/red START STOP — |
| SKY CONDITIONS | Clear START STOP ✓ |
| WIND SPEED | 8-12 START STOP — |
| WIND DIRECTION | NE START STOP ✓ |
| AMBIENT TEMP. | 60 START STOP — |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9/23/92 | 10:58 | 12:08 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 0 | 0 | 48 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 49 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 0 |
| NUMBER OF READINGS ABOVE | 0 % WERE 0 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 0 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Steve Dillard |
| OBSERVER'S SIGNATURE | Steve Dillard |
| DATE | 9/23/92 |
| ORGANIZATION | Fugro McClelland Environmental |
| CERTIFIED BY | St. Louis Air Pollution Control |
| DATE | 4/16/92 |
| VERIFIED BY | |
| DATE | |
| COMMENTS | |
| I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS | |
| SIGNATURE | |
| TITLE | |
| DATE | |

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | |
| CITY | Alton |
| STATE | Illinois |
| ZIP | |
| PHONE | |
| SOURCE ID NUMBER | Roof Vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | dust collector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT START | roof vent |
| DESCRIBE EMISSION POINT STOP | ✓ |
| HEIGHT ABOVE GROUND LEVEL START | 100' |
| HEIGHT ABOVE GROUND LEVEL STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER START | 100' |
| HEIGHT RELATIVE TO OBSERVER STOP | ✓ |
| DISTANCE FROM OBSERVER START | 450' |
| DISTANCE FROM OBSERVER STOP | ✓ |
| DIRECTION FROM OBSERVER START | NW |
| DIRECTION FROM OBSERVER STOP | ✓ |
| DESCRIBE EMISSIONS START | gas / smoke |
| DESCRIBE EMISSIONS STOP | ✓ |
| EMISSION COLOR START | blue / white |
| EMISSION COLOR STOP | ✓ |
| PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ | |
| WATER DROPLETS PRESENT: NO ☒ YES ☐ | |
| IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ | |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | middle |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP | ✓ |
| DESCRIBE BACKGROUND START | dustcollector / sky |
| DESCRIBE BACKGROUND STOP | ✓ |
| BACKGROUND COLOR START | red / blue |
| BACKGROUND COLOR STOP | — |
| SKY CONDITIONS START | Clear |
| SKY CONDITIONS STOP | ✓ |
| WIND SPEED START | 10 - 12 |
| WIND SPEED STOP | — |
| WIND DIRECTION START | NE |
| WIND DIRECTION STOP | ✓ |
| AMBIENT TEMP. START | 70 |
| AMBIENT TEMP. STOP | — |
| WET BULB TEMP. | |
| RH, percent | |

OBSERVATION DATE: 9/23/92 | START TIME: 14:10 | STOP TIME: 15:42

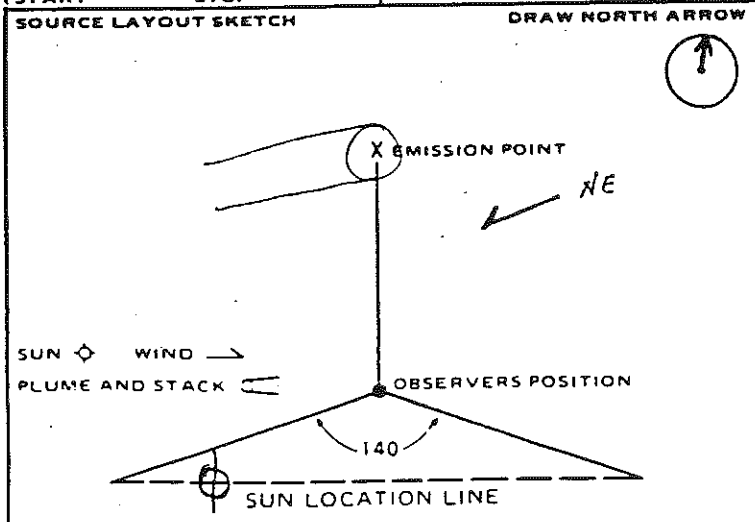
| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 33 | 0 | 5 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 5 | 0 |
| 5 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 36 | 5 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 37 | 0 | 5 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 5 | 5 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 5 | 0 | 5 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 5 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 5 | 0 | 5 | 0 | 47 | 0 | 0 | 0 | 0 |
| 18 | 5 | 5 | 0 | 5 | 48 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 49 | 0 | 0 | 0 | 0 |
| 20 | 5 | 0 | 5 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 5 | 5 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 5 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 5 |
| 23 | 0 | 0 | 0 | 5 | 53 | 5 | 5 | 5 | 5 |
| 24 | 5 | 0 | 5 | 0 | 54 | 5 | 5 | 5 | 5 |
| 25 | 0 | 5 | 0 | 0 | 55 | 5 | 0 | 0 | 5 |
| 26 | 0 | 0 | 0 | 0 | 56 | 5 | 5 | 5 | 5 |
| 27 | 5 | 0 | 0 | 0 | 57 | 5 | 5 | 5 | 5 |
| 28 | 0 | 0 | 0 | 0 | 58 | 5 | 5 | 5 | 0 |
| 29 | 0 | 5 | 0 | 0 | 59 | 5 | 0 | 5 | 5 |
| 30 | 0 | 0 | 0 | 0 | 60 | 0 | 5 | 5 | 5 |

AVERAGE OPACITY FOR HIGHEST PERIOD: 5

NUMBER OF READINGS ABOVE: 5 WERE 0

RANGE OF OPACITY READINGS: 0 MINIMUM, 5 MAXIMUM

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




COMMENTS: 17:45 into test - dust line plug

OBSERVER'S NAME (PRINT): Steve Dillard

OBSERVER'S SIGNATURE: Steve Dillard — DATE: 9/23/92

ORGANIZATION: Fugro McClelland Environmental

CERTIFIED BY: St. Louis Air Pollution Control — DATE: 4/16/92

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SIGNATURE

TITLE — DATE

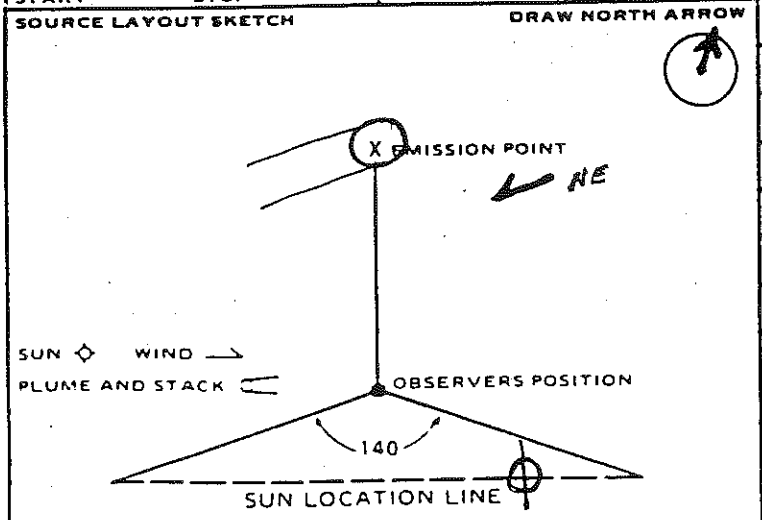
VERIFIED BY — DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | |
| CITY | Alton |
| STATE | Il |
| ZIP | |
| PHONE | |
| SOURCE ID NUMBER | Roof vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | dust collector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT | START roof vent STOP ✓ |
| HEIGHT ABOVE GROUND LEVEL | START 100' STOP ✓ |
| HEIGHT RELATIVE TO OBSERVER | START 100' STOP ✓ |
| DISTANCE FROM OBSERVER | START 450' STOP ✓ |
| DIRECTION FROM OBSERVER | START NW STOP ✓ |
| DESCRIBE EMISSIONS | START gas/smoke STOP ✓ |
| EMISSION COLOR | START blue/white STOP ✓ |
| PLUME TYPE: | CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ |
| WATER DROPLETS PRESENT: | NO ☒ YES ☐ |
| IF WATER DROPLET PLUME: | ATTACHED ☐ DETACHED ☐ |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | START middle STOP ✓ |
| DESCRIBE BACKGROUND | START dustcollector/sky STOP ✓ |
| BACKGROUND COLOR | START red/blue STOP — |
| SKY CONDITIONS | START Clear STOP ✓ |
| WIND SPEED | START 8-10 STOP — |
| WIND DIRECTION | START NE STOP ✓ |
| AMBIENT TEMP. | START 50 STOP — |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9/24/92 | 9:07 | 10:12 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 5 | 0 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 5 | 0 |
| 18 | 0 | 0 | 0 | 0 | 48 | 0 | 0 | 0 | 0 |
| 19 | 5 | 0 | 0 | 0 | 49 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 0 |
| NUMBER OF READINGS ABOVE | 0 % WERE 3 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 5% MAXIMUM |
| OBSERVER'S NAME (PRINT) | Steve Dillard |
| OBSERVER'S SIGNATURE | Steve Dillard |
| DATE | 9/24/92 |
| ORGANIZATION | Fugro McClelland Environmental |
| CERTIFIED BY | St. Louis Air Pollution Control |
| DATE | 4/16/92 |
| VERIFIED BY | |
| DATE | |

COMMENTS

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TITLE

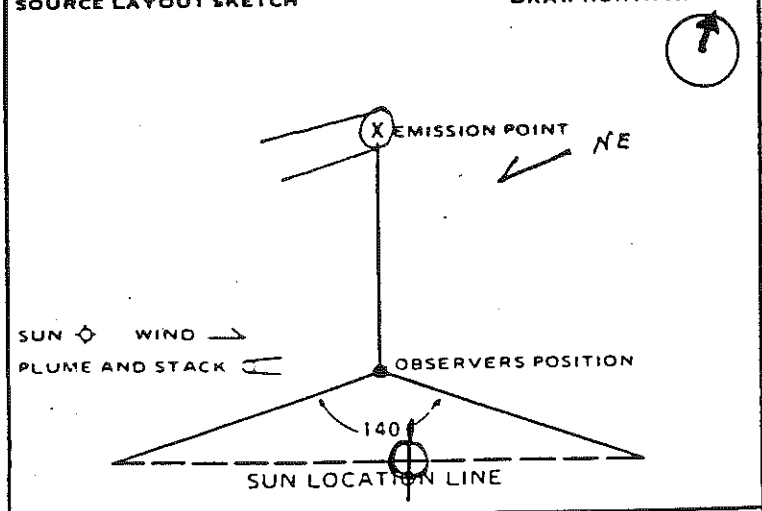
DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | |
| CITY | Alton |
| STATE | Il |
| ZIP | |
| PHONE | |
| SOURCE ID NUMBER | Roof Vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | dustcollector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT START | Roof Vent |
| DESCRIBE EMISSION POINT STOP | ✓ |
| HEIGHT ABOVE GROUND LEVEL START | 100' |
| HEIGHT ABOVE GROUND LEVEL STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER START | 100' |
| HEIGHT RELATIVE TO OBSERVER STOP | ✓ |
| DISTANCE FROM OBSERVER START | 450' |
| DISTANCE FROM OBSERVER STOP | ✓ |
| DIRECTION FROM OBSERVER START | NW |
| DIRECTION FROM OBSERVER STOP | ✓ |
| DESCRIBE EMISSIONS START | gas / smoke |
| DESCRIBE EMISSIONS STOP | ✓ |
| EMISSION COLOR START | blue/white |
| EMISSION COLOR STOP | ✓ |
| PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ | |
| WATER DROPLETS PRESENT: NO ☒ YES ☐ | |
| IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ | |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | middle |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP | ✓ |
| DESCRIBE BACKGROUND START | dustcollector / sky |
| DESCRIBE BACKGROUND STOP | ✓ |
| BACKGROUND COLOR START | red / blue |
| BACKGROUND COLOR STOP | ✓ |
| SKY CONDITIONS START | Clear |
| SKY CONDITIONS STOP | ✓ |
| WIND SPEED START | 8-10 |
| WIND SPEED STOP | ✓ |
| WIND DIRECTION START | NE |
| WIND DIRECTION STOP | ✓ |
| AMBIENT TEMP. START | 58 |
| AMBIENT TEMP. STOP | ✓ |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW




OBSERVATION DATE: 9/24/92 START TIME: 11:20 STOP TIME: 1233

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 5 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 |
| 3 | 5 | 5 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 |
| 8 | 5 | 0 | 0 | 5 | 38 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 |
| 10 | 5 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 5 | 0 | 0 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 0 | 0 | 48 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 49 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 0 | 5 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 |

AVERAGE OPACITY FOR HIGHEST PERIOD: 0

NUMBER OF READINGS ABOVE 0 % WERE 8

RANGE OF OPACITY READINGS: 0 MINIMUM 5 MAXIMUM

| | |
|---|---|
| OBSERVER'S NAME (PRINT) | Steve Dillard |
| OBSERVER'S SIGNATURE | Steve Dillard |
| DATE | 9/24/92 |
| ORGANIZATION | Fugro McClelland Environmental |
| CERTIFIED BY | St. Louis Air Pollution Control |
| DATE | 9/16/92 |
| VERIFIED BY | |
| DATE | |
| COMMENTS | |
| I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS | |
| SIGNATURE | |
| TITLE | |
| DATE | |

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | |
| CITY | Alton |
| STATE | Il. |
| ZIP | |
| PHONE | |
| SOURCE ID NUMBER | Roof Vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | dustcollector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT START | Roof vent |
| DESCRIBE EMISSION POINT STOP | ✓ |
| HEIGHT ABOVE GROUND LEVEL START | 100' |
| HEIGHT ABOVE GROUND LEVEL STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER START | 100' |
| HEIGHT RELATIVE TO OBSERVER STOP | ✓ |
| DISTANCE FROM OBSERVER START | 300' |
| DISTANCE FROM OBSERVER STOP | ✓ |
| DIRECTION FROM OBSERVER START | E |
| DIRECTION FROM OBSERVER STOP | ✓ |
| DESCRIBE EMISSIONS START | gas/smoke |
| DESCRIBE EMISSIONS STOP | ✓ |
| EMISSION COLOR START | blue/white |
| EMISSION COLOR STOP | ✓ |
| PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ | |
| WATER DROPLETS PRESENT: NO ☒ YES ☐ | |
| IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ | |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | middle |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP | ✓ |
| DESCRIBE BACKGROUND START | dustcollector / sky |
| DESCRIBE BACKGROUND STOP | ✓ |
| BACKGROUND COLOR START | red / grey |
| BACKGROUND COLOR STOP | – |
| SKY CONDITIONS START | cloudy/overcast |
| SKY CONDITIONS STOP | ✓ |
| WIND SPEED START | 5-8 |
| WIND SPEED STOP | – |
| WIND DIRECTION START | SE |
| WIND DIRECTION STOP | ✓ |
| AMBIENT TEMP. START | 65 |
| AMBIENT TEMP. STOP | – |
| WET BULB TEMP. | |
| RH, percent | |

OBSERVATION DATE: 9/25/92 START TIME: 9:21 STOP TIME: 10:27

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 5 | 10 | 10 | 15 |
| 3 | 0 | 0 | 0 | 0 | 33 | 10 | 10 | 5 | 5 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 0 |
| 5 | 0 | 0 | 0 | 0 | 35 | 0 | 10 | 10 | 10 |
| 6 | 0 | 0 | 0 | 0 | 36 | 5 | 5 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 39 | 10 | 10 | 15 | 15 |
| 10 | 0 | 0 | 0 | 0 | 40 | 10 | 5 | 5 | 5 |
| 11 | 0 | 0 | 0 | 0 | 41 | 5 | 5 | 5 | 0 |
| 12 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| 13 | 5 | 5 | 5 | 5 | 43 | 0 | 0 | 0 | 0 |
| 14 | 5 | 5 | 5 | 5 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 5 | 5 | 48 | 0 | 0 | 0 | 0 |
| 19 | 5 | 5 | 5 | 0 | 49 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 5 | 5 | 60 | 0 | 0 | 0 | 0 |

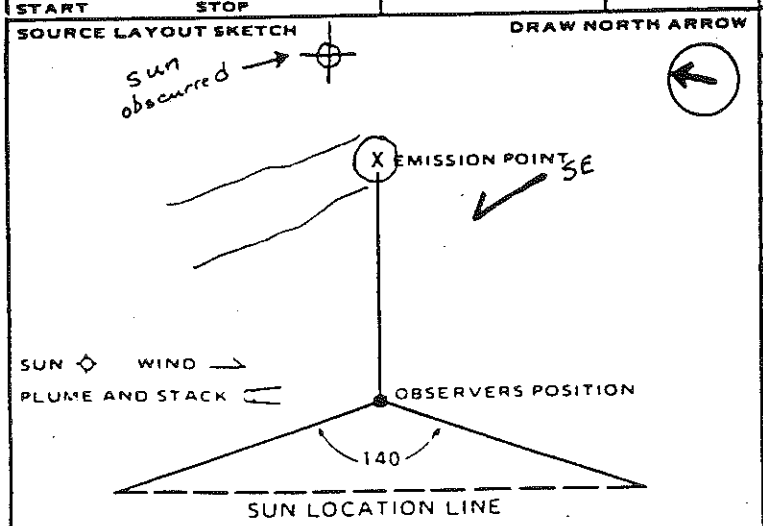
AVERAGE OPACITY FOR HIGHEST PERIOD: 5

NUMBER OF READINGS ABOVE 5 % WERE 13

RANGE OF OPACITY READINGS: 0 MINIMUM 15 MAXIMUM

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW




COMMENTS: This is not an ideal location (following EPA observer) EPA observer using tinted glasses

OBSERVER'S NAME (PRINT): Steve Dillard

OBSERVER'S SIGNATURE: Steve Dillard DATE: 9/25/92

ORGANIZATION: Fugro McClelland Environmental

CERTIFIED BY: St. Louis Air Pollution Control DATE: 4/16/92

VERIFIED BY: DATE:

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SIGNATURE

TITLE DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | |
| CITY | Alton |
| STATE | Il |
| ZIP | |
| PHONE | |
| SOURCE ID NUMBER | Roof Vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | roof mounted dust collector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT START | roof vent |
| DESCRIBE EMISSION POINT STOP | ✓ |
| HEIGHT ABOVE GROUND LEVEL START | 100' |
| HEIGHT ABOVE GROUND LEVEL STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER START | 100' |
| HEIGHT RELATIVE TO OBSERVER STOP | ✓ |
| DISTANCE FROM OBSERVER START | 460' |
| DISTANCE FROM OBSERVER STOP | ✓ |
| DIRECTION FROM OBSERVER START | W |
| DIRECTION FROM OBSERVER STOP | ✓ |
| DESCRIBE EMISSIONS START | gas / smoke |
| DESCRIBE EMISSIONS STOP | ✓ |
| EMISSION COLOR START | blue / white |
| EMISSION COLOR STOP | |
| PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ | |
| WATER DROPLETS PRESENT: NO ☒ YES ☐ | |
| IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ | |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START | middle |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED STOP | ✓ |
| DESCRIBE BACKGROUND START | dustcollector / sky |
| DESCRIBE BACKGROUND STOP | ✓ |
| BACKGROUND COLOR START | red / grey |
| BACKGROUND COLOR STOP | — |
| SKY CONDITIONS START | Cloudy |
| SKY CONDITIONS STOP | ✓ |
| WIND SPEED START | 5-8 |
| WIND SPEED STOP | — |
| WIND DIRECTION START | S |
| WIND DIRECTION STOP | ✓ |
| AMBIENT TEMP. START | 70 |
| AMBIENT TEMP. STOP | — |
| WET BULB TEMP. | |
| RH, percent | |

OBSERVATION DATE: 9/25/92 | START TIME: 11:24 | STOP TIME: 12:28

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 5 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 5 | 0 | 0 | 0 |
| 3 | 0 | 0 | 5 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 5 |
| 5 | 0 | 0 | 0 | 0 | 35 | 5 | 5 | 0 | 0 |
| 6 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 | 0 | 39 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 41 | 0 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 0 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 0 | 0 | 48 | 5 | 5 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 49 | 5 | 0 | 5 | 0 |
| 20 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 0 | 0 | 0 | 0 | 53 | 5 | 0 | 5 | 0 |
| 24 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 55 | 5 | 5 | 0 | 5 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 |

AVERAGE OPACITY FOR HIGHEST PERIOD: 0

NUMBER OF READINGS ABOVE 0 % WERE 15

RANGE OF OPACITY READINGS: 0 MINIMUM 5 MAXIMUM

OBSERVER'S NAME (PRINT): Steve Dillard

OBSERVER'S SIGNATURE: Steve Dillard

DATE: 9/25/92

ORGANIZATION: Fugro McClelland Environmental

CERTIFIED BY: St. Louis Air Pollution Control

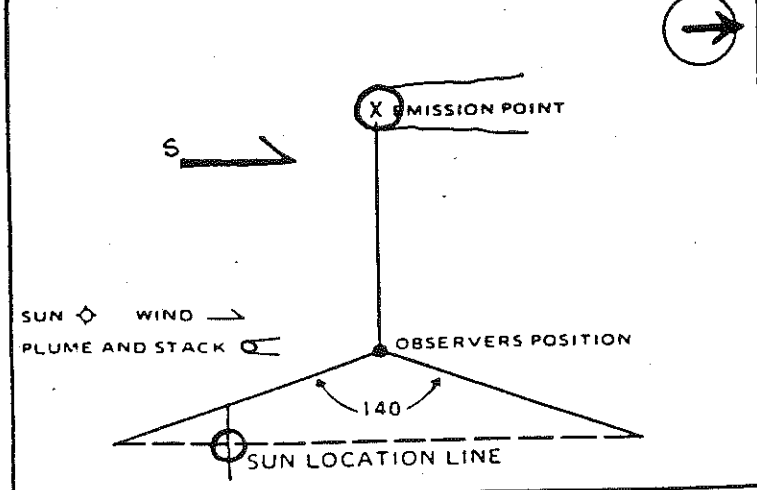
DATE: 4/16/92

VERIFIED BY:

DATE:

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW




COMMENTS

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SIGNATURE

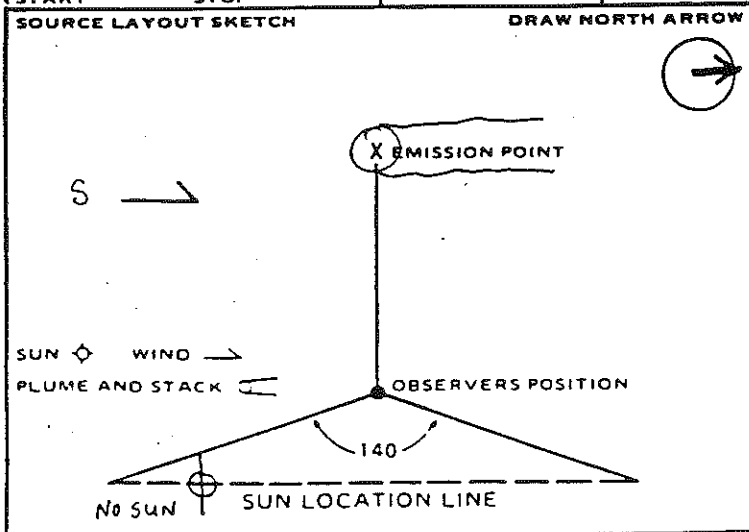
TITLE

DATE

# VISIBLE EMISSION OBSERVATION FORM

| | |
|---|---|
| SOURCE NAME | Chemetco |
| ADDRESS | P.O. Box 187 |
| CITY | Alton |
| STATE | Il |
| ZIP | 62002 |
| PHONE | |
| SOURCE ID NUMBER | Roof vent |
| PROCESS EQUIPMENT | furnace |
| OPERATING MODE | ON |
| CONTROL EQUIPMENT | roof mounted dust collector |
| OPERATING MODE | ON |
| DESCRIBE EMISSION POINT | roof vent |
| START | |
| STOP | ✓ |
| HEIGHT ABOVE GROUND LEVEL | 100' |
| START | |
| STOP | ✓ |
| HEIGHT RELATIVE TO OBSERVER | 100' |
| START | |
| STOP | ✓ |
| DISTANCE FROM OBSERVER | 450' |
| START | |
| STOP | ✓ |
| DIRECTION FROM OBSERVER | W |
| START | |
| STOP | ✓ |
| DESCRIBE EMISSIONS | gas / smoke |
| START | |
| STOP | ✓ |
| EMISSION COLOR | blue / white |
| START | |
| STOP | ✓ |
| PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒ | |
| WATER DROPLETS PRESENT: NO ☒ YES ☐ | |
| IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐ | |
| POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED | middle |
| START | |
| STOP | ✓ |
| DESCRIBE BACKGROUND | dust collector / sky |
| START | |
| STOP | ✓ |
| BACKGROUND COLOR | red / grey |
| START | |
| STOP | – |
| SKY CONDITIONS | overcast |
| START | |
| STOP | ✓ |
| WIND SPEED | 8-12 |
| START | |
| STOP | – |
| WIND DIRECTION | S |
| START | |
| STOP | ✓ |
| AMBIENT TEMP. | 72 |
| START | |
| STOP | – |
| WET BULB TEMP. | |
| RH, percent | |

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW




| OBSERVATION DATE | START TIME | STOP TIME |
|---|---|---|
| 9/25/92 | 12:54 | 14:00 |

| MIN \ SEC | 0 | 15 | 30 | 45 | MIN \ SEC | 0 | 15 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 |
| 3 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 |
| 4 | 5 | 5 | 0 | 5 | 34 | 0 | 0 | 0 | 0 |
| 5 | 0 | 5 | 0 | 5 | 35 | 0 | 0 | 0 | 0 |
| 6 | 5 | 5 | 5 | 5 | 36 | 0 | 0 | 0 | 0 |
| 7 | 5 | 5 | 5 | 5 | 37 | 0 | 0 | 0 | 0 |
| 8 | 5 | 5 | 5 | 5 | 38 | 0 | 0 | 0 | 0 |
| 9 | 5 | 5 | 5 | 5 | 39 | 0 | 0 | 0 | 0 |
| 10 | 5 | 5 | 5 | 0 | 40 | 0 | 0 | 0 | 0 |
| 11 | 5 | 5 | 5 | 0 | 41 | 0 | 0 | 0 | 0 |
| 12 | 0 | 5 | 0 | 5 | 42 | 0 | 0 | 0 | 0 |
| 13 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 |
| 14 | 0 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 |
| 16 | 0 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 0 |
| 17 | 0 | 5 | 5 | 0 | 47 | 0 | 0 | 0 | 0 |
| 18 | 0 | 0 | 0 | 0 | 48 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 0 | 0 | 49 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| 21 | 0 | 0 | 0 | 0 | 51 | 0 | 0 | 0 | 0 |
| 22 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 |
| 23 | 5 | 5 | 0 | 5 | 53 | 0 | 0 | 0 | 0 |
| 24 | 0 | 5 | 0 | 0 | 54 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 55 | 0 | 0 | 0 | 0 |
| 26 | 0 | 0 | 0 | 0 | 56 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 60 | 0 | 0 | 0 | 0 |

| | |
|---|---|
| AVERAGE OPACITY FOR HIGHEST PERIOD | 5 |
| NUMBER OF READINGS ABOVE | 5 % WERE 0 |
| RANGE OF OPACITY READINGS | 0 MINIMUM 5 MAXIMUM |
| OBSERVER'S NAME (PRINT) | Steve Dillard |
| OBSERVER'S SIGNATURE | Steve Dillard |
| DATE | 9/25/92 |
| ORGANIZATION | Fugro McClelland Environmental |
| CERTIFIED BY | St. Louis Air Pollution Control |
| DATE | 4/16/92 |
| VERIFIED BY | |
| DATE | |

COMMENTS

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SIGNATURE

TITLE

DATE

# APPENDIX I

Visual Emissions Certification Documents

# VISIBLE EMISSIONS EVALUATOR

*This is to certify that*

Robert Stoller

*met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.*

President

235221
Certificate Number

Vice President

Cincinnati
Location

David B. Savage, Jr.
Program Manager

September 3, 1992
Date of Issue

LITHO. IN U.S.A.

# QUALIFIED OBSERVER OF VISIBLE OPACITY

I hereby certify that

**Steven Dillard**

did on April 16, 1992 qualify to conduct EPA Method 9 Tests for visible opacity in accordance with the methods established for such qualification in 40CFR Part 52 Appendix F.

| | | |
|---|---|---|
| Average Deviation: | Black Plumes | 5.8 |
| | White Plumes | 5.6 |

ATTEST: Thomas A. Wiese

Thomas A. Wiese
EPA Test Method 9 Trainer
St. Louis, MO
Air Pollution Control

Certificate expires: November 1, 1992

# APPENDIX J

## Facility Process Data

WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

8:56:42 AM SATURDAY OCTOBER 3, 1992

```
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 4                PAGE:  3   * 1*
* 2*                                                                                  * 2*
* 3*  11:25 TAPHOLE METAL TRANSFER     DATE 09/23/92     FCE 4   HEAT C308      RRL   * 3*
* 4*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  FROM  TIME  * 4*
* 5*  2150   94.78    .00   1.53   2.38    .76    .00    .23    .00  80000 3 0184 10:45 * 5*
* 6*                                                                                  * 6*
* 7*  12:50 SLAG OFF TRANSFER          DATE 09/23/92     FCE 4   HEAT C308      RRL   * 7*
* 8*  TEMP      CU     FE     PB     SN     NI     ZN     SB   SIO2 WEIGHT  TO        * 8*
* 9*  2050   28.84   6.55   9.82   5.87   1.56   9.10    .35 14.64  35000 1 0624     * 9*
*10*    TO TIME 13:50 BLOW 01  SLAG : THICK   FLUID                                   *10*
* 1*  12:51 SLAG OFF TRANSFER          DATE 09/23/92     FCE 4   HEAT C308      RRL   * 1*
* 2*  TEMP      CU     FE     PB     SN     NI     ZN     SB   SIO2 WEIGHT  TO        * 2*
* 3*  2050   28.84   6.55   9.82   5.87   1.56   9.10    .35 14.64  30000 4 0309     * 3*
* 4*    TO TIME 13:45 BLOW 01  SLAG : THICK X FLUID                                   * 4*
* 5*  13:05 TAP METAL                  DATE 09/23/92     FCE 4   HEAT 0308      RRL   * 5*
* 6*  TEMP      CU     PB     SN     NI     SB     AG     02  WEIGHT TO HOLD/FCE      * 6*
* 7*  2050   99.44    .11    .00    .09    .03    .C22    .00 235000                 * 7*
* 8*  TO TIME 13:40 GAS 044000  OXYGEN                          144010                 * 8*
* 9*  13:45 REFINE SLAG TRANSFER       DATE 09/23/92     FCE 4   HEAT C309      RRL   * 9*
*20*  TEMP      CU     FE     PB     SN     NI     ZN     SB   SIO2 WEIGHT  FROM      *20*
* 1*  2050   28.84   6.55   9.82   5.87   1.56   9.10    .35 14.64  20000 4 0308     * 1*
* 2*  FROM TIME 12:51 BLOW     SLAG : THICK   FLUID                                   * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
```

EMISSION RATE CALCULATION

09/24/92 Furnace 1 -- REFINE

| TIME | MATERIAL/ACTION | IN | OUT |
|---|---|---|---|
| 07:10 | Cold Charge 23-1 | 30000 | |
| 07:11 | Pot Slag | 10000 | |
| 07:20 | Cold Charge 23-1 | 30000 | |
| 07:21 | Cold Charge 23-1 | 30000 | |
| 07:22 | Lime | 3000 | |
| 09:00 | Cold Charge 23-1 | 47660 | |
| 11:35 | Taphole metal | 90000 | |
| 12:25 | Black Copper | 80000 | |
| 13:15 | Slag off refine slag(Off Burner) | | 45000 |
| 13:58 | Tap Metal to Holding Furnace | | 245000 |

Left in Furnace: 30,660 lbs.

| | | |
|---|---|---|
| | 320660 | 290000 |
| TOTAL TONNAGE: | 160.33 | Tons |
| HEAT TIME: | 6.08 | Hours |
| PROCESS WEIGHT RATE: | 26.37 | Tons/hour |

ORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

6:59:02 AM SATURDAY OCTOBER 3, 1992

```
*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
 *                                                                                     *  *
 1*                          DETAIL EVENT LOG FOR FURNACE 1                PAGE:  1     * 1*
 2*                                                                                     * 2*
 3*  04:30 CHARGE                          DATE 09/24/92      FCE 1   HEAT 0625      DLA  * 3*
 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU   PT  * 4*
 5*   .00    .00    .00  63.18    .00  27.52    .84    .00    .00    .00    .00    .00  .00  * 5*
 6*   19840 POUNDS OF REFINERY                                                          * 6*
 7*  04:31 CHARGE                          DATE 09/24/92      FCE 1   HEAT 0625      DLA  * 7*
 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU   PT  * 8*
 9*   .00    .00    .00  12.00    .00    .00    .00    .00    .00    .00    .00    .00  .00  * 9*
10*   10000 POUNDS OF POT SLAG                                                          *10*
 1*  05:40 SLAG OFF THROWAWAY SLAG         DATE 09/24/92      FCE 1   HEAT 0625      DLA  * 1*
 2*  TEMP      CU     FE     PB     SN     ZN    SIO2   CAO   AL2O3 WEIGHT  TO          * 2*
 3*  0000     .13  39.10    .42    .18   5.43  32.19   2.94    .00 110000 9 9999 06:30  * 3*
 4*                                                                                     * 4*
 5*  07:10 CHARGE                          DATE 09/24/92      FCE 1   HEAT 0626      RRL  * 5*
 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU   PT  * 6*
 7*   .06   2.22   2.93  71.51    .08   7.63    .24    .00    .11    .00    .00    .00  .00  * 7*
 8*   30000 POUNDS OF CC     23-1                                                       * 8*
 9*  07:11 CHARGE                          DATE 09/24/92      FCE 1   HEAT 0626      RRL  * 9*
20*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU   PT  *20*
 1*   .00    .00    .00  12.00    .00    .00    .00    .00    .00    .00    .00    .00  .00  * 1*
 2*   10000 POUNDS OF POT SLAG                                                          * 2*
 3*                                                                                     * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN         * 4*
 *                                                                                     *  *
*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
```

WORKSTATION 162 - USER MLR - REZNACK, MICHELLE 219 RE

8:59:08 AM SATURDAY OCTOBER 3, 1992

```
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 1                PAGE:  2   * 1*
* 2*                                                                                  * 2*
* 3*  07:20 CHARGE                        DATE 09/24/92     FCE 1   HEAT C626      RRL  * 3*
* 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 4*
* 5*    .06   2.22   2.93  71.51   .08   7.63   .24   .00   .11   .00   .00   .00   .00  * 5*
* 6*   30000 POUNDS OF CC     23-1                                                      * 6*
* 7*  07:21 CHARGE                        DATE 09/24/92     FCE 1   HEAT C626      RRL  * 7*
* 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 8*
* 9*    .06   2.22   2.93  71.51   .08   7.63   .24   .00   .11   .00   .00   .00   .00  * 9*
*10*   30000 POUNDS OF CC     23-1                                                      *10*
* 1*  07:22 CHARGE                        DATE 09/24/92     FCE 1   HEAT C626      RRL  * 1*
* 2*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 2*
* 3*    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00  * 3*
* 4*    3000 POUNDS OF LIME,BURNT                                                       * 4*
* 5*  09:00 CHARGE                        DATE 09/24/92     FCE 1   HEAT C626      RRL  * 5*
* 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 6*
* 7*    .06   2.22   2.93  71.51   .08   7.63   .24   .00   .11   .00   .00   .00   .00  * 7*
* 8*   47660 POUNDS OF CC     23-1                                                      * 8*
* 9*  11:35 TAPHOLE METAL TRANSFER        DATE 09/24/92     FCE 1   HEAT C187      RRL  * 9*
*20*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  FROM   TIME  *20*
* 1*  2180    95.27    .00   2.07   1.56    .57    .00    .21    .00  90000 3 0187 11:10  * 1*
* 2*                                                                                  * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

8:59:16 AM SATURDAY OCTOBER 3, 1992

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*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 1                PAGE:  3   * 1*
* 2*                                                                                  * 2*
* 3*  12:25 BLACK COPPER TRANSFER      DATE 09/24/92      FCE 1   HEAT 0626      RRL   * 3*
* 4*  TEMP     CU    FE    PB    SN    NI    ZN    SB    AS  WEIGHT  FROM            * 4*
* 5*  0000   97.14   .00   .93   .47  1.01   .00   .12   .00  80000 2 0799           * 5*
* 6*  FROM TIME 11:50                                                                 * 6*
* 7*  13:15 SLAG OFF TRANSFER          DATE 09/24/92      FCE 1   HEAT 0626      RRL   * 7*
* 8*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2 WEIGHT  TO              * 8*
* 9*  2050   53.69  5.52  7.11  1.01   .74  1.97   .37  9.48  45000 4 0312           * 9*
*10*    TO TIME 13:20 BLOW 01  SLAG : THICK   FLUID                                  *10*
* 1*  13:58 TAP METAL                  DATE 09/24/92      FCE 1   HEAT 0626      RRL   * 1*
* 2*  TEMP     CU    PB    SN    NI    SB    AG    O2  WEIGHT TO HOLD/FCE            * 2*
* 3*  2150   99.28   .18   .00   .18   .04  .024   .00 245000                        * 3*
* 4*  TO TIME 14:15 GAS 033000  OXYGEN                        183380                  * 4*
* 5*  14:10 CHARGE                     DATE 09/24/92      FCE 1   HEAT 0627      GLN   * 5*
* 6*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   * 6*
* 7*   .07  2.23  2.82 73.38   .09  6.72   .15   .00   .10   .00   .00   .00   .00   * 7*
* 8*  139080 POUNDS OF CC    24-3                                                     * 8*
* 9*  15:05 DELAY TYPE MC       17:45 DATE 09/24/92      FCE 1   HEAT 0627      GLN   * 9*
*20*  WORKING ON 100T                                                                 *20*
* 1*                                                                                  * 1*
* 2*                                                                                  * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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EMISSION RATE CALCULATION

09/23/92 Furnace 1 -- SMELT/SLAG TREATMENT WITH DUST INJEC

| TIME | MATERIAL/ACTION | IN | OUT |
|---|---|---|---|
| 09:25 | Smelt Charge | 67520 | |
| 09:26 | Pot Slag | 10000 | |
| 13:40 | Slag Off Throwaway | | 50000 |
| 13:50 | Refine Slag Transfer | 20000 | |
| 14:10 | Inject Dust | 36600 | |
| 16:10 | Slag Off Throwaway | | 45000 |
| 16:38 | Refinery | 10000 | |
| 16:39 | Sand | 10000 | |
| 16:50 | Refinery | 10560 | |
| 18:45 | Smelting Slag Transfer | 60000 | |
| 19:30 | Smelting Slag Transfer | | 70000 |
| 19:45 | Smelting Slag Transfer | 40000 | |
| 19:50 | No. 2 Copper | 12000 | |
| 20:40 | No. 2 Copper | 12000 | |
| 21:00 | Refine Slag Transfer | 40000 | |
| 22:25 | Sand | 12000 | |
| 23:15 | Blow Taphole | | 80000 |
| 00:15 | D.A.B. | 9200 | |
| 01:00 | Blow Taphole | | 12000 |
| 01:35 | Tin Cans | 32000 | |
| 03:00 | Tin Cans | 10000 | |
| 03:55 | Tap 2nd Metal | | 40000 |
| 04:30 | Refinery | 19840 | |
| 04:31 | Pot Slag | 10000 | |
| 05:40 | Slag Off Throwaway | | 110000 |
| | | 421720 | 407000 |

Left in furnace: 14,720 lbs

TOTAL TONNAGE: 210.86 Tons
HEAT TIME: 18.5 Hours
PROCESS WEIGHT RATE: 11.40 Tons/hour

ORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

8:57:21 AM SATURDAY OCTOBER 3, 1992

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*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
 *                                                                                     *  *
 1*                        DETAIL EVENT LOG FOR FURNACE 1                  PAGE:  1     * 1*
 2*                                                                                     * 2*
 3*  09:25 CHARGE                        DATE 09/23/92      FCE 1   HEAT 0624      RRL  * 3*
 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 4*
 5*    .18    .19    .47  35.26    .53   2.44  31.41    .00    .00    .00    .00    .00    .00  * 5*
 6*   67520 POUNDS OF SM CG INJE                                                        * 6*
 7*  09:26 CHARGE                        DATE 09/23/92      FCE 1   HEAT 0624      RRL  * 7*
 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 8*
 9*    .00    .00    .00  12.00    .00    .00    .00    .00    .00    .00    .00    .00    .00  * 9*
10*   10000 POUNDS OF POT SLAG                                                          *10*
 1*  13:40 SLAG OFF THROWAWAY SLAG       DATE 09/23/92      FCE 1   HEAT 0624      RRL  * 1*
 2*  TEMP      CU     FE     PB     SN     ZN    SIO2   CAO   AL2O3 WEIGHT  TO          * 2*
 3*  0000      .28  39.78    .49    .23   6.22  28.09   1.78   9.14  50000 9 9999 13:45  * 3*
 4*                                                                                     * 4*
 5*  13:45 BLACK COPPER SAMPLE ONLY      DATE 09/23/92      FCE 1   HEAT 0624      RRL  * 5*
 6*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  TO          * 6*
 7*  0000    69.60   2.54   7.90  12.82   2.68   4.28    .19    .00       0 0 0000     * 7*
 8*    TO TIME 00:00                                                                    * 8*
 9*  13:50 REFINE SLAG TRANSFER          DATE 09/23/92      FCE 1   HEAT 0624      RRL  * 9*
20*  TEMP      CU     FE     PB     SN     NI     ZN     SB    SIO2 WEIGHT  FROM        *20*
 1*  2050    28.84   6.55   9.82   5.87   1.56   9.10    .35  14.64  20000 4 0308      * 1*
 2*  FROM TIME 12:50 BLOW      SLAG : THICK    FLUID                                    * 2*
 3*                                                                                     * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN         * 4*
 *                                                                                     *  *
*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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ORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

6:57:27 AM SATURDAY OCTOBER 3, 1992

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*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345673901234567890123456789012345678901234567890 ****
*****************************************************************************************
  *                                                                                   *  *
 1*                          DETAIL EVENT LOG FOR FURNACE 1                PAGE:  2    * 1*
 2*                                                                                   * 2*
 3*  14:10 CHARGE                        DATE 09/23/92     FCE 1   HEAT C624      RRL   * 3*
 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT   * 4*
 5*   1.36   .95   3.32  53.41   .30  12.76   1.37   .00   .C1   .00   .00   .00   .00   * 5*
 6*   36600 POUNDS OF SM CG DUST                                                      * 6*
 7*  16:10 SLAG OFF THROWAWAY SLAG       DATE 09/23/92     FCE 1   HEAT C624      RRL   * 7*
 8*  TEMP      CU     FE     PB     SN     ZN    SIO2   CAO   AL2O3 WEIGHT  TO        * 8*
 9*  0000     .01  37.25   1.24   .19   6.75    .00   .66    .00  45000 9 9999 16:20  * 9*
10*                                                                                   *10*
 1*  16:11 BLACK COPPER SAMPLE ONLY      DATE 09/23/92     FCE 1   HEAT C624      RRL   * 1*
 2*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  TO        * 2*
 3*  0000   63.34   1.22  19.39  10.04   2.42   3.41   .18    .00       0 0 0000      * 3*
 4*    TO TIME 00:00                                                                  * 4*
 5*  16:38 CHARGE                        DATE 09/23/92     FCE 1   HEAT C624      RRL   * 5*
 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT   * 6*
 7*   .00    .00    .00  66.00   .00  33.00    .C0   .00    .00    .00    .C0    .00    .00   * 7*
 8*   10000 POUNDS OF REFINERY                                                        * 8*
 9*  16:39 CHARGE                        DATE 09/23/92     FCE 1   HEAT C624      RRL   * 9*
20*    NI     SN     PB     CU     AL     ZN     FE     CL     SE     AS     AG     AU     PT   *20*
 1*   .00    .00    .00    .00    .00    .00    .C0   .00    .C0    .00    .00    .00    .00   * 1*
 2*   10000 POUNDS OF SAND                                                            * 2*
 3*                                                                                   * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN       * 4*
  *                                                                                   *  *
*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345673901234567890123456789012345678901234567890 ****
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ORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

c:57:35 AM SATURDAY OCTOBER 3, 1992

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*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
 *                                                                                     *  *
 1*                        DETAIL EVENT LOG FOR FURNACE 1                  PAGE:  3     * 1*
 2*                                                                                     * 2*
 3*  16:50 CHARGE                        DATE 09/23/92      FCE 1   HEAT C624      RRL  * 3*
 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU   PT  * 4*
 5*   .00    .00    .00  66.00    .00  33.00    .C0    .00    .00    .00    .00    .00  .00  * 5*
 6*   10560 POUNDS OF REFINERY                                                          * 6*
 7*  18:45 SMELTING SLAG TRANSFER        DATE 09/23/92      FCE 1   HEAT C624      GLN  * 7*
 8*  TEMP      CU     FE     PB     SN     ZN    SIO2   CAO  AL2O3 WEIGHT  FROM        * 8*
 9*  0000     3.29  21.84  13.21   6.95   6.90  20.41    .51    .00  60000 3 0184 18:15  * 9*
10*                                                                                     *10*
 1*  19:30 SMELTING SLAG TRANSFER        DATE 09/23/92      FCE 1   HEAT C624      GLN  * 1*
 2*  TEMP      CU     FE     PB     SN     ZN    SIO2   CAO  AL2O3 WEIGHT  TO          * 2*
 3*  0000     1.20  22.01  14.53   1.86   7.53    .00    .60    .00  70000 3 0186 20:35  * 3*
 4*                                                                                     * 4*
 5*  19:31 BLACK COPPER SAMPLE ONLY      DATE 09/23/92      FCE 1   HEAT C624      GLN  * 5*
 6*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  TO          * 6*
 7*  0000    75.44    .66   6.91  13.10   3.13    .50    .26    .00      0 0 0000      * 7*
 8*    TO TIME 00:00                                                                    * 8*
 9*  19:45 SMELTING SLAG TRANSFER        DATE 09/23/92      FCE 1   HEAT C625      GLN  * 9*
20*  TEMP      CU     FE     PB     SN     ZN    SIO2   CAO  AL2O3 WEIGHT  FROM        *20*
 1*  0000     9.43  13.26  13.92   8.64    .19   7.17    .00    .00  40000 2 0795 19:30  * 1*
 2*                                                                                     * 2*
 3*                                                                                     * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN         * 4*
 *                                                                                     *  *
*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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ORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

8:57:42 AM SATURDAY OCTOBER 3, 1992

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*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
  *                                                                                   *  *
 1*                          DETAIL EVENT LOG FOR FURNACE 1                PAGE:  4    * 1*
 2*                                                                                   * 2*
 3*  19:50 CHARGE                        DATE 09/23/92     FCE 1   HEAT 0625      GLN   * 3*
 4*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT    * 4*
 5*   .17   .00   .00 94.59   .03   .44   .37   .00   .00   .00   .00   .00   .00    * 5*
 6*   12000 POUNDS OF NO 2  23-1                                                      * 6*
 7*  20:40 CHARGE                        DATE 09/23/92     FCE 1   HEAT 0625      GLN   * 7*
 8*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT    * 8*
 9*   .17   .00   .00 94.59   .03   .44   .37   .00   .00   .00   .00   .00   .00    * 9*
10*   12000 POUNDS OF NO 2  23-1                                                      *10*
 1*  21:00 REFINE SLAG TRANSFER          DATE 09/23/92     FCE 1   HEAT 0625      GLN   * 1*
 2*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2 WEIGHT  FROM             * 2*
 3*  0000   26.47  7.87 10.28  6.57  1.58   .44 16.10  7.44  40000 4 0309             * 3*
 4*  FROM TIME 20:45 BLOW O2  SLAG : THICK   FLUID F                                  * 4*
 5*  21:25 SAMPLE FIRST REDUCTION        DATE 09/23/92     FCE 1   HEAT 0625      GLN   * 5*
 6*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2  CAO  AL203              * 6*
 7*  2080    4.70 12.07 18.05 11.26  1.46   .11 20.82  7.17   .00   .00              * 7*
 8*                                                                                   * 8*
 9*  22:10 SAMPLE FIRST REDUCTION        DATE 09/23/92     FCE 1   HEAT 0625      GLN   * 9*
20*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2  CAO  AL203              *20*
 1*  2220    3.52 10.31 16.77 12.82  1.79   .15 18.23  5.90   .00   .00              * 1*
 2*                                                                                   * 2*
 3*                                                                                   * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN       * 4*
  *                                                                                   *  *
*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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ORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

8:57:52 AM SATURDAY OCTOBER 3, 1992

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*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
 *                                                                                     *  *
 1*                          DETAIL EVENT LOG FOR FURNACE 1                PAGE:  5     * 1*
 2*                                                                                     * 2*
 3*  22:25 CHARGE                          DATE 09/23/92     FCE 1   HEAT C625      GLN  * 3*
 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 4*
 5*   .00    .00    .00    .00    .00    .00    .C0    .00    .C0    .00    .C0    .00    .00  * 5*
 6*   12000 POUNDS OF SAND                                                                  * 6*
 7*  23:00 SAMPLE FIRST REDUCTION          DATE 09/23/92     FCE 1   HEAT C625      DLA  * 7*
 8*  TEMP      CU     FE     PB     SN     NI     ZN     SB    SIO2   CAO   AL203          * 8*
 9*  2200     7.86   9.62  17.3C  12.09   1.85    .15  21.20   5.90    .00    .00          * 9*
10*                                                                                      *10*
 1*  23:15 BLOW THE TAPHOLE # 1            DATE 09/23/92     FCE 1   HEAT 0625      DLA  * 1*
 2*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  TO      TIME  * 2*
 3*  0000    96.00    .00   1.27   1.14   1.00    .00    .27    .00  80000 4 0310 00:05  * 3*
 4*                                                                                       * 4*
 5*  00:15 CHARGE                          DATE 09/24/92     FCE 1   HEAT C625      DLA  * 5*
 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 6*
 7*   .50    .00    .00  18.00    .50    .00  75.C0    .00    .00    .00    .00    .00    .00  * 7*
 8*    9200 POUNDS OF DAB                                                                  * 8*
 9*  00:45 SAMPLE FIRST REDUCTION          DATE 09/24/92     FCE 1   HEAT C625      DLA  * 9*
20*  TEMP      CU     FE     PB     SN     NI     ZN     SB    SIO2   CAO   AL203          *20*
 1*  2100     3.89  13.15  16.83  11.35   1.44    .11  19.44   5.59    .00    .00          * 1*
 2*                                                                                       * 2*
 3*                                                                                       * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN           * 4*
 *                                                                                     *  *
*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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ORKSTATION 182  -  USER MLR  -  REZNACK, MICHELLE 219 RE

8:58:00 AM    SATURDAY     OCTOBER  3, 1992


*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
 *                                                                                     *  *
 1*                          DETAIL EVENT LOG FOR FURNACE 1                PAGE:  6     * 1*
 2*                                                                                     * 2*
 3*  01:00 BLOW THE TAPHOLE # 1       DATE 09/24/92      FCE 1   HEAT 0625       DLA    * 3*
 4*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  TO     TIME  * 4*
 5*  0000      .00    .00    .00    .00    .00    .00    .00    .00  12000 3 0187 01:25 * 5*
 6*                                                                                     * 6*
 7*  01:35 CHARGE                     DATE 09/24/92      FCE 1   HEAT 0625       DLA    * 7*
 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT    * 8*
 9*    .02    .13    .27    .18    .83    .19 98.35    .00    .03    .00    .00    .00    .00   * 9*
10*   32000 POUNDS OF TIN CANS                                                          *10*
 1*  02:40 SAMPLE SECOND REDUCTION    DATE 09/24/92      FCE 1   HEAT 0625       DLA    * 1*
 2*  TEMP      CU     FE     PB     SN     NI     ZN     SB    SIO2   CAO   AL2O3       * 2*
 3*  1980      .16 35.58     3.67   2.99    .00   5.32    .00 31.67   2.59   3.90       * 3*
 4*                                                                                     * 4*
 5*  03:00 CHARGE                     DATE 09/24/92      FCE 1   HEAT 0625       DLA    * 5*
 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT    * 6*
 7*    .02    .13    .27    .18    .83    .19 98.35    .00    .03    .00    .00    .00    .00   * 7*
 8*   10000 POUNDS OF TIN CANS                                                          * 8*
 9*  03:45 SAMPLE SECOND REDUCTION    DATE 09/24/92      FCE 1   HEAT 0625       DLA    * 9*
20*  TEMP      CU     FE     PB     SN     NI     ZN     SB    SIO2   CAO   AL2O3       *20*
 1*  2060      .06 45.56     .75    .99    .00   4.93    .00 34.17   3.50   4.40       * 1*
 2*                                                                                     * 2*
 3*                                                                                     * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN         * 4*
 *                                                                                     *  *
*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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CRKSTATION 182  -  USER MLR  -  REZNACK, MICHELLE 219 RE

8:58:09 AM    SATURDAY     OCTOBER  3, 1992

*****************************************************************************************
***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
 *                                                                                     *  *
 1*                          DETAIL EVENT LOG FOR FURNACE 1                PAGE:  7     * 1*
 2*                                                                                     * 2*
 3*  03:55 TAP 2ND METAL                DATE 09/24/92     FCE 1   HEAT C625      DLA    * 3*
 4*   WEIGHT:  40000  TO: SHAKER  GAS: 044000  OXYGEN: 130490                          * 4*
 5*                                                                                     * 5*
 6*                                                                                     * 6*
 7*  04:30 CHARGE                       DATE 09/24/92     FCE 1   HEAT C625      DLA    * 7*
 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT    * 8*
 9*   .00    .00    .00  63.18    .00  27.52    .84    .00    .00    .00    .00    .00    .00    * 9*
10*   19840 POUNDS OF REFINERY                                                          *10*
 1*  04:31 CHARGE                       DATE 09/24/92     FCE 1   HEAT C625      DLA    * 1*
 2*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT    * 2*
 3*   .00    .00    .00  12.00    .00    .00    .00    .00    .00    .00    .00    .00    .00    * 3*
 4*   10000 POUNDS OF POT SLAG                                                          * 4*
 5*  05:40 SLAG OFF THROWAWAY SLAG      DATE 09/24/92     FCE 1   HEAT C625      DLA    * 5*
 6*  TEMP      CU     FE     PB     SN     ZN    SIO2   CAO   AL2O3 WEIGHT  TO          * 6*
 7*  0000     .13  39.10    .42    .18   5.43  32.19   2.94    .00 110000 9 9999 06:30 * 7*
 8*                                                                                     * 8*
 9*  07:10 CHARGE                       DATE 09/24/92     FCE 1   HEAT C626      RRL    * 9*
20*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT    *20*
 1*   .06   2.22   2.93  71.51    .08   7.63    .24    .00    .11    .00    .00    .00    .00    * 1*
 2*   30000 POUNDS OF CC     23-1                                                       * 2*
 3*                                                                                     * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN         * 4*
 *                                                                                     *  *
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***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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DUST INJECT

REFINE

EMISSION RATE CALCULATION

09/22/92 Furnace 2 -- REFINE

| TIME | MATERIAL/ACTION | IN | OUT |
|---|---|---|---|
| 06:25 | Cold Charge 21-3 | 30000 | |
| 06:26 | Pot Slag | 12000 | |
| 06:45 | Cold Charge 21-3 | 30000 | |
| 06:55 | Cold Charge 21-3 | 40000 | |
| 06:56 | Lime | 3000 | |
| 08:15 | Cold Charge | 38780 | |
| 08:16 | Sand | 2000 | |
| 10:10 | Taphole metal | 85000 | |
| 10:25 | No. 2 Copper | 25000 | |
| 12:40 | Black Copper metal | 80000 | |
| 13:45 | Slag Off Refine Slag(off Burner) | | 70000 |
| 14:45 | Tap metal | | 230000 |
| | | 345780 | 300000 |

Left in Furnace: 45,780 lbs

TOTAL TONNAGE: 172.89 Tons
HEAT TIME: 7.33 Hours
PROCESS WEIGHT RATE: 23.59 Tons/hour

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)RKSTATION 182  -  USER MLR  -  REZNACK, MICHELLE 219 RE

:55:43 AM    SATURDAY     OCTOBER  3, 1992


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***          1         2         3         4         5         6         7         8 ****
*** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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 *                                                                                    *  *
 1*                          DETAIL EVENT LOG FOR FURNACE 2                PAGE:  1    * 1*
 2*                                                                                    * 2*
 3*  05:CO DELAY TYPE DD       05:25 DATE 09/22/92     FCE 2   HEAT C789       DLA     * 3*
 4*  CLEAN SYSTEM                                                                      * 4*
 5*                                                                                    * 5*
 6*                                                                                    * 6*
 7*  06:25 CHARGE                      DATE 09/22/92     FCE 2   HEAT C789       RRL     * 7*
 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT     * 8*
 9*    .13   2.13   2.88  72.78   .17   7.90   .27   .00   .C9   .00   .CO   .00   .00   * 9*
10*   30000 POUNDS OF CC     21-3                                                       *10*
 1*  06:26 CHARGE                      DATE 09/22/92     FCE 2   HEAT 0789       RRL     * 1*
 2*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT     * 2*
 3*    .00    .00    .00  12.00   .00    .00    .CO    .00    .CO    .00    .00    .00    .00    * 3*
 4*   12000 POUNDS OF POT SLAG                                                           * 4*
 5*  06:45 CHARGE                      DATE 09/22/92     FCE 2   HEAT C789       RRL     * 5*
 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT     * 6*
 7*    .13   2.13   2.88  72.78   .17   7.90   .27   .00   .C9   .00   .CO   .00   .00   * 7*
 8*   30000 POUNDS OF CC     21-3                                                       * 8*
 9*  06:55 CHARGE                      DATE 09/22/92     FCE 2   HEAT C789       RRL     * 9*
20*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT     *20*
 1*    .13   2.13   2.88  72.78   .17   7.90   .27   .00   .C9   .00   .CO   .00   .00   * 1*
 2*   40000 POUNDS OF CC     21-3                                                       * 2*
 3*                                                                                    * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN        * 4*
 *                                                                                    *  *
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***          1         2         3         4         5         6         7         8 ****
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ORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

8:55:49 AM SATURDAY OCTOBER 3, 1992

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 1*                          DETAIL EVENT LOG FOR FURNACE 2                PAGE:  2     * 1*
 2*                                                                                     * 2*
 3*  06:56 CHARGE                        DATE 09/22/92      FCE 2   HEAT 0789      RRL  * 3*
 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 4*
 5*    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00  * 5*
 6*    3000 POUNDS OF LIME,BURNT                                                        * 6*
 7*  08:15 CHARGE                        DATE 09/22/92      FCE 2   HEAT 0789      RRL  * 7*
 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 8*
 9*    .13   2.13   2.88  72.78    .17   7.90    .27    .00    .09    .00    .00    .00    .00  * 9*
10*   38780 POUNDS OF CC     21-3                                                       *10*
 1*  08:16 CHARGE                        DATE 09/22/92      FCE 2   HEAT 0789      RRL  * 1*
 2*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 2*
 3*    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00  * 3*
 4*    2000 POUNDS OF SAND                                                              * 4*
 5*  10:10 TAPHOLE METAL TRANSFER        DATE 09/22/92      FCE 2   HEAT 0789      RRL  * 5*
 6*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  FROM   TIME  * 6*
 7*  2100    94.51    .00   2.40    .95   1.47    .00    .35    .00  85000 3 0181 09:35  * 7*
 8*                                                                                     * 8*
 9*  10:25 CHARGE                        DATE 09/22/92      FCE 2   HEAT 0791      GLN  * 9*
20*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  *20*
 1*    .13    .00    .00  94.64    .04    .38    .24    .00    .00    .00    .00    .00    .00  * 1*
 2*   25000 POUNDS OF NO 2  22-1                                                        * 2*
 3*                                                                                     * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN         * 4*
 *                                                                                     *  *
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***          1         2         3         4         5         6         7         8 ****
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ORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

d:55:5o AM SATURDAY OCTOBER 3, 1992

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***          1         2         3         4         5         6         7         8 ****
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 1*                        DETAIL EVENT LOG FOR FURNACE 2                PAGE:  3      * 1*
 2*                                                                                     * 2*
 3*  12:40 BLACK COPPER TRANSFER      DATE 09/22/92      FCE 2   HEAT 0789       RRL   * 3*
 4*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  FROM      * 4*
 5*  0000   87.58    .11   5.60   4.65   1.36    .52    .18    .00  80000 1 0621     * 5*
 6*  FROM TIME 12:30                                                                   * 6*
 7*  13:45 SLAG OFF TRANSFER          DATE 09/22/92      FCE 2   HEAT C789       GLN   * 7*
 8*  TEMP      CU     FE     PB     SN     NI     ZN     SB   SIO2 WEIGHT  TO         * 8*
 9*  0000   26.6C   5.93  11.68   6.51   1.44    .38  14.35   6.53  70000 4 0306      * 9*
10*    TO TIME 14:30 BLOW 01  SLAG : THICK   FLUID F                                  *10*
 1*  14:45 TAP METAL                  DATE 09/22/92      FCE 2   HEAT C789       GLN   * 1*
 2*  TEMP      CU     PB     SN     NI     SB     AG     02  WEIGHT TO HOLD/FCE       * 2*
 3*  2150   99.25    .13    .00    .22    .07   .C27    .00 23C000                   * 3*
 4*  TO TIME 15:15 GAS 061000  OXYGEN                        210700                    * 4*
 5*  15:20 CHARGE                     DATE 09/22/92      FCE 2   HEAT C790       GLN   * 5*
 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT   * 6*
 7*    .19   1.01   1.58  44.16   1.26  11.98   8.41    .00    .C3    .00    .CO    .00    .00   * 7*
 8*   99460 POUNDS OF SM CG R221                                                        * 8*
 9*  15:21 CHARGE                     DATE 09/22/92      FCE 2   HEAT C790       GLN   * 9*
20*    NI     SN     PB     CU     AL     ZN     FE     CL     SE     AS     AG     AU     PT   *20*
 1*    .50    .00    .00  18.00    .50    .00  75.CO    .00    .CO    .00    .CO    .00    .00   * 1*
 2*    8000 POUNDS OF DAB                                                                * 2*
 3*                                                                                     * 3*
 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN         * 4*
 *                                                                                     *  *
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***          1         2         3         4         5         6         7         8 ****
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EMISSION RATE CALCULATION

09/25/92 Furnace 3 -- SMELT/SLAG TREATMENT

| TIME | MATERIAL/ACTION | IN | OUT |
|---|---|---|---|
| 09:20 | Smelt Charge | 30000 | |
| 09:21 | Pot Slag | 12000 | |
| 09:30 | Smelt Charge | 50000 | |
| 11:25 | Smelt Charge | 38240 | |
| 15:05 | Slag off Throwaway | | 60000 |
| 15:20 | Burnt Lime | 10000 | |
| 15:21 | Refinery Brass | 35000 | |
| 15:22 | Pot Slag | 12000 | |
| 15:40 | Refine Slag Transfer | 70000 | |
| 16:15 | Slag Off Throwaway | | 90000 |
| 16:30 | Refine Slag Transfer | 80000 | |
| 17:00 | Smelting Slag Transfer | | 55000 |
| 17:05 | No. 2 Copper | 42000 | |
| 17:06 | Sand | 10000 | |
| 17:10 | Refine Slag Transfer | 70000 | |
| 17:33 | D.A.B. | 26000 | |
| 17:45 | Blow Taphole | | 140000 |
| 18:05 | D.A.B | 32500 | |
| 18:31 | 2nd Metal | | 75000 |
| 18:40 | D.A.B. SUB | 41000 | |
| 18:41 | Pot Slag | 12000 | |
| 18:42 | Refinery Brass | 22620 | |
| 19:35 | Slag Off Throwaway (Off Burner) | | 135000 |
| 19:40 | Left in Furnace to begin next cycle 38000 lbs | | |
| | | 593360 | 555000 |

TOTAL TONNAGE: 296.68 Tons

HEAT TIME: 10.25 Hours

PROCESS WEIGHT RATE: 28.94 Tons/hour

WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

9:00:28 AM SATURDAY OCTOBER 3, 1992

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****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 3                PAGE:  1   * 1*
* 2*                                                                                  * 2*
* 3*  06:35 DELAY TYPE DD      09:15 DATE 09/25/92     FCE 3   HEAT C189       JGC   * 3*
* 4*  MAINT P.M.                                                                      * 4*
* 5*                                                                                  * 5*
* 6*                                                                                  * 6*
* 7*  09:20 CHARGE                        DATE 09/25/92     FCE 3   HEAT C190       RRL   * 7*
* 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT   * 8*
* 9*    .16    .03    .08  38.07    .35    .45  11.37    .00    .CO    .00    .CO    .00    .00   * 9*
*10*   30000 POUNDS OF SM CG 23-1                                                       *10*
* 1*  09:21 CHARGE                        DATE 09/25/92     FCE 3   HEAT C190       RRL   * 1*
* 2*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT   * 2*
* 3*    .00    .00    .00  12.00    .00    .00    .CO    .00    .00    .00    .CO    .00    .00   * 3*
* 4*   12000 POUNDS OF POT SLAG                                                         * 4*
* 5*  09:30 CHARGE                        DATE 09/25/92     FCE 3   HEAT C190       RRL   * 5*
* 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT   * 6*
* 7*    .16    .03    .08  38.07    .35    .45  11.37    .00    .CO    .00    .CO    .00    .00   * 7*
* 8*   50000 POUNDS OF SM CG 23-1                                                       * 8*
* 9*  11:25 CHARGE                        DATE 09/25/92     FCE 3   HEAT C190       RRL   * 9*
*20*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT   *20*
* 1*    .16    .03    .08  38.07    .35    .45  11.37    .00    .CO    .00    .CO    .00    .00   * 1*
* 2*   38240 POUNDS OF SM CG 23-1                                                       * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
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****          1         2         3         4         5         6         7         8 ****
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WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

9:00:35 AM SATURDAY OCTOBER 3, 1992

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*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 3                PAGE:  2   * 1*
* 2*                                                                                  * 2*
* 3*  14:15 BLACK COPPER SLAG SAMPLE  DATE 09/25/92     FCE 3   HEAT 0190      RRL   * 3*
* 4*  TEMP      CU    FE    PB    SN    ZN   SIO2  CAO  AL203 WEIGHT  TO             * 4*
* 5*  1900     .63 41.56   .96   .54  6.37 29.64  2.63  6.62       0 0 0000 00:00   * 5*
* 6*                                                                                  * 6*
* 7*  14:40 BLACK COPPER SLAG SAMPLE  DATE 09/25/92     FCE 3   HEAT 0190      RRL   * 7*
* 8*  TEMP      CU    FE    PB    SN    ZN   SIO2  CAO  AL203 WEIGHT  TO             * 8*
* 9*  1950     .95 40.66  1.07   .64  6.02 27.72  2.14  5.53       0 0 0000 00:00   * 9*
*10*                                                                                  *10*
* 1*  15:05 SLAG OFF THROWAWAY SLAG   DATE 09/25/92     FCE 3   HEAT 0190      GLN   * 1*
* 2*  TEMP      CU    FE    PB    SN    ZN   SIO2  CAO  AL203 WEIGHT  TO             * 2*
* 3*  0000     .33 41.80   .66   .35  5.83 21.78  2.07  2.59  60000 9 9999 15:15    * 3*
* 4*                                                                                  * 4*
* 5*  15:06 BLACK COPPER SAMPLE ONLY  DATE 09/25/92     FCE 3   HEAT 0190      GLN   * 5*
* 6*  TEMP      CU    FE    PB    SN    NI    ZN    SB    AS  WEIGHT  TO             * 6*
* 7*  0000   71.64  1.68 12.12  9.04  2.15  3.17   .20   .00       0 0 0000         * 7*
* 8*    TO TIME 00:00                                                                 * 8*
* 9*  15:20 CHARGE                    DATE 09/25/92     FCE 3   HEAT 0190      GLN   * 9*
*20*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   *20*
* 1*    .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00  * 1*
* 2*   10000 POUNDS OF LIME,BURNT                                                     * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
*****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
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WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

9:00:43 AM SATURDAY OCTOBER 3, 1992

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*  *                                                                                  *  *
* 1*                        DETAIL EVENT LOG FOR FURNACE 3                PAGE:  3    * 1*
* 2*                                                                                  * 2*
* 3*  15:21 CHARGE                        DATE 09/25/92     FCE 3   HEAT C190      GLN  * 3*
* 4*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   * 4*
* 5*   .00   .00   .00 66.00   .00 33.00   .C0   .00   .00   .00   .C0   .00   .00   * 5*
* 6*   35000 POUNDS OF REF BRASS                                                      * 6*
* 7*  15:22 CHARGE                        DATE 09/25/92     FCE 3   HEAT C190      GLN  * 7*
* 8*    NI    SN    PB    CU    AL    ZN    FE    CL    SE    AS    AG    AU    PT   * 8*
* 9*   .00   .00   .00 12.00   .00   .00   .C0   .00   .C0   .00   .00   .00   .00   * 9*
*10*   12000 POUNDS OF POT SLAG                                                        *10*
* 1*  15:40 REFINE SLAG TRANSFER          DATE 09/25/92     FCE 3   HEAT C190      GLN  * 1*
* 2*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2 WEIGHT  FROM            * 2*
* 3*  0000    4.22 13.49 13.5C  7.72   .71   .10 18.49 12.82  70000 4 0315            * 3*
* 4*  FROM TIME 1c:20 BLOW 01  SLAG : THICK   FLUID                                   * 4*
* 5*  16:15 SLAG OFF THROWAWAY SLAG       DATE 09/25/92     FCE 3   HEAT C190      GLN  * 5*
* 6*  TEMP     CU    FE    PB    SN    ZN   SIO2  CAO  AL2O3 WEIGHT  TO              * 6*
* 7*  2050     .35 43.51   .4C  .19  5.72 29.19  2.11  2.89  90000 9 9999 16:16      * 7*
* 8*                                                                                  * 8*
* 9*  16:30 REFINE SLAG TRANSFER          DATE 09/25/92     FCE 3   HEAT C190      GLN  * 9*
*20*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2 WEIGHT  FROM            *20*
* 1*  0000    4.24 11.78 16.88  9.54   .76   .09 20.52  9.77  80000 4 0315            * 1*
* 2*  FROM TIME 17:45 BLOW 02  SLAG : THICK F FLUID                                   * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
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WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

9:00:49 AM SATURDAY OCTOBER 3, 1992

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*  *                                                                                  *  *
* 1*                        DETAIL EVENT LOG FOR FURNACE 3                PAGE:  4    * 1*
* 2*                                                                                  * 2*
* 3*  17:00 SMELTING SLAG TRANSFER    DATE 09/25/92     FCE 3   HEAT C190      GLN    * 3*
* 4*  TEMP     CU    FE    PB    SN    ZN   SIO2  CAO  AL2O3 WEIGHT  TO              * 4*
* 5*  0000    1.23 16.75 16.03  3.29  6.83 26.72   .20  1.05  55000 1 0630 19:00     * 5*
* 6*                                                                                  * 6*
* 7*  17:01 BLACK COPPER SAMPLE ONLY  DATE 09/25/92     FCE 3   HEAT C190      GLN    * 7*
* 8*  TEMP     CU    FE    PB    SN    NI    ZN    SB    AS  WEIGHT  TO              * 8*
* 9*  0000   80.06   .17  6.08 10.84  2.37   .24   .24   .00       0 0 0000          * 9*
*10*    TO TIME 00:00                                                                *10*
* 1*  17:05 CHARGE                    DATE 09/25/92     FCE 3   HEAT 0190      GLN    * 1*
* 2*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   * 2*
* 3*    .00   .00   .00 99.00   .00   .00   .00   .00   .00   .00   .00   .00   .00  * 3*
* 4*   42000 POUNDS OF NO 2  24-2                                                    * 4*
* 5*  17:06 CHARGE                    DATE 09/25/92     FCE 3   HEAT C190      GLN    * 5*
* 6*    NI    SN    PB    CU    AL    ZN    FE    CL    SE    AS    AG    AU    PT   * 6*
* 7*    .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00   .00  * 7*
* 8*   10000 POUNDS OF SAND                                                           * 8*
* 9*  17:10 REFINE SLAG TRANSFER      DATE 09/25/92     FCE 3   HEAT C190      GLN    * 9*
*20*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2 WEIGHT  FROM            *20*
* 1*  0000   21.91  5.01 14.96 10.20  1.30  2.99   .36 18.66  70000 4 0315            * 1*
* 2*  FROM TIME 19:45 BLOW 04  SLAG : THICK F FLUID                                   * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
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****          1         2         3         4         5         6         7         8 ****
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WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

9:00:59 AM SATURDAY OCTOBER 3, 1992

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**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
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*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 3                PAGE:  5   * 1*
* 2*                                                                                  * 2*
* 3*  17:30 SAMPLE FIRST REDUCTION    DATE 09/25/92     FCE 3   HEAT C190      GLN    * 3*
* 4*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2  CAO  AL203             * 4*
* 5*  2120   13.10  8.77 16.85 12.46  1.35   .23 20.74  4.55   .00   .00             * 5*
* 6*                                                                                  * 6*
* 7*  17:33 CHARGE                    DATE 09/25/92     FCE 3   HEAT C190      GLN    * 7*
* 8*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   * 8*
* 9*   .50   .00   .00 14.16   .50   .00 75.C0   .00   .00   .00   .C0   .00   .00   * 9*
*10*   26000 POUNDS OF DAB                                                            *10*
* 1*  17:40 SAMPLE FIRST REDUCTION    DATE 09/25/92     FCE 3   HEAT 0190      GLN    * 1*
* 2*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2  CAO  AL203             * 2*
* 3*  2140    9.9C 11.30 17.47 12.78  1.43   .21 24.03  4.52   .00   .00             * 3*
* 4*                                                                                  * 4*
* 5*  17:45 BLOW THE TAPHOLE # 1      DATE 09/25/92     FCE 3   HEAT C190      GLN    * 5*
* 6*  TEMP     CU    FE    PB    SN    NI    ZN    SB    AS  WEIGHT  TO     TIME     * 6*
* 7*  0000   97.56   .00   .79   .52   .58   .00   .24   .00 140000 4 0316 17:55     * 7*
* 8*                                                                                  * 8*
* 9*  18:05 CHARGE                    DATE 09/25/92     FCE 3   HEAT C190      GLN    * 9*
*20*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   *20*
* 1*   .50   .00   .00 14.16   .50   .00 75.C0   .00   .C0   .00   .C0   .00   .00   * 1*
* 2*   32500 POUNDS OF DAB                                                            * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
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WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

9:01:08 AM SATURDAY OCTOBER 3, 1992

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*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 3                PAGE:  6   * 1*
* 2*                                                                                  * 2*
* 3*  18:15 SAMPLE FIRST REDUCTION     DATE 09/25/92     FCE 3   HEAT C190      GLN   * 3*
* 4*  TEMP     CU    FE    PB    SN    NI    ZN    SB    SIO2  CAO  AL203            * 4*
* 5*  2120    4.34 15.55 16.87 11.69   .90   .14 20.24   4.11   .00   .00            * 5*
* 6*                                                                                  * 6*
* 7*  18:31 BLOW THE TAPHOLE # 1       DATE 09/25/92     FCE 3   HEAT C190      GLN   * 7*
* 8*  TEMP     CU    FE    PB    SN    NI    ZN    SB     AS  WEIGHT  TO     TIME     * 8*
* 9*  2050   81.16   .16  5.45  6.22  1.24   .71   .23    .00  75000 2 0316 18:35     * 9*
*10*                                                                                  *10*
* 1*  18:32 TAP 2ND METAL              DATE 09/25/92     FCE 3   HEAT C190      BWH   * 1*
* 2*   WEIGHT:  75000  TO: SHAKER  GAS: 01300C  OXYGEN: 03260C                        * 2*
* 3*                                                                                  * 3*
* 4*                                                                                  * 4*
* 5*  18:40 CHARGE                     DATE 09/25/92     FCE 3   HEAT C190      GLN   * 5*
* 6*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT    * 6*
* 7*   .24   .00   .00  8.99  2.47  2.47 82.59   .00   .00   .00   .00   .00   .00    * 7*
* 8*   41000 POUNDS OF DAB SUB                                                         * 8*
* 9*  18:41 CHARGE                     DATE 09/25/92     FCE 3   HEAT C190      GLN   * 9*
*20*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT    *20*
* 1*   .00   .00   .00 12.00   .00   .00   .00   .00   .00   .00   .00   .00   .00    * 1*
* 2*   12000 POUNDS OF POT SLAG                                                         * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
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WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

9:01:24 AM SATURDAY OCTOBER 3, 1992

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*  *                                                                                  *  *
* 1*                        DETAIL EVENT LOG FOR FURNACE 3                PAGE:  7    * 1*
* 2*                                                                                  * 2*
* 3*  18:42 CHARGE                        DATE 09/25/92     FCE 3   HEAT 0190     GLN  * 3*
* 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 4*
* 5*   .00    .00    .00  66.00    .00    .00  33.00    .00    .00    .00    .00    .00    .00  * 5*
* 6*   22620 POUNDS OF REF BRASS                                                       * 6*
* 7*  19:35 SLAG OFF THROWAWAY SLAG       DATE 09/25/92     FCE 3   HEAT 0190     GLN  * 7*
* 8*  TEMP      CU     FE     PB     SN     ZN    SIO2   CAO   AL2O3 WEIGHT  TO       * 8*
* 9*  2010     .40  35.95    .79    .21   5.89  29.93    .80   4.57 135000 9 9999 19:36  * 9*
*10*                                                                                  *10*
* 1*  19:40 TAP BLACK COPPER              DATE 09/25/92     FCE 3   HEAT 0190     GLN  * 1*
* 2*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  TO       * 2*
* 3*  2010   70.08   3.56   5.32  12.60   3.42   4.67    .36    .00       0 3 0191    * 3*
* 4*    TO TIME 19:41                                                                 * 4*
* 5*  19:41 BLACK COPPER TRANSFER          DATE 09/25/92     FCE 3   HEAT 0191     GLN  * 5*
* 6*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  FROM     * 6*
* 7*  2010   70.08   3.56   5.32  12.60   3.42   4.67    .36    .00       0 3 0190    * 7*
* 8*  FROM TIME 19:40                                                                 * 8*
* 9*  19:45 CHARGE                        DATE 09/25/92     FCE 3   HEAT 0191     GLN  * 9*
*20*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  *20*
* 1*   .00    .00    .00  12.00    .00    .00    .00    .00    .00    .00    .00    .00    .00  * 1*
* 2*   12000 POUNDS OF POT SLAG                                                        * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
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****          1         2         3         4         5         6         7         8 ****
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TAPS TO NEXT HEAT

EMISSION RATE CALCULATION

09/23/92 Furnace 4 -- REFINE

| TIME | MATERIAL/ACTION | IN | OUT |
|---|---|---|---|
| 07:20 | Cold Charge 22-1 | 30000 | |
| 07:21 | Pot Slag | 10000 | |
| 07:35 | Cold Charge 22-1 | 30000 | |
| 07:50 | Cold Charge 22-1 | 30000 | |
| 09:05 | Cold Charge 22-1 | 30000 | |
| 09:06 | Lime | 3000 | |
| 09:15 | Cold Charge 22-1 | 19480 | |
| 11:15 | Black Copper | 100000 | |
| 11:25 | Taphole metal | 80000 | |
| 12:50 | Slag off Refine Slag | | 35000 |
| 12:51 | Slag Off Refine Slag (Off Burner) | | 30000 |
| 13:05 | Tap metal | | 235000 |
| | Left in Furnace: 32480 lbs | | |
| | | 332480 | 300000 |

TOTAL TONNAGE: 166.24 Tons

HEAT TIME: 5.5 Hours

PROCESS WEIGHT RATE: 30.23 Tons/hour

WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

8:56:25 AM SATURDAY OCTOBER 3, 1992

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*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 4                PAGE:  1   * 1*
* 2*                                                                                  * 2*
* 3*  05:15 SLAG OFF TRANSFER          DATE 09/23/92     FCE 4   HEAT C307      DLA   * 3*
* 4*  TEMP     CU    FE    PB    SN    NI    ZN    SB   SIO2 WEIGHT  TO              * 4*
* 5*  0000   23.10  4.87  9.54  5.62  2.74  6.55   .29 20.85  15000 2 0793           * 5*
* 6*    TO TIME 05:35 BLOW 03  SLAG : THICK   FLUID F                                 * 6*
* 7*  05:50 TAP METAL                  DATE 09/23/92     FCE 4   HEAT C307      DLA   * 7*
* 8*  TEMP     CU    PB    SN    NI    SB    AG    02  WEIGHT TO HOLD/FCE            * 8*
* 9*  0000   99.13   .10   .01   .36   .08  .C21   .00 27C000                        * 9*
*10*  TO TIME 06:10 GAS 015000  OXYGEN                        229100                  *10*
* 1*  07:20 CHARGE                     DATE 09/23/92     FCE 4   HEAT C308      RRL   * 1*
* 2*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   * 2*
* 3*   .11  1.82  2.65 72.46   .13  9.59   .32   .00   .11   .00   .CO   .00   .00   * 3*
* 4*   30000 POUNDS OF CC    22-1                                                     * 4*
* 5*  07:21 CHARGE                     DATE 09/23/92     FCE 4   HEAT C308      RRL   * 5*
* 6*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   * 6*
* 7*   .00   .00   .00 12.00   .00   .00   .CO   .00   .CO   .00   .CO   .00   .00   * 7*
* 8*   10000 POUNDS OF POT SLAG                                                       * 8*
* 9*  07:35 CHARGE                     DATE 09/23/92     FCE 4   HEAT C308      RRL   * 9*
*20*    NI    SN    PB    CU    AL    ZN    FE    CL    SB    AS    AG    AU    PT   *20*
* 1*   .11  1.82  2.65 72.46   .13  9.59   .32   .00   .11   .00   .CO   .00   .00   * 1*
* 2*   30000 POUNDS OF CC    22-1                                                     * 2*
* 3*                                                                                  * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN      * 4*
*  *                                                                                  *  *
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WORKSTATION 182 - USER MLR - REZNACK, MICHELLE 219 RE

8:56:33 AM SATURDAY OCTOBER 3, 1992

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*  *                                                                                  *  *
* 1*                          DETAIL EVENT LOG FOR FURNACE 4                PAGE:  2   * 1*
* 2*                                                                                  * 2*
* 3*  07:50 CHARGE                        DATE 09/23/92     FCE 4   HEAT C308      RRL  * 3*
* 4*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 4*
* 5*    .11   1.82   2.65  72.46   .13   9.59   .32   .00   .11   .00   .00   .00   .00  * 5*
* 6*   30000 POUNDS OF CC     22-1                                                      * 6*
* 7*  09:05 CHARGE                        DATE 09/23/92     FCE 4   HEAT C308      RRL  * 7*
* 8*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 8*
* 9*    .11   1.82   2.65  72.46   .13   9.59   .32   .00   .11   .00   .00   .00   .00  * 9*
*10*   30000 POUNDS OF CC     22-1                                                      *10*
* 1*  09:06 CHARGE                        DATE 09/23/92     FCE 4   HEAT 0308      RRL  * 1*
* 2*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 2*
* 3*    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00    .00  * 3*
* 4*    3000 POUNDS OF LIME,BURNT                                                       * 4*
* 5*  09:15 CHARGE                        DATE 09/23/92     FCE 4   HEAT C308      RRL  * 5*
* 6*    NI     SN     PB     CU     AL     ZN     FE     CL     SB     AS     AG     AU     PT  * 6*
* 7*    .11   1.82   2.65  72.46   .13   9.59   .32   .00   .11   .00   .00   .00   .00  * 7*
* 8*   19480 POUNDS OF CC     22-1                                                      * 8*
* 9*  11:15 BLACK COPPER TRANSFER         DATE 09/23/92     FCE 4   HEAT C308      RRL  * 9*
*20*  TEMP      CU     FE     PB     SN     NI     ZN     SB     AS  WEIGHT  FROM       *20*
* 1*  0000   99.24    .11    .26    .02    .18    .20    .03    .00 100000 2 0793       * 1*
* 2*  FROM TIME 11:00                                                                   * 2*
* 3*                                                                                    * 3*
* 4*    PF 1 - FIRST, PF 2 - LAST, ENTER - PAGE, PF 4 - BACK, ANY OTHER - RETURN        * 4*
*  *                                                                                  *  *
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# MISCELLANEOUS

Resumes of Sampling Personnel

# RESUME

Christopher N Dawdy
Manager, Air Quality Group

**Professional Experience:**
- Fugro-McClelland (Midwest), Inc: 1991-present;
- Geraghty & Miller, Inc: 1990-1991;
- Environmental Science & Engineering, Inc: 1983-1990

**Education:** Southern Illinois University, BS Geography/Earth Science, 1983

**Additional Training:**
- Certification of completion of 40-hr hazardous materials/waste site investigation, 1985;
- Certification of completion of 8-hr hazardous materials/waste site investigation refresher course, 1991;
- Certification of completion of supervisors course in hazardous materials/waste site operations, 1990;
- Certification of completion of Trinity Consultants Atmospheric Dispersion Modeling Course, 1992;
- Project Management Training Course, 1989; and
- Certification of completion of APTI, Course 401, "Site Specific Monitoring and Evaluation for Air Toxics," 1987.

**General Experience:** Mr Dawdy has over 8 years of experience in the management of air quality projects. He has managed projects involving the collection of air quality data for compliance. He has developed and implemented work plans for trial burn testing to determine compliance with state and federal regulations. His project experience also includes continuous emissions monitoring design and operation, industrial hygiene sampling to determine worker exposure, environmental compliance audits, and development and implementation of projects designed to assess ambient air quality, including CERCLA and RCRA remedial investigations. Mr Dawdy also has experience in preparing air quality permits for a variety of processes, including boilers, incinerators, dust collection systems, and air pollution equipment.

**Ambient Air Monitoring:** Mr Dawdy has conducted and managed several ambient air monitoring programs at NPL sites in Illinois and Missouri. Mr Dawdy has also conducted extensive ambient air monitoring at a former arsenal in Denver, Colorado. This project included establishing 14 ambient air monitoring stations around the perimeter of specified "hot zones" as well as perimeter monitoring of the entire site. This network included the operation of a weather station and Hi-Vol sampling for organic vapors and PM-10. Mr Dawdy's experience includes the management and operation of ambient air monitoring networks designed to assess ambient air quality during the remediation of dioxin contaminated soils in Southeast Missouri. These projects included the establishment of long-term monitoring stations equipped with Hi-Vol air samplers to determine the concentration of particulate matter and dioxin. Mr Dawdy has also managed emergency response ambient air monitoring networks designed to monitor the ambient air quality during the removal and excavation of contaminated soil. This project included setting up ambient air monitoring station and a weather station. Mr Dawdy has managed several projects designed to access the impact of removal and excavation of soils contaminated with organic compounds. These projects included the installation and operation of ambient air monitoring stations and meteorological stations. The monitoring was conducted used PS-1 Hi-Volume air samplers to collect organic contaminants on XAD-2 trap. The data collected was used to document the potential exposure of the nearby population. Mr Dawdy has also conducted landfill gas characterization evaluations at several solid waste landfills in Missouri. As part of this program, methane recovery systems were sampled for over 30 volatile organic compounds, sulfur compounds, methane and non-methane organics using approved EPA methods.

**CEMS Experience:** Mr Dawdy had conducted and managed several Continuous Emission Monitoring System (CEMS) certification tests on coal-fired boilers, oil-fired boilers, and hazardous waste incinerators. The CEMS certification tests included relative accuracy test audits and cylinder gas certifications. Span drift calibration testing and 7-day zero drift tests were also conducted as a part of the certification process. Mr Dawdy has conducted numerous monitor certifications utilizing both conventional and instrumental EPA methods. He has utilized and is familiar with a variety of different types of continuous emission monitors for the monitoring of total hydrocarbons, carbon monoxide, sulfur dioxide, nitrogen oxides, oxygen, carbon dioxide, and opacity.

**Source Emissions Testing.** Mr Dawdy has served as Project Manager on over 300 source emissions testing projects throughout the United States. He served as Project Manager for the source emissions testing of incinerators in Valdez, Alaska designed to incinerate waste generated from the oil spill cleanup effort in Prince William Sound. Mr Dawdy also managed and conducted emissions sampling on a barge-mounted incinerator near Knight Island, Alaska that was designed to incinerate oily waste generated from the cleanup of Prince William Sound. The testing included sampling for particulate matter, dioxins and furans, hydrogen chloride, carbon monoxide, sulfur dioxide, and total hydrocarbons. He has conducted and managed volatile organic compound sampling programs designed to determine hydrocarbon destruction efficiencies for over 30 paint bake ovens in Wentzville, Missouri. Mr Dawdy

managed a volatile organic emissions program designed to assess VOC emissions from several point sources within various chemical processes. The project was designed to collect VOC emission data from process vents, storage and holding tanks flame arrestors, and conservation vents during batch operations. The data collected was used to report emissions to state and local regulatory agencies. Mr Dawdy has conducted testing on several cement kilns to determine mass emission rates of various pollutants during the burning of hazardous waste. The testing included sampling of $SO_2$, $NO_x$, CO, $CO_2$, $O_2$, and VOCs utilizing continuous emission monitors. Mr Dawdy has conducted emissions testing utilizing conventional and instrumental EPA methods for all of the criteria pollutants as well as hydrogen chloride, metals, and dioxins and furans. Mr Dawdy has extensive experience in source testing for a variety of pollutants on various types of control devices and processes, including recovery boilers, bark fed boilers, lime kilns, coal-fired boilers, copper melting furnaces, incinerators, and cement kilns.

**Other Experience:** Mr Dawdy has also conducted environmental compliance audits developed to determine compliance with the Clean Air Act and SARA Title III requirements. He has also managed and provided technical oversight during the closure of a RCRA Part B incinerator in St. Louis, Missouri. Mr Dawdy's background includes many other air quality evaluations as well as a variety of other environmentally related projects. He has also conducted training courses on the operation and applications of various air monitoring equipment.

**Memberships:**

- National Association of Environmental Professionals;
- Illinois Chapter of the Association of Environmental Professionals;
- National Air and Waste Management Association;
- St Louis Missouri Chapter of Air and Waste Management Association; and
- Source Evaluation Society.

Robert F Folle
Air Quality Scientist

**Professional Experience:**
- Fugro-McClelland (Midwest), Inc: 1991-present;
- Environmental Science & Engineering, Inc: 1988-1991;
- United States Air Force: 1968-1988

**Education:** Golden Gate University, San Francisco, California, MBA, 1979; St Leo College, St Leo, Florida, BA, Business Administration, 1977.

**Additional Training:**
- Certified EPA Method 9 visual opacity observer, 40 CFR, Part 52, Appendix F, air pollution control, St Louis, Missouri, 1991.
- Certified AHERA asbestos inspector, certificate number 7ME031391006I, 1991.
- Certified AHERA asbestos management planner, certificate number 7ME031591006M, 1991.
- Certification of completion for 40-hr course in hazardous materials/waste site investigation, 1989.
- Certification of completion for 8-hr refresher course in hazardous materials/waste site investigation, 1990.
- Certification of completion of supervisors course in hazardous materials/waste site operations, 1990.
- Certification of completion of course in air dispersion modeling covering the industrial source complex (ISC), short-term (ISCST), long-term (ISCLT), complex-1, screen, wake, mobile 4, and spills models, 1990.
- Certification of completion of course in computer air dispersion modeling laboratory, 1990.
- Continuous emissions monitoring (CEM) training course number 89C 1, 1989.
- Project management training course, 1989.
- EPA boilers and industrial furnaces (BIF) test methods and analysis for performance specifications of continuous emissions monitoring, multiple metals, hexavalent chromium, hydrogen chloride and chlorine, dioxins and furans and aldehydes and ketones, 1991.
- Ambient air monitoring course, course covered PM10, TSP, CO, $SO_2$, NO, $NO_2$, $NO_x$, $O_3$, data acquisition systems, meteorological equipment and measurements and QA air monitoring project plans and QC/QA site audits, 1991.

**General Experience:** Mr Folle has over 3 years of experience in the performance and management of air quality projects. He has performed as a field team leader, group leader, and project manager for a diversified range of projects involving the collection and analysis of air quality data for engineering, design, permitting, and compliance. His project experience includes source emissions testing, air dispersion modeling, continuous emissions monitoring (CEM) operation and CEM performance specification testing, air toxics sampling, ambient air quality monitoring, indoor air quality, industrial hygiene sampling, volatile organic compound (VOC) screening and control equipment (VOC) reduction efficiency testing.

**Emissions Testing:** Mr Folle has participated as group leader and project manager on over 50 source emissions testing projects. He served as project manager for the source emissions testing of a thermal desorption and vapor extraction system for the reclamation of contaminated soil in Tucson, Arizona. Testing included particulates, lead, cadmium, benzene, toluene, xylene, ethylbenzene, benz(a)pyrene, total hydrocarbons (THC), inlet/outlet VOC reduction efficiency, carbon monoxide, oxides of nitrogen, oxygen, carbon dioxide, heptachlor, chlordane, methyl ethyl ketone, trichloroethylene, tetrachloroethylene, and background and downwind ambient VOC concentrations. He developed and implemented a project test plan for a county air permit to include source test and soil inlet/outlet sampling and analysis. Mr Folle participated in the source emissions testing of incinerators for the City of Valdez, Alaska used to incinerate waste generated from the oil spill cleanup effort in the Prince William Sound. Mr Folle also participated in the source emissions testing on a barge-mounted incinerator located near Knight Island, Alaska used to incinerate oily waste generated from the cleanup effort in the Prince William Sound. Testing included sampling for particulates, dioxins and furans, hydrogen chloride, carbon monoxide, sulfur dioxide, and total hydrocarbons. He conducted source emissions testing at an Atlantic Richfield oil field located in Prudhoe Bay, Alaska on a natural gas-fired turbine used for natural gas injection for the extraction of oil from ARCO's North Slope Oil Field. Testing included velocity, moisture, oxygen, carbon dioxide, oxides of nitrogen, and carbon monoxide. Mr Folle served as field team leader for the testing of a natural gas-fired caterpillar generator used at a large underground natural gas storage facility located in Dubach, Louisiana. Testing included velocity, moisture, oxygen, carbon dioxide, oxides of nitrogen and carbon monoxide.

Mr Folle participated in a RCRA Part B trial burn of a chemical hazardous waste incinerator located in Plaquemine, Louisiana. He performed volatile organic sampling using a volatile organic sampling train (VOST) to demonstrate the destruction removal efficiency of the principal organic hazardous constituents 1,1,2-trichloroethane, 1,2-dichloroethane, tetrachloroethylene, and 1,1,2,2-tetrachloroethane. Mr Folle also participated as field team leader during a trial burn of a chemical hazardous waste incinerator under the EPA's boilers and industrial furnaces (BIF) regulation. Testing was conducted in Geisman, Louisiana for particulates, toxic metals, hydrogen chloride, hydrogen fluoride, chlorine,

particle size distribution, oxygen, carbon dioxide, carbon monoxide, and total hydrocarbons. Mr Folle also served as project manager and field team leader on a variety of pollution control device, volatile organic compound (VOC) reduction efficiency tests for solvent, plating, coating, printing, dry cleaning, and hydrocarbon recovery facilities located in Arizona, Kansas, Iowa, Illinois, and Missouri.

**Dispersion Modeling:** Mr Folle performed air dispersion modeling on an air stripper during a RCRA facility inspection (RFI) for trichloroethylene, 1,2-dichlorethylene, vinyl chloride, and 1,1,2-trichloro-1,2,2-trifluoroethane. Modeling effort included the industrial source complex (ISC) long-term (ISCLT) and short-term (ISCST) versions as well as the valley mode of the complex-1 model. Maximum 1-hr and 24-hr exposures for acute health impacts were analyzed for associated risk assessment as well as annual exposures for chronic health assessment. He also performed air dispersion modeling on two hydrogen fluoride sources. Modeling included the use of ISCST and the ISCLT models for the two sources with a variety of stack heights and diameters. Maximum 1-hr and 24-hr emission concentrations were evaluated for exposure risk.

**CEMS Experience:** Mr Folle served as project manager and field team leader for a continuous emission monitoring system (CEMS) performance specification certification test located in Illinois on two industrial hazardous waste incinerators. CEMS performance specification certifications were conducted on two carbon monoxide and oxygen CEMS. Certification included 7-day zero and span drift calibration testing and CEMS relative accuracy (RA) tests conducted on both systems. Mr Folle performed as project manager and field team leader on many continuous emissions monitoring (CEM) projects for the continuous monitoring of total hydrocarbons, carbon monoxide, sulfur dioxide, oxides of nitrogen, oxygen, carbon dioxide, and volatile organic compounds (VOC).

Mr Folle served as project manager and field team leader on a wide variety of ambient air monitoring, fugitive emission screening, and volatile organic compound (VOC) monitoring.

**Asbestos Experience:** He managed and coordinated numerous projects involving asbestos sampling and asbestos air monitoring. Asbestos sampling included the collection of asbestos-containing materials (ACM), analyzing, and reporting the results of Polarized Light Microscopy (PLM) bulk samples and Transmission Electron Microscopy (TEM) asbestos sample analysis. Mr Folle also managed an asbestos abatement project involving the inspection, sampling, sample analysis, air monitoring, air monitoring filter analysis with phase contrast microscopy (PCM), and project management. Mr Folle designed the project specifications and all sampling, analysis, and removal was conducted in accordance with the EPA, Asbestos Hazard Emergency Response Act (AHERA), National Emission Standards for Hazardous Air Pollutants (NESHAPS), and Occupational Safety and Health Administration Guidelines. Mr Folle is also a certified asbestos inspector and asbestos management planner.

**Other Experience:** Mr Folle has served as project manager and field team leader for a variety of indoor air quality, asbestos, and lead-based paint audits. He has conducted numerous environmental facility and transactional audits. Mr Folle designed and installed a computerized environmental database management system for a major government vendor. The database management system included environmental management programs for chemical, air, and personnel monitoring.

**Memberships:**
- Air and Waste Management Association
- Source Evaluation Society

# RESUME

Steven C Dillard
Senior Air Quality Technician

**Professional Experience:**

- Fugro-McClelland (Midwest), Inc: 1992-present;
- Environmental Science & Engineering, Inc: 1988-1992;
- Monsanto Environmental Sciences: 1986-1988.

**Additional Training:**

- Certified NIOSH 582 Equivalent Training Course for quantifying airborne asbestos fibers, 1989.
- Certified AHERA asbestos inspector, certificate number 7ME0313910091, 1991.
- Certification of completion for 8-hr refresher course in AHERA asbestos inspection, 1992.
- Certified EPA Method 9 visual opacity observer, 40 CFR, Part 52, Appendix F, Air Pollution Control, St Louis, Missouri, 1991.
- Certification of completion for 8-hr refresher course in visual opacity, 1992.
- Certification of completion for 40-hr course in hazardous materials/waste site investigation, 1988.
- Certification of completion for 8-hr refresher course in hazardous materials/waste site investigation, 1989, 1990, 1991.
- Certification of completion of supervisors course in hazardous materials/waste site operations, 1991.
- Certification of completion for 40 hr course in source sampling, 1987.

**General Experience:** Mr Dillard has over 6 years of experience in the performance and field management of air quality projects. He has performed as a field team leader and group leader for a diversified range of projects involving the collection and analysis of air quality data for engineering, design, and compliance. His project experience includes source emissions testing, continuous emissions monitoring (CEM) operation and CEM performance specification testing, air toxics sampling, ambient air quality monitoring, indoor air quality, industrial hygiene sampling, volatile organic compound (VOC) screening and control equipment (VOC) reduction efficiency testing.

**Emissions Testing:** Mr Dillard has participated as group leader and field team leader on over 200 source emissions testing projects. He served as field team leader for the source emissions testing of a thermal desorption and vapor extraction system for the reclamation of contaminated soil in Tucson, Arizona. Testing included particulates, lead, cadmium, benzene, toluene, xylene, ethylbenzene, benzo(a)pyrene, total hydrocarbons (THC), inlet/outlet VOC reduction efficiency, carbon monoxide, oxides of nitrogen, oxygen, carbon dioxide, heptachlor, chlordane, methyl ethyl ketone, trichloroethylene, tetrachloroethylene, and background and downwind ambient VOC concentrations. He also conducted soil inlet/outlet sampling for analysis. Mr Dillard served as field team leader during a RCRA Part B waste incinerator trial burn for a facility located in Plaquemine, Louisiana. He performed volatile organic sampling using a volatile organic sampling train (VOST) to demonstrate a 99.99 percent destruction removal efficiency (DRE) to satisfy USEPA and the Louisiana Department of Environmental Quality (DEQ) requirements. He also performed four USEPA audit samples to certify testing procedures. The principal organic hazardous constituents were 1,1,2-trichloroethane, 1,2-dichloroethane, tetrachloroethylene, and 1,1,2,2-tetrachloroethane. He conducted source emissions testing for Komatsu-Dresser Company in Peoria, Illinois on two hard chrome electroplating processes for particulate matter and chromium concentrations. Additionally, ambient chromium, HCL, $HNO_3$, and $H_2SO_4$ samples were collected and analyzed. Mr Dillard also served as field team leader for the testing of a hospital medical waste incinerator located in Joplin, Missouri. Testing included velocity, moisture, particulates, hydrogen chloride (HCL), carbon monoxide (CO), oxygen ($O_2$), and visible opacity.

Mr Dillard also served as field team leader on a variety of pollution control device VOC reduction efficiency tests for solvent, plating, coating, printing, dry cleaning, and hydrocarbon recovery facilities located in Arizona, Florida, Michigan, Kansas, Ohio, Illinois, and Missouri.

**CEMS Experience:** Mr Dillard conducted a continuous emission monitoring system (CEMS) performance specification certification test in Illinois on two industrial hazardous waste incinerators. CEMS performance specification certifications were conducted on two carbon monoxide and oxygen CEMS. Certification included 7-day zero and span drift calibration testing and CEMS relative accuracy (RA) tests conducted on both systems. Mr Dillard has performed as field team leader on many continuous emissions monitoring (CEM) projects for the continuous monitoring of total hydrocarbons, carbon monoxide, sulfur dioxide, oxides of nitrogen, oxygen, carbon dioxide, and volatile organic

compounds (VOC). Mr Dillard has also served as a field team leader on a wide variety of ambient air monitoring, fugitive emission screening, and volatile organic compound (VOC) monitoring.

**Asbestos Experience:** Mr Dillard has supervised and coordinated numerous projects involving asbestos sampling and asbestos air monitoring. He has conducted collection of asbestos-containing materials (ACM), analyzing, and reporting the results of Polarized Light Microscopy (PLM) bulk samples and Transmission Electron Microscopy (TEM) asbestos sample analysis. Mr Dillard has also supervised many asbestos abatement projects involving the inspection, sampling, sample analysis, and air monitoring filter analysis with on-site phase contrast microscopy (PCM). Mr Dillard is a certified AHERA asbestos inspector and a certified NIOSH 582 microscopist.

**Other Experience:** Mr Dillard has served as field team leader for a variety of indoor air quality, asbestos, fugitive odors, and lead-based paint audits. He has also conducted numerous environmental facility and transactional audits.

**Memberships:**

- Air and Waste Management Association
- Source Evaluation Society

# RESUME

FUGRO ◘ McClelland

Robert W Suda
Environmental Scientist

**Professional Experience:**
- Fugro-McClelland (Midwest), Inc: 1990-present.

**Education:** BS, Geology, University of Illinois; MS, Environmental Studies, Southern Illinois University.

**General Experience:** As an Environmental Geologist with Fugro-McClelland, Mr Suda is primarily responsible for research and preparation of environmental documents. His role with the company includes extensive experience in soil and groundwater assessments as well as preliminary Phase I environmental site assessments. Mr Suda also has experience in the design, installation, and monitoring of soil and groundwater remediation systems.

Mr Suda has conducted numerous soil and groundwater investigations at hazardous industrial sites and underground storage tank facilities. His experience includes various soil, rock, and groundwater sampling techniques as well as the design and installation of groundwater monitoring wells. He has conducted soil vapor surveys at underground storage tank facilities using a portable gas chromatograph to assess extent of the contaminant plume. Mr Suda's assessment experience includes work with a variety of contaminants, such as heavy metals, organic solvents, PCBs, and acids.

Mr Suda is experienced as a site safety and health officer for field investigations and operations at hazardous and non hazardous materials sites. Mr Suda has experience in the development and implementation of site safety plans for hazardous work sites. He is experienced in monitoring for unsafe work conditions using survey instruments, such as a Gas Chromatograph, Organic Vapor Analyzer (OVA), Photoionization Detector (PID), Combustible Gas Indicator, and Draeger Tubes. Mr Suda is also trained and has experience with the proper use and selection of personal protective equipment.

Mr Suda also has a broad experience in geologic mapping having contributed to a number of mapping projects in a variety of geologic environments. He is also experienced in the field characterization and identifications of soils and the preparation of soil boring logs, according to ASTM standards.

Prior to obtaining his masters degree, Mr Suda was involved in the preparation of several environmental impact reports. These reports include an environmental impact statement for a secondary highway expansion and an environmental assessment for a 2500-acre housing development.

Additional training includes OSHA 40-hr Health and Safety Training and U.S. EPA Underground Storage Tank Integrity Certification.

**Professional Membership:** Water Pollution Control Association.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

COLLINSVILLE REGIONAL OFFICE
2009 MALL STREET
COLLINSVILLE, ILLINOIS 62234

Lovely Howard

Kendall Magnuson
Mail Code AR-18J
U.S. Environmental Protection Agency
77 West Jackson Blvd.
Chicago, IL 60604-3590

10/08/93

Hello Howard—

Here is the complete report — can you return when you have finished?

—Kendall

ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS
ROUTE SLIP

DATE 6-4-93

TO: Kendall Magnuson

| | Remarks |
|---|---|
| ___ Approval | |
| ✓ As requested | |
| ___ Comment | |
| ___ Confer | |
| ✓ For information | |
| ___ For recommendation | |
| ___ Investigate | |
| ___ Necessary action | |
| ___ Note and destroy | |
| ___ Note and file | |
| ___ Note and return | |
| ___ Per conversation | |
| ___ Prepare reply | |
| ___ Signature | |

FROM: Jeff Benbenek

IL 532-0561
EPA 001 7/75

076-001

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AUG 09 1993

REPLY TO THE ATTENTION OF:

**MEMORANDUM**

**SUBJECT:** Stack Test Review - TSP, Chemetco, Inc., Hartford, Illinois (2-77-93) (AFH114:D5)

**FROM:** Howard H. A. Caine, Environmental Engineer
Central District Office (SC-10C)

**TO:** Stephen H. Rothblatt, Chief
Regulation Development Branch (AR-18J)

**ATTN:** Marlena Grisby (AR-18J)

**THRU:** Willie H. Harris, Chief
Central District Office (SC-10C)

**INTRODUCTION AND PURPOSE**

Acting on Kendall Magnuson's request of May 14, 1993, the subject stack test was reviewed. I spoke with Mr. Magnuson on May 17, 1993 and asked what he specifically wanted reviewed. He stated to only review the Methods 1-5 testing. I told him I could not review the test unless I had the field and analytical data sheets. Mr. Magnuson stated he would get the data sheets from the Illinois Environmental Protection Agency (IEPA). On June 8, 1993, Mr. Magnuson sent me the data sheets. In reviewing the report, I found that Methods 1-5, 9, and 12 testing was conducted on Furnaces #1-#4 at the subject facility. The contractor for the test series was Fugro-McClelland Environmental, 9921 St. Charles Rock Road, St. Ann, Missouri 63074, (314) 428-8880.

**Stack Test Review**

**Furnace #2**

A review of each method is as follows:

**Method 1** - It cannot be determined from the information in the report that the test location meets the requirements of this method.

**Method 2** - The method appears to have been performed correctly.

**Method 3** - The method appears to have been performed correctly.

**Method 4** - The method appears to have been performed correctly.

**Method 5** - The method appears to have been performed correctly.

During the review, I could not find information showing how many duct diameters upstream and downstream the test location was from the nearest disturbance. The report states that Messrs Smith, Benbenak, and Schlueter of the IEPA observed the testing. It is recommended that ARD inquire with one of these gentlemen that the test location met the criteria of Method 1.

Printed on Recycled Paper

Calculations were checked and were found to be comparable to Table 2-2.

**Furnace #4**

A review of each method is as follows:

**Method 1** - It cannot be determined from the information in the report that the test location meets the requirements of this method (Please refer to the comments under Furnace #2).

**Method 2** - The method appears to have been performed correctly.

**Method 3** - The method appears to have been performed correctly.

**Method 4** - The method appears to have been performed correctly.

**Method 5** - The method appears to have been performed correctly.

Calculations were checked and found to be comparable to Table 2-3 except for Particulate Concentration (grains/dscf). It can be seen in Table 2-3 that the Particulate Concentration (grams/dcsf) was not converted to Particulate Concentration (grains/dscf).

**Furnace #1**

A review of each method is as follows:

**Method 1** - It cannot be determined from the information in the report that the test location meets the requirements of this method (Please refer to the comments under Furnace #2).

**Method 2** - The method appears to have been performed correctly.

**Method 3** - The method appears to have been performed correctly.

**Method 4** - The method appears to have been performed correctly.

**Method 5** - The method appears to have been performed correctly.

Calculations were checked and found to be comparable to Table 2-4 and 2-5 except for Table 2-4, Run 2, Dry, Standard Sample Volume (dscf) and Percent Isokinetic. These reported values are incorrect as Fugro-McClelland miscalculated its meter temperature (See Table 6-3 and compare to raw data in Appendix A of the subject run). The correct Dry, Standard Sample Volume (dscf) is 37.585 and the correct Percent Isokinetic is 99.36. These miscalculations do not greatly impact the particulate emission results.

**Furnace #3**

A review of each method is as follows:

**Method 1** - It cannot be determined from the information in the report that the test location meets the requirements of this method (Please refer to the comments under Furnace #2).

**Method 2** - The method appears to have been performed correctly.

**Method 3** - The method appears to have been performed correctly.

**Method 4** - The method appears to have been performed correctly.

**Method 5** - The method appears to have been performed correctly.

Calculations were checked and found to be comparable to Table 2-6 expect for Run 3, Particulate Emission Rate (lb/hour). The reported value is incorrect as Fugro-McClelland transposed the average value from Table 6-5 to the Run 3 value in Table 2-6. The correct Particulate Emission Rate (lb/hour) for Run 3 is 7.190. Therefore, the Average Particulate Emission Rate (lb/hour) is incorrect in Table 2-6 and should be 10.75.

**Comments**

1) It could not be determined from the report that the test location met the requirements of Method 1.

2) The following was reported incorrectly in the report: Table 2-3, Runs 1-3, Particulate Concentration (grains/dcsf); Table 2-4, Run 2, Dry, Standard Sample Volume (dscf) and Percent Isokinetic; and Table 2-6, Run 3, Particulate Emission Rate (lb/hour).

3) The portions of the report that could be reviewed appeared to meet the requirements of 40 CFR Part 60, Appendix A, Methods 2-5.

4) As requested by Mr. Magnuson, the stack test report is attached.

If you have any questions, please call me at (312) 353-1988.

Attachments

SC-10C:HCAINE:gw:8-6-93:FINAL:FH114D5

CONCURRENCES

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SYMBOL | SC-10C | SC-10C | SC-10C | | | | | |
| SURNAME | M.W. | HAINE | JPS | WHH | | | | |
| DATE | 8-6-93 | 8/6/93 | 8/9/93 | 8/9/93 | | | | |

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

RECEIVED
MAY 17 1993
CENTRAL DISTRICT OFFICE

AFH 114:D5

Date: MAY 14 1993

Subject: Request for ESD Assistance

From: Diane L. Sipe, Chief
Enforcement Section
Regulation Development Branch

Priority # 2-77-93

To: Willie Harris, Chief
Central District Office (5SCDO)

Willie: this is a referral now, so the stack test review is real important. Thanks

Company Name and Address: Chemefco, Inc.

City and State: Hartford, Illinois

Attainment Status: NA 1 ☐ NA 2 ☐ Attainment ☐ NESHAP ☐

Company Contact: _____ Phone Number: _____

Regulation: _____ Date Desired: _____

Purpose: (One Objective MUST be checked)

Consent Decree Enforcement - A18 ☐

Hot Spots - A19 ☐

Fugitive Investigation - A20 ☐

Case Development - litigation support - stack test observation - A21 ☐

Stack Test Reviews - A22 ☒

SO2 Compliance Determination - A23 ☐

NESHAPS - A24 ☐

HC Compliance Determinations - A25 ☐

VOC Case Development and Litigation Support - A26 ☐

CEM/NSPS - A27 ☐

TSP Compliance Investigation - A28 ☐

Consent Decree Negotiation - A29 ☐

Source Specific(Ambient Studies - A31 ☐

| SOURCE | DURATION OF OBS. - HRS | OF INSPS. PROJECTED VISITS | SPECIAL REQUIREMENTS |
|---|---|---|---|
| | | | |

ENGINEER: Kendall Magnuson KM CHIEF, ENFORCEMENT SECTION: Diane L. Sipe

DATE: 05/13/93 PHONE NO: 3-9685 ENGR. TECHNICIAN: _____

cc: C. Mijares
Requesting Staff Member

Attachment

# CONVERSATION RECORD

2:00 PM | 5/17/93

| ROUTING | |
|---|---|
| NAME/SYMBOL | INT |
| | |
| | |
| | |
| | |
| | |

:PE ☐ VISIT ☐ CONFERENCE ☒ TELEPHONE ☐ INCOMING ☒ OUTGOING

ocation of Visit/Conference:

| AME OF PERSON(S) CONTACTED OR IN CONTACT TH YOU | ORGANIZATION (Office, dept., bureau, etc.) | TELEPHONE NO: |
|---|---|---|
| KENDALL MAGNUSON | U.S. EPA REG 5 - ARD | 3-9685 |

JBJECT CHEMETCO, INC.

JMMARY

I ASKED MR. MAGNUSON WHAT HE SPECIFICALLY WANTED REVIEWING IN THE REPORT. HE STATED THAT HE ONLY WANTED METHODS F5 REVIEWED FOR ACCURACY. I TOLD HIM I WOULD NEED A COMPLETE COPY OF THE REPORT IN ORDER TO REVIEW INCLUDING THE FIELD AND ANALYTICAL SHEETS. HE SAID HE WOULD GET THIS FROM FERA FOR ME.

:TION REQUIRED

| ME OF PERSON DOCUMENTING CONVERSATION | SIGNATURE | DATE |
|---|---|---|
| HOWARD H.A. CAINE | Howard H.A. Caine | 7/7/93 |

:TION TAKEN

| :NATURE | TITLE | DATE |
|---|---|---|
| | | |

[illegible] CALCULATION SHEET

Facility: CHEMET CO  Source: STACK #2 (9/22/92)

Location: HARTFORD, FL  Run No: 1

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.25 | | 0.19 | | 0.21 | | | | | | | |
| 0.22 | | 0.18 | | 0.22 | | | | | | | |
| 0.23 | | 0.18 | | 0.22 | | | | | | | |
| 0.23 | | 0.21 | | 0.23 | | | | | | | |
| 0.22 | | 0.20 | | 0.22 | | | | | | | |
| 0.22 | | 0.20 | | 0.22 | | | | | | | |
| 0.19 | | 0.20 | | 0.20 | | | | | | | |
| 0.19 | | 0.20 | | 0.20 | | | | | | | |

$\sqrt{\Delta P} = 0.4574$, $V_m = 40.657$, $T_m = 84.17$, $T_s = 144.2$, $\Delta H = 1.579$

| | Reported Value |
|---|---|
| mstd = 17.64 (40.657/$V_m$)(0.9989/Y) {29.95/$P_{bar}$ + (1.579/13.6)/$\Delta H_{avg}$}/(544.67/$T_m$) = 39.582 | 39.5984 |
| ws = {0.04707 (73.50 condensate, mL)}/3.460 numerator + $V_{mstd}$ = 0.08039 | 8.03 |
| d = 0.44 (1.2 %$CO_2$) + 0.32 (19.7 %$O_2$) + 0.28 (79.1 %$N_2$+CO) = 28.98 | 28.9800 |
| w = $M_d$ (1-$B_{ws}$) + 18 $B_{ws}$ = 28.10  $P_s$ = 29.95 - 0.18/13.6 = 29.94 | 28.0978 ~~27.84~~ 1/27/93 |
| s = 85.49 (0.84/$C_p$)(0.4574/$\sqrt{\Delta P_{avg}}$) {604.2/$T_s$(°R)} $M_w$ 29.94/$P_s$ $^{1/2}$ = 27.84 fps | 27.84 |
| s = 60 (1-$B_{ws}$)$V_s$(17.88 XS area of stack) (528/29.92) ($P_s$/$T_s$) = 24,018 dscfm | 24010.71 |
| = (0.09450 $T_s V_{mstd}/P_s V_s$(60 θ(min.))(0.0004909 XS area-nozzle)(1-$B_{ws}$) = 100.1 % | 100.16 |
| rains/dscf = 95.8 $M_n$ (mg.) (0.01543)/$V_{mstd}$ = 0.03735 | 0.0373 |
| b/hr = (0.00857)(gr/dscf) $Q_s$ = 7.688 | 7.6851 |

or fuel-burning sources using F-factor calculation

= $10^6$(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/ _____ = _____ dscf/MMBtu
heat value (dry basis)

= [illegible] = _____ [illegible]

[illegible] CALCULATION SHEET

Facility: CHEMETCO
Location: HARTFORD, IL

Source: STACK #2 (9/24/92)
Run No: 2

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.23 | | 0.21 | | 0.17 | | | | | | | |
| 0.24 | | 0.22 | | 0.19 | | | | | | | |
| 0.24 | | 0.19 | | 0.22 | | | | | | | |
| 0.25 | | 0.19 | | 0.19 | | | | | | | |
| 0.23 | | 0.20 | | 0.24 | | | | | | | |
| 0.25 | | 0.18 | | 0.20 | | | | | | | |
| 0.23 | | 0.19 | | 0.20 | | | | | | | |
| 0.21 | | 0.17 | | 0.21 | | | | | | | |

$\sqrt{\Delta P} = 0.4580$, $V_m = 63.641$, $\Delta H = 3.900$, $T_s = 145.2°F = 605.2°R$, $T_m = 97.88 = 557.88$

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{63.641}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left[\frac{30.00}{P_{bar}} + \left(\frac{3.900}{\Delta H_{avg}}/13.6\right)\right]/\frac{557.88}{T_m} =$ 60.879 | 60.9046 |
| $V_{ws} = \{0.04707 \left(\frac{94.5}{\text{condensate, mL}}\right)\}/\frac{4.448}{\text{numerator}} + V_{mstd} =$ 0.06809 | 6.81 |
| $M_d = 0.44 \left(\frac{0.7}{\%CO_2}\right) + 0.32 \left(\frac{20.4}{\%O_2}\right) + 0.28 \left(\frac{78.9}{\%N_2+CO}\right) =$ 28.93 | 28.9280 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} =$ 28.19 $\quad P_s = 30.00 - \frac{0.18}{13.6} = 29.99$ | 28.1842 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4580}{\sqrt{\Delta P_{avg}}}\right)\left[\frac{605.2}{T_s(°R)}/M_w \frac{29.99}{P_s}\right]^{1/2} =$ 27.83 fps | 27.83 |
| $Q_s = 60 (1-B_{ws}) V_s \left(\frac{17.88}{\text{XS area of stack}}\right) \left(\frac{528}{29.92}\right) (P_s/T_s) =$ 24,331 dscfm | 24,32360 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s \left(\frac{60}{\theta(\text{min.})}\right)\left(\frac{0.0007670}{\text{XS area-nozzle}}\right)(1-B_{ws}) =$ 97.27 % | 97.32 |
| grains/dscf $= \frac{159.7}{M_n\ (\text{mg.})} (0.01543)/V_{mstd} =$ 0.04048 | 0.0404 |
| lb/hr $= (0.00857)(\text{gr/dscf})\ Q_s =$ 8.441 | 8.4381 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ heat value (dry basis) $=$ _____ dscf/MMBtu

$= [illegible] \times 1000] \times$ _____ $=$ _____ lb/MMBtu

[illegible] CALCULATION SHEET

Facility: CITEMETCO  Source: STACK 2 (9/22/92)

Location: HARTFORD, IL  Run No: 3

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.22 | | 0.19 | | 0.19 | | | | | | | |
| 0.21 | | 0.20 | | 0.20 | | | | | | | |
| 0.22 | | 0.20 | | 0.22 | | | | | | | |
| 0.22 | | 0.19 | | 0.22 | | | | | | | |
| 0.23 | | 0.23 | | 0.24 | | | | | | | |
| 0.24 | | 0.21 | | 0.23 | | | | | | | |
| 0.22 | | 0.20 | | 0.20 | | | | | | | |
| 0.19 | | 0.20 | | 0.20 | | | | | | | |

$\sqrt{\Delta P}$: 0.4593, $V_m$ = 41,188, $\Delta H$ = 1.593, $T_s$ = 144.0 °F / 604.0 °R, $T_m$ = 95.50 °F / 555.50 °R

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{41,188}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left\{\frac{30.02}{P_{bar}} + \left(\frac{1.593}{\Delta H_{avg}}/13.6\right)\right\}/\frac{555.50}{T_m} =$ 39,374 | 39.3879 |
| $B_{ws} = \{0.04707 \left(\frac{52.5}{\text{condensate, mL}}\right)\}/\frac{2,471}{\text{numerator}} + V_{mstd} =$ 0.05905 | 0.8700 |
| $M_d = 0.44 \left(\frac{0.9}{\%CO_2}\right) + 0.32 \left(\frac{20.4}{\%O_2}\right) + 0.28 \left(\frac{78.7}{\%N_2+CO}\right) =$ 28.96 | 28.9565 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} =$ 28.31  $P_s = 30.02 - \frac{0.18}{13.6} = 30.01$ | 28.3097 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4593}{\sqrt{\Delta P_{avg}}}\right)\left[\frac{604.0}{T_s(°R)}/M_w \frac{30.01}{P_s}\right]^{1/2} =$ 27.81 fps | 27.73 |
| $Q_s = 60 (1-B_{ws}) V_s \left(\frac{17.88}{\text{XS area of stack}}\right) \left(\frac{528}{29.92}\right) (P_s/T_s) =$ 24,614 dscfm | 24,584.92 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s \left(\frac{60}{\theta(\text{min.})}\right)\left(\frac{0.0004909}{\text{XS area-nozzle}}\right)(1-B_{ws}) =$ 97.46 % | 97.30 |
| grains/dscf = $\frac{88.0}{M_n\ (mg.)}$ (0.01543)/$V_{mstd}$ = 0.03449 | 0.0344 |
| lb/hr = (0.00857)(gr/dscf) $Q_s$ = 7.275 | 7.2669 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ = _____ dscf/MMBtu
heat value (dry basis)

[illegible]

[illegible] STACK [illegible] CALCULATION SHEET

Facility: CHEMETCO  Source: STACK #4 (9/23/93)

Location: HARTFORD, IL  Run No: 1

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.28 | | 0.25 | | 0.23 | | | | | | | |
| 0.28 | | 0.24 | | 0.25 | | | | | | | |
| 0.30 | | 0.20 | | 0.27 | | | | | | | |
| 0.30 | | 0.15 | | 0.30 | | | | | | | |
| 0.30 | | 0.25 | | 0.25 | | | | | | | |
| 0.23 | | 0.22 | | 0.23 | | | | | | | |
| 0.23 | | 0.22 | | 0.23 | | | | | | | |
| 0.20 | | 0.25 | | 0.23 | | | | | | | |

$\sqrt{\Delta P} = 0.4940$, $V_m = 43.445$, $\Delta H = 1.847$, $T_s = 601.5°R$ (141.5°F), $T_m = 535.96°R$ (75.96°F)

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{43.445}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left\{\frac{30.35}{P_{bar}} + \left(\frac{1.847}{\Delta H_{avg}}/13.6\right)\right\}/\frac{535.96}{T_m} = 43.544$ | 43.3928 |
| $B_{ws} = \{0.04707 \left(\frac{51.7}{\text{condensate, mL}}\right)\}/\frac{2.434}{\text{numerator}} + V_{mstd} = 0.05294$ | 5.31 |
| $M_d = 0.44 \left(\frac{1.1}{\%CO_2}\right) + 0.32 \left(\frac{20.0}{\%O_2}\right) + 0.28 \left(\frac{78.9}{\%N_2+CO}\right) = 28.98$ | 28.9720 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} = 28.40$  $P_s = 30.35 - \frac{0.23}{13.6} = 30.33$ | 28.3844 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4940}{\sqrt{\Delta P_{avg}}}\right)\left[\frac{601.5}{T_s(°R)}/M_w \frac{30.33}{P_s}\right]^{1/2} = 29.64$ fps | 29.65 |
| $Q_s = 60 (1-B_{ws}) V_s \left(\frac{17.88}{\text{XS area of stack}}\right) \left(\frac{528}{29.92}\right) (P_s/T_s) = 26{,}797$ dscfm | 26,794.54 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s \left(\frac{60}{\theta(\text{min.})}\right)\left(\frac{0.0004909}{\text{XS area-nozzle}}\right)(1-B_{ws}) = 98.70$ % | 98.35 |
| grains/dscf $= \frac{101.9}{M_n\ (mg.)} (0.01543)/V_{mstd} = 0.03611$ | 0.0023 |
| lb/hr $= (0.00857)(gr/dscf)\ Q_s = 8.293$ | 8.3246 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ = _____ dscf/MMBtu
heat value (dry basis)

= [illegible] = _____ [illegible]

[illegible] CALCULATION SHEET

Facility: CHEMETCO  Source: STACK 4 (9/23/92)

Location: HARTFORD, IL  Run No: 2

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.20 | | 0.20 | | 0.20 | | | | | | | |
| 0.20 | | 0.20 | | 0.19 | | | | | | | |
| 0.18 | | 0.15 | | 0.17 | | | | | | | |
| 0.18 | | 0.18 | | 0.17 | | | | | | | |
| 0.15 | | 0.18 | | 0.20 | | | | | | | |
| 0.18 | | 0.18 | | 0.18 | | | | | | | |
| 0.18 | | 0.17 | | 0.18 | | | | | | | |
| 0.20 | | 0.20 | | 0.17 | | | | | | | |

$\sqrt{\Delta P}$ = 0.4273, $V_m$ = 37.780, $\Delta H$ = 1.379, $T_s$ = 607.9°R (147.9°F), $T_m$ = 543.83°R (83.83°F)

Reported Value

$V_{mstd}$ = 17.64 (37.780/$V_m$)(0.9989/Y)[30.42/$P_{bar}$ + (1.379/13.6)/$\Delta H_{avg}$]/543.83/$T_m$ = 37.361 — 37.3772

$B_{ws}$ = {0.04707 (49.60 / condensate, mL)}/2.335 / numerator + $V_{mstd}$ = 0.05882 — 5.88

$M_d$ = 0.44 (1.4 / %$CO_2$) + 0.32 (19.8 / %$O_2$) + 0.28 (78.8 / %$N_2$+CO) = 29.02 — 29.0160

$M_w$ = $M_d$ (1-$B_{ws}$) + 18 $B_{ws}$ = 28.37  $P_s$ = 30.42 − 0.24/13.6 = 30.40 — 28.3684

$V_s$ = 85.49 (0.84/$C_p$)(0.4273/$\sqrt{\Delta P_{avg}}$)[607.9/$T_s$(°R) / $M_w$ / 30.40/$P_s$]$^{1/2}$ = 25.76 fps — 25.76

$Q_s$ = 60 (1-$B_{ws}$)$V_s$(17.88 / XS area of stack) (528/29.92) ($P_s$/$T_s$) = 22,954 dscfm — 22,952.70

I = (0.09450 $T_s V_{mstd}/P_s V_s$(60 / θ(min.))(0.0004909 / XS area-nozzle)(1-$B_{ws}$) = 99.97 % — 98.90

Grains/dscf = 107.9 / $M_n$ (mg.) (0.01543)/$V_{mstd}$ = 0.04456 — 0.0029

Lb/hr = (0.00857)(gr/dscf) $Q_s$ = 8.766 — 8.7661

For fuel-burning sources using F-factor calculation

F = $10^6$(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/ _____ = _____ dscf/MMBtu
heat value (dry basis)

I = [illegible] = _____ lbs MMBtu

[illegible] CALCULATION SHEET

Facility: CHEMKTCO

Location: HARTFORD, IL

Source: STACK 4 (9/23/92

Run No: 3

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.20 | | 0.18 | | 0.15 | | | | | | | |
| 0.20 | | 0.15 | | 0.16 | | | | | | | |
| 0.18 | | 0.14 | | 0.19 | | | | | | | |
| 0.17 | | 0.17 | | 0.22 | | | | | | | |
| 0.15 | | 0.20 | | 0.18 | | | | | | | |
| 0.16 | | 0.20 | | 0.20 | | | | | | | |
| 0.18 | | 0.18 | | 0.17 | | | | | | | |
| 0.19 | | 0.17 | | 0.15 | | | | | | | |

$\sqrt{\Delta P} = 0.4196$, $V_m = 37.530$, $\Delta H = 1.330$, $T_s = 145.9°F$ $605.9°R$, $T_m = 87.79°F$ $547.79°R$

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{37.530}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left[\frac{30.42}{P_{bar}} + \left(\frac{1.330}{\Delta H_{avg}}/13.6\right)\right]/\frac{547.79}{T_m} = 36.861$ | 36.8762 |
| $V_{ws} = \{0.04707 \left(\frac{44.30}{\text{condensate, mL}}\right)\}/\frac{2.085}{\text{numerator}} + V_{mstd} = 0.05354$ | 5.35 |
| $M_d = 0.44 \left(\frac{1.0}{\%CO_2}\right) + 0.32 \left(\frac{20.7}{\%O_2}\right) + 0.28 \left(\frac{78.3}{\%N_2+CO}\right) = 28.99$ | 28.9880 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} = 28.40$ $P_s = 30.42 - \frac{0.28}{13.6} = 30.40$ | 28.3999 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4196}{\sqrt{\Delta P_{avg}}}\right)\left[\frac{605.9}{T_s(°R)}/M_w \frac{30.40}{P_s}\right]^{1/2} = 25.24$ fps | 25.24 |
| $Q_s = 60 (1-B_{ws}) V_s \left(\frac{17.88}{\text{XS area of stack}}\right) \frac{528}{(29.92)} (P_s/T_s) = 22,691$ dscfm | 22,690.41 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s \left(\frac{60}{\theta(\text{min.})}\right)\left(\frac{0.0004909}{\text{XS area-nozzle}}\right)(1-B_{ws}) = 98.67$ % | 98.70 |
| grains/dscf $= \frac{44.2}{M_n\ (\text{mg.})} (0.01543)/V_{mstd} = 0.01850$ | 0.0012 |
| lb/hr $= (0.00857)(\text{gr/dscf})\ Q_s = 3.598$ | 3.5981 |

or fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.460)/$ _____ heat value (dry basis) $=$ _____ dscf/MMBtu

$= [illegible] = $ _____ [illegible]

[illegible] CALCULATION SHEET

Facility: CHEMETCO  Source: STACK 1 (9/23/92)

Location: HARTFORD, IL  Run No: 1

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.25 | | 0.20 | | 0.21 | | | | | | | |
| 0.18 | | 0.21 | | 0.21 | | | | | | | |
| 0.15 | | 0.15 | | 0.19 | | | | | | | |
| 0.15 | | 0.15 | | 0.18 | | | | | | | |
| 0.15 | | 0.22 | | 0.15 | | | | | | | |
| 0.13 | | 0.22 | | 0.15 | | | | | | | |
| 0.19 | | 0.22 | | 0.19 | | | | | | | |
| 0.20 | | 0.22 | | 0.17 | | | | | | | |

$\sqrt{\Delta P} = 0.4286$, $V_m = 39.032$, $\Delta H = 1.420$, $T_s = 152.3°F$ / $612.3°R$, $T_m = 82.00°F$ / $542.00°R$

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{39.032}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left\{\frac{30.38}{P_{bar}} + \left(\frac{1.420}{\Delta H_{avg}}/13.6\right)\right\}/\frac{542.00}{T_m} =$ 38.683 | 38.7033 |
| $B_{ws} = \{0.04707 \left(\frac{58.2}{\text{condensate, mL}}\right)\}/\frac{2.739}{\text{numerator}} + V_{mstd} =$ 0.06612 | 6.61 |
| $M_d = 0.44 \left(\frac{0.8}{\%CO_2}\right) + 0.32 \left(\frac{20.0}{\%O_2}\right) + 0.28 \left(\frac{79.2}{\%N_2+CO}\right) =$ 28.93 | 28.9280 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} =$ 28.21  $P_s = 30.38 - \frac{0.24}{13.6}$ | 28.2056 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4286}{\sqrt{\Delta P_{avg}}}\right)\left\{\frac{612.3}{T_s(°R)}/M_w \frac{30.36}{P_s}\right\}^{1/2} =$ ~~[illegible]~~ 26.02 fps | 26.02 |
| $Q_s = 60 (1-B_{ws}) V_s \left(\frac{17.88}{\text{XS area of stack}}\right) \frac{528}{(29.92)} (P_s/T_s) =$ 22,810 dscfm | 22,809.46 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s \left(\frac{60}{\theta(\text{min.})}\right)\left(\frac{0.0004909}{\text{XS area-nozzle}}\right)(1-B_{ws}) =$ 103.0 % | 103.05 |
| grains/dscf $= \frac{46.40}{M_n\ (\text{mg.})} (0.01543)/V_{mstd} =$ 0.01851 | 0.0185 |
| lb/hr $= (0.00857)(\text{gr/dscf})\ Q_s =$ ~~36.18~~ 3.618 | 3.618 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ = _____ dscf/MMBtu
heat value (dry basis)

[illegible] = _____ = _____ lbs/MMBtu

[illegible] CALCULATION SHEET

Facility: CHEMETCO
Location: HARTFORD, IL

Source: STACK #1 (9/23/92)
Run No: 2

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.20 | | 0.22 | | 0.19 | | | | | | | |
| 0.20 | | 0.22 | | 0.17 | | | | | | | |
| 0.17 | | 0.21 | | 0.16 | | | | | | | |
| 0.16 | | 0.20 | | 0.13 | | | | | | | |
| 0.18 | | 0.17 | | 0.13 | | | | | | | |
| 0.19 | | 0.17 | | 0.16 | | | | | | | |
| 0.20 | | 0.19 | | 0.13 | | | | | | | |
| 0.22 | | 0.19 | | 0.17 | | | | | | | |

$\sqrt{\Delta P} = 0.4231$, $V_m = 38.210$, $\Delta H = 1.430$, $T_s = 148.9°F = 608.9°R$, $T_m = 85.38°F = 545.38°R$

| | Reported Value |
|---|---|
| $m_{std} = 17.64 \left(\frac{38.210}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left\{\frac{30.34}{P_{bar}} + \left(\frac{1.430}{\Delta H_{avg}}/13.6\right)\right\}/\frac{545.38}{T_m} = 37.585$ | 35.7175 |
| $w_{s} = \{0.04707 (36.9)\}/1.737 + V_{mstd} = 0.04417$ (condensate, mL; numerator) | 4.64 |
| $M_d = 0.44 (1.2) + 0.32 (19.7) + 0.28 (79.1) = 28.98$ ($\%CO_2$, $\%O_2$, $\%N_2+CO$) | 28.9800 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} = 28.50$ $\quad P_s = 30.34 - \frac{0.24}{13.6} = 30.32$ | 28.4708 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4231}{\sqrt{\Delta P_{avg}}}\right)\left\{\frac{608.9}{T_s(°R)}/M_w \frac{30.32}{P_s}\right]^{1/2} = 25.50$ fps | 25.52 |
| $Q_s = 60 (1-B_{ws}) V_s (17.88) \frac{528}{(29.92)} (P_s/T_s) = 22,977$ dscfm (XS area of stack) | 22,933.60 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s (60)(0.0004909)(1-B_{ws}) = 99.36\ \%$ (θ(min.); XS area-nozzle) | 94.58 |
| grains/dscf $= \frac{78.2}{M_n\ (mg.)} (0.01543)/V_{mstd} = 0.03210$ | 0.0337 |
| lb/hr $= (0.00857)(gr/dscf)\ Q_s = 6.321$ | 6.6429 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ = _____ dscf/MMBTU
heat value (dry basis)

= [illegible] = _____ lbs/MMBTU

[illegible] CALCULATION SHEET

Facility: CITEMETCO  Source: STACK 1 (9/24/92)

Location: HARTFORD, IL  Run No: 1

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.23 | | 0.19 | | 0.14 | | | | | | | |
| 0.24 | | 0.19 | | 0.14 | | | | | | | |
| 0.24 | | 0.19 | | 0.22 | | | | | | | |
| 0.25 | | 0.20 | | 0.20 | | | | | | | |
| 0.25 | | 0.17 | | 0.22 | | | | | | | |
| 0.26 | | 0.17 | | 0.19 | | | | | | | |
| 0.22 | | 0.13 | | 0.17 | | | | | | | |
| 0.20 | | 0.14 | | 0.15 | | | | | | | |

$\sqrt{\Delta P} = 0.4404$, $V_m = 40.120$, $\Delta H = 1.561$, $T_s = 605.1°R$ (145.1°F), $T_m = 533.13°R$ (73.13°F)

| | Reported Value |
|---|---|
| mstd = 17.64 (40.120/$V_m$)(0.9989/Y)[30.34/$P_{bar}$ + (1.561/13.6)/$\Delta H_{avg}$]/533.13/$T_m$ = 40.383 | 40.2630 |
| ws = [0.04707 (62.4 condensate, mL)]/2.937 numerator + $V_{mstd}$ = 0.06821 | 6.80 |
| d = 0.44 (0.9 %$CO_2$) + 0.32 (19.7 %$O_2$) + 0.28 (79.4 %$N_2$+CO) = 28.93 | 28.9267 |
| w = $M_d$ (1-$B_{ws}$) + 18 $B_{ws}$ = 28.18  $P_s = 30.34 - \frac{0.29}{13.6}$ | 28.1838 |
| s = 85.49 (0.84/$C_p$)(0.4404/$\sqrt{\Delta P_{avg}}$)[605.1/$T_s$(°R) /$M_w$ 30.32/$P_s$]$^{1/2}$ = 26.61 fps | 26.66 |
| s = 60 (1-$B_{ws}$)$V_s$(17.88 XS area of stack) (528/29.92) ($P_s$/$T_s$) = 23,521 dscfm | 23,482.76 |
| = (0.09450 $T_s V_{mstd}/P_s V_s$(60 θ(min.))(0.0004909 XS area-nozzle)(1-$B_{ws}$) = 104.3 % | 104.13 |
| rains/dscf = 103.1 $M_n$ (mg.) (0.01543)/$V_{mstd}$ = 0.03939 | 0.0394 |
| b/hr = (0.00857)(gr/dscf) $Q_s$ = 7.940 | 7.9554 |

or fuel-burning sources using F-factor calculation

= $10^6$(3.64H + 1.53C + 0.57S + 0.14N + 0.460)/ _____ heat value (dry basis) = _____ dscf/MMBT

= [illegible] = _____ [illegible]

[illegible] CALCULATION SHEET

Facility: CHEMETCO  Source: STACK #1 (9/24/90)

Location: HARTFORD, IL  Run No: 2

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.17 | | 0.20 | | 0.21 | | | | | | | |
| 0.15 | | 0.19 | | 0.21 | | | | | | | |
| 0.14 | | 0.15 | | 0.20 | | | | | | | |
| 0.13 | | 0.19 | | 0.15 | | | | | | | |
| 0.13 | | 0.20 | | 0.15 | | | | | | | |
| 0.14 | | 0.20 | | 0.16 | | | | | | | |
| 0.15 | | 0.22 | | 0.15 | | | | | | | |
| 0.20 | | 0.21 | | 0.16 | | | | | | | |

$\sqrt{\Delta P} = 0.4149$, $V_m = 37.910$, $\Delta H = 1.376$, $T_s = 149.4°F$ / $609.4°R$, $T_m = 86.17°F$ / $546.17°R$

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{37.910}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left[\frac{30.34}{P_{bar}} + \left(\frac{1.376}{\Delta H_{avg}}/13.6\right)\right]/\frac{546.17}{T_m} = 37.231$ | 37.2469 |
| $B_{ws} = \{0.04707 (55.9)\}/2.631 + V_{mstd} = 0.06601$ (condensate, mL; numerator) | 6.60 |
| $M_d = 0.44 (1.4) + 0.32 (19.5) + 0.28 (79.1) = 29.00$ (%$CO_2$, %$O_2$, %$N_2$+CO) | 29.0040 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} = 28.27$  $P_s = 30.34 - \frac{0.29}{13.6}$ | 28.2779 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4149}{\sqrt{\Delta P_{avg}}}\right)\left[\frac{609.4}{T_s(°R)}/M_w \frac{30.32}{P_s}\right]^{1/2} = 25.12$ fps | 25.12 |
| $Q_s = 60 (1-B_{ws}) V_s (17.88) \frac{528}{29.92} (P_s/T_s) = 22,099$ dscfm (XS area of stack) | 22,093.56 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s (60)(0.00004909)(1-B_{ws}) = 102.3$ % (θ(min.); XS area-nozzle) | 102.38 |
| grains/dscf $= \frac{85.6}{M_n\ (mg.)} (0.01543)/V_{mstd} = 0.03548$ | 0.0354 |
| lb/hr $= (0.00857)$(gr/dscf) $Q_s = 6.720$ | 6.7175 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ = _____ dscf/MMBtu
heat value (dry basis)

[illegible]

[illegible] CALCULATION SHEET

Facility: CHEMETCO  Source: STACK #1 (9/24/93)

Location: HARTFORD, IL  Run No: 3

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.22 | | 0.18 | | 0.12 | | | | | | | |
| 0.20 | | 0.17 | | 0.18 | | | | | | | |
| 0.20 | | 0.17 | | 0.19 | | | | | | | |
| 0.20 | | 0.17 | | 0.19 | | | | | | | |
| 0.22 | | 0.17 | | 0.19 | | | | | | | |
| 0.21 | | 0.16 | | 0.20 | | | | | | | |
| 0.21 | | 0.16 | | 0.15 | | | | | | | |
| 0.18 | | 0.13 | | 0.15 | | | | | | | |

$\sqrt{\Delta P} = 0.4231$, $V_m = 38.302$, $\Delta H = 1.386$, $T_s = 146.5°F = 606.5°R$, $T_m = 84.96°F = 544.96°R$

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{38.302}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left[\frac{30.34}{P_{bar}} + \left(\frac{1.386}{\Delta H_{avg}}/13.6\right)\right]/\frac{544.96}{T_m} = 37.701$ | 37.7156 |
| $B_{ws} = \{0.04707 \left(\frac{34.8}{\text{condensate, mL}}\right)\}/\frac{1.638}{\text{numerator}} + V_{mstd} = 0.04164$ | 4.16 |
| $M_d = 0.44 \left(\frac{0.7}{\%CO_2}\right) + 0.32 \left(\frac{20.5}{\%O_2}\right) + 0.28 \left(\frac{78.8}{\%N_2+CO}\right) = 28.93$ | 28.9373 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} = 28.47$  $P_s = 30.34 - \frac{0.29}{13.6}$ | 28.4820 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4231}{\sqrt{\Delta P_{avg}}}\right)\left[\frac{606.5}{T_s(°R)}/M_w \frac{30.32}{P_s}\right]^{1/2} = 25.47$ fps | 25.46 |
| $Q_s = 60 (1-B_{ws}) V_s \left(\frac{17.88}{\text{XS area of stack}}\right) \left(\frac{528}{29.92}\right) (P_s/T_s) = 23,101$ dscfm | 23,091.76 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s \left(\frac{60}{\theta(\text{min.})}\right)\left(\frac{0.0004909}{\text{XS area-nozzle}}\right)(1-B_{ws}) = 99.13$ % | 99.19 |
| Grains/dscf $= \frac{60.0}{M_n\ (\text{mg.})} (0.01543)/V_{mstd} = 0.02456$ | 0.0245 |
| Lb/hr = (0.00857)(gr/dscf) $Q_s$ = 4.862 | 4.8601 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ = _____ dscf/MMBTU
heat value (dry basis)

I = [illegible] = _____ [illegible]

[illegible] STACK [illegible] CALCULATION SHEET

Facility: CHEMFTCO  Source: STACK 3 (9/24/92)

Location: HARTFORD, IL  Run No: 1

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.25 | | 0.18 | | 0.22 | | | | | | | |
| 0.24 | | 0.16 | | 0.22 | | | | | | | |
| 0.25 | | 0.16 | | 0.21 | | | | | | | |
| 0.24 | | 0.19 | | 0.21 | | | | | | | |
| 0.24 | | 0.24 | | 0.20 | | | | | | | |
| 0.22 | | 0.23 | | 0.20 | | | | | | | |
| 0.23 | | 0.23 | | 0.19 | | | | | | | |
| 0.20 | | 0.22 | | 0.19 | | | | | | | |

$\sqrt{\Delta P} = 0.4610$, $\Delta H = 1.607$, $V_m = 40.928$, $T_s = 156.9°F$ / $616.9°R$, $T_m = 85.75°F$ / $545.75°R$

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{40.928}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left[\frac{30.20}{P_{bar}} + \left(\frac{1.607}{\Delta H_{avg}}/13.6\right)\right]/\frac{545.75}{T_m} = 40.064$ | 40.0809 |
| $B_{ws} = \{0.04707 (\underset{\text{condensate, mL}}{83.5})\}/\underset{\text{numerator}}{3.930} + V_{mstd} = 0.08933$ | 8.93 |
| $M_d = 0.44 (\underset{\%CO_2}{0.5}) + 0.32 (\underset{\%O_2}{20.5}) + 0.28 (\underset{\%N_2+CO}{79}) = 28.90$ | 28.9568 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} = 27.93$  $P_s = 30.20 - \frac{0.24}{13.6}$ | 27.9784 (HMM 7/27/93) |
| $V_s = 85.49 (\underset{C_p}{0.84})(\underset{\sqrt{\Delta P_{avg}}}{0.4610})\left[\underset{T_s(°R)}{616.9}/M_w \underset{P_s}{30.18}\right]^{1/2} = 28.32$ fps | 28.30 |
| $Q_s = 60 (1-B_{ws})V_s(\underset{\text{XS area of stack}}{17.88}) \frac{528}{29.92} (P_s/T_s) = 23,886$ dscfm | 23,864.12 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s(\underset{\theta(\text{min.})}{60})(\underset{\text{XS area-nozzle}}{0.0004909})(1-B_{ws}) = 101.19$ % | 102.00 |
| Grains/dscf $= \underset{M_n\ (\text{mg.})}{110.7} (0.01543)/V_{mstd} = 0.04263$ | 0.0425 |
| Lb/hr $= (0.00857)(\text{gr/dscf})\ Q_s = 8.726$ | 8.7200 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ (heat value (dry basis)) = _____ dscf/MMBTU

I = [illegible] = _____ [illegible] MMBTU

[illegible] CALCULATION SHEET

Facility: CHEMETCO  Source: STACK 3

Location: HARTFORD, IL  Run No: 2

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.20 | | 0.18 | | 0.23 | | | | | | | |
| 0.20 | | 0.17 | | 0.22 | | | | | | | |
| 0.23 | | 0.14 | | 0.21 | | | | | | | |
| 0.22 | | 0.18 | | 0.21 | | | | | | | |
| 0.22 | | 0.22 | | 0.18 | | | | | | | |
| 0.20 | | 0.21 | | 0.16 | | | | | | | |
| 0.18 | | 0.23 | | 0.16 | | | | | | | |
| 0.18 | | 0.22 | | 0.16 | | | | | | | |

$\sqrt{\Delta P} = 0.4420$, $V_m = 39.976$, $\Delta H = 1.521$, $T_s = 624.7°R$ (164.7°F), $T_m = 549.04°F$ (89.04°F)

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64 \left(\frac{39.976}{V_m}\right)\left(\frac{0.9989}{Y}\right)\left[\frac{30.20}{P_{bar}} + \left(\frac{1.521}{\Delta H_{avg}}/13.6\right)\right]/\frac{549.04}{T_m} = 38.889$ | 38.9044 |
| $B_{ws} = \left[0.04707 \left(\frac{8166}{\text{condensate, mL}}\right)\right]/\frac{3.841}{\text{numerator}} + V_{mstd} = 0.08989$ | 8.99 |
| $M_d = 0.44 \left(\frac{2.3}{\%CO_2}\right) + 0.32 \left(\frac{18.4}{\%O_2}\right) + 0.28 \left(\frac{79.3}{\%N_2+CO}\right) = 29.10$ | 29.1040 |
| $M_w = M_d (1-B_{ws}) + 18 B_{ws} = 28.10$  $P_s = 30.20 - \frac{0.24}{13.6}$ | 28.1062 |
| $V_s = 85.49 \left(\frac{0.84}{C_p}\right)\left(\frac{0.4420}{\sqrt{\Delta P_{avg}}}\right)\left[\frac{624.7}{T_s(°R)}/M_w \frac{30.18}{P_s}\right]^{1/2} = 27.24$ fps | 27.24 |
| $Q_s = 60 (1-B_{ws}) V_s \left(\frac{17.88}{\text{XS area of stack}}\right) \left(\frac{528}{29.92}\right) (P_s/T_s) = 22{,}675$ dscfm | 22,673.29 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s \left(\frac{60}{\theta(\text{min.})}\right)\left(\frac{0.0004909}{\text{XS area-nozzle}}\right)(1-B_{ws}) = \cancel{107.1}$ 104.2 % MMC 7/27/93 | 104.21 |
| Grains/dscf $= \frac{211.8}{M_n\ (mg.)} (0.01543)/V_{mstd} = 0.09404$ | 0.0838 |
| Lb/hr = (0.00857)(gr/dscf) $Q_s$ = 16.33 | 16.3306 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)/$ _____ = _____ dscf/MMBTU
heat value (dry basis)

I = [illegible] = _____ [illegible]

[illegible] CALCULATION SHEET

Facility: CHEMETCO  Source: STACK 3

Location: HARTFORD, IL  Run No: 3

| ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP | ΔP | √ΔP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.25 | | 0.20 | | 0.23 | | | | | | | |
| 0.27 | | 0.20 | | 0.22 | | | | | | | |
| 0.26 | | 0.17 | | 0.21 | | | | | | | |
| 0.24 | | 0.23 | | 0.21 | | | | | | | |
| 0.24 | | 0.20 | | 0.19 | | | | | | | |
| 0.23 | | 0.20 | | 0.19 | | | | | | | |
| 0.23 | | 0.26 | | 0.19 | | | | | | | |
| 0.20 | | 0.24 | | 0.17 | | | | | | | |

$\sqrt{\Delta P}$ = 0.4659, $V_m$ = 42.397, ΔH = 1.695, $T_s$ = 163.8°F 623.8°R, $T_m$ = 90.71°F 550.71°R

| | Reported Value |
|---|---|
| $V_{mstd} = 17.64\ (42.397)(0.9989)[30.18 + (1.695/13.6)]/550.71$ = 41.109 | 41.1270 |
| $B_{ws} = [0.04707\ (71.5)]/3.367 + V_{mstd}$ = 0.07570 (condensate, mL; numerator) | 7.56 |
| $M_d = 0.44\ (0.6) + 0.32\ (20.2) + 0.28\ (79.2)$ = 28.90 ($\%CO_2$, $\%O_2$, $\%N_2$+CO) | 28.9040 |
| $M_w = M_d\ (1-B_{ws}) + 18\ B_{ws}$ = 28.07  $P_s = 30.18 - \frac{0.24}{13.6} = 30.16$ | 28.0792 |
| $V_s = 85.49\ (0.84)(0.4659)[623.8/M_w\ 30.16]^{1/2}$ = 28.72 fps ($C_p$, $\sqrt{\Delta P_{avg}}$, $T_s$(°R), $P_s$) | 28.71 |
| $Q_s = 60\ (1-B_{ws})V_s(17.88)\ (528/29.92)\ (P_s/T_s)$ = ~~28.77~~ 24,298 dscfm (XS area of stack) | 24,291.46 |
| $I = (0.09450\ T_s V_{mstd}/P_s V_s(60)(0.00014909)(1-B_{ws})$ = 102.8 % (θ(min.); XS area-nozzle) | 102.82 |
| Grains/dscf = 92.0 (0.01543)/$V_{mstd}$ = 0.03453 ($M_n$ (mg.)) | 0.03453 |
| Lb/hr = (0.00857)(gr/dscf) $Q_s$ = 7.190 | 10.7465 |

For fuel-burning sources using F-factor calculation

$F = 10^6(3.64H + 1.53C + 0.57S + 0.14N + 0.46O)$/ _____ = _____ dscf/MMBtu
heat value (dry basis)

I = [illegible] = _____ [illegible]