| | |
|---|---|
| AP42 Section: | 11.27 |
| Reference: | 5 |
| Title: | *Particulate Emission Test Report For Two Scrubber Stacks At Lawson United Feldspar & Mineral Company: Spruce Pine, NC*, North Carolina Department of Natural Resources & Community Development, Division of Environmental Management, October 1978. |

AP-42 Section 11.27
Reference 5
Report Sect. 4
Reference 3

A-82-39
II-A-54

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# PARTICULATE EMISSION TEST REPORT

For 2 Scrubber Stacks at

LAWSON UNITED FELDSPAR & MINERAL COMPANY

Spruce Pine, North Carolina

Performed by the Source Testing Staff
of the
North Carolina Department
of Natural Resources & Community Development
Division of Environmental Management
Monitoring Management

October 25 & 26, 1978

CONTENTS

## INTRODUCTION

This report presents the results of source tests performed October 25 & 26, 1978, on two scrubber stacks at Lawson United Feldspar & Mineral Company in Spruce Pine, North Carolina. The purpose of the test was to determine compliance with 15 NCAC 2D .0509, "Particulates from Mica or Feldspar Processing Plants" (Reference 1). Results indicate compliance during the test period.

Test personnel were M.Y. Aldridge and J.A. Shanklin from the North Carolina Source Test Section. Source liaison person was G.H. Taylor.

## SOURCE DESCRIPTION

The plant has one dryer each for Feldspar and Quartz. For each dryer, ductwork carries the dust-laden gases from the outlets to a simple cyclone, then thru a scrubber to an ID fan. In each case, sampling was done in the outlet from the fan.

An additional, back-up system was connected into each of the aforementioned control systems by ductwork connected to the primary systems between the cyclones and scrubbers. However, the back-up system was isolated from the primary systems by means of Blind flanges in the ductwork.

## SAMPLING AND ANALYTICAL PROCEDURES

Particulate testing and analysis of samples were performed according to procedures developed by the U.S. Environmental Protection Agency and referred to as Method 5. Sampling port locations and number of test points to be used were determined according to Method 1. The above federal test methods appear in their original form in the December 23, 1971, Federal Register (Reference 2), with updated versions appearing in the Environment Reporter (Reference 3).

Test point locations and sampling port placement are shown in Appendix E.

The composition of the flue gas was determined by the following method: carbon dioxide measurements were made periodically during the run with a Bacharach Fyrite instrument. Percent oxygen was determined from a nomograph (Chart 9 in Reference 4). Carbon monoxide was assumed to be zero and the percent nitrogen was determined by subtracting the percentages of carbon dioxide and oxygen from 100%.



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## SUMMARY OF RESULTS

As summarized below, the plant was shown to be in compliance at both stacks during the test period. Note that two runs slightly exceed the limits of acceptability for the isokinetic variation. However, the source was so far in compliance that the 1 & 2% excess variation cannot be considered significant enough to void the test results.

Julius A. Shanklin
Environmental Engineer I
February 29, 1980

## REFERENCES


1. North Carolina Administrative Code, Title 15, Chapter 2, Subchapter 2D, Section .0509 "Particulates from Mica or Feldspar Processing Plants", Environmental Management Commission, Raleigh, N.C. (January, 1977).

2. Federal Register, Standards of Performance for New Stationary Sources, Volume 36, Number 247, U.S. Government Printing Office, Washington, D.C. (December 23, 1971).

3. Environment Reporter, pp 121:0401 - 121:0485 updated thru November 12, 1974, The Bureau of National Affairs, Washington, D.C.

4. Smith, Walter S., and D. James Grove, Stack Sampling Nomographs for Field Estimations, Entropy Environmentalists, Inc., Research Triangle Park, N. C.,(1973).

TEST SUMMARY - LAWSON UNITED FELDSPAR & MINERAL COMPANY

| | Parameter | AVG | Feldspar Dryer Run 1 | Run 2 | Run 3 | Quartz Dryer Run 4 | Run 5 | Run 6 | AVG |
|---|---|---|---|---|---|---|---|---|---|
| $Q_s$ | Stack volume flow rate, acfm | | 8265 | 8210 | 8432 | 6238 | 6044 | 6269 | |
| $Q_{std}$ | Stack volume flow rate, scfm | 6944 | 6936 | 6821 | 7074 | 5344 | 5186 | 5340 | 5290 |
| $V_{std}$ | Sample volume, scf | | 62.2 | 62.7 | 65.1 | 36.4 | 35.9 | 35.9 | |
| %I | Percent isokinetic | | 102 | 105 | 105 | 111 | 112 | 110 | |
| $pmr_{avg}$ | Emission rate, lb/hr | .24 | 0.252 | 0.190 | 0.292 | 0.374 | 0.209 | 0.217 | .27 |
| P | Production rate during test, T/hr. | | | 20 | | | 12 | | |
| $\overline{pmr}$ | Average emission rate, lb/hr. | | | 0.24 | | | 0.27 | | |
| E | Maximum allowable emission rate based on NCAC 2D .0509 lb/hr. | | | 30.4 | | | 21.5 | | |

$.24 \frac{lb}{hr} \times \frac{7000\ gr}{lb} \times \frac{min}{6944\ ft^3} \times \frac{hr}{60\ min} = .004\ gr/dscf$

$\frac{hr}{60\ min} \times .24 \frac{lb}{hr} \times \frac{454\ g}{lb} \times \frac{min}{6944\ ft^3} \times \frac{35.31\ ft^3}{m^3} = .009\ g/m^3$

## Calculation Summary

SOURCE Lawson United Feldspar & Mineral Co. Date 10/25-26/78

LOCATION Spruce Pine

Feldspar Dryer

| ENTRY | RUN 1 | RUN 2 | RUN 3 | ANSWER |
|---|---|---|---|---|
| Ave. $\Delta H$ (in $H_2O$) | 3.3400 | 3.4000 | 3.6400 | |
| $P_{atm}$ (in Hg) | 27.0100 | 27.0200 | 27.0000 | |
| | 27.2556 | 27.2700 | 27.2676 | $P_m$ (in Hg) |
| $P_s$(gage)(in $H_2O$) | 0.0000 | 0.0000 | 0.0000 | |
| | 27.0100 | 27.0200 | 27.0000 | $P_s$ (in Hg) |
| $T_m$ ($^oR$) | 542.0000 | 550.0000 | 524.0000 | |
| $V_m$ ($ft^3$) | 63.4180 | 64.6150 | 65.1530 | |
| | 56.4790 | 56.7380 | 60.0440 | $V_{mstd}$ ($ft^3$) |
| $V_{lq}$ (ml) | 120.7000 | 125.8000 | 106.3000 | |
| | 5.7091 | 5.9503 | 5.0280 | $V_{wstd}$ ($ft^3$) |
| | 62.1882 | 62.6884 | 65.0720 | $V_{std}$ ($ft^3$) |
| | 9.1804 | 9.4919 | 7.7268 | %M |
| | 0.9082 | 0.9051 | 0.9227 | $M_d$ |
| $MW_d$ | 28.9000 | 28.9000 | 28.9000 | |
| | 27.8993 | 27.8654 | 28.0578 | M |
| $T_s$ ($^oR$) | 570.0000 | 576.0000 | 570.0000 | |
| $\Sigma\sqrt{\Delta p}$ | 24.2650 | 23.9683 | 24.8227 | |
| $n_{\Delta p}$ | 24.0000 | 24.0000 | 24.0000 | |
| | 1.0110 | 0.9987 | 1.0343 | Ave $\sqrt{\Delta p}$ |
| $C_p$ | 0.8400 | 0.8400 | 0.8400 | |
| | 63.1380 | 62.7200 | 64.4185 | $v_s$ (ft/sec) |
| $D_s$ (in) | 20.0000 | 20.0000 | 20.0000 | |
| | 2.1817 | 2.1817 | 2.1817 | $A_s$ ($ft^2$) |
| | 8265. | 8210. | 8432. | $Q_s$ ($ft^3$/min) |
| | 6936. | 6821. | 7074. | $Q_{std}$ ($ft^3$/min) |
| $W_t$ (gm) | 0.0169 | 0.0129 | 0.0198 | |
| | 0.2494 | 0.1857 | 0.2848 | $pmr_c$ (lb/hr) |
| $D_n$ (in) | 0.2420 | 0.2420 | 0.2420 | |
| | 0.0460 | 0.0460 | 0.0460 | $A_n$ ($in^2$) |
| $\theta$ (min) | 60.0000 | 60.0000 | 60.0000 | |
| | 0.2545 | 0.1943 | 0.2982 | $pmr_a$ (lb/hr) |
| | 102.0676 | 104.6259 | 104.7165 | %I |
| | 0.2519 | 0.1900 | 0.2915 | $pmr_{avg}$ (lb/hr) |
| ~~%CO~~ | | | | |
| ~~$\%O_2$~~ | | | | |
| ~~$\%N_2$~~ | | | | |
| | 0.2445 | | | %EA |
| ~~F Factor~~ | TEST AVG. | | | |
| | | | | ~~HI~~ ($10^6$ BTU/hr.) |
| | | | | ~~$pmr_a$ (lbs/$10^6$BTU)~~ |

## Calculation Summary

SOURCE Lawson United Feldspar & Mineral Co. Date 10/26/78

LOCATION Spruce Pine
Quartz Dryer

| ENTRY | RUN 4 | RUN 5 | RUN 6 | ANSWER |
|---|---|---|---|---|
| Ave. $\Delta H$ (in $H_2O$) | 1.2800 | 1.1900 | 1.2200 | |
| $P_{atm}$ (in Hg) | 26.9500 | 26.9000 | 26.8500 | |
| | 27.0441 | 26.9875 | 26.9397 | $P_m$ (in Hg) |
| $P_s$(gage)(in $H_2O$) | -0.1400 | -0.1400 | -0.1400 | |
| | 26.9397 | 26.8897 | 26.8397 | $P_s$ (in Hg) |
| $T_m$ ($^oR$) | 553.0000 | 561.0000 | 564.0000 | |
| $V_m$ ($ft^3$) | 39.3050 | 39.8240 | 40.0220 | |
| | 34.0419 | 33.9284 | 33.8556 | $V_{m_{std}}$ ($ft^3$) |
| $V_{lq}$ (ml) | 49.3000 | 42.8000 | 42.4000 | |
| | 2.3319 | 2.0244 | 2.0055 | $V_{v_{std}}$ ($ft^3$) |
| | 36.3738 | 35.9528 | 35.8612 | $V_{std}$ ($ft^3$) |
| | 6.4109 | 5.6308 | 5.5925 | %M |
| | 0.9359 | 0.9437 | 0.9441 | $M_d$ |
| $MW_d$ | 29.0000 | 29.0000 | 29.0000 | |
| | 28.2948 | 28.3806 | 28.3848 | M |
| $T_s$ ($^oR$) | 557.0000 | 555.0000 | 558.0000 | |
| $\Sigma\sqrt{\Delta p}$ | 16.2247 | 15.7559 | 16.2859 | |
| $n_{\Delta p}$ | 32.0000 | 32.0000 | 32.0000 | |
| | 0.5070 | 0.4924 | 0.5089 | Ave $\sqrt{\Delta p}$ |
| $C_p$ | 0.8400 | 0.8400 | 0.8400 | |
| | 31.1206 | 30.1495 | 31.2745 | $v_s$ (ft/sec) |
| $D_s$ (in) | 24.7500 | 24.7500 | 24.7500 | |
| | 3.3410 | 3.3410 | 3.3410 | $A_s$ ($ft^2$) |
| | 6238. | 6044. | 6269. | $Q_s$ ($ft^3$/min) |
| | 5344. | 5186. | 5340. | $Q_{std}$ ($ft^3$/min) |
| $W_t$ (gm) | 0.0182 | 0.0103 | 0.0105 | |
| | 0.3537 | 0.1966 | 0.2069 | $pmr_c$ (lb/hr) |
| $D_n$ (in) | 0.2420 | 0.2420 | 0.2420 | |
| | 0.0460 | 0.0460 | 0.0460 | $A_n$ ($in^2$) |
| $\Theta$ (min) | 64.0000 | 64.5100 | 64.0000 | |
| | 0.3935 | 0.2209 | 0.2270 | $pmr_a$ (lb/hr) |
| | 111.2487 | 112.4101 | 109.7444 | %I |
| | 0.3736 | 0.2088 | 0.2170 | $pmr_{avg}$ (lb/hr) |
| ~~%CO~~ | | | | |
| ~~$\%O_2$~~ | | | | |
| ~~$\%N_2$~~ | | | | |
| | | 0.2665 | | ~~%EA~~ |
| ~~F Factor~~ | | TEST AVG. | | |
| | | | | ~~HI ($10^6$ BTU/hr.)~~ |
| | | | | ~~$pmr_U$ (lbs/$10^6$BTU)~~ |

## EQUATIONS

1. Absolute Pressure in Dry Gas Meter - $P_m$ (in. Hg.)

$$P_m = P_{atm} + \frac{\Delta H}{13.6}$$

2. Absolute Stack Pressure - $P_s$ (in. Hg.)

$$P_s = P_{atm} + \frac{P_{s(gage)}}{13.6}$$

3. Sample Volume at Standard Conditions - $V_{m_{std}}$ ($ft^3$)

$$V_{m_{std}} = V_m \frac{T_{std}}{T_m} \frac{P_m}{P_{std}}$$

4. Volume of Water Vapor Collected, Corrected to Standard Conditions - $V_{v_{std}}$ ($ft^3$)

$$V_{v_{std}} = K_2 V_{lq} \frac{T_{std}}{P_{std}} \qquad K_2 = 0.00267 \text{ (units conversion)}$$

5. Total Sample Volume at Standard Conditions - $V_{std}$ ($ft^3$)

$$V_{std} = V_{m_{std}} + V_{v_{std}}$$

6. Percent Moisture in Stack Gas - %M

$$\%M = \frac{V_{v_{std}}}{V_{std}} \times 100$$

7. Mole Fraction of Dry Gas - $M_d$

$$M_d = \frac{100 - \%M}{100}$$

8. Molecular Weight of Wet Gas - M (lb/lb mole)

$$M = (MW_d \times M_d) + 18(1 - M_d)$$

9. Stack Velocity - $v_s$ (ft/sec)

$$v_s = K_p C_p \sqrt{\frac{T_s}{P_s M}} \qquad \Sigma\sqrt{\Delta p} \over n_{\Delta p}$$

$$K_p = 85.48 \text{ (units conversion factor)}$$

10. Stack Volume Flow Rate - $Q_s$ ($ft^3/min$)

$$Q_s = K_1 v_s A_s' \qquad K_1 = 60 \text{ (units conversion)}$$

11. Stack Volume Flow Rate at Standard Conditions - $Q_{std}$ ($ft^3/min$)

$$Q_{std} = \frac{T_{std}}{P_{std}} \frac{P_s}{T_s} Q_s$$

12. Pollutant Mass Rate Based on Particulate Concentration - $pmr_c$ (lb/hr)

$$pmr_c = K_3 \frac{W_t Q_{std}}{V_{std}} \qquad K_3 = 0.1323 \text{ (units conversion)}$$

13. Pollutant Mass Rate Based on the Ratio of the Cross Sectional Area of the Stack and the Sampling Nozzle - $pmr_a$ (lb/hr)

$$pmr_a = K_3 \frac{W_t A_s}{\theta A_n} \qquad K_3 = 0.1323 \text{ (units conversion)}$$

14. Percent Isokineticity - %I

$$\%I = \frac{pmr_a}{pmr_c} \times 100$$

15. Average Pollutant Mass Rate - $pmr_{avg}$ (lb/hr)

$$pmr_{avg} = \frac{pmr_a + pmr_c}{2}$$

16. Percent Excess Air - %EA

$$\%EA = \frac{\%O_2 - .5(\%CO)}{.264(\%N_2) - \%O_2 + .5(\%CO)} (100)$$

17. Heat Input Rate - HI ($10^6$ BTU/hr)

$$HI = \frac{60 \; Q_{std} \; M_d}{F(100 + \%EA)} (100)$$

18. Specific Emission Rate - $pmr_u$ ($lb/10^6$ BTU)

$$pmr_u = \frac{pmr_{avg}}{HI}$$

## NOMENCLATURE

| | |
|---|---|
| $A_n$ | ($in^2$), Cross sectional area of nozzle |
| $A_s$ | ($in^2$), Cross sectional area of stack |
| $A'_s$ | ($ft^2$), Cross sectional area of stack |
| $C_p$ | Pitot tube calibration coefficient |
| %EA | Percent Excess Air |
| F | ($scfd/10^6$ BTU), F factor |
| $\Delta H$ | (in $H_2O$), Average orifice meter reading |
| HI | ($10^6$ BTU/hr), Heat Input Rate |
| %I | Percent Isokineticity |
| M | (lb/lb mole), Molecular Weight of wet gas |
| %M | Percent Moisture |
| $M_d$ | Mole fraction of dry gas |
| $MW_d$ | (lb/lb mole) Molecular weight of dry gas |
| $n_{\Delta p}$ | Number of $\Delta p$ readings |
| $P_{atm}$ | (in Hg), Local atmospheric pressure |
| $P_m$ | (in Hg), Absolute pressure in dry gas meter |
| $P_s$ | (in Hg), Absolute stack pressure |
| $P_{s(gage)}$ | (in $H_2O$), Measured static stack pressure |
| $P_{std}$ | (29.92 in Hg), Standard pressure |
| $pmr_a$ | (lb/hr), Pollutant mass rate based on ratio of areas |
| $pmr_{avg}$ | (lb/hr), Average pollutant mass rate |
| $pmr_c$ | (lb/hr), Pollutant mass rate based on concentration |
| $pmr_u$ | ($lb/10^6$ BTU), Specific emission rate |
| $\Delta p$ | (in $H_2O$), Velocity pressure |
| $Q_s$ | ($ft^3$/min), Actual stack volume flow rate |
| $Q_{std}$ | ($ft^3$/min), Stack volume flow rate at standard conditions |

$T_m$ ($^oR$), Average dry gas meter temperature

$T_s$ ($^oR$), Average stack temperature

$T_{std}$ (530 $^oR$), Standard temperature

$V_{lq}$ (ml), Liquid volume

$V_m$ ($ft^3$), Sample volume measured by dry gas meter

$V_{m_{std}}$ ($ft^3$), Sample volume at standard conditions

$V_{std}$ ($ft^3$), Total sample volume at standard conditions

$V_{v_{std}}$ ($ft^3$), Volume of water vapor collected, corrected to standard conditions

$v_s$ (ft/sec), Stack velocity

$W_t$ (gm), Total weight of particulate collected

$\theta$ (min), Duration of test

## Determination of Dry Molecular Weight ($MW_d$)

WHERE:

$$MW_d = \frac{\%CO_2}{100} \times 44 + \frac{\%O_2}{100} \times 32 + \frac{\%CO}{100} \times 28 + \frac{(100-\%CO_2-\%O_2-\%CO)}{100} \times 28$$

| ENTRY | RUN 2 | ~~RUN 2~~ | RUN 5 | Ans. |
|---|---|---|---|---|
| % $CO_2$ | | | | |
| % $O_2$* | | | | |
| % CO** | | | | |
| | | | | $MW_d$ |
| | | | | $N_2$ |

* Based on Chart 9 of Reference 2
** Assumed

ANALYTICAL DATA

Lab No. 3711

Plant Lawson United Feldspar

Run Number 1 Date _____

Location _____

Box 1

| FILTER WEIGHTS | | | | TOTALS |
|---|---|---|---|---|
| Filter Number | 55528-N | | | |
| Final Weight (g) | | | | |
| Tare Weight (g) | .3945 | | | .3945 |

| WASHINGS | | | | TOTALS |
|---|---|---|---|---|
| Beaker Number | 51 | | | |
| Volume (Acetone) | 150 | | | |
| Final Weight (g) | 183.7929 | | | 183.7929 |
| Tare Weight (g) | 183.3796 | | | 183.3796 |

ACETONE BLANK

Lot Number 775109

Beaker Number 3

Volume (ml) 150

Final Weight (g) 179.0409

Tare Weight (g) 179.0390

Blank Residue (g) .0019

TOTAL PARTICULATE CATCH

Filter Final Weight _____

+ Washings, Final Weight 183.7929

- Filter Tare .3945

- Beaker Tare (Washings) 183.3796

- Corrected Blank .0017

= Total Particulate (g) .0169

BLANK CORRECTION =

$$\frac{(\text{Vol. Washings})}{(\text{Vol. Blank})} \times (\text{Blank Residue})$$

$$\frac{(150)}{(150)} \times (.0019) = .0017$$

✓ Meyer 11-13-78

IMPINGERS (1, 2, 3)

Final Volume (ml) 296.0 ml

Initial Volume (200 ml) 200.0 ml

Water Collected (ml) 96.0 ml

SILICA GEL

Final Weight (g) 224.7 g

Initial Weight (g) 200.0 g

Moisture Collected (g) 24.7 g

Total Water Collected (ml) 120.7

*These blocks will be blank if filter is weighed together with the washings.

ANALYTICAL DATA

Lab No. 3712

Plant Lawson United Fiberboard

Run Number 2 Date _____

Location _____

Box #2

| FILTER WEIGHTS | | | | TOTALS |
|---|---|---|---|---|
| Filter Number | 55529-N | | | |
| Final Weight (g) | | | | |
| Tare Weight (g) | .3926 | | | .3926 |

| WASHINGS | | | | TOTALS |
|---|---|---|---|---|
| Beaker Number | 5 Kimax | | | |
| Volume (Acetone) | 150 | | | |
| Final Weight (g) | 174.3697 | | | 174.3697 |
| Tare Weight (g) | 173.9623 | | | 173.9623 |

ACETONE BLANK

| | |
|---|---|
| Lot Number | 9 |
| Beaker Number | |
| Volume (ml) | As on |
| Final Weight (g) | Run #1 |
| Tare Weight (g) | |
| Blank Residue (g) | |

TOTAL PARTICULATE CATCH

| | |
|---|---|
| Filter Final Weight * | |
| + Washings, Final Weight | 174.3697 |
| - Filter Tare | .3926 |
| - Beaker Tare (Washings) | 173.9623 |
| - Corrected Blank | .0017 |
| = Total Particulate (g) | .0124 |

BLANK CORRECTION =

$$\frac{(\text{Vol. Washings})}{(\text{Vol. Blank})} \times (\text{Blank Residue})$$

$$\frac{(150)}{(150)} \times (.0019) = .0017$$

✓ Meyer 10-14-78

IMPINGERS (1, 2, 3)

Final Volume (ml) 306.5 ml

Initial Volume (200 ml) 200.0 ml

Water Collected (ml) 106.5 ml

SILICA GEL

Final Weight (g) 218.8 g

Initial Weight (g) 200.0 g

Moisture Collected (g) 18.8 g

Total Water Collected (ml) 125.3

*These blocks will be blank if filter is weighed together with the washings.

ANALYTICAL DATA

Lab No. 3713

Plant Lawson United Telephone

Run Number 3 Date _____

Location _____

Box #3

| FILTER WEIGHTS | | | | TOTALS |
|---|---|---|---|---|
| Filter Number | 55530-N | | | |
| Final Weight (g) | | | | |
| Tare Weight (g) | .3927 | | | .3927 |

| WASHINGS | | | | TOTALS |
|---|---|---|---|---|
| Beaker Number | 12 | | | |
| Volume (Acetone) | 200 | | | |
| Final Weight (g) | 179.1435 | | | 179.1435 |
| Tare Weight (g) | 178.7285 | | | 178.7285 |

ACETONE BLANK

| | |
|---|---|
| Lot Number | [illegible] |
| Beaker Number | |
| Volume (ml) | As on |
| Final Weight (g) | Run #1 |
| Tare Weight (g) | |
| Blank Residue (g) | |

TOTAL PARTICULATE CATCH

| | |
|---|---|
| Filter Final Weight | |
| + Washings, Final Weight | 179.1435 |
| - Filter Tare | .3927 |
| - Beaker Tare (Washings) | 178.7285 |
| - Corrected Blank | .0025 |
| = Total Particulate (g) | .0198 |

BLANK CORRECTION =

$$\frac{(\text{Vol. Washings})}{(\text{Vol. Blank})} \times (\text{Blank Residue})$$

$$\frac{(200)}{(150)} \times (.0019) = .0025$$

~~SMB~~
✓ Meyer
11-14-78

IMPINGERS (1, 2, 3)

| | |
|---|---|
| Final Volume (ml) | 283.0 |
| Initial Volume (200 ml) | 200.0 ml |
| Water Collected (ml) | 83.0 ml |

SILICA GEL

| | |
|---|---|
| Final Weight (g) | 222.3 g |
| Initial Weight (g) | 200.0 g |
| Moisture Collected (g) | 22.3 g |

Total Water Collected (ml) 106.3

*These blocks will be blank if filter is weighed together with the washings.

10-23-75

APPENDIX C

ANALYTICAL DATA

Lab No. 3714

Plant Lawson United Fertilizer

Run Number 4 Date _____

Location _____

Box # 4

| FILTER WEIGHTS | | | | TOTALS |
|---|---|---|---|---|
| Filter Number | 55531-N | | | |
| Final Weight (g) | | | | * |
| Tare Weight (g) | .3925 | | | .3925 |

| WASHINGS | | | | TOTALS |
|---|---|---|---|---|
| Beaker Number | 5 pyrex | | | |
| Volume (Acetone) | 150 | | | |
| Final Weight (g) | 177.3769 | | | 177.3769 |
| Tare Weight (g) | 176.9643 | | | 176.9643 |

ACETONE BLANK

Lot Number _____

Beaker Number _____

Volume (ml) As on

Final Weight (g) Run #1

Tare Weight (g) _____

Blank Residue (g) _____

TOTAL PARTICULATE CATCH

Filter Final Weight * _____

+ Washings, Final Weight 177.3769

- Filter Tare .3925

- Beaker Tare (Washings) 176.9643

- Corrected Blank .0019

= Total Particulate (g) .0182

BLANK CORRECTION =

$$\frac{(\text{Vol. Washings})}{(\text{Vol. Blank})} \times (\text{Blank Residue})$$

$$\frac{(150)}{(150)} \times (.0019) = .0019$$

✓ Mayer 11-14-78

| IMPINGERS (1, 2, 3) | | SILICA GEL | |
|---|---|---|---|
| Final Volume (ml) | 242.0 ml | Final Weight (g) | 207.3 g |
| Initial Volume (200 ml) | 200.0 ml | Initial Weight (g) | 200.0 g |
| Water Collected (ml) | 42.0 ml | Moisture Collected (g) | 7.3 g |

Total Water Collected (ml) 49.3

*These blocks will be blank if filter is weighed together with the washings.

10-23-75

ANALYTICAL DATA

Lab No. 3715

Plant Lawson United Telephone

Run Number 5 Date _____

Location _____

Box #5

| FILTER WEIGHTS | | | | TOTALS |
|---|---|---|---|---|
| Filter Number | 55532-N | | | |
| Final Weight (g) | | | | |
| Tare Weight (g) | .3895 | | | .3895 |

| WASHINGS | | | | TOTALS |
|---|---|---|---|---|
| Beaker Number | 2 | | | |
| Volume (Acetone) | 150 | | | |
| Final Weight (g) | 182.3610 | | | 182.3610 |
| Tare Weight (g) | 181.9593 | | | 181.9593 |

ACETONE BLANK

Lot Number _____

Beaker Number _____

Volume (ml) As on

Final Weight (g) Run #1

Tare Weight (g) _____

Blank Residue (g) _____

TOTAL PARTICULATE CATCH

| | |
|---|---|
| Filter Final Weight | |
| + Washings, Final Weight | 182.3610 |
| - Filter Tare | .3895 |
| - Beaker Tare (Washings) | 181.9593 |
| - Corrected Blank | .0019 |
| = Total Particulate (g) | .0103 |

BLANK CORRECTION =

$$\frac{(\text{Vol. Washings})}{(\text{Vol. Blank})} \times (\text{Blank Residue})$$

$$\frac{(150)}{(150)} \times (.0019) = .0019$$

√ Meyer 11-14-78

IMPINGERS (1, 2, 3)

Final Volume (ml) 235.0 ml

Initial Volume (200 ml) 200.0 ml

Water Collected (ml) 35.0 ml

SILICA GEL

Final Weight (g) 207.5 g

Initial Weight (g) 200.0 g

Moisture Collected (g) 7.8 g

Total Water Collected (ml) 42.8

*These blocks will be blank if filter is weighed together with the washings.

10-23-75

ANALYTICAL DATA

Lab No. 3716

Plant Lawson United Feldspar

Run Number 6 Date _____

Location _____

Box #6

| FILTER WEIGHTS | | | | | TOTALS |
|---|---|---|---|---|---|
| Filter Number | 55533-N | | | | |
| Final Weight (g) | | | | | * |
| Tare Weight (g) | .3951 | | | | .3951 |

| WASHINGS | | | | TOTALS |
|---|---|---|---|---|
| Beaker Number | 71 | | | |
| Volume (Acetone) | 150 | | | |
| Final Weight (g) | 164.9482 | | | 164.9482 |
| Tare Weight (g) | 164.5407 | | | 164.5407 |

ACETONE BLANK

Lot Number _____

Beaker Number _____

Volume (ml) As on

Final Weight (g) Run #1

Tare Weight (g) _____

Blank Residue (g) _____

TOTAL PARTICULATE CATCH

| | |
|---|---|
| Filter Final Weight * | |
| + Washings, Final Weight | 164.9482 |
| - Filter Tare | .3951 |
| - Beaker Tare (Washings) | 164.5407 |
| - Corrected Blank | .0019 |
| = Total Particulate (g) | .0105 |

BLANK CORRECTION =

$$\frac{(\text{Vol. Washings})}{(\text{Vol. Blank})} \times (\text{Blank Residue})$$

$$\frac{(150)}{(150)} \times (.0019) = .0019$$

✓ Meyer 11-14-78

| IMPINGERS (1, 2, 3) | | SILICA GEL | |
|---|---|---|---|
| Final Volume (ml) | 235.0 ml | Final Weight (g) | 207.4 g |
| Initial Volume (200 ml) | 200.0 ml | Initial Weight (g) | 200.0 g |
| Water Collected (ml) | 35.0 ml | Moisture Collected (g) | 7.4 g |

Total Water Collected (ml) 42.4

*These blocks will be blank if filter is weighed together with the washings.

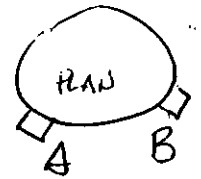
## AIR QUALITY SECTION

### SOURCE SAMPLING FIELD DATA

Plant Lawson United Feld. & Mineral Co. Meter $\Delta H_@$ 1.862
Date 10/25/78 C Factor .99
Location Spruce Pine Probe Type Pyrex
Sample Type Particulate Probe Length 5'
Run Number 1 Probe Tip Dia., In. .242
Operator JAC Probe Heater Setting 75%
Sample Box No. 1 Heater Box Setting Hi
Meter Box No. 2 Assumed Moisture % 9

Ambient Temperature 70
Barometric Pressure, In. Hg. 27.01
Static Pressure ($P_s$), Nil.
Stack Dimension(s) 20" Dia
Distance: Disturbance to port 84"
Distance: Port to exit 64"
Leak Rate 0/0 cfm@ 15/10
Filter number(s) 55528N

Remarks:




| TRAVERSE POINT NUMBER | SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK) | GAS METER READING ($V_m$), ft³ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ DESIRED | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ ACTUAL | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F | DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F | PUMP VACUUM, in. Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F | %$CO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | 0 1703 | 439.400 | 0.67 | 2.20 | 2.20 | 115 | | 69 | 4 | 225 | 66 | 1½ |
| 2 | 2.5 | 441.98 | 0.73 | | 2.40 | 110 | | 69 | 4½ | 225 | 51 | |
| 3 | 5 | 443.71 | 0.82 | | 2.65 | 110 | | 70 | 5 | 225 | 50 | |
| 4 | 7.5 | 446.06 | 0.89 | | 2.85 | 110 | | 71 | 5½ | 225 | 53 | 1 |
| 5 | 10 | 448.50 | 0.87 | | 2.80 | 110 | | 73 | 5½ | 225 | 50 | |
| 6 | 12.5 | 450.95 | 0.87 | | 2.80 | 110 | | 74 | 5½ | 230 | 62 | |
| 7 | 15 | 453.40 | 1.10 | | 3.50 | 110 | | 75 | 6½ | 235 | 70 | |
| 8 | 17.5 | 456. | 1.25 | | 4.05 | 110 | | 77 | 7 | 235 | 77 | 1 |
| 9 | 20 | 458.66 | 1.30 | | 4.20 | 110 | | 79 | 7 | 235 | 84 | |
| 10 | 22.5 | 461.60 | 1.30 | | 4.20 | 110 | | 80 | 7 | 235 | 85 | |
| 11 | 25 | 464.73 | 1.25 | | 4.05 | 110 | | 81 | 7 | 235 | 86 | |
| 12 | 27.5 | 467.60 | 1.25 | | 4.05 | 110 | | 83 | 7 | 240 | 87 | 1 |
| A12 | 30 | 470.553 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| B1 | ↓ | | | | | | | | | | | |

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APPENDIX D

AQ-44

12-15-72 6-2-76 WOGR

Plant Lawson United Feldspar & Mineral Co. Run No. 1 Date 10/25/78

| TRAVERSE POINT NUMBER | SAMPLING TIME min / CLOCK TIME (24-hr CLOCK) | GAS METER READING ($V_m$), ft³ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F | %$CO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | | |
| B 1 | 30 1737 | 470.553 | 0.86 | | 2.80 | 110 | | 84 | 5 | 240 | 72 | |
| 2 | 32.5 | 473.08 | 1.00 | | 3.20 | 110 | | 81 | 5½ | 240 | 68 | |
| 3 | 35 | 475.51 | 1.15 | | 3.70 | 110 | | 85 | 6½ | 240 | 67 | 1 |
| 4 | 37.5 | 478.33 | 1.20 | | 3.85 | 110 | | 86 | 6½ | 240 | 62 | |
| 5 | 40 | 481.18 | 1.20 | | 3.85 | 110 | | 87 | 6½ | 240 | 62 | |
| 6 | 42.5 | 484.04 | 1.15 | | 3.70 | 110 | | 88 | 6½ | 240 | 63 | |
| 7 | 45 | 486.87 | 1.10 | | 3.55 | 110 | | 89 | 6 | 240 | 65 | |
| 8 | 47.5 | 489.64 | 0.96 | | 3.15 | 110 | | 91 | 5½ | 240 | 67 | 1 |
| 9 | 50 | 492.29 | 0.96 | | 3.15 | 110 | | 91 | 5½ | 240 | 68 | |
| 10 | 52.5 | 494.92 | 0.97 | | 3.20 | 110 | | 92 | 5½ | 240 | 67 | |
| 11 | 55 | 497. | 0.96 | | 3.15 | 110 | | 93 | 5½ | 240 | 67 | |
| 12 | 57.5 | 500.18 | 0.96 | | 3.15 | 110 | | 94 | 5½ | 240 | 67 | 1 |
| B12 | 60 | 502.818 | | | | | | | | | | |
| | | | | | 8oz/½ | | | 1965/½ | | | | |
| Diff. | 60 | 63.418 | - | | | | | | | | | |
| Avg. | — | — | (1.0119) | | 3.34 | 110.2 | | 81.9 | | | | 1.2 |
| | | | | | | | | | | | | |
| | | $2\sqrt{\Delta p}$ | 24.2865 | | | 570 R | | 542 R | | | | |
| | | $n\Delta p$ | 20 | | | | | | | | | |

AQ-44 (con.)

12-15-72 WOGR

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## AIR QUALITY SECTION

### SOURCE SAMPLING FIELD DATA

Plant Lawson United Feldspar — Meter $\Delta H_@$ 1.862 — Ambient Temperature 65 — Remarks:

Date 10/25/78 — C Factor .99 — Barometric Pressure, In. Hg. 27.02

Location Spruce Pine — Probe Type Pyrex — Static Pressure ($P_s$), nil

Sample Type Particulate — Probe Length 5' — Stack Dimension(s) 20" Dia

Run Number 2 — Probe Tip Dia., In. .242 — Distance: Disturbance to port 84"

Operator M.Y.A. — Probe Heater Setting 75% — Distance: Port to exit 64"

Sample Box No. 2 — Heater Box Setting HI — Leak Rate .002/0 cfm@ 15/10 IN HG

Meter Box No. 2 — Assumed Moisture % 9 — Filter number(s) 55529-N

| TRAVERSE POINT NUMBER | SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK) 1834 | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ DESIRED | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ ACTUAL | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F | DRY GAS METER TEMPERATURE OUTLET ($T_{m\,out}$), °F | PUMP VACUUM, in. Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F | %$CO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A 1 | 00 | 503.45 | .65 | 2.2 | 2.4 | 110 | | 86 | 5.0 | 165 | 55 | 1 |
| 2 | 2.5 | 505.75 | .71 | | 2.4 | 110 | | 85 | 5.0 | 180 | 42 | |
| 3 | 5 | 508.04 | .82 | | 2.75 | 110 | | 86 | 5.5 | 190 | 41 | |
| 4 | 7.5 | 510.47 | .86 | | 2.9 | 112 | | 86 | 6.0 | 200 | 42 | |
| 5 | 10 | 512.98 | .85 | | 2.85 | 112 | | 86 | 6.0 | 205 | 45 | 1 |
| 6 | 12.5 | 515.50 | .83 | | 2.8 | 112 | | 87 | 6.0 | 210 | 47 | |
| 7 | 15 | 517.06 | 1.05 | | 3.6 | 112 | | 88 | 7.0 | 215 | 49 | |
| 8 | 17.5 | 520.67 | 1.15 | | 3.9 | 113 | | 89 | 7.5 | 220 | 53 | |
| 9 | 20 | 523.54 | 1.25 | | 4.3 | 112 | | 90 | 8.0 | 225 | 59 | |
| 10 | 22.5 | 526.48 | 1.25 | | 4.2 | 112 | | 90 | 8.0 | 225 | 65 | 1 |
| 11 | 25 | 529.46 | 1.20 | | 4.05 | 112 | | 91 | 8.0 | 230 | 72 | |
| 12 | 27.5 | 532.43 | 1.20 | | 4.05 | 112 | | 92 | 8.0 | 230 | 71 | |
| 12 | 30 | 535.39 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |







AQ-44

12-15-72 6-2-76 WOGR

Plant Lawson United Feldspar Run No. 2 Date 10-25-78

| TRAVERSE POINT NUMBER | SAMPLING TIME min / CLOCK TIME (24-hr CLOCK) | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE °F | % $CO_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | | |
| B1 | 00 | 535.39 | .81 | | 2.75 | 112 | | 91 | 5.5 | – | 55 | |
| 2 | 2.5 | 537.85 | 1.05 | | 3.6 | | | – | – | – | 53 | 1 |
| 3 | 5 | | 1.05 | | 3.6 | 110 | | 91 | 7.0 | 220 | 52 | |
| 4 | 7.5 | 543.13 | 1.2 | | 4.05 | 110 | | 91 | 7.5 | 240 | 51 | |
| 5 | 10 | 546.05 | 1.2 | | 4.05 | 110 | | 91 | 7.5 | 240 | 53 | |
| 6 | 12.5 | 549.0 | 1.2 | | 4.05 | 110 | | 91 | 8.0 | 240 | 53 | 1 |
| 7 | 15 | 551.95 | .97 | | 3.3 | 110 | | 93 | 7.0 | 240 | 54 | |
| 8 | 17.5 | 554.73 | .94 | | 3.1 | 112 | | 93 | 6.5 | 240 | 54 | |
| 9 | 20 | 557.35 | .95 | | 3.15 | 114 | | 93 | 6.5 | 240 | 54 | |
| 10 | 22.5 | 560.00 | .96 | | 3.2 | 114 | | 93 | 6.5 | 240 | 54 | 1 |
| 11 | 25 | 562.67 | .98 | | 3.3 | 115 | | 94 | 7.0 | 240 | 53 | |
| 12 | 27.5 | 565.35 | .99 | | 3.3 | 115 | | 94 | 7.0 | 240 | 53 | |
| | 30 | 568.065 | | | | | | | | | | |
| | 1940 | | 23.96 | | 81.4/9 | 2056/23 | | 2071/23 | | | | |
| | | | 24 | | | | | | | | | |
| Diff. | 60 | 64.615 | | | – | – | | – | | | | |
| Avg. | – | – | (.998) | | 3.395 | 106.8 | | 90.0 | | | | 1 |
| | | | | | 3.4 | | | | | | | |
| | | | | | | 567R | | 550R | | | | |

AQ-44 (con.)

12-15-72 WOGR

## AIR QUALITY SECTION

### SOURCE SAMPLING FIELD DATA

Plant Lawson United Fellsmere  Meter $\Delta H_@$ 1.862  Ambient Temperature 50  Remarks:

Date 10-26-78  C Factor .99  Barometric Pressure, In. Hg. 27.00

Location Spruce Pine  Probe Type Pyrex  Static Pressure ($P_s$), nil

Sample Type Particulate  Probe Length 5'  Stack Dimension(s) 20"

Run Number 3  Probe Tip Dia., In. .242  Distance: Disturbance to port 84"

Operator JAS  Probe Heater Setting ~~75%~~ HI  Distance: Port to exit 64"

Sample Box No. 3  Heater Box Setting HI  Leak Rate 0 / 0 cfm@ 15 in Hg / 9 in

Meter Box No. 2  Assumed Moisture % 9  Filter number(s) 55530

| TRAVERSE POINT NUMBER | SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK) | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in. Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | |
| A1 | 0 0840 | 568.260 | 0.71 | | 2.40 | 105 | | 45 | 5 | 185 | 42 |
| 2 | 2.5 | 570.45 | 0.78 | | 2.67 | 110 | | 47 | 5 | 195 | 38 |
| 3 | 5 | 572.74 | 0.84 | | 2.85 | 110 | | 47 | 5½ | 205 | 38 |
| 4 | 7.5 | 575.11 | 0.86 | | 2.95 | 110 | | 48 | 6 | 205 | 39 |
| 5 | 10 | 577.56 | 0.87 | | 2.95 | 110 | | 51 | 6 | 205 | 42 |
| 6 | 12.5 | 580.02 | 0.88 | | 3.00 | 110 | | 53 | 6 | 210 | 45 |
| 7 | 15 | 582.49 | 1.15 | | 3.90 | 110 | | 55 | 7½ | 210 | 48 |
| 8 | 17.5 | 585.22 | 1.25 | | 4.25 | 110 | | 57 | 8½ | 215 | 55 |
| 9 | 20 | 588.13 | 1.30 | | 4.40 | 110 | | 59 | 8½ | 220 | 63 |
| 10 | 22.5 | 591.06 | 1.30 | | 4.40 | 110 | | 61 | 8½ | 220 | 71 |
| 11 | 25 | 594.01 | 1.25 | | 4.25 | 110 | | 63 | 8½ | 225 | 76 |
| 12 | 27.5 | 597.05 | 1.30 | | 4.40 | 110 | | 65 | 8½ | 225 | 78 |
| A12 | 30 | 599.927 | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Plant Lawson United Feldspar & Mineral Run No. 3 Date 10/26/78

| TRAVERSE POINT NUMBER | SAMPLING TIME min / CLOCK TIME (24-hr CLOCK) | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE °F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | |
| 1-1 | 30 0917 | 599.927 | 0.96 | | 3.25 | 110 | | 66 | 6 | 235 | 60 |
| 2 | 32.5 | 602.49 | 1.10 | | 3.70 | 110 | | 68 | 7 | 235 | 55 |
| 3 | 35 | 605.20 | 1.15 | | 3.90 | 110 | | 69 | 7 | 235 | 55 |
| 4 | 37.5 | 608.02 | 1.20 | | 4.00 | 110 | | 70 | 7½ | 235 | 55 |
| 5 | 40 | 610.88 | 1.20 | | 4.00 | 110 | | 72 | 7½ | 235 | 55 |
| 6 | 42.5 | 614.- | 1.20 | | 4.00 | 110 | | 74 | 7½ | 240 | 56 |
| 7 | 45 | 616.64 | 1.00 | | 3.40 | 110 | | 76 | 6½ | 240 | 57 |
| 8 | 47.5 | 619.4 | 1.00 | | 3.40 | 110 | | 77 | 6½ | 240 | 58 |
| 9 | 50 | 622.07 | 1.10 | | 3.70 | 110 | | 78 | 7 | 240 | 58 |
| 10 | 52.5 | 625.- | 1.15 | | 3.90 | 110 | | 80 | 7½ | 240 | 58 |
| 11 | 55 | 627.68 | 1.15 | | 3.90 | 110 | | 81 | 7½ | 240 | 58 |
| 12 | 57.5 | 630.55 | 1.15 | | 3.90 | 110 | | 83 | 7½ | 240 | 58 |
| 12 | 60 | 633.413 | | | | | | | | | |
| | | | ΣTDP 24.822°F | | 89.4/24 | | | 1545/24 | | | |
| | | | nΔP 24 | | | | | | | | |
| Diff. | 60 | 65.153 | | | | | | | | | |
| Avg. | - | - | (1.0343) | | 3.64 | 109.8 | | 64.4 | | | |
| | | | | | | 570R | | 524R | | | |

AQ-44 (con.)

12-15-72 WOGR

## AIR QUALITY SECTION

### SOURCE SAMPLING FIELD DATA

Plant LAWSON UNITED FELDSPAR QUARTZ DRYER
Date 10-26-78
Location Spruce Pine
Sample Type Particulate
Run Number 4
Operator M.Y.A.
Sample Box No. 4
Meter Box No. 2

Meter $\Delta H_@$ 1.862
C Factor 1.0
Probe Type Pyrex
Probe Length 3'
Probe Tip Dia., In. .242
Probe Heater Setting H1
Heater Box Setting H1
Assumed Moisture % 7

Ambient Temperature 75
Barometric Pressure, In. Hg. 26.95
Static Pressure ($P_s$), -.14
Stack Dimension(s) 20" Dia
Distance: Disturbance to port 84"
Distance: Port to exit 64"
Leak Rate 0 / 0 cfm@ 15 / 10 IN Hg.
Filter number(s) 55531

Remarks:

| TRAVERSE POINT NUMBER | CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min 1223 | GAS METER READING ($V_m$), ft³ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in. Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | |
| A 1 | 00 | 633.65 | .73 | | 2.8 | 100 | | 80 | 5.5 | 190 | 65 |
| 2 | 2 | 635.62 | .76 | | 3.0 | 101 | | 80 | 6.0 | 194 | 65 |
| 3 | 4 | 637.64 | .83 | | 3.2 | 101 | | 82 | 6.0 | 194 | 55 |
| 4 | 6 | 639.72 | .79 | | 3.1 | 101 | | 82 | 6.0 | 198 | 55 |
| 5 | 8 | 641.80 | .67 | | 2.6 | 100 | | 83 | 5.5 | 206 | 55 |
| 6 | 10 | 643.74 | .56 | | 2.2 | 100 | | 84 | 5.0 | 210 | 55 |
| 7 | 12 | 645.53 | .42 | | 1.65 | 99 | | 85 | 4.0 | 210 | 55 |
| 8 | 14 | 647.10 | .26 | | 1.0 | 99 | | 86 | 3.0 | 210 | 55 |
| 9 | 16 | 648.39 | .07 | | .275 | 99 | | 87 | 2.0 | 210 | 55 |
| 10 | 18 | 649.23 | .03 | | .12 | 99 | | 87 | 2.0 | 211 | 55 |
| 11 | 20 | 649.73 | .04 | | .16 | 99 | | 88 | 2.0 | 211 | 55 |
| 12 | 22 | 650.23 | .05 | | .20 | 98 | | 89 | 2.0 | 212 | 55 |
| 13 | 24 | 650.79 | .06 | | .235 | 98 | | 90 | 2.0 | 211 | 58 |
| 14 | 26 | 651.4 | .07 | | .275 | 98 | | 91 | 2.0 | 215 | 57 |
| 15 | 28 | 652.03 | .07 | | .275 | 98 | | 92 | 2.0 | 218 | 57 |
| 16 | 30 | 652.7 | .07 | | .275 | 96 | | 93 | 2.0 | 218 | 56 |
| 16 | 32 | 653.367 | | | | | | | | | |
| | 12:55 | | | | | | | | | | |

AQ-44
12-15-72 6-2-76 WOGR

LAWSON UNITED FELDSPAR

Plant QUARTZ DRYER SCRUBBER Run No. 4 Date 10-26-78

| TRAVERSE POINT NUMBER | SAMPLING TIME min / CLOCK TIME (24 hr CLOCK) 1259 | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | |
| B 1 | 00 | 653.367 | .50 | | 2.0 | 98 | | 95 | 4.0 | 222 | 60 |
| 2 | 2 | 655.02 | .49 | | 1.95 | 95 | | 96 | 4.0 | 222 | 56 |
| 3 | 4 | 656.66 | .53 | | 2.1 | 95 | | 96 | 4.5 | 219 | 55 |
| 4 | 6 | 658.35 | .53 | | 2.1 | 95 | | 97 | 4.5 | 215 | 55 |
| 5 | 8 | 660.06 | .51 | | 2.0 | 93 | | 98 | 4.0 | 211 | 55 |
| 6 | 10 | 661.73 | .44 | | 1.75 | 93 | | 98 | 4.0 | 215 | 55 |
| 7 | 12 | 663.35 | .38 | | 1.5 | 95 | | 99 | 3.5 | 209 | 55 |
| 8 | 14 | 664.84 | .24 | | .96 | 95 | | 99 | 3.0 | 208 | 55 |
| 9 | 16 | 666.10 | .12 | | .46 | 97 | | 100 | 2.5 | 213 | 55 |
| 10 | 18 | 667.02 | .07 | | .27 | 95 | | 100 | 2.0 | 211 | 55 |
| 11 | 20 | 667.77 | .09 | | .35 | 95 | | 101 | 2.0 | 218 | 55 |
| 12 | 22 | 668.50 | .12 | | .46 | 95 | | 101 | 2.5 | 215 | 55 |
| 13 | 24 | 669.33 | .13 | | .51 | 95 | | 101 | 2.5 | 213 | 55 |
| 14 | 26 | 670.21 | .13 | | .51 | 95 | | 101 | 2.5 | 211 | 55 |
| 15 | 28 | 671.11 | .14 | | .55 | 94 | | 101 | 2.5 | 213 | 55 |
| 16 | 30 | 672.02 | .14 | | .55 | 95 | | 102 | 2.5 | 212 | 55 |
| 16 | 32 | 672.955 | | | | | | | | | |
| | | | ΣΔp 16.2247 | | 41.05/32 | 3166/32 | | 2964/32 | | | |
| | | | n 32 | | | | | | | | |
| DIFF. | 64 | 39.305 | | | | | | | | | |
| AVG. | - | - | (.5070) | | 1.28 | 99.1 | | 92.6 | | | |
| | | | | | | 557R | | 553R | | | |

AQ-44 (con.)

12-15-72 WOGR

## AIR QUALITY SECTION

### SOURCE SAMPLING FIELD DATA

Plant Lawson United Feldspar — Meter $\Delta H_@$ 1.662 — Ambient Temperature 70 F — Remarks:

Date 10/20/78 — C Factor 1.0 — Barometric Pressure, In. Hg. 26.90

Location Spruce Pine — Probe Type Pyrex — Static Pressure ($P_s$), -.14

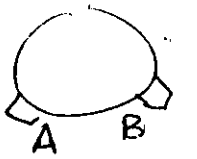
Sample Type Particulate — Probe Length 3' — Stack Dimension(s) 20" Dia

Run Number 5 — Probe Tip Dia., In. .242 — Distance: Disturbance to port 84"

Operator JAS — Probe Heater Setting Hi — Distance: Port to exit 64"

Sample Box No. 5 — Heater Box Setting Hi — Leak Rate .002/.001 cfm@ 15½ inHg/7

Meter Box No. 2 — Assumed Moisture % 7 — Filter number(s) 55532




| TRAVERSE POINT NUMBER | CLOCK TIME (24-hr CLOCK) / SAMPLING TIME, min | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in. Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | |
| A 1 | 0 1349 | 673.207 | 0.75 | | 2.95 | 95 | | 95 | 6½ | 180 | 65 |
| 2 | 2 | 675.16 | 0.79 | | 3.05 | 95 | | 94 | 7 | 182 | 56 |
| 3 | 4 | 677.23 | 0.81 | | 3.15 | 95 | | 94 | 7 | 186 | 54 |
| 4 | 6 | 679.- | 0.75 | | 2.95 | 95 | | 94 | 7 | 186 | 56 |
| 5 | 8 | 681.42 | 0.60 | | 2.35 | 95 | | 95 | 6 | 190 | 58 |
| 6 | 10 | 683.32 | 0.47 | | 1.85 | 95 | | 95 | 5 | 192 | 61 |
| 7 | 12 | 685.01 | 0.34 | | 1.35 | 95 | | 96 | 4 | 198 | 63 |
| 8 | 14 | 686.48 | 0.18 | | 0.71 | 95 | | 96 | 3 | 204 | 64 |
| 9 | 16 | 687.62 | 0.04 | | 0.16 | 95 | | 97 | 2 | 205 | 65 |
| 10 | 18 | 688.38 | 0.03 | | 0.12 | 95 | | 97 | 2 | 207 | 66 |
| 11 | 20 | 688.89 | 0.05 | | 0.20 | 95 | | 97 | 2 | 192 | 67 |
| 12 | 22 | 689.44 | 0.07 | | 0.28 | 95 | | 97 | 2 | 186 | 67 |
| 13 | 24 | 690.- | 0.08 | | 0.32 | 95 | | 98 | 2½ | 186 | 66 |
| 14 | 26 | 690.84 | 0.10 | | 0.39 | 95 | | 98 | 2½ | 192 | 65 |
| 15 | 28 | 691.60 | 0.10 | | 0.39 | 95 | | 99 | 2½ | 202 | 64 |
| 16 | 30 | 692.- | 0.10 | | 0.39 | 95 | | 99 | 2½ | 208 | 64 |
| A 16 | 32 | 693.295 | | | | | | | | | |

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APPENDIX D

Plant Lawson United Feldspar & Mineral Run No. 5 Date 10/26/78

| TRAVERSE POINT NUMBER | CLOCK TIME (24-hr CLOCK) / SAMPLING TIME min | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE °F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | | |
| B1 | 32 1026 | 693.295 | 0.68 | | 1.90 | 95 | | 100 | 4½ | 174 | 70 | |
| 2 | 34 | 694.79 | 0.51 | | 2.00 | 95 | | 100 | 5 | 180 | 58 | (1.0) |
| 3 | 36 | 696.45 | 0.55 | | 2.15 | 95 | | 101 | 5 | 186 | 56 | |
| 4 | 38 | 698.18 | 0.52 | | 2.05 | 95 | | 101 | 5 | 182 | 57 | |
| 5 | 40 | 699.89 | 0.45 | | 1.75 | 95 | | 102 | 4½ | 188 | 58 | |
| 6 | 42 | 701.50 | 0.43 | | 1.70 | 95 | | 102 | 4½ | 190 | 60 | |
| 7 | 44 | 703.06 | 0.36 | | 1.45 | 95 | | 103 | 4 | 192 | 61 | |
| 8 | 46 | 704.55 | 0.21 | | 0.82 | 95 | | 104 | 3 | 200 | 61 | |
| 9 | 48 | 704.75 | 0.07 | 0.28 | 0.67 | 95 | | 105 | 3 | 196 | 63 | |
| 10 | 50 | 707.30 | 0.07 | 0.28 | 0.67 | 95 | | 106 | 3 | 191 | 64 | |
| 11 | 52 | — | 0.08 | | 0.32 | 95 | | 107 | 2½ | 191 | 64 | |
| 12 | 54 | — | 0.08 | | 0.32 | 95 | | 108 | 2½ | 192 | 65 | |
| 13 | 56 | 709.— | 0.10 | | 0.39 | 95 | | 108 | 2½ | 192 | 65 | |
| 14 | 58 | 710.30 | 0.12 | | 0.48 | 95 | | 109 | 3½ | 190 | 65 | |
| 15 | 60 | 711.16 | 0.10 | | 0.39 | 95 | | 109 | 2½ | 190 | 64 | |
| 16 | 62 | 711.97 | 0.12 | | 0.48 | 95 | | 110 | 3½ | 191 | 65 | (2.0) |
| 16 | 64.51 | 713.031 | — | | | | | | | | | |
| | | | ΣTBP | 15.7559 | | 38.15/32 | | 3216/32 | | | | |
| | | | n(4) | 32 | | | | | | | | |
| DIFF. | 64.51 | 39.824 | - | | - | - | | - | | | | |
| AVG. | - | - | (.49) | | 1.19 | 95 | | 100.5 | | | | 1.5 |
| | | | | | | 555R | | 561R | | | | |

AQ-44 (con.)

12-15-72 WOGR

## AIR QUALITY SECTION

## SOURCE SAMPLING FIELD DATA

Plant Lawson United Feld — Meter $\Delta H_@$ 1.862 — Ambient Temperature 85 — Remarks:

Date Quartz Dryer 10-26-78 — C Factor 1.0 — Barometric Pressure, In. Hg. 26.85

Location Spruce Pine — Probe Type Pyrex — Static Pressure ($P_s$), −.14

Sample Type Particulate — Probe Length 3' — Stack Dimension(s) 20" Dia

Run Number 6 — Probe Tip Dia., In. .242 — Distance: Disturbance to port 84"

Operator M.Y.A. — Probe Heater Setting HI — Distance: Port to exit 64"

Sample Box No. 6 — Heater Box Setting HI — Leak Rate .002/0 cfm@ 15/8 in Hg.

Meter Box No. 2 — Assumed Moisture % 7 — Filter number(s) 55533

| TRAVERSE POINT NUMBER | CLOCK TIME (24 hr CLOCK) / SAMPLING TIME, min (1535) | GAS METER READING ($V_m$), ft³ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ DESIRED | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ ACTUAL | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE INLET ($T_{m\ in}$), °F | DRY GAS METER TEMPERATURE OUTLET ($T_{m\ out}$), °F | PUMP VACUUM, in. Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A 1 | 00 | 713.30 | .7 | | 2.7 | 91 | | 102 | 5.0 | 166 | 54 |
| 2 | 2 | 715.25 | .79 | | 3.05 | 98 | | 101 | 5.0 | 177 | 46 |
| 3 | 4 | 717.32 | .83 | | 3.2 | 99 | | 101 | 5.5 | 178 | 45 |
| 4 | 6 | 719.44 | .72 | | 2.8 | 100 | | 102 | 5.0 | 180 | 47 |
| 5 | 8 | 721.50 | .67 | | 2.6 | 99 | | 102 | 5.0 | 188 | 50 |
| 6 | 10 | 723.45 | .52 | | 2.05 | 100 | | 103 | 4.0 | 190 | 53 |
| 7 | 12 | 725.22 | .39 | | 1.55 | 100 | | 103 | 3.5 | 190 | 55 |
| 8 | 14 | 726.80 | .23 | | .89 | 100 | | 104 | 3.0 | 192 | 55 |
| 9 | 16 | 728.04 | .05 | .20 | .16 | 99 | | 104 | 2.0 | 194 | 55 |
| 10 | 18 | 728.82 | .04 | .16 | .16 | 98 | | 104 | 2.0 | 205 | 55 |
| 11 | 20 | 729.35 | .04 | | .16 | 98 | | 104 | 2.0 | 200 | 54 |
| 12 | 22 | 729.87 | .06 | | .235 | 99 | | 104 | 2.0 | 200 | 54 |
| 13 | 24 | 730.48 | .07 | | .275 | 99 | | 104 | 2.0 | 200 | 54 |
| 14 | 26 | 731.14 | .08 | | .315 | 98 | | 104 | 2.0 | 200 | 53 |
| 15 | 28 | 731.85 | .09 | | .36 | 99 | | 104 | 2.0 | 205 | 52 |
| 16 | 30 | 732.61 | .09 | | .36 | 99 | | 104 | 2.0 | 203 | 52 |
| AQ-44 | 32 | 733.37 | | | | | | | | | |
| | 1606 | | | | | | | | | | |

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APPENDIX D

## AIR QUALITY SECTION

## SOURCE SAMPLING FIELD DATA

Page 2

Plant Lawson United Quantz Dryer — Meter $\Delta H_@$ ____ — Ambient Temperature ____ — Remarks:

Date 10-26-78 — C Factor ____ — Barometric Pressure, In. Hg. ____

Location ____ — Probe Type ____ — Static Pressure ($P_s$), ____

Sample Type ____ — Probe Length ____ — Stack Dimension(s) ____

Run Number 6, Page 2 — Probe Tip Dia., In. ____ — Distance: Disturbance to port ____

Operator ____ — Probe Heater Setting ____ — Distance: Port to exit ____

Sample Box No. ____ — Heater Box Setting ____ — Leak Rate ____ cfm@ ____

Meter Box No. ____ — Assumed Moisture % ____ — Filter number(s) ____

| TRAVERSE POINT NUMBER | SAMPLING TIME, min / CLOCK TIME (24-hr CLOCK) | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in. $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in. Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE, °F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | |
| B1 | 00 | 733.37 | .45 | 1.8 | 2.0 | 99 | | 104 | 4.0 | 210 | 60 |
| 2 | 2 | 735.05 | .48 | | 1.9 | 98 | | 104 | 4.0 | 210 | 51 |
| 3 | 4 | 736.71 | .54 | | 2.1 | 99 | | 105 | 4.0 | 210 | 50 |
| 4 | 6 | 738.42 | .52 | | 2.0 | 99 | | 105 | 4.0 | 210 | 50 |
| 5 | 8 | 740.12 | .52 | | 2.0 | 99 | | 105 | 4.0 | 211 | 52 |
| 6 | 10 | 741.03 | .49 | | 1.9 | 99 | | 105 | 4.0 | 211 | 52 |
| 7 | 12 | 743.52 | .42 | | 1.65 | 98 | | 106 | 3.5 | 211 | 53 |
| 8 | 14 | 745.08 | .27 | | 1.05 | 98 | | 106 | 3.0 | 211 | 53 |
| 9 | 16 | 746.43 | .11 | | .43 | 98 | | 106 | 2.5 | 212 | 54 |
| 10 | 18 | 747.56 | .09 | | .35 | 98 | | 106 | 2.0 | 212 | 56 |
| 11 | 20 | 748.12 | .09 | | .35 | 98 | | 106 | 2.0 | 218 | 58 |
| 12 | 22 | 748.88 | .11 | | .43 | 98 | | 106 | 2.5 | 218 | 60 |
| 13 | 24 | 749.70 | .13 | | .51 | 97 | | 107 | 2.5 | 218 | 60 |
| 14 | 26 | 750.57 | .14 | | .55 | 98 | | 107 | 2.5 | 219 | 60 |
| 15 | 28 | 751.49 | .14 | | .55 | 98 | | 107 | 2.5 | 220 | 60 |
| 16 | 30 | 752.42 | .13 | | .51 | 97 | | 107 | 2.5 | 220 | 59 |
| 16 | 32 | 753.32 | 16/2857 | | 3141/32 | | | 3342/32 | | | |

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DIFF. 64/64's

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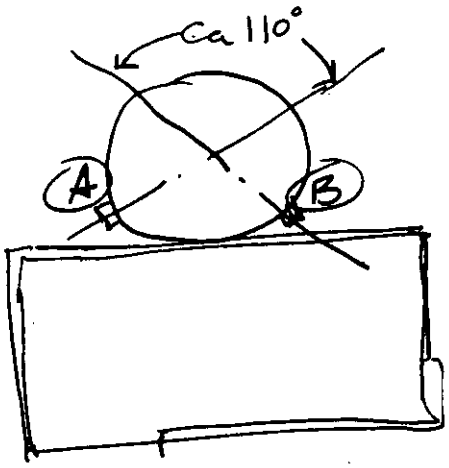
AVG. 1.22 98.2 EQR 104.4 564 R

APPENDIX D

## Preliminary Field Data




Plant Lawson United Feld. & Mineral Co.

Date 10/26/78

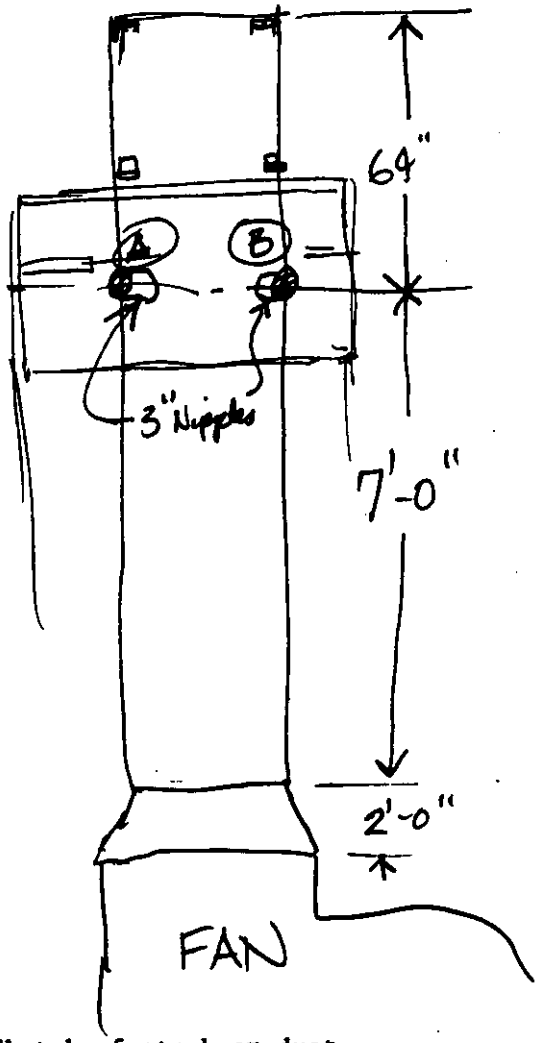
Port Location Ditch from ID Fan for FELDSPAR DRYER

Nearest Disturbance:

Before Port 84" (4.2 Dias.)

After Port 64" (3.2 Dias.)

Duct Diameter 20" ID. (ca 20¾" OD)




Sketch of stack or duct showing location of sampling ports

| Point Number | % of Diameter | Distance From Near Wall | |
|---|---|---|---|
| 1 | .021 | .42 | 1" |
| 2 | .067 | 1.34 | 1 5/16" |
| 3 | .118 | 2.36 | 2 3/8" |
| 4 | .177 | 3.54 | 3½" |
| 5 | .250 | 5.0 | 5" |
| 6 | .356 | 7.12 | 7⅛" |
| 7 | .644 | 12.88 | 12 7/8" |
| 8 | .750 | 15.0 | 15" |
| 9 | .823 | 16.46 | 16½" |
| 10 | .882 | 17.64 | 17 5/8" |
| 11 | .933 | 18.66 | 18 11/16" |
| 12 | .979 | 19.58 | 19" |
| | | | |
| | | | |
| | | | |
| | | | |
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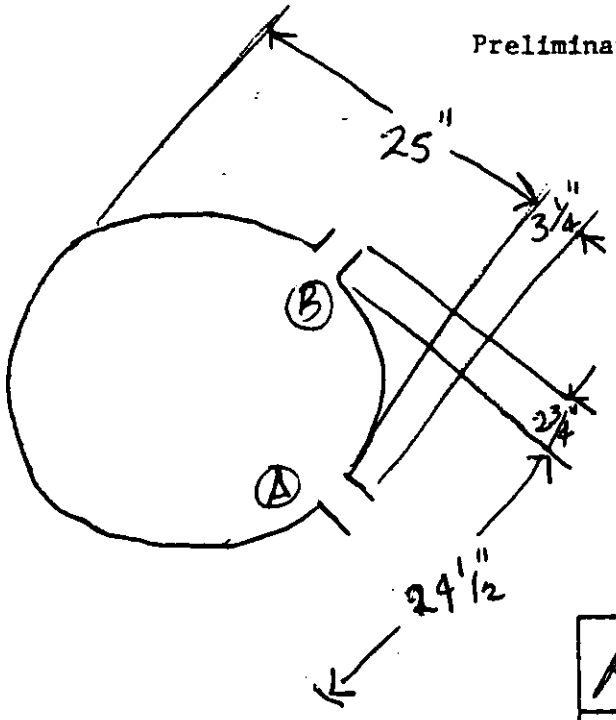
Preliminary Field Data




Plant Lawson United Feldsp.

Date 10/26/78

Port Location Stack (Quartz Dryer)

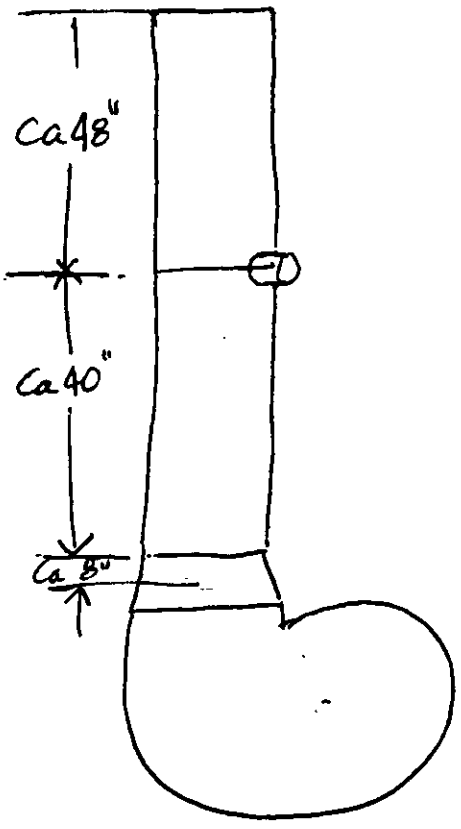
Nearest Disturbance:

Before Port ca 48"

After Port ca 48"

Duct Diameter 24½" X 25"

| A Point Number B | % of Diameter | Distance From Near Wall A | Distance From Near Wall B |
|---|---|---|---|
| | | 25 | 24.5 |
| 1 | 1.6 | 1 (3/8) | 1 (3/8) |
| 2 | 4.9 | 1¼ | 1¼ |
| 3 | 8.5 | 2⅛ | 2⅛ |
| 4 | 12.5 | 3⅛ | 3⅛ |
| 5 | 16.9 | 4¼ | 4⅛ |
| 6 | 22.0 | 5½ | 5⅜ |
| 7 | 28.3 | 7 1/16 | 6 15/16 |
| 8 | 37.5 | 9⅜ | 9⅜ |
| 9 | 62.5 | 15 5/8 | 15 5/8 |
| 10 | 71.7 | 17 15/16 | 17½ |
| 11 | 78.0 | 19½ | 19⅛ |
| 12 | 83.1 | 20¾ | 20⅜ |
| 13 | 87.5 | 21⅞ | 21½ |
| 14 | 91.5 | 22⅞ | 22½ |
| 15 | 95.1 | 23¾ | 23 5/16 |
| 16 | 98.4 | (24 5/8) | (24) |
| | | 24 | 23.5 |




Sketch of stack or duct showing location of sampling ports

# NOMOGRAPH DATA

PLANT Lawson United Feldspar & Mineral Co.

DATE 10/25/78

SAMPLING LOCATION Scrubber Stack, Feldspar Dryer

| | | |
|---|---|---|
| CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. $H_2O$ | $\Delta H_@$ | 1.862 |
| AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F | $T_{m_{avg.}}$ | 90 |
| PERCENT MOISTURE IN GAS STREAM BY VOLUME | $B_{wo}$ | 7 |
| BAROMETRIC PRESSURE AT METER, in. Hg | $P_m$ | |
| STATIC PRESSURE IN STACK, in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. $H_2O$) | $P_s$ | |
| RATIO OF STATIC PRESSURE TO METER PRESSURE | $P_s/P_m$ | 1 |
| AVERAGE STACK TEMPERATURE, °F | $T_{s_{avg.}}$ | 107 |
| AVERAGE VELOCITY HEAD, in. $H_2O$ | $\Delta p_{avg.}$ | 1.11 |
| MAXIMUM VELOCITY HEAD, in. $H_2O$ | $\Delta p_{max.}$ | 1.35 |
| C FACTOR | | 0.99 |
| CALCULATED NOZZLE DIAMETER, in. | | .203 |
| ACTUAL NOZZLE DIAMETER, in. | | .242 |
| REFERENCE $\Delta p$, in. $H_2O$ | | 0.65 |

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# FELDSPAR DRYER SCRUBBER STACK

| | | Δp | $T_s$ |
|---|---|---|---|
| B | 2 | 1.2 | 105 |
| | 4 | 1.3 | 105 |
| | 6 | 1.25 | 105 |
| | 8 | 0.98 | 105 |
| | 10 | 1.0 | 105 |
| | 12 | 1.15 | 105 |
| A | 2 | 0.72 | 110 |
| | 4 | 0.88 | 110 |
| | 6 | 0.89 | 110 |
| | 8 | 1.3 | 105 |
| | 10 | 1.35 | 105 |
| | 12 | 1.30 | 110 |

$13.32/12 = 1.11$

$1280/12 = 106.7$

## NOMOGRAPH DATA

PLANT LAWSON UNITED FELDSPAR

DATE 10-26-78

SAMPLING LOCATION QUARTZ DRYER SCRUBBER STACK

| | | |
|---|---|---|
| CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. $H_2O$ | $\Delta H_@$ | 1.862 |
| AVERAGE METER TEMPERATURE (AMBIENT + 20 °F), °F | $T_{m\,avg.}$ | 90 |
| PERCENT MOISTURE IN GAS STREAM BY VOLUME | $B_{wo}$ | 7 |
| BAROMETRIC PRESSURE AT METER, in. Hg | $P_m$ | 26.95 |
| STATIC PRESSURE IN STACK, in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. $H_2O$) | $P_s$ | NEG |
| RATIO OF STATIC PRESSURE TO METER PRESSURE | $P_s/P_m$ | 1 |
| AVERAGE STACK TEMPERATURE, °F | $T_{s\,avg.}$ | 100 |
| AVERAGE VELOCITY HEAD, in. $H_2O$ | $\Delta p_{avg.}$ | .284 |
| MAXIMUM VELOCITY HEAD, in. $H_2O$ | $\Delta p_{max.}$ | .80 |
| C FACTOR | 1 | |
| CALCULATED NOZZLE DIAMETER, in. | .28 | |
| ACTUAL NOZZLE DIAMETER, in. | .25 | |
| REFERENCE $\Delta p$, in. $H_2O$ | | |

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LAWSON UNITED FELDSPAR

Plant QUARTZ DRYER Run No. Prelim Date 10-26-78

| TRAVERSE POINT NUMBER | SAMPLING TIME min / CLOCK TIME (24-hr CLOCK) | GAS METER READING ($V_m$), $ft^3$ | VELOCITY HEAD ($\Delta p_s$), in. $H_2O$ | ORIFICE PRESSURE DIFFERENTIAL ($\Delta H$), in $H_2O$ | | STACK TEMPERATURE ($T_s$), °F | DRY GAS METER TEMPERATURE | | PUMP VACUUM, in Hg | SAMPLE BOX TEMPERATURE, °F | IMPINGER TEMPERATURE °F |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | DESIRED | ACTUAL | | INLET ($T_{m\,in}$), °F | OUTLET ($T_{m\,out}$), °F | | | |
| B 2 | | | .47 | | | | | | | | |
| 4 | | | .53 | | | 90 | | | | | |
| 6 | | | .47 | | | 90 | | | | | |
| 8 | | | .25 | | | 93 | | | | | |
| 10 | | | .05 | | | 95 | | | | | |
| 12 | | | .05 | | | 97 | | | | | |
| 14 | | | .09 | | | 98 | | | | | |
| 16 | | | .07 | | | 98 | | | | | |
| A 2 | | | .80 | | | 99 | | | | | |
| 4 | | | .79 | | | 99 | | | | | |
| 6 | | | .54 | | | 99 | | | | | |
| 8 | | | .22 | | | 99 | | | | | |
| 10 | | | .02 | | | 99 | | | | | |
| 12 | | | .05 | | | 100 | | | | | |
| 14 | | | .06 | | | 101 | | | | | |
| 16 | | | .07 | | | 100 | | | | | |
| | | | 4.55 | | | 1417 | | | | | |
| | | | 16 | | | 15 | | | | | |
| | | | Ave .284 | | | 97.2 | | | | | |

AQ-44 (con.)

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APPENDIX G

## DETERMINATION OF EMISSION LIMITS

The maximum allowable emission rate during the test period was determined by applying North Carolina Emission Control Standard NCAC 2D .0509 "Particulates from Mica or Feldspar Processing Plants" (Reference 1). Using the appropriate equation below, where E = allowable emission rate in lb/hr. and P = production rate in tons/hr., the allowable is calculated as follows:

| | |
|---|---|
| P = 1 to 30 tons/hr. | $E = 4\ P^{0.677}$ |
| P = 30 to 1000 | $E = 20.421\ P^{0.1977}$ |
| P = 1000 to 3000 | $E = 38.147\ P^{0.1072}$ |

| For this source: | Feldspar Dryer | Quartz Dryer |
|---|---|---|
| P = | 20 T/hr. * | 12 T/hr. * |
| $E = 4\ P^{0.677}$ | $= 4\ (20)^{0.677}$ | $= 4\ (12)^{0.677}$ |
| | = 30.4 lb/hr. | = 21.5 lb/hr. |

*previously estimated as 14 & 10 T/hr. respectively