IRECO
CAE Project No: 5314

## SUMMARY

### INTRODUCTION

Clean Air Engineering was contracted by IRECO to perform testing at their facility located in Donora, Pennsylvania for compliance purposes.

The testing took place at the Hydra-Clean System Stacks (Pre-Dryer No. 1, Dryer No. 2 and Cooler No. 3) and NW Blower on October 10 and 12, 1990. Coordinating the field testing were:

R. Moon - IRECO
S. Williams - Clean Air Engineering

### SUMMARY OF TEST RESULTS

The gas conditions and results of analysis for particulate testing are presented in Tables 1 through 4 on pages 1-2 through 1-5.

To the best of our knowledge, the data presented in this report are accurate and complete.

Respectfully submitted,

CLEAN AIR ENGINEERING

Robert Preksta
Manager, Eastern Region

Kimberly Kempf
Manager, Technical Communications

## TABLE 1 - SUMMARY OF TEST RESULTS

**EPA Method 5**
**Pre-Dryer No. 1**
**October 10, 1990**

| Run No. | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Start Time (approx.) | 10:20 AM | 2:20 PM | 4:30 PM | |
| Stop Time (approx.) | 11:46 AM | 3:42 PM | 5:45 PM | |
| Gas Conditions | | | | |
| Temperature (°F) | 98 | 98 | 97 | 98 |
| Moisture (volume %) | 4.2 | 4.2 | 4.0 | 4.1 |
| $O_2$ (dry volume %) | 20.9 | 20.9 | 20.9 | 20.9 |
| $CO_2$ (dry volume %) | 0.0 | 0.0 | 0.0 | 0.0 |
| Volumetric Flow Rate | | | | |
| acfm | 10,310 | 9,985 | 10,190 | 10,162 |
| dscfm | 9,061 | 8,774 | 8,994 | 8,943 |
| Particulate | | | | |
| gr/dscf | 0.0035 | 0.0023 | 0.0121 | 0.0060 |
| lb/hr | 0.274 | 0.173 | 0.932 | 0.460 |

## TABLE 2 - SUMMARY OF TEST RESULTS

**EPA Method 5**
**Dryer No. 2**
**October 10, 1990**

| Run No. | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Start Time (approx.) | 9:25 AM | 11:40 AM | 1:55 PM | |
| Stop Time (approx.) | 10:41 AM | 1:00 PM | 3:13 PM | |
| Gas Conditions | | | | |
| Temperature (°F) | 100 | 100 | 100 | **100** |
| Moisture (volume %) | 5.5 | 5.0 | 3.8 | **4.8** |
| $O_2$ (dry volume %) | 20.9 | 20.9 | 20.9 | **20.9** |
| $CO_2$ (dry volume %) | 0.0 | 0.0 | 0.0 | **0.0** |
| Volumetric Flow Rate | | | | |
| acfm | 10,480 | 10,250 | 10,500 | **10,410** |
| dscfm | 9,048 | 8,907 | 9,245 | **9,067** |
| Particulate | | | | |
| gr/dscf | 0.0080 | 0.0028 | 0.0016 | **0.0041** |
| lb/hr | 0.618 | 0.218 | 0.130 | **0.32** |

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## TABLE 3 - SUMMARY OF TEST RESULTS

**EPA Method 5**
**Cooler No. 3**
**October 10, 1990**

| Run No. | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Start Time (approx.) | 10:35 AM | 2:18 PM | 4:28 PM | |
| Stop Time (approx.) | 12:00 PM | 3:32 PM | 5:44 PM | |
| Gas Conditions | | | | |
| Temperature (°F) | 90 | 91 | 91 | 91 |
| Moisture (volume %) | 2.2 | 2.7 | 2.8 | 2.6 |
| $O_2$ (dry volume %) | 20.9 | 20.9 | 20.9 | 20.9 |
| $CO_2$ (dry volume %) | 0.0 | 0.0 | 0.0 | 0.0 |
| Volumetric Flow Rate | | | | |
| acfm | 17,240 | 16,710 | 16,920 | 16,957 |
| dscfm | 15,700 | 15,100 | 15,310 | 15,370 |
| Particulate | | | | |
| gr/dscf | 0.0027 | 0.0023 | 0.0013 | 0.0021 |
| lb/hr | 0.364 | 0.303 | 0.170 | 0.279 |

## TABLE 4 - SUMMARY OF TEST RESULTS

**EPA Method 5**
**NW Blower**
**October 12, 1990**

| Run No. | 1 | 2 | 3 | Average |
|---|---|---|---|---|
| Start Time (approx.) | 10:56 AM | 1:25 PM | 3:34 PM | |
| Stop Time (approx.) | 12:18 PM | 2:42 PM | 4:50 PM | |
| Process Data | | | | |
| Particulate (tons/hr) | 16.91 | 16.91 | 16.91 | **16.91** |
| Gas Conditions | | | | |
| Temperature (°F) | 96 | 100 | 105 | **100** |
| Moisture (volume %) | 1.6 | 1.8 | 1.6 | **1.7** |
| $O_2$ (dry volume %) | 20.9 | 20.9 | 20.9 | **20.9** |
| $CO_2$ (dry volume %) | 0.0 | 0.0 | 0.0 | **0.0** |
| Volumetric Flow Rate | | | | |
| acfm | 28,590 | 29,480 | 29,090 | **29,053** |
| dscfm | 26,110 | 26,680 | 26,160 | **26,317** |
| Particulate | | | | |
| gr/dscf | 0.0046 | 0.0036 | 0.0059 | **0.0047** |
| lb/hr | 1.04 | 0.833 | 1.33 | **1.068** |
| lb/ton production | 0.062 | 0.049 | 0.079 | **0.063** |

**Commonwealth of Pennsylvania**
Environmental Resources
February 20, 1991

**Subject:** Source Test Review

**To:** Data File
IRECO, Incorporated
Donora, Washington County

**From:** John S. Pitulski JSP
Air Quality Program Specialist
Division of Technical Services and Monitoring
Bureau of Air Quality Control

**Through:** Chief, Source Testing and Monitoring Section B

IRECO, Inc. operates a 400 ton per day ammonium nitrate plant at the aforementioned location. Concentrated liquid ammonium nitrate is pumped through a series of spray heads located at the top of a 160-foot tower. As the solution free-falls in the tower, crystallization occurs forming ammonium nitrate prills. The counter-current air flow exits the top of the prill tower and passes through two inoperative impingement scrubbers prior to discharging to the atmosphere through four exhaust stacks. The prills are conveyed from the base of the tower to a pre-dryer, a dryer, and a cooler each controlled by a separate hydro-clean wet scrubber.

Particulate emissions testing was conducted by Clean Air Engineering, Inc. (CAE) in the three hydro-clean scrubber exhaust stacks on October 10, 1990 and in the northwest prill tower exhaust stack on October 12, 1990. Three complete tests were performed at each location. The sampling methods employed by CAE were in accordance with their pre-test protocol (reviewed by Richard Begley, September 11, 1990) and the results appear to be valid.

A question was raised regarding the prill tower sampling location by Bill Charlton of the Pittsburgh Regional Office who observed the testing. The concern was the close proximity of the ports to the I.D. fan and fan belt housing and its effect on the validity of the test results.

A preliminary check by CAE indicated some cyclonic flow along the sampling plane. However, the flows were not significant enough to warrant deviation of the original test plan. Although the velocity data recorded during the three test runs showed a decrease in flow at the center of the duct (location of fan assembly), no actual blockage of the exhaust stream was indicated. Based upon these findings and additional data from previous Department testing performed at the site, it is my opinion that the results obtained by CAE be considered valid.

The following information was obtained from the test report:

Pre-Dryer Exhaust Stack

| Test Run Number | 1 | 2 | 3 |
|---|---|---|---|
| Volumetric Flowrate (dscfm) | 9100 | 8800 | 9000 |
| Particulate Emission Rate(lb/hr) | 0.274 | 0.173 | 0.932 |
| Particulate Concentration (gr/dscf) | 0.0035 | 0.0023 | 0.0121 |
| Allowable Concentration (gr/dscf) | 0.04 | 0.04 | 0.04 |

Dryer Exhaust Stack

| Test Run Number | 1 | 2 | 3 |
|---|---|---|---|
| Volumetric Flowrate (dscfm) | 9000 | 8900 | 9200 |
| Particulate Emission Rate(lb/hr) | 0.618 | 0.218 | 0.130 |
| Particulate Concentration (gr/dscf) | 0.0080 | 0.0028 | 0.0016 |
| Allowable Concentration (gr/dscf) | 0.04 | 0.04 | 0.04 |

Cooler Exhaust Stack

| Test Run Number | 1 | 2 | 3 |
|---|---|---|---|
| Volumetric Flowrate (dscfm) | 15700 | 15100 | 15300 |
| Particulate Emission Rate(lb/hr) | 0.364 | 0.303 | 0.170 |
| Particulate Concentration (gr/dscf) | 0.0027 | 0.0023 | 0.0013 |
| Allowable Concentration (gr/dscf) | 0.04 | 0.04 | 0.04 |

Prill Tower-Northwest Exhaust Stack

| Test Run Number | 1 | 2 | 3 |
|---|---|---|---|
| Volumetric Flowrate (dscfm) | 26100 | 26700 | 26200 |
| Particulate Emission Rate(lb/hr) | 1.04 | 0.833 | 1.33 |
| Particulate Concentration (gr/dscf) | 0.0046 | 0.0036 | 0.0059 |
| Allowable Concentration (gr/dscf) | 0.04 | 0.04 | 0.04 |

cc: Bill Charlton, Pittsburgh Regional Office
Permit File No. 63-313-001
EPA/RSL
Reading File - Stack Test
Doug Lesher

JP:taw

STATISTICAL ANALYSIS IRECO

## LOCATION - COOLER 3

| RUN | DATE OF RUN | AVERAGE SQ. RT. VEL PRES | AVERAGE TEMP | STANDARD DEVIATION SQ. RT. VEL PRES | STANDARD DEVIATION TEMP | VARIANCE SQ. RT. VEL PRES | VARIANCE TEMP | RMS DEVIATION SQ. RT. VEL PRES | RMS DEVIATION TEMP |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10/10/90 | 1.235 | 89.6 | 0.056 | 0.6 | 0.003 | 0.3 | 4.571 | 0.7 |
| 2 | 10/10/90 | 1.194 | 91.3 | 0.050 | 0.9 | 0.003 | 0.8 | 4.213 | 1.0 |
| 3 | 10/10/90 | 1.211 | 90.6 | 0.031 | 1.1 | 0.001 | 1.2 | 2.598 | 1.2 |

## LOCATION - DRIER 2

| RUN | DATE OF RUN | AVERAGE SQ. RT. VEL PRES | AVERAGE TEMP | STANDARD DEVIATION SQ. RT. VEL PRES | STANDARD DEVIATION TEMP | VARIANCE SQ. RT. VEL PRES | VARIANCE TEMP | RMS DEVIATION SQ. RT. VEL PRES | RMS DEVIATION TEMP |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10/10/90 | 0.863 | 99.9 | 0.056 | 0.3 | 0.003 | 0.1 | 6.540 | 0.3 |
| 2 | 10/10/90 | 0.845 | 100.1 | 0.059 | 0.3 | 0.004 | 0.1 | 7.024 | 0.3 |
| 3 | 10/10/90 | 0.868 | 100.3 | 0.050 | 0.4 | 0.002 | 0.2 | 5.739 | 0.4 |

## LOCATION - PRE-DRIER 1

| RUN | DATE OF RUN | AVERAGE SQ. RT. VEL PRES | AVERAGE TEMP | STANDARD DEVIATION SQ. RT. VEL PRES | STANDARD DEVIATION TEMP | VARIANCE SQ. RT. VEL PRES | VARIANCE TEMP | RMS DEVIATION SQ. RT. VEL PRES | RMS DEVIATION TEMP |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10/10/90 | 0.853 | 97.9 | 0.054 | 0.3 | 0.003 | 0.1 | 6.364 | 0.3 |
| 2 | 10/10/90 | 0.826 | 97.9 | 0.065 | 0.7 | 0.004 | 0.5 | 7.918 | 0.7 |
| 3 | 10/10/90 | 0.844 | 96.7 | 0.057 | 0.6 | 0.003 | 0.4 | 6.784 | 0.6 |

| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|---|---|
| [illegible] | 10/12/98 | 1.488 | [illegible] | 0.157 | [illegible] | 0.258 | [illegible] | [illegible] | [illegible] |
| [illegible] | 10/12/98 | 1.497 | 100.4 | 0.361 | 3.2 | 0.131 | 18.5 | 24.143 | 3.2 |
| [illegible] | 10/12/98 | 1.472 | 104.8 | 0.289 | 1.5 | 0.095 | 2.1 | 20.972 | 1.4 |