

IRECO  
CAE Project No: 5314

Note: This is a reference cited in AP 42, *Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources*. AP42 is located on the EPA web site at [www.epa.gov/ttn/chief/ap42/](http://www.epa.gov/ttn/chief/ap42/)

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02\_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

## 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:

*Bill Jones*  
*1054*  
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.

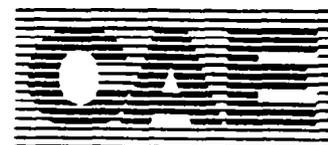
To the best of our knowledge, the data presented in this report are accurate and complete.

Respectfully submitted,

CLEAN AIR ENGINEERING

*Robert Preksta*  
Robert Preksta  
Manager, Eastern Region

*Kimberly Kempf*  
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	
<u>Gas Conditions</u>				
Temperature (°F)	98	98	97	98
Moisture (volume %)	4.2	4.2	4.0	4.1
O <sub>2</sub> (dry volume %)	20.9	20.9	20.9	20.9
CO <sub>2</sub> (dry volume %)	0.0	0.0	0.0	0.0
<u>Volumetric Flow Rate</u>				
acfm	10,310	9,985	10,190	10,162
dscfm	9,061	8,774	8,994	8,943
<u>Particulate</u>				
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	
<u>Gas Conditions</u>				
Temperature (°F)	100	100	100	100
Moisture (volume %)	5.5	5.0	3.8	4.8
O <sub>2</sub> (dry volume %)	20.9	20.9	20.9	20.9
CO <sub>2</sub> (dry volume %)	0.0	0.0	0.0	0.0
<u>Volumetric Flow Rate</u>				
acfm	10,480	10,250	10,500	10,410
dscfm	9,048	8,907	9,245	9,067
<u>Particulate</u>				
gr/dscf	0.0080	0.0028	0.0016	0.0041
lb/hr	0.618	0.218	0.130	0.32

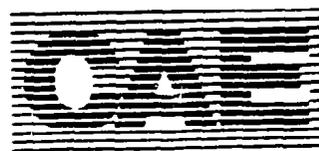


**TABLE 3 - SUMMARY OF TEST RESULTS**

1-4

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	
<u>Gas Conditions</u>				
Temperature (°F)	90	91	91	91
Moisture (volume %)	2.2	2.7	2.8	2.6
O <sub>2</sub> (dry volume %)	20.9	20.9	20.9	20.9
CO <sub>2</sub> (dry volume %)	0.0	0.0	0.0	0.0
<u>Volumetric Flow Rate</u>				
acfm	17,240	16,710	16,920	16,957
dscfm	15,700	15,100	15,310	15,370
<u>Particulate</u>				
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	
<u>Process Data</u>				
Particulate (tons/hr)	16.91	16.91	16.91	16.91
<u>Gas Conditions</u>				
Temperature (°F)	96	100	105	100
Moisture (volume %)	1.6	1.8	1.6	1.7
O <sub>2</sub> (dry volume %)	20.9	20.9	20.9	20.9
CO <sub>2</sub> (dry volume %)	0.0	0.0	0.0	0.0
<u>Volumetric Flow Rate</u>				
acfm	28,590	29,480	29,090	29,053
dscfm	26,110	26,680	26,160	26,317
<u>Particulate</u>				
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 Leshner

JP:taw

STATISTICAL ANALYSIS IRECO

LOCATION - COOLER 3

RUN	DATE OF RUN	AVERAGE		STANDARD DEVIATION		VARIANCE		RMS DEVIATION	
		SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES 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		STANDARD DEVIATION		VARIANCE		RMS DEVIATION	
		SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES 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		STANDARD DEVIATION		VARIANCE		RMS DEVIATION	
		SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES TEMP	SO. RT.	VEL PRES 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	6.704	0.6

RUN	DATE OF RUN	STATION 1		STATION 2		STATION 3		STATION 4	
		DO (PT)	TEMP						
1	10/10/98	1.458	18.2	0.207	2.4	0.200	18.7	17.609	4.0
2	10/12/98	1.497	18.4	0.361	3.2	0.151	18.5	24.143	3.0
3	10/13/98	1.472	18.8	0.289	1.5	0.895	2.1	20.972	1.4