

**Final Test Report  
for**

**Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results**

**Based on information and belief formed after reasonable inquiry, I certify that the statements and information in this test report are true, accurate, and complete.**

\_\_\_\_\_  
Permitted Facility Representative / Date

**Name:  
Title:  
Company:  
Sign Date:**

**I have reviewed all testing details and results in this test report and hereby certify that the test report is authentic and accurate.**

\_\_\_\_\_  
Testing Company Representative / Date

**Name:  
Title:  
Company:  
Sign Date:**



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

### Facility Information:

U. S. Steel - Minnesota Ore Operations - Mi			
8771 Park Ridge Drive			
Mountain Iron	MN	55768-	
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<b>Phone:</b>	(218) 778-8684		
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### Testing Company:

Barr Engineering Co.			
4300 MarketPointe Dr.			
Suite 200			
Minneapolis	MN	55435-	
<b>Contact:</b>	Tom Kuchinski		
<b>Phone:</b>	(952) 832-2787		
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<b>Industry/SCC/NAIS</b>	212210	<b>AFS #:</b>		<b>FRS #:</b>	110008799247
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<b>Air Permit Number:</b>	<b>Permitted Source ID/Name:</b>
13700005-006	EU280-283, E Line 5 Waste Gas/Line 7 Waste Gas

<b>Permitted Maximum Process Rate:</b>	<b>Max. Normal Operation Process Rate:</b>	<b>Target Process Test Rate</b>
NA	425 LTPH (Both)	385-425 LTPH (Both)

<b>SCC / Description</b>	30302352	Industrial Processes - Primary Metal Production - Taconite Iron Ore Processing - Induration: Grate/Kiln, Gas-fired, Flux Pellets
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The following state and federal regulations that apply to the proposed testing:

### Description of the source (including control equipment). Please see the attachments for source or process flow diagram:

Both Line 5 and Line 7 agglomerator grate-kiln systems consist of four primary components; the dryer, preheat furnace, kiln, and cooler. Green pellets from the balling drums enter the grate, supported by a slotted grate. The grate is divided into three sections: two for drying and one for preheating the pellets. Hot process gases are passed through the bed of the green pellets on the grate in order to first dry and then preheat them. The grate then transports the pellets into the rotary kiln. In the kiln the pellets are tumbled and indurated (heat hardened) by heating them to 2450° F. The pellets are discharged into an annular cooler with slotted traveling pallets. Ambient air is passed through the bed of pellets in the cooler to cool the pellets and recover heat. The waste gases from each kiln are controlled by a separate wet scrubber.

### Sampling Location Information:

Location	Round Duct Diam.	Rect. Duct Length /Width		Equiv. Diam	DownStream Distance from Disturbance (Distance B):	UpStream Distance from Disturbance:	Number of Traverse Ports	Min.Travers Points
SV127/CE113	168				684	408	4	24



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

SV151/CE136	192				504	300	4	24

### Test Parameter Information:

Location	Target Parameter	Test Method	Number of Test Runs	Test Run Duration	Comments
SV127/CE113	Carbon Monoxide	Method 10	3	156	Concurrent with each run
SV127/CE113	Hydrogen Fluoride	Method 26A	3	120	Duration dependent on 2 dcm/run
SV127/CE113	Hydrogen Chloride	Method 26A	3	120	Duration dependent on 2 dcm/run
SV127/CE113	Filterable Particulate	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Antimony	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Antimony Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Antimony Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Arsenic	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Arsenic Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Arsenic Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Beryllium	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Beryllium Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Beryllium Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Cadmium	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Cadmium Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Cadmium Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Chromium	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Chromium Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Chromium Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Cobalt	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Cobalt Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Cobalt Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Lead	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Lead Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Lead Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Manganese	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Manganese Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Manganese Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Mercury	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Mercury Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Mercury Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Nickel	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Nickel Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Nickel Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Phosphorus (yellow or white)	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Phosphorus (yellow or white) Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Phosphorus (yellow or white) Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Selenium	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Selenium Back Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Selenium Front Half	Method 29	3	156	Duration dependent on 3 dcm/run
SV127/CE113	Carbon Dioxide	Method 3A CO2	3	156	Concurrent with each run
SV127/CE113	Oxygen	Method 3A O2	3	156	Concurrent with each run



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

SV151/CE136	Carbon Monoxide	Method 10	3	168	Concurrent with each run
SV151/CE136	Hydrogen Chloride	Method 26A	3	120	Duration dependent on 2 dcm/run
SV151/CE136	Hydrogen Fluoride	Method 26A	3	120	Duration dependent on 2 dcm/run
SV151/CE136	Filterable Particulate	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Antimony	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Antimony Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Antimony Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Arsenic	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Arsenic Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Arsenic Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Beryllium	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Beryllium Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Beryllium Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Cadmium	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Cadmium Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Cadmium Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Chromium	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Chromium Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Chromium Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Cobalt	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Cobalt Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Cobalt Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Lead	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Lead Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Lead Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Manganese	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Manganese Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Manganese Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Mercury	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Mercury Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Mercury Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Nickel	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Nickel Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Nickel Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Phosphorus (yellow or white)	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Phosphorus (yellow or white) Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Phosphorus (yellow or white) Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Selenium	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Selenium Back Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Selenium Front Half	Method 29	3	168	Duration dependent on 3 dcm/run
SV151/CE136	Oxygen	Method 3A O2	3	168	Concurrent with each run
SV151/CE136	Carbon Dioxide	Method 3A CO2	3	168	Concurrent with each run

**The following describes any modifications and/or deviations to the applicable test methods. If alternative methods were requested, see the attachments for documentation of request AND approval, including dates.**

Method 3A and 10 will be modified to have bias calibrations performed before and after each M29/26A test run. > 60 minutes.

Method 26A will include the addition of a fourth impinger loaded with 0.1N sulfuric acid. This impinger will be



## **Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results**

collected and analyzed separately to monitor HF breakthrough.



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

## Sampling / Stack Data Results Summary

**Location** SV127/CE113 - Method 10

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	4:42:00 PM	10:59:00 AM	4:34:00 PM	
Carbon Dioxide, %	2.5929	2.7052	2.7665	2.688
Oxygen, %	17.5189	17.317	17.1141	17.317
Dry Volumetric Flow Rate, dry scfm	418499.7	413470.5	409818.2	413,929.467
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	10.9091	11.2548	12.1174	11.427
Fuel Type				
Fw	0	0	0	0.000
Fc	0	0	0	0.000

**Location** SV127/CE113 - Method 26A

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	3:55:00 PM	10:15:00 AM	1:38:00 PM	
Net Run Time, minutes	120	108	108	
Dry Gas Meter Volume Sampled, dscf	95.926	85.246	83.725	88.299
Moisture Content of Stack Gas, %	11.1698	11.5604	12.2949	11.675
Moisture Saturation at Stack Gas Temperature, %	17.47	17.69	19.20	18.120
Carbon Dioxide, %	2.5929	2.7052	2.7665	2.688
Oxygen, %	17.5189	17.317	17.1141	17.317
Average Stack Gas Temperature, °F	133.25	133.46	136.58	134.430
Square Root of Average Velocity, inches of H2O	0.9889	0.9869	0.9742	0.983
Dry Volumetric Flow Rate, dry scfm	424,332.7	420,343.7	411,003.9	418,560.100
Actual Wet Volumetric Flue Gas Flow Rate, acfm	569,701.2	571,086.6	566,006.6	568,931.467
Percent Isokinetic of Sampling Rate, %	100.5	100.2	100.6	100.433
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

**Location** SV127/CE113 - Method 29

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	4:42:00 PM	10:59:00 AM	4:34:00 PM	
Net Run Time, minutes	168	156	156	
Dry Gas Meter Volume Sampled, dscf	120.810	110.510	110.087	113.802
Moisture Content of Stack Gas, %	10.9091	11.2548	12.1174	11.427
Moisture Saturation at Stack Gas Temperature, %	16.57	16.95	18.12	17.213
Carbon Dioxide, %	2.5929	2.7052	2.7665	2.688
Oxygen, %	17.5189	17.317	17.1141	17.317
Average Stack Gas Temperature, °F	131.25	131.83	134.38	132.487
Square Root of Average Velocity, inches of H2O	0.9712	0.9666	0.9680	0.969
Dry Volumetric Flow Rate, dry scfm	418,499.7	413,470.5	409,818.2	413,929.467
Actual Wet Volumetric Flue Gas Flow Rate, acfm	558,340.4	558,248.0	561,203.7	559,264.033
Percent Isokinetic of Sampling Rate, %	100.2	99.9	100.4	100.167
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Fw	0	0	0	0.000
Fc	0	0	0	0.000

**Location** SV127/CE113 - Method 3A CO2

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	4:42:00 PM	10:59:00 AM	4:34:00 PM	
Carbon Dioxide, %	2.5929	2.7052	2.7665	2.688
Oxygen, %	17.5189	17.317	17.1141	17.317
Dry Volumetric Flow Rate, dry scfm	418499.7	413470.5	409818.2	413,929.467
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	10.9091	11.2548	12.1174	11.427
Fuel Type				
Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

## Location SV127/CE113 - Method 3A O2

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	4:42:00 PM	10:59:00 AM	4:34:00 PM	
Carbon Dioxide, %	0	0	0	0.000
Oxygen, %	17.5189	17.317	17.1141	17.317
Dry Volumetric Flow Rate, dry scfm	0	0	0	0.000
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	0	0	0	0.000
Fuel Type				
Fw	0	0	0	0.000
Fc	0	0	0	0.000

## Location SV151/CE136 - Method 10

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/20/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:55:00 PM	4:43:00 PM	11:00:00 AM	
Carbon Dioxide, %	1.597066867	1.624316640 5	1.646	1.622
Oxygen, %	17.38585388 3	17.37179184 9	17.2483	17.335
Dry Volumetric Flow Rate, dry scfm	364363.3	369922	372410.4	368,898.567
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	13.7451	13.8057	13.8257	13.792
Fuel Type				
Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

**Location** SV151/CE136 - Method 26A

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/19/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:02:00 PM	4:15:00 PM	10:27:00 AM	
Net Run Time, minutes	132	120	120	
Dry Gas Meter Volume Sampled, dscf	83.751	75.486	74.923	78.053
Moisture Content of Stack Gas, %	13.5848	14.1346	13.9933	13.904
Moisture Saturation at Stack Gas Temperature, %	14.08	14.23	14.47	14.260
Carbon Dioxide, %	1.6	1.6266	1.646	1.624
Oxygen, %	17.39	17.3672	17.2483	17.335
Average Stack Gas Temperature, °F	124.79	125.17	125.13	125.030
Square Root of Average Velocity, inches of H2O	0.6726	0.6661	0.6678	0.669
Dry Volumetric Flow Rate, dry scfm	370,119.9	364,390.1	362,575.5	365,695.167
Actual Wet Volumetric Flue Gas Flow Rate, acfm	509,083.9	504,741.0	510,531.6	508,118.833
Percent Isokinetic of Sampling Rate, %	99.5	100.2	100.0	99.900
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

**Location** SV151/CE136 - Method 29

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/20/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:55:00 PM	4:43:00 PM	11:00:00 AM	
Net Run Time, minutes	180	156	156	
Dry Gas Meter Volume Sampled, dscf	114.167	111.963	112.660	112.930
Moisture Content of Stack Gas, %	13.7451	13.8057	13.8257	13.792
Moisture Saturation at Stack Gas Temperature, %	13.64	13.52	13.68	13.613
Carbon Dioxide, %	1.6	1.6266	1.646	1.624
Oxygen, %	17.39	17.3672	17.2483	17.335
Average Stack Gas Temperature, °F	123.63	123.29	123.08	123.333
Square Root of Average Velocity, inches of H2O	0.6619	0.6711	0.6827	0.672
Dry Volumetric Flow Rate, dry scfm	364,363.3	369,922.0	372,410.4	368,898.567
Actual Wet Volumetric Flue Gas Flow Rate, acfm	500,518.8	507,153.7	520,665.0	509,445.833
Percent Isokinetic of Sampling Rate, %	99.5	99.6	99.5	99.533
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Fw	0	0	0	0.000
Fc	0	0	0	0.000

**Location** SV151/CE136 - Method 3A CO2

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/20/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:55:00 PM	4:48:00 PM	11:00:00 AM	
Carbon Dioxide, %	1.6	1.6266	1.646	1.624
Oxygen, %	17.39	17.3672	0	11.586
Dry Volumetric Flow Rate, dry scfm	364363.3	369922	372410.4	368,898.567
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	13.7451	13.8057	13.8257	13.792
Fuel Type				
Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

**Location** SV151/CE136 - Method 3A O2

				<u>Average</u>
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/20/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:55:00 PM	4:43:00 PM	11:00:00 AM	
Carbon Dioxide, %	0	0	0	0.000
Oxygen, %	17.39	17.3672	17.2483	17.335
Dry Volumetric Flow Rate, dry scfm	0	0	0	0.000
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	0	0	0	0.000
Fuel Type				
Fw	0	0	0	0.000
Fc	0	0	0	0.000



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

### Point to Point Isokenitic Calculations

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# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

## Emissions Summary

**Location:** SV127/CE113 - Method 10

**Compound:** Carbon Monoxide

				Average	Reg Limit
Run	1	2	3		
lb/hr	1.97E+01	2.49E+01	2.26E+01	2.24E+01	
ppm	1.08E+01	1.38E+01	1.26E+01	1.24E+01	

**Location:** SV127/CE113 - Method 26A

**Compound:** Hydrogen Chloride

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.956	0.954	0.726	8.79E-01	
lb / Long Tons of Pellets Produced	1.47E-03	1.60E-03	1.16E-03	1.41E-03	
lb/hr	5.59E-01	6.22E-01	4.71E-01	5.51E-01	
mg/dscm	3.52E-01	3.95E-01	3.06E-01	3.51E-01	

**Compound:** Hydrogen Fluoride

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.0309	0.0282	0.03	2.97E-02	
lb / Long Tons of Pellets Produced	4.76E-05	4.73E-05	4.79E-05	4.76E-05	
lb/hr	1.81E-02	1.84E-02	1.95E-02	1.87E-02	
mg/dscm	1.14E-02	1.17E-02	1.27E-02	1.19E-02	

**Location:** SV127/CE113 - Method 29

**Compound:** Antimony

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.00008	0.0001215	0.000086	9.58E-05	
lb / Long Tons of Pellets Produced	9.68E-08	1.54E-07	1.05E-07	1.19E-07	
lb/hr	3.67E-05	6.01E-05	4.23E-05	4.64E-05	
mg/dscm	2.34E-05	3.88E-05	2.76E-05	2.99E-05	

**Compound:** Antimony Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000052	0.000052	0.000052	5.20E-05	
lb / Long Tons of Pellets Produced	6.28E-08	6.57E-08	6.34E-08	6.40E-08	
lb/hr	2.38E-05	2.57E-05	2.56E-05	2.50E-05	
mg/dscm	1.52E-05	1.66E-05	1.67E-05	1.62E-05	

**Compound:** Antimony Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000028	0.0000695	0.000034	4.38E-05	
lb / Long Tons of Pellets Produced	3.38E-08	8.80E-08	4.13E-08	5.44E-08	



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

lb/hr	1.28E-05	3.44E-05	1.67E-05	2.13E-05
mg/dscm	8.19E-06	2.22E-05	1.09E-05	1.38E-05

## Compound: Arsenic

			Average	Reg Limit
RunNumber	1	2	3	
Mass_mg	0.005032	0.0062145	0.011334	7.53E-03
lb / Long Tons of Pellets Produced	6.09E-06	7.88E-06	1.38E-05	9.26E-06
lb/hr	2.31E-03	3.08E-03	5.58E-03	3.66E-03
mg/dscm	1.47E-03	1.99E-03	3.64E-03	2.37E-03

## Compound: Arsenic Back Half

			Average	Reg Limit
RunNumber	1	2	3	
Mass_mg	0.000086	0.0000135	0.000098	6.58E-05
lb / Long Tons of Pellets Produced	1.04E-07	1.71E-08	1.20E-07	8.04E-08
lb/hr	3.94E-05	6.68E-06	4.83E-05	3.15E-05
mg/dscm	2.51E-05	4.31E-06	3.14E-05	2.03E-05

## Compound: Arsenic Front Half

			Average	Reg Limit
RunNumber	1	2	3	
Mass_mg	0.004946	0.006201	0.011236	7.46E-03
lb / Long Tons of Pellets Produced	5.99E-06	7.85E-06	1.37E-05	9.18E-06
lb/hr	2.27E-03	3.07E-03	5.53E-03	3.62E-03
mg/dscm	1.45E-03	1.98E-03	3.60E-03	2.34E-03

## Compound: Beryllium

			Average	Reg Limit
RunNumber	1	2	3	
Mass_mg	0.000148	0.0001505	0.000162	1.54E-04
lb / Long Tons of Pellets Produced	1.79E-07	1.91E-07	1.98E-07	1.89E-07
lb/hr	6.78E-05	7.45E-05	7.98E-05	7.40E-05
mg/dscm	4.33E-05	4.81E-05	5.20E-05	4.78E-05

## Compound: Beryllium Back Half

			Average	Reg Limit
RunNumber	1	2	3	
Mass_mg	0.000002	0.000002	0.000003	2.33E-06
lb / Long Tons of Pellets Produced	2.42E-09	2.53E-09	3.66E-09	2.87E-09
lb/hr	9.16E-07	9.90E-07	1.48E-06	1.13E-06
mg/dscm	5.85E-07	6.39E-07	9.63E-07	7.29E-07

## Compound: Beryllium Front Half

			Average	Reg Limit
RunNumber	1	2	3	
Mass_mg	0.000146	0.0001485	0.000159	1.51E-04
lb / Long Tons of Pellets Produced	1.77E-07	1.88E-07	1.94E-07	1.86E-07



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

lb/hr	6.69E-05	7.35E-05	7.83E-05	7.29E-05
mg/dscm	4.27E-05	4.75E-05	5.10E-05	4.71E-05

## Compound: Cadmium

	Average			Reg Limit
RunNumber	1	2	3	
Mass_mg	0.000626	0.0008195	0.000563	6.70E-04
lb / Long Tons of Pellets Produced	7.57E-07	1.04E-06	6.86E-07	8.28E-07
lb/hr	2.87E-04	4.06E-04	2.77E-04	3.23E-04
mg/dscm	1.83E-04	2.62E-04	1.81E-04	2.09E-04

## Compound: Cadmium Back Half

	Average			Reg Limit
RunNumber	1	2	3	
Mass_mg	0.000131	0.0003765	0.000081	1.96E-04
lb / Long Tons of Pellets Produced	1.58E-07	4.76E-07	9.88E-08	2.44E-07
lb/hr	6.00E-05	1.86E-04	3.99E-05	9.53E-05
mg/dscm	3.83E-05	1.20E-04	2.60E-05	6.14E-05

## Compound: Cadmium Front Half

	Average			Reg Limit
RunNumber	1	2	3	
Mass_mg	0.000495	0.000443	0.000482	4.73E-04
lb / Long Tons of Pellets Produced	5.99E-07	5.60E-07	5.87E-07	5.82E-07
lb/hr	2.27E-04	2.19E-04	2.37E-04	2.28E-04
mg/dscm	1.45E-04	1.42E-04	1.55E-04	1.47E-04

## Compound: Chromium

	Average			Reg Limit
RunNumber	1	2	3	
Mass_mg	0.005024	0.00571	0.006704	5.81E-03
lb / Long Tons of Pellets Produced	6.07E-06	7.24E-06	8.17E-06	7.16E-06
lb/hr	2.30E-03	2.83E-03	3.30E-03	2.81E-03
mg/dscm	1.47E-03	1.82E-03	2.15E-03	1.81E-03

## Compound: Chromium Back Half

	Average			Reg Limit
RunNumber	1	2	3	
Mass_mg	0.000354	0.000485	0.000554	4.64E-04
lb / Long Tons of Pellets Produced	4.27E-07	6.14E-07	6.76E-07	5.72E-07
lb/hr	1.62E-04	2.40E-04	2.73E-04	2.25E-04
mg/dscm	1.03E-04	1.55E-04	1.78E-04	1.45E-04

## Compound: Chromium Front Half

	Average			Reg Limit
RunNumber	1	2	3	
Mass_mg	0.00467	0.005225	0.00615	5.35E-03
lb / Long Tons of Pellets Produced	5.65E-06	6.62E-06	7.50E-06	6.59E-06



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

lb/hr	2.14E-03	2.59E-03	3.03E-03	2.59E-03
mg/dscm	1.37E-03	1.67E-03	1.97E-03	1.67E-03

## Compound: Cobalt

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000661	0.000767	0.00028	5.69E-04	
lb / Long Tons of Pellets Produced	7.99E-07	9.72E-07	3.42E-07	7.04E-07	
lb/hr	3.03E-04	3.80E-04	1.38E-04	2.74E-04	
mg/dscm	1.93E-04	2.45E-04	8.98E-05	1.76E-04	

## Compound: Cobalt Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000528	0.000601	0.000145	4.25E-04	
lb / Long Tons of Pellets Produced	6.39E-07	7.60E-07	1.77E-07	5.25E-07	
lb/hr	2.42E-04	2.97E-04	7.14E-05	2.03E-04	
mg/dscm	1.54E-04	1.92E-04	4.65E-05	1.31E-04	

## Compound: Cobalt Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000133	0.000166	0.000135	1.45E-04	
lb / Long Tons of Pellets Produced	1.61E-07	2.10E-07	1.65E-07	1.79E-07	
lb/hr	6.09E-05	8.22E-05	6.65E-05	6.99E-05	
mg/dscm	3.89E-05	5.31E-05	4.33E-05	4.51E-05	

## Compound: Filterable Particulate

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	33.7225490196078	31.9294117647059	33.3049019607843	3.30E+01	
lb / Long Tons of Pellets Produced	4.09E-02	4.04E-02	4.06E-02	4.06E-02	
lb/hr	1.55E+01	1.58E+01	1.64E+01	1.59E+01	
mg/dscm	9.86E+00	1.02E+01	1.07E+01	1.03E+01	

## Compound: Lead

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.043949	0.036754	0.045099	4.19E-02	
lb / Long Tons of Pellets Produced	5.30E-05	4.65E-05	5.50E-05	5.15E-05	
lb/hr	2.01E-02	1.82E-02	2.22E-02	2.02E-02	
mg/dscm	1.28E-02	1.17E-02	1.45E-02	1.30E-02	

## Compound: Lead Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.004035	0.00384	0.002785	3.55E-03	
lb / Long Tons of Pellets Produced	4.88E-06	4.86E-06	3.39E-06	4.38E-06	



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

lb/hr	1.85E-03	1.90E-03	1.37E-03	1.71E-03
mg/dscm	1.18E-03	1.23E-03	8.94E-04	1.10E-03

## Compound: Lead Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.039914	0.032914	0.042314	3.84E-02	
lb / Long Tons of Pellets Produced	4.83E-05	4.17E-05	5.15E-05	4.72E-05	
lb/hr	1.83E-02	1.63E-02	2.08E-02	1.85E-02	
mg/dscm	1.17E-02	1.05E-02	1.36E-02	1.19E-02	

## Compound: Manganese

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.014935	0.01968	0.018825	1.78E-02	
lb / Long Tons of Pellets Produced	1.80E-05	2.49E-05	2.29E-05	2.19E-05	
lb/hr	6.84E-03	9.74E-03	9.27E-03	8.62E-03	
mg/dscm	4.37E-03	6.29E-03	6.04E-03	5.57E-03	

## Compound: Manganese Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.00314	0.003285	0.00473	3.72E-03	
lb / Long Tons of Pellets Produced	3.80E-06	4.17E-06	5.77E-06	4.58E-06	
lb/hr	1.44E-03	1.63E-03	2.33E-03	1.80E-03	
mg/dscm	9.18E-04	1.05E-03	1.52E-03	1.16E-03	

## Compound: Manganese Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.011795	0.016395	0.014095	1.41E-02	
lb / Long Tons of Pellets Produced	1.42E-05	2.07E-05	1.72E-05	1.74E-05	
lb/hr	5.40E-03	8.11E-03	6.94E-03	6.82E-03	
mg/dscm	3.45E-03	5.24E-03	4.52E-03	4.40E-03	

## Compound: Mercury

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.009754	0.0088255	0.0091585	9.25E-03	
lb / Long Tons of Pellets Produced	1.18E-05	1.12E-05	1.12E-05	1.14E-05	
lb/hr	4.47E-03	4.37E-03	4.51E-03	4.45E-03	
mg/dscm	2.85E-03	2.82E-03	2.94E-03	2.87E-03	

## Compound: Mercury Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.009695	0.00877	0.009105	9.19E-03	
lb / Long Tons of Pellets Produced	1.17E-05	1.11E-05	1.11E-05	1.13E-05	



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

lb/hr	4.44E-03	4.34E-03	4.48E-03	4.42E-03
mg/dscm	2.83E-03	2.80E-03	2.92E-03	2.85E-03

## Compound: Mercury Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000059	0.0000555	0.0000535	5.60E-05	
lb / Long Tons of Pellets Produced	7.12E-08	7.03E-08	6.51E-08	6.89E-08	
lb/hr	2.70E-05	2.75E-05	2.63E-05	2.69E-05	
mg/dscm	1.72E-05	1.77E-05	1.72E-05	1.74E-05	

## Compound: Nickel

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.002785	0.0050405	0.004692	4.17E-03	
lb / Long Tons of Pellets Produced	3.38E-06	6.37E-06	5.72E-06	5.16E-06	
lb/hr	1.28E-03	2.49E-03	2.31E-03	2.03E-03	
mg/dscm	8.14E-04	1.61E-03	1.51E-03	1.31E-03	

## Compound: Nickel Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000666	0.0007315	0.001073	8.24E-04	
lb / Long Tons of Pellets Produced	8.05E-07	9.26E-07	1.31E-06	1.01E-06	
lb/hr	3.05E-04	3.62E-04	5.28E-04	3.98E-04	
mg/dscm	1.95E-04	2.34E-04	3.44E-04	2.58E-04	

## Compound: Nickel Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.002119	0.004309	0.003619	3.35E-03	
lb / Long Tons of Pellets Produced	2.56E-06	5.45E-06	4.41E-06	4.14E-06	
lb/hr	9.71E-04	2.13E-03	1.78E-03	1.63E-03	
mg/dscm	6.20E-04	1.38E-03	1.16E-03	1.05E-03	

## Compound: Phosphorus (yellow or white)

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.007737	0.008387	0.009867	8.66E-03	
lb / Long Tons of Pellets Produced	9.37E-06	1.06E-05	1.20E-05	1.07E-05	
lb/hr	3.55E-03	4.15E-03	4.86E-03	4.19E-03	
mg/dscm	2.26E-03	2.68E-03	3.17E-03	2.70E-03	

## Compound: Phosphorus (yellow or white) Back

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.003747	0.002812	0.004577	3.71E-03	
lb / Long Tons of Pellets Produced	4.54E-06	3.55E-06	5.57E-06	4.55E-06	



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

lb/hr	1.72E-03	1.39E-03	2.25E-03	1.79E-03
mg/dscm	1.10E-03	8.99E-04	1.47E-03	1.16E-03

**Compound:** Phosphorus (yellow or white) Front

				<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3		
Mass_mg	0.00399	0.005575	0.00529	4.95E-03	
lb / Long Tons of Pellets Produced	4.83E-06	7.06E-06	6.44E-06	6.11E-06	
lb/hr	1.83E-03	2.76E-03	2.60E-03	2.40E-03	
mg/dscm	1.17E-03	1.78E-03	1.70E-03	1.55E-03	

**Compound:** Selenium

				<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3		
Mass_mg	0.00793	0.0061255	0.00685	6.97E-03	
lb / Long Tons of Pellets Produced	9.58E-06	7.75E-06	8.34E-06	8.56E-06	
lb/hr	3.63E-03	3.03E-03	3.37E-03	3.34E-03	
mg/dscm	2.32E-03	1.96E-03	2.20E-03	2.16E-03	

**Compound:** Selenium Back Half

				<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3		
Mass_mg	0.00134	0.0009055	0.0011	1.12E-03	
lb / Long Tons of Pellets Produced	1.62E-06	1.15E-06	1.34E-06	1.37E-06	
lb/hr	6.14E-04	4.48E-04	5.42E-04	5.35E-04	
mg/dscm	3.92E-04	2.89E-04	3.53E-04	3.45E-04	

**Compound:** Selenium Front Half

				<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3		
Mass_mg	0.00659	0.00522	0.00575	5.85E-03	
lb / Long Tons of Pellets Produced	7.97E-06	6.60E-06	7.00E-06	7.19E-06	
lb/hr	3.02E-03	2.58E-03	2.83E-03	2.81E-03	
mg/dscm	1.93E-03	1.67E-03	1.84E-03	1.81E-03	

**Location:** SV127/CE113 - Method 3A CO2

**Compound:** Carbon Dioxide

				<b>Average</b>	<b>Reg Limit</b>
Run	1	2	3		
Percent(%)	2.59E+00	2.71E+00	2.77E+00	2.69E+00	

**Location:** SV127/CE113 - Method 3A O2

**Compound:** Oxygen

				<b>Average</b>	<b>Reg Limit</b>
Run	1	2	3		
Percent(%)	1.75E+01	1.73E+01	1.71E+01	1.73E+01	

**Location:** SV151/CE136 - Method 10

**Compound:** Carbon Monoxide

				<b>Average</b>	<b>Reg Limit</b>
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# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Run	1	2	3	
lb/hr	2.18E+01	2.52E+01	2.04E+01	2.25E+01
ppm	1.37E+01	1.56E+01	1.26E+01	1.40E+01
<b>Location: SV151/CE136 - Method 26A</b>				
<b>Compound: Hydrogen Chloride</b>				
			<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3	
Mass_mg	1.001	1.044	0.752	9.32E-01
lb / Long Tons of Pellets Produced	1.49E-03	1.69E-03	1.17E-03	1.45E-03
lb/hr	5.85E-01	6.67E-01	4.81E-01	5.78E-01
mg/dscm	4.22E-01	4.88E-01	3.55E-01	4.22E-01
<b>Compound: Hydrogen Fluoride</b>				
			<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3	
Mass_mg	3.371	2.917	1.875	2.72E+00
lb / Long Tons of Pellets Produced	5.03E-03	4.71E-03	2.91E-03	4.22E-03
lb/hr	1.97E+00	1.86E+00	1.20E+00	1.68E+00
mg/dscm	1.42E+00	1.36E+00	8.84E-01	1.22E+00
<b>Location: SV151/CE136 - Method 29</b>				
<b>Compound: Antimony</b>				
			<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3	
Mass_mg	0.000153	0.0001015	0.000163	1.39E-04
lb / Long Tons of Pellets Produced	1.64E-07	1.12E-07	1.73E-07	1.50E-07
lb/hr	6.46E-05	4.44E-05	7.13E-05	6.01E-05
mg/dscm	4.73E-05	3.20E-05	5.11E-05	4.35E-05
<b>Compound: Antimony Back Half</b>				
			<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3	
Mass_mg	0.000052	0.000064	0.000052	5.60E-05
lb / Long Tons of Pellets Produced	5.58E-08	7.07E-08	5.51E-08	6.05E-08
lb/hr	2.20E-05	2.80E-05	2.27E-05	2.42E-05
mg/dscm	1.61E-05	2.02E-05	1.63E-05	1.75E-05
<b>Compound: Antimony Front Half</b>				
			<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3	
Mass_mg	0.000101	0.0000375	0.000111	8.32E-05
lb / Long Tons of Pellets Produced	1.08E-07	4.14E-08	1.18E-07	8.91E-08
lb/hr	4.26E-05	1.64E-05	4.85E-05	3.58E-05
mg/dscm	3.12E-05	1.18E-05	3.48E-05	2.59E-05
<b>Compound: Arsenic</b>				
			<b>Average</b>	<b>Reg Limit</b>
RunNumber	1	2	3	



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Mass_mg	0.123584	0.141874	0.152474	1.39E-01
lb / Long Tons of Pellets Produced	1.32E-04	1.57E-04	1.62E-04	1.50E-04
lb/hr	5.22E-02	6.20E-02	6.67E-02	6.03E-02
mg/dscm	3.82E-02	4.48E-02	4.78E-02	4.36E-02

## Compound: Arsenic Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.007648	0.009938	0.010538	9.37E-03	
lb / Long Tons of Pellets Produced	8.20E-06	1.10E-05	1.12E-05	1.01E-05	
lb/hr	3.23E-03	4.34E-03	4.61E-03	4.06E-03	
mg/dscm	2.37E-03	3.14E-03	3.30E-03	2.94E-03	

## Compound: Arsenic Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.115936	0.131936	0.141936	1.30E-01	
lb / Long Tons of Pellets Produced	1.24E-04	1.46E-04	1.51E-04	1.40E-04	
lb/hr	4.89E-02	5.77E-02	6.21E-02	5.62E-02	
mg/dscm	3.59E-02	4.16E-02	4.45E-02	4.07E-02	

## Compound: Beryllium

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000495	0.0004935	0.000528	5.06E-04	
lb / Long Tons of Pellets Produced	5.30E-07	5.45E-07	5.61E-07	5.45E-07	
lb/hr	2.09E-04	2.16E-04	2.31E-04	2.19E-04	
mg/dscm	1.53E-04	1.56E-04	1.66E-04	1.58E-04	

## Compound: Beryllium Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000002	0.000011	0.000002	5.00E-06	
lb / Long Tons of Pellets Produced	2.14E-09	1.21E-08	2.12E-09	5.45E-09	
lb/hr	8.44E-07	4.81E-06	8.75E-07	2.18E-06	
mg/dscm	6.19E-07	3.47E-06	6.27E-07	1.57E-06	

## Compound: Beryllium Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000493	0.0004825	0.000526	5.01E-04	
lb / Long Tons of Pellets Produced	5.28E-07	5.33E-07	5.58E-07	5.40E-07	
lb/hr	2.08E-04	2.11E-04	2.30E-04	2.16E-04	
mg/dscm	1.53E-04	1.52E-04	1.65E-04	1.57E-04	

## Compound: Cadmium

				Average	Reg Limit
RunNumber	1	2	3		



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Mass_mg	0.000458	0.0005095	0.000638	5.35E-04
lb / Long Tons of Pellets Produced	4.90E-07	5.63E-07	6.77E-07	5.77E-07
lb/hr	1.93E-04	2.23E-04	2.79E-04	2.32E-04
mg/dscm	1.42E-04	1.61E-04	2.00E-04	1.68E-04

## Compound: Cadmium Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000049	0.000058	0.000199	1.02E-04	
lb / Long Tons of Pellets Produced	5.25E-08	6.39E-08	2.11E-07	1.09E-07	
lb/hr	2.07E-05	2.53E-05	8.70E-05	4.43E-05	
mg/dscm	1.52E-05	1.83E-05	6.24E-05	3.20E-05	

## Compound: Cadmium Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000409	0.0004515	0.000439	4.33E-04	
lb / Long Tons of Pellets Produced	4.39E-07	4.97E-07	4.66E-07	4.67E-07	
lb/hr	1.73E-04	1.97E-04	1.92E-04	1.87E-04	
mg/dscm	1.27E-04	1.42E-04	1.38E-04	1.36E-04	

## Compound: Chromium

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.023934	0.018749	0.011739	1.81E-02	
lb / Long Tons of Pellets Produced	2.56E-05	2.07E-05	1.25E-05	1.96E-05	
lb/hr	1.01E-02	8.19E-03	5.13E-03	7.81E-03	
mg/dscm	7.40E-03	5.91E-03	3.68E-03	5.66E-03	

## Compound: Chromium Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.001224	0.000939	0.000729	9.64E-04	
lb / Long Tons of Pellets Produced	1.31E-06	1.04E-06	7.74E-07	1.04E-06	
lb/hr	5.17E-04	4.10E-04	3.19E-04	4.15E-04	
mg/dscm	3.79E-04	2.96E-04	2.29E-04	3.01E-04	

## Compound: Chromium Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.02271	0.01781	0.01101	1.72E-02	
lb / Long Tons of Pellets Produced	2.43E-05	1.96E-05	1.17E-05	1.85E-05	
lb/hr	9.59E-03	7.78E-03	4.81E-03	7.39E-03	
mg/dscm	7.03E-03	5.62E-03	3.45E-03	5.37E-03	

## Compound: Cobalt

				Average	Reg Limit
RunNumber	1	2	3		



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Mass_mg	0.000566	0.0005105	0.000258	4.45E-04
lb / Long Tons of Pellets Produced	6.07E-07	5.63E-07	2.74E-07	4.81E-07
lb/hr	2.39E-04	2.23E-04	1.13E-04	1.92E-04
mg/dscm	1.75E-04	1.61E-04	8.09E-05	1.39E-04

## Compound: Cobalt Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000094	0.0001635	0.000046	1.01E-04	
lb / Long Tons of Pellets Produced	1.01E-07	1.81E-07	4.88E-08	1.10E-07	
lb/hr	3.97E-05	7.15E-05	2.01E-05	4.38E-05	
mg/dscm	2.91E-05	5.16E-05	1.44E-05	3.17E-05	

## Compound: Cobalt Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.000472	0.000347	0.000212	3.44E-04	
lb / Long Tons of Pellets Produced	5.05E-07	3.84E-07	2.25E-07	3.71E-07	
lb/hr	1.99E-04	1.52E-04	9.27E-05	1.48E-04	
mg/dscm	1.46E-04	1.09E-04	6.65E-05	1.07E-04	

## Compound: Filterable Particulate

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	66.7	64.1	43.1	5.80E+01	
lb / Long Tons of Pellets Produced	7.16E-02	7.07E-02	4.56E-02	6.26E-02	
lb/hr	2.82E+01	2.80E+01	1.88E+01	2.50E+01	
mg/dscm	2.06E+01	2.02E+01	1.35E+01	1.81E+01	

## Compound: Lead

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.067559	0.070349	0.074729	7.09E-02	
lb / Long Tons of Pellets Produced	7.23E-05	7.75E-05	7.94E-05	7.64E-05	
lb/hr	2.85E-02	3.07E-02	3.27E-02	3.06E-02	
mg/dscm	2.09E-02	2.22E-02	2.34E-02	2.22E-02	

## Compound: Lead Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.001145	0.001435	0.002015	1.53E-03	
lb / Long Tons of Pellets Produced	1.23E-06	1.58E-06	2.14E-06	1.65E-06	
lb/hr	4.83E-04	6.27E-04	8.81E-04	6.64E-04	
mg/dscm	3.54E-04	4.53E-04	6.32E-04	4.80E-04	

## Compound: Lead Front Half

				Average	Reg Limit
RunNumber	1	2	3		



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Mass_mg	0.066414	0.068914	0.072714	6.93E-02
lb / Long Tons of Pellets Produced	7.11E-05	7.60E-05	7.72E-05	7.48E-05
lb/hr	2.80E-02	3.01E-02	3.18E-02	3.00E-02
mg/dscm	2.05E-02	2.17E-02	2.28E-02	2.17E-02

## Compound: Manganese

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.064705	0.06639	0.041945	5.77E-02	
lb / Long Tons of Pellets Produced	6.93E-05	7.32E-05	4.44E-05	6.23E-05	
lb/hr	2.73E-02	2.90E-02	1.83E-02	2.49E-02	
mg/dscm	2.00E-02	2.09E-02	1.32E-02	1.80E-02	

## Compound: Manganese Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.00201	0.002795	0.00535	3.39E-03	
lb / Long Tons of Pellets Produced	2.15E-06	3.08E-06	5.68E-06	3.64E-06	
lb/hr	8.49E-04	1.22E-03	2.34E-03	1.47E-03	
mg/dscm	6.22E-04	8.82E-04	1.68E-03	1.06E-03	

## Compound: Manganese Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.062695	0.063595	0.036595	5.43E-02	
lb / Long Tons of Pellets Produced	6.73E-05	7.02E-05	3.88E-05	5.88E-05	
lb/hr	2.65E-02	2.78E-02	1.60E-02	2.34E-02	
mg/dscm	1.94E-02	2.01E-02	1.15E-02	1.70E-02	

## Compound: Mercury

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.016046	0.0140815	0.0149115	1.50E-02	
lb / Long Tons of Pellets Produced	1.72E-05	1.55E-05	1.58E-05	1.62E-05	
lb/hr	6.77E-03	6.15E-03	6.52E-03	6.48E-03	
mg/dscm	4.96E-03	4.44E-03	4.67E-03	4.69E-03	

## Compound: Mercury Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.01592	0.0139685	0.0148415	1.49E-02	
lb / Long Tons of Pellets Produced	1.71E-05	1.54E-05	1.58E-05	1.61E-05	
lb/hr	6.72E-03	6.10E-03	6.49E-03	6.44E-03	
mg/dscm	4.93E-03	4.41E-03	4.65E-03	4.66E-03	

## Compound: Mercury Front Half

				Average	Reg Limit
RunNumber	1	2	3		



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Mass_mg	0.000126	0.000113	0.00007	1.03E-04
lb / Long Tons of Pellets Produced	1.35E-07	1.25E-07	7.43E-08	1.11E-07
lb/hr	5.32E-05	4.94E-05	3.06E-05	4.44E-05
mg/dscm	3.90E-05	3.56E-05	2.19E-05	3.22E-05

**Compound:** Nickel

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.008872	0.0053945	0.006782	7.02E-03	
lb / Long Tons of Pellets Produced	9.52E-06	5.96E-06	7.21E-06	7.56E-06	
lb/hr	3.75E-03	2.36E-03	2.97E-03	3.03E-03	
mg/dscm	2.74E-03	1.70E-03	2.13E-03	2.19E-03	

**Compound:** Nickel Back Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.001383	0.0006805	0.002353	1.47E-03	
lb / Long Tons of Pellets Produced	1.48E-06	7.50E-07	2.50E-06	1.58E-06	
lb/hr	5.84E-04	2.97E-04	1.03E-03	6.37E-04	
mg/dscm	4.28E-04	2.15E-04	7.38E-04	4.60E-04	

**Compound:** Nickel Front Half

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.007489	0.004714	0.004429	5.54E-03	
lb / Long Tons of Pellets Produced	8.02E-06	5.20E-06	4.71E-06	5.98E-06	
lb/hr	3.16E-03	2.06E-03	1.94E-03	2.39E-03	
mg/dscm	2.32E-03	1.49E-03	1.39E-03	1.73E-03	

**Compound:** Phosphorus (yellow or white)

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.025407	0.028982	0.033877	2.94E-02	
lb / Long Tons of Pellets Produced	2.72E-05	3.21E-05	3.59E-05	3.17E-05	
lb/hr	1.07E-02	1.27E-02	1.48E-02	1.27E-02	
mg/dscm	7.86E-03	9.14E-03	1.06E-02	9.20E-03	

**Compound:** Phosphorus (yellow or white) Back

				Average	Reg Limit
RunNumber	1	2	3		
Mass_mg	0.001067	0.001942	0.002337	1.78E-03	
lb / Long Tons of Pellets Produced	1.14E-06	2.14E-06	2.48E-06	1.92E-06	
lb/hr	4.50E-04	8.49E-04	1.02E-03	7.73E-04	
mg/dscm	3.30E-04	6.13E-04	7.33E-04	5.59E-04	

**Compound:** Phosphorus (yellow or white) Front

				Average	Reg Limit
RunNumber	1	2	3		



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Mass_mg	0.02434	0.02704	0.03154	2.76E-02
lb / Long Tons of Pellets Produced	2.61E-05	2.98E-05	3.35E-05	2.98E-05
lb/hr	1.03E-02	1.18E-02	1.38E-02	1.20E-02
mg/dscm	7.53E-03	8.53E-03	9.89E-03	8.65E-03
<b>Compound: Selenium</b>				
				<b>Average Reg Limit</b>
RunNumber	1	2	3	
Mass_mg	0.01973	0.01827	0.01987	1.93E-02
lb / Long Tons of Pellets Produced	2.11E-05	2.02E-05	2.11E-05	2.08E-05
lb/hr	8.33E-03	7.98E-03	8.69E-03	8.33E-03
mg/dscm	6.10E-03	5.76E-03	6.23E-03	6.03E-03
<b>Compound: Selenium Back Half</b>				
				<b>Average Reg Limit</b>
RunNumber	1	2	3	
Mass_mg	0.0111	0.010045	0.0105	1.05E-02
lb / Long Tons of Pellets Produced	1.19E-05	1.11E-05	1.11E-05	1.14E-05
lb/hr	4.69E-03	4.39E-03	4.59E-03	4.56E-03
mg/dscm	3.43E-03	3.17E-03	3.29E-03	3.30E-03
<b>Compound: Selenium Front Half</b>				
				<b>Average Reg Limit</b>
RunNumber	1	2	3	
Mass_mg	0.00863	0.008225	0.00937	8.74E-03
lb / Long Tons of Pellets Produced	9.24E-06	9.07E-06	9.95E-06	9.42E-06
lb/hr	3.64E-03	3.59E-03	4.10E-03	3.78E-03
mg/dscm	2.67E-03	2.59E-03	2.94E-03	2.73E-03
<b>Location: SV151/CE136 - Method 3A CO2</b>				
<b>Compound: Carbon Dioxide</b>				
				<b>Average Reg Limit</b>
Run	1	2	3	
Percent(%)	1.60E+00	1.63E+00	1.65E+00	1.63E+00
<b>Location: SV151/CE136 - Method 3A O2</b>				
<b>Compound: Oxygen</b>				
				<b>Average Reg Limit</b>
Run	1	2	3	
Percent(%)	1.74E+01	1.74E+01	1.72E+01	1.73E+01



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

### Process Run Data

Process:		Pellets Produced			SCC: 30302352	
Comment:						
Run	Value	Unit of Measure	Target Low	Target High	Comment	
1	379	Long Tons/hr	385	425	SV127 M29	
2	391	Long Tons/hr	385	425	SV127 M29	
3	404	Long Tons/hr	385	425	SV127 M29	
4	380	Long Tons/hr	385	425	SV127 M26	
5	389	Long Tons/hr	385	425	SV127 M26	
6	407	Long Tons/hr	385	425	SV127 M26	
7	394	Long Tons/hr	385	425	SV151 M29	
8	396	Long Tons/hr	385	425	SV151 M29	
9	412	Long Tons/hr	385	425	SV151 M29	
10	392	Long Tons/hr	385	425	SV151 M26	
100	395	Long Tons/hr	385	425	SV151 M26	
101	412	Long Tons/hr	385	425	SV151 M26	
Process:		Pellets Processed			SCC:	
Comment:		Greenball Feed				
Run	Value	Unit of Measure	Target Low	Target High	Comment	
1	513	Long Tons/hr	485	540	SV127 M29	
2	516	Long Tons/hr	485	540	SV127 M29	
3	516	Long Tons/hr	485	540	SV127 M29	
4	514	Long Tons/hr	485	540	SV127 M26	
5	515	Long Tons/hr	485	540	SV127 M26	
6	515	Long Tons/hr	485	540	SV127 M26	
7	518	Long Tons/hr	485	540	SV151 M29	
8	519	Long Tons/hr	485	540	SV151 M29	
9	517	Long Tons/hr	485	540	SV151 M29	
10	518	Long Tons/hr	485	540	SV151 M26	
100	519	Long Tons/hr	485	540	SV151 M26	
101	517	Long Tons/hr	485	540	SV151 M26	
Process:		Natural Gas Burned			SCC:	
Comment:		Values will be provided in the report.				
Run	Value	Unit of Measure	Target Low	Target High	Comment	
1	266	1000 Cubic Feet/hr	0	0	SV127 M29	
2	282	1000 Cubic Feet/hr	0	0	SV127 M29	
3	300	1000 Cubic Feet/hr	0	0	SV127 M29	
4	268	1000 Cubic Feet/hr	0	0	SV127 M26	
5	289	1000 Cubic Feet/hr	0	0	SV127 M26	
6	301	1000 Cubic Feet/hr	0	0	SV127 M26	
7	211	1000 Cubic Feet/hr	0	0	SV151 M29	
8	215	1000 Cubic Feet/hr	0	0	SV151 M29	
9	226	1000 Cubic Feet/hr	0	0	SV151 M29	
10	210	1000 Cubic Feet/hr	0	0	SV151 M26	
100	215	1000 Cubic Feet/hr	0	0	SV151 M26	
101	226	1000 Cubic Feet/hr	0	0	SV151 M26	



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Process:	Biomass Burned					SCC:
Comment:	Values will be provided in the report.					
Run	Value	Unit of Measure	Target Low	Target High	Comment	
1	0	Pounds/hr	0	0	SV127 M29	
2	0	Pounds/hr	0	0	SV127 M29	
3	0	Pounds/hr	0	0	SV127 M29	
4	0	Pounds/hr	0	0	SV127 M26	
5	0	Pounds/hr	0	0	SV127 M26	
6	0	Pounds/hr	0	0	SV127 M26	
7	0	Pounds/hr	0	0	SV151 M29	
8	0	Pounds/hr	0	0	SV151 M29	
9	0	Pounds/hr	0	0	SV151 M29	
10	0	Pounds/hr	0	0	SV151 M26	
100	0	Pounds/hr	0	0	SV151 M26	
101	0	Pounds/hr	0	0	SV151 M26	
Process:	Flux Added					SCC:
Comment:	Pounds of flux (limestone/dolomite blend) per long ton pellets. Values will be provided in the report.					
Run	Value	Unit of Measure	Target Low	Target High	Comment	
1	27.7	Pounds/hr	0	0	SV127 M29	
2	27.4	Pounds/hr	0	0	SV127 M29	
3	25.1	Pounds/hr	0	0	SV127 M29	
4	27.7	Pounds/hr	0	0	SV127 M26	
5	27.2	Pounds/hr	0	0	SV127 M26	
6	14.5	Pounds/hr	0	0	SV127 M26	
7	0	Pounds/hr	0	0	SV151 M29	
8	0	Pounds/hr	0	0	SV151 M29	
9	0	Pounds/hr	0	0	SV151 M29	
10	0	Pounds/hr	0	0	SV151 M26	
100	0	Pounds/hr	0	0	SV151 M26	
101	0	Pounds/hr	0	0	SV151 M26	
Process:	Binder Added					SCC:
Comment:	Pounds of binder (bentonite) per long ton pellets processed. Values will be provided in the report.					
Run	Value	Unit of Measure	Target Low	Target High	Comment	
1	15.5	Pounds/hr	0	0	SV127 M29	
2	15.5	Pounds/hr	0	0	SV127 M29	
3	14.8	Pounds/hr	0	0	SV127 M29	
4	15.5	Pounds/hr	0	0	SV127 M26	
5	15.7	Pounds/hr	0	0	SV127 M26	
6	25.3	Pounds/hr	0	0	SV127 M26	
7	25.4	Pounds/hr	0	0	SV151 M29	
8	25.2	Pounds/hr	0	0	SV151 M29	
9	25	Pounds/hr	0	0	SV151 M29	
10	25.5	Pounds/hr	0	0	SV151 M26	
100	25.3	Pounds/hr	0	0	SV151 M26	



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

101	25	Pounds/hr	0	0	SV151 M26
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## APCD Run Data

APCD: SCRUBBER					
Comment:					
Run	Value	Unit of Measure	Target Value	Comment	
1	10.1	in H2O	7.5	SV127 M29	
1	2674	gpm	2641	SV127 M29	
1	0	in H2O	5.7	SV151	
1	0	gpm	2897	SV151	
2	2712	gpm	2641	SV127 M29	
2	10.4	in H2O	7.5	SV127 M29	
2	0	gpm	2897	SV151	
2	0	in H2O	5.7	SV151	
3	0	gpm	2897	SV151	
3	10.4	in H2O	7.5	SV127 M29	
3	0	in H2O	5.7	SV151	
3	2691	gpm	2641	SV127 M29	
4	10	in H2O	7.5	SV127 M26	
4	0	gpm	2897	SV151	
4	0	in H2O	5.7	SV151	
4	2675	gpm	2641	SV127 M26	
5	0	in H2O	5.7	SV151	
5	10.4	in H2O	7.5	SV127 M26	
5	0	gpm	2897	SV151	
5	2705	gpm	2641	SV127 M26	
6	0	gpm	2897	SV151	
6	0	in H2O	5.7	SV151	
6	10.4	in H2O	7.5	SV127 M26	
6	2685	gpm	2641	SV127 M26	
7	0	gpm	2641	SV127	
7	2992	gpm	2897	SV151 M29	
7	8.4	in H2O	5.7	SV151 M29	
7	0	in H2O	7.5	SV127	
8	0	in H2O	7.5	SV127	
8	8.6	in H2O	5.7	SV151 M29	
8	2979	gpm	2897	SV151 M29	
8	0	gpm	2641	SV127	
9	9.2	in H2O	5.7	SV151 M29	
9	0	in H2O	7.5	SV127	
9	0	gpm	2641	SV127	
9	3220	gpm	2897	SV151 M29	
10	2991	gpm	2897	SV151 M26	
10	8.3	in H2O	5.7	SV151 M26	
10	0	gpm	2641	SV127	
10	0	in H2O	7.5	SV127	



### Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

11	0	gpm	2641	SV127
11	0	in H2O	7.5	SV127
11	2977	gpm	2897	SV151 M26
11	8.7	in H2O	5.7	SV151 M26
12	0	gpm	2641	SV127
12	9.2	in H2O	5.7	SV151 M26
12	3157	gpm	2897	SV151 M26
12	0	in H2O	7.5	SV127

### Process Lab Run Data



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

## Sampling / Stack Data Results Detail

Location SV127/CE113 - Method 10				
				Average
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	4:42:00 PM	10:59:00 AM	4:34:00 PM	
Carbon Dioxide, %	2.5929	2.7052	2.7665	2.688
Oxygen, %	17.5189	17.317	17.1141	17.317
Fuel Factor	0	0	0	
Dry Volumetric Flow Rate, dry scfm	418499.7	413470.5	409818.2	413,929.467
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	10.9091	11.2548	12.1174	11.427
Analyzer Make	Thermo	Thermo	Thermo	
Analyzer Model	48i	48i	48i	
Analyzer Serial Number	1151040014	1151040014	1151040014	1,151,040.0 14.000
Operating Range	45.5	45.5	45.5	45.500
Operating Units	ppm	ppm	ppm	
No. Readings/Avg.	168	156	156	160.000
Calibration Set	1275	1276	1276	1,275.667
Calibration Pre Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Pre Zero Cylinder Instrument Response	0	0	0.1	0.033
Calibration Pre Zero Cylinder Bias	0	0	0.22	0.073
Calibration Pre Zero Cylinder Drift	0	0	0	0.000
Calibration Pre High Cylinder ID	EB0097780 - CO LOW	EB0097780 - CO LOW	EB0097780 - CO LOW	
Calibration Pre High Cylinder Instrument Response	23	23	23	23.000
Calibration Pre High Cylinder Bias	-0.22	-0.22	-0.22	-0.220
Calibration Pre High Cylinder Drift	0	0	0	0.000
Calibration Post Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Post Zero Cylinder Instrument Response	0.1	0.1	0	0.067
Calibration Post Zero Cylinder Bias	0.22	0.22	0	0.147
Calibration Post Zero Cylinder Drift	0.22	0.22	0.22	0.220
Calibration Post High Cylinder ID	EB0097780 - CO LOW	EB0097780 - CO LOW	EB0097780 - CO LOW	
Calibration Post High Cylinder Instrument Response	23	23	23	23.000
Calibration Post High Cylinder Bias	-0.22	-0.22	-0.22	-0.220
Calibration Post High Cylinder Drift	0	0	0	0.000
Cavg	10.76	13.78	12.6	12.380
Cavg Units	ppmvd	ppmvd	ppmvd	
Cgas	10.78	13.8197	12.632	12.411



**Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results**

Cgas Units	ppmvd	ppmvd	ppmvd	
Fuel Type				
Fw	0	0	0	0.000
Fc	0	0	0	0.000
Cgasw	0	0	0	0.000
Cgasw Units				



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Location SV127/CE113 - Method 26A				
				Average
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	3:55:00 PM	10:15:00 AM	1:38:00 PM	
Net Traversing Points	24	24	24	
Net Run Time, minutes	120	108	108	
Nozzle Diameter, inches	0.23	0.23	0.23	0.230
Pitot Tube Coefficient	0.84	0.84	0.84	0.840
Dry Gas Meter Calibration Factor	0.982	0.982	0.982	0.982
Barometric Pressure, inches of Mercury	28.25	28.05	28.05	28.117
Average Orifice Meter Differential, inches H2O	2.70	2.56	2.55	2.603
Dry Gas Meter Volume Sampled, cubic feet	107.900	92.690	94.320	98.303
Average Dry Gas Meter Temperature, °F	94.52	72.08	91.25	85.950
Dry Gas Meter Volume Sampled, dscf	95.926	85.246	83.725	88.299
Total Moisture Liquid collected, g	255.8	236.3	248.9	247.000
Volume of Water Vapor, standard cubic feet	12.062	11.143	11.737	11.647
Moisture Content of Stack Gas, %	11.1698	11.5604	12.2949	11.675
Moisture Saturation at Stack Gas Temperature, %	17.47	17.69	19.20	18.120
Dry Mole Fraction	0.8883	0.8844	0.8771	0.883
Carbon Dioxide, %	2.5929	2.7052	2.7665	2.688
Oxygen, %	17.5189	17.317	17.1141	17.317
Carbon Monoxide & Nitrogen, %	79.8882	79.9778	80.1194	79.995
Fuel Factor	1.30	1.32	1.37	
Dry Molecular Weight, lb/lb-Mole	29.1156	29.1255	29.1272	29.123
Wet Molecular weight, lb/lb-Mole	27.8756	27.8412	27.7624	27.826
Flue Gas Static Pressure, inches of H2O	-0.75	-0.75	-0.75	-0.750
Absolute Flue Gas Pressure, inches of Mercury	28.19	27.99	27.99	28.057
Average Stack Gas Temperature, °F	133.25	133.46	136.58	134.430
Square Root of Average Velocity, inches of H2O	0.9889	0.9869	0.9742	0.983
Average Stack Gas Velocity, feet/second	61.68	61.83	61.28	61.597
Stack Cross-Sectional Area, square feet	153.94	153.94	153.94	153.940
Dry Volumetric Flow Rate, dry scfm	424,332.7	420,343.7	411,003.9	418,560.100
Actual Wet Volumetric Flue Gas Flow Rate, acfm	569,701.2	571,086.6	566,006.6	568,931.467
Percent Isokinetic of Sampling Rate, %	100.5	100.2	100.6	100.433
Percent Excess Air, %	490.5	456.1	423.9	456.833
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Round Duct Diameter, inches	168	168	168	
Rectangular Duct Width, inches				
Rectangular Duct Length, inches				



### Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

**Location** SV127/CE113 - Method 29

				Average
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	4:42:00 PM	10:59:00 AM	4:34:00 PM	
Net Traversing Points	24	24	24	
Net Run Time, minutes	168	156	156	
Nozzle Diameter, inches	0.22	0.22	0.22	0.220
Pitot Tube Coefficient	0.84	0.84	0.84	0.840
Dry Gas Meter Calibration Factor	1.0009	1.0009	1.0009	1.001
Barometric Pressure, inches of Mercury	28.25	28.05	28.05	28.117
Average Orifice Meter Differential, inches H2O	2.12	2.02	2.03	2.057
Dry Gas Meter Volume Sampled, cubic feet	133.530	119.640	121.450	124.873
Average Dry Gas Meter Temperature, °F	94.54	79.21	89.48	87.743
Dry Gas Meter Volume Sampled, dscf	120.810	110.510	110.087	113.802
Total Moisture Liquid collected, g	313.7	297.2	321.9	310.933
Volume of Water Vapor, standard cubic feet	14.793	14.015	15.179	14.662
Moisture Content of Stack Gas, %	10.9091	11.2548	12.1174	11.427
Moisture Saturation at Stack Gas Temperature, %	16.57	16.95	18.12	17.213
Dry Mole Fraction	0.8909	0.8875	0.8788	0.886
Carbon Dioxide, %	2.5929	2.7052	2.7665	2.688
Oxygen, %	17.5189	17.317	17.1141	17.317
Carbon Monoxide & Nitrogen, %	79.8882	79.9778	80.1194	79.995
Fuel Factor	1.30	1.32	1.37	
Dry Molecular Weight, lb/lb-Mole	29.1156	29.1255	29.1272	29.123
Wet Molecular weight, lb/lb-Mole	27.9044	27.8764	27.7799	27.854
Flue Gas Static Pressure, inches of H2O	-0.75	-0.75	-0.75	-0.750
Absolute Flue Gas Pressure, inches of Mercury	28.19	27.99	27.99	28.057
Average Stack Gas Temperature, °F	131.25	131.83	134.38	132.487
Square Root of Average Velocity, inches of H2O	0.9712	0.9666	0.9680	0.969
Average Stack Gas Velocity, feet/second	60.45	60.44	60.76	60.550
Stack Cross-Sectional Area, square feet	153.94	153.94	153.94	153.940
Dry Volumetric Flow Rate, dry scfm	418,499.7	413,470.5	409,818.2	413,929.467
Actual Wet Volumetric Flue Gas Flow Rate, acfm	558,340.4	558,248.0	561,203.7	559,264.033
Percent Isokinetic of Sampling Rate, %	100.2	99.9	100.4	100.167
Percent Excess Air, %	490.5	456.1	423.9	456.833
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Round Duct Diameter, inches	168	168	168	
Rectangular Duct Width, inches				
Rectangular Duct Length, inches				



### Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Location SV127/CE113 - Method 3A CO2				
				Average
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	4:42:00 PM	10:59:00 AM	4:34:00 PM	
Carbon Dioxide, %	2.5929	2.7052	2.7665	2.688
Oxygen, %	17.5189	17.317	17.1141	17.317
Fuel Factor	0	0	0	
Dry Volumetric Flow Rate, dry scfm	418499.7	413470.5	409818.2	413,929.467
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	10.9091	11.2548	12.1174	11.427
Analyzer Make	Servomex	Servomex	Servomex	
Analyzer Model	1440	1440	1440	1,440.000
Analyzer Serial Number	4876	4876	4876	4,876.000
Operating Range	9.5	9.5	9.5	9.500
Operating Units	%	%	%	
No. Readings/Avg.	168	156	156	160.000
Calibration Set	1273	1274	1274	1,273.667
Calibration Pre Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Pre Zero Cylinder Instrument Response	0.1	0.1	0.1	0.100
Calibration Pre Zero Cylinder Bias	1.05	1.05	1.05	1.050
Calibration Pre Zero Cylinder Drift	0	0	0	0.000
Calibration Pre High Cylinder ID	EB0098395 - CO2 LOW	EB0098395 - CO2 LOW	EB0098395 - CO2 LOW	
Calibration Pre High Cylinder Instrument Response	4.9	4.9	4.9	4.900
Calibration Pre High Cylinder Bias	0	0	0	0.000
Calibration Pre High Cylinder Drift	0	0	0	0.000
Calibration Post Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Post Zero Cylinder Instrument Response	0.1	0.1	0.1	0.100
Calibration Post Zero Cylinder Bias	1.05	1.05	1.05	1.050
Calibration Post Zero Cylinder Drift	0	0	0	0.000
Calibration Post High Cylinder ID	EB0098395 - CO2 LOW	EB0098395 - CO2 LOW	EB0098395 - CO2 LOW	
Calibration Post High Cylinder Instrument Response	4.9	4.9	4.9	4.900
Calibration Post High Cylinder Bias	0	0	0	0.000
Calibration Post High Cylinder Drift	0	0	0	0.000
Cavg	2.64	2.75	2.81	2.733
Cavg Units	%vd	%vd	%vd	
Cgas	2.5929	2.7052	2.7665	2.688
Cgas Units	%vd	%vd	%vd	
Fuel Type				



**Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results**

Fw	0	0	0	0.000
Fc	0	0	0	0.000
Cgasw	0	0	0	0.000
Cgasw Units				



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Location SV127/CE113 - Method 3A O2				
				Average
Run Number	1	2	3	
Test Date	5/17/2022	5/18/2022	5/18/2022	
Run Start Time	1:45:00 PM	8:17:00 AM	11:43:00 AM	
Run Finish Time	4:42:00 PM	10:59:00 AM	4:34:00 PM	
Carbon Dioxide, %	0	0	0	0.000
Oxygen, %	17.5189	17.317	17.1141	17.317
Fuel Factor	0	0	0	
Dry Volumetric Flow Rate, dry scfm	0	0	0	0.000
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	0	0	0	0.000
Analyzer Make	Servomex	Servomex	Servomex	
Analyzer Model	1440	1440	1440	1,440.000
Analyzer Serial Number	4876	4876	4876	4,876.000
Operating Range	22.5	22.5	22.5	22.500
Operating Units	%	%	%	
No. Readings/Avg.	168	156	156	160.000
Calibration Set	1271	1272	1272	1,271.667
Calibration Pre Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Pre Zero Cylinder Instrument Response	0	0	0.1	0.033
Calibration Pre Zero Cylinder Bias	0	0	0.44	0.147
Calibration Pre Zero Cylinder Drift	0	0	0	0.000
Calibration Pre High Cylinder ID	EB0098395 - O2 HIGH	EB0098395 - O2 HIGH	EB0098395 - O2 HIGH	
Calibration Pre High Cylinder Instrument Response	22.5	22.5	22.4	22.467
Calibration Pre High Cylinder Bias	0	0	-0.44	-0.147
Calibration Pre High Cylinder Drift	0	0	0	0.000
Calibration Post Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Post Zero Cylinder Instrument Response	0	0.1	0	0.033
Calibration Post Zero Cylinder Bias	0	0.44	0	0.147
Calibration Post Zero Cylinder Drift	0	0.44	0.44	0.293
Calibration Post High Cylinder ID	EB0098395 - O2 HIGH	EB0098395 - O2 HIGH	EB0098395 - O2 HIGH	
Calibration Post High Cylinder Instrument Response	22.4	22.4	22.4	22.400
Calibration Post High Cylinder Bias	-0.44	-0.44	-0.44	-0.440
Calibration Post High Cylinder Drift	0.44	0.44	0	0.293
Cavg	17.48	17.29	17.05	17.273
Cavg Units	%vd	%vd	%vd	
Cgas	17.5189	17.317	17.1141	17.317
Cgas Units	%vd	%vd	%vd	
Fuel Type				



**Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results**

Fw	0	0	0	0.000
Fc	0	0	0	0.000
Cgasw	0	0	0	0.000
Cgasw Units				



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Location SV151/CE136 - Method 10				
				Average
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/20/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:55:00 PM	4:43:00 PM	11:00:00 AM	
Carbon Dioxide, %	1.597066867	1.6243166405	1.646	1.622
Oxygen, %	17.385853883	17.371791849	17.2483	17.335
Fuel Factor	0	0	0	
Dry Volumetric Flow Rate, dry scfm	364363.3	369922	372410.4	368,898.567
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	13.7451	13.8057	13.8257	13.792
Analyzer Make	Thermo	Thermo	Thermo	
Analyzer Model	48i	48i	48i	
Analyzer Serial Number	1151040014	1151040014	1151040014	1,151,040.0 14.000
Operating Range	45.5	45.5	45.5	45.500
Operating Units	ppm	ppm	ppm	
No. Readings/Avg.	180	156	156	164.000
Calibration Set	1515	1515	1516	1,515.333
Calibration Pre Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Pre Zero Cylinder Instrument Response	0.1	0.1	0.1	0.100
Calibration Pre Zero Cylinder Bias	0.22	0.22	0	0.147
Calibration Pre Zero Cylinder Drift	0	0	0	0.000
Calibration Pre High Cylinder ID	EB0097780 - CO LOW	EB0097780 - CO LOW	EB0097780 - CO LOW	
Calibration Pre High Cylinder Instrument Response	23	23	22.9	22.967
Calibration Pre High Cylinder Bias	0	0	0	0.000
Calibration Pre High Cylinder Drift	0	0	0	0.000
Calibration Post Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Post Zero Cylinder Instrument Response	0.1	0.5	0.1	0.233
Calibration Post Zero Cylinder Bias	0.22	1.1	0	0.440
Calibration Post Zero Cylinder Drift	0	0.88	0	0.293
Calibration Post High Cylinder ID	EB0097780 - CO LOW	EB0097780 - CO LOW	EB0097780 - CO LOW	
Calibration Post High Cylinder Instrument Response	23	23	22.9	22.967
Calibration Post High Cylinder Bias	0	0	0	0.000
Calibration Post High Cylinder Drift	0	0	0	0.000
Cavg	13.67	15.63	12.52	13.940
Cavg Units	ppmvd	ppmvd	ppmvd	
Cgas	13.6885	15.6001	12.5834	13.957
Cgas Units	ppmvd	ppmvd	ppmvd	



Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Fuel Type				
Fw	0	0	0	0.000
Fc	0	0	0	0.000
Cgasw	0	0	0	0.000
Cgasw Units				



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Location SV151/CE136 - Method 26A				
				Average
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/19/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:02:00 PM	4:15:00 PM	10:27:00 AM	
Net Traversing Points	24	24	24	
Net Run Time, minutes	132	120	120	
Nozzle Diameter, inches	0.252	0.252	0.252	0.252
Pitot Tube Coefficient	0.84	0.84	0.84	0.840
Dry Gas Meter Calibration Factor	0.982	0.982	0.982	0.982
Barometric Pressure, inches of Mercury	27.9	27.9	27.4	27.733
Average Orifice Meter Differential, inches H2O	1.66	1.65	1.63	1.647
Dry Gas Meter Volume Sampled, cubic feet	92.340	84.010	83.710	86.687
Average Dry Gas Meter Temperature, °F	75.40	80.42	72.83	76.217
Dry Gas Meter Volume Sampled, dscf	83.751	75.486	74.923	78.053
Total Moisture Liquid collected, g	279.2	263.5	258.5	267.067
Volume of Water Vapor, standard cubic feet	13.166	12.426	12.190	12.594
Moisture Content of Stack Gas, %	13.5848	14.1346	13.9933	13.904
Moisture Saturation at Stack Gas Temperature, %	14.08	14.23	14.47	14.260
Dry Mole Fraction	0.8642	0.8587	0.8601	0.861
Carbon Dioxide, %	1.6	1.6266	1.646	1.624
Oxygen, %	17.39	17.3672	17.2483	17.335
Carbon Monoxide & Nitrogen, %	81.01	81.0062	81.1057	81.041
Fuel Factor	2.19	2.17	2.22	
Dry Molecular Weight, lb/lb-Mole	28.9516	28.9549	28.9533	28.953
Wet Molecular weight, lb/lb-Mole	27.4673	27.4099	27.4236	27.434
Flue Gas Static Pressure, inches of H2O	-0.32	-0.32	-0.32	-0.320
Absolute Flue Gas Pressure, inches of Mercury	27.88	27.88	27.38	27.713
Average Stack Gas Temperature, °F	124.79	125.17	125.13	125.030
Square Root of Average Velocity, inches of H2O	0.6726	0.6661	0.6678	0.669
Average Stack Gas Velocity, feet/second	42.20	41.84	42.32	42.120
Stack Cross-Sectional Area, square feet	201.06	201.06	201.06	201.060
Dry Volumetric Flow Rate, dry scfm	370,119.9	364,390.1	362,575.5	365,695.167
Actual Wet Volumetric Flue Gas Flow Rate, acfm	509,083.9	504,741.0	510,531.6	508,118.833
Percent Isokinetic of Sampling Rate, %	99.5	100.2	100.0	99.900
Percent Excess Air, %	435.1	432.2	414.3	427.200
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Round Duct Diameter, inches	192	192	192	
Rectangular Duct Width, inches				
Rectangular Duct Length, inches				



### Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Location SV151/CE136 - Method 29				
				Average
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/20/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:55:00 PM	4:43:00 PM	11:00:00 AM	
Net Traversing Points	24	24	24	
Net Run Time, minutes	180	156	156	
Nozzle Diameter, inches	0.254	0.268	0.268	0.263
Pitot Tube Coefficient	0.84	0.84	0.84	0.840
Dry Gas Meter Calibration Factor	1.0009	1.0009	1.0009	1.001
Barometric Pressure, inches of Mercury	27.9	27.9	27.4	27.733
Average Orifice Meter Differential, inches H2O	1.62	2.10	2.13	1.950
Dry Gas Meter Volume Sampled, cubic feet	124.480	123.540	124.760	124.260
Average Dry Gas Meter Temperature, °F	79.60	86.75	79.00	81.783
Dry Gas Meter Volume Sampled, dscf	114.167	111.963	112.660	112.930
Total Moisture Liquid collected, g	385.8	380.3	383.3	383.133
Volume of Water Vapor, standard cubic feet	18.193	17.933	18.075	18.067
Moisture Content of Stack Gas, %	13.7451	13.8057	13.8257	13.792
Moisture Saturation at Stack Gas Temperature, %	13.64	13.52	13.68	13.613
Dry Mole Fraction	0.8636	0.8648	0.8632	0.864
Carbon Dioxide, %	1.6	1.6266	1.646	1.624
Oxygen, %	17.39	17.3672	17.2483	17.335
Carbon Monoxide & Nitrogen, %	81.01	81.0062	81.1057	81.041
Fuel Factor	2.19	2.17	2.22	
Dry Molecular Weight, lb/lb-Mole	28.9516	28.9549	28.9533	28.953
Wet Molecular weight, lb/lb-Mole	27.4598	27.4758	27.4569	27.464
Flue Gas Static Pressure, inches of H2O	-0.32	-0.32	-0.32	-0.320
Absolute Flue Gas Pressure, inches of Mercury	27.88	27.88	27.38	27.713
Average Stack Gas Temperature, °F	123.63	123.29	123.08	123.333
Square Root of Average Velocity, inches of H2O	0.6619	0.6711	0.6827	0.672
Average Stack Gas Velocity, feet/second	41.49	42.04	43.16	42.230
Stack Cross-Sectional Area, square feet	201.06	201.06	201.06	201.060
Dry Volumetric Flow Rate, dry scfm	364,363.3	369,922.0	372,410.4	368,898.567
Actual Wet Volumetric Flue Gas Flow Rate, acfm	500,518.8	507,153.7	520,665.0	509,445.833
Percent Isokinetic of Sampling Rate, %	99.5	99.6	99.5	99.533
Percent Excess Air, %	435.1	432.2	414.3	427.200
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Round Duct Diameter, inches	192	192	192	
Rectangular Duct Width, inches				
Rectangular Duct Length, inches				



### Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Fw	0	0	0	0.000
Fc	0	0	0	0.000



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Location SV151/CE136 - Method 3A CO2				
				Average
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/20/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:55:00 PM	4:48:00 PM	11:00:00 AM	
Carbon Dioxide, %	1.6	1.6266	1.646	1.624
Oxygen, %	17.39	17.3672	0	11.586
Fuel Factor	0	0	0	
Dry Volumetric Flow Rate, dry scfm	364363.3	369922	372410.4	368,898.567
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	13.7451	13.8057	13.8257	13.792
Analyzer Make	Servomex	Servomex	Servomex	
Analyzer Model	1440	1440	1440	1,440.000
Analyzer Serial Number	4876	4876	4876	4,876.000
Operating Range	9.5	9.5	9.5	9.500
Operating Units	%	%	%	
No. Readings/Avg.	180	156	156	164.000
Calibration Set	1513	1513	1514	1,513.333
Calibration Pre Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Pre Zero Cylinder Instrument Response	0	0	0	0.000
Calibration Pre Zero Cylinder Bias	0	0	0	0.000
Calibration Pre Zero Cylinder Drift	0	0	0	0.000
Calibration Pre High Cylinder ID	EB0098395 - CO2 LOW	EB0098395 - CO2 LOW	EB0098395 - CO2 LOW	
Calibration Pre High Cylinder Instrument Response	4.9	4.9	4.9	4.900
Calibration Pre High Cylinder Bias	0	0	0	0.000
Calibration Pre High Cylinder Drift	0	0	0	0.000
Calibration Post Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Post Zero Cylinder Instrument Response	0	0.1	0	0.033
Calibration Post Zero Cylinder Bias	0	1.05	0	0.350
Calibration Post Zero Cylinder Drift	0	1.05	0	0.350
Calibration Post High Cylinder ID	EB0098395 - CO2 LOW	EB0098395 - CO2 LOW	EB0098395 - CO2 LOW	
Calibration Post High Cylinder Instrument Response	4.9	4.9	4.9	4.900
Calibration Post High Cylinder Bias	0	0	0	0.000
Calibration Post High Cylinder Drift	0	0	0	0.000
Cavg	1.6	1.66	1.646	1.635
Cavg Units	%vd	%vd	%vd	
Cgas	1.6	1.6266	1.646	1.624
Cgas Units	%vd	%vd	%vd	
Fuel Type				



Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Fw	0	0	0	0.000
Fc	0	0	0	0.000
Cgasw	0	0	0	0.000
Cgasw Units				



# Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Location SV151/CE136 - Method 3A O2				
				Average
Run Number	1	2	3	
Test Date	5/19/2022	5/19/2022	5/20/2022	
Run Start Time	9:38:00 AM	1:59:00 PM	8:15:00 AM	
Run Finish Time	12:55:00 PM	4:43:00 PM	11:00:00 AM	
Carbon Dioxide, %	0	0	0	0.000
Oxygen, %	17.39	17.3672	17.2483	17.335
Fuel Factor	0	0	0	
Dry Volumetric Flow Rate, dry scfm	0	0	0	0.000
F-Factor, dscfm/MMBtu @ %O2	0	0	0	0.000
Moisture, %	0	0	0	0.000
Analyzer Make	Servomex	Servomex	Servomex	
Analyzer Model	1440	1440	1440	1,440.000
Analyzer Serial Number	4876	4876	4876	4,876.000
Operating Range	22.5	22.5	22.5	22.500
Operating Units	%	%	%	
No. Readings/Avg.	180	156	156	164.000
Calibration Set	1511	1511	1512	1,511.333
Calibration Pre Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Pre Zero Cylinder Instrument Response	0	0	0	0.000
Calibration Pre Zero Cylinder Bias	0	0	0	0.000
Calibration Pre Zero Cylinder Drift	0	0	0	0.000
Calibration Pre High Cylinder ID	EB0098395 - O2 HIGH	EB0098395 - O2 HIGH	EB0098395 - O2 HIGH	
Calibration Pre High Cylinder Instrument Response	22.5	22.5	22.4	22.467
Calibration Pre High Cylinder Bias	0	0	-0.44	-0.147
Calibration Pre High Cylinder Drift	0	0	0	0.000
Calibration Post Zero Cylinder ID	NITROGEN	NITROGEN	NITROGEN	
Calibration Post Zero Cylinder Instrument Response	0	0	0	0.000
Calibration Post Zero Cylinder Bias	0	0	0	0.000
Calibration Post Zero Cylinder Drift	0	0	0	0.000
Calibration Post High Cylinder ID	EB0098395 - O2 HIGH	EB0098395 - O2 HIGH	EB0098395 - O2 HIGH	
Calibration Post High Cylinder Instrument Response	22.5	22.3	22.5	22.433
Calibration Post High Cylinder Bias	0	-0.89	0	-0.297
Calibration Post High Cylinder Drift	0	0.89	0.44	0.443
Cavg	17.39	17.29	17.21	17.297
Cavg Units	%vd	%vd	%vd	
Cgas	17.39	17.3672	17.2483	17.335
Cgas Units	%vd	%vd	%vd	
Fuel Type				



**Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results**

Fw	0	0	0	0.000
Fc	0	0	0	0.000
Cgasw	0	0	0	0.000
Cgasw Units				



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

### Included Attachments:

Attachments	
Source/Process Flow Diagram	Test Ports L5 WGS SV127.pdf
Source/Process Flow Diagram	Test Ports L7 WGS SV151.pdf
EPA Method 1Location Supporting Documentation (Item 9) (optional)	Test Ports L5 WGS SV127.pdf
EPA Method 1Location Supporting Documentation (Item 9) (optional)	Test Ports L7 WGS SV151.pdf
Cyclonic Flow Absence Supporting Documentation (Item 10)	L5 Method 2.pdf
Cyclonic Flow Absence Supporting Documentation (Item 10)	L7 Method 2.pdf
Pre-Test Meter Boxes/DGMs Calibrations	C-9 4-18-2022 1.0009.pdf
Pre-Test Meter Boxes/DGMs Calibrations	C-12 4-29-2022.pdf
Post-Test Meter Boxes/DGMs Calibrations	L5 26A PTC.pdf
Post-Test Meter Boxes/DGMs Calibrations	L5 metals PTC.pdf
Post-Test Meter Boxes/DGMs Calibrations	L7 metals PTC.pdf
Post-Test Meter Boxes/DGMs Calibrations	Line 7 26A PTC.pdf
Nozzles Calibrations	L5 EPA 5-29 Nozzle Cal.pdf
Nozzles Calibrations	L5 EPA 26A Nozzle Cal.pdf
Nozzles Calibrations	L7 EPA 26A Nozzle Cal.pdf
Nozzles Calibrations	L7 Methdo 29 Nozzles.pdf
Pitots Calibrations	7-4.pdf
Pitots Calibrations	7-5.pdf
Thermocouples Calibrations	7-4.pdf
Thermocouples Calibrations	7-5.pdf
Thermocouples Calibrations	C-9-I.pdf
Thermocouples Calibrations	C-9-O.pdf
Thermocouples Calibrations	C-12-I.pdf
Thermocouples Calibrations	C-12-O.pdf
Thermocouples Calibrations	TIO-1253.pdf
Thermocouples Calibrations	TIO-8062.pdf
Sampling Locations Dimensions and Point Locations	Test Ports L5 WGS SV127.pdf



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Sampling Locations Dimensions and Point Locations	Test Ports L7 WGS SV151.pdf
Sampling Locations Dimensions and Point Locations	Traverse Points L5 WGS SV127.pdf
Sampling Locations Dimensions and Point Locations	Traverse Points L7 WGS SV151.pdf
Run Field Data Sheets (raw data sheets for field sampling)	L5 Method 2.pdf
Run Field Data Sheets (raw data sheets for field sampling)	L5 WGS 26A FDS.pdf
Run Field Data Sheets (raw data sheets for field sampling)	L5 WGS Metal FDS.pdf
Run Field Data Sheets (raw data sheets for field sampling)	L7 Method 2.pdf
Run Field Data Sheets (raw data sheets for field sampling)	L7 WGS 26A FDS.pdf
Run Field Data Sheets (raw data sheets for field sampling)	L7 WGS Metal FDS.pdf
Run Field Data Sheets (raw data sheets for field sampling)	Line 5 Analyzer cals.pdf
Run Field Data Sheets (raw data sheets for field sampling)	Line 7 Analyzer cals.pdf
Moisture Recovery	Line 5 26A recovery sheet.pdf
Moisture Recovery	Line 5 Metals recovery sheet.pdf
Moisture Recovery	Line 7 26A recovery sheet.pdf
Moisture Recovery	Line 7 Metals recovery sheet.pdf
Lab Data (raw data sheets for field and laboratory analysis)	_email2_38652 Barr Engineering M5-29 Rev. 06.23.22.pdf
Lab Data (raw data sheets for field and laboratory analysis)	0522-193.pdf
Chain-of-Custody	M26A COC.pdf
Chain-of-Custody	M29 COC.pdf
Laboratory Accreditation Certification	Element One - LA_NELAP_Certificate_Parameter_List_E 2.pdf
Laboratory Accreditation Certification	Element One - NJ_NELAP_Certificate_u0026_Paramet _30_22__2_.pdf
Laboratory Accreditation Certification	Enthalpy - Durham_Louisiana-DEQ-NELA 063022.pdf
Laboratory Accreditation Certification	Enthalpy - Durham_New-Jersey-DEP-NE 063022-1.pdf
Laboratory Accreditation Certification	Element One - SOP-201 Method 29 and C 1.9.pdf
Laboratory Accreditation Certification	Enthalpy - SOP-312_R15 EPA Methods 2



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Process and APCD Monitor Calibrations	Minntac EPA Process Data .pdf
Calibration Gas Certificates (Item 16)	CO 23.1 EB0097780.20190404.PDF
Calibration Gas Certificates (Item 16)	EB0098395.20200716.pdf
Calibration Gas Certificates (Item 16)	EB0098604.20181015.PDF
Calibration Gas Certificates (Item 16)	EB0099389.20200203.pdf
Stratification Test	Line 5 strat.pdf
Stratification Test	Line 7 strat.pdf
Example calculations for reported results	L5 26A Calcs.pdf
Example calculations for reported results	L5 26A Iso Calcs.pdf
Example calculations for reported results	L5 26A Lab Summary.pdf
Example calculations for reported results	L5 29 calcs.pdf
Example calculations for reported results	L5 29 Lab Summary.pdf
Example calculations for reported results	L5 PM calcs.pdf
Example calculations for reported results	L5 PM Lab Summ.pdf
Example calculations for reported results	L7 26A Calcs.pdf
Example calculations for reported results	L7 26A Iso Calcs.pdf
Example calculations for reported results	L7 26A Lab Summary.pdf
Example calculations for reported results	L7 29 calcs.pdf
Example calculations for reported results	L7 29 Lab Summary.pdf
Example calculations for reported results	L7 PM calcs.pdf
Example calculations for reported results	L7 PM Lab Summary.pdf
Example calculations for reported results	Line 5 Analyzer calcs.pdf
Example calculations for reported results	Line 7 Analyzer calcs.pdf

### Completeness Questions:

Completeness Quality Assessment Questions		
As described in ASTM D7036-12 Standard Practice for Competence of Air Emission Testing Bodies, does the testing firm meet the criteria as an AETB or is the person in charge of the field team a QI for the type of testing conducted? A certificate from an independent organization (e.g., Stack Testing Accreditation council (STAC), California Air Resources Board (CARB), National Environmental Laboratory Accreditation Program (NELAP)	No	Not required for non-Part 75 testi



### Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

or self declaration provides documentation of competence as an AETB.		
Is a description and drawing of test location provided?	Yes	
Has a description of deviations from published test methods been provided, or is there a statement that deviations were not required to obtain data representative of typical facility operation?	Yes	
Is a full description of the process and the unit being tested (including installed controls) provided?	Yes	
Has a detailed discussion of source operating conditions, air pollution control device operations and the representativeness of measurements made during the test been provided?	Yes	
Were the operating parameters for the tested process unit and associated controls described and reported?	Yes	
Is there an assessment of the validity, representativeness, achievement of DQO's and usability of the data?	Yes	
Have field notes addressing issues that may influence data quality been provided?	No	No field notes provided
Have the following been included in the report: Dry Gas Meter (DGM) calibrations, pitot tube and nozzle inspections?	Yes	
Was the Method 1 sample point evaluation included in the report?	Yes	
Were the cyclonic flow checks included in the report?	Yes	
Were the raw sampling data and test sheets included in the report?	Yes	
Did the report include a description and flow diagram of the recovery procedures?	Yes	
Was the laboratory certified/accredited to perform these analyses?	Yes	
Did the report include a complete laboratory report and flow diagram of sample analysis?	Yes	
Were the chain-of-custody forms included in the report?	Yes	
Did the report include a complete description of the instrumental method sampling system?	Yes	
Did the report include calibration gas certifications?	Yes	
Did the report include interference tests?	No	Interference tests performed by manufacturers



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Were the response time tests included in the report?	No	
Were the calibration error tests included in the report?	Yes	
Did the report include drift tests?	Yes	
Did the report include system bias tests?	Yes	
Were the converter efficiency tests included in the report?	No	Converter efficiencies not required testing
Did the report include stratification checks?	No	See stratification test attachments
Did the report include the raw data for the instrumental method?	Yes	

### Regulatory Review Questions:

Regulatory Review Quality Assessment Questions		
As described in ASTM D7036-12 Standard Practice for Competence of Air Emission Testing Bodies, does the testing firm meet the criteria as an AETB or is the person in charge of the field team a QI for the type of testing conducted? A certificate from an independent organization (e.g., STAC, CARB, NELAP) or self declaration provides documentation of competence as an AETB.		
Was a representative of the regulatory agency on site during the test?		
Is a description and drawing of test location provided?		
Is there documentation that the source or the test company sought and obtained approval for deviations from the published test method prior to conducting the test or that the tester's assertion that deviations were not required to obtain data representative of operations that are typical for the facility?		
Were all test method deviations acceptable?		
Is a full description of the process and the unit being tested (including installed controls) provided?		
Has a detailed discussion of source operating conditions, air pollution control device operations and the representativeness of measurements made during the test been provided?		
Is there documentation that the required process monitors have been calibrated and that the calibration is acceptable?		
Was the process capacity documented?		
Was the process operating within an appropriate range for the test program objective?		
Were process data concurrent with testing?		



## Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results

Were data included in the report for all parameters for which limits will be set?		
Did the report discuss the representativeness of the facility operations, control device operation, and the measurements of the target pollutants, and were any changes from published test methods or process and control device monitoring protocols identified?		
Were all sampling issues handled such that data quality was not adversely affected?		
Was the DGM pre-test calibration within the criteria specified by the test method?		
Was the DGM post-test calibration within the criteria specified by the test method?		
Were thermocouple calibrations within method criteria?		
Was the pitot tube inspection acceptable?		
Were nozzle inspections acceptable?		
Were flow meter calibrations acceptable?		
Were the appropriate number and location of sampling points used?		
Did the cyclonic flow evaluation show the presence of an acceptable average gas flow angle?		
Were all data required by the method recorded?		
Were required leak checks performed and did the checks meet method requirements?		
Was the required minimum sample volume collected?		
Did probe, filter, and impinger exit temperatures meet method criteria (as applicable)?		
Did isokinetic sampling rates meet method criteria?		
Was the sampling time at each point greater than 2 minutes and the same for each point?		
Was the recovery process consistent with the method?		
Were all required blanks collected in the field?		
Where performed, were blank corrections handled per method requirements?		
Were sample volumes clearly marked on the jar or measured and recorded?		
Was the laboratory certified/accredited to perform these analyses?		
Did the laboratory note the sample volume upon receipt?		



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If sample loss occurred, was the compensation method used, documented, and approved for the method?		
Were the physical characteristics of the samples (e.g., color, volume, integrity, pH, temperature) recorded and consistent with the method?		
Were sample hold times within method requirements?		
Does the laboratory report document the analytical procedures and techniques?		
Were all laboratory QA requirements documented?		
Were analytical standards required by the method documented?		
Were required laboratory duplicates within acceptable limits?		
Were required spike recoveries within method requirements?		
Were method-specific analytical blanks analyzed?		
If problems occurred during analysis, is there sufficient documentation to conclude that the problems did not adversely affect the sample results?		
Was the analytical detection limit specified in the test report?		
Is the reported detection limit adequate for the purposes of the test program?		
Do the chain-of-custody forms indicate acceptable management of collected samples between collection and analysis?		
Was a complete description of the sampling system provided?		
Were calibration standards used prior to the end of the expiration date?		
Did calibration standards meet method criteria?		
Did interference checks meet method requirements?		
Was a response time test performed?		
Did calibration error tests meet method requirements?		
Were drift tests performed after each run and did they meet method requirements?		
Did system bias checks meet method requirements?		
Was the NOX converter test acceptable?		
Was a stratification assessment performed?		
Was the duration of each sample run within method criteria?		



**Minntac 114 Request Line 5 and Line 7 Waste Gas Test Results**

Was the appropriate traverse performed during sample collection, or was the probe placed at an appropriate center point (if allowed by the method)?		
Were sample times at each point uniform and did they meet method requirements?		
Were sample lines heated sufficiently to prevent potential adverse data quality issues?		
Was all data required by the method recorded?		

**Tester's DQ Assement:**

Comment
Testing was valid in all respects



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