Notification of Compliance Status Report[a]

National Emission Standards for Hazardous Air Pollutants:

Stationary Reciprocating Internal Combustion Engines

40 CFR part 63, subpart ZZZZ

SECTION I : GENERAL INFORMATION

A. If you have been issued a Title V permit, do not complete this form. Submit your NOCS in accordance with your Title V permit. [§63.9(h)(3)]

B. If you have not been issued a Title V permit, complete the remaining portions of this section and also complete Sections II-IX. [§63.9(h)(2)(i)]

C. Print or type the following information for each facility for which you are making notification of compliance status:

Permit Number (OPTIONAL)	Facility I.D. Number (OPTIONAL)
MI PTI 264-05	SRN N7538

Responsible Official's Name/Title
Joey Holmes, District Superintendant

Street Address
226 E. Sixteenth Street

City	State	ZIP Code
Traverse City	MI	49686

Facility Name (if different from Responsible Official's Name)
Wild West Booster

Facility Street Address (If different than Responsible Official's Street Address)
SE1/4, NE1/4, SE1/4, Sec. 16, T30N, R4W

Facility Local Contact Name	Title	Phone (OPTIONAL)
Joey Holmes	District Superintendant	231.922.7302

City	State	ZIP Code
Traverse City	MI	49686

D. Indicate the relevant standard or other requirement that is the basis for this notification and the source's compliance date: (§63.9(b)(2)(iii))

Basis for this notification (relevant standard or other requirement)	Compliance Date (mm/dd/yyyy)
40 CFR 63.6645 ZZZZ Notification of Compliance Status	12/12/2013

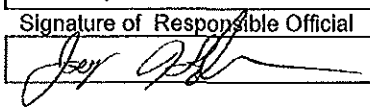
[a] This Notification of Compliance Status is being made in accordance with 40 CFR §63.9(h).

SECTION II : CERTIFICATION (Note: you may edit this text as appropriate)

Based upon information and belief formed after a reasonable inquiry, I, as a responsible official of the above-mentioned facility, certify the information contained in this report is accurate and true to the best of my knowledge. The above-mentioned facility, Wild West Booster, has complied with the relevant standard or and other applicable requirements referenced in the relevant standard. [§63.9(h)(2)(i)(G)]

Name of Responsible Official (Print or Type)	Title	Date (mm/dd/yyyy)
Mr. Joey Holmes	District Superintendant	12/04/2013

Signature of Responsible Official



Note: Responsible official is defined under §63.2 as one of the following: a president, vice-president, secretary, or treasurer of the company that owns the plant; the owner of the plant; the plant engineer or supervisor; a government official if the plant is owned by the Federal, State, city, or county government; or a ranking military officer if the plant is located on a military installation.

SECTION III: METHODS

Describe the methods you used to determine compliance. [§63.9(h)(2)(i)(A)]

This facility installed non-selective catalytic reduction (NSCR) to reduce formaldehyde emissions from their stationary existing 4SRB engine in order to comply with the emission standards in Table 2d of 40 CFR part 63, subpart ZZZZ. An acceptable performance test was conducted on 10/10/2013 in accordance with the requirements in Table 4 of 40 CFR part 63, subpart ZZZZ as described in the attached report. This facility installed and operated a high temperature shut down mechanism to maintain the catalyst inlet temperature below 1250 deg F and has shown the CO concentration is less than 270 ppmvd at 15% O_2 according to 40 CFR 63.6625 requirements in Table 5. This facility follows the startup requirements in 63.6625 (h).

SECTION IV: RESULTS

Describe the results of any performance tests, opacity or visible emission observations, continuous monitoring system (CMS) performance evaluations, and/or other monitoring procedures or methods that were conducted. [§63.9(h)(2)(i)(B)] Facility can attach test reports and output results from a CEMS and/or CPMS to this notification.

Existing stationary SI 4SRB engine above 500 HP located at an area source.						
			Results			
Source ID	Source Location	Test Date	CO Concentration (Formaldehyde surrogate)	Catalyst Inlet Temperature	Catalyst Pressure Drop	Startup Time
EUENGINE	Facility Bldg	10/10/2013	110 ppmvd at 15% O_2	1,108°F	1.9 in. w.c.	Running

SECTION V: CONTINUOUS COMPLIANCE

Describe the methods you will use to determine continuous compliance, including a description of monitoring and reporting requirements and test methods. [§63.9(h)(2)(i)(C)]

Existing stationary SI 4SRB engines above 500 HP located at an area source.

This facility will determine continuous compliance with applicable requirements by continuing to use monitoring methods as identified in Section III and Section IV of this notification. In addition, the facility plans to do the following: (1) continuously monitoring the catalyst inlet temperature to ensure it remains greater than or equal to 750°F and less than or equal to 1,250°F; (2) conduct performance test on each engine every 8,760 hours of operation or 3 years, whichever comes first, to measure formaldehyde emissions to determine that formaldehyde is reduced by maintaining the CO concentration below 270 ppmvd at 15% O_2 ; (3) record the necessary information as specified in §63.6655, and (5) submit the necessary notifications and reports, according to the requirements in §63.6645 and §63.6650.

SECTION VI : EMISSIONS

Describe the type and quantity of hazardous air pollutants (HAP) emitted by the source (or surrogate pollutants if specified in the relevant standard), reported in units and averaging times and in accordance with the test methods specified in the relevant standard. [§63.9(h)(2)(i)(D)]

The following hazardous air pollutants (HAP) were emitted by affected sources at this facility during the period 10/10/2013 – 10/10/2013.

Source ID	Source Location	Source Description	Surrogate Emitted	Surrogate (CO) Emitted (tons/day)
EUENGINE	Facility Bldg	Waukesha 4SRB 512 HP non-emergency engine	CO (for Formaldehyde)	0.027

SECTION VII: FACILITY DESIGNATION

If the relevant standard applies to both major and area sources, present an analysis demonstrating whether the affected source is a major source, using the emissions data generated for this notification. [§63.9(h)(2)(i)(E)]

This facility consists of one 512 HP rich burn engine with catalyst. The 512 HP engine/catalyst unit emits 2.25 lb/hr of controlled CO emissions and operates continuously (8,760 hours per year). Consequently, yearly HCHO (Formaldehyde) emissions (per . manufacturer emission specification) are 0.05 g/bHP-hr x 8,760 hrs/yr x 405 HP x ton/2,000 lb x (2.2 lbs/1,000 g) = 0.20 tons/yr and well below the threshold to be classified as a major source, therefore this facility is an area source. We do not expect this source to emit HAP in quantities greater than the major source threshold.

SECTION VIII: CONTROLS

Describe the air pollution control equipment or method for each emission point, including each control device (or method) for each hazardous air pollutant and the control efficiency (percent) for each control device or method. [§63.9(h)(2)(i)(F)]

The following pollution control equipment is used at this facility. Additionally, this facility uses an AFRC and a catalyst high-temperature shut-in sensor set to 1,250 deg F.

Source ID	Source Location	Equipment Type	Control Device	Control Efficiency	HAP Controlled
Engine A	Building 1	Miratech IQ-16, 3-way (NSCR) Catalyst	NSCR/AFR	Reduces formaldehyde by 76% or more	Formaldehyde

SECTION IX: CONSTRUCTION/RECONSTRUCTION

A. Did you submit an application for construction or reconstruction under §63.5(d) that contained preliminary or estimated data? [§63.9(h)(5)]

Yes ☐ **No** ☐

Not applicable ■ (did not submit an application for construction or reconstruction).

B. If you answered yes, provide actual emission data or other corrected information below.

Notification of Compliance Status reports must be postmarked before the close of business on the 60th calendar day following the completion of the relevant compliance demonstration specified in the standard, unless a different reporting period is specified. In the second case, the letter shall be postmarked before the close of business on the day the report of the testing or monitoring results is required to be delivered or postmarked. Notifications may be combined as long as the due date requirements are met for each notification. [40 CFR §63.9(h)(2)(ii)].

END OF FORM. ***A Responsible Official must sign this form*** **– See Section II.**

Derenzo and Associates, Inc.
Environmental Consultants

EMISSION TEST REPORT

Title	Natural Gas Fired Reciprocating Engine CO Emissions for the RICE NESHAP
Report Date	October 24, 2013
Test Date(s)	October 10, 2013

Facility Information	
Name	LINN Operating, Inc. – Wild West Booster
Street Address	SE 1/4, NE 1/4, SEC16, T30N, R4W
City, County	Hayes Township, Otsego

Facility Permit Information			
State Registration No:	N7538	Permit to Install No. :	264-05

Testing Contractor	
Company	Derenzo and Associates, Inc.
Mailing Address	39395 Schoolcraft Road Livonia, MI 48150
Phone	(734) 464-3880
Project No.	1307005

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

EMISSION TEST REPORT

NATURAL GAS FIRED RECIPROCATING ENGINE
CO EMISSIONS FOR THE
RICE NESHAP

1.0 INTRODUCTION

LINN Operating, Inc. (LINN Operating) owns and operates one (1) Waukesha Model 3521 four-stroke rich burn (4SRB) spark ignition (SI) reciprocating internal combustion engine (RICE) at its Wild West Booster facility located in Hayes Township, Otsego County, Michigan. The SI RICE is subject to the emission standards and testing requirements in Title 40 of the Code of Federal Regulations (40 CFR) Part 63 Subpart ZZZZ *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines* (40 CFR Part 63 Subpart ZZZZ) as an existing 4SRB SI RICE with a power output greater than 500 horsepower (hp), located at an area source of hazardous air pollutant (HAP) emissions.

Pursuant to 40 CFR Part 63 Subpart ZZZZ, an owner/operator of an existing 4SRB SI RICE with a power output greater than 500 hp at an area source of HAP emissions (and is not classified as a remote source) must:

- Install a non-selective catalytic reduction (NSCR) system.
- Reduce carbon monoxide (CO) emissions by 75% or more, or reduce CO to an outlet concentration of 270 ppmvd at 15% oxygen, or reduce total hydrocarbon (THC) emissions by 30% or more.
- Perform initial compliance testing no later than 180 days after October 19, 2013.

1.1 Purpose and Objectives of Testing

Derenzo and Associates, Inc. (Derenzo and Associates) was contracted to perform the SI RICE CO emissions testing specified in 40 CFR Part 63 Subpart ZZZZ. The CO compliance emission measurements consisted of three (3), one-hour test runs during which the catalyst exhaust gas was measured for O_2 and CO concentrations using instrumental analyzers.

The compliance testing was performed by Derenzo and Associates representatives Tyler Wilson and Jason Logan on October 10, 2013. The exhaust gas sampling and analysis was performed using procedures specified in the test protocol dated August 9, 2013 and clarifications provided in the approval letter issued by the U.S. Environmental Protection Agency (USEPA) Region 5 Office.

Appendix A provides a copy of the USEPA test plan approval letter.

1.2 Project Contacts and Report Certification

Questions regarding this emission test report should be directed to:

Mr. Tyler J. Wilson
Environmental Consultant
Derenzo and Associates, Inc.
39395 Schoolcraft Rd.
Livonia, MI 48150
(734) 464-3880

Mr. Jeffrey V. Simsa, C.P.G., P.G., C.P.
Senior Project Manager
Gosling Czubak Engineering Services, Inc.
1280 Business Park Drive
Traverse City, Michigan 49686
(231) 933-5133

This test report was prepared by Derenzo, Associates based on the emission measurements and field sampling data collected by Derenzo and Associates. Facility process and operating data were collected and provided by representatives of LINN Operating and Gosling Czubak Engineering Services, Inc. (GCES).

The information presented in this report follows the Michigan Department of Environmental Quality (MDEQ) Air Quality Division (AQD) *Format for Submittal of Source Emission Test Plans and Reports, February 2008.*

A Notification of Compliance Status (NOCS) report, certified by the emission source owner/operator accompanies this test report.

Report Prepared By:

Tyler J. Wilson
Environmental Consultant

Reviewed By:

For: Robert L. Harvey, P.E.
Vice President, Engineering Services

2.0 SUMMARY OF TEST RESULTS

The exhaust gas from the natural gas-fueled 4SRB SI RICE is routed to an NSCR system for the control of CO and hydrocarbons in the exhaust gas. The exhaust gas downstream of the NSCR was sampled for three (3) one-hour test periods during the compliance testing performed October 10, 2013. Instrumental analyzers were used to measure concentrations of CO and O_2 in the catalyst exhaust gas. Table 1 below presents a summary of the compliance test results.

The testing was performed while the 4SRB SI RICE was operated at full operating load. Table 2 below presents a summary of the emission unit operating conditions during the test periods.

The test results verify compliance with the 40 CFR Part 63 Subpart ZZZZ emission standard of 270 ppmvd at 15% O_2 for an existing 4SRB SI RICE >500 hp located at an area source of HAP emissions.

Table 1. Summary of compliance test results, catalyst outlet

Emission Unit ID	CO Concentration (ppmvd)	Oxygen Content (% vol)	CO Concentration (ppmvd @15% O_2)
EUENGINE1	390	0.0	110
Emission Standard	--	--	270

Table 2. Summary of emission unit operating conditions

Emission Unit ID	Operating Hours†	Engine Horsepower	Catalyst Inlet (°F)
EUENGINE1	65,312	405	1,108

† Engine run hour meter reading at the beginning of Test 1.

3.0 SOURCE DESCRIPTION

3.1 Emission Unit Location and Description

The LINN Operating Wild West Booster facility is located in the SE ¼ of the NE ¼ of Section 16 in Hayes Township, Otsego County, Michigan.

LINN Operating uses natural gas as fuel to power one (1) Waukesha Model 3521 rich-burn engine that is connected to a compressor that is used to compress natural gas for pipeline transmission. The engine is classified as an existing 4SRB SI RICE with a power output greater than 500 hp, located at an area source of HAP emissions. LINN Operating provided the following identification information for the tested engine:

- Model No. F3521G
- Serial No. N/A
- Date of manufacture: Pre 2005

3.2 Rated Capacities, Type and Quantity of Raw Materials Used

The Waukesha Model 3521 4SRB SI RICE is fueled exclusively with natural gas. The engine has a maximum rated output of 512 hp.

The emissions testing was performed while the 4SRB SI RICE operated at 'full operating load', which is the maximum achievable operating rate for the engine/compressor considering the restrictions associated with the connected gas transmission service (i.e., allowable gas flow and pressures). Engine output or percent load percent was determined by GCES personnel using the Waukesha Engine BHP/IMP Prediction software. The average calculated output for the engine during the test periods was 405 hp. However, since the engine is rated for greater than 500 hp, the engine is categorized as >500 hp relative to the 40 CFR Part 63 Subpart ZZZZ emission standards.

Appendix B provides gas engine and compressor operating records provided by LINN Operating and GCES.

3.3 Emission Control System Description

Exhaust gases from the 4SRB SI RICE are directed through a non-selective catalytic reduction (NSCR) emission control system, which reduces CO and other hydrocarbon emissions prior to their release to ambient air. The catalyst is designed to reduce CO emissions by greater than 75%.

CO and other hydrocarbons in the SI RICE exhaust gas stream are oxidized by the catalyst using excess oxygen that is present in the SI RICE exhaust gas stream. The SI RICE exhaust gas

provides the heat necessary to initiate the catalytic reaction (an additional heat source is not used to preheat the NSCR inlet gas).

The temperature at the catalyst inlet is monitored continuously to verify that SI RICE exhaust gas temperature / catalyst inlet temperature is within the proper range for the catalytic reaction. Table 6 of 40 CFR Part 63 Subpart ZZZZ specifies that the catalyst inlet temperature must be maintained between 750 and 1250°F for a 4SRB SI RICE.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

This section provides a summary of the exhaust gas sampling and analytical procedures that were used during the test event.

4.1 Testing Location and Sampling System

A continuous sample of the RICE exhaust gas was obtained from the sampling ports installed just downstream of the emission control catalyst. During each one-hour pollutant sampling period, a continuous sample of the RICE exhaust gas stream was extracted from the stack using a stainless steel probe connected to a Teflon® heated sample line. The sampled gas was conditioned by removing moisture prior to being introduced to the instrumental analyzers.

Appendix C provides a diagram of the sampling location.

4.2 Exhaust Gas Oxygen and CO Concentration (USEPA Methods 3A and 10)

The O_2 content and CO concentration in the RICE NSCR exhaust gas stream was measured continuously throughout each one-hour test period in accordance with USEPA Methods 3A and 10. A Servomex Model 4100 oxygen analyzer with a paramagnetic sensor was used to measure the O_2 content; CO concentration was measured using a Thermo Environmental Instruments Inc. (TEI) Model 48c non-dispersive infrared (NDIR) analyzer. Sampling times were recorded on field data sheets.

Instrument response for each analyzer was recorded using an ESC Model 8816 data logging system that monitored the analog output of the instrumental analyzers continuously and logged data as one-minute averages. Prior to, and at the conclusion of each test, instrument calibration was verified using appropriate calibration gases to determine accuracy and system bias (described in Section 4.3 of this document).

Appendix D provides field data sheets and calculations.

Appendix E provides raw (one-minute average) instrumental analyzer response data for each test period.

4.3 Quality Assurance Procedures

4.3.1 Instrument Calibration and System Bias Checks

At the beginning of the test day, initial three-point instrument calibrations were performed by injecting calibration gas directly into the inlet sample port for each instrument. System bias checks were performed prior to and at the conclusion of each sampling period by introducing the appropriate upscale calibration gas and zero gas into the sampling system (at the base of the stainless steel sampling probe prior to the particulate filter and Teflon® heated sample line) and verifying the instrument response against the initial instrument calibration readings.

The instrument analyzers were calibrated with USEPA Protocol 1 certified O_2 and CO concentrations in nitrogen and zeroed using nitrogen. A STEC ten-step gas divider was used (as needed) to obtain intermediate calibration gas concentrations.

4.3.2 Gas Divider Certification (USEPA Method 205)

The STEC 10-step gas divider was used in the field to obtain appropriate calibration span gases. The 10-step gas divider was NIST-certified on January 11, 2013 with a primary flow standard in accordance with Method 205. When cut with an appropriate zero gas, the ten-step gas divider delivers calibration gas values at 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, and 100% of the USEPA Protocol 1 calibration gas that is introduced into the system. The field evaluation procedures presented in Section 3.2 of Method 205 were followed prior to use of the 10-step gas divider. The field evaluation yielded no errors greater than 2% of the triplicate measured average and no errors greater than 2% from the expected values.

4.3.3 Instrumental Analyzer Interference Check

The instrumental analyzers used to measure CO and O_2 concentrations have had an interference response test performed prior to their use in the field (July 21, 2011 and April 3, 2012, respectively), pursuant to the interference response test procedures specified in USEPA Method 7E. The appropriate interference test gases (i.e., gases that would be encountered in the exhaust gas stream) were introduced into each analyzer, separately and as a mixture with the analyte that each analyzer is designed to measure. All of analyzers exhibited a composite deviation of less than 3.0% of the span for all measured interferent gases. No major analytical components of the analyzers have been replaced since performing the original interference tests.

Appendix F presents test equipment quality assurance data (instrument calibration and system bias check records, calibration gas and gas divider certifications, interference test results).

5.0 DISCUSSION OF TEST RESULTS

5.1 Results Summary and Comparison to Emission Standard

Emission testing was performed for the natural-gas fueled Waukesha Model 3521 engine to measure exhaust gas O_2 content and CO concentration downstream of the installed NSCR oxidation catalyst. Pursuant to 40 CFR Part 63 Subpart ZZZZ, an owner/operator of an existing 4SRB SI RICE with a rated power output greater than 500 hp at an area source of HAP emissions (and is not classified as a remote source) must install an oxidation catalyst emission control system and reduce CO emissions by 75% or more, or reduce CO to an outlet concentration of no more than 270 ppmvd at 15% oxygen.

The emission test results are presented in Table 3. The measured exhaust gas CO concentration at the outlet of the NSCR oxidation catalyst (one-hour average) ranged between 104 and 116 ppmvd at 15% oxygen, which is less than the emission standard specified for a 4SRB SI RICE (i.e., less than 270 ppmvd at 15% oxygen).

5.2 Operating Conditions During the Compliance Test

The emissions testing was performed while the 4SRB SI RICE operated at 'full operating load', which is the maximum achievable operating rate for the engine/compressor considering the restrictions associated with the connected gas transmission service (i.e., allowable gas flow and pressures). Engine output ranged between 402 and 409 hp (approximately 79% of rated engine capacity) as determined by GCES personnel using the Waukesha Engine BHP/IMP Prediction software. Operating data are provided in Appendix B.

The catalyst inlet temperature was recorded at 15 minute intervals. The one-hour average catalyst inlet temperature for each of the three tests ranged between 1,107 and 1,110°F. Table 6 of 40 CFR Part 63 Subpart ZZZZ specifies that the catalyst inlet temperature must be maintained between 750 and 1250°F for a 4SRB SI RICE.

The engine operating hours (run hour meter) recorded at the beginning of Test No. 1 was 65,312 hours. According to 40 CFR Part 63 Subpart ZZZZ the testing must be repeated every 8,760 operating hours or no less frequent than every three years. Therefore, testing must be repeated prior to exceeding 74,072 engine run hours.

5.3 Variations from Normal Sampling Procedures or Operating Conditions

The testing was performed according to the procedures specified in the test protocol dated August 9, 2013 and clarifications provided in the approval letter issued by the USEPA Region 5 Office, with the following minor exceptions:

- Pre-catalyst CO and O_2 measurements were not performed as specified in the USEPA test plan approval letter. The source demonstrated compliance with the RICE NESHAP emission standard based on the measured CO concentration at the catalyst outlet, not reduction efficiency (catalyst inlet/outlet comparison). This was clarified with the USEPA prior to performing the tests.

A copy of the USEPA test plan approval letter is provided in Appendix A.

Table 3. Measured exhaust gas carbon monoxide and oxygen concentrations for the LINN Operating Waukesha Model 3521 natural gas-fueled internal combustion engine

Test Number	1	2	3	Three
Test Date	10/10/13	10/10/13	10/10/13	Test
Test Period (24-hr)	1030-1130	1145-1245	1300-1400	Average
Engine Operating Parameters				
Engine horsepower (hp)	409	404	402	405
Engine load at RPM (%)	80	79	79	79
Catalyst Data				
Inlet temperature (°F)	1,110	1,107	1,108	1,108
Exhaust Gas Measurements[1]				
Oxygen content (%vol)	0.0	0.0	0.0	0.0
CO concentration (ppmvd)	392	367	410	390
CO concentration (ppmvd 15% O_2)[2]	111	104	116	110

Notes
1. Measured at the catalyst outlet.
2. 40 CFR Part 63 Subpart ZZZZ emission standard is 270 ppmvd at 15% O_2.