DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
Permit Application Analysis

AP-9199

NAME OF FIRM:	Ultra Resources, Inc.
NAME OF FACILITY:	Drill Rig Fleet
FACILITY LOCATION:	Sublette County, Wyoming
TYPE OF OPERATION:	Drill Rig Fleet
RESPONSIBLE OFFICIAL:	Ms. Belinda Salinas Manager, Environmental, Safety & Regulatory Affairs
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ANALYSIS DATE:	September 24, 2009
REVIEWING ENGINEER:	Jamie Sharp, Air Quality Engineer

PURPOSE OF APPLICATION:

On March 19, 2009, the Division received an application from Ultra Resources, Inc. to permit sixteen (16) drill rigs to be located in the Jonah and Pinedale Anticline Development Area (JPDA) in Sublette County, Wyoming. This permit application was submitted to ensure compliance with Wyoming Air Quality Standards and Regulations (WAQSR), establish federally enforceable emission limits which can be used for future modeling analyses, recognize voluntary control of drill rig emissions, and to preserve air quality in the area. Emissions presented in this permit are based on sixteen (16) drill rigs. Additional rigs are authorized by this permitting action as long as the individual drill rigs and the drill rig fleet comply with the applicable conditions of the permit which includes a fleet limit of 516.4 tons per year (tpy) NO_x for 2009, 553.7 tpy NO_x for 2010, 497.0 tpy for 2011, and 213.3 tpy NO_x for 2012.

The drill rig fleet permit will encompass operations in the JPDA only. The JPDA definition has been previously utilized by the Division to define a particular operational area in conjunction with the Oil and Gas Production Facilities Chapter 6, Section 2 Permitting Guidance. The JPDA is defined as follows: 109W & R110W in T34N, R109W & R110W in T33N, R108W, R109W & R110W in T32N, R108W, R109W & R110W in T31N, R107W, R108W & R109W in T30N, R107W, R108W & R109W in T29N, R108W & R109W in T28N, and R107W, R108W & R109W in T27N. A map of the JPDA is located in Appendix A.

ESTIMATED EMISSIONS:

The major pollutants emitted from diesel combustion include nitrogen oxides (NO_x) with some carbon monoxide (CO) from incomplete combustion. Volatile organic compounds (VOCs) including some hazardous air pollutants (HAPs), particulate matter, and sulfur dioxide (SO_2) will also be emitted from the engines and boilers. The drill rig engines will be diesel fired. The boilers will be natural gas or diesel fired. Emission factors for the drill rig engines are based on manufacturer data and 90% control efficiency for the Selective Catalytic Reduction (SCR) system. Boiler emission factors are based on AP-42 Chapter 1.3 data. The boilers are operated in colder months for heat trace purposes. It is estimated that the boilers will operate seven (7) months per year. The boilers may be diesel or natural gas fired. Emissions for the engines and boilers are presented in Appendix B.

Ultra Resources, Inc. has committed to installing Selective Catalytic Reduction (SCR) controls on each of the diesel drill rig engines. SCR is a post-combustion NO_x control technology that can be used on combustion engines. SCR reduces NO_x emissions by injecting urea reagent into the exhaust gas stream upstream of the catalyst. The urea ($NH_2C(O)NH_2$) is atomized upon entry with compressed air. Ammonia (NH_3) and carbon dioxide (CO_2) are generated in the exhaust stream through a series of chemical reactions. The SCR system utilizes the ammonia to react with NO_x to form nitrogen (N_2) and water (H_20). Ultra Resources, Inc. proposed to utilize CleanAIR E-POD™ technology. For the SCR system to operate properly, the exhaust gas must be within a temperature range of 518 to 1002 °F. Upon reaching the proper temperature range, the control system initiates the flow of reagent. Some residual amounts of NO_x and ammonia remain in the final exhaust stream. The CleanAIR E-POD™ technology operates in either a closed-loop or an open-loop scenario. While the application is based on the use of CleanAIR E-POD™ technology, Ultra Resources, Inc. may utilize other SCR systems in order to fulfill the requirements of this permit analysis.

For the closed-loop scenario, NO_x is continuously monitored at the inlet and outlet of the system. The control system adjusts the urea injection rate to achieve the desired NO_x control efficiency. For the open-loop scenario, a NO_x reduction performance curve is prepared for each engine upon startup to determine the proper amount of reagent based on engine load to maximize control efficiency of NO_x and to minimize ammonia slip. The NO_x reduction performance curve is utilized to determine the minimum amount of urea necessary to achieve a given NO_x control efficiency for multiple load conditions. This information is input into the SCR control system to provide set points for the flow control loop.

Ultra Resources, Inc. has committed to installing an oxidation catalyst with a minimum control efficiency of 90% in conjunction with the SCR system for the control of VOC and CO emissions. Ultra Resources, Inc. has requested offset credits for VOC emissions. Therefore, the Division will require initial testing for VOC emissions and periodic testing for CO as a surrogate for drill rigs equipped with SCR to demonstrate the effectiveness of the oxidation catalyst.

CHAPTER 6, SECTION 2(c)(i):

In accordance with Chapter 6, Section 2(c)(i) of the Wyoming Air Quality Standards and Regulations (WAQSR), applicants for permits are required to demonstrate to the Administrator of the Air Quality Division (AQD) that "[t]he proposed facility will comply with all rules and regulations of the Wyoming Department of Environmental Quality, Division of Air Quality, and with the intent of the Wyoming Environmental Quality Act." Under Chapter 6, Section 2(l) approval to construct or modify shall not relieve any owner or operator of the responsibility to comply with all local, state, and federal rules and regulations. Proposed condition 19 of this analysis requires Ultra Resources, Inc. to comply with all local, state, and federal rules and regulations applicable to drill rig(s), engine(s), and boiler(s).

The Division is satisfied that the proposed permitting action will comply with all applicable requirements.

CHAPTER 6, SECTION 2(c)(ii):

Under the Wyoming Air Quality Standards and Regulations (WAQSR), applicants for permits are required to demonstrate to the Administrator of the Air Quality Division (AQD), that "[t]he proposed facility will not prevent the attainment or maintenance of any ambient air quality standard." [WAQSR Chapter 6, Section 2(c)(ii)].

Since Ultra Resources, Inc. has taken actions to reduce emissions from the drill rig fleet since the baseline period, the Division will allow Ultra Resources, Inc. to bank emissions to offset future increases in emissions. As part of the drill rig permitting actions, the Division is establishing the baseline emissions. For production sites, the baseline annual emissions are calculated based on the average production rates for January-March, 2008. The Division does not consider this approach to be appropriate for drill rigs. Annualizing drilling emissions based on three months of operation is not a valid representation of annual emissions. Drilling schedules are not standardized and there are many factors that influence drill rig usage, such as wildlife stipulations. To establish the baseline for drill rigs, the Division considered the requirements of 40 CFR Parts 51 and 52. Part 51 is the major source nonattainment rules and Part 52 is the prevention of significant deterioration (PSD) rules (i.e. Chapter 6, Section 4 of the WAQSR). Both regulations suggest that baseline periods should be established based on a twenty-four (24) month timeframe. Therefore, the Division chose calendar years 2006 and 2007 as the twenty-four (24) month baseline period preceding the April 1, 2008 date.

As part of the application, the Division required companies to submit actual emission inventories for 2006 and 2007. Upon receipt, the Division compared the inventories submitted against the inventories submitted as part of the JPDA inventory request. The Division has requested drill rig engine emission inventories from JPDA operators for several years. For some companies, there were discrepancies between the JPDA inventories and the inventories submitted as part of the drill application. For consistency purposes, the Division is using the emissions submitted as part of the JPDA inventories as the baseline emissions. For Ultra Resources, Inc., the average of the 2006-07 JPDA inventory was 987.9 tpy NO_x. VOC emissions were not reported as part of the JPDA emission inventories, therefore, the Division will consider the average of the actual 2006 and 2007 emissions submitted in the application for baseline VOC emissions.

As shown, the proposed drill rig fleet will result in a decrease in actual NO_x emissions of 774.6 tpy and a decrease in actual VOC emissions of 17.6 tpy by 2012, which reflects all the engines being equipped with SCR. Interim limits will be established for years 2009-2011 to reflect Ultra Resources, Inc.'s SCR installation schedule. Annual emissions for NO_x and VOC are the highest during 2010. Therefore, the Division is calculating offsets at this time based on the proposed 2010 emissions. The proposed drill rig fleet will result in a decrease in actual NO_x emissions of -434.2 tpy and an increase in VOC emissions of 5.8 tpy in 2010. Ultra Resources, Inc.'s permitting actions to date including this application have resulted in a decrease in NO_x emissions of 439.2 tpy and a decrease in VOC emissions of 107 tpy based on 2010 emissions. Attached to this analysis in Appendix C is a demonstration spreadsheet for Ultra Resources, Inc. Therefore, Ultra Resources, Inc. has met the offset requirements for NO_x and VOC. The Division is satisfied that the proposed permitting action will not prevent the attainment or maintenance of any ambient air quality standard as required by WAQSR Chapter 6, Section 2(c)(ii). Additional offset credits generated during 2011 and 2012 will be added to Ultra Resources, Inc.'s offset bank in those years.

Table 1: Proposed Fleet Emissions

Year	NO_x	VOC
	tpy	tpy
2009	516.4	29.4
2010	553.7	41.8
2011	497.0	37.9
2012	213.3	18.4

Table 2: Demonstration of Proposed Emission Reduction (2010)

Source	NO_x	VOC
	tpy	tpy
Proposed Drill Rig Fleet Emissions (2010)	553.7	41.8
2006-2007 Baseline Emissions	987.9 [1]	36.0 [2]
Total Offsets	**-434.2**	**5.8**
Offset Factor	1.1	1.5
Offset Required	**--**	**8.7**

[1] Average from JPDA 2006 - 2007 Drill Rig Emission Inventory
[2] As provided by applicant

Table 3: Demonstration of Proposed Emission Reduction (2012)

Source	NO_x	VOC
	tpy	tpy
Proposed Drill Rig Fleet Emissions (2012)	213.3	18.4
2006-2007 Baseline Emissions	987.9 [1]	36.0 [2]
Total Offsets	**-774.6**	**-17.6**
Incremental Offset (2010-2012)	**-340.4**	**-23.4**

[1] Average from JPDA 2006 - 2007 Drill Rig Emission Inventory
[2] As provided by applicant

CHAPTER 6, SECTION 2(c)(iii):

In accordance with Chapter 6, Section 2(c)(iii) of the WAQSR, applicants for permits are required to demonstrate to the Administrator of the AQD, that "[t]he proposed facility will not cause significant deterioration of existing ambient air quality in the Region as defined by any Wyoming standard or regulation that might address significant deterioration." A NO_2 PSD increment evaluation entitled *Southwest Wyoming NO2 PSD Increment Consumption Analysis Modeling Results for Tasks 3 and 4* (ENVIRON International Corporation, 2007) was conducted at the direction of the Division to evaluate NO_2 increment consumption in Sublette County and a portion of Fremont County. The report is available online at:
http://deq.state.wy.us/aqd/downloads/Modeling%20Studies/WDEQ_PSD_REVFINAL_2.pdf.

Modeling results concluded the following:

Table 4: NO_2 Increment Consumption Results

Area	Result $\mu g/m^3$	Maximum Allowable $\mu g/m^3$	Percent of Maximum Allowable
Class I	0.25	2.5	10%
Class II	16	25	64%

As shown, the study determined that increment consumption within the study area did not exceed the PSD increment standards for Class I or Class II areas. Emissions from drill rigs in this increment analysis were based on the 2004 inventory. Total drill rig emissions used in the modeling were 2,978 tpy NO_x. The Division's 2004 JPDA inventory indicates that 256.5 tpy NO_x was reported for drill rig engines by Ultra Resources, Inc. The proposed permitting action will establish enforceable conditions limiting the potential Ultra Resources, Inc. NO_x emissions for drill rig engines and boilers to 213.3 tpy by 2012; a reduction of 43.2 tpy.

The Division is satisfied that the proposed permitting action will not cause significant deterioration of existing ambient air quality.

CHAPTER 6, SECTION 2(c)(iv):

In accordance with Chapter 6, Section 2(c)(iv) of the WAQSR, applicants for permits are required to demonstrate to the Administrator of the AQD, that "[t]he proposed facility will be located in accordance with proper land use planning as determined by the appropriate state or local agency charged with such responsibility." The Division contacted the Sublette County Planning & Zoning regarding drill rig operations. Drill rigs operating on private land for periods exceeding three (3) months in duration are required to obtain a conditional use permit. Land use permits for drill rigs located on private land for periods not to exceed three (3) months or drill rigs located on public land are not required. Proposed condition 17 of this analysis requires Ultra Resources, Inc. to obtain and maintain proper land use planning documentation.

The Division is satisfied that the proposed permitting action will comply with all applicable proper land use planning regulations.

CHAPTER 6, SECTION 2(c)(v):

In accordance with Chapter 6, Section 2(c)(v) of the WAQSR, applicants for permits are required to demonstrate to the Administrator of the AQD, that "[t]he proposed facility will utilize the Best Available Control Technology with consideration of the technical practicability and economic reasonableness of reducing or eliminating the emissions resulting from the facility." Since this is a voluntary application, a formal BACT Analysis was not required.

Further NO_x emissions reductions will be provided as drill rig engines are equipped with Selective Catalytic Reduction (SCR). The SCR will have a minimum NO_x control efficiency of 90%. The engines will also be limited to annual NO_x emissions of 10 tpy per drill rig. The Division considers the installation of SCR with 90% control efficiency and a 10 tpy NO_x emission limit per drill rig to represent BACT for the drill rig engines.

Ultra Resources, Inc. has chosen install an oxidation catalyst on drill rig engines equipped with SCR, which will reduce both CO and VOC emissions with a minimum 90% control efficiency. The Division has determined that an oxidation catalyst is not required for diesel drill rig engines to meet BACT. However, the Division recognizes the proposed reduction in CO and VOC emissions through the use of an oxidation catalyst.

The Division has evaluated ammonia slip in BACT analysis for other sources using SCR to control NO_x and determined an ammonia slip limit of 10 ppm_v at 15% O_2 to represent BACT.

EPA regulations currently limit the sulfur content in the diesel fuel to 500 ppm for non-road engines. The limit will be lowered to 15 ppm in near future. The Division considers compliance with the federal fuel standards as representing BACT for SO_2.

The Division has evaluated the use of soot filters for PM control. A BACT cost analysis was conducted and yielded an annual cost of $39,317 per ton PM removed per engine based on the proposed Ultra Resources, Inc. PM emissions and an 85% control efficiency. The approximate cost for an integrated soot filter is $58,000. The filter requires a full replacement every 10,000 operating hours and requires cleaning every 5,000 operating hours. In the economic analysis, an interest rate of 10% was utilized along with an estimated control system life of two (2) years. The Division has determined this cost to be economically unreasonable and will not require soot filters for PM control at this time. The Division considers a Tier 1 or better engine to represent BACT for PM.

The drill rig boiler(s) are not controlled. Given the size of the boilers and limited operating hours, the Division considers good combustion practices as representing BACT.

CHAPTER 6, SECTION 2(c)(vi):

In accordance with Chapter 6, Section 2(c)(vi) of the WAQSR, applicants for permits are required to demonstrate to the Administrator of the AQD, that "[t]he proposed facility will have provisions for measuring the emissions of significant air contaminants as determined by the Administrator of the Division of Air Quality." The Division considers the initial and periodic testing requirements in the proposed permit conditions to represent provisions for measuring the emissions of significant air contaminants as determined by the Administrator. Proposed conditions 11, 12, and 13 of this analysis require Ultra Resources, Inc. to perform testing to demonstrate compliance.

The Division is satisfied that the proposed conditions ensure the measurement of air emissions from the drill rigs and engines.

CHAPTER 6, SECTION 2(c)(vii):

In accordance with Chapter 6, Section 2(c)(vii) of the WAQSR, applicants for permits are required to demonstrate to the Administrator of the AQD, that "[t]he proposed facility will achieve the performance specified in the application for the permit to construct or modify." Performance based limits that were determined to represent BACT have been set in the proposed conditions. In addition, the proposed conditions require initial and periodic testing to ensure compliance the performance based standards. Proposed conditions 8, 9, 10, 11, 12, and 130. of this analysis require Ultra Resources, Inc. to achieve the performance represented in the application.

The Division is satisfied that the proposed conditions ensure the drill rigs and engines meet the performance specified in the application.

CHAPTER 6, SECTION 2(c)(viii):

In accordance with Chapter 6, Section 2(c)(viii) of the WAQSR, the applicants for permits are required to demonstrate to the Administrator of the AQD, that "[t]he proposed facility will not emit any air pollutant in amounts which will (i) prevent attainment or maintenance by any other state of any such national primary or secondary Ambient Air Quality Standard or (ii) interfere with measures required by the Federal Clean Air Act to be included in the applicable Implementation Plan for any other state to prevent significant deterioration of air quality or to protect visibility." On May 8, 2008, EPA approved the Interstate Transport SIP submitted by the State of Wyoming, stating that the State adequately addressed the required elements of section 110(a)(2)(D)(i) of the Clean Air Act. EPA specifically states that the data and analysis provided by the state shows that the State of Wyoming is unlikely to contribute significantly to ozone nonattainment in downwind states, or any neighboring $PM_{2.5}$ nonattainment area. Since the proposed permitting action results in a greater degree of control of transport pollutants (ozone and $PM_{2.5}$, the Division has concluded that the proposed action will not prevent the attainment or maintenance of the ambient air quality standards for any other state.

The Division is satisfied that the proposed drill rig fleet will not prevent the attainment or maintenance of the ambient air quality standards for any other state.

ENGINE(S) MEETING STATIONARY SOURCE DEFINITION:

The drill rig diesel engines are non-road engines. In the event a diesel drill rig engine meets the definition of a stationary source, certain additional requirements apply, as identified in sections A through D below:

A. CHAPTER 6, SECTION 3 APPPLICABILITY:

None of the criteria pollutants of a single drill rig exceed the threshold levels of 100 tons per year. HAP emissions do not exceed 10 tpy of any individual HAP, or 25 tpy of any combination of HAPs. Therefore, operation of a single drill rig at a location does not represent a "major source" as defined in Chapter 6, Section 3(b)(xvii) of the Wyoming Air Quality Standards and Regulations (WAQSR). If multiple drill rigs are located at a single pad, total emissions from those drill rigs need to be considered for applicability.

B. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (MACT):

EPA's current promulgated NESHAP rules under 40 CFR part 63, subpart ZZZZ apply to major sources of HAP emissions, as well as area sources of HAP emissions. Since the drill rig has the potential to emit less than 10 tpy of any individual HAP, or 25 tpy of any combination of HAPs, the drill rig is considered an area source of HAPs, and engines at this drill rig will be subject to all applicable requirements of 40 CFR part 63, subpart ZZZZ. HAP emissions for multiple drill rigs located at a single pad are required to be combined for this determination. Based on the information presented in the application, the Division is satisfied that multiple rigs located at a single pad will not exceed the major source threshold of 10 tpy of any individual HAP or 25 tpy of any combination of HAPs. Therefore, the drill rigs engines are subject to all applicable requirements of 40 CFR part 63, subpart ZZZZ for area sources only.

C. PREVENTION OF SIGNIFICANT DETERIORATION (PSD):

On a per-rig basis, no air pollutant is emitted at a rate of 250 tpy or more. Therefore the drill rig is not a "major emitting facility" as defined in Chapter 6, Section 4 of the WAQSR, and a PSD analysis is not required. If multiple drill rigs are located at a single pad, total emissions from those drill rigs need to be considered for applicability.

D. NEW SOURCE PERFORMANCE STANDARDS (NSPS):

The diesel fired engines are subject to all applicable requirements of 40 CFR part 60, subpart IIII – *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*.

PROPOSED PERMIT CONDITIONS:

The Division proposes to issue an Air Quality Permit to Ultra Resources, Inc. to establish federally enforceable conditions to reflect the Drill Rig Fleet with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.

2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.

3. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 510 Meadowview Drive, Lander, WY 82520.

4. This permit only applies to the Ultra Resources, Inc. Drill Rig Fleet while operating in the Jonah and Pinedale Anticline Development Area (JPDA). The permit conditions contained herein are only enforceable while operating drill rigs in the JPDA.

    i. The JPDA area consists of 109W & R110W in T34N, R109W & R110W in T33N, R108W, R109W & R110W in T32N, R108W, R109W & R110W in T31N, R107W, R108W & R109W in T30N, R107W, R108W & R109W in T29N, R108W & R109W in T28N, and R107W, R108W & R109W in T27N.

5. That written notification of the actual date of initial start-up for each drill rig/engine/boiler is required fifteen (15) days after start-up as defined in Condition 10. Such notification shall be submitted on a complete AQD-RIG Installation/Removal form. The form can be downloaded from the Air Quality Division website http://deq.state.wy.us/aqd or obtained from the Air Quality Division.

6. That upon removal of a drill rig/engine/boiler from the JPDA, written notification is required within fifteen (15) days of removal. Such notification shall be submitted on a complete AQD-RIG Installation/Removal form.

7. That by January 1, 2012, all drill rig engines shall be equipped with selective catalytic reduction (SCR).

8. Total actual annual NO_x emissions from all drill rig engines and boilers associated with the Ultra Resources, Inc. Drill Rig Fleet shall not exceed 516.4 tons per year (tpy) NO_x for 2009, 553.7 tpy NO_x for 2010, 497.0 tpy for 2011, and 213.3 tpy NO_x for 2012.

i. Total actual annual NO_x emissions from engines on any given drill rig equipped with SCR in the Ultra Resources, Inc. Drill Rig Fleet shall not exceed 10 tpy per drill rig. This requirement shall become effective January 1, 2010.

ii. Drill rig engines shall be equipped with SCR with a minimum NO_x control efficiency of ninety (90) percent.

9. Drill rig engines equipped with SCR shall be limited to 0.6 g/hp-hr CO.

10. Ammonia slip from each SCR air pollution control system shall not exceed 10 ppm_v at 15% O_2 as measured by initial and periodic testing.

11. Ultra Resources, Inc. shall conduct an initial performance test for each drill rig engine no later than ninety (90) days after start-up. Startup shall be defined as follows:

i. For drill rig engines in service at the time of permit issuance, the start-up date shall be the permit issuance date.

ii. For all other drill rig engines, the start-up date shall be the date the drill rig commences drilling at the first well.

12. Initial performance testing as required by Condition 11 of this permit shall be conducted on the drill rig engines as follows:

i. For drill rig engines equipped with SCR:

NO_x Emissions: Compliance testing for NO_x shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer Protocol. Testing shall consist of three (3) runs conducted at the inlet and outlet of the SCR system to determine the NO_x control efficiency. Results shall be reported in terms of percent control efficiency and g/hp-hr. Emissions shall be calculated using the following equation:

$$g/hp-hr\ NO_X = (ppm\,NO_{X_{corrected}})(1.19x10^{-7})(F\_factor)\left(\frac{20.9}{20.9-O_2\%_{corrected}}\right)$$
$$(Brake\ Specific\ Fuel\ Consumption(Btu/hp-hr))(10^{-6})(454)$$

CO Emissions: Testing for CO shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Results shall be submitted in terms of g/hp-hr. Brake Specific Fuel Consumption (BSFC) shall be provided in the report.

$$g/hp-hr\,CO = (ppm CO_{corrected})(7.27x10^{-8})(F\_factor)\left(\frac{20.9}{20.9-O_2\%_{corrected}}\right)$$
$$(Brake\,Specific\,Fuel\,Consumption(Btu/hp-hr))(10^{-6})(454)$$

VOC Emissions: Compliance testing for VOCs shall be conducted in accordance with a Division approved test method for one (1) engine of each engine type in the fleet.

Ammonia Slip: Compliance testing for ammonia slip shall be conducted in accordance with a Division approved test method.

Urea flow (gph and /or liters per hour), engine load (%) and/or boost pressure (psi), and catalyst inlet temperature (°F and/or °C) shall be recorded during each run and submitted with the test report. The report shall also include the commissioning report. Brake specific fuel consumption (BSFC) shall be reported with the results for both the initial performance test and the commissioning report.

ii. For drill rig engines not equipped with SCR:

NO_x Emissions: For diesel engines, testing for NO_x shall consist of three (3) 1-hour tests following EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Emissions shall be calculated using the equation in Condition 10(i) above. Results shall be reported in terms of g/hp-hr.

VOC Emissions: Testing for VOCs shall be conducted in accordance with a Division approved test method for one (1) engine of each engine type in the fleet.

Engine load (%) and brake specific fuel consumption (BSFC) shall be provided in the report.

A test protocol shall be submitted for review and approval prior to testing. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. Results shall be submitted to the Division within forty-five (45) days of completion.

13. Periodic testing is required as follows:

i. For drill rig engines equipped with SCR, each drill rig engine shall be tested quarterly. The first quarterly test is required the following calendar quarter after completion of the initial performance tests required under Condition 11.

1. Testing for NO_x shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Testing shall consist of one (1) ten (10) minute run conducted at the inlet and outlet of the SCR system to determine the NO_x control efficiency. Results shall be submitted in terms of percent control efficiency and g/hp-hr. Brake Specific Fuel Consumption (BSFC) shall be provided in the report. Emissions shall be calculated using the equation listed in Condition 12.

2. Testing for CO shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Results shall be submitted in terms of g/hp-hr. Compliance with the CO limits is considered verification that the VOC emissions for the drill rig engines are controlled. Brake Specific Fuel Consumption (BSFC) shall be provided in the report. Emissions shall be calculated using the equation listed in Condition 12.

3. Testing for ammonia slip shall be conducted using Draeger-Tube detectors or other methods as approved by the Administrator.

4. Urea flow (gph and /or liters per hour), engine load (%) and/or boost pressure (psi), and catalyst inlet temperature (°F and/or °C) shall be recorded during each run and submitted with the test report.

ii. For drill rig engines not equipped with SCR, each drill rig engine shall be tested annually. The first annual test is required the following calendar year after completion of the initial performance tests required under Condition 11.

1. Testing for NO_x shall be conducted in accordance with EPA approved reference methods or the State of Wyoming's Portable Analyzer protocol. Emissions shall be calculated using the equation listed in Condition 12.

2. The engine load (%) and brake specific fuel consumption (BSFC) shall be provided in the report.

iii. For SCR engines and non-SCR engines, a test protocol shall be submitted for review and approval prior to testing. Notification of the test date shall be provided to the Division fifteen (15) days prior to the testing. Results shall be submitted to the Division with the annual emissions inventory required by Condition 15 of this permit.

iv. The Air Quality Division shall be notified within twenty-four (24) hours of the testing/monitoring required by this condition that shows operation outside the permitted emission limits. By no later than seven (7) calendar days of such testing/monitoring event, the owner or operator shall repair and retest/monitor the affected engine to demonstrate that the engine has been returned to operation within the permitted emission limits. Compliance with this permit condition regarding repair and retesting/monitoring shall not be deemed to limit the authority of the Air Quality Division to cite the owner or operator for an exceedance of the permitted emission limits for any testing/monitoring required by this condition which shows noncompliance.

v. In lieu of quarterly testing, Ultra Resources, Inc. may submit for approval an alternative monitoring plan. A minimum of one (1) year of quarterly testing is required before an alternative plan will be considered. If approved, the Division will administratively amend this permit to incorporate the alterative monitoring plan.

14. Ultra Resources, Inc. shall follow the monitoring and maintenance requirements for each of the permitted engines equipped with a SCR system.

    i. Operate and maintain the engine, SCR system, and monitoring equipment according to good air pollution control practices. The SCR system shall be operated at all times the drill rig is operating in the JPDA, except when the engine catalyst inlet temperature is less than 518°F. Records shall be kept to document periods when the SCR system is not operating and the engine is operating. The records shall include date, duration and cause.

    ii. Operate the SCR Emission Control System in accordance with the manufacturer's recommendations which includes visually inspecting the catalysts and cleaning as necessary. Records shall be maintained of catalyst maintenance and replacement. Upon replacement of the catalyst, performance tests as required by Condition 12 shall be conducted.

    iii. Records of urea flow (gph and /or liters per hour), engine load (%) and/or boost pressure (psi), and catalyst inlet temperature (°F and/or °C) shall be recorded, at minimum, daily when the engine is operating. Records of interim spot checks conducted to verify catalyst condition and any maintenance or corrective actions shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.

    iv. On or before January 1, 2010, all drill rigs in use shall be equipped with a datalogger to record urea flow (gph and /or liters per hour), engine load (%) and/or boost pressure (psi), and catalyst inlet temperature (°F and/or °C). Upon startup, new drill rig engines equipped with SCR require a datalogger. Data shall be recorded on an interval of fifteen (15) minutes or less. Records shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.

15. Ultra Resources, Inc. shall report the following for each well drilled.

    i. Drill Rig ID
    ii. Well API number
    iii. Well name
    iv. Well location (longitude, latitude, elevation)
    v. Drilling start and end dates
    vi. Field name
    vii. Equipment description, controls, and site rating
    viii. Brake specific fuel consumption (BSFC)
    ix. Total fuel usage for drill rig engines and boilers recorded on a daily basis
    x. Heat content and sulfur content of fuel burned recorded from supplier certification
    xi. Actual emissions for NO_x, CO, VOC, SO_2, PM_{10}, ammonia, and formaldehyde
        1. For engines, emissions shall be based on fuel consumption, g/hp-hr emission rates, and BSFC. Information recorded in Condition 14 regarding catalyst operation shall be utilized to calculate emissions from the engines.
        2. For boilers, emissions shall be based on fuel consumption, lb/MMBtu emission rates or AP-42 factors converted to lb/MMBtu, and BSFC.

    The format presented in Appendix D shall be utilized to satisfy reporting requirements for the Division's annual emission inventory, which shall be submitted by March 31 of the following calendar year.

16. That drill rigs, boilers or engines that are subject to the conditions of this permit may be replaced without modifying this permit. Ultra Resources, Inc. shall provide notifications as required by Conditions 5 and 6 of this permit. The replacement drill rig(s)/engine(s)/boiler(s) shall comply with the conditions of this permit.

17. Ultra Resources, Inc. shall obtain and maintain proper land use planning documentation.

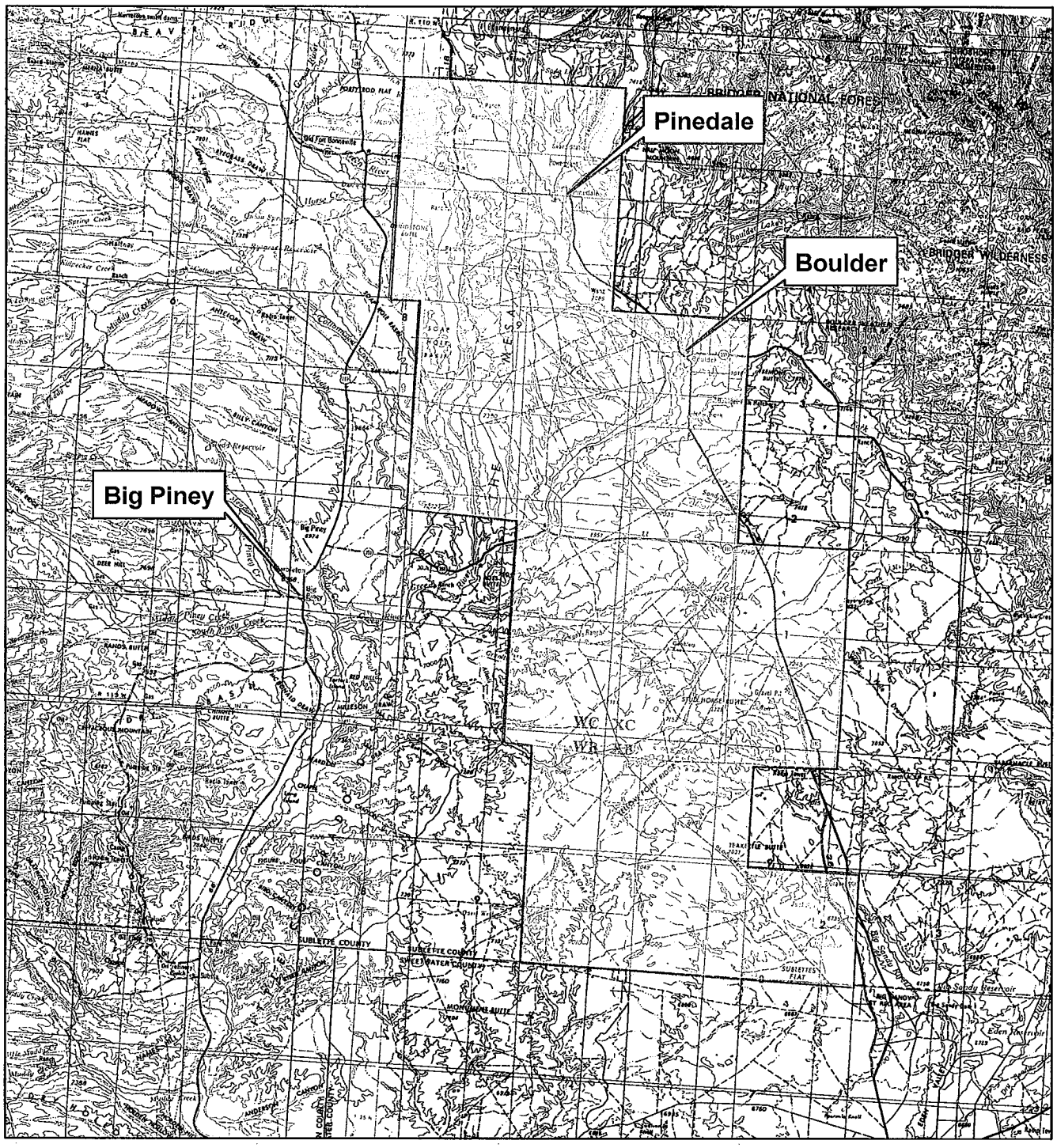
18. All records required under this permit shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.

19. That should drill rig engine(s) meet the definition of a stationary source, Ultra Resources, Inc. shall comply with all state and federal regulations applicable for stationary sources.

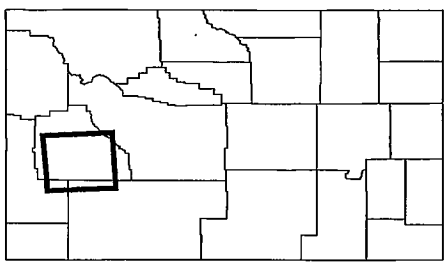
20. Ultra Resources, Inc. shall comply with all local, state, and federal rules and regulations applicable to the drill rig fleet.

Appendix A

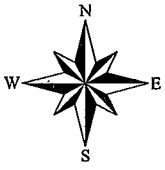
Map of JPDA Area



Extent Area



Wyoming Extent Map



JPDA Area

0 5 10 20 Miles

DEPARTMENT OF ENVIRONMENTAL QUALITY
WYOMING

Appendix B

Fleet Emission Summaries

Applicant: ULTRA

ACTUAL 2006-07 EMISSIONS

							2006			2007			Avg. 2006-07															
Rig Name	Rig Type (direct or electric)	Wells Drilled 2006	Wells Drilled 2007	Engine/Boiler	Tier/ control equipment	Site Rating	Annual Operating Days	Natural Gas Use Per Year	Diesel Use Per Year	Annual Operating Days	Natural Gas Use Per Year	Diesel Use Per Year	Annual Operating Days	Natural Gas Use Per Year	Diesel Use Per Year	Fuel Use Per Year	BSFC	NO_x	CO	VOC	PM_{10}	HCHO	NO_x	CO	VOC	PM_{10}	HCHO	SO_2
						HP or (MMBtu/hr)		mscf	gal		mscf	gal		mscf	gal	MMBtu	Btu/hp-hr	g/hp-hr or (lb/MMBtu) for IC engines; lb/kgal or (lb/MMBtu) for boilers [2,3,4,5]					tpy					
Cyclone 9	Mechanical	2	n/a	Cat D399 TA	0	1,308 hp		0	101,228		0	0		0	101,228	13,035	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	16.9	2.8	0.2	0.1	0.0005	0.4
				Cat D399 TA	0	1,308 hp		0	101,228		0	0		0	101,228	13,035	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	16.9	2.8	0.2	0.1	0.0005	0.4
				Cat D399 TA	0	1,308 hp		0	101,228		0	0		0	101,228	13,035	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	16.9	2.8	0.2	0.1	0.0005	0.4
				Hurst		8.40 MMBtu/hr		0	143,841		0	0		0	143,841	18,522		20.00	5.00	0.34	2.00	0.061	1.44	0.36	0.02	0.14	0.0044	0.50
Cyclone 17	Mechanical	7	1 (see notes)	Cat D398 TA	0	939 hp		0	159,011		0	0		0	159,011	20,475	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	26.7	4.5	0.3	0.2	0.0008	0.6
				Cat D398 TA	0	939 hp		0	159,011		0	0		0	159,011	20,475	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	26.7	4.5	0.3	0.2	0.0008	0.6
				Cat D398 TA	0	939 hp		0	159,011		0	0		0	159,011	20,475	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	26.7	4.5	0.3	0.2	0.0008	0.6
				Hurst		8.40 MMBtu/hr		0	234,941		0	0		0	234,941	30,253		20.00	5.00	0.34	2.00	0.061	2.35	0.59	0.04	0.23	0.0072	0.82
Cyclone 18	Mechanical	2	n/a	Cat D379 TA	0	628 hp		0	56,509		0	0		0	56,509	7,276	7,374	7.84	2.35	0.18	0.11	(7.89E-05)	8.5	2.6	0.2	0.1	0.0003	0.2
				Cat D379 TA	0	628 hp		0	56,509		0	0		0	56,509	7,276	7,374	7.84	2.35	0.18	0.11	(7.89E-05)	8.5	2.6	0.2	0.1	0.0003	0.2
				Cat D379 TA	0	628 hp		0	56,509		0	0		0	56,509	7,276	7,374	7.84	2.35	0.18	0.11	(7.89E-05)	8.5	2.6	0.2	0.1	0.0003	0.2
				Hurst		8.40 MMBtu/hr		0	79,455		0	0		0	79,455	10,231		20.00	5.00	0.34	2.00	0.061	0.79	0.20	0.01	0.08	0.0024	0.28
Cyclone 19	Mechanical	6	(see note)	Cat D398 TA	0	939 hp		0	157,157		0	0		0	157,157	20,237	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	26.4	4.4	0.3	0.2	0.0008	0.6
				Cat D398 TA	0	939 hp		0	157,157		0	0		0	157,157	20,237	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	26.4	4.4	0.3	0.2	0.0008	0.6
				Cat D398 TA	0	939 hp		0	157,157		0	0		0	157,157	20,237	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	26.4	4.4	0.3	0.2	0.0008	0.6
				Hurst		8.40 MMBtu/hr		0	232,201		0	0		0	232,201	29,900		20.00	5.00	0.34	2.00	0.061	2.32	0.58	0.04	0.23	0.0071	0.81
Cyclone 20	Mechanical	7	(see note)	Cat D398 TA	0	939 hp		0	162,720		0	0		0	162,720	20,953	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	27.3	4.6	0.3	0.2	0.0008	0.6
				Cat D398 TA	0	939 hp		0	162,720		0	0		0	162,720	20,953	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	27.3	4.6	0.3	0.2	0.0008	0.6
				Cat D398 TA	0	939 hp		0	162,720		0	0		0	162,720	20,953	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	27.3	4.6	0.3	0.2	0.0008	0.6
				Hurst		8.40 MMBtu/hr		0	240,421		0	0		0	240,421	30,958		20.00	5.00	0.34	2.00	0.061	2.40	0.60	0.04	0.24	0.0073	0.84
Cyclone 24	Electric	4	3	Cat D399 TA	0	1,308 hp		0	117,135		0	60,737		0	88,936	11,452	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	14.8	2.4	0.2	0.1	0.0005	0.3
				Cat D399 TA	0	1,308 hp		0	117,135		0	60,737		0	88,936	11,452	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	14.8	2.4	0.2	0.1	0.0005	0.3
				Cat D399 TA	0	1,308 hp		0	117,135		0	60,737		0	88,936	11,452	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	14.8	2.4	0.2	0.1	0.0005	0.3
				Hurst		8.40 MMBtu/hr		0	166,445		0	86,305		0	126,375	16,273		20.00	5.00	0.34	2.00	0.061	1.26	0.32	0.02	0.13	0.0039	0.44
DHS #1	Mechanical	2	n/a	Cat D398 TA	0	939 hp		0	50,415		0	0		0	50,415	6,492	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	8.5	1.4	0.1	0.1	0.0003	0.2
				Cat D398 TA	0	939 hp		0	50,415		0	0		0	50,415	6,492	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	8.5	1.4	0.1	0.1	0.0003	0.2
				Cat 3512B	0	1,476 hp		0	47,768		0	0		0	47,768	6,151	6,288	7.65	2.70	0.10	0.06	(7.89E-05)	8.2	2.9	0.1	0.1	0.0002	0.2
				Cat 3512B	0	1,476 hp		0	47,768		0	0		0	47,768	6,151	6,288	7.65	2.70	0.10	0.06	(7.89E-05)	8.2	2.9	0.1	0.1	0.0002	0.2
				Cat 3412	0	971 hp		0	46,480		0	0		0	46,480	5,985	6,533	7.44	0.29	0.09	0.71	(7.89E-05)	7.5	0.3	0.1	0.7	0.0002	0.2
				Cat 3412	0	971 hp		0	46,480		0	0		0	46,480	5,985	6,533	7.44	0.29	0.09	0.71	(7.89E-05)	7.5	0.3	0.1	0.7	0.0002	0.2
				Hurst		8.40 MMBtu/hr		0	99,319		0	0		0	99,319	12,789		20.00	5.00	0.34	2.00	0.061	0.99	0.25	0.02	0.10	0.0030	0.35
Greywolf 520	Electric	2	n/a	Cat D398 TA	0	939 hp		0	70,002		0	0		0	70,002	9,014	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	11.8	2.0	0.1	0.1	0.0004	0.2
				Cat D398 TA	0	939 hp		0	70,002		0	0		0	70,002	9,014	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	11.8	2.0	0.1	0.1	0.0004	0.2
				Cat D398 TA	0	939 hp		0	70,002		0	0		0	70,002	9,014	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	11.8	2.0	0.1	0.1	0.0004	0.2
				Hurst		8.40 MMBtu/hr		0	103,429		0	0		0	103,429	13,318		20.00	5.00	0.34	2.00	0.061	1.03	0.26	0.02	0.10	0.0032	0.36
Greywolf 821	Electric	6	6	Cat D398 TA	0	939 hp		0	138,150		0	75,713		0	106,931	13,769	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	18.0	3.0	0.2	0.1	0.0005	0.4
				Cat D398 TA	0	939 hp		0	138,150		0	75,713		0	106,931	13,769	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	18.0	3.0	0.2	0.1	0.0005	0.4
				Cat D398 TA	0	939 hp		0	138,150		0	75,713		0	106,931	13,769	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	18.0	3.0	0.2	0.1	0.0005	0.4
				Hurst		8.40 MMBtu/hr		0	204,118		0	119,868		0	161,993	20,859		20.00	5.00	0.34	2.00	0.061	1.62	0.40	0.03	0.16	0.0049	0.57
Greywolf 841	Electric	7	9	Cat D399 TA	0	1,308 hp		0	153,770		0	149,345		0	151,558	19,516	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	25.2	4.1	0.3	0.2	0.0008	0.5
				Cat D399 TA	0	1,308 hp		0	153,770		0	149,345		0	151,558	19,516	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	25.2	4.1	0.3	0.2	0.0008	0.5
				Cat D399 TA	0	1,308 hp		0	153,770		0	149,345		0	151,558	19,516	7,172	8.41	1.37	0.10	0.07	(7.89E-05)	25.2	4.1	0.3	0.2	0.0008	0.5
				Hurst		8.40 MMBtu/hr		0	218,502		0	210,967		0	214,735	27,651		20.00	5.00	0.34	2.00	0.061	2.15	0.54	0.04	0.21	0.0065	0.75
H&P 241	Electric	n/a	5	Cat 3512C DITA	2	1,476 hp		0	0		0	144,910		0	144,910	18,660	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	21.0	6.3	1.5	0.7	0.0007	0.5
				Cat 3512C DITA	2	1,476 hp		0	0		0	144,910		0	144,910	18,660	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	21.0	6.3	1.5	0.7	0.0007	0.5
				Cat 3512C DITA	2	1,476 hp		0	0		0	144,910		0	144,910	18,660	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	21.0	6.3	1.5	0.7	0.0007	0.5
				Hurst		8.40 MMBtu/hr		0	0		0	148,636		0	148,636	19,139		20.00	5.00	0.34	2.00	0.061	1.49	0.37	0.03	0.15	0.0045	0.52
H&P 284	Electric	3	12	Cat 3512B DITA	CARB/IMO	1,476 hp		0	70,718		0	214,493		0	142,605	18,363	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	24.6	8.7	1.0	0.2	0.0007	0.5
				Cat 3512B DITA	CARB/IMO	1,476 hp		0	70,718		0	214,493		0	142,605	18,363	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	24.6	8.7	1.0	0.2	0.0007	0.5
				Cat 3512B DITA	CARB/IMO	1,476 hp		0	70,718		0	214,493		0	142,605	18,363	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	24.6	8.7	1.0	0.2	0.0007	0.5
				Hurst		8.40 MMBtu/hr		0	110,278		0	249,325		0	179,802	23,153		20.00	5.00	0.34	2.00	0.061	1.80	0.45	0.03	0.18	0.0055	0.63
H&P 285	Electric	3	13	Cat 3512B DITA	CARB/IMO	1,476 hp		0	63,251		0	171,324		0	117,287	15,103	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	20.3	7.1	0.8	0.2	0.0006	0.4
				Cat 3512B DITA	CARB/IMO	1,476 hp		0	63,251		0	171,324		0	117,287	15,103	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	20.3	7.1	0.8	0.2	0.0006	0.4
				Cat 3512B DITA	CARB/IMO	1,476 hp		0	63,251		0	171,324		0	117,287	15,103	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	20.3	7.1	0.8	0.2	0.0006	0.4
				Hurst		8.40 MMBtu/hr		0	98,634		0	164,390		0	131,512	16,934		20.00	5.00	0.34	2.00	0.061	1.32	0.33	0.02	0.13	0.0040	0.46
H&P 286	Electric	3	13	Cat 3512B DITA	CARB/IMO	1,476 hp		0	59,737		0	203,372		0	131,555	16,940	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	22.7	8.0	0.9	0.2	0.0007	0.5
				Cat 3512B DITA	CARB/IMO	1,476 hp		0	59,737		0	203,372		0	131,555	16,940	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	22.7	8.0	0.9	0.2	0.0007	0.5
				Cat 3512B DITA	CARB/IMO	1,476 hp		0	59,737		0	203,372		0	131,555	16,940	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	22.7	8.0	0.9	0.2	0.0007	0.5
				Hurst		8.40 MMBtu/hr		0	93,154		0	219,187		0	156,171	20,110		20.00	5.00	0.34	2.00	0.061	1.56	0.39	0.03	0.16	0.0048	0.55
H&P 287	Electric	2	10	Cat 3512B DITA	CARB/IMO	1,476 hp		0	42,167		0	188,420		0	115,293	14,846	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	19.9	7.0	0.8	0.2	0.0006	0.4
				Cat 3512B DITA	CARB/IMO	1,476 hp		0	42,167		0	188,420		0	115,293	14,846	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	19.9	7.0	0.8	0.2	0.0006	0.4
				Cat 3512B DITA	CARB/IMO	1,476 hp		0	42,167		0	188,420		0	115,293	14,846	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	19.9	7.0	0.8	0.2	0.0006	0.4
				Hurst		8.40 MMBtu/hr		0	65,756		0	200,693		0	133,225	17,155		20.00	5.00	0.34	2.00	0.061	1.33	0.33	0.02	0.13	0.0041	0.47
Mountain Drilling #1	Electric	4	n/a	Cat D398 TA	0	939 hp		0	92,718		0	0		0	92,718	11,939	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	15.6	2.6	0.2	0.1	0.0005	0.3
				Cat D398 TA	0	939 hp		0	92,718		0	0		0	92,718	11,939	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	15.6	2.6	0.2	0.1	0.0005	0.3
				Cat D398 TA	0	939 hp		0	92,718		0	0		0	92,718	11,939	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	15.6	2.6	0.2	0.1	0.0005	0.3
				Hurst		8.40 MMBtu/hr		0	136,992		0	0		0	136,992	17,640		20.00	5.00	0.34	2.00	0.061	1.37	0.34	0.02	0.14	0.0042	0.48
Patterson 191	Electric	1	3	Cat 3512C DITA	2	1,476 hp		0	0		0	61,114		0	61,114	7,869	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	8.9	2.7	0.6	0.30	0.0003	0.2
				Cat 3512C DITA	2	1,476 hp		0	0		0	61,114		0	61,114	7,869	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	8.9	2.7	0.6	0.30	0.0003	0.2
				Cat 3512C DITA	2	1,476 hp		0	0		0	61,114		0	61,114	7,869	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	8.9	2.7	0.6	0.30	0.0003	0.2
				Solar Saturn 20	nat gas	1,590 hp		0	0		53,731	0		53,731	0	54,806	10,370	(0.32)	(0.082)	(0.0021)	(6.60E-03)	(7.10E-04)	8.77	2.25	0.06	0.18	0.02	0.00
				Solar Saturn 20	nat gas	1,590 hp		0	0		53,731	0		53,731	0	54,806	10,370	(0.32)	(0.082)	(0.0021)	(6.60E-03)	(7.10E-04)	8.77	2.25	0.06	0.18	0.02	0.00
				Allison 501-KB3	nat gas	2,119 hp		0	0		53,731	0		53,731	0	54,806	9,799	(0.32)	(0.082)	(0.0021)	(6.60E-03)	(7.10E-04)	8.77	2.25	0.06	0.18	0.02	0.00

				Hurst		8.40 MMBtu/hr	0	57,537	0	184,939	0	242,476	31,223		20.00	5.00	0.34	2.00	0.061	2.42	0.61	0.04	0.24	0.0074	0.85
Patterson 455	Mechanical	7	7	Cat D398 TA	0	939 hp	0	117,868	0	88,627	0	103,247	13,295	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	17.4	2.9	0.2	0.1	0.0005	0.4
				Cat D398 TA	0	939 hp	0	117,868	0	88,627	0	103,247	13,295	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	17.4	2.9	0.2	0.1	0.0005	0.4
				Cat 3512B	0	1,476 hp	0	111,677	0	88,627	0	100,152	12,896	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	17.3	6.1	0.7	0.1	0.0005	0.4
				Cat 3512B	0	1,476 hp	0	111,677	0	88,627	0	100,152	12,896	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	17.3	6.1	0.7	0.1	0.0005	0.4
				Cat 3412	0	971 hp	0	108,668	0	88,627	0	98,647	12,703	6,533	8.05	0.29	0.10	0.71	(7.89E-05)	17.3	0.6	0.2	1.5	0.0005	0.3
				Cat 3412	0	971 hp	0	108,668	0	88,627	0	98,647	12,703	6,533	8.05	0.29	0.10	0.71	(7.89E-05)	17.3	0.6	0.2	1.5	0.0005	0.3
				Hurst		8.40 MMBtu/hr	0	232,201	0	203,433	0	217,817	28,048		20.00	5.00	0.34	2.00	0.061	2.18	0.54	0.04	0.22	0.0066	0.76
Patterson 476	Electric	n/a	3	Cat 3512C DITA	Tier 2	1,476 hp	0	0	0	59,963	0	59,963	7,721	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	8.7	2.6	0.6	0.3	0.0003	0.2
				Cat 3512C DITA	Tier 2	1,476 hp	0	0	0	59,963	0	59,963	7,721	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	8.7	2.6	0.6	0.3	0.0003	0.2
				Cat 3512C DITA	Tier 2	1,476 hp	0	0	0	59,963	0	59,963	7,721	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	8.7	2.6	0.6	0.3	0.0003	0.2
				Hurst	n/a	8.40 MMBtu/hr	0	0	0	57,537	0	57,537	7,409		20.00	5.00	0.34	2.00	0.061	0.58	0.14	0.01	0.06	0.0018	0.20
Patterson 515	Mechanical	6	7	Cat D398 TA	0	939 hp	0	107,089	0	86,108	0	96,599	12,439	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	16.2	2.7	0.2	0.1	0.0005	0.3
				Cat D398 TA	0	939 hp	0	107,089	0	86,108	0	96,599	12,439	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	16.2	2.7	0.2	0.1	0.0005	0.3
				Cat 3512B	0	1,476 hp	0	101,465	0	86,108	0	93,787	12,077	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	16.2	5.7	0.7	0.1	0.0005	0.3
				Cat 3512B	0	1,476 hp	0	101,465	0	86,108	0	93,787	12,077	6,287	7.65	2.70	0.31	0.06	(7.89E-05)	16.2	5.7	0.7	0.1	0.0005	0.3
				Cat 3412	0	971 hp	0	131,641	0	86,108	0	108,875	14,019	6,533	8.05	0.29	0.10	0.71	(7.89E-05)	19.0	0.7	0.2	1.7	0.0006	0.4
				Cat 3412	0	971 hp	0	131,641	0	86,108	0	108,875	14,019	6,533	8.05	0.29	0.10	0.71	(7.89E-05)	19.0	0.7	0.2	1.7	0.0006	0.4
				Cat 3412	0	971 hp	0	131,641	0	86,108	0	108,875	14,019	6,533	8.05	0.29	0.10	0.71	(7.89E-05)	19.0	0.7	0.2	1.7	0.0006	0.4
				Hurst		8.40 MMBtu/hr	0	210,967	0	205,488	0	208,228	26,813		20.00	5.00	0.34	2.00	0.061	2.08	0.52	0.04	0.21	0.0064	0.73
Unit 233	Electric	n/a	6	Cat D398 TA	0	939 hp	0	0	0	135,928	0	135,928	17,503	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	22.8	3.8	0.2	0.2	0.0007	0.5
				Cat D398 TA	0	939 hp	0	0	0	135,928	0	135,928	17,503	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	22.8	3.8	0.2	0.2	0.0007	0.5
				Cat D398 TA	0	939 hp	0	0	0	135,928	0	135,928	17,503	7,135	8.45	1.42	0.09	0.07	(7.89E-05)	22.8	3.8	0.2	0.2	0.0007	0.5
				Hurst		8.40 MMBtu/hr	0	0	0	162,335	0	162,335	20,903		20.00	5.00	0.34	2.00	0.061	1.62	0.41	0.03	0.16	0.0050	0.57
Unit 326	Electric	n/a	5	Cat 3512C DITA	2	1,476 hp	0	0	0	142,680	0	142,680	18,372	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	20.7	6.2	1.4	0.7	0.0007	0.5
				Cat 3512C DITA	2	1,476 hp	0	0	0	142,680	0	142,680	18,372	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	20.7	6.2	1.4	0.7	0.0007	0.5
				Cat 3512C DITA	2	1,476 hp	0	0	0	142,680	0	142,680	18,372	6,059	6.20	1.87	0.43	0.21	(7.89E-05)	20.7	6.2	1.4	0.7	0.0007	0.5
				Hurst		8.40 MMBtu/hr	0	0	0	150,006	0	150,006	19,316		20.00	5.00	0.34	2.00	0.061	1.50	0.38	0.03	0.15	0.0046	0.53
								8,838,796		8,321,623		11,756,577	1,678,273							1,418.9	319.8	36.0	28.2	0.2	41.1

Applicant: ULTRA

2009 PROJECTED ACTUAL DRILL RIG EMISSIONS

Rig	Engine/Boiler	Tier/ control equipment	Site Rating	Annual Operating Days	Natural Gas Use Per Year	Diesel Use Per Year	Fuel Use Per Year	BSFC	NO_X	VOC	NO_X	VOC
			HP or (MMBtu/hr)		mscf	gal	MMBtu	Btu/hp-hr	(lb/MMBtu, lb/kgal or lb/MMscf)	(lb/MMBtu, lb/kgal or lb/MMscf)	tpy	tpy
Drill Rig 1	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
(Ensign 89)	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Cat 3412E DITA	CARB/IMO	860 hp	365	0			6,392				
	Annual Average Rig Load		1,599 hp	365	0	162,120	21,886		(2.19)	(0.07)	23.9	0.8
Drill Rig 2	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(Greywolf 110/Precision 110)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
						54,937	7,416		(1.35)	(0.10)		2.9
	Annual Average Rig Load		1,599 hp	365	0	370,716	50,047				8.4	
Drill Rig 3	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
(H&P 284)	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Annual Average Rig Load		1,599 hp	365	0	358,017	48,332		(2.19)	(0.07)	52.9	1.7
Drill Rig 4	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
(H&P 285)	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Annual Average Rig Load		1,599 hp	365	0	151,941	20,512		(2.19)	(0.07)	22.4	0.7
Drill Rig 5	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
(H&P 286)	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Annual Average Rig Load		1,599 hp	365	0	131,689	17,778		(2.19)	(0.07)	19.4	0.6
Drill Rig 6	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
(H&P 287)	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Annual Average Rig Load		1,599 hp	365	0	479,805	64,774		(2.19)	(0.07)	70.9	2.2
Drill Rig 7	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
(Patterson 176 [304])	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Cat 3512B DITA	CARB/IMO	1,476 hp	365	0			6,287				
	Annual Average Rig Load		1,599 hp	365	0	133,121	17,971		(2.19)	(0.07)	19.7	0.6

Drill Rig 8	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(Patterson 181 [305])	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	108,168	14,603		(1.35)	(0.10)	9.9	0.7
Drill Rig 9	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(Patterson 186 [311])	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	66,933	9,036		(1.35)	(0.10)	6.1	0.5
Drill Rig 10	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(Patterson 476 [309])	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
						196,090	26,472		(1.35)	(0.10)		3.0
	Annual Average Rig Load		1,599 hp	365	0	243,805	32,914				20.1	
Drill Rig 11	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(Unit 326)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	447,649	60,433		(1.35)	(0.10)	40.8	3.0
Drill Rig 12	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(Patterson 318)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
NEW July 09	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	42,985	5,803		(1.35)	(0.10)	3.9	0.3
Drill Rig 13	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(Patterson 319)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
NEW August 09	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	10,527	1,421		(1.35)	(0.10)	1.0	0.1
						2,958,503	399,398					
Total Drill Rig Engine Emissions based on Jan-August 2009 fuel usage =											299.4	17.0
Scale-Up to December 2009 Projection =											449.1	25.6
Scale-Up to December 2009 Projection (15% contingency included) =											516.4	29.4

Applicant: ULTRA

2010 PROJECTED ACTUAL DRILL RIG EMISSIONS

Rig	Engine/Boiler	Tier/ control equipment	Site Rating	Annual Operating Days	Natural Gas Use Per Year	Diesel Use Per Year	Fuel Use Per Year	BSFC	NO_x	VOC	NO_x	VOC
			HP or (MMBtu/hr)		mscf	gal	MMBtu	Btu/hp-hr	(lb/MMBtu, lb/kgal or lb/MMscf)	(lb/MMBtu, lb/kgal or lb/MMscf)	tpy	
Drill Rig 9	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 318)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 10	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 319)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 11	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 12	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 13	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 14	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 15	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 16	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0

	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 1	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 318)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 2	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly Greywolf 110/Precision 110)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 3	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly H&P 284)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 4	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly H&P 287)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 5	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 181 [305])	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 6	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 186 [311])	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 7	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly Patterson 476 [309])	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 8	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Unit 326)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
						17,043,455	2,954,405		Total for Rig Engines and Rig Boilers		553.7	41.8
									Total for Rig Engines Only		500.4	40.0
									Total for Rig Boilers Only		53.3	1.85

Notes:

Rig boiler emissions are based upon worst-case emissions during either natural gas or fuel oil combustion

553.7 41.8

Notation of 10 tpy NOx emissions for drill rigs with SCR are for emission estimation purposes only, and are not being proposed as a drill rig permit limitation.

Applicant: ULTRA

2011 PROJECTED ACTUAL DRILL RIG EMISSIONS

Rig	Engine/Boiler	Tier/ control equipment	Site Rating	Annual Operating Days	Natural Gas Use Per Year	Diesel Use Per Year	Fuel Use Per Year	BSFC	NO_X	VOC	NO_X	VOC
			HP or (MMBtu/hr)		mscf	gal	MMBtu	Btu/hp-hr	(lb/MMBtu, lb/kgal or lb/MMscf)	(lb/MMBtu, lb/kgal or lb/MMscf)	tpy	
Drill Rig 9	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 318)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 10	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 319)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 11	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 12	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 13	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 14	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 15	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 16	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0

	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 1	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly Patterson 318)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 2	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly Greywolf 110/Precision 110)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 3	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly H&P 284)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 4	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly H&P 287)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 5	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 181 [305])	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 6	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Patterson 186 [311])	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 7	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
(formerly Patterson 476 [309])	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	10.0	1.0
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
Drill Rig 8	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
(formerly Unit 326)	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Cat 3512C DITA	Tier 2	1,476 hp	365	0			6,059				
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.100)	66.7	4.9
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	5.50	2.1	0.12
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	0.34	3.3	0.06
						17,043,455	2,954,405		Total for Rig Engines and Rig Boilers		497.0	37.9
									Total for Rig Engines Only		443.7	36.1
									Total for Rig Boilers Only		53.3	1.85

Notes:

Rig boiler emissions are based upon worst-case emissions during either natural gas or fuel oil combustion

497.0 37.9

Notation of 10 tpy NOx emissions for drill rigs with SCR are for emission estimation purposes only, and are not being proposed as a drill rig permit limitation.

Applicant: ULTRA

2012 PROJECTED ACTUAL DRILL RIG EMISSIONS

Rig	Engine/Boiler	Tier/ control equipment	Site Rating	Annual Operating Days	Natural Gas Use Per Year	Diesel Use Per Year	Fuel Use Per Year	BSFC	NO_x	CO	VOC	PM_{10}	HCHO	NH_3	NO_x	CO	VOC	PM_{10}	HCHO	NH_3	SO_2
			HP or (MMBtu/hr)		mscf	gal	MMBtu	Btu/hp-hr	g/hp-hr or (lb/MMBtu) for IC engines; lb/kgal or lb/MMscf for boilers [1,2,3,4]					ppm	tpy						
Drill Rig 9	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
(formerly Patterson 318)	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2
Drill Rig 10	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2
Drill Rig 11	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2
Drill Rig 12	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2
Drill Rig 13	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2
Drill Rig 14	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2
Drill Rig 15	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2
Drill Rig 16	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059													
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2

Drill Rig 1	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
(formerly Patterson 318)	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1	
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3	
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2	
Drill Rig 2	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059														
(formerly Greywolf 110/Precision 110)	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059														
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059														
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1	
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3	
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2	
Drill Rig 3	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
(formerly H&P 284)	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1	
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3	
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2	
Drill Rig 4	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
(formerly H&P 287)	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1	
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3	
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2	
Drill Rig 5	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
(formerly Patterson 181 [305])	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1	
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3	
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2	
Drill Rig 6	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
(formerly Patterson 186 [311])	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1	
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3	
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2	
Drill Rig 7	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059														
(formerly Patterson 476 [309])	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059														
	Cat 3512C DITA	II/SCR	1,476 hp	365	0			6,059														
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1	
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3	
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2	
Drill Rig 8	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
(formerly Unit 326)	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Cat 3512C DITA	Tier 1 or 2, SCR or equivalent	1,476 hp	365	0			6,059														
	Annual Average Rig Load		1,599 hp	365	0	731,869	98,802		(1.35)	(0.514)	(0.100)	(0.045)	(7.89E-05)	10	10.0	25.4	1.0	2.2	0.0039	0.3406	0.1	
	Rig Boiler Make/Model TBD	N/A	8.40 MMBtu/hr	213	42,082	0	42,924		100.00	84.00	5.50	7.60	0.075		2.1	1.8	0.12	0.2	0.0016		0.3	
			8.40 MMBtu/hr	213	0	333,347	42,924		20.00	5.00	0.34	2.00	0.061		3.3	0.8	0.06	0.3	0.0102		1.2	
						17,043,455	2,954,405						Total for Rig Engines and Rig Boilers		213.3	434.5	18.36	40.6	0.23	5.4	19.9	
													Total for Rig Engines Only		160.0	406.2	16.5	35.3	0.06	5.45	1.2	
													Total for Rig Boilers Only		53.3	28.3	1.85	5.3	0.16	0.00	18.7	
															213.3	434.5	18.36	40.6	0.23	5.4	19.9	

Notes:

Rig boiler emissions are based upon worst-case emissions during either natural gas or fuel oil combustion

Notation of 10 tpy NOx emissions for drill rigs with SCR are for emission estimation purposes only, and are not being proposed as a drill rig permit limitation.

Appendix C

Ultra Resources, Inc. Offset Spreadsheet

Chapter 6, Section 2c(ii) Demonstration

AppNum	Company	Facility	PermitNumber	PermitDate	CurrentVOC	CurrentNOx	BaseVOC	BaseNOx	DeltaVOC	DeltaNOx	OffsetVOC	OffsetNOx	DemoComments
6944	Ultra Resources	Riverside 9-2 PAD	CT-6944	4/8/2008	0	0	0	0	0	0	0	0	offsets are under AP-9374 tracking log
7101	Ultra Resources	Warbonnet 4-9 PAD	MD-7101	4/15/2008	15.2	18.2	22.2	18	-7	0.2	-7	0.2	Permit Actions: MD-7101 Notes: short form app / removed dehydration unit / decline in production
7733	Ultra Resources	Warbonnet 7-3 PAD	MD-7733	7/23/2008									offset information is under AP-9377 tracking log
8765	Ultra Resources	Central Gathering Facility #1	CT-8765	5/20/2009	15	12.8	0	0	15	12.8	22.5	14.1	Permit Actions: CT-8765 Notes: Liquids Gathering System
8764	Ultra Resources	Central Gathering Facility #3	CT-8764	5/20/2009	15.8	15.4	0	0	15.8	15.4	23.7	16.9	Permit Actions: CT-8764 Notes: Liquids Gathering System
7655	Ultra Resources	Stud Horse Butte 14-21	MD-7655	6/2/2009	11.4	4	20.5	2.6	-9.1	1.4	-9.1	1.4	Permit Actions: MD-7655 Notes:
7656	Ultra Resources	Warbonnet 15-26WDW	CT-7656	6/2/2009	2.7	4.3	0	0	2.7	4.3	2.7	4.3	Permit Actions: CT-7656 Notes:
8926	Ultra Resources	CGF#3 Offsets	wv-8926	7/1/2009	0	0	119.6	45.5	-119.6	-45.5	-119.6	-45.5	Permit Actions: wv-8926 Notes: eliminate wellsite flashing, combustor, and loading emissions, VMT
8927	Ultra Resources	CGF#1 Offsets	wv-8927	7/1/2009	0	0	61.7	21.3	-61.7	-21.3	-61.7	-21.3	Permit Actions: wv-8927 Notes: eliminate wellsite flashing, combustor, and loading emissions, VMT
7676	Ultra Resources	Boulder 10-32 PAD	CT-7676	7/16/2009	3.1	3.2	3.9	3.4	-0.8	-0.2	-0.8	-0.2	Permit Actions: CT-7676 Notes: decline in production
6946	Ultra Resources	Warbonnet 4-23	CT-6946	7/16/2009	2.7	1.7	3.1	1.7	-0.4	0	-0.4	0	Permit Actions: CT-6946 Notes: controlling pneumatic pumps
7737	Ultra Resources	Warbonnet 6-4 PAD	MD-7737	7/16/2009	5.8	5.6	9.1	6.2	-3.3	-0.6	-3.3	-0.6	Permit Actions: MD-7737 Notes: decline in production
7738	Ultra Resources	Warbonnet 11d-15d PAD	MD-7738	7/16/2009	4.7	4	5.6	4.2	-0.9	-0.2	-0.9	-0.2	Permit Actions: MD-7738 Notes: decline in production
7735	Ultra Resources	Boulder 14-34 PAD	MD-7735	7/16/2009	4.2	4.8	5.3	5	-1.1	-0.2	-1.1	-0.2	Permit Actions: MD-7735 Notes: decline in production
6945	Ultra Resources	Boulder 10A-30	CT-6945	7/16/2009	2	1.6	3.5	2.8	-1.5	-1.2	-1.5	-1.2	Permit Actions: CT-6945 Notes: decline in production
7094	Ultra Resources	Warbonnet 1-10 PAD	MD-8313	7/16/2009									offset information under AP-8313 tracking log
7100	Ultra Resources	Warbonnet 16-5 PAD	MD-8320	7/16/2009									offset information under AP-8320 tracking log
7099	Ultra Resources	Warbonnet 9-15 PAD	MD-8317	7/16/2009									offset information under AP-8317 tracking log
7098	Ultra Resources	Warbonnet 3-10 PAD	MD-8314	7/16/2009									offset information under AP-8314 tracking log
7097	Ultra Resources	Warbonnet 2-8 PAD	MD-7097	7/16/2009	6.5	5	5.6	4.1	0.9	0.9	1.4	1	Permit Actions: MD-7097 Notes:
7096	Ultra Resources	Riverside 5-2 Facility	MD-7096	7/16/2009	18.5	12.3	10.4	8.3	8.1	4	12.2	4.4	Permit Actions: MD-7096 Notes:
7095	Ultra Resources	Mesa 7-34 Facility	MD-7095	7/16/2009	15.8	10.8	19.2	11.8	-3.4	-1	-3.4	-1	Permit Actions: MD-7095 Notes: decline in production
7391	Ultra Resources	Mesa 4-34 PAD	MD-7391	7/16/2009	7.8	4.9	10.1	5.4	-2.3	-0.5	-2.3	-0.5	Permit Actions: MD-7391 Notes: decline in production
7678	Ultra Resources	Boulder 10-31 PAD	CT-7678	7/16/2009	3.1	3.2	2.2	1.7	0.9	1.5	1.4	1.7	Permit Actions: CT-7678 Notes:
7398	Ultra Resources	Riverside 10d-23	CT-7398	7/16/2009	2	2.7	2.2	2.8	-0.2	-0.1	-0.2	-0.1	Permit Actions: CT-7398 Notes: decline in production
7093	Ultra Resources	Riverside 1-4 Facility	MD-7093	7/16/2009	10.5	9.3	4.7	4.1	5.8	5.2	8.7	5.7	Permit Actions: MD-7093 Notes:
7677	Ultra Resources	Stewart Point 10-8 PAD	CT-7677	7/16/2009	2.2	2.2	2.7	2.3	-0.5	-0.1	-0.5	-0.1	Permit Actions: CT-7677 Notes: decline in production
7679	Ultra Resources	Boulder 12a-33 PAD	MD-7679	7/16/2009	3.9	3.5	5.8	4.1	-1.9	-0.6	-1.9	-0.6	Permit Actions: MD-7679 Notes: decline in production
7680	Ultra Resources	Riverside 10-25 PAD	CT-7680	7/16/2009	2.2	1.7	2.6	1.8	-0.4	-0.1	-0.4	-0.1	Permit Actions: CT-7680 Notes:

Chapter 6, Section 2c(ii) Demonstration

AppNum	Company	Facility	PermitNumber	PermitDate	CurrentVOC	CurrentNOx	BaseVOC	BaseNOx	DeltaVOC	DeltaNOx	OffsetVOC	OffsetNOx	DemoComments
7681	Ultra Resources	Warbonnet 15-11 PAD	CT-7681	7/16/2009	3.8	2.1	5.7	2.5	-1.9	-0.4	-1.9	-0.4	Permit Actions: CT-7681 Notes: decline in production
7734	Ultra Resources	Riverside 11-14 PAD	MD-7734	7/16/2009	5.4	3.4	3	3.1	2.4	0.3	3.6	0.3	Permit Actions: MD-7734 Notes:
7393	Ultra Resources	Mesa 15-27 PAD	MD-7393	7/16/2009	6.7	7.4	7.6	7.7	-0.9	-0.3	-0.9	-0.3	Permit Actions: MD-7393 Notes: decline in production
8316	Ultra Resources	Warbonnet 6-5 Pad	MD-8316	7/16/2009	13.1	11	11.5	8	1.6	3	2.4	3.3	Permit Actions: MD-8316 Notes: controlled previously uncontrolled pneumatic pumps
8031	Ultra Resources	Warbonnet 9-14 Pad	CT-8031	7/16/2009	3.9	2.1	9.5	3.4	-5.6	-1.3	-5.6	-1.3	Permit Actions: CT-8031 Notes: decline in production
8314	Ultra Resources	Warbonnet 3-10 Pad	MD-8314	7/16/2009	13.1	14.1	18.7	14.6	-5.6	-0.5	-5.6	-0.5	Permit Actions: MD-8314 Notes: decline in production
8317	Ultra Resources	Warbonnet 9-15 Pad	MD-8317	7/16/2009	5.1	4.2	4.3	4	0.8	0.2	1.2	0.2	Permit Actions: MD-8317 Notes:
8318	Ultra Resources	Warbonnet 10-9 Pad	MD-8318	7/16/2009	4.3	3.5	1.5	1.7	2.8	1.8	4.2	2	Permit Actions: MD-8318 Notes:
8319	Ultra Resources	Warbonnet 14-5 Pad	CT-8319	7/16/2009	10.8	8.6	11.1	8.9	-0.3	-0.3	-0.3	-0.3	Permit Actions: CT-8319 Notes: decline in production
8320	Ultra Resources	Warbonnet 16-5 Facility	MD-8320	7/16/2009	17.5	16	13.9	14.5	3.6	1.5	5.4	1.7	Permit Actions: MD-8320 Notes:
8321	Ultra Resources	Warbonnet 15-10 Pad	MD-8321	7/16/2009	6.4	4.5	5	2.8	1.4	1.7	2.1	1.9	Permit Actions: MD-8321 Notes: controlled previously uncontrolled pneumatic pumps
8322	Ultra Resources	Warbonnet 16-4 Pad	MD-8322	7/16/2009	12.7	9	9.5	6.1	3.2	2.9	4.8	3.2	Permit Actions: MD-8322 Notes: controlled previously uncontrolled pneumatic pumps
8323	Ultra Resources	Warbonnet 8-11 Pad	CT-8323	7/16/2009	6.9	3.9	0	0	6.9	3.9	10.4	4.3	Permit Actions: CT-8323 Notes:
8313	Ultra Resources	Warbonnet 1-10 Pad	MD-8313	7/16/2009	25.6	17	22.6	14.1	3	2.9	4.5	3.2	Permit Actions: MD-8313 Notes:
9379	Ultra Resources	Warbonnet 10-24 Pad	CT-8030	7/16/2009	7	3	4.1	2.1	2.9	0.9	4.4	1	Permit Actions: AP-9379 Notes:
9378	Ultra Resources	Warbonnet 16-5 Facility	MD-8320	7/16/2009	10.8	12.2	9.2	12.6	1.6	-0.4	2.4	-0.4	Permit Actions: AP-9378 Notes: less heaters than previous permit
9376	Ultra Resources	Warbonnet 1-10 Pad	MD-8313	7/16/2009	5.8	12.3	6.2	11.9	-0.4	0.4	-0.4	0.4	Permit Actions: AP-9376/MD-8313 Notes: decline in production
8022	Ultra Resources	Warbonnet 16-5 Facility	MD-8320	7/16/2009									offset information under AP-8320 tracking log
8023	Ultra Resources	Warbonnet 16-10 Pad	MD-8023	7/16/2009	5	5.2	4.7	5	0.3	0.2	0.3	0.2	Permit Actions: MD-8023 Notes:
8024	Ultra Resources	Warbonnet 14-5 Pad	CT-8319	7/16/2009									offset information under AP-8319 tracking log
8026	Ultra Resources	Warbonnet 3-10 Pad	MD-8314	7/16/2009									offset information under AP-8314 tracking log
8027	Ultra Resources	Warbonnet 1-10 Pad	MD-8313	7/16/2009									offset information under AP-8313 tracking log
8028	Ultra Resources	Warbonnet 15-3	CT-8028	7/16/2009	2.8	1.8	5.4	2.5	-2.6	-0.7	-2.6	-0.7	Permit Actions: CT-8028 Notes: decline in production
8029	Ultra Resources	Warbonnet 9-8 Pad	CT-8029	7/16/2009	2	1.7	2.6	1.9	-0.6	-0.2	-0.6	-0.2	Permit Actions: CT-8029 Notes: decline in production
8030	Ultra Resources	Warbonnet 10-24 Pad	CT-8030	7/16/2009	4.1	2.1	6.1	2.8	-2	-0.7	-2	-0.7	Permit Actions: CT-8030 Notes: decline in production
9199	Ultra Resources	Drill Rig Fleet			41.8	553.7	36	987.9	5.8	-434.2	8.7	-434.2	Drill rig offsets, to be adjusted in 2011 to reflect 2012 proposed emissions
				Totals	**369.7**	**830**	**518.2**	**1275.2**	**-148.5**	**-445.2**	**-107**	**-439.2**	

Appendix D

Drill Rig Emission Reporting Form

Drill Rig Locations & Emissions

(Sample data entries provided below)

* Use emission factors from actual test data and attach test results inclusive of tested rate

** Emission factors from manufacturer or AP-42 may be used if test data is not available

Rig ID	Equipment Description	Controls	API #	Location			Well Name	Drilling Start Date	Drilling End Date	Field Name	Well Spud Date	Formation	Total Well Depth	Site Rating	Heat Content Diesel Fuel	Diesel Sulfur Content	Heat Content of Natural Gas	Natural Gas Use	Diesel Fuel Use	Fuel Use per Year	BSFC	Drill Rig Emission Factors					Emissions from Drilling						Stack Parameters			
				Lat	Long	Elev																NO_x	CO	VOC	PM_{10}	HCHO	NO_x	CO	VOC	PM_{10}	HCHO	SO_2	Height	Temp	Velocity	Diameter
				WGS84		ft							ft	hp or (MMBtu/hr)	Btu/gal	ppm_w	Btu/scf	mscf	gal	MMBtu	Btu/hp-hr	g/hp-hr* or (lb/MMBtu)**					tons						ft	°F	ft/sec	ft
Rig #1 - H&P 000	Cat 3512CDITA Diesel	Tier 2	00-000-00000	42.47183	-109.70750	7,179	Well 21	2/3/09	2/14/09	Jonah				1,476	130,000	500	1,000		15,431	2,006	7,389	4.80	8.50	1.00	0.40	0.00	1.44	2.54	0.30	0.12	0.00	0.05	16.40	630.55	98.40	0.66
	Cat 3512CDITA Diesel	Tier 2												1,476	130,000	500	1,000		15,431	2,006	7,389	4.80	8.50	1.00	0.40	0.00	1.44	2.54	0.30	0.12	0.00	0.05	16.40	630.55	98.40	0.66
	Rig Boiler	None												(6.3)	130,000	500	1,000		4,209	547	7,000	(0.15)	(0.036)	(0.0022)	(0.015)	(0.00045)	0.04	0.01	0.00	0.00	0.00	0.01	13.00	344.00	17.50	1.29