



Department of Energy  
Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352

0074705

08-SED-0060

DEC 06 2007

Mr. Ron Skinnarland, Manager  
Waste Management Section  
Nuclear Waste Program  
State of Washington  
Department of Ecology  
3100 Port of Benton Blvd  
Richland, Washington 99352

RECEIVED  
DEC 11 2007  
EDMC

Dear Mr. Skinnarland:

RESPONSE TO NOTICE OF VIOLATION AND REQUIREMENT FOR INFORMATION FOR EXCESS EMISSIONS NOTIFICATION IN THE OPERATION OF TWO DIESEL ENGINES AT THE HIGH BAY TESTING FACILITY (336 BUILDING), HANFORD SITE APPROVAL ORDER DE06NWP-002.

- References:
- (1) Ecology ltr. to D. A. Brockman, RL, from R. Skinnarland, "Excess Emissions Notification in the Operation of Diesel Engines at the Hanford 336 Building; Notice of Violation and Requirement for Information," dtd. October 25, 2007. 0074215
  - (2) PNNL E-mail Transmittal, to Oliver Wang, Ecology, from Rodger Woodruff, "Report of a Deviation from Approval Order DE06NWP-002," dtd. July 25, 2007.
  - (3) *Notice of Construction, Approval Order #DE06NWP-002, Air Emissions Notice of Construction Approval Order Conditions and Restrictions*, Pursuant to the State of Washington Department of Ecology General Regulations for Air pollutions Sources, Chapter 173-400 Washington Administrative Code (WAC), and Controls for New Sources of Toxic Air Pollutants, Chapter 173-460 WAC, five (5) pages total, dtd. July 20, 2006. 0070283

The purpose of this letter is to provide the information requested by the State of Washington Department of Ecology (Ecology) in Reference 1, concerning the permit deviation reported in Reference 2. This issue concerns the U.S. Department of Energy, Richland Operations Office's (DOE-RL) Air Emission Notice of Construction (NOC), Approval Order *DE06NWP-002*, issued by Ecology (Reference 3). The NOC Approval Order is for the installation and operation of two (2) diesel-driven compressor units, or generators to support equipment testing, at the Hanford Site 300 Area, 336 Building. Currently the units/generators are used in research being conducted by PNNL to support the Waste Treatment Plant (WTP) project.

Mr. Ron Skinnarland  
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Ecology's Notice of Violation (NOV) letter of October 25, 2007 (Reference 1), requests four (4) items of information. This information is identified in Enclosures 1-8 to this letter. For convenience, Enclosure 1 cites verbatim, prior to the corresponding response, each of the four (4) items in Ecology's October 25, 2007 NOV Letter (Reference 1).

If you have any questions, or require additional information regarding this submittal, please contact me, or your staff may contact Rob G. Hastings, Acting Assistant Manager for Safety and Engineering on (509) 376-9824.

Sincerely,



David A. Brockman  
Manager

SED:MFJ

Enclosures:

1. Ecology Request for Information
2. Eng. Emission Cert. (S/N BEM02662)
3. PO 36187
4. Eng. Emission Cert. (S/N 6BR02120 & 3ER04959)
5. PO 46870
6. Diesel Fuel Specs.
7. Eng. Emission Cert. (S/N BEM06690 & BEM06685)
8. PO 48602 MOD 1

Mr. Ron Skinnarland  
08-SED-0060

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cc w/encls:

B. C. Barfuss, PNNL  
J. M. Barnett, PNNL  
T. G. Beam, FHI  
G. Bohnee, NPT  
J. Bontha, PNNL  
L.J. Brandon, PNNL  
S. D. Cooke, PNNL  
E.G. Damberg, PNNL  
C.J. Duchsherer, PNNL  
B. Erlandson, BNI  
R. D. Haggard, BNI  
S. Harris, CTUIR  
J. A. Hedges, Ecology  
D. W. Hendrickson, Ecology  
N. A. Homan, FHI  
A. K. Ikenberry, PNNL  
R. Jim, YN  
K. A. Peterson, FHI  
O. S. Wang, Ecology  
R. K. Woodruff, PNNL  
D. Zhen, EPA Region 10, Seattle, WA.

Administrative Record [File: Notice of Construction DE06NWP-002; Approval Order DE06NWP-  
002; 336 Building Diesel Engines Ecology Notice of Violation]  
Environmental Portal, LMSI

*HO-7*

## **Ecology's Request for Information in October 25, 2007 Letter And DOE-RL/PNSO Responses**

**Note:** Enclosure 1 presents the State of Washington Department of Ecology's October 25, 2007 Letter\* request for information in italics, followed by DOE-RL/PNSO's responses.

**Ecology's Item 1\*** *Your statement of the root cause of the installation and operation of non-complaint engines.*

### **Response:**

In accordance with Pacific Northwest National Laboratory Procedures (PNNL) procedures, and as requested in the Notice of Violation (NOV), a causal analysis was performed of this event. The PNNL causal analysis team examined the facts surrounding the procurement and operation of the diesel-fueled compressors in violation of the conditions of Approval Order DE06NWO-002, in order to identify the casual factors leading to this deviation. The causal analysis identified as a root cause the lack of a formal PNNL process for assuring implementation of permit requirements, and three (3) contributing causes of the event as follows:

1. Turnover between the PNNL Waste Treatment Plant (WTP) Deputy Project Managers was informal and incomplete;
2. Staff roles and responsibilities for the engine acquisition process were not clearly understood or executed.
3. The receipt inspection process was not comprehensive, and the staff roles and responsibilities for this process were not clearly understood or implemented.

Ecology's Notice of Construction Approval Order requirements were not placed in the Project Specific Documentation (i.e., *the Project Management Plan, the Electronic Prep. and Risk Forms, or the Project Specific SOPs*). These are all PNNL-controlled documents. The PNNL WTP Deputy Project Manager informed the PNNL Project Engineer about modifications to the Engine-Rental Agreement. However, the PNNL Project Engineer mistakenly believed these modifications to be of a minor nature. As a result, the PNNL Project Engineer did not understand that these were important licensing requirements, and that those changes might result in an Approval Order deviation.

The casual analysis performed also showed the PNNL Project Engineer position to be in flux, as the original project engineer was absent on short-term disability leave. Further, Project confusion occurred as the Contract Assistant, who had drafted the previous compressor (engine) rental Purchase Order (PO), was also absent, having taken short-term disability leave.

As a corrective measure from the Causal Analysis, the PNNL Effluent Management Group reviewed other issued Approval Orders for emissions requirements on other diesel engines to determine if similar conditions exist. This review identified a similar Permit

Implementation Matrix for Approval Order TP 2007-003, and the diesel generator that was used was verified as EPA Tier 2-compliant. The casual analysis also contained other recommended corrective actions. These corrective actions are in the area of project management, acquisition management, property management, and process documentation. PNNL has committed to use the recommendations to develop and implement appropriate corrective actions.

**Ecology's Item 2\*** *For the last prior compliant engine installed and operated before July 3, 2007, under Order DE06NWP-002:*

- a. *Engine identification including manufacturer, model, rating (kW), and unique engine number.*
- b. *A copy of the manufacturer's emissions certification.*
- c. *A copy of the contract or lease agreement for the engine including conditions of engine specification and pricing.*

**Response:** For the last, prior, compliant engine installed, and operated, before July 3, 2007, under Approval Order DE06NWP-002:

- a. Engine identification: Caterpillar engine, model C15, power rating 442 kW, serial number BEM02662.
- b. Manufacturer's emissions certification: Enclosure 2.
- c. Contract or lease agreement for the engine, including conditions of engine specification and pricing Enclosure 3 Purchase Order (PO) - Services. The PO constitutes the contractual agreement between the parties.

**Ecology's Item 3\*** *For each non-compliant engine installed, operated under Order DE06NWP-002:*

- a. *Engine identification including manufacturer, model rating (kW), and unique engine number.*
- b. *A copy of the manufacturer's emissions certification.*
- c. *A copy of the contract or lease agreement for the engine including conditions of engine specification and pricing.*
- d. *A copy of the vendor certification and fuel delivery record identifying the fuel type and sulfur content of fuel combusted by this engine.*
- e. *Date of installation.*
- f. *Hours of operation for each day operated,*
- g. *Date of removal from the site of installation.*

**Response:** For each non-compliant engine installed and operated under Approval Order DE06NWP-002:

- a. Engine identification: #1) Caterpillar engine, model 3406, power rating 391.5 kW, serial number 6BR02120 and #2) Caterpillar engine, model 3406, power rating 391.5 kW, serial number 3ER04959.
- b. Manufacturer's emissions certification: Enclosure 4.
- c. Contract or lease agreement for the engine, including conditions of engine specification and pricing; see: Enclosure 5, Purchase Order (PO) - Services. The PO constitutes the contractual agreement between the parties.

- d. Vendor certification and fuel delivery record identifying the fuel type and sulfur content of fuel combusted by this engine: Fluor Hanford, Inc. provided fuel delivery to the engines. Table 1.0 shows fuel delivery dates and the amount of fuel delivered. Fuel specifications are provided in Enclosure 6.
- e. Date of installation: Both engines were installed at the 336 Building on July 3, 2007.
- f. Hours of operation for each day operated: see Table 1.0, below.
- g. Date of removal from the site of installation: Engine #1 was removed on July 30, 2007, and Engine #2 was removed on July 16, 2007.

**Table 1.0. Hours of Operation and Fuel Deliveries**

Date	Engine #1 S/N 6BR02120		Engine #2 S/N 3ER04959	
	Hours Operated	Gallons Fuel Delivered	Hours Operated	Gallons Fuel Delivered
7/3/07	0	0	0	0
7/5/07	3	0	0	0
7/6/07	2	0	0	0
7/8/07	2	0	0	0
7/9/07	9	129	0	0
7/10/07	1	38	0	0
7/11/07	6	14	0	0
7/12/07	2	38	0	25
7/13/07	3	0	5	0
7/16/07	0	85	0	9

**Ecology's Item 4\*** *For each compliant engine installed or operated after July 19, 2007, under Order DE06NWP-002:*

- a. *Engine identification including manufacturer, model, rating (kW), and unique engine number.*
- b. *A copy of the manufacture's emissions certification.*
- c. *A copy of the contact or lease agreement for the engine including conditions of engine specification and pricing.*

**Response:** For each compliant engine installed or operated after July 19, 2007, under Approval Order DE06NWP-002:

- a. Engine identification: #1) Caterpillar engine, engine arrangement number 2349188, power rating 391.5 kW, serial number BEM06690 and #2) Caterpillar engine, engine arrangement number 2349188, power rating 391.5 kW, serial number BEM06685.
- b. Manufacturer's emissions certification: Enclosure 7.
- c. Contract or lease agreement for the engine including conditions of engine specification and pricing: Enclosure 8, Purchase Order (PO) - Services.

The PO constitutes the contractual agreement between the parties.

\*Letter, from R. Skinnarland, State of Washington, Department of Ecology (Ecology), to D.A. Brockman, United States Department of Energy, Richland Operations (DOE-RL), "Excess Emissions Notification in the Operation of Diesel Engines at the Hanford 336 Building; Notice of Violation and Requirement for Information," dated and issued October 25, 2007. **Note:** The Ecology, October 25, 2007 Notice of Violation (NOV) letter contains four (4) items, which require responses. The text of all four (4) items is cited verbatim in Enclosure 1, prior to its associated response.

**Enclosure 2**

**Engine Emissions Certification  
(S/N BEM02662)**

**EMISSIONS DATA [BEM02692]**

**AUGUST 06, 2008**  
 Can't find what you're looking for? Click here

ENGINE EMISSIONS DATA	
Serial Number	BEM02662
Engine Arrangement Number	18B906
A1 - Shipped Certification Labeled Model Year	EPA / CARB / EU 2003
Family Code	BCFXL14.6SK
Family Certification	EPA Tier 2 EU Stage II
Spec Number	01K2169
Cycle Steady State Osmicous Emissions (EPA/CARB) (g/hp-hr)	Transient Cycle Smoke Emissions (EPA/CARB)
NOx @ 1800	PM
4.2	0.05
Has Engine Been Rebuilt?	No
Interlock Code Actual Progression	No Interlock Code Progression
A1 - Shipped Interlock Code	011
A1 - Shipped Flash File	2290424
A1 - Shipped Flash File CRB	2497272
A1 - Shipped CORR FL Power at RPM	No Power Available at 2100 rpm
Build Date	01 Dec 2003
Caterpillar Certification: Green Contact Center: Allen Beck Web Message#: 2501396 Based Product: S1900G Current Date: Wednesday, August 06, 2008 7:51:28 AM © Caterpillar Inc. 2008 All Rights Reserved. Data Entry: S1900G	
This is not an official emission certificate. This is for emission data information only. This emission data is Caterpillar's best estimate for this rating. If actual emissions are required then an emission test needs to be run on your engine. If you need further Certification Information please contact engine_certification@cat.com.	

**Enclosure 3**

**Purchase Order (PO) – Services  
PO NO. 36187**

# Battelle

The Business of Innovation

902 Battelle Boulevard  
P.O. Box 999  
Richland, WA 99352

## PURCHASE ORDER (PO) - SERVICES

Page 1 of 3

DATE 11/30/2006	DELIVERY DATE: 12/11/2006 * See Delivery Comment Below PICK-UP DATE: TBD * Approximately 4-8 weeks	PO NO. 36187
CONTRACTS REPRESENTATIVE Alfred Garcia, Jr.	K9-84 PO Box 999 Richland WA 99352	Phone Number: 509-375-4312 Fax Number: 509-372-4334 Email Address: A1.Garcia@pnl.gov
CONTRACTOR:  Star Rentals 1912 West "A" Street Pasco, WA 99301  Rick Siegel Tel: (509) 545-8521 Cell: (509) 948-3061 Fax: (509) 545-8529	SHIP TO:  Battelle 790 6th Street Richland, WA 99352 Attn: PO No. 27706  Payment Terms: Net 30 Days FOB Point: Destination Shipping Method: Other Freight Payment Method: Other (see Delivery and Pick-Up line items below)	Submit electronic invoice to: <a href="mailto:ap.invoices@pnl.gov">ap.invoices@pnl.gov</a> If not possible, submit 2 invoices to: Battelle, Pacific Northwest Division ATTN: ACCOUNTS PAYABLE PO Box 999, MSIN: J1-04 Richland, WA 99352 United States  Tel: 509-373-7377 Fax: 509-376-1338

Item	Qty	U/M	Description	Unit Price	Total Price
1	1	Month	1600CFM 150PSI Diesel Air Compressor S/N 004-141834, including minimum of 20-ft of 2-inch flexible tubing to connect to test equipment. Monthly Rental Price \$5000.00/Compressor plus \$108/Air Hose.	\$ 5,108.00	\$ 5,108.00
2	0	Week	Weekly Rental Price \$2000.00/Compressor plus \$54.00/Air Hose.	\$ 2,054.00	\$ -
3	0	Day	Daily Rental Price \$500.00/Compressor plus \$18.00/Air Hose.	\$ 518.00	\$ -
4	1	EA	Delivery Fee	\$ 50.00	\$ 50.00
5	1	EA	Pick-Up Fee (upon return of equipment to Star Rentals)	\$ 50.00	\$ 50.00
6	1	EA	Fuel Charge for refill upon return to Star Rentals.	TBD	TBD
<b>TOTAL</b>					\$ 5,208.00

The above equipment is being rented to Battelle for an estimated period of approximately **ONE MONTH**, unless extended by Battelle with a Modified Purchase Order. Upon completion of the rental period, the equipment shall be returned, FOB destination, transportation prepaid.

In the event of loss or damage to the equipment while in the possession of Battelle, Battelle may, at its option, either pay for the repair or purchase the equipment. Battelle's maximum liability shall not exceed the purchase price of \$85,000.00.

**Delivery Date:** Delivery shall be made on December 11, 2006, unless notified by Battelle in a delay of the time frame. Please contact Bill Combs at 376-9030 to arrange for exact delivery date and location.

**Technical Administrator:** The Battelle Technical Administrator for this contract is Bill Combs who may be contacted on (509) 376-9030. The Technical Administrator has no authority to: change or waive any provision of this contract, including but not limited to statements of work, drawings, specifications and standards, whether attached or incorporated by reference; provide interpretations of any provision or requirement of this contract; direct, advise, or recommend any particular course of conduct on the part of the Contractor; or create any legally binding commitment on behalf of Battelle.

**Not-To-Exceed Price:** All inclusive firm, fixed price amount for this purchase order.

**Invoices:** An application for payment (invoice) may not be submitted more frequently than monthly. Applications shall reference this purchase order number, include supporting documentation such as time sheets and travel receipts, and be mailed, in duplicate to the invoice address above.

**Work on Battelle or Government Premises:** This contract will require work on Battelle or Government premises. Note general provisions below.

**Insurance Certificate:** Note that your insurance certificate must be submitted to the Battelle Contract Specialist prior to any work on Battelle or Government premises.

**General Insurance Requirements:** Contractor shall obtain and maintain the following additional coverage during the time it is performing under any resulting contract:

- **Comprehensive General Liability:** Personal injury and property damage \$1,000,000 minimum per occurrence (combined single limit). Certificate shall indicate that coverage is afforded for completed operation and/or products liability.
- **Comprehensive Automobile Liability:** Personal injury and property damage, \$1,000,000 per occurrence (combined single limit). Certificates shall indicate that coverage is afforded for all owned, non-owned, and hired automobiles.

**Other Application Provisions:** 1.3.2.1.1 and 1.3.2.1.3 "The diesel compressor engine shall be rated at 450 KW or less and certified by the manufacturer to meet EPA Tier 2 or 3 emission limits. Contractor shall provide a copy of the manufacturer's specification sheet(s) for the provided engine stating the model, KW rating and certified Tier level.

1.3.2.2.2 Contractor shall provide a non-resettable hour meter installed to record engine operating hours.

1.4 "Contractor shall have performed the maintenance required to maintain engine emissions specifications as described in the manufacturer's instructions before the unit is first required for operation by Battelle, and perform subsequent maintenance at the frequency required to maintain same during the duration of the contract. The manufacturer's maintenance manual and records of said maintenance shall be made available for inspection by the Washington State Department of Ecology or Battelle at the contractor's place of business upon request and in a reasonable time, and a copy of same shall be provided to Battelle upon completion of the contract.

Acceptance of this item is contingent upon the following: No visible signs of damage (e.g. dents, cuts, structural cracks, loose or missing parts) to the compressor, trailer or essential components. Owners manual must be attached to the equipment. The vendor must conduct a pre-delivery inspection of all major components of the compressor prior to delivery. Documentation of this inspection must be attached to the equipment when it arrives at PNNL. All repaired or replaced parts and components must be compliant with the manufacturer's specifications. Operating controls must not subject the operator to pinch points, sharp edges or snagging hazards or other hazards. All machine guarding must provide proper coverage and must be in good condition. All labels and signs identifying hazards ("Danger", "Warning", "Caution") and operator instructions must be clearly displayed (e.g. not blocked behind structural or other components) and legible to read (i.e. not smeared, damaged or painted over). Equipment must not contain suspect counterfeit fasteners (parts).

**Conclusion:** Prices in accordance with your written offer dated 11/30/2006 by your Rick Siegel. Notwithstanding any other terms received with your offer, only the terms and conditions noted herein shall apply to this contract.

<i>Show PO number on all packages, invoices and/or correspondence. Complete packing list must accompany each shipment.</i>	
General Provisions that are part of the purchase order are as follows:	Battelle Memorial Institute Pacific Northwest Division
General Provisions Commercial (CP-B <CSN) October 2002 - Attached Environmental, Safety & Health Requirements Clause 3112C	 Alfred Gabor, Jr. Manager, Contracts  12/1/06 Date Signed

**Enclosure 4**

**Engine Emissions Certifications  
(S/N 6BR02120 & S/N 3ER04959)**

**Duchsherer, Cheryl J**

**From:** Engine Certification [Engine\_Certification@cat.com]  
**Sent:** Thursday, July 19, 2007 2:09 PM  
**To:** Duchsherer, Cheryl J  
**Subject:** Re: Engine Emissions Data sheet  
**Attachments:** YCPXL14.6ERK\_CARB.pdf; YCPXL14.6MRJ\_CARB.pdf

Greetings,

Engine s/n 6BR02120 is US EPA Tier 1 Certified under engine family YCPXL14.6ERK.

Engine s/n 3ER04959 is US EPA Tier 1 Certified under engine family YCPXL14.6MRJ.

Regards,  
Engine Certification

"Duchsherer, Cheryl J" <cheryl.duchsherer@pnl.gov>

07/18/2007 04:30 PM

To <Engine\_Certification@cat.com>

To

cc

Subject: Engine Emissions Data sheet

Classification: Confidential Green    Retain Until: 08/17/2007    Retention Category: G00 - General Matters/Administration

Please fax me the Engine Emissions Data sheets for the equipment listed below:

S/N 6BR02120  
Eng 3406  
Env Comp #EIRC 97/68AA003502

S/N 3ER04959  
Eng 3406

These units are being rented from Sun Rentals in Pasco, WA.

Thank you,

Cheryl Duchsherer

10/15/2007

*Effluent Management Group  
Pacific Northwest National Laboratory  
Phone: (509) 371-7769  
Fax: (509) 371-7773*

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-1-130  
Relating to Certification of New Heavy-Duty Off-Road Equipment Engines

CATERPILLAR, INC.

Pursuant to the authority vested in the Air Resources Board at Sections 43000.5, 43013, and 43018 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned at Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9; and

IT IS ORDERED AND RESOLVED: That the following diesel engines and exhaust emission control systems produced by the manufacturer are certified as described below for use in heavy-duty off-road equipment:

Model Year: 2000

Typical Equipment Usage: Tractor, Loader, Generator and Industrial equipment

Engine Power Ratings Range: 175 – 750 horsepower, inclusive

Fuel Type: Diesel

<u>Engine Family</u>	<u>Displacement</u>		<u>Exhaust Emission Control Systems and Special Features</u>
	<u>Liters</u>	<u>Cubic Inches</u>	
YCPXL14.6ERK	14.6	895	Engine Control Module Turbocharger Charge Air Cooler

The engine models and codes are listed on attachments. Production engines shall be in all material respects the same as those for which certification is granted.

The exhaust emission certification standards and certification values in grams per brake horsepower-hour (g/bhp-h) for total hydrocarbons (THC), carbon monoxide (CO), nitrogen oxides (NOx), and particulate matter (PM), and the opacity-of-smoke certification standards and certification values in percent (%) during acceleration (Accel), lugging (Lug), and the peak-values from either mode (Peak) for this engine family are as follows (Title 13, California Code of Regulations, Section 2423):

	<u>Exhaust Emissions (g/bhp-h)</u>				<u>Smoke Opacity (%)</u>		
	<u>THC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>	<u>Accel</u>	<u>Lug</u>	<u>Peak</u>
Standard	1.0	8.5	6.9	0.4	20	15	50
Certification	0.1	0.8	6.5	0.1	6	1	16

BE IT FURTHER RESOLVED: That the listed engine models comply with "Exhaust Emission Standards and Test Procedures—Heavy-Duty Off-Road Diesel-Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model-year.

BE IT FURTHER RESOLVED: That the listed engine models also comply with "Emission Control Labels—1996 and Later Heavy-Duty Off-Road Diesel-Cycle Engines" (Title 13, California Code of Regulations, Section 2424) for the aforementioned model-year.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the materials to demonstrate certification compliance with the Board's emission control system warranty provisions (Title 13, California Code of Regulations, Sections 2425 *et seq.*).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

Executed at El Monte, California this 29<sup>th</sup> day of December 1999.



R. B. Summerfield, Chief  
Mobile Source Operations Division

LARGE ENGINE MODEL SUMMARY

Manufacturer: CATERPILLAR INC. Process Code: New Submission ED: U-R-1-130

EPA Engine Family: YCPXL14.6ERK

Manufacturer Family Name: N/A

1.Engine Code	2.Engine Model	3.HP@RPM (B&E Gross)	4.Fuel Rate (mm/hr) @ peak HP (for diesel only)	5.Fuel Rate (mm/hr) @ peak HP (for diesel only)	6.Torque @ RPM (B&E Gross)	7.Fuel Rate (mm/hr) @ peak torque	8.Fuel Rate (mm/hr) @ peak torque	9.Emission Control Device Per SAE J1880
Note: Peak HP and Peak torque fuel rates are nominal values. Due to product- on engine avgs. These fuel rates may change. T <sub>1</sub> , C <sub>1</sub> , F <sub>1</sub> , E <sub>CM</sub>								
1 - Cat Engine								
2	3406	680 @ 1800	358	216.9	2503 @ 1200	475	181.5	EM, DI, TC, ECM,
3	3406	427 @ 2000	213	143.3	1493 @ 1200	285	114.9	EM, D12AC, ECM,
4	3406	325 @ 1800	176	106.7	1231 @ 1200	229	92.8	EM, D12AC, ECM,
5	3406	350 @ 1800	190	115.1	1328 @ 1200	246	96.2	EM, D12AC, ECM,
6	3406	375 @ 1800	202	122.2	1425 @ 1200	263	106.1	EM, D12AC, ECM,
7	3406	400 @ 1800	215	130.0	1519 @ 1200	278	112.6	EM, D12AC, ECM,
8	3406	425 @ 1800	226	137.0	1613 @ 1200	299	120.6	EM, D12AC, ECM,
9	3406	325 @ 2000	163	108.4	1109 @ 1400	204	96.0	EM, D12AC, ECM,
10	3406	350 @ 2000	175	116.0	1195 @ 1400	221	104.0	EM, D12AC, ECM,
11	3406	375 @ 2000	185	124.7	1282 @ 1400	237	111.4	EM, D12AC, ECM,
12	3406	400 @ 2000	197	132.7	1364 @ 1400	251	118.3	EM, D12AC, ECM,
13	3406	425 @ 2000	209	140.5	1452 @ 1400	267	125.7	EM, D12AC, ECM,
14	3406	450 @ 1800	241	145.8	1707 @ 1200	318	128.3	EM, D12AC, ECM,
15	3406	375 @ 2100	183	129.0	1221 @ 1400	225	106.1	EM, D12AC, ECM,
16	3406	400 @ 2100	192	138.0	1300 @ 1400	237	111.5	EM, D12AC, ECM,
17	3406	425 @ 2100	203	143.3	1382 @ 1400	252	118.7	EM, D12AC, ECM,
18	3406	450 @ 2100	215	151.6	1463 @ 1400	266	125.1	EM, D12AC, ECM,
19	3406	325 @ 2100	161	113.6	1055 @ 1400	199	93.5	EM, D12AC, ECM,
20	3406	350 @ 2100	171	120.9	1138 @ 1400	212	98.6	EM, D12AC, ECM,
21	3406	375 @ 2100	183	129.0	1221 @ 1400	225	106.1	EM, D12AC, ECM,
22	3406	400 @ 2100	192	136.0	1300 @ 1400	237	111.5	EM, D12AC, ECM,
23	3406	425 @ 2100	203	143.3	1382 @ 1400	252	118.7	EM, D12AC, ECM,
24	3406	450 @ 2100	215	151.6	1463 @ 1400	266	125.1	EM, D12AC, ECM,
25	3406	500 @ 2100	238	166.5	1627 @ 1400	293	131.4	EM, D12AC, ECM,
26	3406	525 @ 2100	252	177.5	1707 @ 1400	310	138.1	EM, D12AC, ECM,
27	3406	550 @ 2100	264	186.2	1788 @ 1400	321	145.8	EM, D12AC, ECM,
28	3406	585 @ 2100	271	191.1	1836 @ 1400	331	151.5	EM, D12AC, ECM,
29	3406	575 @ 2100	264	186.4	1871 @ 1400	340	156.1	EM, D12AC, ECM,
30	3406	500 @ 2100	263	185.6	1635 @ 1400	313	147.4	EM, D12AC, ECM,
31	3406	450 @ 2100	236	166.9	1475 @ 1200	284	133.7	EM, D12AC, ECM,
32	3406	425 @ 2100	221	158.4	1376 @ 1400	263	124.1	EM, D12AC, ECM,
33	3406	400 @ 2100	208	147.5	1305 @ 1400	251	118.4	EM, D12AC, ECM,

**LARGE ENGINE MODEL SUMMARY**

11/28/99

ED: U-R-1-130

Manufacturer: CATERPILLAR INC.

Process Code: New Submission

EPA Engine Family: YCPXL14.6ERK

Manufacturer Family Name:

1.Engine Code	2.Engine Model	3.HP@1800 (SAE Gross)	4.Fuel Rate: minimum @ peak HP (for diesel only)	5.Fuel Rate: @ peak HP (for diesel only)	6.Torque @ 1800 (SAE Gross)	7.Fuel Rate: minimum@peak torque	8.Fuel Rate: (peak)/@peak torque	9.Emission Control Devices Per SAE J1939
41	3406	383 @ 2000	186	125.3	1385 @ 1200	254	188.2	EMDI,TC,ECM,
42	3408	380 @ 2100	189	140.7	1171 @ 1800	230	123.8	EMD,DP,EECM,
43	3406	360 @ 2100	182	128.8	1171 @ 1800	230	123.8	EMD,DP,EECM, CAC

↑  
TC, dte, ECM

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-1-118  
Relating to Certification of New Heavy-Duty Off-Road Equipment Engines

CATERPILLAR, INC.

Pursuant to the authority vested in the Air Resources Board at Sections 43000.5, 43013, and 43018 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned at Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9; and

IT IS ORDERED AND RESOLVED: That the following diesel engines and the exhaust emission control systems produced by the manufacturer are certified as described below for use in heavy-duty off-road equipment:

Model Year: 2000

Typical Equipment Usage: Tractor, Generator and Industrial equipment

Engine Power Ratings Range: 175 – 750 horsepower, inclusive

Fuel Type: Diesel

<u>Engine Family</u>	<u>Displacement</u>		<u>Exhaust Emission Control Systems and Special Features</u>
	<u>Liters</u>	<u>Cubic Inches</u>	
YCPXL14.6MRJ	14.6	895	Smoke Puff Limiter Turbocharger Charge Air Cooler

The engine models and codes are listed on attachments. Production engines shall be in all material respects the same as those for which certification is granted.

The exhaust emission certification standards and certification values in grams per brake horsepower-hour (g/hp-h) for total hydrocarbons (THC), carbon monoxide (CO), nitrogen oxides (NOx), and particulate matter (PM), and the opacity-of-smoke certification standards and certification values in percent (%) during acceleration (Accel), lugging (Lug), and the peak-values from either mode (Peak) for this engine family are as follows (Title 13, California Code of Regulations, Section 2423):

	<u>Exhaust Emissions (g/hp-h)</u>				<u>Smoke Opacity (%)</u>		
	<u>THC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>	<u>Accel</u>	<u>Lug</u>	<u>Peak</u>
Standard	1.0	8.5	6.9	0.4	20	15	50
Certification	0.1	2.7	6.6	0.3	15	5	30

CATERPILLAR, INC.

EXECUTIVE ORDER U-R-1-118  
(Page 2 of 2)

BE IT FURTHER RESOLVED: That the listed engine models comply with "Exhaust Emission Standards and Test Procedures—Heavy-Duty Off-Road Diesel-Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model-year.

BE IT FURTHER RESOLVED: That the listed engine models also comply with "Emission Control Labels—1996 and Later Heavy-Duty Off-Road Diesel-Cycle Engines" (Title 13, California Code of Regulations, Section 2424) for the aforementioned model-year.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the materials to demonstrate certification compliance with the Board's emission control system warranty provisions (Title 13, California Code of Regulations, Sections 2425 *et seq.*).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

Executed at El Monte, California this 7 day of December 1999.

  
R. B. Summerfield, Chief  
Mobile Source Operations Division

**LARGE ENGINE MODEL SUMMARY**

10/27/98

EO:U-R-1-118

Manufacturer: CATERPILLAR INC.

Process Code: New Submission

EPA Engine Family: YCPXL14.6MRJ

Manufacturer Family Name: NA

1.Engine Code	2.Engine Model	3.HP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lba/hr) @ peak HP (for diesel only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lba/hr)@peak torque	9.Emission Control Device Per SAE J1930	
Note: Peak HP and Peak Torque		fuel rates are		nominal values.	Due to product-	ion engine avgs.	these fuel rates	may change.	TC-CAC, SPL
1 - Cert Engine	3406	598 @ 1800	352	213.4	2045 @ 1350	405	183.9	EM, DI, TC, SPL	
2	3406	328 @ 2100	182	128.8	1215 @ 1200	234	94.3	EM, DCAC, SPL	
3	3406	325 @ 2100	178	126.0	1280 @ 1200	251	101.0	EM, DCAC, SPL	
4	3406	338 @ 2100	184	130.2	1258 @ 1200	245	98.9	EM, DCAC, SPL	
5	3406	341 @ 2100	186	131.6	1240 @ 1200	242	97.6	EM, DCAC, SPL	
6	3406	328 @ 2100	182	128.6	1215 @ 1200	233	94.3	EM, DCAC, SPL	
7	3406	328 @ 2100	182	128.8	1215 @ 1200	233	94.3	EM, DCAC, SPL	
8	3406	289 @ 1850	166	103.3	1029 @ 1200	205	82.7	EM, DCAC, SPL	
9	3406	264 @ 1800	142	91.0	957 @ 1200	188	78.1	EM, DCAC, SPL	
10	3406	355 @ 2000	187	125.5	1201 @ 1200	248	99.5	EM, DCAC, SPL	
11	3406	400 @ 2000	213	143.1	1381 @ 1400	281	132.4	EM, DCAC, SPL	
12	3406	420 @ 2000	227	153.0	1448 @ 1200	301	122.0	EM, DCAC, SPL	
13	3406	480 @ 2100	237	167.1	1461 @ 1400	281	132.4	EM, DCAC, SPL	
14	3406	325 @ 1800	180	114.9	1153 @ 1200	239	96.8	EM, DCAC, SPL	
15	3406	345 @ 1800	201	122.0	1233 @ 1200	260	105.0	EM, DCAC, SPL	
16	3406	325 @ 2000	174	116.8	1098 @ 1400	220	103.7	EM, DCAC, SPL	
17	3406	340 @ 2000	181	121.9	1181 @ 1400	226	109.5	EM, DCAC, SPL	
18	3406	325 @ 1800	190	114.9	1153 @ 1200	243	98.1	EM, DCAC, SPL	
19	3406	345 @ 1800	201	122.0	1233 @ 1200	260	105.0	EM, DCAC, SPL	
20	3406	325 @ 2100	168	118.9	1089 @ 1400	218	102.6	EM, DCAC, SPL	
21	3406	335 @ 2100	174	122.9	1133 @ 1400	227	108.9	EM, DCAC, SPL	
22	3406	335 @ 2100	174	122.9	1133 @ 1400	218	102.6	EM, DCAC, SPL	
23	3406	500 @ 2100	255	180.0	1600 @ 1400	298	139.4	EM, DCAC, SPL	
24	3406	360 @ 1800	208	126.0	1264 @ 1200	262	106.0	EM, DCAC, SPL	
25	3406	380 @ 2000	192	129.0	1213 @ 1400	246	116.0	EM, DCAC, SPL	
26	3406	360 @ 1800	208	126.0	1251 @ 1200	262	106.0	EM, DCAC, SPL	
27	3406	360 @ 2100	188	133.0	1202 @ 1400	240	113.0	EM, DCAC, SPL	
28	3406	380 @ 2100	201	142.0	1287 @ 1400	260	123.0	EM, DCAC, SPL	
29	3406	400 @ 2100	249	150.0	1369 @ 1400	278	131.0	EM, DCAC, SPL	
30	3406	390 @ 2100	201	141.9	1331 @ 1400	258	121.2	EM, DCAC, SPL	
31	3406	435 @ 2100	227	160.4	1505 @ 1400	293	138.1	EM, DCAC, SPL	
32	3406	347 @ 1900	189	120.8	1219 @ 1200	243	98.3	EM, DCAC, SPL	
33	3406	382 @ 1900	208	133.2	1384 @ 1200	273	110.2	EM, DCAC, SPL	

EO:U-R-118

YCRXL14-6MRJ

TC, CAC, SPL  
CAC

EM, DI, TC, SPL	132.4	282	1485 @ 1350	151.8	251	440 @ 1800	3406	34
EM, DQRC, SPL	109.3	271	1317 @ 1200	130.5	215	375 @ 1800	3406	35
EM, DQRC, SPL	122.0	259	1339 @ 1400	139.3	207	380 @ 2000	3406	36
EM, DQRC, SPL	114.2	283	1430 @ 1200	137.6	227	400 @ 1800	3406	37
EM, DQRC, SPL	112.4	278	1378 @ 1200	140.2	219	400 @ 1900	3406	38
EM, DQRC, SPL	110.3	247	1280 @ 1400	133.3	198	375 @ 2000	3406	39
EM, DQRC, SPL	126.7	267	1379 @ 1400	142.7	212	400 @ 2000	3406	40
EM, DQRC, SPL	115.5	245	1270 @ 1400	136.2	193	375 @ 2100	3406	41
EM, DI, TC, SPL	124.8	265	1369 @ 1400	145.8	206	400 @ 2100	3406	42
EM, DQRC, SPL	138.1	283	1505 @ 1400	160.5	227	435 @ 2100	3406	43
EM, DQRC, SPL	156.2	332	1680 @ 1400	181.8	257	485 @ 2100	3406	44
EM, DQRC, SPL	113.0	249	1244 @ 1350	122.2	218	385 @ 1800	3406	45
EM, DQRC, SPL	128.9	269	1388 @ 1400	155.4	231	440 @ 2000	3406	46
EM, DQRC, SPL	132.4	282	1485 @ 1350	151.8	251	440 @ 1800	3406	47
EM, DQRC, SPL	129.8	285	1482 @ 1350	154.8	242	440 @ 1800	3406	48
EM, DQRC, SPL	128.9	288	1398 @ 1400	155.4	231	440 @ 2000	3406	49

LARGE ENGINE TEST ENGINE INFORMATION FORM

Manufacturer: **CATERPILLAR INC.**

ED: *U-R-1-118*

1. EPA Standardized Engine Family: **YCPXL14.6MRJ** 2. Process Code: **New Sub - continued** 3. Test Data Set: **2**

- 4. Engine Code: **45**
- 5. Engine Model: **3406**
- 6. Displacement(s) (cid Or Liters): **14.6 Liters**
- 7. Engine I.d. Number: **1A10210**
- 8. Rated HP @ **385** @
- Rated RPM: **1800**
- 9. Torque (ft-lb) @ **1275** @
- Engine RPM: **1350**
- 10. WAIVERS: **CO PM Smoke Idle Co**  
**NA NA NA NA**
- 11. COLD START: **NA**
- 12. Certification Fuel: **Diesel (Part 89, Sub D, Appdx A, Table 5)**
- 13. Special Test Device  Yes  No
- 14 Test Procedure: **Nonroad, 8 Mode & Smoke**

15. Official Test Results

Date: **8/3/95**

16. Deterioration Factors

	Test 1	Test 2	Test 3
HC/OMHCE	0.08		
NMHC/OMNMHCE			
HC + NOx			
CARBON MONOXIDE	1.25		
OXIDE OF NITROGEN	6.58		
PARTICULATE	0.080		
FORMALDEHYDE			
ACCELERATION (%opacity)	11.0		
LUGGING (Gen) (%opacity)	2.0		
PEAK (%opacity)	28.0		
IDLE CO %			
CO2			



17. Certification Levels (Rounded Test Results)

Units-- g/bHp-hr --Units

STDs FELs  
g/BHP-hr g/kW-hr

HC/OMHCE	0.1
NMHC/OMNMHCE	
HC + NOx	
CARBON MONOXIDE	1.2
OXIDE OF NITROGEN	6.6
PARTICULATE	0.08
FORMALDEHYDE	
ACCELERATION (%opacity)	11
LUGGING (Gen) (%opacity)	2
PEAK (%opacity)	28
IDLE CO%	

# LARGE ENGINE TEST ENGINE INFORMATION FORM

Manufacturer: **CATERPILLAR INC.**

EO: *U-R-1-118*

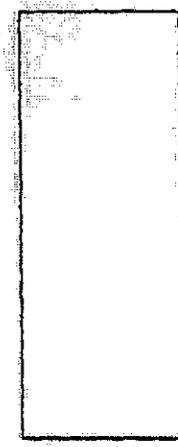
1. EPA Standardized Engine Family: **YCPXL14.6MRJ** 2. Process Code: **New Submission** 3. Test Data Set: **1**

4. Engine Code: <b>1</b>	10. WAIVERS: <b>CO PM Smoke Idle Co</b>	
5. Engine Model: <b>3406</b>	<b>NA NA NA NA</b>	
6. Displacement(s) (cid Or Liters): <b>14.6 Liters</b>	11. COLD START: <b>NA</b>	
7. Engine I.d. Number: <b>1A10746</b>	12. Certification Fuel: <b>Diesel (Part 89, Sub D, Appdx A, Table 5)</b>	
8. Rated HP @ <b>599</b> @	13. Special Test Device <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Rated RPM: <b>1800</b>	14. Test Procedure: <b>Nonroad, 3 Mode &amp; Smoke</b>	
9. Torque (ft-lb) @ <b>2045</b> @		
Engine RPM: <b>1350</b>		

15. Official Test Results Date: **8/14/85**

18. Deterioration Factors

	Test 1	Test 2	Test 3
HC/OMHCE	<b>0.04</b>		
NMHC/OMNMHCE			
HC + NOx			
CARBON MONOXIDE	<b>2.67</b>		
OXIDE OF NITROGEN	<b>6.59</b>		
PARTICULATE	<b>0.254</b>		
FORMALDEHYDE			
ACCELERATION (%opacity)	<b>15.3</b>		
LUGGING (Gen) (%opacity)	<b>5.2</b>		
PEAK (%opacity)	<b>29.6</b>		
IDLE CO %			
CO2			



17. Certification Levels (Rounded Test Results)

Units-- g/bHp-hr --Units

STDs FELs  
g/BHP-hr g/W-hr

HC/OMHCE	<b>0.04</b>
NMHC/OMNMHCE	
HC + NOx	
CARBON MONOXIDE	<b>2.7</b>
OXIDE OF NITROGEN	<b>6.6</b>
PARTICULATE	<b>0.254 ~ 0.3</b>
FORMALDEHYDE	
ACCELERATION (%opacity)	<b>15</b>
LUGGING (Gen) (%opacity)	<b>5</b>
PEAK (%opacity)	<b>30</b>
IDLE CO%	





**Enclosure 5**

**Purchase Order (PO) – Services  
PO NO. 46870**

# Battelle

The Business of Innovation

902 Battelle Boulevard  
P.O. Box 999  
Richland, WA 99352

## PURCHASE ORDER (PO) - SERVICES

Page 1 of 2

DATE 06/29/2007	DELIVERY DATE: 07/02/07 * See Delivery Comment Below PICK-UP DATE: 09/03/07	PO NO. 46870
CONTRACTS REPRESENTATIVE Alfred Garcia, Jr.	K9-84 PO Box 999 Richland WA 99352	Phone Number: 509-375-4312 Fax Number: 509-372-4334 Email Address: Al.Garcia@pnl.gov
CONTRACTOR:  United Rentals 1901 Frontier Loop Pasco, WA 99301  Jeff Wattenburger Tel: (509) 546-2100 Fax: (509) 546-0924	SHIP TO:  Battelle 790 6th Street Richland, WA 99352 Attn: PO No. 46870  Payment Terms: Net 30 Days FOB Point: Destination Shipping Method: Vendor Delivery Freight Payment Method: Other (see Delivery and Pick-Up line items below)	Submit electronic invoice to: an.invoices@pnl.gov If not possible, submit 2 invoices to: Battelle, Pacific Northwest Division ATTN: ACCOUNTS PAYABLE PO Box 999, MSIN: J1-04 Richland, WA 99352 United States  Tel: 509-371-7546 Fax: 509-371-7551

Item	Qty	U/M	Description	Unit Price	Total Price
1	2	EA	1600 CFM, 150 PSI Diesel Air Compressor, monthly rental price of \$5,200. per month each for two months	\$ 10,400.00	\$ 20,800.00
2	1	EA	Delivery Fee	\$ 500.00	\$ 500.00
3	1	EA	Pick-Up Fee	\$ 500.00	\$ 500.00
<b>TOTAL</b>					<b>\$ 21,800.00</b>

The above equipment is being rented to Battelle for an estimated period of approximately **TWO MONTHS**, unless extended by Battelle with a Modified Purchase Order. Upon completion of the rental period, the equipment shall be returned, FOB destination, transportation prepaid.

In the event of loss or damage to the equipment while in the possession of Battelle, Battelle may, at its option, either pay for the repair or purchase the equipment. Battelle's maximum liability shall not exceed the purchase price of \$80,000.00/ea.

\*Delivery Date: Delivery for this equipment shall be July 3, 2007. Please contact Bill Combs at (509) 376-9030 to arrange for pickup date and location.

Technical Administrator: The Battelle Technical Administrator for this contract is Bill Combs who may be contacted on (509) 376-9030. The Technical Administrator has no authority to: change or waive any provision of this contract, including but not limited to statements of work, drawings, specifications and standards, whether attached or incorporated by reference; provide interpretations of any provision or requirement of this contract; direct, advise, or recommend any particular course of conduct on the part of the Contractor; or create any legally binding commitment on behalf of Battelle.

Not-To-Exceed Price: All inclusive firm, fixed price amount for this purchase order.

# Battelle

The Business of Innovation

## PURCHASE ORDER (PO) - SERVICES

Page 2 of 2

**Invoices:** An application for payment (invoice) may not be submitted more frequently than monthly. Applications shall reference this purchase order number, include supporting documentation such as time sheets and travel receipts, and be mailed, in duplicate to the invoice address above.

**Work on Battelle or Government Premises:** This contract will require work on Battelle or Government premises. Note general provisions below and in the attachments. Please complete the Contractor Preliminary Hazard Assessment Form per attached instructions and return to the attention of Al Garcia either via email, mail or faxed to the following: [al.garcia@pnl.gov](mailto:al.garcia@pnl.gov), 3208 Q Avenue, K9-84, Richland, WA 99354, or (fax) (509) 372-4334.

**Insurance Certificate:** Note that your insurance certificate must be submitted to the Battelle Contract Specialist prior to any work on Battelle or Government premises.

**General Insurance Requirements:** Contractor shall obtain and maintain the following additional coverage during the time it is performing under any resulting contract:

- Comprehensive General Liability: Personal injury and property damage \$1,000,000 minimum per occurrence (combined single limit). Certificate shall indicate that coverage is afforded for completed operation and/or products liability.
- Comprehensive Automobile Liability: Personal injury and property damage, \$1,000,000 per occurrence (combined single limit). Certificates shall indicate that coverage is afforded for all owned, non-owned, and hired automobiles.

Acceptance of this item is contingent upon the following: No visible signs of damage (e.g. dents, cuts, structural cracks, loose or missing parts) to the compressor, trailer or essential components. Owners manual must be attached to the equipment. The vendor must conduct a pre-delivery inspection of all major components of the compressor prior to delivery. Documentation of this inspection must be attached to the equipment when it arrives at PNNL. All repaired or replaced parts and components must be compliant with the manufacturer's specifications. Operating controls must not subject the operator to pinch points, sharp edges or snagging hazards or other hazards. All machine guarding must provide proper coverage and must be in good condition. All labels and signs identifying hazards ("Danger", "Warning", "Caution") and operator instructions must be clearly displayed (e.g. not blocked behind structural or other components) and legible to read (i.e. not smeared, damaged or painted over). Equipment must not contain suspect counterfeit fasteners (parts).

**Conclusion:** Notwithstanding any other terms received with your offer, only the terms and conditions noted herein shall apply to this contract.

<i>Show PO number on all packages, invoices and/or correspondence. Complete packing list must accompany each shipment.</i>	
General Provisions that are part of the purchase order are as follows:	Battelle Memorial Institute Pacific Northwest Division
General Provisions: Commercial (GP-B <\$25K) including P.A.A. Nuclear Hazards Indemnity Agreement, and Environmental, Safety & Health Requirements Clause 3113a	 Alfred Garcia, Jr. Division Contract Manager ETS & FSS
	7-307 Date Signed

**Enclosure 6**

**Diesel Fuel Specifications**



Attn: Rick Brown  
Hanford, WA  
Phone: 509-372-2181  
Fax: 509-372-1694

October 16<sup>th</sup>, 2007

Rick,

Per your request I have pulled together this year's diesel production data from our Billings, Montana refinery that supplies the Moses Lake Terminal in Washington. It is summarized below for the most recent data I have:

Sulfur content (wt %): High-.00128 Low-.00026 Mean-.00051  
Density (#/gal): High-7.09 Low-7.01 Mean: 7.05  
BTU content (gross/gal): High-138,824 Low-137,625 Mean-138,283

Using the highest sulfur content (0.00128 wt %), the highest density (7.09 #/gal), and the lowest BTU content (137,625 BTU/gal) the sulfur per million BTU calculations would be:

1,000,000 BTU / 137,625 BTU per gal = 7.27 gal of fuel  
(7.27 gal) X (7.09 #/gal) = 51.5# of fuel / 1,000,000 BTU  
(51.5 # of fuel / 1,000,000 BTU) X (.0000128 # of sulfur # of fuel) = 0.0007 # of sulfur per 1,000,000 BTU

Best regards,

Paul Ryder  
Fuels Specialist- Western Region  
Phone: 918-681-0077  
ConocoPhillips  
Bartlesville Technology Center 146-AL  
Bartlesville, OK 74004

**Enclosure 7**

**Engine Emissions Certifications  
(S/N BEM06690 & S/N BEM06685)**

From: Engine Certification [Engine\_Certification@cat.com]  
 Sent: Wednesday, August 01, 2007 1:20 PM  
 To: Duchsherer, Cheryl J  
 Subject: Re: FW: New air Compressors

Greetings,

Both engines are US EPA Tier 2 Certified under engine family

4CPXL14.6ESK.

Regards,  
 Engine Certification

Engine Emissions Data					
Emissions Definitions					
Serial Number	BEM06690				
Engine Arrangement Number	2349188				
Certification Arrangement					
As - Shipped Certification	EPA / CARB Flex / Eu Flex & Stationary w/ Evidence				
Labeled Model Year	2006				
Family Code	4CPXL14.6ESK				
Family Certification	EPA TIER 2		EU STAGE II		
Spec Number	OK2369				
Cycle Steady State Gaseous Emissions (EPA/CARB) (g/kw-hr)			Transient Cycle Smoke Emissions (EPA/CARB)		
NOx + HC	CO	PM	A Smoke % Opacity	B Smoke % Opacity	C Smoke % Opacity
5.7	0.9	0.07	7	1	8

Engine Emissions Data					
Emissions Definitions					

Serial Number	BEM06685				
Engine Arrangement Number	2349188				
Certification Arrangement					
As - Shipped Certification	EPA / CARB Flex / Eu Flex & Stationary w/ Evidence				
Labeled Model Year	2006				
Family Code	4CPXL14.6ESK				
Family Certification	EPA TIER 2		EU STAGE II		
Spec Number	OK2369				
Cycle Steady State Gaseous Emissions (EPA/CARB) (g/kw-hr)			Transient Cycle Smoke Emissions (EPA/CARB)		
NOx + HC	CO	PM	A Smoke % Opacity	B Smoke % Opacity	C Smoke % Opacity
5.7	0.9	0.07	7	1	8

"Duchsherer, Cheryl J" <cheryl.duchsherer@pnl.gov>

08/01/2007 02:36 PM

To <Engine\_Certification@cat.com>

Id

cc

Subject FW: New air Compressors

Caterpillar: Confidential Green    Retain Until: 08/31/2007    Retention Category: G90 - General Matters/Administration

Please send me the Engine Emission Data sheets for the engines listed below.

Thank you,

Cheryl Duchsherer  
Effluent Management Group  
Pacific Northwest National Laboratory

Phone: (509) 371-7769

Fax: (509) 371-7773

---

From: Combs, William H

Sent: Wednesday, August 01, 2007 12:02 PM

To: Duchshner, Cheryl J; Bontha, Jagan

Subject: New air Compressors

Received the 2 new air compressors

#1 Cat Mdl C-15, S/N BEM006690 764 hrs

#2 Cat Mdl C-15, S/N BEM06685 241 hrs

William Combs

376-9030

**Enclosure 8**

**Purchase Order (PO) - Services  
PO NO. 48602 MOD 1**

# Battelle

The Business of Innovation

902 Battelle Boulevard  
P.O. Box 999  
Richland, WA 99352

## PURCHASE ORDER (PO) - SERVICES

Page 1 of 2

DATE 7/31/2007	DELIVERY DATE: 08/01/07 * See Delivery Comment Below PICK-UP DATE: 09/01/07 10/01/07	PO NO. 48602 MOD 1
CONTRACT'S REPRESENTATIVE Laurie Martin	K9-84 PO Box 999 Richland WA 99352	Phone Number: 509-375-2951 Fax Number: 509-375-2605 Email Address: Laurie.Martin@pnl.gov
CONTRACTOR:  United Rentals 1901 Frontier Loop Pasco, WA 99301  Chuck Giesen Tel: (509) 545-2100	SHIP TO:  Battelle 790 6th Street Richland, WA 99352 Attn: PO No. 48602  Payment Terms: Net 30 Days FOB Point: Destination Shipping Method: Other Freight Payment Method: Other (see Delivery and Pick-Up line items below)	Submit electronic invoice to: bp.invoices@pnl.gov If not possible, submit 2 invoices to: Battelle, Pacific Northwest Division ATTN: ACCOUNTS PAYABLE PO Box 999, MSIN: J1-04 Richland, WA 99352 United States  Tel: 509-371-7546 Fax: 509-376-1339

Item	Qty	U/M	Description	Unit Price	Total Price
1	4	EA	Rental of 2 - 1600CFM 150PSI Diesel Air Compressor, including minimum of 20-ft of 2-inch flexible tubing to connect to test equipment. Monthly Rental Price \$8,666.00/Compressor	\$ 8,666.00	\$ 34,664.00
2	2	EA	Delivery Fee	\$ 700.00	\$ 1,400.00
3	2	EA	Pick-Up Fee	\$ 700.00	\$ 1,400.00
<b>TOTAL</b>					\$ 37,464.00

The above equipment is being rented to Battelle for an estimated period of approximately *ONE MONTH*, unless extended by Battelle with a Modified Purchase Order. Upon completion of the rental period, the equipment shall be returned, at the pick-up fee designated above.

**\*\*MODIFICATION 1 EXTENDS THE RENTAL PERIOD TO TWO MONTHS - PICKUP DATE 10/1/2007\*\***

In the event of loss or damage to the equipment while in the possession of Battelle, Battelle may, at its option, either pay for the repair or purchase the equipment. Battelle's maximum liability shall not exceed the purchase price of \$100,000.00, with adequate supporting documentation to support this figure.

\*Delivery Date: Delivery for this equipment will be made on August 1, 2007. Please contact Bill Combs at 376-9030 to arrange for pickup date and location.

Technical Administrator: The Battelle Technical Administrator for this contract is Bill Combs who may be contacted on (509) 376-9030. The Technical Administrator has no authority to: change or waive any provision of this contract, including but not limited to statements of work, drawings, specifications and standards, whether attached or incorporated by reference; provide interpretations of any provision or requirement of this contract; direct, advise, or recommend any particular course of conduct on the part of the Contractor; or create any legally binding commitment on behalf of Battelle.

Not-To-Exceed Price: All inclusive firm, fixed price amount for this purchase order.

Invoices: An application for payment (invoice) may not be submitted more frequently than monthly. Applications shall reference this purchase order number, include supporting documentation such as time sheets and travel receipts, and be mailed, in duplicate to the invoice address above.

**Work on Battelle or Government Premises:** This contract will require work on Battelle or Government premises. Note general provisions below and in the attachments. Please complete the Contractor Preliminary Hazard Assessment Form per attached instructions and return to the attention of Laurie Martin either via email, mail or faxed to the following: [Laurie.Martin@pnl.gov](mailto:Laurie.Martin@pnl.gov), 3200 Q Avenue, K9-84, Richland, WA 99354, or (509) 375-2685.

**Insurance Certificate:** Note that your insurance certificate must be submitted to the Battelle Contract Specialist prior to any work on Battelle or Government premises.

**General Insurance Requirements:** Contractor shall obtain and maintain the following additional coverage during the time it is performing under any resulting contract:

- Comprehensive General Liability: Personal injury and property damage \$500,000 minimum per occurrence (combined single limit). Certificate shall indicate that coverage is afforded for completed operation and/or products liability.
- Comprehensive Automobile Liability: Personal injury and property damage, \$500,000 per occurrence (combined single limit). Certificates shall indicate that coverage is afforded for all owned, non-owned, and hired automobiles.

**Other Application Provisions:** 1.3.2.1.1 and 1.3.2.1.3 "The diesel compressor engine shall be rated at 450 KW or less and certified by the manufacturer to meet EPA Tier 2 or 3 emission limits. Contractor shall provide a copy of the manufacturer's specification sheet(s) for the provided engine stating the model, KW rating and certified Tier level.

1.3.2.2.2 Contractor shall provide a non-resettable hour meter installed to record engine operating hours.

1.4 "Contractor shall have performed the maintenance required to maintain engine emissions specifications as described in the manufacturer's instructions before the unit is first required for operation by Battelle, and perform subsequent maintenance at the frequency required to maintain same during the duration of the contract. The manufacturer's maintenance manual and records of said maintenance shall be made available for inspection by the Washington State Department of Ecology or Battelle at the contractor's place of business upon request and in a reasonable time, and a copy of same shall be provided to Battelle upon completion of the contract.

Acceptance of this item is contingent upon the following: No visible signs of damage (e.g. dents, cuts, structural cracks, loose or missing parts) to the compressor, trailer or essential components. Owners manual must be attached to the equipment. The vendor must conduct a pre-delivery inspection of all major components of the compressor prior to delivery. Documentation of this inspection must be attached to the equipment when it arrives at PNNL. All repaired or replaced parts and components must be compliant with the manufacturer's specifications. Operating controls must not subject the operator to pinch points, sharp edges or snagging hazards or other hazards. All machine guarding must provide proper coverage and must be in good condition. All labels and signs identifying hazards ("Danger", "Warning", "Caution") and operator instructions must be clearly displayed (e.g. not blocked behind structural or other components) and legible to read (i.e. not smeared, damaged or painted over). Equipment must not contain suspect counterfeit fasteners (parts).

**Conclusion:** Prices in accordance with your verbal offer dated 7/26/2007 by your Chuck Giesen. Notwithstanding any other terms received with your offer, only the terms and conditions noted herein shall apply to this contract.

Show PO number on all packages, invoices and/or correspondence. Complete packing list must accompany each shipment.

General Provisions that are part of the purchase order are as follows:	Battelle Memorial Institute Pacific Northwest Division
General Provisions: 48602 General Provisions dated 7/31/2007 attached	 Laurie Martin Sr. Contract Specialist, Contracts
	9-21-07 Date Signed