Mr. Val Cannon, Manager
Quality Assurance
Nuclear Waste Partnership LLC
P.O. Box 2078
Carlsbad, NM 88221-2078

Subject: Surveillance Report S-16-51, Assessment of the WIPP Diesel Fire Pump Dynamometer Test at the Stewart & Stevenson Facility

Dear Mr. Cannon:

The Carlsbad Field Office conducted the subject surveillance on July 14, 2016, at the Stewart & Stevenson Facility, 6565 Hanover Road NW, Albuquerque, NM. Results of the surveillance are provided in the enclosed report. Two deficiencies were identified.

If you have any questions or comments concerning the surveillance, please contact me at (575) 234-7476.

Sincerely,

Michael R. Brown, Director
Office of Quality Assurance

Enclosure
Mr. V. Cannon

cc: w/enclosure
W. Mouser, CBFO
M. Brown, CBFO
D. Miehls, CBFO
M. Navarrete CBFO
E. Garza, CBFO
R. Elmore, CBFO
P. Breidenbach, NWP
J. Blankenhom, NWP
J. Britain, NWP
M. Love, NWP
B. Allen, NWP
S. Punchois, NWP
A. Boyea, NWP
T. Peake, EPA
J. Kieling, NMED
R. Maestas, NMED
C. Smith, NMED
D. Winters, DNFSB
V. Daub, CTAC
P. Martinez, CTAC
C. Castillo, CTAC
M. Leroch, CTAC
D. Knox, CTAC
D. Harvill, CTAC
G. White, CTAC

CBFO QA File
CBFO M&RC

*ED denotes electronic distribution.
SURVEILLANCE NUMBER: S-16-51

SURVEILLANCE TITLE: Assessment of the WIPP Diesel Fire Pump Dynamometer Test at the Stewart & Stevenson Facility at 6565 Hanover Road NW, Albuquerque, NM 87121

DATE OF SURVEILLANCE: July 14, 2016

Prepared and Approved By: Michael R. Brown
Director, Office of Quality Assurance
Carlsbad Field Office

Date: 8/9/2016
1.0 EXECUTIVE SUMMARY

This surveillance team witnessed the test of the diesel fire pump engine (equipment #45-G-602) after it was rebuilt. The water pump was not connected to the engine at the time of the surveillance. The test was observed at the Stewart and Stevenson facility in Albuquerque, NM, located at 6565 Hanover Road NW. The company is an authorized Detroit Diesel Dealer and service center. The engine that was repaired and tested is a Detroit Diesel engine. The engine nameplate rates the engine at 188 BHP at 1760 RPM. The test required running the unit at 25%, 50%, 75%, and 100% load for 15 minutes. The unit was inspected and adjusted and then run at 100% rated BHP for 1 hour. The unit was tested on a Taylor Dynamometer model DS-4012. See the attached picture of the test screen. The acceptance criteria was >= 188 BHP @ 1760 RPM. The test indicated the engine operated at 187 BHP at 1758 RPM which did not meet the acceptance criteria. See Cars 16-058 and 16-059.

2.0 ORGANIZATION ASSESSED

Nuclear Waste Partnership (NWP)

3.0 SURVEILLANCE SCOPE

The surveillance scope included the observation of NWP assurance activities, and the dynamometer testing of the Waste Isolation Pilot Plant (WIPP) diesel fire pump engine that was rebuilt at the Stewart and Stevenson facility. Activities observed included:

1. Observed performance of Stewart and Stevenson Dyno General Procedure, 7.5.7, Rev. #2, approved on PO #506408, AR/VR No. 12
2. Observed NWP Oversight of the Testing

4.0 SURVEILLANCE TEAM

The surveillance team consisted of the following:

Michael R. Brown  Surveillance Team Leader and Director, CBFO Office of Quality Assurance

5.0 INDIVIDUALS CONTACTED DURING THE ASSESSMENT

The following personnel were contacted during the course of the surveillance:

Preston Harvey – NWP Quality Engineer
Laura Garcia – NWP Cognizant-System Engineer
Craig Keen – Stewart & Stevenson personnel
Gary Whelan – Stewart & Stevenson personnel
Maria Clary – Stewart & Stevenson personnel
David Mink – NWP Engineer
Jeff Newman – Stewart & Stevenson personnel
6.0 SUMMARY OF SURVEILLANCE RESULTS

During this surveillance, the Surveillance Team Leader (STL) observed the testing of the diesel fire pump engine after it was rebuilt. The engine was rebuilt at the Stewart & Stevenson facility at 6565 Hanover Road NW, Albuquerque, NM, 87121. The test was conducted on July 14, 2016. The surveillance team arrived at the test facility at 9:00 AM and observed activities at the facility until approximately 12:00 PM. The engine was mounted in a test cell where cooling water flowed in the opposite direction from when it was installed at WIPP due to the design of the facility. Gauges were mounted on the engine and visible through the window of the test cell to show oil pressure, fuel pressure and temperature. A Taylor Dynamometer, model DS-4012, was used with Dyn Pro Version 5.0 software. The system was self-calibrated at the start of the test. The procedure used to perform the test was Stewart & Stevenson procedure, Dyno General Procedure, 7.5.7 W001, Rev #2. Steps 2.21 through 2.25 of the procedure were observed. Acceptance criteria were described in the NWP Commercial Grade Dedication Form (CGID), CGID #16-17, page 3, Critical Characteristic, “Acceptance Criteria : >=188 BHP @ 160 RPM.” held by the NWP Quality Engineer. The Engine was rated at 188 BPH at 1760 RPM as noted on the engine nameplate data shown on page 8. At the test, a reference was made to a plus or minus 5% tolerance, which was not documented on the CGID form. The acceptance criteria was only listed as >=188 BHP @1760 RPM. The Quality Engineer signed the test off as acceptable on 7/14/16. The test report shows the engine at 187 BHP at 1758 RPM, which is technically failing. No NWP nonconformance report (NCR) was generated. Additionally, the CGID #16-17 referenced revision 5 of the DSA, rather than revision 5B and chapter 2. Chapters 4 and 5 of the DSA were not referenced. It was also discovered that some of the DSA related performance criteria were not referenced. The items do not impact the Dynamometer test, but could impact the Post-Installation performance test. See the attached NWP CGID plan (CGID #16-017) and AR/VR PO #506408 – 6.

The Stewart & Stevenson personnel were professional and very knowledgeable. They provided the team required access to the facilities, records, and answered questions from the surveillance team.

1. Individuals were not at the Stewart & Stevenson facility in Albuquerque
7.0 CARs, OBSERVATIONS, RECOMMENDATIONS, and ITEMS CORRECTED

The surveillance identified two CARs 16-058 and 16-059.

7.1 CORRECTIVE ACTION REPORTS

CAR 16-058 was written to address that the test was accepted and signed designating it as acceptable when it failed the criteria listed in CGID #16-17, page 3, Critical Characteristic "Acceptance Criteria: >=188 BHP @ 160 RPM." The test report shows 187 BHP @ 1758. No NCR was generated.

CAR 16-059 was written because CGID # 16-017 referenced an outdated revision of the DSA. The CGID referenced Revision 5 of the WIPP Documented Safety Analysis, DOE/WIPP-07-3372 instead of Revision 5B approved April 2016. In addition the document referenced chapters 2 instead of chapters 4 and 5 for the critical characteristics or performance criteria. The form also references a purchase order number that was not included. It appears that not all requirements were noted.

7.2 OBSERVATIONS

None

7.3 RECOMMENDATIONS

The surveillance team recommends that in the future the acceptance test documents include the acceptance criteria and numbers in the test document. The acceptance criteria were found in CGID#16-017, and were not included in the vendor test report or requirements.

7.4 ITEMS CORRECTED DURING THE SURVEILLANCE

NONE
Engine on test stand in test cell at Stewart & Stevenson
Fire Pump Engine Nameplate showing engine rated at 188bhp at 1760 RPM
See attached Test Report and CGID
See attached Test Report and CGID
**Nuclear Waste Partnership LLC**  
**Commercial Grade Item Dedication Form**

**Section One – Commercial Grade Dedication Evaluation**

<table>
<thead>
<tr>
<th>CGID #</th>
<th>16-017</th>
<th>Revision</th>
<th>2</th>
<th>Date</th>
<th>6/21/2016</th>
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</table>

**Item:** Service – Diesel Fire Pump Engine Rebuild

**Manufacturer:** Clark GM Diesel, INC.

**Manufacturer Part/Model Number:** DDFP-04AT; S/N 4A-276864

**Warehouse Stock Number:** N/A

**Equipment Number:** 45-G-602

**System Number:** FP-01  
**Functional Classification:** SC SS(X)

**Drawing No./Specification ID, etc.:** Clark Manual – DDFP-04AT

**Supplier of CGI to be dedicated:** Stewart & Stevenson

**Supplier Model Number (If different from manufacturer number):** N/A

**CGI/CGS Applicable:** Yes/No (circle one)  
**Commercial item** Yes/No (circle one)  
**Like-for-Like item / Alternative Replacement item** (circle one)

1. **Item's Critical Design/Safety Function:**
   Per DSA Rev. 5 section 2.8.2, the WIPP Fire Protection System is designed to ensure personal safety, mission continuity, and property protection. The Diesel Fire Pump is an integral part of this system in that it supplies the fire water distribution system. This design meets the risk level of protection required by DOE Order 420.1C and meets the applicable sections of the National Fire Protection Association (NFPA) codes.

2. **Performance Requirements:**
   Diesel Fire Pump is required to provide 1,500 gallons per minute @ 125 psi. The Fire Water Tank is sized to provide 1500 GPM for two hours.

3. **Applicable Service Conditions:**
   Diesel Fire Pump is located inside building 456, an un-insulated Steel-framed and metal sheeting building. The inside of Building 456 is climate controlled to maintain the temperature at or above 40 F.

4. **Failure Mode and Effects Analysis:**
   See Attachment 1 for Failure Modes and Effects Analysis (FMEA)
5. **Selected Critical Characteristics for Verification and DSA and/or SDD References:**
   a. Part Identification / Inspection (prior to rebuild)  
      DSA Rev. 5 section 2.8.2
   b. Factory Acceptance Test (FAT)  
      DSA Rev. 5 section 2.8.2
   c. Post-Installation Performance Test  
      DSA Rev. 5 section 2.8.2

6. **Engineering Logic for Selected Characteristics:**
   a. We must validate the replacement parts used in the rebuild are OEM replacement parts to maintain the UL/FM rating.
   b. We must ensure the engine can produce rated HP @ specified RPM (188 BHP @ 1760 RPM).
   c. We must ensure that the rebuilt engine and replacement pump will provide 1,500 GPM @ 125 PSI.

7. **Basis for Sampling Specified in Section Two – Commercial Grade Dedication Plan:**
   100%; all items will receive part identification inspection. Likewise the engine will undergo FAT & the Post-Installation Performance Test.

8. **Equivalency Evaluation (Required for Alternative Replacement Items):**

   **Identification of the Changes:** All vendor-supplied parts will be OEM replacement parts or refurbished parts removed from the original engine that still meet OEM specifications.

   **Evaluation of the Changes:** Any vendor-supplied OEM replacement parts must be equivalent or better than the original OEM-supplied parts. Likewise any refurbished parts will meet OEM specifications or be replaced. Therefore, all parts will meet or exceed OEM specifications.

   Based on the identified changes and their evaluation, the changes do not adversely affect the current design or safety function of the item:

   - Yes
   - No (Circle one)
Nuclear Waste Partnership LLC  
Commercial Grade Item Dedication Form  

Section Two – Commercial Grade Dedication Plan  

**CGID #16-017**  
**Revision 2**  
**Date 6/21/2016**  

**Item:** Service – Diesel Fire Pump Engine Rebuild  

**Item Number:** N/A  

1. **Critical Characteristic (reference section 4.0 of WP 09-CN3040):** Part Identification / Inspection  

Acceptance Method Used:  

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</tbody>
</table>

Acceptance Criteria: Verify all vendor-supplied parts used in the rebuild are OEM (Detroit Diesel or Clark GM Diesel) replacement parts. 

Instructions: Verify all vendor-supplied parts used are traceable to an OEM Bill of Material (BOM) or an OEM purchase order. Vendor shall be able to demonstrate a link between their procurement documents and the OEM.  

2. **Critical Characteristic:** Successful Factory Acceptance Test (FAT)  

Acceptance Method Used:  

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | X | 4 |   |   |

Acceptance Criteria: >=188 BHP @ 1760 RPM.  

Instructions: Witness the FAT at the vendor's selected facility; ensure the M&TE associated with the dynamometer is in calibration. Obtain copy of the test results.  

3. Engineering Logic: Method 1 was selected for Critical Characteristic 3 because NWP needs to witness the Post-installation Testing. We specified Method 3 for Critical Characteristics 1 & 2 since those verifications will take place away from WIPP at the vendor's facility.  

Acceptance Method Used:  

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<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>X</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Acceptance Criteria: N/A  

Instructions: N/A  

4. Comments:  

Note: Critical Characteristic 3 can be found on Attachment 2.  

5. Review/Approvals:  

Cog Engineer Prepared: [Signature]  

Date: 6/29/16  

QAIS Concurrence: [Signature]  

Date: 6/29/16  

Materials Engineer Review: [Signature]  

Date: 6/29/16  

Cog Manager Approval: [Signature]  

Date: 6/29/16
## Nuclear Waste Partnership LLC
### Commercial Grade Item Dedication Form

**Section Three - Commercial Grade Dedication Plan**

<table>
<thead>
<tr>
<th>CGID #16-017</th>
<th>Revision 2</th>
<th>Date 6/21/2016</th>
</tr>
</thead>
</table>

**Item: Service – Diesel Fire Pump Engine Rebuild**

**Item Number:** N/A  
**PO #:**

1. **Critical Characteristic:** Part Identification / Inspection (@ Vendor Facility)
   
   **Results:** Accepted
   
   Accepted By: [Signature]  
   Date: 6/28/16

   **NCR No.:** N/A

2. **Critical Characteristic:** Factory Acceptance Test (@ Vendor Facility)
   
   **Results:** Accepted
   
   Accepted By: [Signature]  
   Date: 7/14/16

   **NCR No.:** N/A

3. **Critical Characteristic:** Post-Installation Performance Test (@ WIPP)
   
   **Results:**

   Accepted By: [Signature]  
   Date: 

   **NCR No.:**

4. **Comments:**

5. **Review/Approvals:**

   **Materials Engineer Review:**
   
   Accepted By: [Signature]  
   Date: 

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EA09CN3040-1-0  
Rev. 3  
Page 4 of 6
<table>
<thead>
<tr>
<th>Failure Commentary</th>
<th>Critical Characteristics</th>
<th>CGD Evaluation</th>
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<tbody>
<tr>
<td>Parts are not used from OEM Supplier / Vendor</td>
<td>Sole Source Justification has verified the selected supplier is an authorized Detroit Diesel &amp; Clark Diesel Representative.</td>
<td>No – Procurement process has mitigated this concern.</td>
</tr>
<tr>
<td>Parts are not used from OEM Supplier / Vendor</td>
<td>NWP to inspect all parts used prior to rebuilding activity. Verification of procurement path provides reasonable assurance of supply chain.</td>
<td>Yes – NWP to verify parts &amp; supply chain at the vendor’s facility prior to rebuilding activities.</td>
</tr>
<tr>
<td>Engines does not produce sufficient horsepower</td>
<td>Witness engine test on Dynamometer, verify engine produces 188 BHP @ 1760 RPM</td>
<td>Yes – NWP to witness this test. Ensure engine produces sufficient horsepower.</td>
</tr>
<tr>
<td>Diesel Fire Pump does not pump sufficient water at the proper pressure.</td>
<td>Perform post-installation performance test to ensure that the diesel-driven fire pump meets or exceeds 1,500 GPM @ 125 PSI</td>
<td>Yes – NWP to witness performance test.</td>
</tr>
</tbody>
</table>
Attachment 2
Additional Critical Characteristic

Critical Characteristic: Successful Post-Installation Performance Test

Acceptance Method Used: 1 X 2 3 4

Acceptance Criteria: >=1,500 GPM @ 125 PSI for duration of 30 minutes. (This is consistent with TSR Surveillance Requirement 4.1.1.3.)

Instructions: Witness performance test of the diesel fire pump to demonstrate its capability to produce rated flow and pressure.
**APPROVAL/VARIATION REQUEST (ARVR)**

1. [x] APPROVAL REQUEST  

506408  
3. PO/Subcontract No.  
5. Resubmittal  
7. **Describe request in detail (attach additional documents, if necessary).** Reference or list applicable specifications, drawings, document numbers, equipment numbers, etc. If Approval Request, describe document submitted as specified in the subcontract or Transmittal Register or other documentation being submitted. If Variation Request, describe nature of variation and requirement from which the variation exists.

Test Report

8. Does the submittal affect schedule, price, or require a contract change notice?  
   - [ ] Yes  
   - [x] No

9. Supplier Contact: Charles Rawson  
   - Date: 07-15-16

Phone number: 800-733-3511  
Fax Number: 505-875-1846  
Email: C.Rawson@ssss.com

---

**Review/Approval/Disposition Section**

|-----|----------------------|------------|---------|----------------------------------|
|     | Facility Restoration |            |         | [ ] Approved  
|     | Cognizant Engineer   | [x] L. Brown | 7/15/16 | [ ] Conditionally Approved  
|     | Quality Assurance    | [x] T. Harvey | 7/15/16 | [ ] For Record Only  
|     | SEC                  |            |         | [ ] Approved  
|     | Safety               |            |         | [ ] Conditionally Approved  
|     | OTHER                |            |         | [ ] Disapproved  
|     | Procurement          |            |         | [ ] Approved  
|     |                      |            |         | [ ] For Record Only  

Disposition by Responsible Technical Manager:

**NOTE:** Document reviews and approvals, inspections, and test by NWP before acceptance of "work," which is used herein to include, but is not limited to, materials, workmanship, and manufacture and fabrication of components, are to assure compliance with the terms and conditions of the Subcontract. Such document reviews and approvals, inspections and tests are for the sole benefit of NWP and the Government and do not: (1) relieve the Subcontractor of responsibility for providing adequate quality control measures, (2) relieve the Subcontractor of responsibility for damages or losses before acceptance; (3) constitute or imply acceptance by NWP; or (4) affect the continuing rights of NWP or the Government before or after acceptance of the complete work. Further, the presence or absence of NWP's review of approval of a document, inspection or test does not relieve the Subcontractor from any Subcontract requirement.

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20. The STR is to provide the supplier, Buyer and Cognizant Engineer with a copy of the dispositioned submittal. Date dispositioned submittal sent to supplier: 7/15/16


Rev 5  
Page 1 of 2
Un-Controlled Copy

Dyno General Procedure

To establish specific requirements for operating the Engine Dynamometer for Albuquerque Operations

2.0 REQUIREMENTS

1-13-16 2.1 Engines sent to Dyno must be tagged with:
- Work Order number
- Full Customer name
- Specified Engine RPM’s
- Specified Engine rated BHP

1-13-16 2.2 If engine arrives at the Dyno shop without a flywheel, one must be installed with flywheel bolts and scuff plate.

1-13-16 2.3 Torque to engine spec or with a dyno center coupling torque to Bowmen Torque spec chart.

1-13-16 2.4 Install engine on dyno cart using flywheel housing bolt holes. Use a dyno cart front cross over to support the front of engine. Ensure engine is level and is 31 inches to the crankshaft center line.

1-13-16 2.5 Install dyno shaft end on the center dyno coupling using 7/16 fine thread nuts and lock washers, or use the dyno drive plate that bolts to the outer ring of the flywheel. With the proper size bolt and torque to Bowmen spec torque chart.

1-13-16 2.6 Install all dyno equipment as follows:
- Water temperature thermo coupling
- Oil temperature thermo coupling
- Oil pressure quick disconnect
- Fuel pressure quick disconnect (engine with a secondary fuel filter)

1-13-16 2.7 If the engine does not have a fuel system, install a secondary fuel filter with fuel lines.

1-13-16 2.8 Install dyno fuel supply and fuel return quick disconnects.

1-13-16 2.9 Remove all valve covers and fuel pressure test, checking jumper line, fuel stands and injectors for any fuel leakage.

1-13-16 2.10 Check engine tune up (valve, injectors and injection rack)

1-13-16 2.11 Move into dyno room; insure the dyno cart is on the guide rails.

1-13-16 2.12 Grease drive line.

1-13-16 2.13 Make sure drive line spines are completely in drive line shaft end that is already on engine.

1-13-16 2.14 Chain dyno cart down to dyno base and chain to eye bolt in the middle of dyno room. Check to make sure the engine is not too deep on drive shaft. (Pushing engine thrust out of engine).

1-13-16 2.15 Hook up all test equipment.

1-13-16 2.16 Remove oil pan drain plug. Fill with water and bleed all air out of cooling system. Once air has been removed from the cooling system, reinstall oil pan drain plug. (This ensures that no water is leaking in to the oil).

1-13-16 2.17 Hook up oil pre-lube pump to oil pressure disconnects. Remove valve covers and check dipstick for proper full and low marking. Pre-lube engine to 1/2 inch of full mark. During pre-lube, check all valve rocker arm assemblies for oil, bleed air out of turbo oil supply lines. Install valve covers after pre-lube is complete.

1-13-16 2.18 Start computer and fill out Dyno report information on screen (Customer, Location, Contact Name and Phone Number). Make sure the form has all the right information. Open the house power screen, temperature screen. Turn the monitor so it can be seen during engine start up.

1-13-16 2.19 Dyno Calibration – The dyno computer system is a self-calibrating system which is performed before each individual dyno test. All reading will read zero before each test.

1-13-16 2.20 Set idle RPM’s and no load RPM’s.

1-13-16 2.21 Start dyno test, running engine at 25 % load, for 15 minutes. 50 % load, for 15 minutes, 75 % load, for 15 minutes, and 100 % load for 15 minutes.

1-13-16 2.22 After the first hour of dyno run time. Perform a complete hot tune up. Repair all leaks and other repairs that the engine needs.

1-13-16 2.23 Restart engine, warm engine back up. Dyno test engine for one to two hours at 100 % load.

1-13-16 2.24 Bring engine back down to idle and let engine cool down. Turn engine off.
Fill out all paper work and save dyno report to the dyno computer hard drive.

Unhook all test lines, hoses, remove chains, pull engine off the dyno and move into dyno set up shop.

Remove all test equipment installed on engine before dyno test. Pull off dyno cart and place engine on shipping skid.

Inform Diesel Shop Foreman that the engine is complete.

Move engine to paint shop or back to diesel shop.

Test is complete at this point.

3.0 Safety Points
- Hearing protection in dyno rooms
- Non-slip safety shoes in dyno rooms
- Safety Glasses in dyno rooms
- Dyno room operator and safety person (only) in dyno room during testing.

7.0 REVISION HISTORY

<table>
<thead>
<tr>
<th>Revision No.</th>
<th>Effective Date</th>
<th>Responsible Person</th>
<th>Description of Revision</th>
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<tr>
<td>0</td>
<td>10/8/03</td>
<td>Gary Whelan/Marla Clark</td>
<td>Initial Issue</td>
<td>Quality Management Team</td>
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<tr>
<td>1</td>
<td>3/26/2012</td>
<td>Craig Keen</td>
<td>General update</td>
<td>Quality Management Team</td>
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<tr>
<td>2</td>
<td>7/13/2016</td>
<td>Jeff Newmann</td>
<td>General update</td>
<td>Management Team</td>
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This document is intended only for internal use by: Stewart & Stevenson, Albuquerque, NM Branch
<table>
<thead>
<tr>
<th>DAILY CUSTOMER ACKNOWLEDGEMENT</th>
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<tr>
<th>CUSTOMER COMPLAINT</th>
<th>CAUSE OF COMPLAINT</th>
<th>REPAIR DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>DYNODE TEST ENGINE</td>
<td>MAJOR OVERHAUL</td>
<td>AT 0815, STARTED ENGINE AND LET IDLE AT 600 RPM UNTIL 130° COOLANT TEMP WAS REACHED. AT 0830, THROTTLED ENGINE TO 1860 RPM NO LOAD AND APPLIED 25% LOAD, 47 HORSEPOWER (HP) AT 1840 RPM USING A TAYLOR DYNAMOMETER MODEL DS-4012, FOR 15 MIN. AT 0845, INCREASED LOAD TO 50%, 94 HP AT 1820 RPM FOR 15 MIN. AT 0900, INCREASED LOAD TO 75%, 141 HP AT 1790 RPM FOR 15 MIN. AT 0915, INCREASED LOAD TO 100% AT 1760 RPM AND 188 HP FOR 15 MIN. AT 0930, REDUCED LOAD TO 0% AND BROUGHT ENGINE BACK TO IDLE FOR 5 MIN. COOL DOWN, SHUT OFF ENGINE AND INSPECTED FOR LEAKS - NO LEAKS DETECTED. REMOVED VALVE COVER AND PERFORMED A HOT TUNE BY ADJUSTING VALVES, INJECTORS, AND FUEL RACK. INSTALLED VALVE COVER. AT 1000, STARTED ENGINE AT FULL THROTTLE (HOT START) AND APPLIED 100% LOAD, 188 HP AT 1760 RPM AND MAINTAINED FOR 1 HOUR. AT 1100, REDUCED LOAD TO 0% AND BROUGHT ENGINE TO IDLE FOR 5 MIN. SHUT OFF ENGINE, DISCONNECTED FROM DYNODE, PREPPED ENGINE FOR PAINTING.</td>
</tr>
</tbody>
</table>

NOTE: TAYLOR DYNAPO 5 SOFTWARE WAS USED.
Test Setup

Engine_Speed

Torque

Power

Gauges

1/0

Throttle

Mode

Setpoint

CJ

Throttle

Setpoint

CJ

P_Teen

psig

T_Teen

degF

T_Teen

degF

0.0

cu.in.

Dyno Mode

Dyno Setpoint

21.0

Throttle Mode

Throttle Setpoint

0

525
1050
1575
2100

2-14-16 RA
### Engine Basic Report

**Customer Name:** Nuclear Waste Partners  
**Customer Address:**  
**Customer City/State/Zip:**  
**Customer Phone:**  
**Customer Mobile Phone:**  
**Customer Contact:** David Lasky  
**Engine ID No.:**  
**Engine Maker:** Detroit Diesel  
**Engine Model:**  
**W.O. No.:**  
**Driver Operator:** Mark Hackett  
**Vehicle Model:**  
**Vehicle Miles:**  
**Vehicle Fleet Number:**  
**Vehicle Plate Number:**  
**Engine Fuel:**  
**Engine HP:**  
**Engine RPM:**  
**Engine Speed (RPM):**

<table>
<thead>
<tr>
<th>Time (seconds)</th>
<th>Engine Speed</th>
<th>Power</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4887.60</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>8910.30</td>
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</tbody>
</table>

**Pre Test Conditions:**

**Post Test Conditions:**

C:\dympro\Data\160714_0805140714_0805_History.csv  
7/14/2016 11:30 AM  
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