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Document #: SD-WM-ATR-105

Title/Desc:

DIESEL GENERATOR ACCEPTANCE TEST REPORT

Pages: 47

STA 4 (2)
FEB 12 1996

ENGINEERING DATA TRANSMITTAL

Page 1 of 1
1. EDT No 612070

2. To: (Receiving Organization) Characterization Plant Engineering	3. From: (Originating Organization) Characterization Equipment Improvement	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: Core Sampling Aux. Equipment	6. Cog. Engr.: J.L. Smalley	7. Purchase Order No.: 404886
8. Originator Remarks: ETN-94-0023-D This Acceptance Test Report is transmitted for approval. The report documents compliance with specification WHC-S-0252 Rev.0.		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 200 General
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 5/12/95

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-ATR-105	N/A	0	Diesel Generator Acceptance Test Report	Q	1	1	1

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval	4. Review	1. Approved	4. Reviewed no/comment
		2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment
		3. Information	6. Dist. (Receipt Acknow. Required)	3. Disapproved w/comment	6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)										(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
+		Cog. Eng. J.L. Smalley	<i>[Signature]</i>	2/6/96		Alvin Kostelnik	<i>[Signature]</i>	6/7/95	57-12	1	1
+		Mgr. R.D. Blanchard	<i>[Signature]</i>	2/6/96		D.W. Hamilton	<i>[Signature]</i>	2/6/96	57-12	1	1
1	1	QA J.J. Verderber	<i>[Signature]</i>	5/12/95	57-07						
		Safety N/A									
		Env. N/A									
1	1	Core Sampling Cog. J.L. Smalley	<i>[Signature]</i>	5/12/95							
1	1	Core Sampling Cog Mgr. J.S. Schofield	<i>[Signature]</i>	6/14/95	57-12						

18. Signature of EDT Originator <i>AJ Kostelnik</i> Date 5/8/95	19. Authorized Representative for Receiving Organization <i>TO Jacki</i> Date 6/13/95	20. Cognizant Manager <i>J.S. Schofield</i> Date 6/14/95	21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
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DIESEL GENERATOR ACCEPTANCE TEST REPORT

ALOIS J. KOSTELNIK

WESTINGHOUSE HANFORD COMPANY, Richland, WA 99352

U.S. Department of Energy Contract DE-AC06-87RL10930

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Total Pages: 45

Key Words: ETN-94-0023-D, Core Sampling, Diesel Generator, Specification WHC-S-0252, Cummins, Onan, 150KW Generator, Purchase Order 404866, Core Sampling Ancillary Equipment

Abstract: This Acceptance Test Report documents compliance with the requirements of specification WHC-S-0252. The equipment was tested according to WHC-SD-WM-ATP-105 Rev.0.

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Release Approval

Date

Release Stamp

Approved for Public Release

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APPENDIX C (NEC Inspection Results)	Page C1
APPENDIX D (Receipt Inspection Report)	Page D1

SUMMARY

The test was performed at Cummins Northwest's facility in Renton, WA. All steps and exceptions were completed at the time of testing. The NEC Inspection discovered items that needed repair which were verified upon receipt inspection.

One item which was not written as an exception is the 88 decibel noise recording for the generator sets. The Gensets were parked on an asphalt drive, next to a shop area for access to fuel, tools and test equipment during the test. The control station for the generator was between the generator and the shop wall. If the noise meter was moved to either side of the control panel the noise level dropped indicating that the cinder block shop wall was reflecting the noise back at the Genset and influencing the noise measurement. After considering the test conditions and the fact that the Gensets will be used in the field, parked on sand, the 88 decibel noise level was judged as acceptable without retesting.

The attached Appendix A contains the Acceptance Test Results for Genset Model # 150DGFA, Serial # E940542240. Appendix B contains the Acceptance Test Results for Genset Model # 150DGFA, Serial # F940547197. Appendix C contains the Internal Memo from Electrical Power Systems Engineering which includes the NEC Inspection results for both Gensets. Appendix D includes the Receipt Inspection Report for both Gensets.

ENGINEERING DATA TRANSMITT

18. <u>AJ Kostelnik</u> <u><i>AJ Kostelnik</i></u> Signature of EDT Originator	19. <u>AP Mousel</u> <u><i>See Block 17</i></u> Authorized Representative for Receiving Organization	20. <u>RJ Mousard</u> <u><i>RJ Mousard</i></u> Cognizant Manager	21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
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RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-ATP-105, REV 0

Document Title: Diesel Generator Trailer Acceptance Test Procedure

Release Date: 9/23/94

* * * * *

This document was reviewed following the
procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

* * * * *

WHC Information Release Administration Specialist:

Kara Broz

(Signature)

9/23/94

(Date)

SUPPORTING DOCUMENT

2. Title Diesel Generator Trailer Acceptance Test Procedure		3. Number WHC-SD-WM-ATP-105	4. Rev No. 0
5. Key Words ETN-94-0023-D Core Sampling, Diesel Generator, Specification WHC-S-0252, Trailer, Cummins, Onan, 150KW Generator, Purchase Order 404886, Core Sampling Auxiliary Equipment <i>Handwritten: 9/23/94</i>		6. Author Name: Alois J Kostelnik <i>Signature: Alois J Kostelnik</i> Signature Organization/Charge Code 7EA40/	
7. Abstract PUBLIC RELEASE This Acceptance Test Procedure (ATP) will document compliance with the requirements of WHC-S-0252 Rev.1 and ECNs 609271, and 609272. The equipment being tested is a 150KW Diesel Generator mounted on a trailer with switchgear. The unit was purchased as a Design and Fabrication procurement activity. The ATP was written by the Seller and will be performed by the Seller with representatives of the Westinghouse Hanford Company witnessing the test at the Seller's location.			
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9. Impact Level <i>Q</i>			

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1.0 Scope

This acceptance test procedure is to verify that the trailer mounted 150KW Cummins/Onan Diesel Generator Set meets the requirements of Westinghouse Hanford specification WHC-S-0252.

2.0 Test Performance

Cummins Northwest will complete the following test in the order deemed best by Cummins personnel. Westinghouse Hanford Company (WHC) personnel shall witness all testing and shall perform the inspection portion of the test. All steps will be completed and any exceptions shall be noted on the attached exception sheet along with the resolution. Cummins Northwest shall resolve all exceptions with the concurrence of WHC.

3.0 Inspection Plan

3.1 Record the model and serial numbers of the Generator Set and Trailer.

	GENERATOR SET	TRAILER
Model	150DC-FA	1091151922RS151331
Serial	E94C54224C	2010

3.2 Verify by record review that the generator is capable of the following:

CHK 3.2.1 3-phase, 4-wire, 277/480 VAC and single-phase 240/120 VAC.

CHK 3.2.2 Operating frequency is 60 Hertz $\pm$ 0.5%.

CHK 3.2.3 Standby Rating Range is 150KW @ 0.8 power factor.

CHK 3.2.4 Prime Rating Range is 135KW @ 0.8 power factor.

CHK 3.2.5 Voltage dip does not exceed 20% of rated voltage upon application of rated load at rated power factor. *Per Gen Size 2 printout*

CHK 3.2.6 Voltage regulation under load from no load to 100% load is within $\pm$ 2% of rated voltage, ($\pm$ 10 V).

CHK 3.2.7 Frequency regulation under varying loads from no load to 100% load is within $\pm$ 3 Hz.

3.3 Verify the control panel contains the following:

AK 3.3.1 Run-Off-Auto switch: (Run: manually start engine) (Off: stop engine) (Auto: start engine by closing of a remote contact) *Run-off-Remote*

AK 3.3.2 Accessible remote start-stop terminals.

3.4 Verify controls are provided to shutdown and lock out the engine under the following abnormal operating conditions:

AK 3.4.1 Engine failure to start after a specified cranking time.

AK 3.4.2 Engine over-speed.

AK 3.4.3 Engine low lube oil pressure.

AK 3.4.4 Engine high operating temperature.

AK 3.4.5 Remote manual stop activated.

3.5 Verify the following instrumentation is provided as a minimum:

AK 3.5.1 Engine lube oil pressure gauge.

AK 3.5.2 Coolant temperature gauge.

AK 3.5.3 Hour meter.

AK 3.5.4 Battery volt meter.

AK 3.5.5 Fuel gauge for day tank.

AK 3.5.6 Cranking time meter (Internal timer, alarm light indicator) *3.4.1 Duplicate*

AK 3.5.7 Other instruments normally provided by the manufacturer for the proper operation and maintenance of their engine-generator set. *Pre High Engine Temperature*
Pre Low Oil Pressure

3.6 Verify battery-powered visual and audible alarms for the following condition as a minimum are provided. Verify alarm test switch, lamp test switch and alarm reset switch and contacts for each alarm for remote signaling are provided: *No audible alarm, AK*

AK 3.6.1 Over-crank shutdown.

AK 3.6.2 High engine temperature shutdown.

AK 3.6.3 Low engine lube oil pressure shutdown.

AK 3.6.4 Over-speed of engine shutdown.

3.7 Verify the generator AC power output monitoring and controls include the following as a minimum:

- CAF* 3.7.1 AC voltmeter with a phase selector switch with an OFF position.
- CAF* 3.7.2 AC ammeter with a phase selector switch with an OFF position.
- CAF* 3.7.3 Frequency meter.
- CAF* 3.7.4 AC voltage adjust rheostat.
- CAF* 3.7.5 Generator output circuit breaker with manual reset.

3.8 Verify the following equipment has been installed:

- CAF* 3.8.1 The basic trailer is ^{Rec} provided with an electrical equipment rack located on the ~~side~~ of the engine-generator set enclosure that does not increase the total width dimension of the unit. The equipment rack is located for easy access but allows accessibility to the engine-generator set for maintenance and operation. All receptacles are on the same side of the generator and labels are mechanically fastened to the equipment with screws.
- CAF* 3.8.2 The distribution and wiring system have been installed per NFPA 70, National Electrical Code. *See Exception*
- CAF* 3.8.3 There is a 25KVA transformer on the unit to provide single phase power of 240/120 volt. The transformer has fault protection on the primary side.
- CAF* 3.8.4 A 100KW load bank is on the unit. The load bank is divided into 3 sections, 2 (two) 25KW and 1 (one) 50KW sections, which may be manually switched on individually as required to maintain the generator near 70% of capacity. The load bank is wired for operation in parallel with the normal load.

3.8.5 The electrical equipment furnished by the engine-generator set Supplier, mounted on the equipment rack outside of the engine-generator set enclosure, and wired to the generator output terminals via a 3-phase, 4-wire bus is as follows:
(Rated current capacity of components shall not be less than the rating requested.)

CR 3.8.5.1 One (1), 3-pole, 3-wire, 150 amp rated, 80 amp trip, 600 VAC, lockable circuit breaker. A 100 amp. receptacle is on the load side of the circuit breaker and is labeled as "SERVICE TRAILER 240 VAC 80 AMPS". The receptacle is an Appleton Cat. # ADR1034.

CR 3.8.5.2 One (1), 3-pole, 3-wire, 150 amp rated, 50 amp trip, 600 VAC, time delay lockable circuit breaker. A 60 amp. receptacle is on load side of the circuit breaker and is labeled as "BREATHING AIR COMPRESSOR 480 VAC 50 AMPS". The receptacle is an Appleton Cat. # ADR6034.

CR 3.8.5.3 One (1), 3-pole, 3-wire, 200 amp rated, 110 amp trip, 600 VAC, lockable circuit breaker. A 200 amp. receptacle to the load side of the circuit breaker and label receptacle as "UTILITY 480 VAC 110 AMPS". The receptacle is an Appleton Cat. # ~~ADR20044~~ *ADR not available. CR*
ADR20044

CR 3.8.5.4 One (1), 20 amp, 240 VAC, single receptacle, wired from a two pole, 20 amp breaker to be used for hookup of temporary power boxes. Labeled as "240 VAC 20 AMPS".

CR 3.8.5.5 One (1), 20 amp, 120 VAC, duplex receptacle, wired from a single pole, 20 amp breaker with ground fault protection, to be used for hookup of temporary tools and lighting. Labeled as "120 VAC 20 AMPS".

CR 3.8.5.6 One (1), 30 amp, 120 VAC, single receptacle, wired from a single pole, 30 amp breaker. Labeled as "PURGE GAS TRAILER 120 VAC 30 AMPS".

3.8.6 The unit has grounding rods and a 100 foot cable to allow grounding to a ground grid.

To be verified at receipt inspection. CR

#4 Copper minimum CR

3.9 Verify the following engine-generator trailer requirements are satisfied:

- CPK* 3.9.1 The engine-generator set including all accessories are mounted on a heavy duty type trailer designed for use in construction, communications, and utility applications.
- CPK* 3.9.2 The trailer meets Department of Transportation (DOT) requirements for highway travel. (DOT Certification)
- CPK* 3.9.3 Vibration isolators are used between the engine-generator set and the ~~trailer.~~
frame
- CPK* 3.9.4 The trailer is equipped with running lights, brake lights, safety brake, stabilizer jack on each corner; a front wheel jack with wheel; and hitches.
- CPK* 3.9.5 The trailer has a 2 3/4 inch Lunette hitch with vertical adjustment.
- CPK* 3.9.6 The underside of the trailer is undercoated for rust protection.
- CPK* 3.9.7 The trailer has hydraulic surge type brakes.
- CPK* 3.9.8 The generator is within an enclosure and the enclosure is lined with sound deadening material.
- CPK* 3.9.9 The instruments and controls are vibration isolated to prevent gauge and control malfunction.

3.10 Verify the following engine requirements are satisfied:

- CAK 3.10.1 Diesel fuel engine.
- CAK 3.10.2 Engine shall be electric start from negative grounded battery supplied.
- CAK 3.10.3 Battery shall be charged with alternator having automatic voltage regulation supplied with engine.
- CAK 3.10.4 A fuel tank is on the unit that will supply fuel for the engine to operate at full load for at least 24 hours. (Capacity 250 gal, Consumption rate 9.2 gal/hr)
- CAK 3.10.5 Two (2) stage dry type air cleaner with a restriction gauge.
- CAK 3.10.6 Furnished with the capability for cold weather starting such as electric glow plugs. Engine hot start 1500 watt, 110 volt heater.
- CAK 3.10.7 Record the freeze point of the engine antifreeze. (-40 °F)
- CAK 3.10.8 Drip pan to catch fuel or oil leaks.
- CAK 3.10.9 Painted inside and out. Exterior is White.
- CAK 3.10.10 Verify there are no Suspect Fasteners as identified on the U.S. Custom's Fasteners Headmark List.
- CAK 3.10.11 Verify all visible welds are acceptable per AWS D1.1.

4.0 Run Test

4.1 No Load Cold start: Verify that the engine starts and comes to 1800 $\pm$ 9 rpm in the specified time. (MFR 10 - 12 sec.)

CAK 4.1.1 Switch Run-Off-Auto switch to Run.
(Time from close of contacts to 1800 rpm 4 sec.)

4.1.2 Verify the following instrumentation is functional and the value indicated is within the range specified by the manufacturer:

CAK 4.1.2.1 Engine lube oil pressure gauge.
(100 psi, MFR 10 - 12 psi) Good OK

CAK 4.1.2.2 Coolant temperature gauge.
(100 °F, MFR 60 - 230 °F)

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- CHK 4.1.2.3 Hour meter.
(1.4 hrs)
- CHK 4.1.2.4 Battery volt meter.
(26 volts, MFR 24 - 30 volts)
- CHK 4.1.2.5 Fuel gauge for day tank.
(Empty level)
- N/A 4.1.2.6 Other instruments normally provided by the manufacturer for the proper operation and maintenance of their particular engine-generator set.
- CHK 4.1.3 Record and with a sound meter the generator noise level at the electrical control panel and verify that it is less than 85 decibels. 88 decibels. *lot of trapped noise at test site* CHK
- 4.2 Loaded Cold start with Remote/Auto start: Verify, with the 100 KW load bank on line, that the engine starts, comes to 1800 $\pm$ 9 rpm, and the load is automatically switched on-line in the specified time. (MFR 0 - 10 sec.)
- CHK 4.2.1 Switch Run-Off-Auto switch to Auto.
- CHK 4.2.2 Close contacts on a temporarily installed switch.
(Time from close of contacts to load on-line. 2 sec.)
- CHK 4.2.3 Switch Run-Off-Auto switch to Off. (Remove temporary switch.)
- 4.3 Verify controls shutdown and lock out the engine under the following simulated abnormal operating conditions. (Temporarily install contacts and jumpers as required to simulate conditions. Restart the generator between each alarm test.) Verify alarm test switch, lamp test switch and alarm reset switch are operational:
- CHK 4.3.1 Engine failure to start after a specified cranking time, with alarm. — 3 cycles, 17 sec on 17 sec rest
- CHK 4.3.2 Engine over-speed, with ^{light} alarm. 2140 rpm ref Factory Test
- CHK 4.3.3 Engine low lube oil pressure, with ^{light} alarm. ex-Pic Low Oil Pressure
- CHK 4.3.4 Engine high operating temperature, with ^{light} alarm. ex-Pic High Engine Temp
- CHK 4.3.5 Remote manual stop activated. (~~located on distribution panel~~) Temporary Switch

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- 4.4 Verify proper operation of the generator, power distribution components and load bank according to the manufacturer's supplied information. (For load bank test operate for 15 minutes at each step prior to recording information.)

4.4.1 Step 1 (25KW Resistive Load for 15 min.)

- CAK 4.4.1.1 Amperage 130, 230, 330 amps
CAK 4.4.1.2 Voltage 1-2 483, 2-3 484, 1-3 483
CAK 4.4.1.3 Frequency 62.1 Hz
CAK 4.4.1.4 Oil Pressure 80 psi
CAK 4.4.1.5 Water Temperature 125 °F

4.4.2 Step 2 (50KW Resistive Load for 15 min.)

- CAK 4.4.2.1 Amperage 159, 259, 360 amps
CAK 4.4.2.2 Voltage 1-2 483, 2-3 483, 1-3 483
CAK 4.4.2.3 Frequency 61.8 Hz
CAK 4.4.2.4 Oil Pressure 75 psi
CAK 4.4.2.5 Water Temperature 170 °F

4.4.3 Step 3 (100KW Resistive Load for 15 min.)

- CAK 4.4.3.1 Amperage 120, 220, 320 amps
CAK 4.4.3.2 Voltage 1-2 483, 2-3 483, 1-3 483
CAK 4.4.3.3 Frequency 61.1 Hz
CAK 4.4.3.4 Oil Pressure 65 psi
CAK 4.4.3.5 Water Temperature 175 °F

- 4.4.4 Verify voltage and clockwise phase rotation as noted for the following:

- CAK 4.4.4.1 UTILITY 480 VAC 110 AMPS outlet
4.4.4.1.1 Phase rotation CWS
4.4.4.1.2 Voltage 1-2 483, 2-3 483, 1-3 483

CAK 4.4.4.2 SERVICE TRAILER 240 VAC 80 AMPS outlet

4.4.4.2.1 Voltage 1-2 240

CAK 4.4.4.3 BREATHING AIR COMPRESSOR 480 VAC 50 AMPS outlet

4.4.4.3.1 Phase rotation CLW

4.4.4.3.2 Voltage 1-2 483, 2-3 483, 1-3 483

CAK 4.4.4.4 240 VAC 20 Amp Single Receptacle

4.4.4.4.1 Voltage 240

CAK 4.4.4.5 120 VAC 20 Amp Duplex Receptacle

4.4.4.5.1 Voltage 120

CAK 4.4.4.6 PURGE GAS TRAILER 120 VAC 30 Amp Single Receptacle

4.4.4.6.1 Voltage 120

CAK 4.4.5 Switch Run-Off-Auto switch to Off.

4.5 No load hot start: Verify that the engine starts and comes to 1800 rpm in the specified time. (MFR C - 10 sec.)

CAK 4.5.1 Switch Run-Off-Auto switch to Run. Time 2 sec.

CAK 4.5.2 Switch Run-Off-Auto switch to Off.

4.6 Loaded hot start: Verify, with the 100 KW load bank on line, that the engine starts, comes to 1800 $\pm$ 9 rpm, and the load is automatically switched on-line in the specified time. (MFR C - 10 sec.)

CAK 4.6.1 Switch Run-Off-Auto switch to Run.
(Time from close of contacts to load on-line. 2 sec.)

CAK 4.6.2 Switch Run-Off-Auto switch Off.

TEST EXCEPTIONS

Step #	Description of exception and resolution.
3.8.2	Grounding: (1) Generator Frame should be bonded to the trailer frame (2) provide chase through circuit breaker Enclosure (Mounted on the Rear of Trailer) for Grounding Electrode connection to neutral / Ground Bus. <i>g/k</i> Verify upon receipt inspection. <i>g/k</i>
3.2.2	Frequency for full load factory set @ 60 Hz. Test data shows variance which is explained by lack of full load during test. Trend of frequency indicates equipment is capable. <i>g/k</i>

TEST COMPLETED BY:

PRINT NAME	COMPANY	SIGNATURE	DATE
Alvin J Kestelink	WHC	<i>Alvin J Kestelink</i>	9-26-94
CUMMINS NORTHWEST INC		<i>Charles J. Smith</i>	9-26-94

* Make additional copies as required.

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SUSPECT FASTENER HEADMARK LIST

Westinghouse Hanford Company
Help Stamp Out Suspects/Counterfeits

Suspect Fastener Headmark List

All Grade 5 and Grade 8 fasteners of foreign origin which do not bear any manufacturers' headmarks:

Grade 5

Grade 8

Grade 5 fasteners with the following Manufacturers' headmarks:

Mark	Manufacturer	Mark	Manufacturer
J Jinn Her (TW)		KS Kosaka Kogyo (JP)

Grade 8 fasteners with the following Manufacturers' headmarks:

Mark	Manufacturer	Mark	Manufacturer
A Asahi Mfg (JP)		KS Kosaka Kogyo (JP)
NF Nippon Fasteners (JP)		RT Takai Ltd (JP)
H Hinomoto Metal (JP)		FM Fastener Co. of Japan (JP)
M Minamida Sieybo (JP)		KY Kyoel Mfg (JP)
MS Minato Kogyo (JP)		J Jinn Her (TW)
Hollow Triangle Intasco (CA, TW, JP, YU) (Greater than 1/2-inch diameter Grade 8 Hollow Triangle only)		UNY Unytite (JP)
E Daisel (JP)		

Grade 8.2 fasteners with the following headmarks:

Mark	Manufacturer
KS	Kosaka Kogyo (JP)

Grade A325 fasteners (Bennett Denver target only) with the following headmarks:

Type	Mark	Manufacturer
Type 1		A325 KS Kosaka Kogyo (JP)
Type 2
Type 3

Key: CA-Canada, JP-Japan, TW-Taiwan, YU-Yugoslavia

Any bolt on this list should be treated as defective without further testing.

GENERATOR SET

II
CERTIFICATE OF TEST

Model 150DGFA 68913H		S/N E940542240				
Customer CUMMINS NORTHWEST INC		Order File Number U432913D P.O. 1311R				
SERVICE RATING	☒ Prime	KW 135	KVA 169			
	☐ Standby	KW	KVA			
FUEL TYPE	☐ Gasoline ☒ Diesel ☐ LP Vapor ☐ LP Liquid ☐ Nat Gas ☐ Other					
GOVERNOR TYPE	☒ Mechanical ☐ Electrical	Brand BOSCH				
COOLING SYSTEM	☒ Mounted Radiator ☐ Remote Radiator ☐ Heat Exchanger	Other				
ITEMS CHECKED/ADJUSTED	☒ Governor ☒ Remote Start ☒ Voltage Regulator					
	☒ Oil Pressure Pre-Alarm ☒ Oil Pressure Shutdown ☒ Meter Accuracy					
	☒ Hi Cool Temp Pre-Alarm ☒ Hi Cool Temp Shutdown ☐ LET Alarm					
	☒ Overspeed 2140 RPM ☒ Overcrank Sec 17 Crank 17 Rest 87 Total					
	☒ Other: List: H389 H462 H480 KH22 K001 B184 F001					
TEST CONDITIONS	Test Spec. 98126	Ambient Temp 77 Deg F	Barometer 28.71 In Hg	Voltage 277/480 V	Phase 3	Frequency 60 Hz
UNIT RESULTS* No Load >	Batt Charge Syst 28 ☒ Volts ☐ Amps	Voltage 1-2 481	2-3 481	1-3 481		
	Volt Reg Adj 444-510	1-N 278	2-N 278	3-N 278		
	Frequency 62.6 HZ	Coolant Temp 175	Lube Press 65	Phase Sequence ☒ UVW ☐ Other		
Full Load (4 / 4) >	Batt Charge Syst 28 ☒ Volts ☐ Amps	Voltage 1-2 480	2-3 480	1-3 480		
		1-N 277	2-N 277	3-N 277		
	KW 135	Current 1 203	2 201	3 203		
	Frequency 60 HZ	Coolant Temp 180	Lube Press 60	Power Factor .8		
Maximum Power 152	Freq 59.5 HZ	Voltage 480	ISO Correction Factor 1.0	Test Date 05/16/94	Running Time 1.2	

Data Recorded & Certified By:
J OLINGER 2947

Quality Engineer:

Date:

Y. Z. McCauley

5/20/94

X22A041-Front 1/90 * If unit is dual fuel, see additional sheet for second fuel results.
19-78 (See reverse side for extended running time data.)

Mail to: Cummins Northwest
211 S.W. Brady Way
Renton, Wa. 98055
Attn: Del. Schwab

D. Young
5/31/94

ONAN CORPORATION

GenSize 2

Version 4.00

Fi

Appendix A-17 of A-19

```
=====
--R U N N I N G----- | -----M A X---S U R G E--At Specified Voltage---
```

KW	KVA	PF	KW	Occurs in Step	KVA	Occurs in Step
-----	-----	-----	-----	-----	-----	-----
135	135	1.00	135	1	135	1

```
=====
```

Recommended GenSet
Model: 150DGFA

GenSet Voltage: 208-240/416-480

Nominal KW	Duty	Specified Voltage	Freq.	Alternator	
				Specified	Recommended
-----	-----	-----	-----	-----	-----
150	Standby	277/480 WYE	60	105	105

```
=====
```

When operated at 500 Feet Altitude
and 77 degrees Fahrenheit Ambient the
operating performance is:

* GenSet selected with one GenSet. *

Maximum KW	Voltage Dip	Freq. Dip	Excitation
-----	-----	-----	-----
150	19%	8%	Shunt

```
=====
```

Onan Corporation has developed this GenSize 2 computer program to help you, the engineer, with a generator set selection. The recommendations are based upon your input of the genset requirements and typical performance data published by NEMA and other agencies.

Due to changing load and site conditions beyond our control, we cannot be certain the selection of a genset based upon the recommendation of this computer program will meet the site requirements. Therefore, nothing in this program may be construed as a warranty. You must decide for yourself or consult with your local Cummins/Onan distributor that the generator set selected is sufficient for your intended purpose. Each Onan generator set is covered by an express written warranty which is in lieu of all other warranties, expressed or implied.

Please consult with your Cummins/Onan distributor representative in your area for further information.

File Name: UNTITLED

and engine/alternator capacity.	135 KVA	187	Acceptable
2. Running load requirements and alternator capacity at site conditions.	135 KW 135 KVA	150 187	Acceptable Acceptable
3. Max load surge KVA and Max set KVA capacity with minimum 90% sustained voltage.	135 KVA	563	Acceptable
4. Max load Surge KW and Max set Surge KW capacity at site conditions with minimum 90% sustained voltage.	135 KW	189	Acceptable
5. Transient Voltage Dip:	19 %		Acceptable
Allowable Transient Voltage Dip:	35 %		
6. Total non-linear plus linear load KW and Alternator KW capacity.	135 KW	150	Acceptable

ONAN CORPORATION GenSize 2 Version 4.00

Project Name: (WESTINGHOUSE HANFORD)

Project Parameters:

Duty:.....: Stationary Standby
Voltage:.....: 277/480 WYE
Frequency.....: 60
Max. Temp. Rise.....: 105
Max. VDIP%.....: 35
Max. Altitude.....: 500
Altitude Scale.....: Feet
Max. Amb. Temp.....: 77
Temperature Scale.....: Fahrenheit
Cooling System.....: Radiator
Fuel Type.....: Diesel

Load Listing

Load Number: 1 Load Type: Resistive Phase 3
Load Name: (135 KW PRIME) Input KW: 135
Comment:

SKW:	SKVA:	SKVAR:	SPF:	RKW:	RKVA:	RKVAR:	RPF:
135.0	135.0	0	1.00	135.0	135.0	0	1.00

Step Sequence/Load

Step Number: 1 Surge KW: 135 Surge SKVA: 135

Step Name: START 135 KW PRIME LOAD
Comment:

Load #	Qty	SKW	SKVA	SKVAR	SPF	RKW	RKVA	RKVAR	RPF
1	1	135.0	135.0	0	1.00	135.0	135.0	0	1.00

Step Total:

135.0	135.0	0	1.00	135.0	135.0	0	1.00
-------	-------	---	------	-------	-------	---	------

Cumulative:

135.0	135.0			135.0	135.0	0
-------	-------	--	--	-------	-------	---

Criteria Selection Results:

Model:150DGFA

	Required by Loads	Available from Model	Result
1. Running load requirements	135 KW	150	Acceptable

SEP 23 1994 ENGINEERING DATA TRANS

2. To: (Receiving Organization) Core Sampling	3. From: (Originating Organization) Characterization Equipment	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: Core Sampling Aux. Equipment	6. Cog. Engr.: J.L. Smalley	7. Purchase Order No.: 404886
8. Originator Remarks: ETN-94-0023-D This Acceptance Test Procedure is transmitted for approval. The procedure was prepared by the Seller and will be performed at the Sellers location. It will show compliance with specification WHC-S-0252 Rev. 0.1 <i>OK 9-7-94</i>		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 200 General
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 9/15/94

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-ATP-105	N/A	0	Diesel Generator Trailer Acceptance Test Procedure	Q	1	1	1

16. KEY			
Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment	4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)										(G)	(H)
Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
1	1	Cog.Eng. J.L. Smalley	<i>J.L. Smalley</i>	9/23/94	RI-17	OSTI (2)	<i>[Signature]</i>	18-07		3	
1	1	Cog. Mgr. R.J. Blanchard	<i>R.J. Blanchard</i>	9/23/94	RI-17						
1	1	QA J.J. Verducci	<i>J.J. Verducci</i>	9-22-94	SI-57						
		Safety N/A									
		Env. N/A									
1	1	Core Sampling Cog. A.P. Mousel	<i>A.P. Mousel</i>	9/23/94	SI-12						
3		Central Files		18-04							

18. A.J. Kostelick <i>A.J. Kostelick</i> 9-7-94 Signature of EDT Date Originator	19. AP Mousel <i>AP Mousel</i> 9-22-94 Authorized Representative Date for Receiving Organization	20. R.J. Blanchard <i>R.J. Blanchard</i> 9/23/94 Significant Manager Date	21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments
---	---	---	---

RELEASE AUTHORIZATION

Document Number: WHC-SD-WM-ATP-105, REV 0

Document Title: Diesel Generator Trailer Acceptance Test Procedure

Release Date: 9/23/94

* * * * *

This document was reviewed following the
procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

* * * * *

WHC Information Release Administration Specialist:

Kaya Broz

(Signature)

9/23/94

(Date)

SUPPORTING DOCUMENT

2. Title Diesel Generator Trailer Acceptance Test Procedure	3. Number WHC-SD-WM-ATR-105	4. Rev No. 0
5. Key Words ETN-94-0023-D Core Sampling, Diesel Generator, Specification WHC-S-0252, Trailer, Cummins, Onan, 150KW Generator, Purchase Order 404886, Core Sampling Auxiliary Equipment <i>APPROVED FOR</i>	6. Author Name: Alois J Kostelnik <i>Alois J Kostelnik</i> Signature Organization/Charge Code 7EA40 /	
7. Abstract PUBLIC RELEASE This Acceptance Test Procedure (ATP) will document compliance with the requirements of WHC-S-0252 Rev.1 and ECNs 609271, and 609272. The equipment being tested is a 150KW Diesel Generator mounted on a trailer with switchgear. The unit was purchased as a Design and Fabrication procurement activity. The ATP was written by the Seller and will be performed by the Seller with representatives of the Westinghouse Hanford Company witnessing the test at the Seller's location.		
8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed. PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA. DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.	10. RELEASE STAMP <div style="border: 1px solid black; padding: 5px; text-align: center;">OFFICIAL RELEASE BY WHC DATE SEP 23 1994 JIA 4</div>	
9. Impact Level Q		

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1.0 Scope

This acceptance test procedure is to verify that the trailer mounted 150KW Cummins/Onan Diesel Generator Set meets the requirements of Westinghouse Hanford specification WHC-S-0252.

2.0 Test Performance

Cummins Northwest will complete the following test in the order deemed best by Cummins personnel. Westinghouse Hanford Company (WHC) personnel shall witness all testing and shall perform the inspection portion of the test. All steps will be completed and any exceptions shall be noted on the attached exception sheet along with the resolution. Cummins Northwest shall resolve all exceptions with the concurrence of WHC.

3.0 Inspection Plan

- 3.1 Record the model and serial numbers of the Generator Set and Trailer.

GENERATOR SET	TRAILER
M 150 DGEFA 68913H F940547197 3U 79E	VIN: 1D94S1923RS 15133E

- 3.2 Verify by record review that the generator is capable of the following:

CHK 3.2.1 3-phase, 4-wire, 277/480 VAC and single-phase 240/120 VAC.

CHK 3.2.2 Operating frequency is 60 Hertz $\pm$ 0.5%. See Exception

CHK 3.2.3 Standby Rating Range is 150KW @ 0.8 power factor.

CHK 3.2.4 Prime Rating Range is 135KW @ 0.8 power factor.

CHK 3.2.5 Voltage dip does not exceed 20% of rated voltage upon application of rated load at rated power factor. For Gen size 2 percent

CHK 3.2.6 Voltage regulation under load from no load to 100% load is within $\pm$ 2% of rated voltage, ($\pm$ 10 V).

CHK 3.2.7 Frequency regulation under varying loads from no load to 100% load is within $\pm$ 3 Hz.

3.3 Verify the control panel contains the following:

CPK 3.3.1 Run-Off-Auto switch: (Run: manually start engine) (Off: stop engine) (Auto: start engine by closing of a remote contact) *Run Stop Remote*

CPK 3.3.2 Accessible remote start-stop terminals.

3.4 Verify controls are provided to shutdown and lock out the engine under the following abnormal operating conditions:

CPK 3.4.1 Engine failure to start after a specified cranking time.

CPK 3.4.2 Engine over-speed.

CPK 3.4.3 Engine low lube oil pressure.

CPK 3.4.4 Engine high operating temperature.

CPK 3.4.5 Remote manual stop activated.

3.5 Verify the following instrumentation is provided as a minimum:

CPK 3.5.1 Engine lube oil pressure gauge.

CPK 3.5.2 Coolant temperature gauge.

CPK 3.5.3 Hour meter.

CPK 3.5.4 Battery volt meter.

CPK 3.5.5 Fuel gauge for day tank.

CPK 3.5.6 Cranking time meter (Internal timer, alarm light indicator) *3.4.1 Duplicate:*

CPK 3.5.7 Other instruments normally provided by the manufacturer for the proper operation and maintenance of their engine-generator set. *High Engine Temperature
Low Oil Pressure*

3.6 Verify battery-powered visual and audible alarms for the following condition as a minimum are provided. Verify alarm test switch, lamp test switch and alarm reset switch and contacts for each alarm for remote signaling are provided:

CPK 3.6.1 Over-crank shutdown.

CPK 3.6.2 High engine temperature shutdown.

CPK 3.6.3 Low engine lube oil pressure shutdown.

CPK 3.6.4 Over-speed of engine shutdown.

No audible alarm.
CPK

3.7 Verify the generator AC power output monitoring and controls include the following as a minimum:

CHK 3.7.1 AC voltmeter with a phase selector switch with an OFF position.

CHK 3.7.2 AC ammeter with a phase selector switch with an OFF position.

CHK 3.7.3 Frequency meter.

CHK 3.7.4 AC voltage adjust rheostat.

CHK 3.7.5 Generator output circuit breaker with manual reset.

3.8 Verify the following equipment has been installed:

CHK 3.8.1 The basic trailer is ^{Revised} provided with an electrical equipment rack located on the ~~side~~ of the engine-generator set enclosure that does not increase the total width dimension of the unit. The equipment rack is located for easy access but allows accessibility to the engine-generator set for maintenance and operation. All receptacles are on the same side of the generator and labels are mechanically fastened to the equipment with screws.

CHK 3.8.2 The distribution and wiring system have been installed per NFPA 70, National Electrical Code. ~~Sec. Exception~~

CHK 3.8.3 There is a 25KVA transformer on the unit to provide single phase power of 240/120 volt. The transformer has fault protection on the primary side.

CHK 3.8.4 A 100KW load bank is on the unit. The load bank is divided into 3 sections, 2 (two) 25KW and 1 (one) 50KW sections, which may be manually switched on individually as required to maintain the generator near 70% of capacity. The load bank is wired for operation in parallel with the normal load.

3.8.5 The electrical equipment furnished by the engine-generator set Supplier, mounted on the equipment rack outside of the engine-generator set enclosure, and wired to the generator output terminals via a 3-phase, 4-wire bus is as follows: (Rated current capacity of components shall not be less than the rating requested.)

g/k 3.8.5.1 One (1), 3-pole, 3-wire, 150 amp rated, 80 amp trip, 600 VAC, lockable circuit breaker. A 100 amp. receptacle is on the load side of the circuit breaker and is labeled as "SERVICE TRAILER 240 VAC 80 AMPS". The receptacle is an Appleton Cat. # ADR1034.

g/k 3.8.5.2 One (1), 3-pole, 3-wire, 150 amp rated, 50 amp trip, 600 VAC, time delay lockable circuit breaker. A 60 amp. receptacle is on load side of the circuit breaker and is labeled as "BREATHING AIR COMPRESSOR 480 VAC 50 AMPS". The receptacle is an Appleton Cat. # ADR6034.

g/k 3.8.5.3 One (1), 3-pole, 3-wire, 200 amp rated, 110 amp trip, 600 VAC, lockable circuit breaker. A 200 amp. receptacle to the load side of the circuit breaker and label receptacle as "UTILITY 480 VAC 110 AMPS". The receptacle is an Appleton Cat. # ~~ADR20044~~. *ADR not available g/k*
ADR 20044

g/k 3.8.5.4 One (1), 20 amp, 240 VAC, single receptacle, wired from a two pole, 20 amp breaker to be used for hookup of temporary power boxes. Labeled as "240 VAC 20 AMPS".

g/k 3.8.5.5 One (1), 20 amp, 120 VAC, duplex receptacle, wired from a single pole, 20 amp breaker with ground fault protection, to be used for hookup of temporary tools and lighting. Labeled as "120 VAC 20 AMPS".

g/k 3.8.5.6 One (1), 30 amp, 120 VAC, single receptacle, wired from a single pole, 30 amp breaker. Labeled as "PURGE GAS TRAILER 120 VAC 30 AMPS".

3.8.6 The unit has grounding rods and a 100 foot cable to allow grounding to a ground grid. *To be verified at receipt inspection. g/k*

#4 copper minimum. g/k

3.9 Verify the following engine-generator trailer requirements are satisfied:

CAK 3.9.1 The engine-generator set including all accessories are mounted on a heavy duty type trailer designed for use in construction, communications, and utility applications.

CAK 3.9.2 The trailer meets Department of Transportation (DOT) requirements for highway travel. (DOT Certification)

CAK 3.9.3 Vibration isolators are used between the engine-generator set and the ~~trailer~~ generator frame.

CAK 3.9.4 The trailer is equipped with running lights, brake lights, safety brake, stabilizer jack on each corner; a front wheel jack with wheel; and hitches.

CAK 3.9.5 The trailer has a 2 3/4 inch Lunette hitch with vertical adjustment.

CAK 3.9.6 The underside of the trailer is undercoated for rust protection.

CAK 3.9.7 The trailer has hydraulic surge type brakes.

CAK 3.9.8 The generator is within an enclosure and the enclosure is lined with sound deadening material.

CAK 3.9.9 The instruments and controls are vibration isolated to prevent gauge and control malfunction.

3.10 Verify the following engine requirements are satisfied:

- CPK 3.10.1 Diesel fuel engine.
- CPK 3.10.2 Engine shall be electric start from negative grounded battery supplied.
- AK 3.10.3 Battery shall be charged with alternator having automatic voltage regulation supplied with engine.
- CPK 3.10.4 A fuel tank is on the unit that will supply fuel for the engine to operate at full load for at least 24 hours. (Capacity 250 gal, Consumption rate 7.7 gal/hr)
- CPK 3.10.5 Two (2) stage dry type air cleaner with a restriction gauge.
- CPK 3.10.6 Furnished with the capability for cold weather starting such as electric glow plugs. Engine hot start 1500 watt, 110 volt heater.
- CPK 3.10.7 Record the freeze point of the engine antifreeze. (-40 °F)
- CPK 3.10.8 Drip pan to catch fuel or oil leaks.
- CPK 3.10.9 Painted inside and out. Exterior is White.
- CPK 3.10.10 Verify there are no Suspect Fasteners as identified on the U.S. Custom's Fasteners Headmark List.
- CPK 3.10.11 Verify all visible welds are acceptable per AWS D1.1.

4.0 Run Test

4.1 No Load Cold start: Verify that the engine starts and comes to 1800 $\pm$ 9 rpm in the specified time. (MFR 6 - 10 sec.)

CPK 4.1.1 Switch Run-Off-Auto switch to Run.
(Time from close of contacts to 1800 rpm 2 sec.)

4.1.2 Verify the following instrumentation is functional and the value indicated is within the range specified by the manufacturer:

CPK 4.1.2.1 Engine lube oil pressure gauge.
(75 psi, MFR 10 - 70 psi)

CPK 4.1.2.2 Coolant temperature gauge.
(175 °F, MFR 50 - 250 °F)

- CLK 4.1.2.3 Hour meter.
(1.6 hrs)
- CLK 4.1.2.4 Battery volt meter.
(28 volts, MFR 24 - 30 volts)
- CLK 4.1.2.5 Fuel gauge for day tank.
(Empty level)
- N/A 4.1.2.6 Other instruments normally provided by the manufacturer for the proper operation and maintenance of their particular engine-generator set.
- CLK 4.1.3 Record and with a sound meter the generator noise level at the electrical control panel and verify that it is less than 85 decibels. 88 decibels. *Lot of trapped noise at test 3 to CLK*
- 4.2 Loaded Cold start with Remote/Auto start: Verify, with the 100 KW load bank on line, that the engine starts, comes to 1800 $\pm$ 9 rpm, and the load is automatically switched on-line in the specified time. (MFR 0 - 10 sec.)
- CLK 4.2.1 Switch Run-Off-^{Remote}~~Auto~~ switch to ^{Remote}~~Auto~~.
- CLK 4.2.2 Close contacts on a temporarily installed switch.
(Time from close of contacts to ~~load on-line~~ ^{Full Speed} 2 sec.)
- CLK 4.2.3 Switch Run-Off-^{Remote}~~Auto~~ switch to Off. (Remove temporary switch.)
- 4.3 Verify controls shutdown and lock out the engine under the following simulated abnormal operating conditions. (Temporarily install contacts and jumpers as required to simulate conditions. Restart the generator between each alarm test.) Verify alarm test switch, lamp test switch and alarm reset switch are operational:
- CLK 4.3.1 Engine failure to start after a specified cranking time, with ~~alarm~~ - ^{light} 3 cycles 16 on 16 off,
- CLK 4.3.2 Engine over-speed, with ^{light} ~~alarm~~ 2100 ref factory test.
- CLK 4.3.3 Engine low lube oil pressure, with ^{light} ~~alarm~~ Pre Low Oil Pressure
- CLK 4.3.4 Engine high operating temperature, with ^{light} ~~alarm~~ Pre High Engine Temp.
- CLK 4.3.5 Remote manual stop activated. (~~located on distribution panel~~) Temporary switch.

- 4.4 Verify proper operation of the generator, power distribution components and load bank according to the manufacturer's supplied information. (For load bank test operate for 15 minutes at each step prior to recording information.)

4.4.1 Step 1 (25KW Resistive Load for 15 min.) *OK*

OK 4.4.1.1 Amperage ^{30 30 30}
~~175~~, ~~265~~, ~~365~~ amps

OK 4.4.1.2 Voltage 1-2 480, 2-3 481, 1-3 480

OK 4.4.1.3 Frequency 62.5 Hz

OK 4.4.1.4 Oil Pressure 70 psi

OK 4.4.1.5 Water Temperature 170 °F

4.4.2 Step 2 (50KW Resistive Load for 15 min.)

OK 4.4.2.1 Amperage 1 60, 2 60, 3 60 amps

OK 4.4.2.2 Voltage 1-2 480, 2-3 481, 1-3 481

OK 4.4.2.3 Frequency 62.15 Hz

OK 4.4.2.4 Oil Pressure 70 psi

OK 4.4.2.5 Water Temperature 170 °F

4.4.3 Step 3 (100KW Resistive Load for 15 min.)

OK 4.4.3.1 Amperage 1 119, 2 119, 3 119 amps

OK 4.4.3.2 Voltage 1-2 480, 2-3 481, 1-3 480

OK 4.4.3.3 Frequency 61.4 Hz

OK 4.4.3.4 Oil Pressure 70 psi

OK 4.4.3.5 Water Temperature 170 °F

- 4.4.4 Verify voltage and clockwise phase rotation as noted for the following:

OK 4.4.4.1 UTILITY 480 VAC 110 AMPS outlet

4.4.4.1.1 Phase rotation CCW

4.4.4.1.2 Voltage 1-2 480, 2-3 481, 1-3 481

CAK 4.4.4.2 SERVICE TRAILER 240 VAC 80 AMPS outlet

4.4.4.2.1 Voltage 1-2 239

CAK 4.4.4.3 BREATHING AIR COMPRESSOR 480 VAC 50 AMPS outlet

4.4.4.3.1 Phase rotation CW

4.4.4.3.2 Voltage 1-2 481, 2-3 481, 1-3 481

CAK 4.4.4.4 240 VAC 20 Amp Single Receptacle

4.4.4.4.1 Voltage 239

CAK 4.4.4.5 120 VAC 20 Amp Duplex Receptacle

4.4.4.5.1 Voltage 120

CAK 4.4.4.6 PURGE GAS TRAILER 120 VAC 30 Amp Single Receptacle

4.4.4.6.1 Voltage 120

CAK 4.4.5 Switch Run-Off-Auto switch to Off.

4.5 No load hot start: Verify that the engine starts and comes to 1800 rpm in the specified time. (MFR 5 - 15 sec.)

CAK 4.5.1 Switch Run-Off-^{Remote}Auto switch to Run. Time 2 sec.

CAK 4.5.2 Switch Run-Off-^{Remote}Auto switch to Off.

4.6 Loaded hot start: Verify, with the 100 KW load bank on line, that the engine starts, comes to 1800 $\pm$ 9 rpm, and the load is automatically switched on-line in the specified time. (MFR 5 - 15 sec.)

CAK 4.6.1 Switch Run-Off-^{Remote}Auto switch to Run.
(Time from close of contacts to ^{Full Speed}load on line. 2 sec.)

CAK 4.6.2 Switch Run-Off-^{Remote}Auto switch Off.

TEST EXCEPTIONS

Step #	Description of exception and resolution.
3.8.2	Grounding: 1) GENERATOR FRAME SHOULD BE BOLTED TO TRAILER FRAME. 2) PROVIDE CHASE THROUGH CIRCUIT BREAKER ENCLOSURE (MOUNTED ON REAR OF TRAILER) FOR GROUNDING ELECTRODE CONNECTION TO NEUTRAL/GROUND BUS. <i>CAK</i> Verify upon receipt inspection. <i>CAK</i>
3.2.2	Frequency for full load factory set @ 60 Hz. Test data shows variance which is explained by lack of full load during test. Trend of frequency indicates the equipment is capable. <i>CAK</i>

TEST COMPLETED BY:

PRINT NAME	COMPANY	SIGNATURE	DATE
Alexis J Kostelnik	WHC	<i>Alexis J Kostelnik</i>	9-26-94
COMMINS NORTHWEST INC		<i>Ch. L. Lott</i>	9-26-94

* Make additional copies as required.

BEST COPY AVAILABLE

SUSPECT FASTENER HEADMARK LIST

Westinghouse Hanford Company
Help Stamp Out Suspects/Counterfeits

Suspect Fastener Headmark List

All Grade 5 and Grade 8 fasteners of foreign origin which do not bear any manufacturers' headmarks:

Grade 5

Grade 8

Grade 5 fasteners with the following Manufacturers' headmarks:

Mark	Manufacturer	Mark	Manufacturer
J Jinn Har (TW)		KS Kosaka Kogyo (JP)

Grade 8 fasteners with the following Manufacturers' headmarks:

Mark	Manufacturer	Mark	Manufacturer
A Asahi Mfg (JP)		KS Kosaka Kogyo (JP)
NF Nippon Fasteners (JP)		RT Takai Ltd (JP)
H Hinomoto Metal (JP)		FM Fastener Co. of Japan (JP)
M Minamida Sanyo (JP)		KY Kyoei Mfg (JP)
MS Minate Kogyo (JP)		J Jinn Har (TW)
Hollow Triangle Intasec (CA, TW, JP, YU) (Greater than 1/2-inch diameter Grade 8 Hollow Triangle only)		UNY Unytite (JP)
E Dalei (JP)		

Grade 8.2 fasteners with the following headmarks:

Mark	Manufacturer
KS	Kosaka Kogyo (JP)

Grade A325 fasteners (Barnett Denver target only) with the following headmarks:

	Mark	Manufacturer
Type 1		A325 KS Kosaka Kogyo (JP)
Type 2
Type 3

Key: CA-Canada, JP-Japan, TW-Taiwan, YU-Yugoslavia

Any bolt on this list should be treated as defective without further testing.

GENERATOR SET

WHC-SD-WM-ATR-105
Rev. 0
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Model 150DGFA 68913H		S/N F940547197				
Customer CUMMINS NORTHWEST INC		Order File Number U434358D P.O. 11353R				
SERVICE RATING	☒ Prime	KW 135	KVA 169			
	☐ Standby	KW	KVA			
FUEL TYPE	☐ Gasoline ☒ Diesel ☐ LP Vapor ☐ LP Liquid ☐ Nat Gas ☐ Other					
GOVERNOR TYPE	☒ Mechanical ☐ Electrical		Brand BOSCH			
COOLING SYSTEM	☒ Mounted Radiator ☐ Remote Radiator ☐ Heat Exchanger		Other			
ITEMS CHECKED/ADJUSTED	☒ Governor ☒ Remote Start ☒ Voltage Regulator					
	☒ Oil Pressure Pre-Alarm ☒ Oil Pressure Shutdown ☒ Meter Accuracy					
	☒ Hi Cool Temp Pre-Alarm ☒ Hi Cool Temp Shutdown ☐ LET Alarm					
	☒ Overspeed 2100 RPM ☒ Overcrank Sec 16 Crank 16 Rest 83 Total					
	☒ Other: List: B255 F001 H462 H480 KH22 H389 K001					
TEST CONDITIONS	Test Spec. 98126	Ambient Temp 85 Deg F	Barometer 28.47 In Hg	Voltage 277/480 V	Phase 3	Frequency 60 Hz
UNIT RESULTS* No Load >	Batt Charge Syst 28.01 ☒ Volts Amps	Voltage 1-2 482	2-3 482	1-3 482		
	Volt Reg Adj 450-517	1-N 278	2-N 278	3-N 278		
	Frequency 62.7 HZ	Coolant Temp 176	Lube Press 66	Phase Sequence ☒ UVW ☐ Other		
Full Load (4 / 4) >	Batt Charge Syst 28.01 ☒ Volts Amps	Voltage 1-2 480	2-3 480	1-3 480		
		1-N 277	2-N 277	3-N 277		
	KW 135	Current 1 203	2 203	3 203		
	Frequency 60 HZ	Coolant Temp 178	Lube Press 62	Power Factor .8		
Maximum Power 167	Freq 59.6 HZ	Voltage 481	ISO Correction Factor 1.0	Test Date 07/15/94	Running Time .8	
Data Recorded & Certified By: R HOGEN 4139		Quality Engineer: <i>[Signature]</i>		Date: 7/21/94		

X22A041-Front 1/90 * If unit is dual fuel, see additional sheet for second fuel results.
19-78 (See reverse side for extended running time data.)

Mail to

Cummins Northwest, Inc.
800 S.W. Grady Way
Renton, WA 98055
4th & 5thD. Young
7/21/94

ONAN CORPORATION GenSize 2 Version 4.00

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=====
--R U N N I N G----- | -----M A X-----S U R G E--At Specified Voltage---
      KW      KVA      PF      |      KW      Occurs in Step      KVA      Occurs in Step
      -----      -----      |      -----      -----      -----
      135      135      1.00      |      135      1      135      1
=====

```

Recommended GenSet
Model: 150DGFA

GenSet Voltage: 208-240/416-480

Nominal KW	Duty	Specified Voltage	Freq.	Alternator	
				Specified	Recommended
150	Standby	277/480 WYE	60	105	105

When operated at 500 Feet Altitude
and 77 degrees Fahrenheit Ambient the
operating performance is:

* GenSet selected with one GenSet. *

Maximum KW	Voltage Dip	Freq. Dip	Excitation
150	19%	8%	Shunt

Onan Corporation has developed this GenSize 2 computer program to help you, the engineer, with a generator set selection. The recommendations are based upon your input of the genset requirements and typical performance data published by NEMA and other agencies.

Due to changing load and site conditions beyond our control, we cannot be certain the selection of a genset based upon the recommendation of this computer program will meet the site requirements. Therefore, nothing in this program may be construed as a warranty. You must decide for yourself or consult with your local Cummins/Onan distributor that the generator set selected is sufficient for your intended purpose. Each Onan generator set is covered by an express written warranty which is in lieu of all other warranties, expressed or implied.

Please consult with your Cummins/Onan distributor representative in your area for further information.

File Name: UNTITLED

and engine/alternator capacity.	135 KVA	187	Acceptable
2. Running load requirements and alternator capacity at site conditions.	135 KW 135 KVA	150 187	Acceptable Acceptable
3. Max load surge KVA and Max set KVA capacity with minimum 90% sustained voltage.	135 KVA	563	Acceptable
4. Max load Surge KW and Max set Surge KW capacity at site conditions with minimum 90% sustained voltage.	135 KW	189	Acceptable
5. Transient Voltage Dip: Allowable Transient Voltage Dip:	19 % 35 %		Acceptable
6. Total non-linear plus linear load KW and Alternator KW capacity.	135 KW	150	Acceptable

N CORPORATION GenSize 2 Version 4.00 File Nam

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Project Name: (WESTINGHOUSE HANFORD)

Project Parameters:

Duty:.....: Stationary Standby
 Voltage:.....: 277/480 WYE
 Frequency.....: 60
 Max. Temp. Rise.....: 105
 Max. VDIP%.....: 35
 Max. Altitude.....: 500
 Altitude Scale.....: Feet
 Max. Amb. Temp.....: 77
 Temperature Scale.....: Fahrenheit
 Cooling System.....: Radiator
 Fuel Type.....: Diesel

Load Listing

Number: 1 Load Type: Resistive Phase 3

Name: (135 KW PRIME) Input KW: 135

t:

KW:	SKVA:	SKVAR:	SPF:	RKW:	RKVA:	RKVAR:	RPF:
5.0	135.0	0	1.00	135.0	135.0	0	1.00

Step Sequence/Load

Number: 1 Surge KW: 135 Surge SKVA: 135

Name: START 135 KW PRIME LOAD

t:

Qty	SKW	SKVA	SKVAR	SPF	RKW	RKVA	RKVAR	RPF
1	135.0	135.0	0	1.00	135.0	135.0	0	1.00

Total:	135.0	135.0	0	1.00	135.0	135.0	0	1.00
--------	-------	-------	---	------	-------	-------	---	------

Active:	135.0	135.0			135.0	135.0	0	
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via Selection Results:

150DGFA

Required by Loads	Available from Model	Result
135 KW	150	Acceptable

uning load requirements

From: Electrical Power Systems Engineering
Phone: 376-8109 L4-90
Date: October 17, 1994
Subject: CORE SAMPLING EQUIPMENT GENERATORS

To: Al Kostelnik RI-17
cc: CMM File/LB

Two Diesel generator sets by Cummins Diesel, 800 Grady Way, Renton Washington, 200 Kva each. The generators are 480Y/277 volt units.

The generators are installed on trailers fabricated for the units. The trailers have an industrial control panel enclosure. The enclosure is a NEMA 4 outdoor rated enclosure. The control panel has a dead front through which the handles of all circuit breakers are accessible.

The circuit breakers are properly rated and installed. Wire sizes were examined and found to be correct.

Also on the trailer is a 25 Kva transformer to supply 120/240 volt single phase power. The neutral ground point is located in the industrial control panel. A 100 KW load bank is mounted on the front of the generator unit. The load bank can be switched to provide load in increments of 25 KW.

Items requiring further attention.

1. The only provision for connection of a grounding electrode is inside the generator enclosure. A mechanical set screw type lug is bolted to the generator frame, inside the louvered door on the right side of the unit. This location does not allow connection of the grounding electrode conductor and closing of the louvered doors.
2. The generator neutral is internally grounded to the generator frame, however the generator is mounted on rubber vibration isolation pads. The neutral ground point of the generator and the trailer mounted transformer must be the same point.
3. The procurement specifications require that two ground rods (size was not specified) and 100 feet of grounding electrode conductor be provided. The grounding electrode conductor and the ground rods were not provided with the two units observed.
4. The acceptance criteria called for rotation checks of the three phase power. All three phase circuit breakers and receptacles were checked and found to have consistent clockwise rotation. However, the rotation required by the actual three phase loads to be connected was not evaluated.

Al Kostelnik
Page 2
October 17, 1994

Recommendations.

1. The neutral and equipment grounds are connected to a terminal bar located inside the industrial control enclosure. It is recommended that a chase be provided through the enclosure, below the level of all enclosed components, to allow the appropriate grounding electrode conductor to be routed from the grounding electrode selected to the neutral grounding bar inside the enclosure. This chase will allow the grounding electrode conductor to connect the grounding bar to the grounding electrode without splice or tap.
2. The generator housing is bonded to the generator frame with a braided bonding strap. A similar bonding strap should be provided to bond the generator frame to the trailer frame.
3. Include two 5/8 X 10 ground rods and 100 feet of # 4 AWG copper wire for connection to a grounding electrode system. The required grounding electrode conductor for the ground rods is #6 AWG.
4. A bump test for rotation check of all three phase motor loads will have to be accomplished at the time of first connection to the generator unit.

Conclusion. There were no NEC violations or safety issues not mentioned above that would prevent this unit from safely performing it's intended function.

CM Monasmith, NEC Interpretative Authority
Electrical Power Systems Engineering

rmg

QUALITY ASSURANCE INSPECTION PLAN

Sheet 1 of 2
Safety class 3

WHC-SD-WM-ATR-105
Rev. 0
Appendix D-1 of D-2

Item Title Diesel Generator		Drawing/Spec. No. WHC-S-0252		Rev. 1		
		Item Description Diesel Generator				
		Supplier Cummins Northwest		Inspection No. 2799		
		P.O. Subcontract 404866				
Prepared by AJ Kostelnik / J. Verderber		Item No. 192 qty. 1		Inspected by [Signature] Date 11-27-79		
Reference						
Char. No.	Inspection Characteristics	INSPECTION STATUS				Remarks
		Acc	Hid Tag	Rej	NCR	
	<p>SAMPLE SIZE DETERMINATION</p> <p>Sample size (number of items to be inspected in a lot), shall be determined by using Table I and Table III-A of the latest edition of MIL-STD-105 as follows:</p> <ul style="list-style-type: none"> Select the Sample Size Code Letter from Table I, based on the lot size of material received and the General Inspection Level indicated by the QAIP (Level I, II, or III). Select the sample size from Table III-A using the Sample Size Code Letter obtained from Table I and the AQL number specified by the QAIP. The minimum sample size utilizing Level II, AQL 4.0, Table III-A shall be 8 or 100%, if the lot size is less than 8. <p>NOTE: If any samples are found nonconforming, the entire lot shall be placed on HOLD pending engineering evaluation and NCR disposition.</p>					
1	Verify the Diesel Generator Trailer was not damaged during shipment.	NOV 01 1984				
2	Verify a wire chase has been installed on the Electrical Distribution panel at the rear of the trailer which consists of a short section of Rigid Galvanized Steel conduit which is bent with the end turned down to keep rain from entering the cabinet.	NOV 01 1984				
3	Verify that a ground strap has been installed to electrically bond the generator frame to the trailer frame. (Probably located inside of the generator enclosure on the right side. One strap grounds the generator to the frame and the second strap grounds the frame to the trailer.)	NOV 01 1984				
4	Verify there is a minimum of 100 feet of #4 CU wire provided.	NOV 01 1984				

QUALITY ASSURANCE INSPECTION PLAN (Continuation Sheet)

Sheet 2 of 2
Safety Class 3

Item Title Diesel Generator	Drawing/Spec. No. WHC-S-0252	Rev. 1
	P.O. No. 404866	
	Item No. 1 of 2	

Char. No.	Inspection Characteristics	INSPECTION STATUS					Remarks
		Acc	Hold Tag	Rel	NCR	Cond. Acc	
5	Verify there are no Suspect Fasteners on the Generator Trailer.	NCV 0.1 WHC 11/25/93	1994				
6	Verify Receipt of 8 copies of Vendor Data. A. Assembly drawings showing general equipment layout, subassembly details, critical interface dimensions and identification of all major components of the engine and the generator. Layout and wiring diagrams of the receptacles on the engine-generator set shall be shown. B. Schematic electrical drawings of wiring systems, including operating and safety devices, control panels, instrumentation and alarms. Include make, model and part numbers of items. C. Operating and maintenance instructions. D. Pictorial parts list and part numbers. E. Recommended spare parts list. F. Recommended maintenance procedures. G. Short-circuit current capability at the generator output terminals.	NOV 0 WHC 11/25/93	1994				

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