DOCUMENT CONTROL SHEET

BOMBARDIER
the evolution of mobility

UNIT 870

INSPECTION TYPE: 3M (pick from drop down list)

DATE OPENED: 1/7/2015

DATE FINISHED: 1/12/2015

REPAIR WORK ORDER ECMS01

PM WORK ORDER ECMS01 5

RECEIVED JAN 22 2015

WHEEL	FLANGE HEIGHT	FLANGE THICKNESS	RIM THICKNESS	TM POSITION	LAST RECORDED SERIAL NUMBER	*IF INCORRECT* CURRENT SERIAL #
1 - L1	18	2	24	1	10C34021C	
2 - R1	18	2	24	2	10D34009B	
3 - L2	18	2	28	3	10D34008B	
4 - R2	18	2	28	4	10D34010B	
5 - L3	17	0	22	RECENT REPAIRS OR SERVICE DEFECTS		
6 - R3	17	0	22			
7 - L4	17	0	18			
8 - R4	17	0	18			

NOT IN STOCK -- TASKS FOR FOLLOW UP

PART #	DESCRIPTION	SRD# - W/O#	DUE DATE	APPROVED BY

ALL TASK ITEM SIGNED OFF — X

WHEEL DATA ATTACHED — X

ATS DOCUMENTATION ATTACHED(*) — X

EVENT RECORDER HARD COPY REVIEWED — X

EVENT RECORDER HARD COPY ATTACHED (*) — X

HORN TEST COPY ATTACHED (*) — X

[redacted] — 1-21-15

SUPERVISOR SIGN OFF — *DATE*

(*) Required for locomotives & cab cars

REVIEWED BY [redacted] **DATE** 1/29/15

UNIT #: 870

PM W/O#: ECMS01-2015-5

DATE: 1-7-15

Repair W/O#: ECMS01-2014-

BOMBARDIER
the evolution of mobility

DEFECT SHEET FOR ELEC TASKS 92 DAYS INSPECTION

Initials Inspect	Complaint Symptom	Fail Cause	Material Required	REQ#	Corrective Action	SRD #	Initials Repair
FRG	Head Light Indicator Panel Top Light Very Dim		Y / N		Replaced Headlight Board		[redacted]
HN	TM #3 Low RSMn		Y / N		Cleaned & rebrushed ac/dc Sides		[redacted]
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				

SUPERVISOR: [redacted]

DATE: 1-19-15

METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: _____ Locomotive#: _____ 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: Electrical Operator
Session 1: INBOUND

Task ID	Description	Completed By:
Exterior		
FL-C 1001	**Inspect MU, communication, HEP cables & receptacles.**	[redacted]
	Inspect condition of MU, Communication, and HEP cabling. Inspect condition of insulation and for signs of a stretched cable. Inspect receptacle cover, spring, rubber seal, pins, and mica insulating plate. All three mounting screws must be in place and tight. Remove dirt and debris from receptacle using air pressure and an electrical cleaner if needed.	
Cab		
FL-C 1020	**Inspect, download, reset time & seal event recorder.**	[redacted]
FL-C 1009	**Check instrument panel, cab, and indicator lights.**	
	Inspect all gauge and panel lights including speed indicator and gauge lights dimmer. Operate push to test feature to verify lamps are working properly.	
FL-C 1010	**Check for low voltage grounds**	[redacted]
	Using a 6 Wattstest light at battery knife switch when closed, place one lead on the + side of the knife switch and one lead to the electrical cabinet frame. If test light illuminates, a negative ground exists. If test light illuminates when lead is placed on the - side of the knife switch, a positive ground exists. Investigate and clear low voltage grounds.	
L-C 1024	**Check operation of dynamic & blended brakes.**	[redacted]
	To test dynamic brake on F59PH locomotives, using the computer, select the option "Meter/IOL" option on the main menu then Dynamic Brake. On F59PHI locomotives, select the option "Data Meter" and the Dynamic Brake on the default screen. Place the dynamic handle in #8 or maximum brakings and the display panel should indicated 24T pin - 74V and 875 field amps	
	Test dynamic brake interlock by making an automatic application with the independent in the release position and going into dynamic brake. Brakes applied by the automatic application should release and brake cylinder pressure reduce to zero pounds.	
	To test blended brake, select "Self Test" on the display panel and select blended brake. Follow the prompts to perform the test.	
L-C 1036*	**Measure computer power supply output voltage.**	[redacted]

Measure Output Voltage

	PHI		PH
A. PSM 300	-5.01	A. PSH 5 Volt	_____
B. PSM 310	+12.11 -12.03	B. PSH 15 Volts	_____
C. PSM 320	-15.11 +15.03	C. PSH 15 V. VRDC	_____

L-C 1035* **Check & record aux. generator output at VR15 module.**

Aux. Gen. Output at VR15 module must be 72 - 78 volts.

Record AC voltage readings at:

TP4 _____ TP6 _____ TP10 _____

Make sure phases are balanced.

FL-C 1005 **Check operation of ground relay.**

Induce a ground by using a jumper wire from HV cabling to the car body. Verify operation of audible and visual alarms.

L-C 1042 **Ensure decals and stenciling are in place and legible.**

Ensure "DANGER - High Voltage" decals are in place and legible on hi-voltage cabinet.

Ensure stencil on interior wall reading "Fully Equipped FRA Part 223 Glazing" is in place and legible.

L-C 1031 **Check computer display for faults.**

Check computer for logged faults and report to supervisor, faults occurring with last 30 days and uncleared faults.

FL-C 1032 **Perform module test of Wheel Slip System**

HEP

L-C 1054* **Perform and record the results of the following tests.**

Record findings on Inbound Load Test Sheet

HEP ENGINE

Overspeed (65Hz) (Adjust Tach Rheostat) _____

Over Voltage (510 - 520 VAC) _____

Under Voltage (450 - 460 VAC) _____

Over Frequency (62.5 - 63 Hz) _____

Under Frequency (56 - 58 HZ) _____

	Tripped	Not Tripped
Low Oil Pressure (Jumper N.C. Contacts of Oil Pressure Switch)	_____	_____
Hot Engine Warning (Jumper pins on gray 215 switch)	_____	_____
Hot engine shut down (Jumper pins on black 225 switch)	_____	_____
Ground Relay Test (jumper 24L7)	_____	_____

Oil Pressure _____

Temperature _____

Fuel Pressure _____

L-C 1056 **Test HEP low oil pressure device.**

Using jumper wire, jumper the normally closed contacts at the oil pressure switch to verify engine shuts down.

L-C 1057 **Test HEP hot engine warning device (215°)**

- Unplug harness from the hot engine switch (215°) gray switch.
- Use jumper wire to short the two (2) pins together.
- Observe cooling fans energize and the Hot Eng. & Aux. Eng. Fault light illuminate.
- Remove jumper wire and attach harness to switch, cooling fan drops out and the Hot Eng. & Aux. Eng.
- Fault light goes out.

L-C 1058 Test HEP hot engine shut down (225°)

- Unplug the harness for the engine shut down switch (225°) black switch.
- Use jumper wire to short the two (2) pins together.
- The Hot Eng. light and Aux. Eng. Fault lights will illuminate, engine speed will reduce to idle and after one (1) min. the engine will shut down.
- Try to restart the engine and it should not crank.
- Remove the jumper wire and attach harness to switch.
- Press the Fault Reset button and the Aux. Eng. Fault light & Hot Eng. lights will go out.
- Restart HEP.

L-C 1059 Test HEP UOVT setting (510-520 VAC & 450-460 VAC)

- Mark the position on the HEP rheostat REHE where presently set for 480 VAC.
- Increase/Decrease HEP voltage until UOV either drops out at 510-520 VAC or 450-460 VAC. Both under and over volts shall be tested.
- After ten (10) secs. The VOLT TRIP light will come on and RH and LH HEP indicator light will go off. The RH and LH HEP Breaker Open lights will also come on.
- Readjust the rheostat to 480 volts, depress the Fault Reset button and the VOLT TRIP light will go off.
- Depress HEP pushbutton. Observe the RH and LH HEP lights come on.
- The RH and LH Breaker lights will go off.

L-C 1060 Test HEP UOF relay settings (56-58 Hz & 62.5-63 Hz)

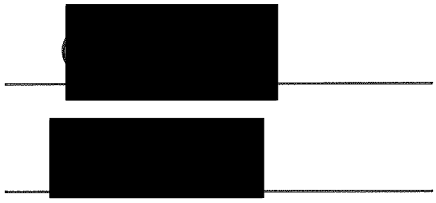
- Turning the rated speed adjustment on the governor speed control panel, engine RPM will increase or decrease accordingly until the Under/Over Frequency Relay drops out at 56-58 Hz for low frequency or 62.5-63 Hz for high frequency.
- After ten (10) secs. the FREQ TRIP light will come on, the RH and LH HEP On indicator lights will go off and the RH and LH Breaker Open lights will come on.
- Readjust the engine RPM to 60 Hz.
- Push the Fault Reset button and the FREQ Trip light will go off.

L-C 1055 Test HEP overspeed (65Hz)

Adjust tach. rheostat and increase engine speed to verify engine overspeed functions properly and drips at 65HZ.

FL-C 1017 Test ground relay (HEP)

- At the HEP Fuse & Switch Panel, place the 480 VAC toggle switch to OFF.
- Ground 24L7 using a jumper. Place 480 VAC toggle switch to ON and observe the HEP SYST. GRND. light illuminates.
- Place the 480 VAC toggle switch to OFF and the Ground light should stay on. Depress the Ground Fault Reset push button and the GRND light will go out.
- Remove ground jumper from 24L7.
- Return the 480 VAC toggle switch to the ON position.

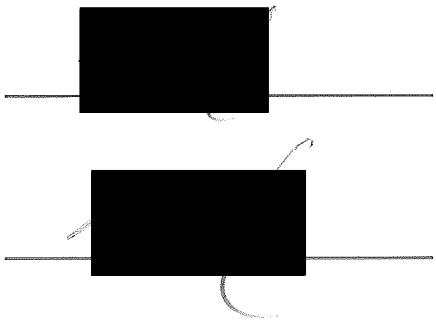


L-C 1052 Check operation of cooling fan.

When first starting HEP engine and prior to load test, use a temperature pyrometer to measure coolant temperature at the Y pipe. As HEP engine ramps and coolant temperature increases, verify cooling fan start to operate at 185 degrees.

L-C 1062 Load test HEP engine.

Verify HEP is producing 350KW with 60Hz. Check to ensure needles are not fluctuating.



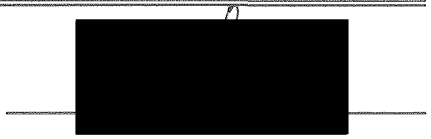
METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: _____ Locomotive#: _____ 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: Electrical Operator
Session 2: HOUSE

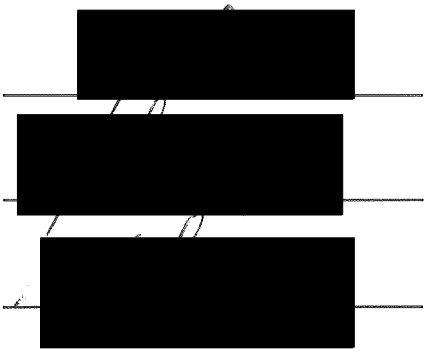
Cab



L-C 1064 Calibrate speed indicator with current wheel size.

Record the following settings:

1) Speed Indicator 37
2) Event Recorder 37
3) QES Computer _____



L-C 1065 Check speedometer overspeed & zero speed setting.

Verify overspeed setting using a function generator. Check to ensure zero speed picks up and drops out at 3 mph.

FL-C 1019 Check circuit and control breakers for proper operation.

Open and close circuit breakers ensuring that each spring and latch when closed and circuit breaker does not bind.

FL-C 1015 Inspect high voltage cabinet.

L-C 1066

Inspect the following contactors and switches:

1) Power Contactors
2) Motor Brake Transfer Switches
3) Generator Field Contactor
4) Starting Contactor
5) Engine Purge Contactor
6) Load Test Transfer Switch
7) Brake Power Contactor

- Inspect the condition of contactor tips, indications of arcing, and signs of overheating.
- Inspect insulation and connections.
- Ensure arc shutes are properly postioned after inspection.
- Ensure wires are routed properly and fastened securely.
- Verify control Relay for loose wires
- Verify bottom of cabinet for loose parts, clean
- Verify wiring support, ensure wires are secured and cannot move with vibration

FL-C 1018 Check for high voltage system grounds.

Use a 1000 volt megger, readings must be above 4 megs.

FL-C 1033 Perform functional test of Wheel Slip System N/A

ONLY TO BE DONE ON LOCOMOTIVE WITHOUT A MODULE TEST OF WHEEL SLIP SYSTEM

1) Ensure hand and air brakes are applied on locomotive.
2) Place generator field switch in the off or down position.
3) Place reverser in the reverse position.
4) Remove arc shute from reverser switch gear and verify switch gear is in the reverse position.
5) Place insulated non-conductive material between forward and center of reverser contacts.
6) Replace arc shute on reverser switch gear.
7) Place reverser in forward position.
8) Place generator field switch in the on or up position.
9) Place throttle in Run 2 position.
10) Verify that the wheel slip light is illuminated on the warning panel.
11) Place throttle in idle position.
12) Place generator field switch in the off or down position.
13) Place reverser in the reverse postion.
14) Remove arc shute from reverser switch gear.
15) Remove non-conductive material from switch gear.
16) Replace arc shute on reverser switch gear.
17) Perform power (stall) test in Run 1 in forward and reverse to ensure locomotive will make power in both directions.

Main Generator Compartment

L-C 1073 Inspect & clean AR15 slip rings, fuses & diodes.

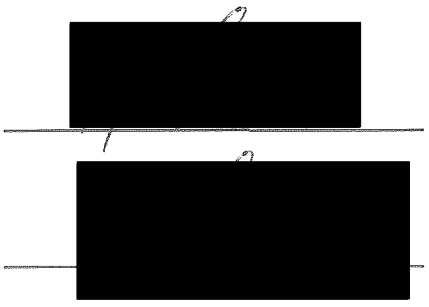
Inspect Slip rings :

Ensure that the surface of the slip rings are smooth and free of grooves. Inspect the surface of the slip rings for discoloration. Discoloration is a sign of alternator overloading (slip rings under stress). A horsepower reading or an excitation system check may assist in troubleshooting. Etching of the surface may be caused by an accumulation of dirt between the brush and slip ring. Threading may be caused by an improperly placed brush holder or improper spring tension. Ensure the insulation between the slip rings is wiped clean preventing a short circuit between slip rings. On the brush holders, verify the carbonway surface is smooth, allowing the brushes to move freely.

Ensure that the brushe holders are placed at the proper distance and location on the slip rings, not outside the surface of the slip rings. Clean the brush holder insulators and verify all wire connections are tight.
Ensure the brushes are applied properly and that the pigtails do not interfere with the spring tension. The pigtails must be placed at an angle away from the spring finger.

Inspect Fuses / Diodes :

Clean all diodes. A protruding pin on the fuse (attached to a diode) will signify a defective diode.
Replace failed fuses and associated diodes in effected cluster. There are two types of diodes; the positive diode has a white ceramic ring and the negative diode has a pink ceramic ring. When changing diodes, both corresponding positive and negative diodes must be changed. Apply a thin coat of silicon heat transfer compound on the heat sink seat (hex base), not on the diode thread. Torque specifications for the diode is 25 ft/lbs and 13 ft/lb for the terminal lug end.



L-C 1074 Renew worn AR15 slip ring brushes.

Renew brushes if shorter than the top of the brush holder.
When new brushes are installed, they need to be "sanded-in" by
Clean slip rings and brush holders

L-C 1075 Ensure "Danger-High Voltage" decals are in place & legible.

Danger - High Voltage decals must be legible and in place on frame of alternator housing and on high voltage cabinet.

L-C 1076 **Inspect T.B.31-M .**

Inspect T.B. 31-M for signs of overheating, and ensure connections are secure.

Main Engine Room

L-C 1081 **Inspect dynamic brake blower motor.**

Inspect brushes and replace if below top of brush holder. Inspect condition of commutator.

Inspect wiring and verify connections are tight.
Blow out dust and debris with low pressure shop air.
Ensure "Danger-High Voltage" decals are in place and legible.

Verify "Danger-High Voltage" decal on high voltage cover adjacent to turbo lube pump is in place and legible.

FL-C 1021 **Inspect fuel pump motor. ~~Replace worn brushes.~~**

Ensure mounting bolts are securely fastened. Inspect wiring and verify connections are tight, replacing worn brushes on F59PH as required.
Blow out dust and debris with low pressure shop air.

FL-C 1022 **Inspect turbo soak back pump/motor. ~~Replace worn brushes.~~**

Ensure mounting bolts are securely fastened. Inspect wiring and verify connections are tight. Replace worn brushes on F59PH as required.
Blow out dirt and debris using low pressure shop air.

FL-C 1023 **Inspect A/C cabinets & check for grounds.**

- Inspect contactors
- Inspect wiring for loose connections
- Clean cabinet : No debris on the bottom

FL-C 1016 **Inspect HEP wiring and connections.**

Inspect HEP wiring and loose connections and for signs of overheating.

METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: _____ Locomotive#: _____ 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: Electrical Operator
Session 3: OUTBOUND

Task ID	Description	Completed By:
L-C 1052	**Check operation of cooling fan.** When first starting HEP engine and prior to load test, use a temperature pyrometer to measure coolant temperature at the Y pipe. As HEP engine ramps and coolant temperature increases, verify cooling fan start to operate at 185 degrees.	Final [redacted]
L-C 1062	**Load test HEP engine.** Verify HEP is producing 350KW with 60Hz. Check to ensure needles are not fluctuating.	[redacted]
FL-C 1028	**Check operation of ATS.** Verify ATS receiver is properly secured and the washboards are aligned. Perform a slap test. Perform ATS test and complete form SMP 8.	Final c [redacted] Final check before service

UNIT #: 870 DATE: 1-7-15

PM W/O#: ECMS01-2015-55 Repair W/O#: ECMS01-2014-

BOMBARDIER
the evolution of mobility

DEFECT SHEET FOR	COMP TASKS	92 DAYS INSPECTION

Initials Inspect	Complaint Symptom	Fail Cause	Material Required	REQ#	Corrective Action	SRD #	Initials Repair
AT	Thermal crack: Wheel # 4 Right.		Y / N		Trued wheels		[redacted]
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				

SUPERVISOR: [redacted] DATE: 1-19-15

METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: 1-7-15 Locomotive#: 870 92 Days Inspection Plan rev 10 10/25/2014

Work Order # 5 Date Work Order Opened: _____

Process Manning Sheets: COMPOSITE MECHANICS
Session 1: INBOUND

Task ID	Description	Completed By:
Exterior		
FL-C 1003	**Check operation of main reservoir automatic drain valves.** Turn the drain valves to manual and drain condensate from #1 and #2 main reservoirs. Return the drain valves to the automatic position and ensure it is cycling properly.	[redacted]
L-C 1002*	**Inspect & gauge knuckle & coupler & check slack.** Gauge coupler, checking, Guard Arm Distortion, Contour Wear, Knuckle Nose and Knuckle Stretch. Draft gear components, pocket and coupler pin must be inspected for slack or wear. Using a long bar between the coupler horn and striker face and prying outward, measure the distance between the coupler horn and the striker face. Then move the coupler in as far as possible towards the draft gear and again measure the distance between the coupler horn and the striker face. The distance between the two is the amount of free slack in the draft gear and coupler arrangement. Total slack must not exceed 1/2".	[redacted]
L-C 1003	**Check rod eye & lock lift lever clearance.** Inspect all operating lever mechanisms for loose mounting or bracket bolts bent or damaged and damage to the operating lever. On F59PHI locomotives, center the coupler, close and lock the knuckle. A minimum of 1-3/4" should exist between the operating rod eye and the link that is connected to the lock lift of the coupler. This slack is necessary to prevent unintentional uncoupling of the lever during operating conditions. The front of the rod eye should be no more than 3-3/4" forward of the coupler horn face.	[redacted]
L-C 1004*	**Check & record coupler and front pilot height.** Check and record the following measurements:	[redacted]
L-C 1005	**Visually inspect trucks & running gear.**	[redacted]

Total slack Front 0 Rear 1/16

	Front	Rear	Clearance Limits
Coupler Height Above Top of Rail	33 1/2	32 7/8	31-1/2" Min. 34-1/2" Max.
	Left	Right	
Front Pilot/Plow Height	3 3/4	3 1/2	3" Min. 6" Max.

1) Inspect truck frame for cracks in stress areas that may effect structural integrity.
2) Check for minimum 3/8" clearance between spring plank and safety hanger.
3) Max. wear of swing hanger pin/bushing is 1/8".
4) Check for a bent, cracked or broken swing hanger.
5) Clearance between upper and lower halves of the bearing block is minimum 1/8".
6) Check for broken or weak elliptical springs. A gap of 1/8" or greater underneath the ends of the second largest leaf indicates weak elliptical springs.
7) Inspect for broken or compressed truck coil springs.
8) Inspect shock absorber, yaw damper and mounting for the following defects:

Broken or missing mounting bolts.

Cracked or broken mounting bracket.

Damaged rubber bushing.

Damaged or dented casing.

Leaking clearly formed droplets of oil.

9) Inspect running gear for the following conditions:
Levers, rods, brake beams, and hangers must not be

10) Replace phenolic wear plate on brake shoe guide if worn to 1/8" or less.

11) Inspect slack adjuster assembly. Ensure locking pins are in place and properly secured.

12) Visually inspect journal bearing for overheating, excessive lubricant leakage or defective seals, cracked or broken cups, end caps, or adapters.

13) Ensure end cap retainer clips are in proper condition.

14) Inspect for loose or broken pedestal liners. Total clearance between journal bearing adaptor and pedestal liner is 1/4" max. (Both sides added together).

15) Inspect and ensure proper securement of journal box binder.

16) On F59PH, inspect axle generator and cabling for proper securement.

L-C 1006 Check side bearing clearance.

Minimum side bearing clearance is 1/32" not to exceed 1/4" on each side or a total of 1/2" on both sides.

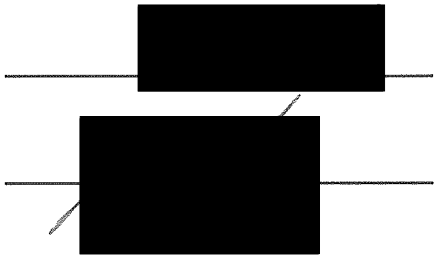
L-C 1009 Inspect vertical & horizontal handrails and steps.

Inspect condition and ensure proper clearance of all vertical handholds and horizontal handholds. Inspect condition of steps.

1) Vertical handholds must provide 2-1/2" of clearance, painted a contrasting color, securely fastened using 1/2" or larger bolts and cannot be cracked or broken.

2) Horizontal handholds must provide 2" of clearance.

3) Steps must be securely fastened using 1/2" or larger bolts, cannot be broken or cracked, with the outer edge having a contrasting color.



L-C 1010 Inspect car body for damage & loose components.

Report severe rusting and corrosion to your supervisor. Inspect hinges and pins.

L-C 1008 Ensure proper operation of all exterior lights.

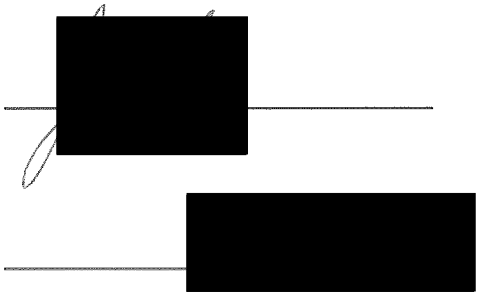
1) Front & rear headlight (all positions).
2) Auxiliary lights (steady state and flashing).
3) Marker Light(s)
4) Emergency Red Light.
5) Front and rear walkway light (F59PH).
6) Step lights and ground lights.

L-C 1011 Inspect decals & reflectorized tape.

Replace decals that are faded or discolored. Replace reflectorized tape if deteriorated or pulled away from car body.

L-C 1012 Check condition of all air hoses & valves.

Check brake pipe, main reservoir, and actuating hoses, and end valves at front and rear of locomotive. Check condition of gladhands and gaskets. Ensure air valves lock into position when open. Check condition of spring assembly.



L-C 1014 Check operation of sanders.

Inspect for missing, broken, loose or misaligned sander nozzles, sander pipes or brackets. Turn on sanders and verify sand is delivered at front and rear of locomotive. Remove clean out pipe plug from sand trap and check if plugged.

L-C 1016 Inspect main reservoirs.

Inspect the air reservoirs for physical damage. Ensure the reservoir mounting bolts are tight and inspect the mounting brackets for cracks.

[redacted]

L-C 1021 Check brake shoes & adjust piston travel.

Shoes have minimum 3/8" friction material remaining.

When applied, brake shoes make full contact with wheel thread and are not overriding.

Inspect brake levers, hangers, pins & bushing for loose, missing or worn out components.

Piston travel is sufficient to provide brake shoe clearance when brakes are released.

With brakes applied, piston travel may not exceed 1 1/2" less than total possible piston travel.

[redacted]

FL-C 1002 Check Salem air dryer, humidity indicator & timing cycle.

Replace humidity indicator if white.

With air compressor pumping, alternating exhaust should occur at 2 min. intervals ± 15 secs.

Ensure air is not discharging from dehydrating unit.

[redacted]

L-C 1136 Check & drain moisture from main reservoir tanks.

Drain condensate from main reservoir tanks.

[redacted]

Batteries

L-C 1130* Check & record battery specific gravity.

1.27	1.27	1.27	1.27
1.27	1.27	1.27	1.27
1.27	1.27	1.27	1.27
1.27	1.25	1.25	1.27

Left Right

Front

Facing Battery

1.27	1.27	1.25	1.27
1.27	1.25	1.27	1.27
1.27	1.27	1.27	1.27
1.25	1.27	1.23	1.27

Left Right

Front

Facing Battery

[redacted]

L-C 1131 Wash batteries & check electrolyte level.

The electrolyte level in all cells should not be allowed to fall below the top of the battery plates. When refilling, allow about 1/4" space below the bottom of the filling tube to minimize splashing. Take care not to overfill, particularly cells that are hard to access. If the level is extremely low, check the battery cases for cracks. Look for acid corrosion marks when inspecting for cracks. Cleanliness is important to prevent the collection of dirt, corrosive products and oil on the top of the batteries. With the battery switch open, wash off the batteries with water or scrape the residue of oil/dirt with a wooden scraper. Note: An electrolyte spill can be neutralized with baking soda.

[redacted]

FL-C 1027 Check battery cables & connections.

Verify the condition of the cable insulation for dryness and cuts. Ensure connectors (lugs) are properly secured to the battery posts.

METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: _____ Locomotive#: _____ 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: COMPOSITE MECHANICS
Session 2: HOUSE

Task ID **Description** **Completed By:**

Underframe

L-C 1111* **Record wheel measurements.** [redacted]

Record wheel measurements

	Flange Ht.	Flange Th.	Rim Th.
	Max. 1-1/2"	Min. 1"	Min. 1"
Gauge readings	24	8	16
Wheel #L1	18	2	24
Wheel #R1	18	2	24
Wheel #L2	18	2	28
Wheel #R2	18	2	28
Wheel #L3	18	2	24
Wheel #R3	18	2	25
Wheel #L4	18	2	21
Wheel #R4	18	1	21

[redacted] isor

Action Taken: 3 FY T/C's

X Wheels Trued

_____ Changed Wheels

_____ Ok for Service

Notify Supervisor if readings are at these points:

Flange Ht.	Flange Th.	Rim Th.
22	5	18

L-C 1112* **Inspect wheels for defects.** [redacted]

Following are condemning conditions involving wheels. Report any defective condition found to your supervisor regardless of severity.

Flat spots	A single flat spot that is 2-1/2 inches or more in length, or two adjoining spots that are each two or more inches in length.
Gouge or chip in the flange	Gouge or chip that is more than 1-1/2 inches in length and 1/2 inch in width.
Broken rim	If the tread, measured from the flange at a point 5/8 of an inch above the tread, is less than 3-3/4 inches in width.
Shelling	A shelled-out spot 2-1/2 inches or more in length, or two adjoining spots that are each two or more inches in length.
Seam running lengthwise	A seam running lengthwise that is within 3-3/4 inches of the flange.
Tread worn hollow	A tread worn hollow 5/16 of an inch or more.
Crack or break	A crack or break in the flange, tread, rim, plate, or hub.
Loose wheel	Any indication the wheel may be loose. Look for rust where the axle contacts the hub.
Rim thickness differential	No more than 3/8" on the same truck and no more than a 1/2" between trucks

L-C 1015 **Check oil level in the support bearing caps and end bells. (CE & PE)**

Before lifting the filler cap, throughly clean entire area around cap removing dirt and grit.

L-C 1118 Check support bearing lubricating oil level by inserting a clean steel ruler or rod properly marked. Accurate measurements can be obtained only if the rule for rod is inserted parallel to the fill pipe.

Check support bearing lubricating oil level by inserting a clean steel ruler or rod properly marked. Accurate measurements can be obtained only if the rule for rod is inserted parallel to the fill pipe.
If inspection shows that water or dirt is present in the oil, notify your supervisor.

Fill the reservoir with motor support oil to the point of overflow at the top of the filler cap.

Verify all bolts are secured properly and support bearing cap bolts are properly safety wired.

L-C 1113 **Inspect all traction motors, cables & ground wire. Replace all brushes**

L-C 1116 Inspect cabling for signs of being burnt, overheated, cut & exposed wire strands.

FLC 1025 Ensure brush holders are secure (150-160 ft/lbs) with cable & shunt connectors tight.

FLC 1026 Brush holder is between 1/8" to 3/16" above commutator.

Inspect commutator for high/low bars, grooving, threading, copper drag & bar edge burning.

Examine for signs of flash over.

Replace all brushes. Inspect old brushes for the following:
Brakes, chips or cracks.
Brush shunts for evidence of being burnt, pulled out, discolored or frayed.

Ensure shunt leads are properly routed around the spring fingers of the holder.

Ensure protected sleeves are in place.

Ensure ground wire is secure.

L-C 1114 **Clean traction motor string band & brush holders.**

Wipe string/ teflon band clean using a clean shop towel. Clean brush holder insulator studs. When condition warrants, use high volume, low pressure (30-50 psi) clean dry compressed air to blow away debris.

L-C 1115 **Ensure traction motor covers & seals are in place.**

Verify all covers are not bent, cracked or broken, are in place, tight and all bolts secured. Verify gaskets are correctly installed

L-C 1117 **Inspect air ducts for damage or loose connections.**

Inspect ducts ensuring each is in proper position and are not damaged or cut.

L-C 1119 **Inspect traction motor gear case & lube level.**

Thoroughly clean dirt and debris from cap before removing. Inspect for damage. Inspect for excessive leakage evidenced by excessive oil flung outward around inside of the wheel. Add oil if necessary. Inspect support arm. Ensure gear case plugs are secured & safety wired.

L-C 1120 **Check suspension bearing assembly & oil level. (F59PH)**

Oil level should be to the point of overflow at the top of the filler cap. Inspect condition of filler cap & spring mechanism. Inspect for evidence of leakage, overheated condition or damage. Extract oil sample and perform a visual analysis of oil for any contaminants. Ensure all bolts are secured & safety wired. Wick bolts are tightened to 50 ft/lbs torque. Report defects to supervisor.

Record Traction Motor Brush Wear					Gear Case Oil		Wick Oil	
	12 o'clock	3 o'clock	6 o'clock	9 o'clock	Level Found	Added	Level Found	Added
TM#1	85 %	85 %	85 %	85 %	30%	1.8 gal.	100%	–
Changed	Y / N	Y / N	Y / N	Y / N				
TM#2	85 %	85 %	85 %	85 %	60%	1.2 gal.	100%	–
Changed	Y / N	Y / N	Y / N	Y / N				
TM#3	85 %	85 %	85 %	85 %	85%	–	100%	–
Changed	Y / N	Y / N	Y / N	Y / N				
TM#4	85 %	85 %	85 %	85 %	85%	–	100%	–
Changed	Y / N	Y / N	Y / N	Y / N				

INSPECTION TASK SIGN OFF

	L-C 1015	L-C 1113	L-C 1114	L-C 1115	L-C 1116	L-C 1117
TM#1	[redacted]					
TM#2						
TM#3						
TM#4						

	L-C 1118	L-C 1119	L-C 1120	FL-C 1025	FL-C 1026	
TM#1	[redacted]					
TM#2						
TM#3						
TM#4						

RPI RPI RPI RPI

TM#1 S/N: 10C3-4021C 03/10 TM#2 S/N: 10D3-4009B 04/10 TM#3 S/N: 10D3-4008B 4/10 TM#4 S/N: 10D3-4010B 04/10

L-C 1121 Check truck center casting, motor suspension lugs/frames. [redacted]

Visually inspect for oil leaks, cracks or breaks.
Inspect traction motor nose suspension for excessive wear resulting in free movement between the traction motor frame and the suspension assembly.
Check for more than 1/4" free movement in the nose suspension assembly. Minimum thickness of the lower wear plate is 7/16".

L-C 1122 Verify wheel is not contacting truck side frame. [redacted]

L-C 1123 Inspect draft gear, pocket & coupler carrier.

L-C 1124 Clean radar head.

Check for proper alignment of radar unit and inspect cable for damage and being properly secured.

L-C 1007 Inspect fuel tank. [redacted]

Inspect fuel tank bolts and ensure tank is not in contact with safety support.
Inspect fuel fill and hoses.
Inspect condition of sight gauge, dial gauge and dust cap. Compare gauges for consistency.

L-C 1125 Drain condensate from fuel tank. [redacted]

To drain condensate from the fuel tank, remove the drain pipe plug, and open the drain valve.
Drain condensate until clean fuel appears.
Close the drain valve, and replace the plug when completed.

METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: _____ Locomotive#: _____ 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: COMPOSITE MECHANICS
Session 3: OUTBOUND

Task ID	Description	Completed By:
	Final Running Checks	
Exterior		
L-C 1137	**Drain intercooler & dirt collector condensate.**	[redacted]
L-C 1138	**Check air compressor system.**	
L-C 1014	**Check operation of sanders.** Inspect for missing, broken, loose or misaligned sander nozzles, sander pipes or brackets. Turn on sanders and verify sand is delivered at front and rear of locomotive. Remove clean out pipe plug from sand trap and check if plugged.	
L-C 1021	**Check brake shoes & adjust piston travel.** Shoes have minimum 3/8" friction material remaining. When applied, brake shoes make full contact with wheel thread and are not overriding. Inspect brake levers, hangers, pins & bushing for loose, missing or worn out components. Piston travel is sufficient to provide brake shoe clearance when brakes are released. With brakes applied, piston travel may not exceed 1 1/2" less than total possible piston travel.	[redacted] Final check before service
BT- 1005	**Permorm air dryer test using power analzyer** Using Graham-White power analyzer P/N 5666-150 perform test on air dryer assembly. **Do not apply device while air dryer power is applied.** Open air dryer circuit breaker before connecting device and to remove device.	[redacted]

UNIT #: 870 DATE: 1-7-15

PM W/O#: ECMS01-2015 55 Repair W/O#: ECMS01-2014-

BOMBARDIER
the evolution of mobility

DEFECT SHEET FOR		MEC TASKS			92 DAYS INSPECTION		
Initials Inspect	Complaint Symptom	Fail Cause	Material Required	REQ#	Corrective Action	SRD #	Initials Repair
	OIL SAMPLE - ALL - Before OIL change		Y / N		Oil Samples Taken		JC
	Change main engine OIL - High Zinc		Y / N		Oil Changed		JC
PO	Fireman Side Sun visor loose	MISSING HARDWARE	Y / N		Tightened		MSA
AO	Possible leakage ~~on~~ on Pipe near water pump		Y / N		Inspected No leak Found		JC
HN	Oil All over in Generator Room		Y / N		Found leak and repaired		JC
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				
			Y / N				

SUPERVISOR: [redacted] DATE: 1-19-15

Bombardier / Reliability Improvement

Date: _____ Locomotive#: _____ 92 Days Inspection Plan
rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Task ID **Description** **Completed By:**

BT-1005 **Test and record power assembly combustion pressure** N/A [redacted]

Using a rated pressure gauge and adapter test set, remove test cock and apply adapter and gauge at each power assembly port. Load test and record values at idle and full load.

P/A #	Idle	Full Load
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

BT-1006 **Record main engine power assembly liner serial number** N/A [redacted]

Record serial number while performing air box inspection on main engine.

#1	_____	#9	_____
#2	_____	#10	_____
#3	_____	#11	_____
#4	_____	#12	_____
#5	_____	#13	_____
#6	_____	#14	_____
#7	_____	#15	_____
#8	_____	#16	_____

BT-1007 **Record the following component serial numbers:** N/A [redacted]

Main Generator	_____
Auxiliary Generator	_____
Main Engine Turbo	_____
Main Engine Block	_____
Air Compressor	_____
HEP Engine Block	_____
HEP ECM	_____
HEP Generator	_____

METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: _____ Locomotive#: _____ 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: MECHANICS
Session 1: INBOUND

Task ID	Description	ompleted By:
L-C 1029	**Check operation of HVAC.** Using HTR-A/C switch. ensure heat and air conditioner function in all settings.	[redacted]
L-C 1030	**Check operation of defrosters.**	[redacted]
L-C 1032	**Check output using Watt meter and voice test radio.** Check also reflection. Should be under 24 Watts	
L-C 1037	**Inspect cab seats & mounting.** Ensure cab seats are securely mounted and adjustable.	[redacted]
L-C 1038	**Inspect cab windows, windshields & sun visors.** Ensure cab windows and windshields are not cracked or broken and provide a clear unobstructed view.	[redacted]
L-C 1039	**Test windshield wipers.** Ensure windshield wiper blades are in good condition and windshield wipers are operating properly. Ensure engine speeds respond to changes in throttle settings.	[redacted]
L-C 1071	**Replenish supplies, tools & hoses.** Supplies should include: 1 red flag, 1 sealed first aid kit , 6 fuses, pipe wrench, brake pipe and main reservoir hoses, a brake pipe adjustment tool and a reverser handle.	[redacted]
FL-C 1029	**Test air gauges.** Verify accuracy of each needle (4) using a CO2 tester at 100 lbs. of pressure.	[redacted]
FL-C 1006	**Perform brake pipe leakage test.** Brake pipe leakage must not exceed 3 lbs. per minute.	[redacted]
FL-C 1007	**Test air brake, safety controls and warning devices.** Ensure 30 CDW Automatic Brake Valve functions as intended in all positions. Test actuating (bail-off), graduated release, TMS and emergency with PC function.	[redacted]
FL-C 1008	**Test independent brake.** Apply independent brake in 10 lb. increments and ensure brake cylinder pressure increases and stabilizes. Fully apply independent brake obtaining 72 lbs. brake cylinder pressure. Fully release independent and brake cylinder pressures should reduce to 0 lbs. pressure.	[redacted]

[redacted]

FL-C 1014 Test main reservoir safety valve for proper operating range.

On the F59PH : Place the Control & Fuel Pump slide switch down
On the F59PFI, open the Module Breaker.
Observe the main reservoir pressure increase on the gauge in the cab and when reaching 150 lbs, the safety valve should open, discharging compressed air to atmosphere. Verify that main reservoir pressure does not exceeding 150 lbs.

[redacted]

FL-C 1030 Equalizing reservoir & brake pipe pressure within 3 lbs.

Ensure equalizing reservoir needle and brake pipe needle are within 3 lbs. of each other. Increase and decrease equalizing reservoir pressure and note brake pipe pressure responds.

[redacted]

L-C 1094 Inspect all doors, latches, seals & safety retainers.

Check all car body and electrical cabinet doors, door handles and latches, door seals and module door supports.

[redacted]

L-C 1129 Check all fire extinguishers.

Fire extinguishers in place & sealed.
Check date tag (within 1 year) & pressure gauges.

[redacted]

FL-C 1011 Check Emergency Fuel Shut Off & MU Stop

Main engine and HEP engine must shut down when Emergency Fuel shut Off button is depressed. Main engine should shut down when MU stop switch is depressed. Place MU switch to RUN when completed.

[redacted]

BT-1010 Take oil samples

Take main, HEP and air compressor oil samples prior to oil chage out.

Main Engine

[redacted]

L-C 1102 Ensure guards are properly applied on rotating equipment.

Inspect the following guards.

1) Air Compressor drive shaft.
2) Auxiliary generator drive shaft.
3) Auxiliary generator blower shroud..
4) Cooling fan shrouds.
5) Dynamic brake fan shroud.
6) HEP cooling fan shroud.
7) Shutter shrouds.
8) Main generator guards.
9) Traction motor blower guard.
10) Front of HEP shaft guard..

N/A

L-C 1090 Check governor oil level. (F59PH) Bring to full mark.

Determine cause if governor oil level is low. Do not over fill.

*To be checked in run 8

[redacted]

FL-C 1013 Check low water & crankcase pressure device (F59PH).

Using the test fitting on the low water device, ensure low water button trips on device. Use vacuum bulb to test crankcase overpressure portion of device. Governor button will also trip shutting down main engine. Verify audible and visual alarms function properly.

L-C 1044 With engine running, listen for unusual main engine noise.

[redacted]

Listen for unusual noise from rotating equipment such as the gear train, pumps and accessories, noise in the area of the crankshaft, the auxiliary generator and drive assembly, and the engine stub shaft.
Listen for usual noise from fans: Cooling fans, HEP fan, dynamic brake grid blower motor.
Open the top deck covers and inspect camshaft, rocker arms and valve bridges.

L-C 1046 With engine running, inspect for oil, fuel & coolant leaks.

[redacted]

Oil Leaks: Check for oil leaks at the crankcase and air box covers, top deck and head frame assembly, eductor tube and oil separator, michianna oil filter and the turbo lube oil pump. At the HEP engine, inspect oil lines and the engine.

Fuel leaks: Check for fuel leaks at the fuel pump discharge piping, spin on fuel filters and sight glasses, fuel manifold and crossover piping, and the Amot valve and associated piping. At the HEP engine check for leaks at the fuel filters and strainer, and the fuel lines.

Coolant Leaks: Check for coolant leaks in the following areas: air compressor and piping, fuel oil pre heater piping, lube oil cooler piping, water expansion tank, sight glass, pressure cap and associated piping, water pumps and associated piping, water drain valves, engine discharge "Y" pipes, turbocharger aftercooler piping, radiator cores, manifolds and associated piping. At the HEP engine, check for coolant leaks at the water pipe couplings.

Also check for air leaks on the aftercooler housing gaskets, aftercooler core gaskets and the engine air box hand hole cover gaskets.

L-C 1047 With engine running, inspect HEP & air compressor.

[redacted]

Air compressor :
inspect for sticking unloader valve, or air escaping from pop off valves.

HEP engine :
Inspect for fuel, exhaust, and coolant leaks, listening for unusual noise.
Ensure exhaust manifold and piping on HEP engine are protected will blankets.
Ensure hot water pipes on main engine and HEP engine are protect with wrapping.

L-C 1048 With engine running, inspect for exhaust leaks.

[redacted]

Using a flashlight, check for exhaust in the area of the exhaust manifold base bolts, exhaust stack and silencer, turbo screen inspection window, turboscreen to expansion joint, and the expansion joint to turbo inlet scrolls.

L-C 1050 Check cooling fans & radiator shutter operation.

[redacted]

Using the computer, select "Self Test' and the select "Fan Test" on the default screen. Following prompts and directed on the display panel and observe the #1 cooling fan and shutters operate first and then the #2 cooling fan.

For 59Ph - Repowered (Tier 2) : Check the cooling fan at Half speed and Full speed

L-C 1132 **Verify opreation of main engine radiator shutters**

- Remove radiator inpsection covers in the roof of the engine room
- Place shutter operate test handle in "OPERATE" position
- Verify shutters on both side of the locomotive are in "CLOSED" position
- Plase shutter operate test handle in "TEST" position
- Verify shutters on both side of the locomotive are in "OPEN" position
- Apply seal to the shutter control handle in accordance with current directive

[redacted]

FL-C 1012 **With engine running, inspect AR15 gen. & blower assembly.**

Listen for unusual noise and excessive vibration at blower assembly and inertial filter blower motor.

[redacted]

L-C 1020 **Check inertial filter motor.**

Verify inertial filter motor is operating and listen for abnormal noise and vibration.

L-C 1023 **Power test in forward & reverse. Check controller operation.**

Ensure locomotive loads in forward and reverse noting that load meter indicates loading.

Ensure controller and reverser interlock as intended.

[redacted]

L-C 1133* **Load test main engine. Record results.**

[redacted]

Self load main engine. F59Phi & F59Ph

	Load Test 1	Load Test 2
Horsepower (F59Phi LT1 : 2800 +/- 100 - LT2 3000 +/- 100)	3029	3071
Engine RPM (F59Phi 904 RPM +/- 5 RPM)	905	905
LR% MAX (F59Phi LT1 ≥89% - LT2 : 90% +/- 2%)	100	90
Main Generator Volts (F59Phi : 1390 +/- 10V)	1388	1399
Main Generator Amps (F59 Phi : 1500 +/- 100 A)	1525	1532
Engine R (F59Phi 0.85 +/- 0.03)	0.97	~~20.4~~ 0.88
TPU RPM (F59Phi 17000 +/- 2000 RPM)	19.8	20.4
MGFld A (F59Phi 105 +/- 5 A)	118	124
APImRbP - AirPressureBox (F59Phi between 38 & 43 PSI)	43	45
	EPT1F EPT2F	EPT1F EPT2F
Engine Temperature	182 191	190 188
Fuel Pressure In	109 Idle	113 Full load
Lube Oil Pressure	60	

Self load main engine. MP36	Load Test
Corrected Horse Power (MP36 : 3550 +/- 50)	_____
RPM Request (MP36 : 926 +/- 2 RPM) Actual _____	Current _____
Load Signal % (MP36 +/- 2)	_____
Main Generator Volts (MP36 : 1210 +/- 10V)	_____ V
Main Generator Amps (MP36 : 2012 +/- 20 A)	_____ A
Engine Boost Air (from 22 to 27 PSI)	_____
Boost Air (from 22 to 27 PSI)	_____
Fuel Pressure (80 +/- 5 PSI)	_____
Crankcase Vacuum Pressure at Full Load (>2 inches)	_____
Lube Oil (> 60 PSI)	_____

L-C 1040 **Check engine speeds.**

L-C 3001 Perform an air compressor orifice test.

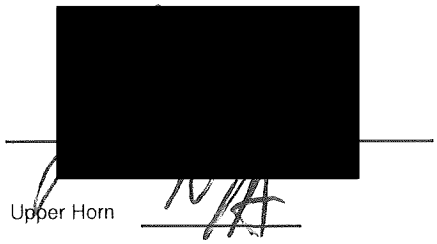
Using a 23/64" orifice attached to the main reservoir glad hand with the end valve open, self load locomotive at full RPM (904) and verify at main reservoir gauge in cab that main reservoir pressure is maintained between 120 and 135 lbs.

Exterior

L-C 1080 **Clean radiators using heated pressurized water**

Steam radiators using pressurized water. Do not clean radiators up close due to possiblity of bending the fins. For best results clean from top of locomotive and inside engine room roof access panels. Ensure passages between the tubes are clear and free from obstructions such as an accumulation of dirt/dust.

L-C 1013* **Test and record Db level of upper & lower horns & test bell.**



Using a sound level meter, within 1 yr. of calibration, position meter 100 ft. forward of locomotive with microphone positioned above top of rail 4 ft. for the lower horn and 15 ft. for the upper horn.

Adjust horn to produce a sound level of 100 dB(A).

Minimum sound level of 96db(A) and a maximum of 110dB(A) must be produced.

Sign and attach sound level printout to locomotive maintenance file.

FL-C 1004 **Check operation of emergency fuel shut off buttons.**

Operate emergency fuel shut off button on each side of locomotive and ensure main and HEP engines shut down.

METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: _____ Locomotive#: _____ 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: MECHANICS
Session 2: HOUSE

Task ID	Description	[redacted]ted By:
L-C 1098	**Inspect main engine air box & crankcase.**	[redacted]

Inspect main engine air box :

Pressurize the coolant system with water to 20 psi. With the top deck covers open and the air box hand hole covers removed, bar the engine over, inspecting all power assemblies and components for abnormal conditions, and signs of internal coolant leaks.

1) Abnormal ring or ringland wear.
2) Broken or damaged rings.
3) Excessive scoring or scuffing on the piston or liner.
4) Leaking inlet water jumper tube gasket at the manifold or the seal at the liner.
5) Water jumper cracked.
6) Cylinder head to liner gaskets leaking as seen by water leaking down the inside and outside
7) Cracked head leaking into combustion chamber as seen by water leaking down the inside of the liner or on top of the piston.
8) Cracked cylinder head in exhaust port as seen by water leaking past the exhaust valves onto the liner or on top of the piston.
9) Cracked liner as seen by water leaking down the inside of the liner, or leaking down the outside of the liner.
10) Inspect the aftercooler cores through the air box ports #6 and #12 power assemblies.
11) Air box to oil pan bolts for tightness.
12) Air box hand hole cover gaskets.

Crankcase Inspection:

Bar the engine over and inspect for defects or abnormal conditions in the following areas:

1) Overheated main bearing caps, connecting rods, piston carriers and pistons. Overheated components will change from their normal gray color to a blue/red discoloration.
2) Worn or damaged main bearings or connecting rod bearings as seen by babbit or lead material weeping or rolling out from the bearing caps.
3) Loose main bearing caps.
4) Loose connecting rod basket bolts (fork rods).
5) Basket assembly improperly applied.
6) Blade rod out of place.
7) Pee pipes that are loose, bent, cracked, plugged, or misaligned.
8) Bottom of the pistons, piston carriers and connecting rods for signs of missing or damaged components.
9) Crankshaft for visible damage or cracks.
10) Thrust washer for excessive wear or visible defects.
11) Crankcase hand hole cover gaskets.

L-C 1101 **Inspect aftercoolers, radiators, piping & couplings for leaks.** [redacted]

Inspect all water piping in the engine, and air compressor compartments. Inspect all Marmon seals and clamps for coolant leaks and pipework alignment. Remove inspections covers and inspect radiator cores and headers for coolant leaks. Inspect water pumps, expansion tank filler cap and neck for coolant leaks. When completed, relieve pressure and remove the pressurized equipment.

L-C 1099 **Verify air box drains are clear.**

Ensure air box drains are free from obstruction to prevent the accumulation of oil inside the air box.

L-C 1100 **With fuel pump running, inspect for internal/external leaks**

Fuel Leaks: Inspect for fuel leaks at the fuel injector body, fuel jumper line connections at manifold and at injector, and the fuel delivery manifold and connections inside the top deck.

L-C 1097 **Inspect turbo exhaust stack & silencer.**

Inspect to ensure exhaust stack and silencer is secured and look for signs of an exhaust leak.

L-C 1077 **Test & lube traction motor blower inlet guide vane.**

Lubricate bushing around vane.

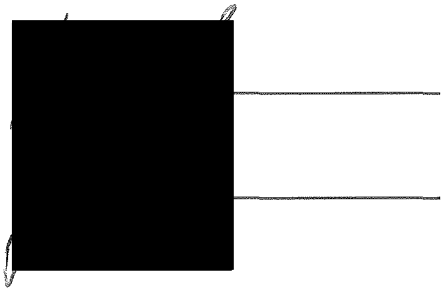
L-C 1078 **Change bag type engine air filters.**

With the filters removed, examine the condition of the turbocharger intake impeller and check for signs of visible damage, nicks or chips on the impeller blades, or signs of the impeller rubbing on the housing. Inspect frame for missing or broken components. Install new intake filters and ensure hardware on filter housing is properly secured.

Not Applicable for MP36 (Annual task)

L-C 1085 **Change soak back & turbo oil filters.**

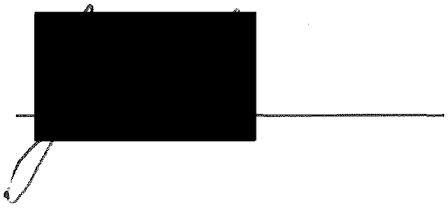
- Drain and clean filter housing.
- Refill turbo canister with oil before replacing filter.



L-C 1086 **Change main engine lube oil filters. Clean lube oil strainers.**

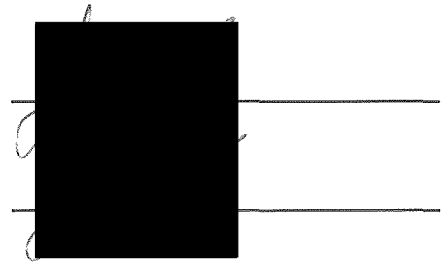
- After removing the old filters, clean the housing of debris before applying new filters.
- Apply a new seal to the housing door, close the door and gradually tighten bolts in a cross pattern.
- At the lube oil strainer housing, remove and clean the fine mesh strainers and clean the housing.
- Apply new seals before the strainer screens are reapplied.

Note: If the strainer screen is not seated properly when reinstalled, a suction leak in the lube oil system may be created and a low lube oil shutdown condition will occur.



L-C 1083 **Change fuel filters, clean suction strainer.**

- Check for signs of water in the bottom of the housing. If water accumulation is observed, this may be caused by excessive condensation in the fuel tank or a defective fuel oil heat exchanger.
- Drain and clean condensate from primary filter housing.
- Renew O-ring on filter housing.
- Renew secondary fuel filters, applying a light film of oil on the seal of the new filters and apply hand tight only.
- Remove both sight glasses, clean and reapply.



L-C 1088 **Clean eductor tube & lube oil separator screen.**

The meshed element inside the oil separator and the eductor tube must be removed, cleaned and reapplied with new gaskets.

L-C 1089 **Inspect turbo screen**

Inspect the turbo screen through the inspection port for cracks, breaks, buildup of carbon or chemical residue buildup from the cooling water additive. These are all indicators of engine performance or engine problems.

The engine should be examined further if any of these conditions are present.

L-C 1096 **Inspect exhaust manifold & expansion joints.**

- Inspect for loose exhaust manifold base bolts and gaskets out of position.
- Ensure engine "Vee" section is clean and free from an accumulation of oil which could cause an engine room fire.
- Ensure exhaust manifold heat shields are properly applied and secured and are free from damage.

L-C 1092 **Lubricate shutter linkage. Check for binding & worn areas.**

Inspect for binding and worn sections.

L-C 1072 **Change all HVAC air filters.**

Change condenser inlet filter.
Change return air filter.
Change fresh air make-up filter.

L-C 1091 **Check main engine coolant level & concentration.**

Air Compressor

BT 1001 **Inspect and lubricate Unloader assemblies**

For all three assemblies

L-C 1103 **Change air compressor oil filter & air filter.**

L-C 1104 **Check air compressor oil level. Bring to full.**

Use the proper oil and fill to the proper indicator on the dipstick.

HEP

L-C 1105 **Change HEP lube oil filter and air filter.**

L-C 1082 **Change HEP crankcase breather filter.**

L-C 1106 **Change HEP fuel filter.**

L-C 1107 **Clean HEP lube oil centrifuge element (884-887).**

L-C 1108 **Change HEP engine oil. Bring to full mark after starting.**

L-C 1109 **Change HEP coolant filter (884-887).**

L-C 1110 **Check HEP coolant level & concentration.**

BT-008 **Clean HEP fuel strainer on fuel supply line**

Fuel supply line from tank located on engineer's side of HEP skid package.

Final Checks

L-C 1126 **Bring engine and HEP oil level to full mark.**

Immediately after starting locomotive and HIP engine, check main engine and HIP engine oil level and bring to full mark.

L-C1127 **Bring engine and HEP coolant level to full mark.**

Immediately after starting locomotive and HEP engine, check main engine and HEP engine coolant level and bring to full mark.

FL-C 1029 **Test air gauges.**

Verify accuracy of each needle (4) using a CO2 tester at 100 lbs. of pressure.

FL-C 1006 **Perform brake pipe leakage test.**

Brake pipe leakage must not exceed 3 lbs. per minute.

FL-C 1007 **Test air brake, safety controls and warning devices.**

Ensure 30 CDW Automatic Brake Valve functions as intended in all positions. Test actuating (bail-off), graduated release, TMS and emergency with PC function.

FL-C 1008 Test independent brake.

Apply independent brake in 10 lb. increments and ensure brake cylinder pressure increases and stabilizes. Fully apply independent brake obtaining 72 lbs. brake cylinder pressure. Fully release independent and brake cylinder pressures should reduce to 0 lbs. pressure.

FL-C 1014 Test main reservoir safety valve for proper operating range.

On the F59PH : Place the Control & Fuel Pump slide switch down
On the F59PFI, open the Module Breaker.
Observe the main reservoir pressure increase on the gauge in the cab and when reaching 150 lbs, the safety valve should open, discharging compressed air to atmosphere. Verify that main reservoir pressure does not exceeding 150 lbs.

FL-C 1030 Equalizing reservoir & brake pipe pressure within 3 lbs.

Ensure equalizing reservoir needle and brake pipe needle are within 3 lbs. of each other. Increase and decrease equalizing reservoir pressure and note brake pipe pressure responds.

L-C 1023 Power test in forward & reverse. Check controller operation.

Ensure locomotive loads in forward and reverse noting that load meter indicates loading.

Ensure controller and reverser interlock as intended.

L-C 1050 Check cooling fans & radiator shutter operation.

Using the computer, select "Self Test' and the select "Fan Test" on the default screen. Following prompts and directed on the display panel and observe the #1 cooling fan and shutters operate first and then the #2 cooling fan.

Verify correct rotation of fan

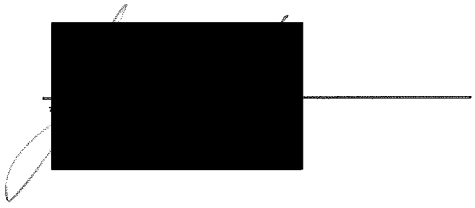
For 59Ph - Repowered (Tier 2) : Check the cooling fan at Half speed and Full speed

L-C 1132 Verify opreation of main engine radiator shutters

- Remove radiator inpsection covers in the roof of the engine room
- Place shutter operate test handle in "OPERATE" position
- Verify shutters on both side of the locomotive are in "CLOSED" position
- Plase shutter operate test handle in "TEST" position
- Verify shutters on both side of the locomotive are in "OPEN" position
- Apply seal to the shutter control handle in accordance with current directive

L-C 1128 Engine room inspection

Perform engine room inspection of all components and checking for air, oil, fuel, and water leaks.



METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: _____ Locomotive#: _____ 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: MECHANICS
Session 3: OUTBOUND

Task ID	Description	Completed By:
L-C 1087	**Check main engine oil level.**	[redacted]
L-C 1041*	**Measure & record manometer readings of air filters.**	

Reading in Inches of Water		Minimum	Maximum	
A =	Air Filters 5	5 inches	14.5 inches	(Eng. + Inertial)
I =	Inertial 3	3 inches	7 inches	
E =	Engine Filters 2	2 inches	8.5 inches	(A - I)
	Electrical Cabinet .5	0.5 inch		
	HEP Cabinet 1	1.0 inch		

L-C 1095 **Lube & operate handbrake. Stencil PM date on cover.** [redacted] Final check before service

L-C 3001 Perform an air compressor orifice test.

Using a 23/64" orifice attached to the main reservoir glad hand with the end valve open, self load locomotive at full RPM (904) and verify at main reservoir gauge in cab that main reservoir pressure is maintained between 120 and 135 lbs.

[redacted]

L-C 1133* **Load test main engine. Record results.** [redacted] Final check before service

Self load main engine. F59Phi

	Load Test 1	Load Test 2
Horsepower (F59Phi LT1 : 2800 +/- 100 - LT2 3000 +/- 100)	3031	3125
Engine RPM (F59Phi 904 RPM +/- 5 RPM)	904	905
LR% MAX (F59Phi LT1 ≥89% - LT2 : 90% +/- 2%)	100%	91%
Main Generator Volts (F59Phi : 1390 +/- 10V)	1399	1423
Main Generator Amps (F59 Phi : 1500 +/- 100 A)	1515	1539
Engine R (F59Phi 0.85 +/- 0.03)	.85	.87
TPU RPM (F59Phi 17000 +/- 2000 RPM)	19.8	20.5
MGFld A (F59Phi 105 +/- 5 A)	113	122
APImRbP - AirPressureBox (F59Phi between 38 & 43 PSI)	113	45
	EPT1F EPT2F	EPT1F EPT2F
Engine Temperature	180 179	186 184
Fuel Pressure In	109 Idle	114 Full load
Lube Oil Pressure	74	

METROLINK/92 DAY LOCOMOTIVE INSPECTION

Date: 1-9-15 Locomotive#: 870 92 Days Inspection Plan rev 10 10/25/2014

Work Order # _____ Date Work Order Opened: _____

Process Manning Sheets: Mechanical Locomotive Clean
Session 1: Outside

Task ID	Description	Completed By:
	Cleaning	
L-L 1001	**Wash exterior of locomotive.** Completely wash locomotive using high pressure washer and hand brush car body, fuel tank, trucks, and walkways. Clean "eye brow" area of F59PHI.	[redacted]
L-L 1002	**Clean cab.** Completely clean inside of cab by washing walls, ceiling, control stand, observers side desk and seats by hand. Remove graffiti. Sweep and mop cab floor. Clean windshield, side windows and mirrors. Clean dirt and debris from door tracks.	[redacted]
L-L 1003	**Clean engineroom and HEP area; main engine, air compressor and HEP engine.** Using high pressure washer, clean engine room walls, walkways and overhead areas. Clean main engine including vee and exhaust manifold, accessory rack, air compressor and HEP engine.	[redacted]
L-L 1004	**Drain retention tank.** Drain contents into an approved waste container.	[redacted]
L-L 1005	**Drain & clean main engine, alternator, and HEP sumps.** Clean main generator pit aspirator. With retention tank open, clean all sumps, removing rags and other debris. Close drain when completed and apply cap.	
L-L 1006	**Clean nose compartment.** Wash walls and ceiling area. Sweep and mop floor. Clean dirt and debris from door tracks.	[redacted]
	Supervisor	
FL-C 1031	**Complete form FRA F6180-49A (Blue Card)**	[redacted] Supervisor
L-C 1079*	**Review all lab results of oil samples.** Review lab analysis of main engine oil, air compressor oil, HEP oil.	
L-C 1063	**Review and resolve all outstanding defects.** Review SMP 100, Service Requests, Notes, and other defect reports. All defects recorded and those found during inspection shall be corrected before locomotive is released for service.	

NOTE: **All defects must be corrected before releasing vehicle for service.**

Supervisor Reviewing Work Order: [redacted] Name

Date Work Order Finished: [redacted]

Manager Reviewing Work Order: [redacted] Name

Date Work Order Closed: 1/22/15

<CEL-246 Data>		
Version	035-08	
<Run>		
Start		1/12/2015 14:56
Duration		0:00:12
Serial Number		3021071
Run		44
Range	60-130 dB	
Overload	No	
Battery Low	No	
Interval Seconds		10
<Broadband>		
LASmax		101.9
LAeq		100.8
Lavg Q=5		100.9
<Profile LAeq>		
1/12/2015 14:56		101

METROLINK WHEEL TRUING RECORD

EQUIPMENT NO. SCAX 870

BEFORE TRUING WHEEL MEASUREMENT

WHEEL POSITION		DEFECT	BACK TO BACK	FLANGE THICKNESS	FLANGE HEIGHT	RIM THICKNESS
☐ CAR	☐ LOCO					
A - END						
8	R1					
7	L1					
6	R2					
5	L2					
4	R3	HC		0	18	24
3	L3	HC		2	18	24
2	R4	HC		0	18	19
1	L4	HC		2	18	19

AFTER TRUING WHEEL MEASUREMENTS

FLANGE THICKNESS	FLANGE HEIGHT	RIM THICKNESS	OPERATOR COMMENTS
0	17	22	
0	17	22	
0	17	18	witness groove open
0	17	19	witness groove open

2 4 6 8
COACH/CAB
1 3 5 7

CAR A -END

L4 L3 L2 L1
LOCOMOTIVE
R4 R3 R2 R1

LOCO A - END

SERVICE LIMITS

BACK TO BACK	53" - 53 3/8"
FLANGE THICKNESS	"0" ÷ 1 or "0" - 0 ON STEEL WHEEL GAGE
RIM THICKNESS	1 1/8" MINIMUM
TAPE SIZE	BOTH WHEELS <= 1 TAPE DIFFERENCE
RUN OUT	< .020"

DEFECTS		
	FS	FLAT SPOTS
	BUT	BUILT-UP TREAD
	ST	SHELLING
	HF	HIGH FLANGE
	HC	THERMO CRACKS
	TF	THIN FLANGE
	WT	TREAD WORN HOLLOW
	RP/TRUE	REPROFILE/TRUE TO MATCH

PERFORM DAILY MAINTENANCE ☐ YES ☒ NO

INDEX INSERTS/CHECK RUN OUT/TAPE ☐ YES ☒ NO

SINGLE CAR AIR TEST PER CFR 238.311 ☐ YES ☑ NO

Additonal Operator Comments

Witness Groove open
wheels will be to small
IF I Continue truing it

MACHINE OPERATOR/ ID #: 186332 [redacted]
Signature

SUPERVISOR/ ID#: _____
Signature

DATE: 1-10-15

Download File: 015A0870.D08

MLK-255

Unit Number:	0870	Laptop Time:	15/01/08 13:07:33
Recording Start:	15/01/02 06:43:48	Download Time:	15/01/08 14:07:58
Recording Stop:	15/01/08 14:07:29	Prev. Download:	14/12/03 13:23:52
Recorder Type:	ERS	2 Freq., 16 Analog, 48 Digital Channels	
Firmware Ver.:	4.51	8 MB Flash Memory	
Flexware Ver.:	6.00	Vigilance: Installed	
Download Ver.:	1.47	WinDNLD Download	
Serial No.:	100325		

Processor Module:	6.00	Freq. Channels:	SPD	F02
Freq & ID:	0.90	Wheel Diameter (in.):	37.0	180.0
Analog Module 1:	1.60	Pulses/Revolution:	60	704
		Event Threshold:	1	20

Anl. Channels:	BCP	BPP	A03	HLV	A05	A06	TMC	A08
Max. Input (V):	10	10	10	100	100	100	20	20
Max. Sensor (V):	10.0	10.0	10.0	100.0	100.0	100.0	11.3	20.0
Sensor Offset (V):	1.6	1.6	1.6	-5.0	-4.7	-4.4	-0.9	-0.6
Sensor FS (EU):	239	237	241	117	115	117	2050	117
Event Thres.(EU):	2	2	2	5	5	5	30	1

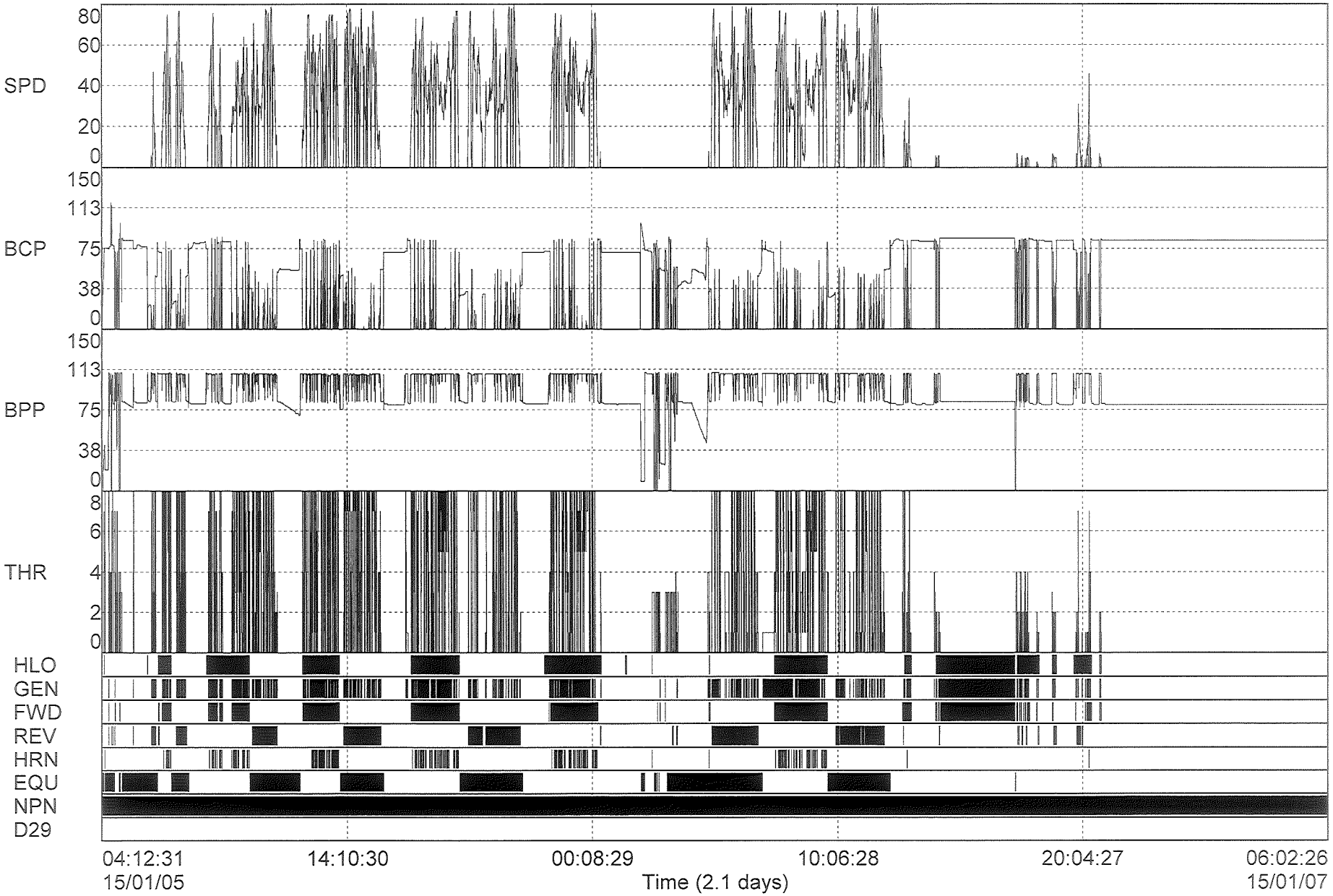
Anl. Channels:	A09	A10	A11	APP	SPD	A14	A15	A16
Max. Input (V):	100	100	100	100	100	100	100	100
Max. Sensor (V):	48.8	48.8	48.8	48.8	48.8	48.8	48.8	48.8
Sensor Offset (V):	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sensor FS (EU):	999	999	999	999	999	999	999	999
Event Thres.(EU):	1	1	1	1	1	1	1	1

F01, SPD, Speed of Car (MPH)	F02, F02, Frequency 2		
A01, BCP, Brake Cylinder Pressure	A02, BPP, Brake Pipe Pressure	A03, A03, Spare Pressure Channel	A04, HLV, Headlight Voltage
A05, A05, Spare Analog Channel	A06, A06, Spare Analog Channel	A07, TMC, Traction Motor Current (	A08, A08, Spare Analog Channel
A09, A09, Analog 9	A10, A10, Analog 10	A11, A11, Analog 11	A12, APP, Application
A13, SPD, Analog 13	A14, A14, Analog 14	A15, A15, Analog 15	A16, A16, Analog 16
D01, ASL, Solenoid AV	D02, BSL, Solenoid BV	D03, CSL, Solenoid CV	D04, DSL, Solenoid DV
D05, BBC, Blended Brake Cut Out	D06, DOV, Door Open Override	D07, DOR, Door Status	D08, HLO, Headlight On
D09, GEN, Generator	D10, FWD, Forward	D11, REV, Reverse	D12, SND, Manual Sanding
D13, EQU, Equalizing Reservoir	D14, FRS, Foot Reset Switch	D15, HRS, Hand Reset Switch	D16, HRN, Horn Switch
D17, D17, Spare Digital Input	D18, EMG, Emergency Brake	D19, RAD, Radio Hand Switch	D20, BAL, Bail Off Pressure Switch
D21, BEL, Bell	D22, NPN, No Alerter Penalty	D23, OVR, ERS TMS Override Switch	D24, BTE, Bench Test Enabled Input
D25, D25, Spare Digital Input	D26, ZSP, Zero Speed By Pass	D27, ATA, ATS Acknowledge Switch	D28, DIT, Ditch Lights
D29, D29, Spare Digital Input	D30, D30, Spare Digital Input	D31, D31, Spare Digital Input	D32, HSQ, Horn Sequencer Switch
D33, D33, Spare Digital Input	D34, D34, Spare Digital Input	D35, D35, Spare Digital Input	D36, D36, Spare Digital Input
D37, D37, Digital 37	D38, D38, Digital 38	D39, D39, Digital 39	D40, D40, Digital 40
D41, PHN, PTC Horn	D42, HMV, Horn Magnet Valve	D43, D43, Digital 43	D44, D44, Digital 44
D45, D45, Digital 45	D46, D46, Digital 46	D47, D47, Digital 47	D48, D48, Digital 48
D49, D49, Digital 49	D50, D50, Digital 50	D51, D51, Digital 51	D52, D52, Digital 52
D53, D53, Digital 53	D54, D54, Digital 54	D55, D55, Digital 55	D56, D56, Digital 56
D57, D57, Digital 57	D58, D58, Digital 58	D59, VEN, Alerter Enabled	D60, VAL, Alerter Alarm
D61, VPE, Alerter Penalty	D62, FLT, ER Fault	D63, PEN, Penalty Output	D64, FPN, Fault Penalty

Download File: 015A0870.D08
Speed (mph) Wheel Size: 37.0 (inches)
Unit#: 0870, SN: 100325

Graph Data

Report Date: 15/01/19
Dnld Date: 15/01/08
Dnld Time: 14:07:58



U.S. Department of Transportation
Federal Railroad Administration

SCAX870 Next PM Due By:
04/14/15 11:59 PM
Bombardier Transportation

LOCOMOTIVE INSPECTION AND REPAIR RECORD

Reporting year 2015 Check if new loco. ☐ If loco. renumbered give previous no.

OMB No. 2130-0004

1. OPERATED BY	RR CODE	2. OWNED BY (Railroad)	RR CODE
AMTRAK	A M T K	Southern California Regional Rail Authority	S C A X

3. MODEL NO.	4. LOCO. NO.	5. YR. BUILT	6. PROPELLED BY	7. HORSEPOWER	8. TYPE OF SERVICE: PASSENGER ☒ ROAD ☐ YARD ☐ OTHER ☐
F59PH	870	1992	D - E	3200	

9. STEAM GEN.	GEN. #1	Working Pressure	GEN. #2	Working Pressure
NOT EQUIPPED	N/A	N/A	N/A	N/A

10. MAXIMUM PISTON TRAVEL	TYPE OF AIR BRAKE	11. OUT OF USE CREDIT
8 Inches	26L-UL	0 DAYS

12. LAST PERIODIC INSPECTION DATE	PLACE
10/06/2014 (1472 DAY)	LOS ANGELES, CA

PERIODIC INSPECTIONS

13. DATE MO DAY YR	14. PLACE	15. ITEMS *	16. PERSON CONDUCTING	15. ITEMS *	16. PERSON CONDUCTING	17. CERTIFIED BY
OUT OF USE FROM	1-7-15	TO	1-12-15	LOS ANGELES, CA		[redacted]
1-12-15	LOS ANGELES, CA	1-4 & 7	[redacted]	[redacted]	[redacted]	[redacted]
OUT OF USE FROM		TO		LOS ANGELES, CA		
	LOS ANGELES, CA	1-4 & 7		5		
OUT OF USE FROM		TO		LOS ANGELES, CA		
	LOS ANGELES, CA	1-4 & 7		5		
OUT OF USE FROM		TO		LOS ANGELES, CA		
	LOS ANGELES, CA	1-4 & 7		5		

* 15. ITEM CODE: [1] BRAKES [2] RUNNING GEAR [3] CAB EQUIP. [4] MECH. EQUIP. [5] ELECT. EQUIP. [6] STEAM GEN. [7] SAFETY APPL.

TESTS	18. H&H TEST PRESSURE	19. WAIVER PART - 229	20. WAIVER - OTHER
	DRILLED		

TYPE	INTERVAL NOT MORE THAN	21. PERSON CONDUCTING	22. TEST DATE AND PLACE	23. CERTIFIED BY	24. PREVIOUS TEST DATE AND PLACE
METER	368 calendar days		LOS ANGELES, CA		10/06/2014 LOS ANGELES, CA
HAMMER AND HYDRO	736 calendar days		DRILLED		DRILLED
AIRBRAKE 229.27	368 calendar days		LOS ANGELES, CA		10/06/2014 LOS ANGELES, CA
AIRBRAKE 229.29	NUMBER OF CALENDAR DAYS 1,472		LOS ANGELES, CA		10/06/2014 LOS ANGELES, CA

In accordance with the Locomotive Inspection Act, 36 State, 913, as amended and the regulations issued pursuant to that Act, the parts and appurtenances of the locomotive unit have been inspected and all defects disclosed by the inspection have been properly repaired.

Certification of true copy.
I certify that this is a true copy of the inspection and repair record of locomotive no. 870

ATTENTION: A false entry on this form is punishable by fine or imprisonment (U.S. Code, Title 18, Sec. 1001).

(Officer-in-charge) DATE