

NON-CONFIDENTIAL

Request IR-1:

Page 1 of the application notes that Nova Scotia Power Incorporated (NS Power) operates a comprehensive preventative maintenance program which includes inspections, condition assessments, and targeted maintenance to ensure safe and reliable hydro operations. The Hollow Bridge generator rotor and stator have been in service for decades and maintained under this program. Despite these efforts, an unforeseen stator fault occurred in September 2025, causing significant winding damage and forcing the unit offline. Testing confirmed widespread insulation degradation in both components, making partial repairs impractical.

(a) Please provide the estimated time to complete this repair.

(b) Please provide the power produced by the unit for the past ten years.

(c) Please provide a list of all work completed on Hollow Bridge generator since 2020, along with the associated cost and completion duration.

(d) What is the frequency of maintenance performed on the generator/rotor?

(i) Who performs this maintenance.

(ii) Please provide the maintenance documents for the past five years.

Response IR-1:

(a) The estimated time to complete this refurbishment is 9 months (September 2025 – May 2026).

(b) The power produced by the unit for the past five years is outlined below. Due to the cyber incident, specific unit generation data is unavailable pre-2021; however, production values

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for 2018-2020 are estimated at within 5% of actual based on a secondary data source. For 2016-2017, Hollow Bridge generation is estimated at 29% of the Black River generation (historically accurate). The Black River Hydro annual production is provided for the full 10-year request to generally allow these assumptions to be made. NS Power's IT team is continuing to work to bring affected portions of the IT system back online; however, the data required to fully respond to the foregoing question is not expected to be recovered.

Annual Production (MWh)		
Year	Hollow Bridge	Black River
2016	22,969*	79,203
2017	17,725*	61,119
2018	30,942**	101,974
2019	33,411**	114,450
2020	20,922**	73,613
2021	25,896	80,898
2022	27,148	80,161
2023	23,987	84,175
2024	25,098	88,250
2025 (YTD Nov)	9,232	41,176

*These figures are estimated at 29% of Black River Generation (avg)

**These figures are approximate within 5% of actual production

- (c) Operational work was carried out on the Hollow Bridge generator between 2020-2025 at an approximate cost of \$20,000. This work included slip ring and brush maintenance, troubleshooting issues with the excitation system and breaker operations, breaker/switch maintenance, electrical inspections, insulation testing, and making minor component adjustments. None of this work identified any issues with the Hollow Bridge Generator. Much of this work was coordinated around other outages during this time.

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Outages/durations of these events on Hollow Bridge since 2020 include:

Asset Class	Outages Count (2020-2025)	Total Outage Duration (hours)	Average Outage Duration (hours)
Generator (Current outage)	1	2,731	2,731
General Maintenance	9	721	80
Electrical Protection & Breakers	6	4	1

(d) A variety of maintenance activities are performed on the generator annually.

(i) Maintenance activities are carried out by a combination of Operations staff, Maintenance staff, and third-party contractors.

(ii) Maintenance documents for the past 3 years outlining this maintenance are provided in Attachment 1. Due to the cyber incident, information on activities prior to 2023 is currently unavailable. As mentioned above, NS Power's IT team is continuing to work to bring affected portions of the IT system back online, but the data required to fully respond to the foregoing questions is not expected to be recovered.

Included in Attachment 1:

Page	Year	Work Order #	Description
1	2023	146870	6-month Mechanical Electrical Inspection (1/2)
7	2023	151298	6-month Mechanical Electrical Inspection (2/2)
13	2023	151299	Annual Mech Elec Inspection
19	2023	151301	Annual Rotor Exciter Ins Tests
22	2023	151302	Annual Stator Ins Test
27	2024	155351	6-month Mechanical Electrical Inspection (1/2)
33	2024	160292	6-month Mechanical Electrical Inspection (2/2)

CI C0080228 HYD Hollow Bridge Generator Refurbishment (NSEB M12596)
NSPI Responses to NSEB Information Requests

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Page	Year	Work Order #	Description
39	2024	159041	Annual Mech Elec Inspection
45	2024	159043	Annual Rotor Exciter Ins Tests
48	2024	159044	Annual Stator Ins Test
50	2025	169710	6-month Mechanical Electrical Inspection (1/2)
56	2025	165045	6-month Mechanical Electrical Inspection (2/2)
62	2025	168697	Annual Rotor Exciter Ins Tests
65	2025	168698	Annual Stator Ins Test



*** Work Order 146870 ***

BSU:

UNIT:

REVIEW EQUIPMENT ENTRY

SYSTEM:

DO NOT USE



Type:	PM	Job Type:		Planned Date:	2023-03-06
Status:	CL	Impact:	OTHER	PM #:	PM01-19
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	26W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2023-03-03	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-02	TURBINE	06V1-01		

----- Description -----	
6 MONTH MECHANICAL/ELECTRICAL INSPECTION - HB	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-02	EVH		2.00	7.00

----- Notes -----	
Mobile Closing Comment	

Completed By: AE316Completion Date: 2023-03-08

Safety Reminder
 Keep Eyes and Mind on Task!

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- Checklist PMEVH-01 -

Checklist:	PMEVH-01	Last Inspected By:	AE316
Description:	BI-ANNUAL MECHANICAL & ELECTRICAL INSPECTION - BLACK	Last Inspected:	2023-03-08
WO#:	146870		
Building#	-		
Eqp#:	06V1-01-02 - TURBINE		

Task	Result	Comments
TAILBOARD HAZARD ASSESSMENT	done	
COMPLETE STEPS OF ISOLATION PROCEDURE DOWN TO ISSUE ISOLATION PER	Complete	done
COMPLETE & ISSUE ISOLATION PERMIT	done	
ENSURE TO BARK HEAD GATE (IF REQUIRED)	N/A	N/A
TAILBOARD (DISCUSS PERMIT ISOLATION POINTS WITH ANYONE WHO WAS NOT PRESENT FOR ISOLATION STEPS)	done	
POST ISOLATION PERMITIN VISIBLE LOCATION AT STATION	done	
CONFIRM FIELD BREAKER OPERATION	confirmed	
VISUALLY CHECK BRAKE PAD THICKNESS	3/4" remaining usable	
CONFIRM BRAKE OPERATION AND TIME CYCLE	Coasted for 1:30 mins, Unit stopped 30 seconds, brakes on for total of 3mins	
BRAKES: CHECK BRAKE LINES FOR LEAKING	No leaks	

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- Checklist PMEVBH-01 -

CONFIRM CREEP AND OVERSPEED PROTECTION	Confirmed Okay
CONFIRM SHUT DOWN FOR LOW OIL PRESSURE GOVERNOR PUMP	Confirmed Okay
CONFIRM GATE POSITION WITH ECC	-2
PERFORM GOVERNOR OPERATIONAL TEST	Confirmed okay
CONFIRM/RECORD BEARING TEMPERATURE ALARM UPPER GUIDE	80 ok
CONFIRM/RECORD BEARING TEMPERATURE TRIP UPPER GUIDE	100 ok
CONFIRM/RECORD BEARING TEMPERATURE ALARM LOWER GUIDE	80 ok
CONFIRM/RECORD BEARING TEMPERATURE TRIP LOWER GUIDE	100 ok
CONFIRM/RECORD BEARING TEMPERATURE ALARM THRUST	80 ok
CONFIRM/RECORD BEARING TEMPERATURE TRIP THRUST	100 ok
CONFIRM/RECORD BEARING TEMPERATURE ALARM TURBINE	set @ 80 Not working
CONFIRM/RECORD BEARING TEMPERATURE TRIP TURBINE	100 ok
CONFIRM COOLING WATER TRIP PROTECTION	okay

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- Checklist PMEVBH-01 -

RECORD MECHANICAL RUNOUT UPPER GUIDE	N/A	
RECORD MECHANICAL RUNOUT LOWER GUIDE	N/A	
RECORD MECHANICAL RUNOUT TURBINE	0.008	
RECORD UPPER GUIDE BEARING VIBRATION	N/A	
RECORD LOWER GUIDE BEARING VIBRATION	0.01	
RECORD TURBINE BEARING VIBRATION	0.03	
RECORD UPPER GUIDE BEARING VIBRATION TRIP	N/A	
RECORD LOWER GUIDE BEARING VIBRATION TRIP	alarms @ 0.20, trips @ 0.30	
RECORD TURBINE BEARING VIBRATION TRIP	alarms @ 0.20, trips @ 0.30	
CONFIRM OPERATION OF PLANT AUXILIARIES	No change	Done
LUBE OIL PRESSURE	N/A	
LUBE OIL PRESSURE TRIP	N/A	
GREASE LINKS/ PINS & CONTROL ARMS	Complete	
GREASE GOVERNOR QUADRANT	Complete	

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- Checklist PMEVH-01 -**SHAFT**

VISUALLY CHECK BRUSHES WHILE REMOVING THEM FROM HOLDERS NOTING ONES THAT NEED REPLACED	Complete
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CLEAN COMMUTATOR AND BRUSH HOLDERS	Complete
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CLEAN COLLECTOR RINGS AND BRUSH HOLDERS	Complete
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CLEAN UP AREA	Done
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ENSURE PERSONAL ARE CLEAR OF EXCITER & ROTOR AREA	Complete
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PERFORM TESTS RECORD MEGGER READINGS	done
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TEST & RECORD EXCITER LEADS TO GROUND	0.2 Mega ohms
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TEST & RECORD ROTOR SLIP RINGS TO GROUND	81.0 Mega ohms
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ENSURE ALL LEADS ARE RECONNECTED & INSULATED	done
--	------

REPLACE BRUSHES IN HOLDERS CHANGING ANY THAT ARE NECESSARY	done
--	------

LINE 3 TO GROUND	N/A
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CHECK TO MAKE BRUSHES AREMOVING FREELY	done
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CONDITION OF EXCITER	Good condition
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- Checklist PMEVBH-01 -

NO. OF BRUSHES CHANGED EXCITER	0
CONDITION OF COLLECTOR RINGS	good
NO OF BRUSHES CHANGED COLLECTOR RINGS	0
AIR COMPRESSOR	Complete okay
CHECK FAN	Okay
LOWER GUIDE OIL LEVEL ALARM CONFIRMED?	N/A
UPPER GUIDE OIL ALARM CONFIRMED?	N/A
UPPER GUIDE CW FLOW ALARMS	N/A
LOWER GUIDE CW FLOW ALARMS	Complete
TURBINE CW FLOW ALARMS	Complete
BACKFLUSH TURBINE BEARING COOLING COIL	N/A
CONFIRM PROTECTION RELAYS ARE INSTALLED	complete
REMOVE ISOLATION PERMIT	complete



*** Work Order 151298 ***

BSU:

UNIT: REVIEW EQUIPMENT ENTRY

SYSTEM: DO NOT USE



Type:	PM	Job Type:		Planned Date:	2023-08-21
Status:	CL	Impact:	OTHER	PM #:	PM01-19
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	26W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2023-08-17	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-02	TURBINE	06V1-01		

----- Description -----	
6 MONTH MECHANICAL/ELECTRICAL INSPECTION - HB	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-02	EVH		2.00	7.00

----- Notes -----	
Biannual complete	

Completed By: AG416Completion Date: 2023-08-24

Safety Reminder
 Keep Eyes and Mind on Task!

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- Checklist PMEVBH-01 -

Checklist:	PMEVBH-01	Last Inspected By:	AG416
Description:	BI-ANNUAL MECHANICAL & ELECTRICAL INSPECTION - BLACK	Last Inspected:	2023-08-24
WO#:	151298		
Building#	-		
Eqp#:	06V1-01-02 - TURBINE		

Task	Result	Comments
TAILBOARD HAZARD ASSESSMENT	Complete	
COMPLETE STEPS OF ISOLATION PROCEDURE DOWN TO ISSUE ISOLATION PER	Complete	
COMPLETE & ISSUE ISOLATION PERMIT	BLR-2023-013	
ENSURE TO BARK HEAD GATE (IF REQUIRED)	N/A	
TAILBOARD (DISCUSS PERMIT ISOLATION POINTS WITH ANYONE WHO WAS NOT PRESENT FOR ISOLATION STEPS)	Complete	
POST ISOLATION PERMIT IN VISIBLE LOCATION AT STATION	Complete	
CONFIRM FIELD BREAKER OPERATION	Complete	
VISUALLY CHECK BRAKE PAD THICKNESS	3/4"	
CONFIRM BRAKE OPERATION AND TIME CYCLE	See annual	
BRAKES: CHECK BRAKE LINES FOR LEAKING	No leaks	

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- Checklist PMEVH-01 -

CONFIRM CREEP AND OVERSPEED PROTECTION	Complete
CONFIRM SHUT DOWN FOR LOW OIL PRESSURE GOVERNOR PUMP	140 psi
CONFIRM GATE POSITION WITH ECC	-2
PERFORM GOVERNOR OPERATIONAL TEST	Complete
CONFIRM/RECORD BEARING TEMPERATURE ALARM UPPER GUIDE	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP UPPER GUIDE	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM LOWER GUIDE	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP LOWER GUIDE	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM THRUST	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP THRUST	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM TURBINE	No alarm
CONFIRM/RECORD BEARING TEMPERATURE TRIP TURBINE	100

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- Checklist PMEVH-01 -

CONFIRM COOLING WATER TRIP PROTECTION	Ok
RECORD MECHANICAL RUNOUT UPPER GUIDE	_____
RECORD MECHANICAL RUNOUT LOWER GUIDE	_____
RECORD MECHANICAL RUNOUT TURBINE	_____
RECORD UPPER GUIDE BEARING VIBRATION	_____
RECORD LOWER GUIDE BEARING VIBRATION	.002
RECORD TURBINE BEARING VIBRATION	.004
RECORD UPPER GUIDE BEARING VIBRATION TRIP	_____
RECORD LOWER GUIDE BEARING VIBRATION TRIP	Complete
RECORD TURBINE BEARING VIBRATION TRIP	Complete
CONFIRM OPERATION OF PLANT AUXILIARIES	Good
LUBE OIL PRESSURE	_____
LUBE OIL PRESSURE TRIP	_____
GREASE LINKS/ PINS & CONTROL ARMS	Complete

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- Checklist PMEVH-01 -

GREASE GOVERNOR QUADRANT SHAFT	Complete
VISUALLY CHECK BRUSHES WHILE REMOVING THEM FROM HOLDERS NOTING ONES THAT NEED REPLACED	Ok
CLEAN COMMUTATOR AND BRUSH HOLDERS	Ok
CLEAN COLLECTOR RINGS AND BRUSH HOLDERS	Ok
CLEAN UP AREA	Ok
ENSURE PERSONAL ARE CLEAR OF EXCITER & ROTOR AREA	Ok
PERFORM TESTS RECORD MEGGER READINGS	Ok
TEST & RECORD EXCITER LEADS TO GROUND	.276
TEST & RECORD ROTOR SLIP RINGS TO GROUND	57.9
ENSURE ALL LEADS ARE RECONNECTED & INSULATED	Complete
REPLACE BRUSHES IN HOLDERS CHANGING ANY THAT ARE NECESSARY	Complete
LINE 3 TO GROUND	N/A
CHECK TO MAKE BRUSHES AREMOVING FREELY	Complete

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- Checklist PMEVH-01 -

CONDITION OF EXCITER	Good
NO. OF BRUSHES CHANGED EXCITER	0
CONDITION OF COLLECTOR RINGS	Good
NO OF BRUSHES CHANGED COLLECTOR RINGS	4
AIR COMPRESSOR	Good
CHECK FAN	Ok
LOWER GUIDE OIL LEVEL ALARM CONFIRMED?	_____
UPPER GUIDE OIL ALARM CONFIRMED?	_____
UPPER GUIDE CW FLOW ALARMS	_____
LOWER GUIDE CW FLOW ALARMS	_____
TURBINE CW FLOW ALARMS	_____
BACKFLUSH TURBINE BEARING COOLING COIL	_____
CONFIRM PROTECTION RELAYS ARE INSTALLED	Complete
REMOVE ISOLATION PERMIT	Complete



*** Work Order 151299 ***

BSU:

UNIT:

REVIEW EQUIPMENT ENTRY

SYSTEM:

DO NOT USE



Type:	PM	Job Type:		Planned Date:	2023-08-21
Status:	CL	Impact:	OTHER	PM #:	PM02-12
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	52W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	2014-66216,MDS-HB,MECH-INSP
Isolation:	U	Submitted Date:	2023-08-17	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-02	TURBINE	06V1-01		

----- Description -----	
ANNUAL MECHANICAL/ELECTRICAL INSPECTION - HB	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-02	EVH		3.00	7.00

----- Notes -----	
Annual complete except draft tube inspection. Draft tube to be completed during unit assessment	

Completed By: AG416Completion Date: 2023-08-24

Safety Reminder
 Keep Eyes and Mind on Task!

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- Checklist PM-ELEC01 -

Checklist:	PM-ELEC01	Last Inspected By:	AG416
Description:	ANNUAL ELECTRICAL INSPECTION	Last Inspected:	2023-08-24
WO#:	151299		
Building#	-		
Eqp#:	06V1-01-02 - TURBINE		

Task	Result	Comments
1) REVIEW PREVIOUS YEAR INSPECTION REPORT		
2) **OPERATIONS ELECTRICAL SHUTDOWN TASKS**		
3) - UNIT ISOLATION (AS PER SYSTEM ISOLATION PROCEDURE)		
4) RECORD PERMIT NUMBER	BLB-2023-013	
5) - EXCITER: COMMUTATOR (MEASURE AND RECORD DEPTH OF DEEPEST GROOVES)	1/16"	
6) - EXCITER: HOUSING: (RECORD CONDITION DIRTY)	Good	
7) - EXCITER: BRUSH CONDITION (RECORD AMOUNT OF WEAR 20% 50% ETC)	35%	
8) - COLLECTOR RINGS: BRUSH CONDITION (RECORD AMOUNT OF WEAR 20% 50% ETC)	55%	
9) - COLLECTOR RINGS: SLIP RING CONDITION (RECORD CONDITION GROOVED/ARCHING NEEDS TO BE TURNED)	Good	
10) - STATOR: VISUALLY INSPECT AND RECORD CONDITION OF WINDINGS	Good	
11) - STATOR: CHECK/CHANGE MECHANICAL LUGS LUGS ON STATOR	Good	

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- Checklist PM-ELEC01 -

LEADS		
12) Condition: Stator: IR/PI testing		
13) CONDITION: Stator: Stator Winding		
14) CONDITION: Stator: End Turn condition		
15) CONDITION: Stator: Wedges, packing, blocking and bracing		
16) CONDITION: Stator: Core Laminations		
17) CONDITION: Stator: Main and Neutral Leads		
19) - FIELD BREAKER: INSPECT/CLEAN & TEST TRIP PROTECTION		
20) - FIELD BREAKER: CHECK TORQUE AND CONDITION ON LEADS		
21) - FIELD BREAKER: CHECK DISCHARGE RESISTANCE		
22) - ROTOR: VISUALLY INSPECT AND RECORD CONDITIION ANY BUILD UP ON ROTOR POLES * Deficiency: Some debris build up * Action: Follow up work order 151545 created.	Ok	
23) CONDITION: Rotor: IR/PI testing		
24) CONDITION: Rotor: Rotor Hub, radial arms and rim		
25) CONDITION: Rotor: Field Poles, keys, collars and pole faces		

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- Checklist PM-ELEC01 -

26) CONDITION: Rotor: Field windings		
27) CONDITION: Rotor: Winding Leads		
28) CONDITION: Rotor: Braking Surface/ Pads/ Assmbly		
29) CONDITION: Rotor: Bearings (Upper/Lower/Thrust)		
30) CONDITION: Rotor: Instrumentation Function		
31) **OPERATIONS ELECTRICAL START UP TASKS**		
32) - TRIP PROTECTION TEST: BEARING TEMPERATURES (RECORD ALARM SETTING) * Deficiency recorded * Action: Follow up work order 151546 created.	80	
33) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS - LOWER GUIDE BEARING	100	
34) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS - UPPER GUIDE BEARING	100	
35) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS - TURBINE BEARING	100	
36) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS - THRUST BEARING	100	
37) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS FOR COOLING WATER FLOW - UPPER GUIDE	Complete	

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- Checklist PM-ELEC01 -

BEARING		
38) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS FOR COOLING WATER FLOW - LOWER GUIDE BEARING	Complete	
39) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS FOR COOLING WATER FLOW - TURBINE BEARING	Complete	
40) - TRIP PROTECTION TEST: CONFIRM RELAY PROTECTION		
41) - TRIP PROTECTION TEST: CONFIRM LOW GOVERNOR OIL PRESSURE		
42) - TRIP PROTECTION TEST: CONFIRM VIBRATION TRIPS		
44) - REMOVE ISOLATION		
45) - GOVERNOR: BRING UNIT TO A COMPLETE STOP THEN PUT START THROUGH		
46) - GOVERNOR: RECORD INITIAL GATE OPENING	30%	
47) - WATER UP UNIT		
48) - RUNNING CHECKS		
49) - TRIP PROTECTION TEST: CONFIRM CREEP SWITCH PROTECTION		
50) - TRIP PROTECTION TEST: MEASURE/RECORD ACTUAL SPEEDSWITCH SETTINGS OVERSPEED APPROXIMATELY 115%	Complete	

- Checklist PM-ELEC01 -

51) - COMPLETE BI-ANNUAL INSPECTION		
52) - VERIFY SYNCHRONIZER ON		
53) - RESTART UNIT		



*** Work Order 151301 ***

BSU:

UNIT:

REVIEW EQUIPMENT ENTRY

SYSTEM:

DO NOT USE



Type:	PM	Job Type:		Planned Date:	2023-08-21
Status:	CL	Impact:	OTHER	PM #:	PM25-48
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	52W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2023-08-17	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-01	HB1 GENERATOR	06V1-01		

----- Description -----	
ANNUAL ROTOR AND EXICTER INSULATION TESTS - HB	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-01	EVH		1.00	1.00
06V1-01-01	EVH		1.00	1.00

----- Notes -----	
Rotor exciter testing complete	

Completed By: AG416Completion Date: 2023-08-24

Safety Reminder
Keep Eyes and Mind on Task!

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- Checklist PM25 -

Checklist:	PM25	Last Inspected By:	
Description:	ANNUAL ROTOR AND STATOR INSULATION TESTS	Last Inspected:	2023-08-24
WO#:	151301		
Building#	-		
Eqp#:	06V1-01-01 - HB1 GENERATOR		

Task	Result	Comments
1) TRAVEL	Complete	
2) TAILBOARD	Complete	
3) ENSURE UNIT ISOLATION	BLR-2023-013	
4) TEMPORARY SURRENDER UNIT ISOLATION	N/A	
5) RE-ISSUE WITH CHANGES ALLOWING TESTING PROCEDURE	N/A	
6) VISUALLY INSPECT LEADS FROM EXCITOR TO FIELD POLE	Good	
7) INSPECT SLIP RINGS	Good	
8) VERIFY LUG CONNECTION ON GENERATOR SIDE OF EXITER LEADS	Ok	
9) PERFORM TESTS & RECORD MEGGER READINGS (OHMS) RECORD	Complete	
10) WITH BRUSHES LIFTED COLLECTOR RING TO GROUND	17.7	
11) WITH BRUSHES LIFTED BRUSH HOLDERS TO GROUND	621	
12) WITH EXCITER BRUSHES LIFTED COMMUTATOR TO GROUND	.283	
13) WITH EXCITER BRUSHES LIFTED COMMUTATOR BRUSH HOLDER TO	.458	

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- Checklist PM25 -

GROUND		
14) WITH PILOT EXCITER BRUSHES LIFTED COMMUTATOR TO GROUND	N/A	
15) WITH PILOT EXCITER BRUSHES LIFTED COMMUTATOR BRUSH HOLDER TO GROUND	N/A	
16) SURRENDER PERMIT WHEN TEST IS COMPLETE	N/A	
17) RE-ISSUE WITH CHANGES	N/A	
18) SURRENDER PERMIT	N/A	



*** Work Order 151302 ***

BSU:

UNIT:

REVIEW EQUIPMENT ENTRY

SYSTEM:

DO NOT USE



Type:	PM	Job Type:		Planned Date:	2023-08-21
Status:	CL	Impact:	OTHER	PM #:	PM26-52
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	52W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2023-08-17	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-01	HB1 GENERATOR	06V1-01		

----- Description -----	
ANNUAL GENERATOR STATOR INSULATION TEST - HOLLOW BRIDGE	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-01	EVH		1.00	2.00

----- Notes -----	
Annual stator testing complete	

Completed By: AG416Completion Date: 2023-08-24

Safety Reminder
 Keep Eyes and Mind on Task!

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- Checklist CA-GEN-INSUL-TEST -

Checklist:	CA-GEN-INSUL-TEST	Last Inspected By:	AG416
Description:	Condition Assessment: Generator Insulation Test	Last Inspected:	2023-08-24
WO#:	151302		
Building#	-		
Eqp#:	06V1-01-01 - HB1 GENERATOR		

Task	Result	Comments
1) SYSTEM	BLACK RIVER	
2) STATION	6V- HOLLOW BRIDGE	
3) GENERATOR UNIT	1	
4) TEMPERATURE (IN PLANT)	25	
5) % HUMIDITY	25	
6) TESTER NAME	SH	
7) IF KNOWN, UNIT LAST ONLINE (APPROX)	4 hours	
8) RETURN TO LESS THAN 100 VOLTS BEFORE INCREASING VOLTAGE		
9) IF TEST PROCEDURE IS DIFFERENT THAN FORM, NOTE IN COMMENTS		
10) IF GENERATOR VOLTS ARE 2.3 KV THEN TEST AT MAXIMUM 2 KV		
11) IF GENERATOR VOLTS ARE 6.9 KV OR 7.2 KV THEN TEST AT MAXIMUM 5 KV		
12) IF GENERATOR VOLTS ARE 13.8 KV THEN TEST AT MAXIMUM 10 KV		
13) IF TEST IS PERFORMED WITH WINDINGS AND CABLES IN SERIES AND A FAILURE IS FOUND, TEST WINDINGS		

- Checklist CA-GEN-INSUL-TEST -

AND CABLES SEPARATELY		
15) GENERATOR WINDINGS SECTION		
40) ROTOR INSULATION RESISTANCE	.458	
41) EXCITER INSULATION RESISTANCE	.283	
42) GENERATOR CABLES SECTION		

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- Checklist JP1052-A -

Checklist:	JP1052-A	Last Inspected By:	AG416
Description:	GENERATOR STATOR INSULATION TEST	Last Inspected:	2023-08-24
WO#:	151302		
Building#	-		
Eqp#:	06V1-01-01 - HB1 GENERATOR		

Task	Result	Comments
1) TRAVEL	Complete	
2) TAILBOARD	Complete	
3) ERECT THREE SAFETY SIGNS AND ERECT BARRIER TAPE	Complete	
4) RECORD UNIT ISOLATION NUMBER	BLR-2023-013	
5) TEMPORARILY SURRENDER UNIT ISOLATION	N/A	
6) RE-ISSUE WITH CHANGES ALLOWING TESTING PROCEDURE	N/A	
7) RECORD TESTING VOLTAGE - (KV)	5000	
11) PERFORM POLARIZATION CALCULATION (DIVIDE 1 MINUTE INTO 10 MINUTE = PI)	3.66	
12) IF POLARIZATION INDEX IS <2 CONTINUE WITH TESTS. OTHERWISE JUMP TO STEP 24	N/A	
26) RECORD INSIDE TEMPERATURE (DEGREES C)	25	
27) RECORD OUTSIDE TEMPERATURE (DEGREES C)	25	
28) RECORD INSIDE HUMIDITY (%)	51%	
29) RECORD OUTSIDE HUMIDITY (%)	54%	

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- Checklist JP1052-A -

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*** Work Order 155351 ***

BSU:
UNIT: REVIEW EQUIPMENT ENTRY
SYSTEM: DO NOT USE



Type:	PM	Job Type:		Planned Date:	2024-03-14
Status:	CL	Impact:	OTHER	PM #:	PM01-19
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	26W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2024-01-15	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-02	TURBINE	06V1-01	4	

----- Description -----	
6 MONTH MECHANICAL/ELECTRICAL INSPECTION - HB	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-02	EVH		2.00	7.00

----- Notes -----	
Biannual complete	

Completed By: AG416 Completion Date: 2024-03-14

Safety Reminder
Keep Eyes and Mind on Task!

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- Checklist PMEVH-01 -

Checklist:	PMEVH-01	Last Inspected By:	
Description:	BI-ANNUAL MECHANICAL & ELECTRICAL INSPECTION - BLACK	Last Inspected:	2024-03-14
WO#:	155351		
Building#	-		
Eqp#:	06V1-01-02 - TURBINE		

Task	Result	Comments
TAILBOARD HAZARD ASSESSMENT	Complete	
COMPLETE STEPS OF ISOLATION PROCEDURE DOWN TO ISSUE ISOLATION PER	Complete	
COMPLETE & ISSUE ISOLATION PERMIT	Complete	
ENSURE TO BARK HEAD GATE (IF REQUIRED)	N/A	
TAILBOARD (DISCUSS PERMIT ISOLATION POINTS WITH ANYONE WHO WAS NOT PRESENT FOR ISOLATION STEPS)	Complete	
POST ISOLATION PERMITIN VISIBLE LOCATION AT STATION	Complete	
CONFIRM FIELD BREAKER OPERATION	Complete	
VISUALLY CHECK BRAKE PAD THICKNESS	3/4 in 1/2 in 009d	
CONFIRM BRAKE OPERATION AND TIME CYCLE	Coasted 1:30 stopped 1:50 Off 4:30	
BRAKES: CHECK BRAKE LINES FOR LEAKING	No leaks	
CONFIRM CREEP AND OVERSPEED PROTECTION	Complete	

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- Checklist PMEVH-01 -

CONFIRM SHUT DOWN FOR LOW OIL PRESSURE GOVERNOR PUMP	Complete
CONFIRM GATE POSITION WITH ECC	3
PERFORM GOVERNOR OPERATIONAL TEST	Complete
CONFIRM/RECORD BEARING TEMPERATURE ALARM UPPER GUIDE	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP UPPER GUIDE	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM LOWER GUIDE	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP LOWER GUIDE	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM THRUST	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP THRUST	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM TURBINE	N/A
CONFIRM/RECORD BEARING TEMPERATURE TRIP TURBINE	100
CONFIRM COOLING WATER TRIP PROTECTION	Ok
RECORD MECHANICAL RUNOUT UPPER GUIDE	N/A

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- Checklist PMEVH-01 -

RECORD MECHANICAL RUNOUT LOWER GUIDE	N/A
RECORD MECHANICAL RUNOUT TURBINE	N/A
RECORD UPPER GUIDE BEARING VIBRATION	N/A
RECORD LOWER GUIDE BEARING VIBRATION	86% 0.02
RECORD TURBINE BEARING VIBRATION	86% 0.03
RECORD UPPER GUIDE BEARING VIBRATION TRIP	N/A
RECORD LOWER GUIDE BEARING VIBRATION TRIP	Complete
RECORD TURBINE BEARING VIBRATION TRIP	Complete
CONFIRM OPERATION OF PLANT AUXILIARIES	Good
LUBE OIL PRESSURE	N/A
LUBE OIL PRESSURE TRIP	N/A
GREASE LINKS/ PINS & CONTROL ARMS	Complete
GREASE GOVERNOR QUADRANT SHAFT	Complete
VISUALLY CHECK BRUSHES WHILE REMOVING THEM FROM HOLDERS NOTING ONES THAT NEED	Complete

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- Checklist PMEVBH-01 -**REPLACED**

CLEAN COMMUTATOR AND BRUSH HOLDERS	Complete
------------------------------------	----------

CLEAN COLLECTOR RINGS AND BRUSH HOLDERS	Complete
---	----------

CLEAN UP AREA	Complete
---------------	----------

ENSURE PERSONAL ARE CLEAR OF EXCITER & ROTOR AREA	Complete
---	----------

PERFORM TESTS RECORD MEGGER READINGS	Ok
--------------------------------------	----

TEST & RECORD EXCITER LEADS TO GROUND	.259 mega ohm
---------------------------------------	---------------

TEST & RECORD ROTOR SLIP RINGS TO GROUND	19.5mega ohm
--	--------------

ENSURE ALL LEADS ARE RECONNECTED & INSULATED	Complete
--	----------

REPLACE BRUSHES IN HOLDERS CHANGING ANY THAT ARE NECESSARY	Complete
--	----------

LINE 3 TO GROUND	N/A
------------------	-----

CHECK TO MAKE BRUSHES AREMOVING FREELY	Complete
--	----------

CONDITION OF EXCITER	Good
----------------------	------

NO. OF BRUSHES CHANGED EXCITER	0
--------------------------------	---

CONDITION OF COLLECTOR RINGS	Good
------------------------------	------

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- Checklist PMEVBH-01 -

NO OF BRUSHES CHANGED
COLLECTOR RINGS

0

AIR COMPRESSOR

Good

CHECK FAN

Ok

LOWER GUIDE OIL LEVEL ALARM
CONFIRMED?

N/A

UPPER GUIDE OIL ALARM
CONFIRMED?

N/A

UPPER GUIDE CW FLOW ALARMS

N/A

LOWER GUIDE CW FLOW ALARMS

N/A

TURBINE CW FLOW ALARMS

N/A

BACKFLUSH TURBINE BEARING
COOLING COIL

N/A

CONFIRM PROTECTION RELAYS ARE
INSTALLED

Complete

REMOVE ISOLATION PERMITComplete



Safety Reminder
Keep Eyes and Mind on Task!

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- Checklist PMEVBH-01 -

Checklist:	PMEVBH-01	Last Inspected By:	AQ378
Description:	BI-ANNUAL MECHANICAL & ELECTRICAL INSPECTION - BLACK	Last Inspected:	2024-08-22
WO#:	160292		
Building#	-		
Eqp#:	06V1-01-02 - TURBINE		

Task	Result	Comments
TAILBOARD HAZARD ASSESSMENT	Complete	
COMPLETE STEPS OF ISOLATION PROCEDURE DOWN TO ISSUE ISOLATION PER	Complete	
COMPLETE & ISSUE ISOLATION PERMIT	BLR2024014	
ENSURE TO BARK HEAD GATE (IF REQUIRED)	N/A	
TAILBOARD (DISCUSS PERMIT ISOLATION POINTS WITH ANYONE WHO WAS NOT PRESENT FOR ISOLATION STEPS)	Complete	
POST ISOLATION PERMITIN VISIBLE LOCATION AT STATION	Complete	
CONFIRM FIELD BREAKER OPERATION	Complete	
VISUALLY CHECK BRAKE PAD THICKNESS	3/4	
CONFIRM BRAKE OPERATION AND TIME CYCLE	Complete	
BRAKES: CHECK BRAKE LINES FOR LEAKING	No leaks	

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- Checklist PMEVBH-01 -

CONFIRM CREEP AND OVERSPEED PROTECTION	Complete
CONFIRM SHUT DOWN FOR LOW OIL PRESSURE GOVERNOR PUMP	140psi
CONFIRM GATE POSITION WITH ECC	2
PERFORM GOVERNOR OPERATIONAL TEST	Complete
CONFIRM/RECORD BEARING TEMPERATURE ALARM UPPER GUIDE	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP UPPER GUIDE	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM LOWER GUIDE	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP LOWER GUIDE	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM THRUST	80
CONFIRM/RECORD BEARING TEMPERATURE TRIP THRUST	100
CONFIRM/RECORD BEARING TEMPERATURE ALARM TURBINE	N/A
CONFIRM/RECORD BEARING TEMPERATURE TRIP TURBINE	100

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- Checklist PMEVH-01 -

CONFIRM COOLING WATER TRIP PROTECTION	Complete
RECORD MECHANICAL RUNOUT UPPER GUIDE	N/A
RECORD MECHANICAL RUNOUT LOWER GUIDE	N/A
RECORD MECHANICAL RUNOUT TURBINE	N/A
RECORD UPPER GUIDE BEARING VIBRATION	N/A
RECORD LOWER GUIDE BEARING VIBRATION	Ok
RECORD TURBINE BEARING VIBRATION	Ok
RECORD UPPER GUIDE BEARING VIBRATION TRIP	N/A
RECORD LOWER GUIDE BEARING VIBRATION TRIP	Complete
RECORD TURBINE BEARING VIBRATION TRIP	_____
CONFIRM OPERATION OF PLANT AUXILIARIES	Ok
LUBE OIL PRESSURE	N/A
LUBE OIL PRESSURE TRIP	N/A
GREASE LINKS/ PINS & CONTROL ARMS	Complete

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- Checklist PMEVH-01 -

GREASE GOVERNOR QUADRANT SHAFT	Complete
VISUALLY CHECK BRUSHES WHILE REMOVING THEM FROM HOLDERS NOTING ONES THAT NEED REPLACED	Complete
CLEAN COMMUTATOR AND BRUSH HOLDERS	Complete
CLEAN COLLECTOR RINGS AND BRUSH HOLDERS	Complete
CLEAN UP AREA	Complete
ENSURE PERSONAL ARE CLEAR OF EXCITER & ROTOR AREA	Complete
PERFORM TESTS RECORD MEGGER READINGS	Complete
TEST & RECORD EXCITER LEADS TO GROUND	0.283
TEST & RECORD ROTOR SLIP RINGS TO GROUND	17,7
ENSURE ALL LEADS ARE RECONNECTED & INSULATED	Complete
REPLACE BRUSHES IN HOLDERS CHANGING ANY THAT ARE NECESSARY	Complete
LINE 3 TO GROUND	N/A
CHECK TO MAKE BRUSHES AREMOVING FREELY	Complete

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- Checklist PMEVH-01 -

CONDITION OF EXCITER	Good
NO. OF BRUSHES CHANGED EXCITER	0
CONDITION OF COLLECTOR RINGS	Ok
NO OF BRUSHES CHANGED COLLECTOR RINGS	2
AIR COMPRESSOR	Ok
CHECK FAN	Ok
LOWER GUIDE OIL LEVEL ALARM CONFIRMED?	N/A
UPPER GUIDE OIL ALARM CONFIRMED?	N/A
UPPER GUIDE CW FLOW ALARMS	N//A
LOWER GUIDE CW FLOW ALARMS	N/A
TURBINE CW FLOW ALARMS	N/A
BACKFLUSH TURBINE BEARING COOLING COIL	N/A
CONFIRM PROTECTION RELAYS ARE INSTALLED	Complete
REMOVE ISOLATION PERMIT	Complete



Safety Reminder
Keep Eyes and Mind on Task!

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- Checklist PM-ELEC01 -

Checklist:	PM-ELEC01	Last Inspected By:	AQ378
Description:	ANNUAL ELECTRICAL INSPECTION	Last Inspected:	2024-08-22
WO#:	159041		
Building#	-		
Eqp#:	06V1-01-02 - TURBINE		

Task	Result	Comments
1) REVIEW PREVIOUS YEAR INSPECTION REPORT		
2) **OPERATIONS ELECTRICAL SHUTDOWN TASKS**		
3) - UNIT ISOLATION (AS PER SYSTEM ISOLATION PROCEDURE)		
4) RECORD PERMIT NUMBER	BLR2024014	
5) - EXCITER: COMMUTATOR (MEASURE AND RECORD DEPTH OF DEEPEST GROOVES)	1/16	
6) - EXCITER: HOUSING: (RECORD CONDITION DIRTY)	Ok	
7) - EXCITER: BRUSH CONDITION (RECORD AMOUNT OF WEAR 20% 50% ETC)	35	
8) - COLLECTOR RINGS: BRUSH CONDITION (RECORD AMOUNT OF WEAR 20% 50% ETC)	45	
9) - COLLECTOR RINGS: SLIP RING CONDITION (RECORD CONDITION GROOVED/ARCHING NEEDS TO BE TURNED)	Ok	
10) - STATOR: VISUALLY INSPECT AND RECORD CONDITION OF WINDINGS	Ok	
11) - STATOR: CHECK/CHANGE MECHANICAL LUGS LUGS ON STATOR	Ok	

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- Checklist PM-ELEC01 -

LEADS		
12) Condition: Stator: IR/PI testing		
13) CONDITION: Stator: Stator Winding		
14) CONDITION: Stator: End Turn condition		
15) CONDITION: Stator: Wedges, packing, blocking and bracing		
16) CONDITION: Stator: Core Laminations		
17) CONDITION: Stator: Main and Neutral Leads		
19) - FIELD BREAKER: INSPECT/CLEAN & TEST TRIP PROTECTION		
20) - FIELD BREAKER: CHECK TORQUE AND CONDITION ON LEADS		
21) - FIELD BREAKER: CHECK DISCHARGE RESISTANCE		
22) - ROTOR: VISUALLY INSPECT AND RECORD CONDITIION ANY BUILD UP ON ROTOR POLES	Ok	
23) CONDITION: Rotor: IR/PI testing		
24) CONDITION: Rotor: Rotor Hub, radial arms and rim		
25) CONDITION: Rotor: Field Poles, keys, collars and pole faces		
26) CONDITION: Rotor: Field windings		

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- Checklist PM-ELEC01 -

27) CONDITION: Rotor: Winding Leads		
28) CONDITION: Rotor: Braking Surface/ Pads/ Assmbly		
29) CONDITION: Rotor: Bearings (Upper/Lower/Thrust)		
30) CONDITION: Rotor: Instrumentation Function		
31) **OPERATIONS ELECTRICAL START UP TASKS**		
32) - TRIP PROTECTION TEST: BEARING TEMPERATURES (RECORD ALARM SETTING)	80	
33) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS - LOWER GUIDE BEARING	100	
34) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS - UPPER GUIDE BEARING	100	
35) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS - TURBINE BEARING	100	
36) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS - THRUST BEARING	100	
37) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS FOR COOLING WATER FLOW - UPPER GUIDE BEARING	Complete	
38) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS FOR COOLING WATER FLOW - LOWER GUIDE	Complete	

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- Checklist PM-ELEC01 -

BEARING		
39) - TRIP PROTECTION TEST: RECORD AND CONFIRM TRIP SETTINGS FOR COOLING WATER FLOW - TURBINE BEARING	Complete	
40) - TRIP PROTECTION TEST: CONFIRM RELAY PROTECTION		
41) - TRIP PROTECTION TEST: CONFIRM LOW GOVERNOR OIL PRESSURE		
42) - TRIP PROTECTION TEST: CONFIRM VIBRATION TRIPS		
43) - TRIP PROTECTION TEST: COMPRESSOR LOW AIR TRIP (BLOCK TRIP TO THE ONLINE UNIT - MERSEY LGB, DB, CF UNITS)		
44) - REMOVE ISOLATION		
45) - GOVERNOR: BRING UNIT TO A COMPLETE STOP THEN PUT START THROUGH		
46) - GOVERNOR: RECORD INITIAL GATE OPENING	30	
47) - WATER UP UNIT		
48) - RUNNING CHECKS		
49) - TRIP PROTECTION TEST: CONFIRM CREEP SWITCH PROTECTION		
50) - TRIP PROTECTION TEST: MEASURE/RECORD ACTUAL SPEEDSWITCH SETTINGS OVERSPEED APPROXIMATELY 115%	Complete	

- Checklist PM-ELEC01 -

51) - COMPLETE BI-ANNUAL INSPECTION		
52) - VERIFY SYNCHRONIZER ON		
53) - RESTART UNIT		



Safety Reminder
Keep Eyes and Mind on Task!

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- Checklist PM25 -

Checklist:	PM25	Last Inspected By:	AQ378
Description:	ANNUAL ROTOR AND STATOR INSULATION TESTS	Last Inspected:	2024-08-21
WO#:	159043		
Building#	-		
Eqp#:	06V1-01-01 - HB1 GENERATOR		

Task	Result	Comments
1) TRAVEL	Complete	
2) TAILBOARD	Complete	
3) ENSURE UNIT ISOLATION	Blr-2024-013	
4) TEMPORARY SURRENDER UNIT ISOLATION	N/a	
5) RE-ISSUE WITH CHANGES ALLOWING TESTING PROCEDURE	N/a	
6) VISUALLY INSPECT LEADS FROM EXCITOR TO FIELD POLE	Good	
7) INSPECT SLIP RINGS	Good	
8) VERIFY LUG CONNECTION ON GENERATOR SIDE OF EXITER LEADS	Ok	
9) PERFORM TESTS & RECORD MEGGER READINGS (OHMS) RECORD	Complete	
10) WITH BRUSHES LIFTED COLLECTOR RING TO GROUND	9.6	
11) WITH BRUSHES LIFTED BRUSH HOLDERS TO GROUND	504	
12) WITH EXCITER BRUSHES LIFTED COMMUTATOR TO GROUND	.327	
13) WITH EXCITER BRUSHES LIFTED COMMUTATOR BRUSH HOLDER TO	.454	

- Checklist PM25 -

GROUND		
14) WITH PILOT EXCITER BRUSHES LIFTED COMMUTATOR TO GROUND	N/a	
15) WITH PILOT EXCITER BRUSHES LIFTED COMMUTATOR BRUSH HOLDER TO GROUND	N/a	
16) SURRENDER PERMIT WHEN TEST IS COMPLETE	N/a	
17) RE-ISSUE WITH CHANGES	N/a	
18) SURRENDER PERMIT	N/a	



SYSTEM: DO NOT USE



Safety Reminder
Keep Eyes and Mind on Task!

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- Checklist JP1052-A -

Checklist:	JP1052-A	Last Inspected By:	AQ378
Description:	GENERATOR STATOR INSULATION TEST	Last Inspected:	2024-08-22
WO#:	159044		
Building#	-		
Eqp#:	06V1-01-01 - HB1 GENERATOR		

Task	Result	Comments
1) TRAVEL	Complete	
2) TAILBOARD	Complete	
3) ERECT THREE SAFETY SIGNS AND ERECT BARRIER TAPE	Complete	
4) RECORD UNIT ISOLATION NUMBER	BLR2024014	
5) TEMPORARILY SURRENDER UNIT ISOLATION	N/A	
6) RE-ISSUE WITH CHANGES ALLOWING TESTING PROCEDURE	N/A	
7) RECORD TESTING VOLTAGE - (KV)	5000	



*** Work Order 169710 ***

BSU:

UNIT: REVIEW EQUIPMENT ENTRY

SYSTEM: DO NOT USE



Type:	PM	Job Type:		Planned Date:	2025-07-07
Status:	CL	Impact:	OTHER	PM #:	PM01-19
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	26W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2025-07-02	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	HIGH

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-02	TURBINE	06V1-01	4	

----- Description -----	
6 MONTH MECHANICAL/ELECTRICAL INSPECTION - HB	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-02	EVH		2.00	7.00

----- Notes -----	
Complete	

Completed By: AQ378Completion Date: 2025-07-16

Safety Reminder
 Keep Eyes and Mind on Task!

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- Checklist PMEVH-01 -

Checklist:	PMEVH-01	Last Inspected By:	AQ378
Description:	BI-ANNUAL MECHANICAL & ELECTRICAL INSPECTION - BLACK	Last Inspected:	2025-07-15
WO#:	169710		
Building#	-		
Eqp#:	06V1-01-02 - TURBINE		

Task	Result	Comments
TAILBOARD HAZARD ASSESSMENT	Complete	
COMPLETE STEPS OF ISOLATION PROCEDURE DOWN TO ISSUE ISOLATION PER	Complete	
COMPLETE & ISSUE ISOLATION PERMIT	Complete	
ENSURE TO BARK HEAD GATE (IF REQUIRED)	N/a	
TAILBOARD (DISCUSS PERMIT ISOLATION POINTS WITH ANYONE WHO WAS NOT PRESENT FOR ISOLATION STEPS)	Complete	
POST ISOLATION PERMITIN VISIBLE LOCATION AT STATION	Complete	
CONFIRM FIELD BREAKER OPERATION	Complete	
VISUALLY CHECK BRAKE PAD THICKNESS	5/8	
CONFIRM BRAKE OPERATION AND TIME CYCLE	Off for cooling coil	
BRAKES: CHECK BRAKE LINES FOR LEAKING	No leaks	
CONFIRM CREEP AND OVERSPEED PROTECTION	Complete	
CONFIRM SHUT DOWN FOR LOW OIL	140 psi	

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- Checklist PMEVH-01 -**PRESSURE GOVERNOR PUMP**

CONFIRM GATE POSITION WITH ECC	0
PERFORM GOVERNOR OPERATIONAL TEST	Complete
CONFIRM/RECORD BEARING TEMPERATURE ALARM UPPER GUIDE	Complete 80
CONFIRM/RECORD BEARING TEMPERATURE TRIP UPPER GUIDE	Complete 100
CONFIRM/RECORD BEARING TEMPERATURE ALARM LOWER GUIDE	Complete 80
CONFIRM/RECORD BEARING TEMPERATURE TRIP LOWER GUIDE	Complete 100
CONFIRM/RECORD BEARING TEMPERATURE ALARM THRUST	Complete 80
CONFIRM/RECORD BEARING TEMPERATURE TRIP THRUST	Complete 100
CONFIRM/RECORD BEARING TEMPERATURE ALARM TURBINE	N/a
CONFIRM/RECORD BEARING TEMPERATURE TRIP TURBINE	Complete 100
CONFIRM COOLING WATER TRIP PROTECTION	Complete
RECORD MECHANICAL RUNOUT UPPER GUIDE	N/a
RECORD MECHANICAL RUNOUT LOWER GUIDE	N/a

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- Checklist PMEVBH-01 -

RECORD MECHANICAL RUNOUT TURBINE	N/a
RECORD UPPER GUIDE BEARING VIBRATION	N/a
RECORD LOWER GUIDE BEARING VIBRATION	Not running
RECORD TURBINE BEARING VIBRATION	Not running
RECORD UPPER GUIDE BEARING VIBRATION TRIP	N/a
RECORD LOWER GUIDE BEARING VIBRATION TRIP	Complete
RECORD TURBINE BEARING VIBRATION TRIP	Complete
CONFIRM OPERATION OF PLANT AUXILIARIES	Good
LUBE OIL PRESSURE	N/a
LUBE OIL PRESSURE TRIP	N/a
GREASE LINKS/ PINS & CONTROL ARMS	Complete
GREASE GOVERNOR QUADRANT SHAFT	Complete
VISUALLY CHECK BRUSHES WHILE REMOVING THEM FROM HOLDERS NOTING ONES THAT NEED REPLACED	Complete
CLEAN COMMUTATOR AND BRUSH HOLDERS	Complete

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- Checklist PMEVBH-01 -

CLEAN COLLECTOR RINGS AND BRUSH HOLDERS	Complete
CLEAN UP AREA	Complete
ENSURE PERSONAL ARE CLEAR OF EXCITER & ROTOR AREA	Complete
PERFORM TESTS RECORD MEGGER READINGS	Complete
TEST & RECORD EXCITER LEADS TO GROUND	.483 mohm
TEST & RECORD ROTOR SLIP RINGS TO GROUND	0.07 mohm
ENSURE ALL LEADS ARE RECONNECTED & INSULATED	Complete
REPLACE BRUSHES IN HOLDERS CHANGING ANY THAT ARE NECESSARY	Complete
LINE 3 TO GROUND	N/a
CHECK TO MAKE BRUSHES AREMOVING FREELY	Complete
CONDITION OF EXCITER	Good
NO. OF BRUSHES CHANGED EXCITER	4
CONDITION OF COLLECTOR RINGS	Good
NO OF BRUSHES CHANGED COLLECTOR RINGS	0

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- Checklist PMEVBH-01 -

AIR COMPRESSOR	Good
CHECK FAN	Good
LOWER GUIDE OIL LEVEL ALARM CONFIRMED?	N/a
UPPER GUIDE OIL ALARM CONFIRMED?	N/a
UPPER GUIDE CW FLOW ALARMS	N/a
LOWER GUIDE CW FLOW ALARMS	N/a
TURBINE CW FLOW ALARMS	N/a
BACKFLUSH TURBINE BEARING COOLING COIL	N/a
CONFIRM PROTECTION RELAYS ARE INSTALLED	Complete
REMOVE ISOLATION PERMIT	Complete



*** Work Order 165045 ***

BSU:

UNIT:

REVIEW EQUIPMENT ENTRY

SYSTEM:

DO NOT USE



Type:	PM	Job Type:		Planned Date:	2025-03-05
Status:	CL	Impact:	OTHER	PM #:	PM01-19
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	26W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2025-01-13	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	HIGH

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-02	TURBINE	06V1-01	4	

----- Description -----
6 MONTH MECHANICAL/ELECTRICAL INSPECTION - HB

----- Additional Information -----
<u>High Risk Categories:</u>
<u>Work Order Attachments:</u>
<u>Checked Flags:</u>

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-02	EVH		2.00	7.00

----- Notes -----
Completed bi-annual inspection.

Completed By: AE316Completion Date: 2025-03-07

Safety Reminder
 Keep Eyes and Mind on Task!

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- Checklist PMEVH-01 -

Checklist:	PMEVH-01	Last Inspected By:	AE316
Description:	BI-ANNUAL MECHANICAL & ELECTRICAL INSPECTION - BLACK	Last Inspected:	2025-03-05
WO#:	165045		
Building#	-		
Eqp#:	06V1-01-02 - TURBINE		

Task	Result	Comments
TAILBOARD HAZARD ASSESSMENT	complete	
COMPLETE STEPS OF ISOLATION PROCEDURE DOWN TO ISSUE ISOLATION PER	Complete	
COMPLETE & ISSUE ISOLATION PERMIT	Complete	
ENSURE TO BARK HEAD GATE (IF REQUIRED)	N/a	
TAILBOARD (DISCUSS PERMIT ISOLATION POINTS WITH ANYONE WHO WAS NOT PRESENT FOR ISOLATION STEPS)	Complete	Complete
POST ISOLATION PERMITIN VISIBLE LOCATION AT STATION	Complete	
CONFIRM FIELD BREAKER OPERATION	Complete	
VISUALLY CHECK BRAKE PAD THICKNESS	5/8	
CONFIRM BRAKE OPERATION AND TIME CYCLE	Coasted 1:30, stopped 16 seconds, total brake time 3 mins	
BRAKES: CHECK BRAKE LINES FOR LEAKING	no leaks	

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- Checklist PMEVBH-01 -

CONFIRM CREEP AND OVERSPEED PROTECTION	Overspeed Ok,
CONFIRM SHUT DOWN FOR LOW OIL PRESSURE GOVERNOR PUMP	140 psi ok
CONFIRM GATE POSITION WITH ECC	0
PERFORM GOVERNOR OPERATIONAL TEST	Complete
CONFIRM/RECORD BEARING TEMPERATURE ALARM UPPER GUIDE	complete 80 C
CONFIRM/RECORD BEARING TEMPERATURE TRIP UPPER GUIDE	100 C
CONFIRM/RECORD BEARING TEMPERATURE ALARM LOWER GUIDE	80 C
CONFIRM/RECORD BEARING TEMPERATURE TRIP LOWER GUIDE	100 C
CONFIRM/RECORD BEARING TEMPERATURE ALARM THRUST	80 C
CONFIRM/RECORD BEARING TEMPERATURE TRIP THRUST	100 C
CONFIRM/RECORD BEARING TEMPERATURE ALARM TURBINE	N/A
CONFIRM/RECORD BEARING TEMPERATURE TRIP TURBINE	100 C
CONFIRM COOLING WATER TRIP PROTECTION	confirmed ok
RECORD MECHANICAL RUNOUT UPPER GUIDE	N/a

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- Checklist PMEVBH-01 -

RECORD MECHANICAL RUNOUT LOWER GUIDE	N/a
RECORD MECHANICAL RUNOUT TURBINE	N/a
RECORD UPPER GUIDE BEARING VIBRATION	N/a
RECORD LOWER GUIDE BEARING VIBRATION	0.03 @ 35%
RECORD TURBINE BEARING VIBRATION	0.06 @ 35%
RECORD UPPER GUIDE BEARING VIBRATION TRIP	N/a
RECORD LOWER GUIDE BEARING VIBRATION TRIP	0.30 in/s
RECORD TURBINE BEARING VIBRATION TRIP	0.30 in/s
CONFIRM OPERATION OF PLANT AUXILIARIES	Ok
LUBE OIL PRESSURE	N/A
LUBE OIL PRESSURE TRIP	N/A
GREASE LINKS/ PINS & CONTROL ARMS	completed
GREASE GOVERNOR QUADRANT SHAFT	completed
VISUALLY CHECK BRUSHES WHILE	Complete

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- Checklist PMEVBH-01 -

REMOVING THEM FROM HOLDERS
NOTING ONES THAT NEED REPLACED

CLEAN COMMUTATOR AND BRUSH HOLDERS	Complete
------------------------------------	----------

CLEAN COLLECTOR RINGS AND BRUSH HOLDERS	Complete
---	----------

CLEAN UP AREA	Complete
---------------	----------

ENSURE PERSONAL ARE CLEAR OF EXCITER & ROTOR AREA	Complete
---	----------

PERFORM TESTS RECORD MEGGER READINGS	Complete
--------------------------------------	----------

TEST & RECORD EXCITER LEADS TO GROUND	.255 mega ohm
---------------------------------------	---------------

TEST & RECORD ROTOR SLIP RINGS TO GROUND	13.3 mega ohm
--	---------------

ENSURE ALL LEADS ARE RECONNECTED & INSULATED	Complete
--	----------

REPLACE BRUSHES IN HOLDERS CHANGING ANY THAT ARE NECESSARY	Complete
--	----------

LINE 3 TO GROUND	N/a
------------------	-----

CHECK TO MAKE BRUSHES AREMOVING FREELY	completed
--	-----------

CONDITION OF EXCITER	good
----------------------	------

NO. OF BRUSHES CHANGED EXCITER	3
--------------------------------	---

CONDITION OF COLLECTOR RINGS	good
------------------------------	------

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- Checklist PMEVBH-01 -

NO OF BRUSHES CHANGED
COLLECTOR RINGS

3

AIR COMPRESSOR

Ok

CHECK FAN

Ok

LOWER GUIDE OIL LEVEL ALARM
CONFIRMED?

N/A

UPPER GUIDE OIL ALARM
CONFIRMED?

N/A

UPPER GUIDE CW FLOW ALARMS

N/A

LOWER GUIDE CW FLOW ALARMS

N/A

TURBINE CW FLOW ALARMS

N/A

BACKFLUSH TURBINE BEARING
COOLING COIL

N/A

CONFIRM PROTECTION RELAYS ARE
INSTALLED

Complete

REMOVE ISOLATION PERMITComplete



*** Work Order 168697 ***

BSU:

UNIT:

REVIEW EQUIPMENT ENTRY

SYSTEM:

DO NOT USE



Type:	PM	Job Type:		Planned Date:	2025-07-07
Status:	CL	Impact:	OTHER	PM #:	PM25-48
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	52W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2025-05-26	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	HIGH

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-01	HB1 GENERATOR	06V1-01	4	

----- Description -----	
ANNUAL ROTOR AND EXICTER INSULATION TESTS - HB	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-01	EVH		1.00	1.00
06V1-01-01	EVH		1.00	1.00

----- Notes -----	
Complete	

Completed By: AQ378Completion Date: 2025-07-16

Safety Reminder
 Keep Eyes and Mind on Task!

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Page 1

- Checklist PM25 -

Checklist:	PM25	Last Inspected By:	AQ378
Description:	ANNUAL ROTOR AND STATOR INSULATION TESTS	Last Inspected:	2025-07-15
WO#:	168697		
Building#	-		
Eqp#:	06V1-01-01 - HB1 GENERATOR		

Task	Result	Comments
1) TRAVEL	Complete	
2) TAILBOARD	Complete	
3) ENSURE UNIT ISOLATION	Complete	
4) TEMPORARY SURRENDER UNIT ISOLATION	Completr	
5) RE-ISSUE WITH CHANGES ALLOWING TESTING PROCEDURE	Complete	
6) VISUALLY INSPECT LEADS FROM EXCITOR TO FIELD POLE	Complete	
7) INSPECT SLIP RINGS	Complete	
8) VERIFY LUG CONNECTION ON GENERATOR SIDE OF EXITER LEADS	Complete	
9) PERFORM TESTS & RECORD MEGGER READINGS (OHMS) RECORD	2.15 gohm	
10) WITH BRUSHES LIFTED COLLECTOR RING TO GROUND	0.07 mohm	
11) WITH BRUSHES LIFTED BRUSH HOLDERS TO GROUND	35.1 mohm	
12) WITH EXCITER BRUSHES LIFTED COMMUTATOR TO GROUND	.484 mohm	
13) WITH EXCITER BRUSHES LIFTED COMMUTATOR BRUSH HOLDER TO	.215 mohm	

- Checklist PM25 -

GROUND		
14) WITH PILOT EXCITER BRUSHES LIFTED COMMUTATOR TO GROUND	Na	
15) WITH PILOT EXCITER BRUSHES LIFTED COMMUTATOR BRUSH HOLDER TO GROUND	Na	
16) SURRENDER PERMIT WHEN TEST IS COMPLETE	Complete	
17) RE-ISSUE WITH CHANGES	Complete	
18) SURRENDER PERMIT	Complete	



*** Work Order 168698 ***

BSU:

UNIT: REVIEW EQUIPMENT ENTRY

SYSTEM: DO NOT USE



Type:	PM	Job Type:		Planned Date:	2025-07-07
Status:	CL	Impact:	OTHER	PM #:	PM26-52
Priority:	1	Severity:	LOW (ANY CATEGORY)	Frequency:	52W
Assigned To:	EVH	Submitted By:	PM SCHEDULER	Standard Doc#:	None
Isolation:	U	Submitted Date:	2025-05-26	Safety Doc#:	None
HIT/EM Flag:	0	WO Location:		Can Permit #:	
PowerPlan Proj:	O0000759	PowerPlan Task:	8502.2500	PM Priority:	HIGH

----- Equipment -----				
<u>Equipment</u>	<u>Description</u>	<u>Location</u>	<u>Criticality</u>	<u>Tag #</u>
06V1-01-01	HB1 GENERATOR	06V1-01	4	

----- Description -----	
ANNUAL GENERATOR STATOR INSULATION TEST - HOLLOW BRIDGE	

----- Additional Information -----	
<u>High Risk Categories:</u>	
<u>Work Order Attachments:</u>	
<u>Checked Flags:</u>	

----- MATERIAL (ESTIMATED REQUIREMENTS) -----			
<u>Equipment</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>

----- LABOUR (ESTIMATED REQUIREMENTS) -----				
<u>Equipment</u>	<u>Trade</u>	<u>Function</u>	<u>People</u>	<u>Hrs</u>
06V1-01-01	EVH		1.00	2.00

----- Notes -----	
Complete	

Completed By: AQ378Completion Date: 2025-07-16

Safety Reminder
 Keep Eyes and Mind on Task!

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- Checklist CA-GEN-INSUL-TEST -

Checklist:	CA-GEN-INSUL-TEST	Last Inspected By:	AQ378
Description:	Condition Assessment: Generator Insulation Test	Last Inspected:	2025-07-15
WO#:	168698		
Building#	-		
Eqp#:	06V1-01-01 - HB1 GENERATOR		

Task	Result	Comments
1) SYSTEM	BEAR RIVER	
2) STATION	6V- HOLLOW BRIDGE	
3) GENERATOR UNIT	1	
4) TEMPERATURE (IN PLANT)	27	
5) % HUMIDITY	48	
6) TESTER NAME	Jl	
7) IF KNOWN, UNIT LAST ONLINE (APPROX)	4 hours	
8) RETURN TO LESS THAN 100 VOLTS BEFORE INCREASING VOLTAGE		
9) IF TEST PROCEDURE IS DIFFERENT THAN FORM, NOTE IN COMMENTS		
10) IF GENERATOR VOLTS ARE 2.3 KV THEN TEST AT MAXIMUM 2 KV		
11) IF GENERATOR VOLTS ARE 6.9 KV OR 7.2 KV THEN TEST AT MAXIMUM 5 KV		
12) IF GENERATOR VOLTS ARE 13.8 KV THEN TEST AT MAXIMUM 10 KV		
13) IF TEST IS PERFORMED WITH WINDINGS AND CABLES IN SERIES AND A FAILURE IS FOUND, TEST WINDINGS		

- Checklist CA-GEN-INSUL-TEST -

AND CABLES SEPARATELY		
15) GENERATOR WINDINGS SECTION		
40) ROTOR INSULATION RESISTANCE	.483	
41) EXCITER INSULATION RESISTANCE	.215	
42) GENERATOR CABLES SECTION		

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Request IR-2:

On PDF page 2 of Attachment 1, the report notes the requirement to maintain a balanced winding, particularly in parallel circuits, to avoid circulating currents. It explains that circulating currents can cause heating, which may lead to failure. The report also highlights that voltage unbalance can occur at the main terminals if a different number of coils per phase exists. The initial inspection identified failures in each of the three phases, which are marked on the drawings as “bad coil”.

On PDF page 4 of Attachment 1, the report states that during testing, the stator winding was found to be highly susceptible to moisture. NS Power installed heaters under the unit to help prevent moisture from interfering with the testing process.

On PDF page 5 of Attachment 1, the report notes that once all testing was completed, a total of 11 coils within the winding had either failed an insulation resistance test or a 11,700 V high-potential test. The report also includes a table showing which of the 24 coils would need to be bypassed in the winding to either remove defective coils from the circuit or restore balance to the winding.

(a) Please confirm whether the maintenance procedure includes testing circulating currents and voltage balances.

(i) If yes, please provide supporting documents for the past five years.

(ii) If not, please explain why, given its significance noted in the attachment.

(b) Please confirm whether the windings were balanced and whether the maintenance procedures include tests for this.

(i) If yes, please provide supporting documents for the past five years.

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1 (ii) If not, please explain why, given its significance noted in the
2 attachment.

3
4 (c) When was the heater installed to help prevent stator moisture?
5

6 (i) What triggered this installation? Please provide supporting documents.
7

8 (d) Has the utility been unable to identify issues such as voltage unbalance and winding
9 imbalance noted in Attachment 1, which may have led to more damage than
10 expected? Please explain.
11

12 (e) Do the 24 coils still need to be bypassed in the winding?
13

14 (i) If yes, please explain the impact on the overall generator's health and
15 rating.
16

17 (f) Please list the specific scope of the project in terms of how many coils per phase are
18 being refurbished and how many are bypassed.
19

20 **Response IR-2:**
21

22 (a) Generators that have not sustained a fault are designed to prevent circulating currents and
23 voltage imbalance. These conditions are not expected in any generator that has not
24 undergone coil jumpering; therefore, such testing is not part of NS Power's standard
25 maintenance practices, and no supporting documentation exists. However, in this instance,
26 coil jumpering was required to remediate a series of faults, and it was critical to perform
27 the process carefully to avoid creating an imbalance.
28

29 (b) Yes, the windings were balanced prior to this failure. The balance of the windings is
30 inherent in the generator's design and any subsequent rewinds, and it is verified during

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1 commissioning. After commissioning, the only events that could cause an imbalance in the
2 unit would be fault conditions; therefore, such testing is not part of NS Power's standard
3 maintenance practices, and no supporting documentation exists.

4
5 (c) Installation of the heater was initiated immediately after the faulted state was identified and
6 completed shortly after subsequent testing commenced.

7
8 (i) No formal documentation exists for this step, however this is standard practice for
9 units exhibiting poor insulation test results. Providing heat to the stator windings
10 helps assess the extent to which winding health is influenced by environmental
11 conditions and provides an opportunity to remediate moisture-related insulation
12 issues.

13
14 (d) The root cause of Hollow Bridge Failure has not yet been determined and is still under
15 investigation. There have been no recent incidents where voltage imbalance and winding
16 imbalance have been the root cause of a winding failure within NS Power's Hydro system.

17
18 (e) No, once rewound the generator will have all windings restored to OEM specifications.

19
20 (i) N/A

21
22 (f) Due to the type of construction and the widespread nature of these faults, it was determined
23 that repairing this unit with bypassed coils alone was no longer feasible. The coils are
24 lapped, meaning the copper segment at the front of each diamond traps the back section of
25 the adjacent diamond. As a result, all coils must be removed to replace any faulted sections.
26 Because such a removal process is inherently destructive, a complete rewind of all coils is
27 the only viable intervention.