

NUCLEAR POWER BUSINESS UNIT
OPERATIONS REFUELING TESTS

ORT 4
MAJOR
Revision 9
January 31, 1997

MAIN TURBINE MECHANICAL OVERSPEED
TRIP DEVICE
UNIT 2

Date _____
DSS _____

RECORD

PROCEDURE VERIFIED CURRENT AND CHECKED FOR TEMPORARY CHANGES IF FIELD
COPIES REQUIRED, USE PBF-0026; LAW NP 1.2.4 AND DO NOT COMPLETE THIS BLOCK.

BY: _____ DATE: _____

1.0 PURPOSE

To verify operability of mechanical overspeed trip mechanism and record the trip setpoint in accordance with:

- 1.1 PBNP Technical Specification Table 15.4.1-1
- 1.2 Westinghouse Turbine Manual, Volume 1, Tab 23, Page 10, Item 22 and Tab 24, overspeed trip mechanism

2.0 REFERENCES

IR 96-006, NRC Inspection Report, NRC Commitment for Operations procedure PMT/QC reviews.

3.0 INITIAL CONDITIONS

INITIALS

- 3.1 The turbine generator must be in operation maintaining $\geq 10\%$ load for at least a period of eight hours prior to checking the overspeed of the unit. _____
- 3.2 Have I&C obtain a fire barrier penetration permit, install frequency counter and verify as operable. _____
- 3.3 I&C personnel available to defeat and enable independent overspeed protection system of both units when instructed to do so by the duty shift superintendent. _____
- 3.4 98% and 102% of the last recorded overspeed trip point have been calculated. (Use average of previous three trip points from previous ORT test.) _____

98% _____ rpm 102% _____ rpm

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INITIALS

NOTE: *If the unit will not be returned to service upon completion of this test (e.g., the test is being conducted prior to a refueling shutdown), then Section 5.0 is the proper section to be used.*

- 3.5 Perform either Section 4.0 or 5.0 for taking the turbine off line. Check the appropriate section to be used.

Section 4.0 - taking turbine generator off line while maintaining reactor power ()

Section 5.0 - taking turbine generator off line and reducing reactor power ()

NOTE: *If turbine unloading limitations were calculated as part of ramping down per OP-3A, then it is not necessary to do them again.*

- 3.6 Turbine unloading limitations calculated per CL-1C.

3.7 **Permission to Perform Test**

The conditions required by this test are consistent with required plant conditions including equipment operability. Permission is granted to perform this test.

DSS _____ Time _____ Date _____

4.0 **TAKING THE TURBINE GENERATOR OFF LINE WHILE MAINTAINING REACTOR POWER WITH THE CONDENSER STEAM DUMPS.**

- 4.1 Verify reactor power at ~28%.

- 4.2 Place the steam generator level programmer LM-463F in rack C-127 in manual.

- 4.3 Record the following reference valves.

4.3.1 Turbine first stage pressure, PI-485 _____ psig

4.3.2 Turbine EH reference setting _____

4.3.3 Auctioned T_{avg}, HI TAVG ppcs or TR-401 _____ °F

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- 4.3.4 "Tref", "Tref" ppcs or TR-401 _____ °F
- 4.3.5 Percent nuclear power, AVGPWR ppcs or NR-41 _____ %
- 4.3.6 Steam header pressure, PI-484 _____ psig _____
- 4.4 Verify the steam generator atmospheric steam dump controllers set at 1050 psig and are in "auto." _____
- 4.5 Verify the condenser steam dump mode selector and the steam dump controller, HC-484 are in "auto." _____
- 4.6 Adjust the condenser steam dump controller, HC-484, setpoint to null the deviation meter. The setpoint should match existing steam header pressure PI-484 ± 5 psig. _____
- NOTE:** *If any condenser steam dump(s) open when the mode selector is placed in manual then slowly adjust HC-484 setpoint to just shut the condenser steam dump(s).*
- 4.7 Place the condenser steam dump mode selector to manual. _____
- 4.8 Place the rod control selector switch to manual _____
- 4.9 If required, transfer the unit auxiliary loads from X02 to X04. _____
- 4.10 Return to two sets of "oil cooling fans with pumps" on each phase of the X01 McGraw Edison transformers by transferring the control switch from "manual" to "auto." _____
- 4.11 Secure any nitrogen purge on the X01 transformer tank gas spaces. _____

INITIALS

NOTE: *As the turbine is tripped off line the operator should:*

Maintain T_{out} close to the value of Step 4.3.3 by use of control rods, dilution or boration. Condenser steam dumps should not be adjusted during the load change.

Monitor condenser steam dump operation. Steam dumps should open to maintain steam header pressure at the reference value of Step 4.3.6.

- 4.12 Begin reducing turbine load in accordance with limitations of CL-1C. _____
- 4.13 When turbine load is reduced to $\leq 20\%$, open the turbine drain valves. _____
- 4.14 Shut the crossover steam dump MOVs and place their control switches to stop. Verify locally MOVs OS-1 and OS-2 are full shut. _____
- 4.15 Isolate the crossover steam dump header drain bottle outlet. _____
- Unit 2, Bottle No. 3
- Shut OS-33, OS-5937 outlet isolation _____
- Shut OS-35, ST-5965 outlet isolation _____
- 4.16 Reduce load to approximately zero MWe and MVar. _____
- 4.17 If on automatic voltage regulation, zero the null voltmeter. _____
- 4.18 Start the seal oil backup pump, P37B and the AC turning gear oil pump P37C. _____
- 4.19 Main Generator Operations
- 4.19.1 Place the "turbine trips/generator breaker trip to lockouts" switch 2-43TG02/3 in defeat. _____

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***CAUTION* IF THE MAIN TURBINE SPEED INCREASES UNCONTROLLABLY WHEN THE MAIN GENERATOR BREAKER IS OPENED, IMMEDIATELY TRIP THE TURBINE.**

4.19.2 Trip the generator breaker.

4.19.3 Trip the generator exciter field breaker.

4.19.4 Place the "turbine trips/generator breaker trip to lockouts" switch 2-43TG02/3 in operate.

4.19.5 Check that the EH Turbine control has shifted to "Speed Control."

4.19.6 Place the voltage regulator in OFF.

4.19.7 Run the base adjustment to the lower limit.

4.20 Continue with Step 6.0 "Overspeed Trip Testing."

5.0 TAKING TURBINE GENERATOR OFF LINE AND REDUCING REACTOR POWER

5.1 Decrease load and remove turbine/generator from line by completing the applicable portions of OP-3A and CL-1C.

5.2 Continue with Step 6.0 "Overspeed trip testing."

6.0 OVERSPEED TRIP TEST

NOTE: *Refer to DCS 3.1.25, Crossover Steam Dump System Operability and IOPS Administrative Limits.*

6.1 Enter administrative LCO for defeating Unit 1 IOPS.

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		TRIP CYCLE		
		1	2	3
6.2	Have I&C defeat IOPS of both units by opening individual sliders.	_____	N/A	N/A
6.3	Disable the overspeed protection controller by turning the auxiliary governor key switch to the overspeed test position.	_____	N/A	N/A
6.4	With the setter approximately two percent below the previous overspeed trip setting and the acceleration rate at 50 rpm/min., depress the go pushbutton. Wait until the go light is out and turbine speed has stabilized.	_____	_____	_____
6.5	With the setter at two percent above the previous over-speed trip setting, and the acceleration rate at 50 rpm/min., depress the go pushbutton. Observe the frequency meter installed by I&C and record the speed at which the unit trips (cycles/min = rpm).	_____	_____	_____
NOTE: Log trip speed not run up speed.				
First _____ rpm		_____	_____	_____
Second _____ rpm		_____	_____	_____
Third _____ rpm		_____	_____	_____
6.6	<u>Latch the Turbine</u>	_____	_____	_____
6.6.1	Reference and setter displays energized and reading 0000.	_____	_____	_____
6.6.2	Reset the turbine trip lever.	_____	_____	_____
6.6.3	Depress the turbine trip reset button at CO3.	_____	_____	_____
6.7	<u>Check the Following</u>	_____	_____	_____
6.7.1	"UNIT TRIP" light off.	_____	_____	_____
6.7.2	"SPEED CONTROL" light on.	_____	_____	_____
6.7.3	"STOP VALVE OPEN" lights on.	_____	_____	_____

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		<u>INITIALS</u>		
		TRIP CYCLE		
		<u>1</u>	<u>2</u>	<u>3</u>
6.7.4	"GOVERNOR VALVE CLOSED" indicating lights on.	_____	_____	_____
6.7.5	"TURBINE MANUAL" light on.	_____	_____	_____
<p>*CAUTION* FROM 1000 TO 1400 RPM, THE RATE SHOULD BE 300 RPM/MIN. THE TURBINE SHOULD NOT BE HELD AT AN RPM NEAR THE CRITICAL VALUE OF ABOUT 1250 RPM.</p>				
6.8	As the reference display approaches the speed of the turbine, the speed reference channel light will go out; at this point depress the operator auto pushbutton, set the acceleration rate at 100 rpm/min., and the setter approximately 1800 rpm, then push the go pushbutton. Wait until the go light is out and turbine speed has stabilized.	_____	_____	_____
6.9	Return to Step 6.4	_____	_____	<u>N/A</u>
6.10	Average the trip data from Step 6.5.			
	First → Third Average _____ rpm			
	If the average trip speed is outside of the acceptable range then contact superintendent - Maintenance for recommendations.			
	<u>Acceptable Range</u>	103.9% to 105.0% (1870.2 rpm to 1890 rpm)		

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NOTE: *The remaining steps of Section 6.0 may be performed prior to the completion of Step 6.11 and 6.12.*

PMT

6.11 Have I&C enable IOPS for both units as follows:

6.11.1 At Unit 1 IC-75, Independent Overspeed Protection System Panel, Valve Channel A, verify no "A" train trip signals present as follows:

- a. Connect multimeter to terminals P1 and N1 to check proper operation of voltmeter.
- b. Remove test lead from terminal P1 **AND** check all rack side slider block terminals for no voltage present.
- c. Remove test lead from terminal N1 **AND** set multimeter to measure ohms.
- d. Check for an open condition between rack side slider block terminals 29 and 30.

IC

IC

IC

IC

6.11.2 At Valve Channel B, verify no "B" train trip signals present as follows:

- a. Set multimeter to measure volts.
- b. Check between all rack side slider block terminals and terminal N1 for no voltage present.
- c. Remove test lead from terminal N1 and set multimeter to measure ohms.
- d. Check for an open condition between rack side slider block terminals 29 and 30.

IC

IC

IC

6.11.3 At Unit 1 IC-75, Independent Overspeed Protection System Panel, close all sliders.

IC

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INITIALS

INDEPENDENT VERIFICATION

- 6.11.4 At Unit 1 1C-75, Independent Overspeed Protection System Panel, check all sliders are CLOSED.

Verifier Initials _____ Time _____ Date _____
IC

- 6.11.5 At Unit 2 2C-75, Independent Overspeed Protection System Panel Valve Channel A, verify no "A" train trip signals present as follows:

- a. Connect multimeter to terminals P1 and N1 **AND** check proper operation of voltmeter.
- b. Remove test lead from terminal P1 **AND** check all rack side slider block terminals for no voltage present.
- c. Remove test lead from terminal N1 **AND** set multimeter to measure ohms.
- d. Check for an open condition between rack side slider block terminals 29 and 30.

IC

IC

IC

IC

- 6.11.6 At Valve Channel B, verify no "B" train trip signals present as follows:

- a. Set multimeter to measure volts.
- b. Check between all rack side slider block terminals and terminal N1 for no voltage present.
- c. Remove test lead from terminal N1 and set multimeter to measure ohms.
- d. Check for an open condition between rack side slider block terminals 29 and 30.

IC

IC

IC

IC

- 6.11.7 At Unit 2 2C-75, Independent Overspeed Protection System Panel, close all sliders.

IC

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INDEPENDENT VERIFICATION

6.11.8 At Unit 2 2C-75, Independent Overspeed Protection System Panel, check all sliders are CLOSED.

Verifier Initials _____ Time _____ Date _____
IC

M&TE Id. No. _____ Cal. Date _____

6.12 Exit administrative LCO for Unit 1. _____

6.13 Return the overspeed protection controller key switch to the inservice position. _____

NOTE: *QC Inspector must witness performance of Step 6.14.*

6.14 Have I&C remove the frequency counter and restore the fire barrier penetration to normal. _____

M&TE Id. No. _____ Cal. Date _____

6.15 Frequency counter, and cabling removed. Fire barrier penetration integrity is restored. _____

6.16 As directed by the DSS, perform one of the following actions: _____

6.16.1 If returning to the grid and ORT 4 was conducted while holding reactor at approximately 28% power, then perform Section, 7.0 or

6.16.2 If returning to the grid and ORT 4 was conducted at reduced reactor power, then perform Section 8.0, or

6.16.3 If not returning to the grid, then return to OP-3A, Normal Power Operation to Low Power Operation. _____

6.17 All M&TE Id No.'s used with overspeed testing are recorded on CHAMPS Task Sheet. _____

QC

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7.0 SYNCHRONIZING THE GENERATOR AND LOADING THE TURBINE
WHILE HOLDING REACTOR POWER AT ~28% WITH CONDENSER
STEAM DUMPS

NOTE: If Section 7.0 is being performed then Step 8.0 is N/A.

7.1 Complete applicable section of CL-1C for turbine loading rate. _____

7.2 Verify lockout relays (back of C02) are reset and control power on.

7.2.1 2TG-01 Turbine Generator lockout _____

7.2.2 Trans. 2X01 lockout. _____

7.3 Ensure no protective relay targets showing (back of C02). _____

7.4 Disconnect Operation

*NOTE: If motor operated disconnects have not been opened, then
Step 7.4 is N/A.*

7.4.1 Operator stationed at disconnects to observe proper closure. _____

7.4.2 Verify the generator output breaker 142 is open locally. _____

7.4.3 Close the motor-operated disconnects 142B. Verify closure. _____

7.5 Verify the "turbine trips/generator breaker trip to lockouts" key switch is in
operate. _____

7.6 Set the valve position limiter to ~30%. _____

7.7 Verify EH control is in "oper auto." _____

7.8 Verify the turbine is at 1800 rpm, then stop the turning gear pump and the
seal oil backup pump and place control switches in "auto." _____

7.9 Verify service water cut in to the turbine oil cooler and the controller is set
to control oil temperature leaving the bearings between 130-150°F. _____

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- 7.10 Verify service water cut in to:
- 7.10.1 The exciter cooler. _____
- 7.10.2 The isolated bus duct cooler. _____
- 7.11 Verify all 3 channels of IOPS are indicating approximately 1800 rpm. (Rod drive room.) _____
- 7.12 Notify the system control supervisor that the unit is coming on line. _____
- 7.13 With the turbine speed between 1750 and 1800 rpm, close the field breaker. _____
- 7.14 Slowly raise generator voltage by using small steps on the base adjuster to obtain approximately 19 Kv at 1800 rpm. Verify all three phases. _____
- 7.15 For Automatic Voltage Regulation
- 7.15.1 Turn the regulator switch to "test." Note that the generator null voltmeter will move to "+" or "-." _____
- 7.15.2 Adjust the null voltmeter to zero using the "mag-a-stat" voltage adjuster. _____
- 7.15.3 When nulled, turn the voltage regulator switch to "on." _____
- NOTE:** *The voltage regulator is now in automatic. Voltage at any time and MVARs when synchronized are adjusted by the "mag-a-stat" voltage adjuster.*
- NOTE:** *The base adjuster is used to adjust the output of the manual voltage regulator as indicated on the null voltmeter to approximately zero.*
- 7.16 Turn on the synchroscope and adjust "incoming" voltage to match "running" voltage. _____
- 7.17 Verify approximately 20 amps DC excitation current. _____

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- 7.18 Adjust turbine speed to cause the rotation of the synchroscope slowly in the "fast" direction.

CAUTION ENSURE THE GENERATOR PICKS UP ~20-30 MWE LOAD. IF NECESSARY TAKE MANUAL CONTROL OF EH GOVERNOR AND INCREASE LOAD. DO NOT ALLOW THE GENERATOR TO MOTORIZE AS A GENERATOR TRIP AND LOCKOUT WILL OCCUR IN 45 SECONDS AFTER RECEIPT OF "REVERSE POWER" ALARM.

- 7.19 As the synchroscope reaches the 12:00 position, close the generator output breaker.
- 7.20 Verify "LOAD CONTROL" light on.
- 7.21 Verify approximately 20-30 Mwe load on generator and MVARs in the out direction.
- 7.22 Turn the synchroscope off.
- 7.23 Notify system control supervisor that the unit is on line.

CAUTION FUEL CONDITIONING MAY BE LIMITING AND WILL PREVAIL OVER TURBINE CAPABILITY.

- 7.24 Monitor condenser steam dump operation, to ensure the steam load combination of turbine and condenser dumps are controlling reactor power and T_{avg} at approximately the reference value of Step 4.3.

NOTE: Advance valve position limiter as required to avoid governor tracking errors throughout remainder of power increase.

- 7.25 Transfer EH control to "imp in."
- 7.26 Slowly raise turbine load to approximately 15%.
- 7.27 Verify 2 of 2 "TURBINE POWER P-7" bistable status lights are lit.
- 7.28 Increase electrical load slowly.

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7.29 Ensure generator cold gas temperatures are being maintained at $>40^{\circ}\text{C}$ but $<46^{\circ}\text{C}$ with a maximum hot gas temperature rise of 64°C . _____

7.30 When the turbine is at approximately 20% load. _____

7.30.1 Assuming X02 in service, transfer buses A01 and A02 to X02, minimizing the time the transformers are paralleled. _____

7.30.2 Align X01 FOA coolers as follows: _____

- a. Place all three sets of "oil cooling fans with pump" into operation on each McGraw Edison X01 transformer by transferring control switch from "auto" to "manual." _____

***CAUTION* SIMULTANEOUS "MANUAL OPERATION" OF
FOA COOLERS ON WESTINGHOUSE
TRANSFORMERS IS NOT RECOMMENDED SO
AS TO AVOID POTENTIAL DAMAGE BY
STATIC ELECTRIFICATION.**

- b. The Westinghouse transformer 2X01-C phase should be selected to "auto." _____

7.30.3 Establish the nitrogen purge on each McGraw Edison X01 tank gas space (if purge system installed). _____

7.31 Unisolate the crossover steam dump drain bottle. _____

Unit 2 drain bottle No. 3

Open OS-33, OS-5937 outlet isolation. _____

Open OS-35, ST-5965 outlet isolation. _____

7.32 Open bypass valves OS-1&2 as soon as crossover pressure on PR-2065 is positive. _____

7.33 When the unit is $>20\%$ power, place the control switches for the TCSD (turbine crossover steam dump) isolation valves MOV-1&2 in the "auto" position and ensure that the valves have opened. _____

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- 7.34 Shut bypasses OS-1&2. _____
- 7.35 Close the turbine drain valves. _____
- 7.36 Slowly increase turbine load until the parameters of Step 4.3 are approximately matched. Then stop increasing turbine load. _____
- 7.37 Set the condenser steam dump controller, HC-484 to a pressure of 1005 psig. _____
- 7.38 Verify the condenser steam dumps are shut. _____
- 7.39 Place the steam dump mode selector on "auto." _____
- 7.40 Adjust turbine load to bring T_{ref} within 1°F of T_{avg} . _____
- 7.41 Transfer the rod control system to "auto." _____
- 7.42 Place the steam generator level programmer, LM-463F in rack C-127, in "auto." _____
- 7.43 Return to OP-1C step in effect. _____

8.0 SYNCHRONIZING THE GENERATOR AND LOADING THE TURBINE WHILE INCREASING REACTOR POWER.

NOTE: *If Section 8.0 is being performed then Step 7.0 is N/A.*

- 8.1 Complete applicable section of CL-1C for turbine loading. _____
- 8.2 Verify the lockout relays (back of C02) are reset and control power on.
- 8.2.1 2TG-01 Turbine Generator lockout. _____
- 8.2.2 Trans. 2X01 lockout. _____
- 8.3 Ensure no protective relay targets showing (back of C02). _____

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8.4 Disconnect Operation

NOTE: If motor operated disconnects have not been opened, then Step 8.4 is N/A.

- 8.4.1 Station an operator at disconnects to observe proper closure. _____
- 8.4.2 Verify locally the generator output Breaker 142 is open. _____
- 8.4.3 Close the motor-operated disconnect 142B. Verify closure. _____
- 8.5 Verify the "turbine trips/generator breaker trip to lockouts" key switch is in operate. _____
- 8.6 As required, raise reactor power and dump steam until 2% rated power is reached. _____
- 8.7 Set the value position limiter to ~30%. _____
- 8.8 Verify EH control is in "OPER AUTO." _____
- 8.9 Verify the turbine is at 1800 rpm, then stop the turning gear pump and the seal oil backup pump and place control switches in "auto." _____
- 8.10 Verify service water cut in to the turbine oil cooler and the controller is set to control oil temperature leaving the bearings between 130-150°F. _____
- 8.11 Verify service water cut in to:
- 8.11.1 The exciter cooler. _____
- 8.11.2 The isolated bus duct cooler. _____
- 8.12 Verify all 3 channels of IOPS are indicating approximately 1800 rpm. (Rod drive room) _____

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NOTE: Use ($\Delta T/0.56$) as indicated power during the initial startup following refueling.

- 8.13 Raise reactor power by one of the following methods, whichever is applicable.
- 8.13.1 If not an initial startup following a refueling outage, raise reactor power to >10%.
- 8.13.2 If an initial startup following a refueling outage, raise reactor power per the direction of the Technical Services engineer performing RESP 4.3.
- 8.14 Perform the Following:
- 8.14.1 Verify the "POWER ABOVE P-10" light is on and that 4 of 4 "HI POW RANGE P-10" bistable status lights are lit.
- 8.14.2 Block the "intermediate range reactor trip" and verify the "INTERMED RANGE TRIP BLOCKED" light is lit.
- 8.14.3 Block the "low power reactor trip" and verify the "LO POWER RANGE TRIP BLOCKED" light is lit.
- 8.14.4 Verify the "AT POWER TRIP BLOCKED" permissive light has cleared.
- 8.15 Notify the system control supervisor that the unit is coming on line.
- 8.16 With the turbine speed between 1750 and 1800 rpm, close the field breaker.
- 8.17 Slowly raise generator voltage by using small steps on the base adjuster to obtain approximately 19 Kv at 1800 rpm. Verify all three phases.
- 8.18 For Automatic Voltage Regulation
- 8.18.1 Turn the regulator switch to "test." Note that the generator null voltmeter will move the "+" or "-."

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- 8.18.2 Adjust the null voltmeter to zero using the "mag-a-stat" voltage adjuster. _____
- 8.18.3 When nulled, turn the voltage regulator switch to "on." _____
- NOTE: The voltage regulator is now in automatic. Voltage at any time and MVARs when synchronized are adjusted by the "mag-a-stat" voltage adjuster.*
- NOTE: The base adjuster is used to adjust the output of the manual voltage regulator as indicated on the null voltmeter to approximately zero.*
- 8.19 Turn on the synchroscope and adjust "incoming" voltage to match "running" voltage. _____
- 8.20 Verify approximately 20 amps DC excitation current. _____
- 8.21 Adjust turbine speed to cause the rotation of the synchroscope slowly in the "fast" direction. _____
- *CAUTION* ENSURE THE GENERATOR PICKS UP ~20-30 MWE LOAD. IF NECESSARY TAKE MANUAL CONTROL OF EH GOVERNOR AND INCREASE LOAD. DO NOT ALLOW THE GENERATOR TO MOTORIZE AS A GENERATOR TRIP AND LOCKOUT WILL OCCUR IN 45 SECONDS AFTER RECEIPT OF "REVERSE POWER" ALARM.**
- 8.22 As the synchroscope reaches the 12:00 position, close the generator output breaker. _____
- 8.23 Verify "LOAD CONTROL" light on. _____
- 8.24 Verify approximately 20-30 Mwe load on generator and MVARs in the out direction. _____
- 8.25 Turn the synchroscope off. _____
- 8.26 Notify the system control supervisor that the unit is on line. _____

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CAUTION FUEL CONDITIONING MAY BE LIMITING AND WILL
PREVAIL OVER TURBINE CAPABILITY.

NOTE: Maintain T_{avg} in accordance with turbine load (T. Ref.).

NOTE: Advance valve position limiter as required to avoid governor tracking errors throughout remainder of power increase.

- 8.27 Transfer EH control to "imp in." _____
- 8.28 Transfer steam dump control from "man" (header pressure) to "auto" (T_{avg}), and adjust steam dump controller (HC-484) to a set pressure of 1005 psig. _____
- 8.29 Transfer steam generator feed from the bypass valves to the main feed regulating valves in manual. Place main feed regulating valves in "auto" as soon as load permits. _____
- 8.30 Slowly raise power and stabilize turbine load, reactor power and T_{avg} at approximately 15%. _____
- 8.31 Verify 2 of 2 "TURBINE POWER P-7" bistable status lights are lit. _____
- 8.32 Transfer the rod control system to "auto." _____
- 8.33 Increase electrical load slowly, ensuring primary systems following properly in automatic. CL-1C details turbine loading times. _____
- 8.34 As power is increased, adjust steam generator blowdown heat exchanger condensate outlet temperature according to its return path (HDT or condenser) (not applicable if blowdown path is to the blowdown tank.) _____
- 8.35 Ensure generator cold gas temperatures are being maintained at $<46^{\circ}\text{C}$ but $>40^{\circ}\text{C}$ with a maximum hot gas temperature rise of 64°C . _____

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NOTE: For the next step use ($\Delta T/0.56$) as indicated power on the initial startup for a fuel cycle.

8.36 When the unit is at approximately 20% power:

8.36.1 Assuming X02 in service, transfer buses A01 and A02 to X02, minimizing the time the transformers are paralleled.

8.36.2 Align X01 FOA coolers as follows:

- a. Place all three sets of "oil cooling fans with pump" into operation on each McGraw Edison X01 transformer by transferring control switch from "auto" to "manual."

***CAUTION* SIMULTANEOUS "MANUAL OPERATION" OF FOA COOLERS ON WESTINGHOUSE TRANSFORMERS IS NOT RECOMMENDED SO AS TO AVOID POTENTIAL DAMAGE BY STATIC ELECTRIFICATION.**

- b. The Westinghouse transformer 2X01-C phase should be selected to "auto."

8.36.3 Establish the nitrogen purge on each McGraw Edison X01 tank gas space (if purge system installed).

8.37 Unisolate the crossover steam dump drain bottle.

Unit 2, drain bottle No. 3

Open OS-33, OS-5937 outlet isolation

Open OS-35, ST-5965 outlet isolation

8.38 Open bypass valves OS-1&2 as soon as crossover pressure on PR-2065 is positive.

8.39 When the unit is >20% power, place the control switches for the TCSD (turbine crossover steam dump) isolation valves MOV-1&2 in the "auto" position and ensure that the valves have opened.

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8.40 Shut bypasses OS-1&2.

8.41 Close the turbine drain valves.

NOTE: *For the next step use ($\Delta T/0.56$) as indicated power on the initial startup for a fuel cycle.*

NOTE: *Bank D should be at least 170 steps withdrawn if in an initial startup following a refueling.*

8.42 At about 25% power, verify:

8.42.1 That 4 of 4 "LO POW RANGE TRIP" bistable status lights are lit.

8.42.2 That 2 of 2 "INTERM RANGE TRIP" bistable status lights are lit.

8.43 Return to OP-1C step in effect.
