ATTACHMENT 10.1

IPEC CHANGE FORM

Sheet 1 of 4

I. CHANGE FORM INITIATION

S Prussman	Lic	6694	2 & 3	4/12/08	LI208 09-02-001
INITIATOR'S NAME (print or type)	DEPARTMENT	PHONE #	UNIT	DATE	CHANGE PKG. NUMBER

DESCRIPTION OF THE CHANGE (Attach additional pages if necessary)

Unit 2 - 1.Revise TRM 3.8.B (R0) to delete reference to the GT and adding reference to the SBO / App R diesel with the necessary revisions to surveillance . 2. Revise TRM 3.7.E (R1) for the city water supply to reflect new requirments. 3. Revise TS Bases B.3.8.1R2 and B3.8.3 (R1) to delete GT 4. Revise FSAR (chaper 8, 9.2.2.4.9, 9.3.3.91.1) to delete GT and add Diesel Unit 3 - 1,Modify TRM 3.8.B (R1) to delete action associated with GT 2.Revise TS Bases B3.8.3 (R1) to reflect no GT 3. Revise FSAR (Chapt 8 and 1.3 and 16.1.3)

✓	EN-LI-100 must be completed	Copy of EN-LI-100, Attachment 9.1 must be attached
✓	Verification: verification document(s)	Copy of the cover and applicable pages of verification document(s) pertaining to the change

	DOCUMENT(s) AFFECTED (Check all below that apply.)	AFFECTED PAGES (Attach clearly marked-up copies of the affected pages.)
☐	Operating License (OL)	
☐	Technical Specifications (TS)	
☐	Environmental Protection Plan (EPP)	
☐	Anti-Trust Conditions (Appendix of OL)	
☐	NRC Orders	
☒	Updated Final Safety Analysis Report (UFSAR)	see above
☒	Technical Specification Bases (TS Bases)	see above
☒	Technical Requirements Manual (TRM) (including TRM Bases)	see above
☐	Quality Assurance Program Manual (QAPM)	
☐	Security Plan	
☐	Emergency Plan (EP)	
☐	Offsite Dose Calculation Manual (ODCM)	
☐	Spent Fuel Storage Cask Final safety Analysis Report (CFSAR)	
☐	Spent Fuel Storage Cask CoC Bases	
☐	10CFR72.212 Evaluation Report (212 Report)	
☐	Fire Protection Program (FPP)/Fire Hazards Analysis (FHA)	
☐	Core Operating Limits Report (COLR)	
☐	Other (Specify):	

EC 50000 33794 ECN 5980
ATT. 7.48 PAGE 1 OF 7

METHOD ALLOWING THE CHANGE

- ☒ 10 CFR 50.59 Review: Screen or Evaluation (Attach a copy)
- ☐ 10 CFR 50.54 Evaluation (Attach a copy)
- ☐ Environmental Evaluation (Attach a copy)
- ☐ Approved NRC Change or NRC SER (Attach a copy or reference NRC letter number)
- ☐ NRC Approval is Required (Notify Licensing)
- ☐ Administrative / Editorial Change (LBDs controlled under 50.59 or 72.48, only [except the UFSAR])
- ☐ Other Approval (Attach a copy of any other approval or supporting documents)
- ☐ "FSAR-only" Change (NEI 98-03)

Check applicable boxes below:

Checking the Box is adequate - these items do not require a basis.

- ☐ Reformatting
- ☐ Replaced Detailed Drawing
- ☐ Referenced other Documents

A Check the appropriate box below and provide removal basis for removing the information.

- ☐ Removing Excessive Detail
- ☐ Removing Obsolete Information
- ☐ Removing Redundant Information
- ☐ Removing Commitments

Removal Basis (attach additional sheets if needed):

The basis for the changes are in the screen for the mod. We are adding the U2 SBO / App R diesel and removing the GT from service. Ancillary to this is the use of the CWST for for the initial cooling of the diesel and a TRM explains how water is used and how level is maintained based on a mod. Changes are all mod driven. EC 5000033794

DOES THE CHANGE REQUIRE IMPLEMENTATION ACTIONS?			
	☐	YES	ENTER ACTIONS INTO SECTION II.
	☒	NO	DISCARD SECTION II AND PROCEED TO SECTION III.

EC 5000033794 ECN 5980
ATT. 7.48 PAGE 2 OF 7

II. CHANGE IMPLEMENTATION

REQUIRED ACTIONS SUPPORTING IMPLEMENTATION			
LBD SECTION	ACTION	RESP. DEPT	ACTION TAKEN / TRACKING INITIATED RESPONSIBLE DEPT (Signed, telecom, or electronic)
None - this is a modification which will cover all actions to be taken.			

EC50000337794 ECN5980
ATT. 7.48 PAGE 3 OF 7

ATTACHMENT 10.1 **IPEC CHANGE FORM**

Sheet 4 of 4

III. REVIEW AND APPROVAL

CHANGE TYPE: ☒ FSAR ☒ TRM ☒ TS Bases

CERTIFICATION

"The attached change was prepared using all appropriate sources of information. I certify that this input is, to the best of my knowledge, accurate and complete and the changes have been either declared an "operable" part of the plant, or is "effective", and these changes are now part of the Current Licensing Basis and approved plant configuration and design."

S Prussman — 6694
(Print) **Preparer of Update** — **Department & Phone Extension**

(Sign) **Preparer of Update** — 4-12-08 **Date**

REVIEW

"I have reviewed the attached Update Change, verification and supporting documents. To the best of my knowledge, this input is accurate and complete."

Note: Attach additional pages if more signatures are needed. N/A if no engineering review is needed. See Section 6.4 for instructions on review and concurrence.

NA (covered by SE and DE) — Date
(Print/Sign) Section Reviewer

ERIC ANDERSEN / Godwin Ubaechi — 4/24/08
DE (elect, civil, mech) / Richard Drake (Civil) — 4/24/08
(Print/Sign) Design Engineer — Date

SE (Elec, primary, support) — 4/24/08
(Print/Sign) System Engineer — Date

Operations ~~Manager~~ Ken Scarano — 4/24/08
(Print/Sign) Operations Department — Date

NA — Date
(Print/Sign) "OTHER" Engineer or Department

Licensing Manager Robert Walpole — 4/24/08
(Print/Sign) Preparer's Supervisor or Assigned Manager — Date

REVIEW AND APPROVAL OF OTHER LBDCR		
DEPARTMENT (Applicable Reviews & Approvals; see Attachment 10.2)	**APPROVED**	**DATE**
LBD Owner (Add rows as needed)	(Signed, telecom, or electronic)	
see EN Form		

EC 5000033794 ECN 5980
ATT. 7.48 PAGE 4 OF 7

Specific Document Information				Document Required For:		
Drawing Number	ECN No if applicable	EC Rev.	Title / Description	INST.	RTS	PRTS
175856 ECN5877	ECN 5877	1	21.5 MW Gas Turbine & Generator Arrangement of Conduit	☒	☐	☒
175858 ECN5888	ECN-5888	1	Conduit Schedule Gas Turbine & Auxiliaries	☒	☐	☒
175859 ECN5888	ECN-5888	1	Unit 1 Cable Schedule Gas Turbine & Auxiliaries	☒	☐	☒
175864		0	Block Diagram Gas Turbine Installation	☐	☐	☒
176463		0	One Line Diagram for Gas Turbine	☐	☒	☐
177659 ECN5888	ECN-5888	1	Unit #1, Construction Details of Splice Boxes 4A & 4B (2 Sheets)	☒	☐	☒
~~179692~~		~~0~~	~~Indian Point Substation, Simplified Schematic for Installation of Startup Transformer for IP2 and Startup Transformer for IP 3 Relay Protection~~	☐	☒	☐
208377 ECN5980	~~ECN-4444~~ ECN5980	0	Main One Line Diagram	☐	☒	☐
208671	ECN-4596		Installation of lighting in the Service Water Valve Pit	☒	☐	☒
225649		0	IP2 Conduit Layout T/G & Heater Bays	☒	☐	☒
~~226821~~	ECN4444	~~1~~	~~Indian Point #1, 13.8 KV Swgr, L & P Aux Bus Section Views (2 sheets)~~	☒	☐	☒
231592		0	6900 VAC One Line Diagram	☐	☒	☐
250907 ECN5980	~~ECN-4444~~ ECN5980	1	Elect Distribution & Transmission System, UFSAR Fig. 8.2-1, 8.2-2	☐	☒	☐
251796	ECN-4596	1	Expanded Maintenance Facility Lighting El/ 15'-0"	☒	☐	☒
312901		0	One Line Diagram Gas Turbine Gen. #1	☒	☒	☐
312909		0	Diag. Of Conn. Protective Relay Panel 4R - GT #1, Node EPA89	☐	☐	☒
400421	ECN-4596	1	App R Emergency Battery Lighting safe shutdown paths @ Elevation 15'	☒	☐	☒
400422	ECN-4596	1	App R Emergency Battery Lighting safe shutdown paths @ Elevation 36'	☒	☐	☒
400428	ECN-4596	1	App R Emergency Battery Lighting Safe Shutdown Paths Table	☒	☐	☒
400426	ECN-4596	1	App R Emergency Battery Lighting Safe Shutdown Paths El. 15'-0"'-0"	☒	☐	☒
400427	ECN-4596	1	App R Emergency Battery Lighting safe shutdown paths @ Elevation 36'	☒	☐	☒
400853 Sh.1 ECN6561	~~ECN5978~~ ~~ECN-5888~~ ECN 6561	1	SBO & App. R DG Set, Equipment & Raceway Layout @ El 53'-0", El 33'-0" & El 15'-0", Electrical	☒	☐	☒
400853 Sh.2	ECN-5888	1	SBO & App. R DG Set, Equipment & Raceway Layout @ El 15'-0"Electrical	☒	☐	☒
400854	~~ECN 5978~~ ECN-5888	1	Electrical Grounding and Lighting Plans	☐	☐	☒
400855-ECN5877	~~ECN 5978~~ ~~ECN-5888~~ ~~ECN 6561~~ ~~ECN 6811~~ ECN 5877	1	Diesel Generator Set Cable Block Diagram	☒	☐	☒

EC5000033794 ECN 5980
Attachment 7.48
Page 5 of 7

Specific Document Information				Document Required For:		
Drawing Number	ECN No if applicable	EC Rev.	Title / Description	INST.	RTS	PRTS
501482		1	Appendix R Diesel Generator Outline (0179-3357 Sht 1)	☐	☐	☒
501483-ECN 6561	ECN 6561	1	Appendix R Diesel Generator Outline (0179-3276 Sht 1)	☐	☐	☒
501484		1	Appendix R Diesel Generator Outline (0179-3276 Sht 2)	☐	☐	☒
501485		1	Appendix R Diesel Generator – 6.9kV Swgr. Front View (1032305001)	☐	☐	☒
501486		1	Appendix R Diesel Generator – 13.8kV Swgr. Front Elev. And Plan View (1032301001)	☐	☐	☒
501487		1	Appendix R Diesel Generator – 13.8kV Swgr. Specifications (1032301S01)	☐	☐	☒
501596 ECN5978	ECN 5978	1	LaMarche Drawing D6-138 Case Type 6 Battery Charger Mounting Details	☒	☐	☒
501597 ECN5978	ECN 5978	1	Cummins Dwg. 0416-0439 – Battery Cell 8D Outline Drawing	☒	☐	☒
501598 ECN4596	4596	1	SBO/App.R DG Seismic conduit support Detail	☒	☐	☒
501599 ECN4596	4596	1	SBO/App.R DG Seismic Bracket for EBL EL-16C	☒	☐	☒
501600 ECN4596	4596		SBO/App.R DG Seismic Bracket for EBL EL-16C	☒	☐	☒
501601 ECN4596	4596		SBO/App.R DG Seismic Bracket for EBL EL-16C			
501602 ECN4596	4596		SBO/App.R DG Seismic Bracket Anchorage Detail for EBL EL-16C	☒	☐	☒
501607 ECN5888	ECN 5888	1	SBO/App.R DG Installation of cable splice in Box 4A	☒	☐	☒
501608 ECN5888	ECN 5888	1	SBO/App.R DG Bill of Material for cable splice in Box 4A	☒	☐	☒
501609 ECN5888	ECN 5888	1	SBO/App.R DG Removal of cable splice in Box 3A	☒	☐	☒
501610 ECN5888	ECN 5888	1	SBO/App.R DG Installation of cable splice in Box 3A	☒	☐	☒
501611 ECN5888	ECN 5888	1	SBO/App.R DG Bill of Material for cable splice in Box 3A	☒	☐	☒
501612 ECN5888	ECN 5888	1	SBO/App.R DG Removal of cable splice in Box 4A	☒	☐	☒
501616-ECN 6561	ECN 6561	1	Low coolant probe jacket water surge tank	☒	☐	☒
501617-ECN 6561	ECN 6561	1	Low coolant probe cable harness jacket water surge tank	☒	☐	☒
501618-ECN 6561	ECN 6561	1	Wiring Diagram engine and alternator heaters	☒	☐	☒
9321-F-33853 ECN 5980	ECN 5980	1	Electrical Distribution and Transmission System (IP3)	☐	☒	☐

EC5000033794, Revision 1

Attachment 9.1 – Return To Service Form (RTSF) – Operations Section (Cont'd)

Essential Operations Documents Revised and Issued

Document / Revision	Revised?
2-AOI-27.1 9.2, Providing Appendix R Power from Unit 3	Y
2-AOP-138KV-1, Loss of Power to 6.9KV Bus 5 and/or 6	Y
2-AOP-SSD-1, Control Room Inaccessibility Safe Shutdown Control	Y
2-ARP-1FAF, Unit 1 Flight Panel	Y
2-ONOP-FP-1, Plant Fires	Y
2-COL-27.6, Unit 2 Appendix R Diesel Generator / Revision 0	Y
2-ECA-0.0, Loss of All AC	Y
2-PT-V053C, Mode Change Checklist, Mode 5 to Mode 4	Y
2-PT-V053D, Mode Change Checklist, Mode 4 to Mode 3	Y
2-PT-V053E, Mode Change Checklist, Mode 3 to Mode 2	Y
2-PT-W019, Electrical Verification, Offsite Power Sources and AC Distribution	Y
2-PT-W023, Appendix "R" Diesel Support System Inspection / Revision 0	Y
2-PT-M110, Appendix "R" DG Functional Test / Revision 0	Y
2-SOP-27.1.3, Operation of 13.8KV System	Y
2-SOP-27.1.4, 6900 Volt System	Y
2-OSP-27.6, Support Procedure – Unit 2 Appendix R Diesel Generator Operation / Revision 0	Y
2-SOP-27.6, Unit 2 Appendix R Diesel Generator Operation / Revision 0	Y
3-ONOP-FP-1, Plant Fires	Y
3-PT-W019, Electrical Verification, Offsite Power Sources and AC Distribution	Y
2-COL-27.1.11, Lighting System and Emergency Lighting	Y

EC5000033794 ECN5980
ATTACHMENT 7.4-8
PAGE 1 OF 1

3.7 PLANT SYSTEMS

3.7.E City Water Supply

TRO 3.7.E City water shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. City Water Storage Tank inoperable.	A.1 Restore City Water Storage Tank to OPERABLE status.	12 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Declare the SBO / Appendix R Diesel inoperable	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.E.1	Verify City Water Storage Tank maintains a water level of >655,000 gallons	12 hours
SR 3.7.E.23	Verify City Water Storage Tank valves to required loads are operable	90 days
SR 3.7.E.4	Verfiy altitude valve and city water makeup valves are operable	90 days
SR 3.7.E.5	Perform channel Calibration of City Water Storage Tank level monitoring instruments and Automatic fill instruments	24 months

B 3..7 PLANT SYSTEMS

B 3.7.E City Water Supply

BASES

BACKGROUND

Two City water supply headers provide a water supply for both Unit 2 and Unit 3. One city water header supplies the City Water Storage Tank (CWST) through a fill valve, meter and a second fill valve. A second City water supply header provides water to the Unit 3 fire water storage tank. The CWST provides a protected water inventory because the continued supply of city water from offsite can not be guaranteed.

APPLICABLE SAFETY ANALYSES

The CWST is 42' high and is continually providing a water supply for normal plant uses while maintaining a reserve of water for postulated plant events. The events are Unit 2 Appendix R requirements, Unit 2 SBO requirements, Unit 2 fire fighting, Unit 2 CST backup and redundancy for the Unit 3 CST in the event of its loss (e.g., due to a Tornado missile). The following events are considered simultaneously for the Unit 2 Appendix R fire and their requirements constitute the need for a bounding reserve of 655,000 gallons based on the following:

1. Cooling of the Unit 2 SBO / Appendix R diesel for a Unit 2 Appendix R event – The Appendix R / SBO diesel is a water cooled engine. The engine cooling water requirement is 205 gpm. The CWST provides the engine cooling water for the entire SBO event. However, this event is not postulated simultaneously with an App R event. For an App R event, the CWST protected inventory has been established to provide a minimum of 4 hours supply of cooling water to the engine (this requires 50,000 gallons of reserve). Engine cooling can be transferred to Service Water supply, as required, for the balance of the App R event (see TRM for SBO / App. R diesel).

2. Fire Fighting Water Supply – The plant is committed to having a dedicated water inventory of 300,000 gallons for fire fighting.

3. The city water tank is credited as a backup for fire induced opening of CST drain valves and must supply 215,000 gallons over 30 hours for safe shutdown.

4. Alternate CCW usage of 125 gpm must be supplied for four hours until service water is lined up. This requires 30,000 gallons of protected inventory.

5. Coincident users assumed to be provided water at 500 gpm for two hours (this requires switchover to SW for the SBO / Appendix R diesel in two hours) based on historical usage of water. This requires 60,000 gallons of protected inventory.

The CWST provides for a redundant water supply of 360,000 gallons for the Unit 3 CST (See requirements of Unit 3 TS 3.7.7). A tornado missile was not postulated to result in a loss of the Unit 3 CST as well as the Unit 2 SBO event but the reserve of 655,000 is adequate to meet this event since the 655,000 gallons includes 300,000 gallons of Unit 2 fire water and 215,000 gallons of Unit 2 CST backup water for an Appendix R event. The CWST provides the backup water supply for Unit 3 for a fire induced opening of CST drain valves while fire fighting is provided for by the Unit 3 fire water tanks. An Appendix R event is not postulated for two units at the same time. Neither is a SBO event.

LCO

The CSWT must contain a reserve of >655,000 gallons to assure that Unit 2 and 3 postulated events are certain to have an adequate protected inventory of water.

APPLICABILITY

In MODES 1, 2, 3, 4 the identified events can occur and require the CWST protected inventory to be available. The CWST is not required by this TRM in MODE 5 or 6 for any postulated event.

ACTIONS

A.1

With the CWST <655,000 gallons the CWST is considered inoperable and there are 12 hours to restore the water level. This is a reasonable period of time given that restoration involves the isolation of non essential water usage to allow the city water fill line to restore the required level.

B.1 and B.2

With the CWST not restored to the required water level in 12 hours, the potential exists for the inability to provide the necessary water for Unit 2 & 3 licensing basis events. The declaration of the SBO / Appendix R diesel inoperable initiates the actions in TRM 3.8.B. The declaration of the CWST tank inoperable initiates the actions of Unit 3 TS 3.7.7.

SURVEILLANCE REQUIREMENTS

SR 3.7.E.1

This SR verifies that the CWST level requirements are met. The time frame is considered reasonable to assure that an adequate protected water inventory is maintained, and is on the same periodicity as the Unit 3 TS 3.7.7 surveillance of water pressure and Unit 3 TS 3.7.6 Surveillance of the CST.

SR 3.7.E.2

The CWST supplies water to the Unit 2 Appendix R / SBO diesel heat exchangers, the CST, the alternate CCW, and the fire header. The supplies to the CST, CCW and fire header are preexisting requirements of the fire protection system and valves are tested as required by that program. The supply valves to the Appendix R / SBO

diesel are required to be verified operable to ensure they function when required.
SR 3.7.E.3

Testing of the function of the altitude valves is verification that the valves all work as intended to assure continued water makeup. This can be by observation of the refill function.

SR 3.7.E.5

The instrumentation necessary to initiate the refill of the CWST by opening the city water valves has to be calibrated to verify that the instrumentation loop is operable and capable of maintaining the city water in the band identified in the Referenced modification. The instrumentation necessary for operations to verify the CWST level is within the required value must be calibrated to assure sufficient accuracy.

REFERENCES 1. EC 5000033794

3.8 ELECTRICAL POWER

3.8.B SBO / Appendix R Diesel Generator and Electrical Distribution System

TRO 3.8.B The SBO / Appendix R Diesel Generator and Electrical Distribution System shall be OPERABLE

APPLICABILITY: MODES 1, 2, 3 and 4

----------NOTES----------
1: Portions of the electrical distribution system are also governed by Technical Specification 3.8.
2: TRO 3.0.D is not applicable.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SBO / Appendix R diesel generator is inoperable.	A.1 Restore the Appendix R diesel generator to OPERABLE status. OR A.2 Establish an independent power supply	7 days
B. Required Actions and Completion Times of A not met.	B.1 Be in MODE 3 AND B.3 Be in MODE 4 AND B.2 Be in MODE 5.	6 hours 12 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
TRS 3.8.B.1	Verify the fuel oil storage tank contains $\geq$ 12,500 gallons of usable fuel oil reserved for the diesel.	7 days
TRS 3.8.B.2	Visually inspect the SBO / Appendix R diesel generator support systems, including the closed cooling water system temperature, battery and battery charger.	7 days
TRS 3.8.B.3	Verify individual battery voltage >= 12V	31 days
TRS 3.8.B.4	Verify the battery charger output voltage >= 24V and output current <= 2Amps	31 days

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
TRS 3.8.B.5	Start and run the SBO / Appendix R diesel generator for a period of time sufficient to reach stable operating temperatures. Demonstrate proper operation of the output breaker.	92 days
TRS 3.8.B.6	Sample and analyze fuel oil for the SBO / Appendix R Diesel to ensure applicable standards are met.	184 days
TRS 3.8.B.7	Start the SBO / Appendix R diesel generator, load it between 2335 to 2435 kW, and run for at least 2 hours.	24 months
TRS 3.8.B.8	DEMONSTRATE the ability to line up and provide power from the SBO / Appendix R diesel to the App R Bus loads, to the SBO Bus loads, and to Unit 3 SBO diesel bus loads.	24 months
TRS 3.8.B.9	DEMONSTRATE the governor circuitry operates properly in unit.	24 months

BASES

BACKGROUND

10CFR50 Appendix R requires that alternative or dedicated shutdown capability provided for a specific fire area shall be able to achieve and maintain subcritical reactivity conditions in the reactor, maintain reactor coolant inventory, achieve and maintain hot standby conditions, achieve cold shutdown within 72 hours and maintain cold shutdown conditions thereafter. 10 CFR 50.63 requires the plant to be able to withstand a station blackout (SBO), as defined in 10 CFR 50.2, using an alternate AC power supply. IP2 elected to install a SBO / Appendix R diesel generator and associated switchgear necessary to achieve and maintain cold shutdown conditions independent of the normal safeguards and instrumentation power supplies and to function as the alternate ac power supply operated from outside the Control Room.

APPLICABLE SAFETY ANALYSIS

The Indian Point Unit 2 alternative shutdown capability consists of an arrangement of 6.9KV and 480V ac switchgear, 480V ac motor control centers, power cables, 480V ac power transfer switches, 120V ac distribution panels, instrument isolation and power cabinets, local instrument indication cabinets and associated instrument cables designed to provide an alternative safe shutdown capability. The Appendix R diesel power system is designed to be independent and sufficiently isolated from the existing emergency power system to ensure the availability of power to the safe shutdown pumps and instruments of concern in the event of fires.

The SBO / Appendix R Diesel also supports compliance with Station Blackout (SBO) rule. The new alternate AC power supply meets the criteria (Reference 1) because the power supply and distribution is protected from severe weather (shielded by structures or buried), support services (e.g., air and DC) are independent, it is well in excess of the approximately 2,072 KW identified in the SBO SER (Reference 2), system reliability will be maintained at 0.95 using NSAC-108 methodology, and the unit is capable of being started and loaded within one hour. It is not required to be started from the Control Room to meet this.

The output of the generator is connected to the SBO/APP. R 13.8 kV Switchgear bus via circuit breaker SBO/ASS, located at the DG Breaker Switchgear. The SBO/APP. R 13.8 kV Switchgear section has two feeder circuit breakers, ASS for alternate safe shutdown and SBOH for station blackout. The ASS breaker feeds the existing Unit No. 1, 13.8 kV L&P Bus Section 3 through breaker B3-3 in order to provide power to Alternate Safe Shutdown System loads through transformers to 440 volt switchgear 12FD3 and 12RW3. These loads consist of:

- One charging pump (#23)
- One component cooling water pump (#23)
- One service water pump (#23 or 24)
- One channel of essential process monitoring instrumentation
- One RHR pump (through post-fire repairs)
- One Auxiliary Feedwater pump (#21)

The SBOH breaker feeds the SBO transformer (13.8 kV - 6.9 kV, 3750 KVA transformer), that in turn feeds the 6.9 kV Busses 5 and 6 via the SBOL circuit breaker. Breaker OSP is to provide 13.8 kV alternate offsite power (second source) to the station via the autotransformer.

Supporting services for this on-site ac power source are provided independent of the supporting equipment used by the three emergency diesel generators (e.g., cooling water, DC power, starting air, ventilation and fuel oil).

TRO

The SBO / Appendix R diesel generator must be operable to provide an independent source of power to alternate safe shutdown pumps and instrumentation as well as SBO equipment and instrumentation. An OPERABLE SBO / Appendix R diesel generator consists of the diesel generator, support equipment such as starting batteries, fuel

oil, cooling water, as well as the electrical distribution system.

APPLICABILITY

10CFR50 Appendix R requires that one train of equipment necessary to achieve MODE 3 from either the control room or emergency control station(s) must be maintained free of fire damage by a single fire including an exposure fire. With the Appendix R diesel or its electrical distribution system inoperable, this condition cannot be met for specific fires. The SBO events are postulated during plant operations and coping studies are performed for conditions at power. Therefore the LCO requirements for Appendix R are controlling. Therefore the SBO / Appendix R diesel is required prior to going above MODE 5.

This Technical Requirement allows changes in operating MODE while relying on Required Actions. Allowance of this exception to TRO 3.0.D is based on the low probability of an event requiring the use of such systems and reasoning that such systems can generally be repaired during plant operation without a significant risk of a spurious plant trip.

ACTIONS

A.. With the Appendix R diesel and/or the associated equipment required line-up to the 13.8 kV Bus inoperable, these systems must be restored to OPERABLE status within 7 days or an independent power supply meeting current requirements must be made available. The allowable Outage Time (AOT) is the same as the AOT approved by the NRC for compliance with SBO / App R prior to TS relocation. The focus of this TRM is to establish actions to ensure the operability of the SBO / Appendix R diesel generator and electrical distribution system is maintained in accordance with the bounds of the IP2 license.

B If the requirements of Conditions A, B, C are not met within the allowed outage time, then compliance with 10CFR50 Appendix R and 10 CFR 50.63 are not met. The plant must be placed in a condition where these requirements are not applicable and therefore the plant must be placed in MODE 5. The time requirement of 6 hours for MODE 3, 12 hours for Mode 4 and 36 hours for MODE 5 is selected to be consistent with the NRC requirements previously approved for gas turbines and found in the prior revision of this TRM.

SURVEILLANCE REQUIREMENTS

TRS 3.8.B.1 The Appendix R diesel uses 172 gallons of fuel per hour when loaded at peak capacity. The Appendix R event requires the Apendix R Diesel to run for 72 hours. Therefore there must be $\geq$ 12,500 gallons of usable fuel in the tank dedicated to the diesel. This fuel is normally supplied from the storage tank in Unit 1 Turbine Building. Other fuel oil may be credited where adequate time to refuel exists.

TRS 3.8.B.2 Inspect the SBO / Appendix R diesel generator support systems, including check of the diesel fuel oil level and the closed cooling water system temperature. This surveillance is consistent with industry practice. When the battery is checked it should be looked at for unacceptable signs such as cracking, bulging, corrosion, leakage, or an electrolyte level not above the plates.

TRS 3.8.B.3 This Surveillance verifies the batteries are maintained at 12 V. The capability of the batteries to perform a function is established when they are used to start the SBO / Appendix R diesel every quarter.

TRS 3.8.B.4 This surveillance establishes that the battery charger is operating at the required parameters to support the battery.

TRS 3.8.B.5 Start and run the SBO / Appendix R diesel generator for a period of time sufficient to reach stable operating temperatures. DEMONSTRATE the proper operation of the output breaker. Starting and bringing the SBO / Appendix R diesel to operating conditions on a quarterly frequency is consistent with the Alternate AC Power Criteria identified in Appendix B section of NUMARC 87-00, "Guidelines and Technical Bases For NUMARC Initiatives."

TRS 3.8.B.6 The surveillance to sample and analyze fuel oil from dedicated bulk storage according to applicable standards meets the Alternate AC Power Criteria identified in Appendix B section B8(c) of NUMARC 87-00, "Guidelines and Technical Bases For NUMARC Initiatives." The frequency of once per 6 months is deemed sufficient.

TRS 3.8.B.7 Start the SBO / Appendix R diesel generator, line it up and load it between 2335 to 2435 kW, and run for at least 2 hours. Starting and loading the Appendix R diesel to rated capacity on a refueling frequency is consistent with the Alternate AC Power Criteria identified in Appendix B section B10 of NUMARC 87-00, "Guidelines and Technical Bases For NUMARC Initiatives."

TRS 3.8.B.8 DEMONSTRATE the ability to line up and provide power within 60 minutes from the SBO / Appendix R diesel to the Appendix R loads and SBO loads. This includes lineup through either the ASS breaker to the 12 FD3 and 12 RW3 switchgear or the SBOH breaker to the SBO 13.8kV – 6.9kV transformer to breaker SBOL and then the SBO /APP switchgear. These demonstrations may be made through a combination of tests and simulated actions. The time to identify the necessity for the SBO / Appendix R diesel must be estimated and then the time to initiate actions to line up and provide power must be demonstrated. For the Appendix R event, the demonstration must include the ability to transfer from the cooling water of the CWST to the service water cooling. This transfer must be demonstrated to be made within two hours to assure adequate city water (see Reference 3). DEMONSTRATE the ability to line up and provide power to the Unit 3 Appendix R diesel loads. This demonstrates the ability to provide backup power. This demonstration may be made through a combination of tests and simulated actions.

TRS 3.8.B.9 Start the SBO / Appendix R diesel and operate in unit to test the circuitry of the governor and its ability to control the SBO / Appendix R diesel. This recognizes the separate circuitry in this mode.

References:

1. NUMARC 87-00,"Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors," Appendix B
2. NRC letter of November 21, 1991 regarding Safety Evaluation of SBO Response (TAC M68556)
3. EC 5000033794, "IP2 Station Blackout and Appendix R Diesel Generator Set"

3.8 ELECTRICAL POWER

3.8.B Gas Turbines

TRO 3.8.B At least one gas turbine generator (GT-1, GT-2 or GT-3) and associated switchgear and breakers shall be operable; and

A minimum of 94,870 gallons of fuel for the operable gas turbine shall be available.

APPLICABILITY: At all times

NOTES

1. Portions of the electrical distribution system are also governed by Technical Specification 3.8.
2. Gas Turbine 2 (GT-2) is out-of-service and is not expected to be returned to service.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. All three gas turbines are not operable.	A.1 Restore at least one gas turbine and associated switchgear and breakers to OPERABLE status, OR A.2 Establish an alternate independent power system.	7 Days 7 Days
B. A minimum of 94,870 gallons of fuel for an OPERABLE gas turbine is not available.	B.1 Provide a minimum of 94,870 gallons of fuel, OR B.2 Establish an alternate independent power system.	7 Days 7 Days
C. Required Actions and Completion Times of A OR B not met.	C.1 Be in MODE 3, AND C.2 Be in MODE 4, AND C.3 Be in MODE 5.	6 Hours 12 Hours 36 Hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
TRS 3.8.B.1	Start one gas turbine and synchronize it to the power distribution system for a minimum of thirty (30) minutes with a minimum electric output of 2000kW.	31 days
TRS 3.8.B.2	Verify the minimum gas turbine fuel volume of 94,870 gallons is available and document in the plant log.	Weekly

3.8 ELECTRICAL POWER

B3.8.B Gas turbines

BASES

Electrical power can be provided to Indian Point from any of three gas turbine generators. Several power flow paths exist to connect gas turbine power to the plant, either through various switching arrangements of 13.8kV and 6.9kV underground feeders, or through combinations of 13.8kV underground feeders, transformations up through the Buchanan 138kV, and through either of the two 138kV overhead feeders. Maximum flexibility of routing is provided by inter-ties at the Buchanan substation (138kV and 13.8kV buses) and at the Indian Point site (138kV site switchyard and gas turbine substation 6.9kV bus tie). One of these gas turbine generators is located at the Indian Point site (GT-1) and two are located at the Buchanan Substation (GT2, GT-3).

The gas turbines are credited for providing an alternate source of electrical power to Indian Point Unit 2 in the event of a Station Blackout, or in the event of a loss of offsite power during an Appendix R fire scenario. They can also be connected to provide alternate power to Indian Point Unit 3

The fuel supply for the gas turbines consists of two onsite 30,000-gallon fuel oil tanks and a 200,000-gallon storage tank located at the Buchanan substation site. A minimum of 94,870 gallons of fuel is maintained available and dedicated for the required gas turbine. This minimum fuel inventory will conservatively assure at least three (3) days of operation of a gas turbine generator. Commercial oil supplies and trucking facilities exist to ensure deliveries of additional fuel within one day's notice.

The surveillance requirements are designed to assure that at least one gas turbine will be available to provide power for operation of equipment, if required. Since the Indian Point Unit 2 alternate safe-shutdown power supply system demands a maximum electrical load of approximately 1600 kW, the required minimum test load of 2000kW will demonstrate adequate capability.

References:

1. Unit 2 UFSAR 1.2.2.4
2. Unit 2 UFSAR 8.1
3. Unit 2 UFSAR 8.2
4. Unit 2 UFSAR 8.5
5. Unit 2 UFSAR 9.2.2.4.9
6. Unit 2 UFSAR 9.3.3.1.1

Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available in sufficient time following a loss of all onsite alternating current power supplies and the other offsite electric power circuit, to assure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits shall be designed to be available within a few seconds following a loss-of-coolant accident to assure that the core cooling, containment integrity, and other vital safety functions are maintained.

Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.

Independent alternate power systems are provided with adequate capacity and testability to supply the required engineered safety features and protection systems.

The plant is supplied with normal, standby, and emergency power sources as follows:

1. The normal source of auxiliary power for 6.9-kV buses 1, 2, 3, and 4 during plant operation is the unit auxiliary transformer, which is connected to the main generator via the iso-phase bus.

2. The normal source of auxiliary power for 6.9-kV buses 5 and 6 and standby power required during plant startup, shutdown, and after reactor trip is the station auxiliary transformer, which is supplied from the Con Edison 138-kV system by either of two separate overhead lines from the Buchanan substation approximately 0.5 mile from the plant. Alternate feeds from the Buchanan 13.8-kV system are also available for immediate manual connection to the auxiliary buses. ~~In addition, three gas turbines with blackstart (no auxiliary power) capability are available. These gas turbines may also be used to "bootstrap" the unit back to power operation following a loss of the Con Edison grid. The capacities of these gas turbine generators require that the station load be reduced to a minimum during startup.~~

3. Three diesel-generator sets supply emergency power to the engineered safety features buses in the event of a loss of AC auxiliary power. There are no automatic bus ties associated with these buses. ~~The three gas turbines discussed in item 2 may also serve to supply emergency shutdown power.~~The SBO / Appendix R emergency diesel-generator is installed in Unit 1 Turbine Building may also be used to supply power for Appendix R fires and a Station Blackout.

4. Power for vital instrumentation and controls and for emergency lighting is supplied from the four 125-V DC systems. The station batteries supply

Failure of a single inverter or its static transfer to switch will not cause the loss of a basic protective system or prevent the actuation of the minimum safeguards devices.

Several sources of offsite power are available to Indian Point Unit 2. These consist of two 138-kV overhead supplies from the Buchanan 138-kV substation, and three separate underground feeders from the Buchanan 13.8-kV substation~~, and three 13.8-kV gas turbines (one of which is located on-site)~~. The 13.8-kV line is rated 19.8 MVA at 13-kV. The 13.8/6.9-kV transformer is rated 20 MVA. The maximum engineered safety feature and safe shutdown loads are 9.2 MVA. No safety or emergency power is required from these sources for the retired Indian Point Unit 1.

The Buchanan 138-kV substation supply to Indian Point Unit 2 has two connections to the Millwood 138-kV substation, a connection to the Peekskill Refuse Burning Generating Station and a connection via auto-transformer to the Buchanan North 345-kV substation. The Indian Point Unit 2 345-kV connection to the system goes to the Buchanan North 345-kV substation, which has connections to Ramapo and Eastview 345-kV substations. System stability studies show that the system is stable for the loss of any generating unit including Indian Point Unit 2.

Each 138-kV overhead tie line can provide offsite power to Indian Point 2 via the station auxiliary transformer. The loss of this transformer would interrupt the 138-kV supply to the station. For this reason, an alternate 13.8/6.9-kV supply is provided.

An additional sources of offsite power from the 13.8-kV distribution system at Buchanan ~~and an independent power supply from the onsite gas turbine (Unit 1) installation are~~ is available to 6.9-kV buses 5 and 6 through supply breakers GT-25 and GT-26. The transfer from the normal to the reserve supply (or vice versa) must be accomplished manually.

~~Three (3) gas turbine generators are directly available to the Indian Point site. One gas turbine generator is more than adequate to provide an additional contingency of backup electrical power for maintaining the plant in a safe shutdown condition.~~

~~Gas turbine Unit 1 is located adjacent to the Unit 1 turbine building. The position indication and controls for breakers GT-25 and GT-26 are located on a panel in the Central Control Room.~~

~~Gas turbine Units 2 and 3 are located at the Buchanan substation. Either of these gas turbines can supply power to the Unit 2 auxiliary electrical system through the Buchanan 13.8-kV distribution system connections or through the 138-kV tie lines.~~

Each of these circuits is designed to be available in sufficient time following a loss of all onsite AC power supplies and other offsite electric power circuits, to ensure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. The 138-kV system is designed to be available instantaneously following a loss-of-coolant accident to ensure that core cooling, containment integrity, and other vital safety functions are maintained. This is accomplished by a "dead-fast" transfer scheme that uses stored energy breakers to transfer the auxiliaries on the four 6.9-kV buses supplied by the unit auxiliary transformer to the station auxiliary transformer, which is supplied from the 138-kV system. However, when buses 5 and 6 are supplied from the alternate 13.8-kV supply, the "dead fast" transfer scheme is defeated by manual action to protect the 13.8-kV-6.9-kV transformer.

The diversity and redundancy inherent in the combination of ~~onsite/~~offsite electrical systems minimize the probability of losing electric power from any of the remaining sources as a result

4. Letter from Con Edison to the Nuclear Regulatory Commission, Subject: Station Blackout Rule, dated April 14,1989.

5. Letter from Con Edison to the Nuclear Regulatory Commission, Subject: Station Blackout Rule, dated March 27,1990.

6. Letter from Con Edison to the Nuclear Regulatory Commission, Subject: Station Blackout Rule, dated October 22, 1993.

7. Letter from Con Edison to the Nuclear Regulatory Commission, Subject: Station Blackout Rule, dated November 30,1993.

8. Letter from Francis J. Williams, U.S. Nuclear Regulatory Commission, to Stephen B. Bram, Con Edison, Subject: Safety Evaluation of the Indian Point Nuclear Generating Unit No.2, Response to the Station Blackout Rule (TAC No. M68556), dated November 21, 1991.

9. Letter from Con Edison to the Nuclear Regulatory Commission, Subject: Station Blackout Rule, dated December 23, 1991.

8.2 ELECTRICAL SYSTEM DESIGN

8.2.1 Network Interconnections

Con Edison's external transmission system provides two basic functions for the nuclear generating station: (1) it provides auxiliary power as required for startup and normal shutdown and (2) it transmits the output power of the station.

Electrical energy generated at 22-kV is raised to 345-kV by the two main transformers. Power is delivered to the system via a 345-kV overhead tie line routed between the main transformers and the 345-kV North Ring Bus at Buchanan Substation. The North Ring Bus is configured with three circuit breakers rated 362-kV, 3000A, 40/63kA. Two of these breakers have synchronizing capability to connect the main generator to the system. The North Ring Bus is also connected to Ramapo and Eastview Substations via overhead transmission circuits and to the Buchanan 138-kV Substation via a 335/138-kV auto-transformer.

The electrical one-line diagram for the Indian Point Station is presented in Plant Drawing 250907 [Formerly UFSAR Figure 8.2-1]. Standby power is supplied to the station from the Buchanan 138-kV Substation, which has two connections to the Millwood 138-kV Substation, one connection to the Peekskill Refuse Burner, and one connection to the Buchanan 345-kV Substation via an auto-transformer. ~~In addition, gas turbine power can be provided to Indian Point Unit 2 from any of the three gas turbines.~~ Several power flow paths exist to connect ~~gas turbine power to the plant, either thru various switching arrangements of 13.8-kV and 6.9-kV underground feeders, or thru combinations of 13.8-kV underground feeders, transformations up through the Buchanan 138-kV, and thru either of the two 138-kV overhead feeders. Maximum flexibility of routing is provided by inter-ties at the Buchanan substation (138-kV and~~ 13.8-kV buses~~) and at the Indian Point site (138-kV site switchyard and gas turbine substation 6.9-kV bus tie). One of these gas turbine generators is located at the Indian Point site and two are located at the Buchanan Substation.~~ through 13.8/6.9 kV autotransformers to Buses 1 and 6.

A single-line diagram showing the connections of the main generator to the power system grid and standby power source is shown in ~~Plant Drawing 250907 [Formerly UFSAR Figure 8.2-2]~~.

8.2.1.1 Reliability Assurance

Two~~hree~~ external sources of standby power are available to Indian Point Unit 2. They are the 138-kV tie from the Buchanan 345-kV substation, and the 138-kV Buchanan-Millwood ties~~, and the gas turbine generators.~~ Loss of any ~~two~~ of these sources will not affect the other ~~third~~. Substantial flexibility and alternate paths exist within each source.

The 138-kV supply from the Buchanan substation with its connections to the Con Edison 345-kV system provides a dependable source of station auxiliary power. Upon loss of 345/138-kV auto-transformer supply at Buchanan, two 138-kV ties are designed to provide additional auxiliary power from the Millwood 138-kV substation. A further guarantee of reliable auxiliary power, independent of transmission system connections, is provided by the SBO / Appendix R Diesel for the Appendix R fire or a loss of all AC (station blackout). ~~three gas turbine generators, one installed at the plant site and two (2) at Buchanan. At least one gas turbine generator (GT-1, GT-2 or GT-3) and~~ The SBO / Appendix R diesel, associated switchgear and breakers shall be operable at all times as required by the TRM. ~~A~~ The minimum ~~of 94,870 gallons~~ quantity of fuel for the SBO / Appendix R Diesel to operate for 72 hours ~~operable gas turbine~~ shall be available at all times the diesel is considered operable. Support systems for cooling include the City Water Storage Tank and the Service 'water System (first the city water and then a switch to SW). If these requirements cannot be met, then the diesel is considered inoperable and the TRM requirments are followed. ~~then, within the next seven (7) days, either the inoperable condition shall be corrected or an alternate independent power system shall be established. Additionally, if these requirements cannot be satisfied, the reactor shall be placed in the hot shutdown condition utilizing normal operating procedures. If these requirements cannot be met within an additional 48 hours, the reactor shall be placed in the cold shutdown condition utilizing normal operating procedures.~~ These requirements for the ~~gas turbines ensure that the gas turbines~~ SBO / Appendix R Diesel are in the TRM to assure ~~can provide~~ an alternate backup power source in case of loss of onsite emergency power and concurrent loss of offsite power. ~~as well as required auxiliary power for alternate safe shutdown systems equipment.~~

The fuel supply f~~or gas turbines~~ consists of two onsite 30,000-gal fuel oil tanks and a 200,000-gal storage tank located at the Buchanan substation site. A minimum amount of ~~94,870 gal~~ of fuel is maintained available and dedicated for the SBO / Appendix R Diesel ~~required gas turbine~~. This minimum fuel inventory ensures that ~~one gas turbine~~ SBO / Appendix R Diesel will be capable of supplying the maximum electrical load for the Indian Point Unit 2 alternate safe shutdown power supply system (i.e., 1600kW) for at least 3 days. Commercial oil supplies and trucking facilities exist to ensure deliveries of additional fuel within one day's notice.

In the event of the loss of the Indian Point Unit 2 138-kV supply (the primary preferred offsite supply), the Indian Point Unit 2 13.8/6.9-kV supply is manually connected to 6.9-kV buses 5 and 6. The capacity of this supply is limited and is not capable of supplying full plant load. However, the 13.8-6.9-kV supply is capable of supplying the normal load on buses 5 and 6 and is also capable of supplying all 480-V safeguards and safe shutdown loads. The "dead-fast" transfer of 6.9-kV buses 1, 2, 3, and 4 is prevented by manual action when buses 5 and 6 are supplied from the 13.8/6.9-kV supply.

lines are kept as far apart as physically possible or are protected by heavy (0.24 in.) metal plates interposed where inherent missile protection could not be provided by spacing.

In 1989, the NRC approved changes to the design basis with respect to dynamic effects of postulated primary loop ruptures, as discussed in Section 4.1.2.4.

In those areas where the compressed instrument air system is near the essential 480-V switchgear, the following provisions have been incorporated to shield this essential switchgear and cabling from potential missiles or pipe whip:

1. The compressed instrument air lines in the vicinity of the switchgear are supported at the piping bends. This will resist any step loading of PA (which could occur in the event of an instantaneous circumferential rupture) without occurrence of a "plastic hinge." The possibility of pipe whip is eliminated.

2. A guard cover is supplied around the air compressor flywheel. This cover is designed to absorb the translational kinetic energy associated with a compressor flywheel missile.

3. A guard barrier is supplied adjacent to the compression chamber of the air compressor. This barrier is designed to absorb the kinetic energy associated with a compression chamber segment.

These provisions ensure that no missile or whipping pipe originating from postulated failures in the compressed instrument air system will strike the essential switchgear.

8.2.3 Emergency Power

8.2.3.1 Source Descriptions

The ~~three~~ sources of offsite emergency power are: (1) the Con Edison 345-kV system and (2) Con Edison's 138-kV system ~~and (3) the licensee's gas turbines~~. The emergency diesel-generator sets provide three sources of onsite emergency power. Each set is an Alco Model 16-251-E engine coupled to a Westinghouse 900 rpm, 3-phase, 60-cycle, 480-V generator. The units have a capability of 1750 kW (continuous), 2300 kW for 1/2 hour in any 24 hour period, and 2100 kW for 2 hours in any 24 hour period. There is a sequential limitation whereby it is unacceptable to operate EDG's for two hours at 2100 kW followed by operating at 2300 kW for a half hour. Any other combination of the above ratings is acceptable.

Any two units, backups to the normal standby AC power supply, are capable of sequentially starting and supplying the power requirement of ~~at least~~ one complete set of safeguards equipment. The units are installed in a seismic Class I structure located near the Primary Auxiliary Building.

Each emergency diesel is automatically started by two redundant air motors, each unit having a complete 53-ft^3 air storage tank and compressor system powered by a 480-V motor. The piping and the electrical services are arranged so that manual transfer between units is possible. The capability exists to cross-connect a single EDG air compressor to more than one (1) EDG air receiver, via manual air tie valves. However, to ensure that the operability of two (2) of the three (3) EDGs is maintained for minimum safeguards in the event of a single failure, administrative controls are in-place to require an operator to be stationed within the EDG Building, whenever

low level is detected in the day tank for diesel generator 21, transfer pump 21 will automatically start to refill the tank to approximately 158 gal. If pump 21 fails to refill the day tank, transfer pump 22 will receive an automatic starting signal as a backup to the primary pump. In a similar manner, transfer pump 22 receives an automatic starting signal on low level in the day tank for diesel 22 and is backed up by transfer pump 23. Transfer pump 23 starts on low level in the day tank for diesel generator 23 and is backed up by transfer pump 21.

Each diesel oil transfer pump stops automatically when 15.5-in. of oil remains in the associated underground tank which equates to a maximum of approximately 7000-gal of available fuel oil per tank. A minimum fuel storage of 19,000 gal (i.e., approximately 6340 gal per tank) is maintained in the three underground storage tanks.

The 19,000 gal of storage ensures that two diesels can operate for at least 73 hours at the maximum load profile permitted by the diesels' ratings. If one of the three storage tanks is not available, there is sufficient fuel oil to run two diesels at the maximum load profile for at least 45 hours. Similarly, if three diesels are available, there is sufficient fuel oil in the three storage tanks for at least 45 hours of operation at the maximum load profile. These values are based on the use of No. 2 diesel fuel oil at the lowest density of 6.87 lb/gal and engine fuel oil consumption rates based on operating at each load rating. For heavier oil, the time would be increased proportionally to the ratio of 6.87 lb/gal and the actual fuel density. An upper limit of 7.39 lb/gal is common for No. 2 diesel oil.

Additional fuel oil suitable for the diesel engines is stored on the site ~~for gas turbine GT-1~~ and at Buchanan substation. ~~for gas turbines GT-2 and GT-3.~~ A minimum additional storage of 29,000 gal is maintained in the storage tanks dedicated for diesel-generator use. This storage is sufficient for operation of two diesels for at least 111 hours at the maximum load profile permitted by the diesels' ratings. As previously mentioned (Section 8.2.1), commercial oil supplies and trucking facilities exist to ensure deliveries on one day's notice.

The basis for the minimum total required fuel oil quantity of 48,000 gallons is to provide for operation of two diesel generators for 7 days. The specified minimum quantity of fuel oil is based on operation of two diesel generators for 7 days at the maximum load profile permitted by the diesel generator rating. Each diesel is rated for operation for 0.5 hours of operation out of any 24 hours at 2300 kW plus 2.0 hours of operation out of any 24 hours at 2100 kW with the remaining 21.5 hours of operation of any twenty four hours at 1750 kW. Operation of the diesel generators at the maximum load profile ratings bounds the postulated accident load profile. If one EDG storage tank or transfer pump is unavailable, the remaining tanks or pumps with the additional 29,000 gallons of fuel oil can operate two diesels at the maximum load profile permitted by the diesel generator rating for at least 160 hours.

8.2.3.3 Emergency Diesel Generator Separation

The emergency diesel generators are located in a sheet metal, steel-framed building immediately South of the Primary Auxiliary Building. The diesel generators are arranged parallel to each other on 13-ft centers, with approximately 10 ft of clear space between engine components. The engine foundations are surrounded by a 1 foot-high concrete curb containing sufficient volume to hold all the lube-oil or fuel released from a single engine in the event of an inadvertent spill or line break.

Diesel generator separation and fire protection features necessary to meet the criteria of 10 CFR 50.48 are described in the document under separate cover entitled, "IP2 Fire Hazards

4. Letter from Steven A. Varga, NRC, to John D. O'Toole, Consolidated Edison, "Confirmatory Order", dated December 1, 1982.

5. "Emergency Diesel Generator Loading Study for Indian Point Unit 2," WCAP-12655 (Non-Proprietary Class 3), Rev. June 2002.

6. Letter from Westinghouse to Entergy, IPP-03-187, "EDG Load Study Reconciliation," November 13, 2003.

TABLE 8.2-1
Deleted

TABLE 8.2-2
Diesel Generator Loads

LOAD	D.G. 21 (BUS 5A)	D.G 22 (BUS 2A-3A)	D.G. 23 (BUS 6A)
1. Auxiliary component cooling pumps	1		1
2. Safety injection pumps	1	1	1
3. Residual heat removal pumps		1	1
4. Nuclear service water pumps	1	1	1
5. Containment air recirculation cooling fans	2	2	1
6. Auxiliary feedwater pumps		1	1
7. Spray pumps (if start signal present)	1		1

TABLES 8.2-3 & 8.2-4
Deleted

8.2 FIGURES

Figure No.	Title
Figure 8.2-1	Electrical One-Line Diagram, Replaced with Plant Drawing 250907
Figure 8.2-2	Electrical Power System Diagram, Replaced with Plant Drawing 250907
Figure 8.2-3	Main One-Line Diagram, Replaced with Plant Drawing 208377
Figure 8.2-4	345-KV Installation at Buchanan
Figure 8.2-5	6900-V One-Line Diagram, Replaced with Plant Drawing 231592
Figure 8.2-6	480-V One-Line Diagram, Replaced with Plant Drawing 208088
Figure 8.2-7	Single Line Diagram 480-V Motor Control Centers 21, 22, 23,25, 25A, Replaced with Plant Drawing 9321-3004
Figure 8.2-7a	Single Line Diagram - 480-V Motor Control Centers 24 and 24A, Replaced with Plant Drawing 249956
Figure 8.2-8	Single Line Diagram - 480-V Motor Control Centers 27 and 27A, Replaced with Plant Drawing 9321-3005
Figure 8.2-9	Single Line Diagram - 480-V Motor Control Centers 28 and 210, Replaced with Plant Drawing 208507
Figure 8.2-9a	Single Line Diagram - 480-V Motor Control Centers 29 and 29A, Replaced with Plant Drawing 249955

Figure 8.2-10	Single Line Diagram - 480-V Motor Control Centers 28A and 211, Replaced with Plant Drawing 208241
Figure 8.2-11	Single Line Diagram - 480-V Motor Control Centers 26A and 26B, Replaced with Plant Drawing 9321-3006
Figure 8.2-11a	Single Line Diagram - 480-V Motor Control Center 26C, Replaced with Plant Drawing 248513
Figure 8.2-12	Single Line Diagram - 480-V Motor Control Centers 26AA and 26BB and 120-V AC Panels No. 1 and 2, Replaced with Plant Drawing 208500
Figure 8.2-13	Single Line Diagram - 118-VAC Instrument Buses No. 21 thru 24, Replaced with Plant Drawing 208502
Figure 8.2-14	Single Line Diagram - 118-VAC Instrument Buses No. 21A thru 24A, Replaced with Plant Drawing 208503
Figure 8.2-15	Single Line Diagram - DC System Distribution Panels No. 21, 21A, 21B, 22, and 22A, Replaced with Plant Drawing 208501
Figure 8.2-16	Single Line Diagram - DC System Power Panels No. 21 thru 24, Replaced with Plant Drawing 9321-3008
Figure 8.2-17	Single Line Diagram of Unit Safeguard Channeling and Control Train Development, Replaced with Plant Drawing 208376
Figure 8.2-18	Cable Tray Separations, Functions, and Routing, Replaced with Plant Drawing 208761

8.3 ALTERNATE SHUTDOWN SYSTEM

The Indian Point Unit 2 alternate safe shutdown system provides the necessary functions to maintain the plant in a safe shutdown condition following a fire that damages the capability to power and control essential equipment from normal and emergency Indian Point Unit 2 sources.

In the unlikely event of a major fire or other external event affecting redundant cabling or equipment in certain areas, electrical power could be disrupted to safe shutdown components and systems. However, following the unlikely loss of normal and preferred alternate power, additional independent and separate power supplies from the Indian Point Unit 1 440-V switchgear are provided for a number of safe shutdown components. An independent SBO/APP. R diesel-generator is provided to power the Unit 1 440-V switchgear in the unlikely event of loss of offsite power to Unit 1 switchgear. In addition, there is provision to cross-connect the Unit 3 SBO / Appendix R DG to the Unit 2 alternative shutdown loads; and Unit 2 SBO/APP. R DG to Unit 3 alternative shutdown loads. The Indian Point 2 SBO/App. R diesel generator set is manufactured by Cummins Power Generation, with a rating of 2700 kW (Standby Rating), 13.8 kV, 3 Phase, 60 Hertz, 1800 RPM, for operation on diesel fuel. The output of the generator is connected to SBO/APP. R 13.8 kV Switchgear bus via circuit breaker SBO/ASS, located at DG Breaker Switchgear. The SBO/APP. R 13.8 kV Switchgear section has two feeder circuit breakers, ASS and SBOH. The ASS breaker feeds the existing Unit No. 1, 13.8 kV L&P Bus Section 1 in order to provide power to Alternate Safe Shutdown System loads. The SBOH breaker feeds a 13.8 kV - 6.9 kV, 3750 KVA transformer SBO, that in turn feeds the 6.9 kV section of the SBO/APP Switchgear via SBOL circuit breaker. In addition, there is provision to cross-connect the Unit 3 SBO / Appendix R DG to the Unit 2 alternative shutdown loads; and Unit 2 SBO/APP. R DG to Unit 3 alternative shutdown loads.

The SBO/App. R diesel generator and associated switchgear, fuel supply and breakers shall be operable and tested in accordance with the TRM.

A detailed description of the alternate safe shutdown system including its functions, components, and operation is provided in the document under separate cover entitled, "IP2 10 CFR 50, Appendix R Safe Shutdown Separation Analysis."

8.3 FIGURES

Figure No.	Title
Figure 8.3-1	Deleted

8.4 MINIMUM OPERATING CONDITIONS

The electrical system is designed such that no single contingency can inactivate enough safeguards equipment to jeopardize plant safety. The minimum operating conditions define those conditions of electrical power availability necessary (1) to provide for safe reactor operation and (2) to provide for the continuing availability of engineered safety features. The facility Technical Specifications, Section 3.8, include minimum operating conditions covering the following plant conditions:

1. Minimum electrical conditions for reactor criticality.
2. Minimum electrical conditions during power operation.

8.5 TESTS AND INSPECTIONS

Emergency Diesel generators are tested in accordance with technical specification requirements. The tests specified are designed to demonstrate that the emergency diesel generators will provide power for the operation of equipment. They also ensure that the emergency generator system controls and the control systems for safeguards equipment will function automatically in the event of a loss of all normal 480-V AC station service power.

The testing frequency specified is often enough to identify and correct deficiencies in systems under test before they can result in a system failure. The fuel supply and starting circuits and controls are continuously monitored and any faults are alarm indicated. An abnormal condition in these systems would be signaled without having to place the emergency diesel generators on test.

The Emergency Diesel Generators will be inspected in accordance with a licensee controlled maintenance program. The maintenance program will require inspection in accordance with the manufacturer's recommendation for this class of standby service. Changes to the maintenance program will be controlled under 10 CFR 50.64.

Station batteries will deteriorate with time, but precipitous failure is extremely unlikely. The surveillance specified is that which has been demonstrated over the years to provide an indication of a cell becoming unserviceable long before it fails. The periodic voltage and specific gravity measurements will ensure that the ampere-hour capability of the batteries is maintained.

The 'refueling interval' load test for each battery, together with the visual inspection of the plates, will assure the continued integrity of the batteries. The batteries are of the type that can be visually inspected, and this method of assuring the continued integrity of the battery is proven standard power plant practice.

~~At monthly intervals, at least one gas turbine~~ The SBO / Appendix R Diesel and support systems shall be tested and have surveillances in accordance with the TRM. ~~started and synchronized to the power distribution system for a minimum of thirty (30) minutes with a minimum electric output of 2000kW. At weekly intervals, the minimum gas turbine fuel volume 94,870 gallons shall be verified to be available and shall be documented in the plant log.~~ These tests and surveillances are designed to assure that the SBO / Appendix R diesel ~~at least one gas turbine~~ will be available to provide power for operation of equipment, if required. ~~Since the Indian Point 2 alternate safe-shutdown power supply system demands a maximum electrical load of approximately 1600 kW, the required minimum test load will demonstrate adequate capability.~~

~~In addition, the required minimum gas turbine fuel oil storage volume of 94,870 gallons will conservatively assure at least three (3) days of operation of a gas turbine generator.~~

~~The specified test frequencies for the gas turbine generator(s) and associated fuel supply will be adequate to identify and correct any mechanical or electrical deficiency before it can result in a component malfunction or failure.~~

leak to the outside atmosphere. Pump leakage is piped to the drain header for disposal. The pump design prevents lubricating oil from contaminating the charging flow, and the integral discharge valves act as check valves.

Each pump is designed to provide the normal charging flow and the reactor coolant pump seal water supply during normal seal leakage. Each pump is designed to provide flow against a pressure equal to the sum of the reactor coolant system normal maximum pressure (existing when the pressurizer power-operated relief valve is operating) and the piping, valve and equipment pressure losses at the charging flows. During normal operation, 8 gpm seal injection enters each reactor coolant pump in the thermal barrier region where the flow splits, with 3 gpm flowing upward through the controlled leakage seal package and returning to the chemical and volume control system. The remaining 5 gpm passes through the thermal barrier heat exchanger and into the reactor coolant system where it constitutes a portion of the reactor coolant system water makeup. In the event that normal seal cooling is lost, the component cooling water system provides adequate seal cooling by supplying flow to the thermal barrier heat exchanger.

Seal injection flow is indicated locally and in the central control room.

An alternate power supply is provided for one of the charging pumps from the 13.8-kV normal offsite power through Unit 1 switchgear. If normal offsite power is not available, this pump can be energized using ~~any of the three available gas turbines~~ the SBO Appendix R diesel.

Any one of the three charging pumps can be used to hydrotest the reactor coolant system.

A low-pressure tank (dampener) is installed in the suction line, and a high-pressure tank is installed in the discharge line on each charging pump in order to eliminate pulsation that could potentially cause cavitation at the charging pump suction or root weld cracks on the discharge piping.

9.2.2.4.10 Chemical Mixing Tank

The primary use of the stainless steel chemical mixing tank is to prepare caustic solutions for pH control and hydrazine for oxygen scavenging. The capacity of the chemical mixing tank is more than sufficient to prepare a solution of pH control chemical for the reactor coolant system.

9.2.2.4.11 Excess Letdown Heat Exchanger

The excess letdown heat exchanger cools reactor coolant letdown flow if letdown through the normal letdown path is blocked. The letdown stream flows through the tube side and component cooling water is circulated through the shell side. All surfaces in contact with reactor coolant are austenitic stainless steel and the shell is carbon steel. All tube joints are welded. The unit is designed to withstand 2000 step changes in the tube fluid temperature from 60°F to the cold-leg temperature.

9.2.2.4.12 Seal-Water Heat Exchanger

The seal-water heat exchanger removes heat from two sources; reactor coolant pump seal-water returning to the volume control tank and reactor coolant discharge from the excess letdown heat exchanger. Reactor coolant flows through the tubes and component cooling water

An alternate power supply is also provided for one of the component cooling water pumps from the 13.8-kV normal offsite power through Unit 1 switchgear. If normal offsite power is not available, this pump can be energized using ~~any of the three available gas turbines~~ the SBO/Appendix R diesel. During the recirculation phase following a loss-of-coolant accident, one of the three component cooling water pumps is required to deliver flow to the shell side of one of the residual heat exchangers.

9.3.3.1.2 Residual Heat Removal Loop

Two pumps and two heat exchangers are utilized to remove residual and sensible heat during plant cooldown. If one of the pumps and/or one of the heat exchangers is not operable, safe operation is governed by Technical Specifications and safe shutdown of the plant is not affected; however, the time for cooldown is extended. The function of this equipment following a loss-of-coolant accident is discussed in Section 6.2.

Alternate power can be supplied to one residual heat removal pump from the 13.8-kV normal outside power through Unit 1 switchgear.

The time to cool down using the [redacted] safe shutdown components (1 RHR pump and heat exchanger, 1 component cooling pump, and 1 service water pump supplying flow to non-essential header) has been determined [redacted]. Conditions assumed were an initial core power of 102% of 3216 MW and service water temperature of 95°F. The analysis shows that the RCS can be brought to the cold shutdown mode (temperature less than 200°F) within 72 hours.

9.3.3.1.3 Spent Fuel Pit Cooling Loop

This manually controlled loop may be shut down safely for time periods, as shown in Section 9.3.3.2.3, for maintenance or replacement of malfunctioning components.

9.3.3.2 Leakage Provisions

9.3.3.2.1 Component Cooling Loop

Water leakage from piping, valves, and equipment in the system inside the containment is not considered to be generally detrimental unless the leakage exceeds the makeup capability. With respect to water leakage from piping, valves, and equipment outside the containment, welded construction is used where possible to minimize the possibility of leakage. The component cooling water could become contaminated with radioactive water due to a leak in any heat exchanger tube in the chemical and volume control, the sampling, or the auxiliary coolant systems, or a leak in the thermal barrier cooling coil for the reactor coolant pumps.

Tube or coil leaks in components being cooled would be detected during normal plant operations by the leak detection system described in Sections 4.2.7 and 6.7. Such leaks are also detected at any time by a radiation monitor that samples the component cooling pump discharge downstream of the component cooling heat exchangers.

Leakage from the component cooling loop can be detected by a falling level in the component cooling surge tank. The rate of water level fall and the area of the water surface in the tank permit determination of the leakage rate. To assure accurate determinations, the operator would check that temperatures are stable.

BASES

BACKGROUND (continued)

For the 13.8 kV offsite circuit, there is a 13.8 kV/6.9 kV auto-transformer associated with feeder 13W92 and a 13.8 kV/6.9 kV auto-transformer associated with feeder 13W93. Feeder 13W92 and its associated auto-transformer is the preferred feeder for the IP2 13.8 kV circuit and the backup feeder for the IP3 13.8 kV circuit. Feeder 13W93 and its associated auto-transformer is the backup feeder for the IP2 13.8 kV circuit and the preferred feeder for the IP3 13.8 kV circuit.

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the transformer supplying offsite power to the onsite Distribution System. Within 1 minute after the initiating signal is received, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are returned to service via individual load timers associated with each large load.

~~In addition, gas turbine power can be provided to IP2 via the 13.8 kV circuit from any of the three gas turbines. One of these gas turbine-generators is located at the Indian Point site and two are located near the Buchanan substation. These gas turbines cannot be used to satisfy requirements for a qualified offsite circuit.~~

ONSITE SOURCES

The onsite standby power source consists of three 480 V diesel generators (DGs) with a separate DG dedicated to each of the safeguards power trains. Safeguards power train 5A (480 V bus 5A) is supported by DG 21; safeguards power train 6A (480 V bus 6A) is supported by DG 23; and, safeguards power train 2A/3A (480 V buses 2A and 3A) is supported by DG 22. A DG starts automatically on a safety injection (SI) signal or on an ESF bus degraded voltage or undervoltage signal (refer to LCO 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"). After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ESF bus 5A or 6A undervoltage or degraded voltage, coincident with an SI signal or unit trip. The DGs will also start and operate in the standby mode without tying to the ESF bus on an SI signal alone. Following the trip of offsite power, an undervoltage signal strips nonpermanent loads from the ESF bus. When the DG is tied to the ESF bus, loads are then sequentially connected to its respective ESF bus by individual load timers. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading the DG by automatic load application.

BASES

LCO

Two qualified circuits between the offsite transmission network and the onsite Electrical Power System and separate and independent DGs for each train ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Qualified offsite circuits are those that are described in the UFSAR and are part of the licensing basis for the unit. In addition, required individual load timers for ESF loads must be OPERABLE unless associated with equipment that has automatic initiation capability disabled.

Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ESF buses.

There are two qualified circuits from the transmission network at the Buchanan substation to the onsite electric distribution system. Each of these circuits must be supported by a circuit from the offsite network into the Buchanan substation that is physically independent from the other circuit to the extent practical. The circuits into the Buchanan substation that satisfy these requirements are 96951, 96952 and 95891. ~~Neither the~~ The 138 kV connection to Buchanan substation from the Westchester Refuse Energy Services Company (RESCO) plant ~~nor any of the 13.8 kV gas turbines located at the Buchanan substation or the IP2 site~~ may not be used to satisfy requirements for a circuit from the offsite network into the Buchanan substation.

The 138 kV offsite circuit consists of the following:

a. Either 138 kV feeder 95332 (the preferred feeder for IP2 and the backup feeder for IP3) or 138 kV feeder 95331 (the backup feeder for IP2 and the preferred feeder for IP3);

b. The 138 kV/6.9 kV station auxiliary transformer including the automatic tap changer, circuit breakers ST5 and ST6 which supply 6.9 kV buses 5 and 6, and

c. The following components which are common to both the 138 kV and 13.8 kV offsite circuits:

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil and Starting Air

BASES

BACKGROUND

Fuel oil for the three safeguards DGs is stored in the three DG fuel oil storage tanks (one tank associated with each DG) and the common DG fuel oil reserve.

The three DG fuel oil storage tanks are required to contain a minimum of 19,000 usable gallons (6334 gallons in the tank associated with each DG) to ensure that at least two of the three diesels can operate for at least 73 hours at the maximum load profile permitted by the diesels ratings. If the oil in one of the DG storage tanks is not available, there is sufficient fuel available to run two diesels for 45 hours at the maximum load profile permitted by the diesels ratings.

The DG fuel oil reserve is an additional 29,000 gallons of diesel fuel that is maintained in onsite storage tanks for the exclusive use of Indian Point 2 as described in UFSAR Section 8.2 (Ref. 1). This additional 29,000 gallons of diesel fuel is sufficient for operation of two diesels for an additional 111 hours at the maximum load profile permitted by the diesels ratings.

The basis for a minimum volume of diesel fuel oil of 48,000 gallons (i.e. 6334 usable gallons in each of the three DG fuel oil storage tanks and 29,000 gallons in the DG fuel oil reserve) is sufficient to operate two diesels for at least 168 hours at the maximum load profile permitted by the diesels ratings. If only two of the three DG fuel oil storage tanks are available, the total remaining fuel oil in storage is sufficient to provide for operation of two DGs at the maximum load profile permitted by the diesels ratings for a period of at least 160 hours. This volume of fuel oil is sufficient because commercial oil supplies and trucking facilities exist to ensure fuel oil deliveries within one day.

Note that the operators of Indian Point 2 are responsible for maintaining the reserve that is designated for Indian Point 3 use only as specified in the Indian Point 3 Technical Specifications at the location specified in the Indian Point 3 UFSAR. The DG fuel oil designated for Indian Point 3 is subject to the same sampling and testing requirements as the DG fuel oil designated for Indian Point 2. Indian Point 2 is responsible for promptly informing Indian Point 3 of the results of the periodic verification of DG fuel oil volume and the results of required DG sampling and testing.

BASES

BACKGROUND (Continued)

Each of the three DG fuel oil storage tanks is provided with a motor-driven transfer pump mounted in a manhole opening above oil level. This pump is used to transfer fuel oil from the storage tank to the 175 gallon day tank supporting each DG. A decrease in day tank level to approximately 115 gallons (65%) will start the transfer pump in the corresponding DG fuel oil storage tank and run until the day tank is at approximately 158 gallons (90%). This process ensures that the day tank always contains sufficient fuel to support approximately 53 minutes of DG operation. If pump 21 fails to refill its associated day tank, transfer pump 22 will receive an automatic starting signal as a backup to the primary pump. In a similar manner, transfer pump 22 receives an automatic starting signal on low level in the day tank for diesel 22 and is backed up by transfer pump 23. Transfer pump 23 starts on low level in the day tank for diesel generator 23 and is backed up by transfer pump 21.

If the DGs require fuel oil from the fuel oil reserve tank(s), the fuel oil will be transported by truck to the DG fuel oil storage tanks. A truck with appropriate hose connections and capable of transporting oil is available either on site or at the Buchanan Substation. Commercial oil supplies and trucking facilities are also available in the vicinity of the plant.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide 1.137 (Ref. 2) addresses the recommended fuel oil practices as supplemented by ANSI N195 (Ref. 4). The fuel oil properties governed by these SRs are the water and sediment content, the viscosity, specific gravity (or API gravity), and impurity level. Requirements for DG fuel oil testing methodology, frequency, and acceptance criteria are maintained in the program required by Technical Specification 5.5.11, Diesel Fuel Oil Testing Program.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Administrative controls ensure that the combination of the lube oil in the engine oil sump and maintained in onsite storage is sufficient to support 7 days of continuous operation of all three DGs. This supply is sufficient to allow operators to replenish the lube oil from offsite sources.

BASES

BACKGROUND (continued)

Each emergency diesel is automatically started by two redundant air motors. Each DG has a 53-ft^3 air storage tank and compressor system powered by a 480-V motor. The piping and the electrical services are arranged so that manual transfer between units is possible. The capability exists to cross-connect a single DG air compressor to more than one DG air receiver, via manual air tie valves. However, to ensure that the OPERABILITY of two of the three DGs is maintained in the event of a single failure, administrative controls are in-place to require an operator to be stationed within the DG Building, whenever any of the starting air tie valves are opened. Each air receiver has sufficient storage for four normal starts. However, all starting air will be consumed during a failed start attempt.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 14 (Ref. 3), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, Reactor Coolant System and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

Since diesel fuel oil and the air start subsystem support the operation of the standby AC power sources, they satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The basis for a minimum volume of diesel fuel oil of 48,000 gallons (i.e. 6334 usable gallons in each of the three DG fuel oil storage tanks and 29,000 gallons in the DG fuel oil reserve) is to provide for operation at the maximum load profile permitted by the diesels ratings for a period of at least 168 hours. If only two of the three DG fuel oil storage tanks are available, the total remaining fuel oil in storage is sufficient to provide for operation of two DGs at the maximum load profile permitted by the diesels ratings for a period of at least 160 hours. It is also required to meet specific standards for quality. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an anticipated operational occurrence (AOO) or a postulated DBA with loss of offsite power.

BASES

LCO (Continued)

In MODES 5 and 6, LCO requirements for DG fuel oil are relaxed in recognition that reduced DG loading required to respond to events in MODES 5 and 6 significantly reduces the amount of fuel oil required in the DG fuel oil storage tanks. Therefore, the LCO requires a total of 6334 gallons of fuel oil in the tanks associated with the DGs that are required to be OPERABLE. This fuel may be stored in one tank associated with an OPERABLE DG or proportioned between the tanks associated with OPERABLE DGs. DG day tank fuel requirements, as well as transfer capability from the storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources - Operating," and LCO 3.8.2, "AC Sources - Shutdown."

The starting air system is required to have a minimum capacity for four successive normal DG starts without recharging the air start receivers.

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Since stored diesel fuel oil and the starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil and starting air are required to be within limits when the associated DG is required to be OPERABLE.

ACTIONS

The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each DG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DG subsystem. Complying with the Required Actions for one inoperable DG subsystem may allow for continued operation, and subsequent inoperable DG subsystem(s) are governed by separate Condition entry and application of associated Required Actions.

A.1

In this Condition, the requirements of SR 3.8.3.2.a are not met for one or more DG fuel oil storage tanks. This means that replenishment of DG fuel oil from the reserve storage tanks will be needed in less time than assumed in the UFSAR (Ref. 1). Therefore, the DG(s) associated with the DG fuel oil storage tank(s) not within limits must be declared inoperable within 2 hours because replenishment of the DG fuel oil storage tank requires that fuel be transported from the DG fuel oil reserve by truck and the volume of fuel oil remaining in the DG fuel oil storage tank may not be sufficient to allow continuous DG operation while the fuel transfer is planned and conducted under accident conditions.

BASES
ACTIONS (continued)

This Condition is preceded by a Note stating that Condition A is applicable only in MODES 1, 2, 3 and 4. This Note provides recognition that reduced DG loading required to respond to events in MODES 5 and 6 significantly reduces the amount of fuel oil required in the DG fuel oil storage tanks when in these MODES.

B.1

In this Condition, the requirements of SR 3.8.3.2.b are not met. With less than the total required minimum fuel oil in one or more DG fuel oil storage tanks, the two DGs required to be OPERABLE in MODES 5 and 6 and during movement of recently irradiated fuel may not have sufficient fuel oil to support continuous operation while a fuel transfer from the offsite DG fuel oil reserve or from another offsite source is planned and conducted under accident conditions.

This Condition requires that all DGs be declared inoperable immediately because minimum fuel oil level requirements in SR 3.8.3.2.b is a Condition of OPERABILITY of all DGs when in the specified MODES.

This Condition is preceded by a Note stating that Condition B is applicable only in MODES 5 and 6. This Note provides recognition that reduced DG loading required to respond to events in MODES 5 and 6 significantly reduces the amount of fuel oil required in the DG fuel oil storage tanks when in these MODES.

C.1

In this Condition, the requirements of SR 3.8.3.1 are not met and the fuel oil remaining in the DG fuel oil reserve is not sufficient to operate 2 of the 3 DGs at the maximum load profile permitted by the diesels ratings for 7 days. Therefore, all 3 DGs are declared inoperable within 2 hours.

This Condition is preceded by a Note stating that Condition C is applicable only in MODES 1, 2, 3 and 4 because the DG fuel oil reserve is required to be available only in these MODES. This Note provides recognition that reduced DG loading required to respond to events in MODES 5 and 6 and when moving irradiated fuel and, therefore, significantly reduces the amount of fuel oil required when in these MODES.

BASES
ACTIONS (continued)

D.1

This Condition is entered as a result of a failure to meet the acceptance criterion for total particulate concentration of the fuel oil in the DG fuel oil storage tanks and/or the DG fuel oil reserve storage tanks is not within the allowable value in Technical Specification 5.5.11, Diesel Fuel Oil Testing Program, during periodic verifications required by SR 3.8.3.3 and SR 3.8.3.4. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The Completion Time to restore particulate levels to within required limits is 7 days for DG fuel oil storage tanks and 30 days for reserve storage tanks. These Completion Times allow for further evaluation, resampling and re-analysis of the DG fuel oil and recognize the time that may be required to restore parameters to within limits.

This Condition is preceded by a Note that clarifies that this Condition applies to the reserve fuel oil storage tanks only in MODES 1, 2, 3 and 4.

E.1

New fuel oil may be added to the DG fuel oil storage tanks or the reserve storage tanks before results of samples of this new fuel oil are available. If the properties of new fuel oil are determined not to be within the requirements established by Technical Specification 5.5.11, "Diesel Fuel Oil Testing Program," after the fuel oil has been added to the DG fuel oil storage tanks or the reserve storage tanks, then the oil in the affected storage tank(s) must be confirmed to be within the limits established by Technical Specification 5.5.11. A Completion Time of 30 days is permitted to confirm and/or restore the DG fuel oil storage tanks to within the limits of Technical Specification 5.5.11. A Completion Time of 60 days is permitted to confirm and/or restore the DG fuel oil reserve tanks to within the limits of Technical Specification 5.5.11.

BASES
ACTIONS (continued)

This Condition is preceded by a Note that clarifies that this Condition applies to the reserve fuel oil storage tanks only in MODES 1, 2, 3 and 4.

For the DG fuel oil storage tanks, this period provides sufficient time to test the stored fuel oil to determine that the new fuel oil, when mixed with previously stored fuel oil, remains acceptable, or to restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or combinations of these procedures. Even if a DG start and load was required during this time interval and the fuel oil properties were outside limits, there is a high likelihood that the DG would still be capable of performing its intended function.

For the DG fuel oil reserve, the properties of the fuel oil in the offsite reserve must be maintained within the limits established by Technical Specification 5.5.11, Diesel Fuel Oil Testing Program, because fuel oil from the offsite DG fuel oil reserve will be added to the DG fuel oil storage tanks within the first 48 hours following an event in conjunction with a sustained loss of offsite power. Failure to maintain the offsite DG fuel oil reserve within these limits may adversely impact DG operation of all three DGs at some point following addition of the reserves to the DG fuel oil storage tanks. Therefore, if the offsite DG fuel oil reserve is not restored to within these limits within the specified Completion Time, then all three DGs must be declared inoperable (Required Action E.1 applies to all three DGs).

Restoration of properties to within required limits may be performed by removing fuel or using the fuel in the gas turbine peaking units and replacing it with fuel within required limits or by the methods described for the DG fuel oil storage tank.

The Completion Time of 60 days for the restoration of fuel oil properties to within limits is acceptable because the DG fuel oil storage tanks contain sufficient fuel for a minimum of 48 hours DG operation at the maximum load profile permitted by the diesels ratings. The Completion Time is acceptable because there is a high likelihood that the DG would still be capable of meeting requirements for starting and endurance even if fuel oil from the DG fuel oil reserve must be added to the DG fuel oil tanks during the time interval the fuel oil properties are outside specified limits. Additionally, IP2 is located in an area where compatible fuel oil is readily available.

BASES

ACTIONS (continued)

F.1

With starting air receiver pressure < 250 psig, sufficient capacity for four successive DG start attempts does not exist. However, as long as the receiver pressure is ≥ 90 psig, there is adequate capacity for at least one normal start, and the DG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period. Entry into Condition F is not required when air receiver pressure is less than required limits while the DG is operating following a successful start.

G.1

With a Required Action and associated Completion Time not met, or one or more DG's fuel oil or starting air subsystem is not within limits for reasons other than addressed by Conditions A through F, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the DG fuel oil reserve to support 2 DGs at the maximum load profile permitted by the diesels ratings for 7 days assuming requirements for the DG fuel oil storage tanks and day tanks are met. The 7 day duration with 2 of the 3 DGs at the maximum load profile permitted by the diesels ratings is sufficient to place the unit in a safe shutdown condition and to bring in replenishment fuel from a commercial source.

This SR is modified by a Note that requires this SR to be met only when in MODES 1, 2, 3 or 4. The requirements for DG fuel oil are relaxed in recognition that in MODES 5 and 6 the reduced DG loading required to respond to events significantly reduces the amount of fuel oil required in the DG fuel oil storage tanks.

BASES
SURVEILLANCE REQUIREMENTS (continued)

The 24 hour Frequency was ~~is~~ needed because the DG fuel oil reserve is stored in fuel oil tanks that used to support the operation of gas turbine peaking units. This warrants frequent verification that required offsite DG fuel oil reserve volume is being maintained. Additionally, the DG fuel oil reserve includes oil designated for the exclusive use of Indian Point 3 and the IP3 UFSAR and the IP3 Technical Specifications require verification of the DG fuel oil reserve every 24 hours.

SR 3.8.3.2

SR 3.8.3.2.a provides verification when in MODES 1, 2, 3, and 4, that there is an adequate inventory of fuel oil in the DG fuel oil storage tanks to support at least 73 hours of operation at the maximum load profile permitted by the diesels ratings when all three DG fuel oil storage tanks are available or 45 hours of operation at the maximum load profile permitted by the diesels ratings when any two of the DG fuel oil storage tanks are available (Ref. 1). The 45 hour period of DG operation is sufficient time for a fuel transfer (from the fuel oil reserve or an offsite source) to be planned and conducted under accident conditions.

SR 3.8.3.2.b provides verification when in MODES 5 and 6 that the minimum required fuel oil for operation in these MODES is available in one or more DG fuel oil storage tanks. The minimum required volume of fuel oil takes into account the reduced DG loading required to respond to events in MODES 5 and 6 is sufficient to support the two DGs required to be operable in MODES 5 and 6 while a fuel transfer from the offsite DG fuel oil reserve or from another offsite source is planned and conducted under accident conditions.

This minimum volume required by SR 3.8.3.2.a and SR 3.8.3.2.b is the usable volume and does not include allowances for fuel not usable due to the fuel oil transfer pump cutoff switch (approximately 700 gallons). Additionally, an allowance must be made for instrument accuracy depending on the method used to determine tank volume. These adjustments must be made for each tank for SR 3.8.3.2.b if the required volume is found in more than one DG fuel oil storage tank.

The 31 day Frequency is adequate to ensure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

BASES
SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.3 and SR 3.8.3.4

SR 3.8.3.3 requires that fuel oil properties of new and stored fuel oil in the DG fuel oil storage tanks are tested and maintained in accordance with Technical Specification 5.5.11, " Diesel Fuel Oil Testing Program."

SR 3.8.3.4 requires that fuel oil properties of new and stored fuel oil in the reserve storage tank(s) are within limits specified in Technical Specification 5.5.11. SR 3.8.3.4 is modified by a Note that requires this SR to be met only when in MODES 1, 2, 3 or 4 because the fuel oil in the reserve storage tank(s) is required only when in those MODES.

These Surveillances verify that the properties of new and stored fuel oil meet the acceptance criteria established by Technical Specification 5.5.11, "Diesel Fuel Oil Testing Program." Sampling and testing requirements for the performance of diesel fuel oil testing in accordance with applicable ASTM Standards are specified in the administrative program developed to ensure that Technical Specification 5.5.11 is met.

As required by Technical Specification 5.5.11, new fuel oil is sampled prior to addition to the DG fuel oil storage tanks and stored fuel oil is periodically sampled from the DG fuel oil storage tanks. Requirements and acceptance criteria for fuel oil are divided into 3 parts as follows:

a) tests of the sample of new fuel and acceptance criteria that must be met prior to adding the new fuel to the DG fuel oil storage tanks;

b) tests of the sample of new fuel that may be completed after the fuel is added to the DG fuel oil storage tanks; and,

c) tests of the fuel oil stored in the DG fuel oil storage tanks.

These tests are a means of determining whether new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. These tests are to be conducted prior to adding the new fuel to the storage tank(s), but in no case is the time between receipt of new fuel and conducting the tests to exceed 31 days. The tests, limits, and applicable ASTM Standards are performed in accordance with the administrative program developed to ensure that Technical Specification 5.5.11 is met.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Failure to meet any of the Specification 5.5.11 limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO because the fuel oil is not added to the storage tanks.

The tests of the sample of new fuel that may be completed after the fuel is added to the DG fuel oil storage tanks must be completed within 31 days. The fuel oil is analyzed to establish that the other properties of the fuel oil meet the acceptance criteria of Technical Specification 5.5.11. The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate effect on DG operation. Failure to meet the specified acceptance criteria requires entry into Condition D and restoration of the quality of the fuel oil in the DG fuel oil storage tank within the associated Completion Time and explained in the Bases for Condition D. This Surveillance ensures the availability of high quality fuel oil for the DGs.

The periodic tests of the fuel oil stored in the DG fuel oil storage tanks verify that the length of time or conditions of storage has not degraded the fuel in a manner that could impact DG OPERABILITY. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure.

Particulate concentrations must meet the acceptance criteria of Technical Specification 5.5.11. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing.

The Frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Frequency intervals.

SR 3.8.3.5

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of four engine normal starts without recharging. However, all starting air will be consumed during a failed start attempt. The pressure specified in this SR is intended to reflect the lowest value at which the four successful starts can be accomplished.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

SR 3.8.3.6

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel storage tanks once every 31 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are consistent with Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. Unless the volume of water is sufficient that it could impact DG OPERABILITY, presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed within 7 days of performance of the Surveillance.

REFERENCES

1. UFSAR, Section 8.2.
2. Regulatory Guide 1.137.
3. UFSAR, Chapter 14.
4. ANSI N195-1976, Appendix B.

3.8 ELECTRICAL POWER

3.8.B Appendix R Diesel Generator and Electrical Distribution System

TRO 3.8.B The Appendix R Diesel Generator and Electrical Distribution System shall be OPERABLE

APPLICABILITY: MODES 1, 2, 3 and 4

----------NOTES----------

1. Portions of the electrical distribution system are also governed by Technical Specification 3.8.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Appendix R diesel generator is inoperable.	A.1 Restore the Appendix R diesel generator to OPERABLE status. OR A.2 Establish an independent power supply	30 Days
~~B. Required Actions and Completion Times of A not met.~~	~~B.1 Establish a continuous fire watch in the Cable Spreading Room and 480 V Switchgear Room,~~ ~~AND~~ ~~B.2 VERIFY the operability of 31, 32 and 33 EDGs,~~ ~~AND~~ ~~B.3 VERIFY the OPERABILITY of at least one of the Con Ed Gas Turbines capable of fast start, including the electrical line-up and fuel supply,~~ ~~AND~~ ~~B.4 Restore the Appendix R diesel generator to OPERABLE status.~~	~~Immediately~~ ~~Immediately, and Once per 12 hours thereafter.~~ ~~Immediately, and Once per 12 hours thereafter~~ ~~60 Days~~
B~~C~~. The electrical line-up from the ~~Gas Turbine~~ Switchgear to Bus 312 via Bus 5, Bus 1 and Station Service Transformer 312 is inoperable, AND The electrical line-up from the ~~Gas Turbine~~ Switchgear to Bus 312 via Bus 6, Bus 3, Station Service Transformer 313, and Bus 313 is inoperable.	B~~C~~.1 Restore either electrical line-up to OPERABLE status.	30 Days

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~C~~D. Required Actions and Completion Times of A ~~B~~ and/or B~~C~~ not met.	D.1 Be in MODE 3, AND D.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
TRS 3.8.B.1	Inspect the Appendix R diesel generator support systems, including check of the diesel fuel oil level and the closed cooling water system temperature.	7 days
TRS 3.8.B.2	Start and run the Appendix R diesel generator for a period of time sufficient to reach stable operating temperatures. DEMONSTRATE proper operation of the output breaker.	92 days
TRS 3.8.B.3.a	Measure overall voltage, each cell voltage, and the temperature and specific gravity of the pilot cells, of the Appendix R diesel generator battery.	31 days
TRS 3.8.B.3.b	Measure the specific gravity of each cell of the Appendix R diesel generator battery.	92 days
TRS 3.8.B.4	Start the Appendix R diesel generator, load it between 2400 to 2500 kW, and run for at least 2 hours.	24 Months
TRS 3.8.B.5	DEMONSTRATE the ability to line up and provide power from the Appendix R diesel via either 6.9 KV bus 5 tied to bus 1, or 6.9 KV bus 6 tied to bus 3 to 480V bus 313, to 480 V bus 312.	24 Months (alternating 6.9 Kv bus 1 and 3 line-up)
TRS 3.8.B.6	Perform battery capacity test of the Appendix R diesel generator battery.	24 Months
TRS 3.8.B.7	Sample and analyze fuel oil from the Appendix R Diesel under ground storage tank to ensure applicable standards are met.	184 days

BASES

BACKGROUND

10CFR50 Appendix R requires that alternative or dedicated shutdown capability provided for a specific fire area shall be able to, achieve and maintain subcritical reactivity conditions in the reactor, maintain reactor coolant inventory, achieve and maintain hot standby conditions, achieve cold shutdown within 72 hours and maintain cold shutdown conditions thereafter. IP3 elected to install an Appendix R diesel generator and associated switchgear necessary to achieve and maintain cold shutdown conditions independent of the normal safeguards and instrumentation power supplies.

APPLICABLE SAFETY ANALYSIS

The Indian Point Unit 3 alternative shutdown capability consists of an arrangement of 6.9KV and 480V ac switchgear, 480V ac motor control centers, power cables, 480V ac power transfer switches, 120V ac distribution panels, instrument isolation and power cabinets, local instrument indication cabinets and associated instrument cables designed to provide an alternative safe shutdown capability. The Appendix R diesel power system is designed to be independent and sufficiently isolated from the existing emergency power system to ensure the availability of power to the safe shutdown pumps and instruments of concern in the event of fires in the Control Building, Diesel Generator Buildings, Upper Electrical Tunnel, Electrical Tunnel Entrance from the Cable Spreading Room, Intake Structure, Diesel Oil Transfer Pump Pit and PAB 55' Elevation near MCC-36A & B. The Appendix "R" Diesel also supports compliance with Station Blackout (SBO).

~~NSE 98-3-092 ARDG, evaluated the Appendix R diesel generator out of service beyond the 30 day Allowed Outage Time (AOT) up to 60 days of AOT. This NSE used the NRC Generic Letter 91-18 approach for providing a reasonable assurance of safety while non-technical specification equipment is out of service. Compensating actions can be credited while timely restoration is achieved. With the Appendix R diesel out of service beyond thirty days up to sixty days, a Con Ed gas turbine electrical system is credited to be available in a timely manner to respond to an Appendix R event or a Station Blackout event. To offset the lower reliability factors of the Consolidated Edison gas turbines, it is necessary to credit other compensating actions to ensure no increase in probability of core damage above 1.0E-6. The other compensating actions include maintaining the three EDGs operable and posting continuous fire watches in portions of the control building.~~

The overall IP3 alternative shutdown capability is comprised of:

(1) On-site alternative diesel generator capable of supplying ac power to:
- One of two charging pumps (#31 or #32)
- One component cooling water pump (#32)
- One back-up service water pump (#38)
- One channel of essential process monitoring instrumentation
- One RHR pump (through post-fire repairs)
- One VC FCU (through post-fire repairs)
- One PAB exhaust fan (32)

(2) 6.9KV buses fed from the Appendix R diesel generator (i.e., bus 5 tied to bus 1 and bus 6 tied to bus 3)

(3) 480V ac switchgear 312 and 313, with MCC 312A powered from switchgear 312,

ACTIONS

A. &~~C~~B. With the Appendix R diesel and/or the required electrical line-up inoperable, these systems must be restored to OPERABLE status within 30 days. The allowable Outage Time (AOT) of 30 days is based on Standard Technical Specification 3.3.4, "Remote Shutdown System." The focus of this TRM is to establish actions to ensure the operability of the Appendix R diesel generator and electrical distribution system is maintained in accordance with the bounds of the IP3 license. This is accomplished by ensuring the operability of the Appendix R diesel generator (or independent power supply meeting the same requirements as the existing power supply~~with compensating actions for up to 60 days~~) and its electrical distribution system, or the plant is put into a cold shutdown condition. ~~The AOT of 30 days without other compensatory action is acceptable as long as the plant meets TRM 3.7.A or its required compensatory actions.~~

~~B. If the diesel is not restored within 30 days, then the Con Ed gas turbine electrical system with compensatory measures as evaluated in NSE 98-3-092 ARDG and delineated in Required Action B must be implemented immediately. Immediately is used because it is expected that before the 30 day AOT expires, the compensating actions will be in-place. The compensatory measures include verifying once per 12 hours; the OPERABILITY of all three emergency diesel generators; the operability, with fast start capability, of at least one of the Consolidated Edison gas turbines (GT-1, GT-2 or GT-3), including the required electrical line-up (i.e. feeders to the Gas Turbine Switchgear); the availability of fuel for the gas turbines; and posting a continuous fire watch in the Cable Spreading Room and 480V Switchgear Room. Requiring a shiftly (i.e. once per 12 hours) verification between the two control rooms ensures adequate awareness of equipment status and moreover each shift will maintain effective communication of the need for fast response. Fast start capability means the ability to start the gas turbine from the IP2 control room in approximately 15 minutes for an emergency start (without their normal 20-minute warm-up time). This fast start will ensure time critical tasks are performed in order to meet Appendix R or Station Blackout objectives, such as charging to the RCS within 30 minutes in order to maintain pressurizer level indication.~~

~~IP2 procedure PT-V42 demonstrated OPERABILITY of the black-start capability of their gas turbines. Note there is a memorandum of understanding (SSZ-94-01) which provides for the use of electrical supplies and connections between Indian Point 2 and Indian Point 3.~~

C.~~D.1&D.2~~ If the Appendix R diesel ~~(or not maintaining the substituted gas turbine and compensating actions under Required Action B)~~ and/or its electrical distribution system are not restored within the allowed outage time, then compliance with 10CFR50 Appendix R is considered not met and therefore the plant must be placed in MODE 5. The time requirement of 6 hours for MODE 3 and 36 hours for MODE 5 is selected to be consistent with TRO 3.0.C.

SURVEILLANCE REQUIREMENTS

TRS 3.8.B.1 Inspect the Appendix R diesel generator support systems, including check of the diesel fuel oil level and the closed cooling water system temperature. This surveillance is consistent with industry practice.

TRS 3.8.B.2 Start and run the Appendix R diesel generator for a period of time sufficient to reach stable operating temperatures. DEMONSTRATE proper operation of the output breaker. Starting and bringing the Appendix R diesel to operating conditions on a quarterly frequency is consistent with the Alternate AC Power Criteria identified in Appendix B section B10 of NUMARC 87-00, "Guidelines and Technical Bases for NUMARC Initiatives."

TRS 3.8.B.3a&b For the Appendix R diesel generator battery, measure overall voltage, each cell voltage, and specific gravity and temperature of the pilot cells on a monthly frequency. In addition, on a quarterly frequency measure the specific gravity of each cell of the Appendix R diesel generator battery. These surveillances are consistent with industry practice.

TRS 3.8.B.4 Start the Appendix R diesel generator, load it between 2400 to 2500 kW, and run for at least 2 hours. Starting and loading the Appendix R diesel to rated capacity on a refueling frequency is consistent with the Alternate AC Power Criteria identified in Appendix B section B10 of NUMARC 87-00, "Guidelines and Technical Bases For NUMARC Initiatives."

TRS 3.8.B.5 DEMONSTRATE the ability to line up and provide power from the Appendix R diesel to either 6.9 KV bus 1 and 480 V bus 312 or 6.9 KV bus 3 and 480 V bus 312. This ensures the ability for power transfer from either bus.

TRS 3.8.B.6 Perform a battery capacity test of the Appendix R diesel generator battery. This test ensures that the capacity of the batteries is maintained and is consistent with industry practice. The frequency of once per 24 months is deemed sufficient.

TRS 3.8.B.7 The surveillance to sample and analyze fuel oil from under ground bulk storage according to applicable standards meets the Alternate AC Power Criteria identified in Appendix B section B8(c) of NUMARC 87-00, "Guidelines and Technical Bases For NUMARC Initiatives." The frequency of once per 6 months is deemed sufficient.

References:

1. FSAR 1.3
2. FSAR 8.1
3. FSAR 8.2
4. FSAR 9.6
5. FSAR 16.2

---

missile sources. Provisions were taken, when necessary, against the generation of missiles rather than allow missile formation and try to contain their effects.

Once the requirement that the above systems are not sources of missiles was set forth, the identification of potential deficiencies and the generation of corrective design modifications was initiated through the Quality Assurance Program. (Section 5.1)

Incoming and outgoing lines which penetrate the Reactor Containment are normally or intermittently open during reactor operation, and are connected to closed systems inside the Containment and protected from missiles throughout their length. (Section 5.2)

Sharing of Structures, Systems and Components (Criterion 5)

Criterion: Structures, systems and components important to safety shall not be shared among nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units.

The only structure important to safety that is shared by the nuclear units at the site is the cooling water discharge canal which carries the safety related Service Water System discharge to the river. Since this channel is of sufficient capacity to handle the discharge flow from both operating units, sharing of this structure will in no way impair the ability of safety related systems in either of the nuclear units to perform their safety functions.

There are no safety related systems shared by the nuclear units at the site. However, there are three gas turbine generators provided which are shared by the two operating units and which can be used to supply the safeguard power requirements. Two of these are located near the Buchanan Substation, while the third is at the Indian Point site. The gas turbines are connected to the distribution system at 13.8kV. The 13.8 kV feeders and the gas turbines are connected to the 6.9 kV buses via autotransformers. While each of the 13.8 kV feeders is normally assigned to one unit, interties at the substation permit the cross feeding from any line to any unit. (See Sections 8.1 and 8.2)

The city water supply system provides a backup source of water to the Condensate Water Storage Tank for the Auxiliary Feedwater System of Indian Point 3.

The Fire Protection Systems formerly shared between Indian Point 1, 2 and 3 have been separated to provide independent fire protection capability. Details of the system modification are addressed in Section 9.6

The only components important to safety that are shared by the two operating nuclear units (Indian Point 2 and 3) are the backup fuel oil storage tanks for the emergency diesel generators. The fuel oil storage tanks dedicated to Indian Point 3 have a capacity sufficient to assure continuous operation of two of the three Indian Point 3 diesels at minimum safeguards load for a total of 48 hours. The additional fuel oil required for continuous operation for a minimum of seven days can be transported by truck from the

> Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available in sufficient time following a loss of all onsite alternating current power supplies and the other offsite electric power circuit, to assure that specified acceptable fuel design limit and design limit and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits shall be designed to be available within a few seconds following a Loss-of-Coolant Accident to assure that the core cooling, containment integrity, and other vital safety functions are maintained.
>
> Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.

Independent alternate power systems are provided with adequate capacity and testability to supply the required Engineered Safety Features and protection systems. The plant is supplied with normal, standby (offsite) and emergency (onsite) power sources as follows:

1. The normal source of auxiliary power during plant operation is supplied from both the plant's generator and offsite power.

2. Offsite power is supplied from Buchanan Substation (approximately ¾ mile from the plant) by 138kV and 345 kV feeders, and two underground 13.8 kV feeders. The Buchanan Substation has two 345kV and two 138 kV circuits to Millwood Substation and a 345kV circuit to Ladentown Substation which interconnects with the PJM system. Millwood Substation has ties to Pleasant Valley Substation which is the interconnection point between Consolidated Edison Co. and Niagara Mohawk and Connecticut Light and Power system. In addition, there is 1-25.4 MW and 1-16.9 MW combustion turbine generator at Buchanan Substation connected to the 13.8kV feeders from Buchanan Substation and a 21 MW combustion turbine generator located at the Indian Point site. The 138kV feeders are connected to the 6.9 kV buses through the station auxiliary transformer, the 13.8 kV feeders and combustion turbines are connected to the 6.9 kV buses through autotransformers. The 480 volt engineered safety features buses are connected to the 6.9 kV buses through station auxiliary transformers.

3. Three diesel generators are each connected to their respective engineered safety features buses to supply emergency shutdown power in the event of loss of all other AC auxiliary power. There are no automatic ties between the buses associated with each diesel generator. Each diesel will be started automatically on a safety injection signal or upon the occurrence of under voltage on its associated 480 volt bus. Any two diesels have adequate capacity to supply the engineered safety features for the hypothetical accident concurrent with loss of outside power. This capacity is adequate to provide a safe and orderly plant shutdown in the event of loss of outside electrical power. The

Systems. Periodic operation of one reactor coolant pump for pressurizer homogenization; the auxiliary spray/heaters could be used if necessary. Compressed air for valve operation – manual could be adopted if necessary.

The vital items of this equipment are housed within the containment and the reinforce concrete auxiliary building. The Service Water System is protected by means of redundancy. In order to guarantee the operation of the system the 480 volt system m again be assured.

It is worthy of note that with the reactor held at hot shutdown conditions, boration of plant is not required immediately after shutdown. The xenon transient does not dec to the equilibrium level until at least 9 hours after shutdown and a further period wo elapse before the reactivity shutdown margin provided by the full length control rc have been cancelled. This delay would provide useful time for emergency measu although the essential systems are considered to be adequately protected within auxiliary building and Containment Building. For loss of CCW due to a missile strike the Fuel Storage Building, city water is available for hook-up (IPN-02-040).

c) Pressurizer Pressure Level Control

Following a reactor trip, the primary coolant temperature will automatically reduce to t no load temperature condition as dictated by the steam generator conditions. This reduction in the primary water temperature reduces the primary water volume and if continued pressure control is to be maintained primary water makeup is required. Th pressurizer pressure level is controlled in normal circumstances by the Chemical and Volume Control System. This requirement implies the charging pump duty referred to for boration plus a guaranteed borated water supply. The facility for boration is safety protected within the Primary Auxiliary Building; it is only necessary to supply water fo makeup. Water may readily be obtained from separate sources: that in the volume control tank, boric acid tanks, monitor tanks, primary storage tank, and refueling wate storage tank.

Similarly to the two previous service requirements, the 480 volt system must be assu with the additional electrical load of the pressurizer heaters. Vital instruments a controls are provided both locally and in the Control Room.

d) Ventilation

The most essential ventilation requirements apply to the containment since in orde guarantee the satisfactory operation of the instrumentation and control systems containment air temperature must be controlled to a tolerable level. This system ag requires the satisfactory operation of the Service Water and Electrical Systems.

e) Electrical Systems

Protection from tornado is provided for the 480 volt switchgear and supply redunda is provided by the diesel generators, gas turbine generator, the two above-gro incoming lines and the one below ground incoming line. The 6.9kV is fed by either gas turbine generator or by an underground 13.8 kV feeder from the Buchar substation. The Buchanan substation consists of four buses.

consideration of the most severe of these natural phenomena that have been officially recorded for the site and the surrounding area and (b) an appropriate margin for withstanding forces greater than those recorded to reflect uncertainties about the historical data and their suitability as a basis for design. (GDC 2 of 7/11/67)

All electrical systems and components vital to plant safety, including the emergency diesel generators, are designed as Class I so that their integrity is not impaired by the maximum potential earthquake, wind, storms, floods or disturbances on the external electrical system. Power, control and instrument cabling, motors and other electrical equipment required for operation of the engineered safety features are suitably protected against the effects of either a nuclear system accident or of severe external environment phenomena in order to assure a high degree of confidence in the operability of such components in the event that their use is required.

Emergency Power

Criterion: An emergency power source shall be provided and designed with adequate independency, redundancy, capacity, and testability to permit the functioning of the engineered safety features and protection systems required to avoid undue risk to the health and safety of the public. This power source shall provide this capacity assuming a failure of a single component. (GDC 39 and GDC 24 of 7/11/67)

Independent alternate power systems are provided with adequate capacity and testability to supply the required engineered safety features and protection systems.

The plant is supplied with normal, standby and emergency power sources as follows:

1) The normal sources of auxiliary power during plant operation are both the generator and offsite power.

2) Offsite power is supplied from Buchanan Substation (approximately ¾ mile from the plant) by 138kV and 345kV feeders, and two underground 13.8kV feeders. The Buchanan Substation has two 345kV and two 138kV circuits to Millwood Substation and a 345Kv circuit to Ladentown Substation which interconnects with the PJM system. Millwood Substation has ties to Pleasant Valley Substation which is the interconnection point between Consolidated Edison Company, Niagara Mohawk and Connecticut Light and Power systems. ~~In addition, there are 1-25.4 MW and 1-16.9 MW combustion turbine generators at Buchanan Substation and a 21MW combustion turbine generator located at the Indian Point site.~~ 138Kv feeders are connected to the 6.9 KV buses through the station auxiliary transformer, and 13.8 kV feeders and combustion turbines are connected to the 6.9kV buses through autotransformers. 480 volt engineered safety features are connected to the 6.9kV buses through station auxiliary transformers.

3) Three diesel generators are each connected to their respective engineered safety features buses to supply emergency shutdown power in the event of loss of all other AC auxiliary power. There are no automatic ties between the buses associated with each diesel generator.

   Each diesel will be started automatically on a safety injection signal or upon the occurrence of under voltage on its associated 480 volt bus. Any two diesels have

adequate capacity to supply the engineered safety features for the hypothetical accident concurrent with loss of outside power. This capacity is adequate to provide a sage and orderly plant shutdown in the event of loss of outside electrical power. The diesel generator units are capable of being started and sequence load begun within 10 seconds after the initial signal.

The three diesel-generators are located adjacent to the control building and are connected to three (3) of the four (4) separate 480 volt auxiliary system buses. The fourth 480 volt bus is automatically connected to the third bus during diesel generator operation, and the two buses are operated as a unit from a single diesel generator for this mode of operation only.

4) Emergency power supply for vital instruments, control, and emergency lighting is from the four 125 volt DC station batteries.

5) A 2500 KW diesel generator capable of providing on-site power for safe shutdown loads has been installed in compliance with 10 CFR 50 Appendix "R"; also support compliance with SBO requirements.

8.2 ELECTRICAL SYSTEM DESIGN

8.2.1 Network Interconnection

The offsite transmission system provides two basic functions for the station; namely, it provides auxiliary power as required for startup and normal shutdown and transmits the output of the station.

Electrical energy generated at 22 kV is raised to 345 kV by the two main generator transformers and delivered to the Buchanan 345 kV Switching Station via 345 kV, 3000 Amp, 25,000 MVA synchronizing circuit breakers. The Buchanan Substation has two 345 kV and two 138 kV circuits to Millwood Substation and a 345 kV circuit to Ladentown Substation which interconnects with the PMJ system. Millwood Substation has ties to Pleasant Valley Substation which is the interconnection point between Consolidated Edison Company and Niagara Mohawk and Connecticut Light and Power System. The Buchanan 138 kV Substation has connections to Lovett Station.

Offsite (standby) power is supplied from Buchanan Substation (approximately ¾ mile from the plant) by 138 kV and 345 kV feeders, and two underground 13.8 kV feeders. ~~In addition, there is 1-25.4 MW and 1-16.9 MW combustion turbine generators at Buchanan substation connected to the 13.8 kV feeders and a 21 MW combustion turbine generator located at the Indian Point Site.~~ The 13.8 kV feeders are connected to the 6.9 kV buses through autotransformers. The 480 volt engineered safety feature buses are connected to the 6.9 kV buses through station auxiliary transformers.

Single-Line Diagram

A single-line diagram, showing the connections of the main generator to the power system grid and to standby power source is shown on Plant Drawing 9321-F-33853 [Formerly Figure 8.2-1].

Reliability Insurance

There are four independent sources of emergency power available to Indian Point 3. They are the 138 kV and 345 kV ties from Buchanan and the two 13.8 kV feeders from Buchanan. ~~In addition, there are three combustion turbine generators, one located on the Indian Point site and the others connected to 13.8 kV feeders at Buchanan, providing a completely independent supply from the rest of the offsite transmission system.~~ The 138 kV supply from the Buchanan bus with its connections to the Consolidated Edison Company system and Orange & Rockland County provide a dependable source of station auxiliary power.

An analysis of the 1971 system demonstrated that the interconnected power system remained stable for the loss of the largest unit, Ravenswood No. 3 (1000 Mwe). Since the transmission system is as strong after the installation of Indian Point 3, and since Indian Point 3 is not as large capacity wise, this analysis can be applied to confirm the stability of the interconnected system for the sudden loss of the largest unit. In addition, a 2500 kw self-contained diesel generator is available to provide on-site power for safe shutdown loads having alternate feed capability.

8.2.2 Station Distribution System

The Auxiliary Electrical System was designed to provide a simple arrangement of buses requiring the minimum of switching to restore power to a bus in the event that the normal supply to that bus is lost.

The relays that are used for bus clearing and sequencing of safeguards components on the four 480 volt buses have been physically located in the 480 volt switchgear and the circuitry has been developed on an individual, independent bus scheme. That is, each bus has its own set of bus clearing and load sequencing relays physically located within its own line-up, independent of the other bus sections. Diesel generator No. 31 is connected to bus No. 2A and bus No. 2A is then connected to bus No. 3A in the event of a diesel requirement. Buses No. 2A and 3A together form one of the three 480 volt safeguards power trains with buses No. 5A and 6A used for the remaining two power trains.

In addition, Indian Point 3 has a five-battery DC System. Each of the three 480 volt safeguards power trains and associated circuitry receives its DC control power from its own individual battery (Nos. 31, 32 and 33). Battery No. 36 feeds power panel No. 36. Battery No. 34 feeds instrument bus No. 34.

Batteries 31, 32, 33, and 34 are safety batteries which supply DC power to safe shutdown systems. Battery 36 is a non-safety battery which supplies DC power to non-essential loads.

Single Line Diagrams

The basic components of the station's electrical system are shown on the electrical one line diagrams, ~~Plant Drawings 617F645, 617F643, 617F644, 9321-F-30063, -30083, 9321-H-36933, and 9321-F-39893 [Formerly Figures 8.2-2 through 8.2-6, 8.2-8 and 8.2-9]~~, which include the 6900 volt, the 480 volt, the 120 volt AC instrument, and the 125 volt DC bus systems.

Unit Auxiliary, Station Auxiliary and Station Service Transformers

Unit Auxiliary Transformer

6900 Volt System

The 6900 volt system is divided into seven buses. These buses supply 6900 volt auxiliaries directly and 480 volt auxiliaries via the station service transformers. Two buses, numbers 5 and 6, are connected to the 138 kV system via bus main breakers and the Station Auxiliary Transformer. An alternate connection is available to the 13.8 kV ~~gas turbine~~ SBO / Appendix R diesel and/or the 13.8 kV off-site power network via a step-down auto transformer. Buses No. 1, 2, 3, and 4 are connected to the generator leads via bus main breakers and the Unit Auxiliary Transformer. Buses No. 1 and 2 can be tied to Bus No. 5 and Buses No. 3 and 4 can be tied to Bus No. 6 via bus tie breakers to provide auxiliary power during unit down time. These bus tie connections are automatically initiated, in the event of unit trip, to assist continuity of service. BUS 3NBY01 is connected to the 13.8 kV off-site power network via a step-down auto transformer.

480 Volt System

The 480 volt system consists of seven buses, each supplied from a 6900 volt bus via a station service transformer. Four of these Buses, No. 2A, 3A, 5A and 6A, supplied from Buses No. 2, 3, 5, and 6 respectively, comprise the safety related 480 volt system. The required safeguards equipment circuits are dispersed among these buses. These buses are provided with diesel generator back-up in the event of voltage failure, and are protected against a sustained undervoltage condition, which could cause mis-operation of, or damage to, safeguards equipment. 480V Buses 2A, 3A, 5A and 6A are each rated 3200 amps continuous. However, during peak accident loading scenarios, these buses can be loaded up to 3600 amps for up to 4 hours, based on a maximum ambient switchgear room temperature of 40°C. For Buses 2A and 3A, this short time limit applies to the combined loading, when these buses are tied together and powered from a single station service transformer. (Buses 2A and 3A are considered a single safeguards bus.)

480 Buses 2A, 3A, 5A and 6A load breakers are rated to interrupt up to 50kA short circuit current. Maximum short circuit current at the 480V load breakers during emergency diesel generator testing parallel to the system, was initially and conservatively calculated to be slightly greater than 50kA. However, taking into account cable and raceway construction, and establishment of "safe zone" areas during diesel testing (CAT I areas), the maximum fault current was analyzed to be less than the 50kA rating which would allow the breaker to safely interrupt a fault if it occurs.

The three remaining 480 volt buses, Buses No. 312, 313, and 3NGY01 are supplied from 6900 volt Buses No. 1, 3 and 3NBY01 respectively, and supply auxiliary power to additional plant facilities installed subsequent to the initial installation. A tie breaker between Buses 312 and 313 permit one bus to serve as a backup for the other. Interlocking prevents the cross connecting of the two 6.9 kV sources to Buses 312 and 313 through the 480 volt system. The interlock can be defeated temporarily for performing a live transfer of 480 volt buses 312 and 313 when both 6.9 kV supply buses are fed from the same 6.9 kV power source.

The 480 volt feeders for the Fire Protection System are from the 480 Volt Buses No. 312 and 313 to the 480 volt Motor Control Center G and H, respectively. Buses No. 312 and 313 are located in the Turbine Hall and Motor Control Centers G and H are located in the Fire Pump House. The motor driven fire pump normal feed is Bus No. 312 and the emergency feed is 480 volt Bus No. 5A. These feeders run through the manual transfer switch which is used to manually transfer the feeders to the motor driven fire pump from the normal feed to the emergency feed and from the emergency feed to normal feed. The electrical

feeds to the remaining equipment installed as part of the additional facilities program are supplied through individual breakers. A provision also exists to cross-connect the Unit 2 SBO/App. R DG to the Unit 3 alternative shutdown loads; and the Unit 3 Appendix R DG to the Unit 2 alternative shutdown loads.

The normal source for Buses No. 5A and 6A is the 138 kV system, via the station auxiliary transformer and 6900 volt Buses No. 5 and 6. The normal source for Buses No. 2A and 3A is the main generator, via the unit auxiliary transformer and 6900 volt Buses No. 2 and 3. When the unit is not operating, Buses No. 2A and 3A are supplied from the 138 kV system, via switching at the 6900 volt level. The normal source for Bus No. 3NGY01 is the 13.8 kV system via an autotransformer and 6900 volt Bus 3NBY01.

The relays that are used for bus clearing and sequencing of safeguards components on the four safety related 480 volt buses have been physically located in the 480 volt switchgear, and the circuitry has been developed on an individual, independent bus scheme. That is, each bus has its own set of bus clearing and load sequencing relays physically located within its own lineup, independent of the other bus sections.

Two independent sets of under-voltage protective relays are installed on each bus: one set to initiate load stripping, diesel generator start, bus transfer, and sequencing of safeguards loads upon bus voltage failure; the other set to initiate bus disconnection from the offsite power source upon the occurrence of a sustained period of voltage low enough to cause mis-operation of, or damage to, safeguards equipment.

Coordination between 480V Buses 2A, 3A, 5A and 6A supply breakers and their downstream load breakers ensures that an entire bus will not be lost due to a fault on any feeder circuit.

One emergency diesel-generator set is connected to bus No. 5A, one to 6A and the third to the combination of Bus No. 2A and Bus 3A. Each diesel generator is automatically started upon under-voltage on its associated 480 volt bus.

Interlocks are provided so that a fault on any bus locks out all possible sources of power to that bus. Interlocks are also provided to prevent circuit breakers connecting emergency diesel generator No. 31, 32 and 33 to Buses No. 2A, 6A and 5A from automatically closing if there is a voltage on the bus. The power for the safeguards valve motors is supplied from two motor control centers which in turn are supplied from the safety related 480 volt system. Each motor control center can be supplied by an emergency diesel generator.

Each of the four 480 volt switchgear bus sections which supply power to the safeguards equipment receives DC control power from its associated battery source. Batteries No. 31, 32, and 33 supply DC control power to 480 volt bus No. 5A, 6A and 2A/3A, respectively.

125 Volt DC System

The 125 volt DC system is divided into five buses with one battery and battery charge (supplied from the 480 volt system) serving each. The battery chargers supply the normal DC loads as well as maintaining proper charges on the batteries.

One battery charger is available to each battery so that the five batteries are maintained at full charge in anticipation of loss-of-AC power incident. This ensures that adequate DC power is available for starting the emergency generators and other emergency uses.

Battery chargers 31, 32, and 33 are also relied upon to support the continued operation of systems and components required to either mitigate the consequences of a design basis

is qualified in accordance with the more stringent requirements of the Five-Minute Vertical Flame Test and the Bonfire Test.

Cables are protected in hostile environments by a number of devices. Running the cable in rigid, galvanized conduit is the most frequently of used method protection. For underground runs, PVC heavy wall conduit encased in a concrete envelope provides maximum protection. When cable is run in a tray, peaked covers are used in areas where physical damage to cables may result from falling objects or liquids. In addition, covers are provided on horizontal cable trays which are exposed to the sun.

Fire protection measures to prevent propagation of flame are discussed in Section 9.6-2. Fire detection is provided for areas where there are large groupings of cables in stacked cable trays. The plant has a protective signaling system that transmits fire alarm and supervisory signals to the Control Room where audible and visual alarms are provided. The system includes signals for actuation of fire detectors, and automatic sprinkler, water spray, foam and CO2 systems. Electrical supervisory signals are received from tamper switches on fire water system control valves.

Cables and wireways are marked by means of metal tags attached at each end. These tags are embossed to conform with the identification given in the Conduit and Cable Schedule. At each multiple conductor cable termination, a plastic covering is attached which as been premarked to indicate the terminal designation of each conductor. In addition, cable trays are marked at frequent intervals to indicate the channel number and voltage level of the tray. Color coding is discussed in Section 7.2.

In areas where missile protection could not be provided (such as near the Reactor Coolant System) redundant instrument impulse lines and cables were run by separate routes. These lines were kept as far apart as physically possible, or were protected by heavy (1/4") metal plates interposed where inherent missile protection could not be provided by spacing.

8.2.3 Emergency Power

Sources Description

Standby power required during plant startup, shutdown and after turbine trip is supplied from one 345kV feeder and one 138 kV feeder from the Buchanan Substation (approximately 3/4 mile from the plant) which as connections to the Millwood Substation and the Lovett Station of the Orange and Rockland system. These connections are made through the station auxiliary transformer.

In addition, there are two underground 13.8 kV feeders from the Buchanan Substation. ~~There is also 1-25.4 MW and 1-16.9 MW combustion turbine generator at Buchanan connected to these 13.8 kV underground feeders, and a 21 MW combustion turbine generator located on the Indian Point site.~~ The 13.8 kV feeders are connected to the 6.9 kV buses via autotransformers. If these sources should fail, the on-site sources of emergency power are three emergency diesel generator sets, each consisting of an Alco model 16-251-E engine coupled to a Westinghouse 2188 KVA, 0.8 power factor, 900 rpm, 3 phase, 60 cycle, 480 volt generator. Each unit has a 2000 hour and a 2 hour rating of 1950 kW and a 1750 kW continuous rating. There is also a vendor stated maximum ½ hour rating of 2000 kW. This is not an operational limit but an area of additional margin for handling power surges and spikes which may occur during testing. In addition, an alternate on-site source of power for safe shutdown loads is available from the

The Technical Specifications require 26,826 gallons of fuel as minimum usable storage available for Indian Point 3 usage in other normal supply tanks on site or at the Buchanan Substation. Also, additional supplies of diesel fuel oil are available locally.

There are two 30,000 gallon seismic Class III tanks located in the Indian Point 1 Superheater Building and a 200,000 gallon seismic Class III tank in the Buchanan Substation located immediately across Broadway. These tanks contain fuel oil for operation of ~~combustion turbines that is compatible for use with the diesels~~the Unit 2 SBO / Appendix R diesel. Each tank has a level indicator and a capacity check is made weekly. The maximum consumption of the IP2 SBO / Appendix R diesel generator over a three day operating period is 12,500 gallons. ~~When the combustion turbines are being operated, the dispatcher will be notified to start oil deliveries and to keep the tanks filled. The gas turbines consume approximately 2000 gallons per turbine per hour.~~ A truck with hose connections compatible with the underground storage tanks will be provided. If the diesels require the reserves in these tanks, the contents of these tanks would be transported by truck to the underground diesel storage tanks. Additional supplies of diesel oil are available locally. Under normal conditions, 25,000 gallons can be delivered on a one or two-day notice. Additional supplies are also maintained in the region (about 40 miles from the plant) and are available for use during emergencies, subject to extreme cold weather conditions (increased domestic heating usage) and available transportation.

All components of the emergency diesel fuel oil supply system are seismic Class I and as such were designed in accordance with the criteria of Section 16.1. In addition, all components of the diesel fuel oil supply system are tornado protected and as such are able to withstand the design tornado and the tornado driven missiles delineated in Section 16.2. These components are also protected against the turbine missiles described in Appendix 14A of Chapter 14. The power supply and control system for the diesel fuel oil transfer system were designed in accordance with IEEE-279, meeting fully the single failure criteria specified therein.

Fuel oil for the emergency diesel generators is stored in three buried storage tanks. Each tank is equipped with a single vertical fuel oil transfer pump that discharges oil into either of two headers according to the manual valving arrangement selected. Both of these headers connect to a 175-gallon day tank mounted on each of the three diesel engines.

Decrease in level in any one of the three day tanks to the 65 percent level automatically starts its associated fuel oil transfer pump (local manual controls are also available). The fuel oil transfer pumps are powered from motor control centers 36C, 36D, and 36E. Since each pump is capable of supplying fuel oil to all three diesels, this arrangement assures the availability of fuel oil to each diesel.

Each day tank is provided with AC normal level and low level indicating lights. In addition, each day tank has a DC low-low alarm on its respective diesel generator control panel which also annunciates a common Diesel Generator Trouble Alarm on the supervisory panels in the Control Room.

Diesel-Generator Separation

The emergency diesel generators are located in a tornado-proof reinforced concrete building immediately adjacent to the Control Building. The diesel generators are arranged on 13'-0" centers, parallel to each other with approximately 10'-0" between engine components. The structure is provided with internal walls to separate the three diesel generators and their

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil and Starting Air

BASES

BACKGROUND

Fuel oil for the safeguards DGs is stored in three 7,700 gallon DG fuel oil storage tanks located on the south side of the Diesel Generator Building. The offsite DG fuel oil reserve is maintained in two 30,000 gallon tanks located in the Indian Point 1 Superheater Building and/or a 200,000 gallon tank in the Buchanan Substation which is located in close proximity to the IP3 site. The IP3 offsite fuel oil reserve is maintained by the operators of IP2, in accordance with formal agreements. The IP3 offsite DG fuel oil reserve is normally stored in the same tanks used to store the IP2 offsite DG fuel oil reserve.

Sufficient fuel for at least 48 hours of minimum safeguards equipment operation is available when any two of the DG fuel oil storage tanks are available and each contains 5,365 usable gallons of fuel oil. Additional margin is provided by 115 gallons of fuel oil in the DG day tank required by SR 3.8.1.4. The maximum DG loadings for design basis transients that actuate safety injection are summarized in FSAR 8.2 (Ref. 1). These transients include large and small break loss of coolant accidents (LOCA), main steamline break and steam generator tube rupture (SGTR).

The three DG fuel oil storage tanks are filled through a common fill line that is equipped with a truck hose connection and a shutoff valve at each tank. The overflow from any DG fuel oil storage tank will cascade into an adjacent tank. Each DG fuel oil storage tank is equipped with a single vertical fuel oil transfer pump that discharges to either the normal or emergency header. Either header can be used to fill the day tank at each diesel. Each DG fuel oil storage tank has an alarm that sounds in the control room when the level in the tank approaches the level equivalent of the minimum required usable inventory. Each tank is also equipped with a sounding connection and a level indicator.

BASES

BACKGROUND (continued)

Each emergency diesel is equipped with a 175-gallon day tank with an operating level that provides sufficient fuel for approximately one hour of DG operation. A decrease in day tank level to approximately 115 gallons (65% full) will cause the normal and emergency fill valves on that day tank to open and the transfer pump in the corresponding DG fuel oil storage tank to start. Once started, the pump will continue to run until that day tank is filled. However, any operating transfer pump will fill any day tank with a normal or emergency fill valve that is open. When a day tank is at approximately 158 gallons (90% full), a switch initiates closing of the day tank normal and emergency fill valves.

Technical Specifications require sufficient fuel oil to operate 2 of the 3 required DGs at minimum safeguards load for 7 days. The Technical Specification required volume of fuel oil includes the 26,826 gallons of usable fuel oil in the reserve tanks, and 10,730 usable gallons in two DG fuel oil storage tanks (assuming a failure makes the oil in the third DG fuel oil storage tank unavailable), without crediting the additional margin of 230 gallons in two day tanks (assuming a failure makes the oil in the day tank associated with the third DG unavailable).

If the DGs require fuel oil from the fuel oil reserve tank(s), the fuel oil will be transported by truck to the DG fuel oil storage tanks. A truck with appropriate hose connections and capable of transporting oil is available either on site or at the Buchanan Substation. Commercial oil supplies and trucking facilities are also available in the vicinity of the plant.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. Requirements for DG fuel oil testing methodology, frequency, and acceptance criteria are maintained in the program required by Specification 5.5.12, Diesel Fuel Oil Testing Program.

Each DG has an air start system with adequate capacity for four successive start attempts on the DG without recharging the air start receiver(s). The air starting system is designed to shutdown and lock out any engine

which does not start during the initial start attempt so that only enough air for one automatic start is used. This conserves air for subsequent DG start attempts.

(continued)

BASES

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 14 (Ref. 3), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, Reactor Coolant System and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

Since diesel fuel oil and the air start subsystem support the operation of the standby AC power sources, they satisfy Criterion 3 of 10 CFR 50.36.

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of operation for 2 of 3 DGs at minimum safeguards load. Fuel oil is also required to meet specific standards for quality. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an anticipated operational occurrence (AOO) or a postulated DBA with loss of offsite power. DG day tank fuel requirements, as well as transfer capability from the storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources – Operating," and LCO 3.8.2, "AC Sources – Shutdown."

The starting air system is required to have a minimum capacity for four successive DG start attempts without recharging the air start receivers.

(continued)

BASES

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA. Since stored diesel fuel oil and the starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil and starting air are required to be within limits when the associated DG is required to be OPERABLE.

ACTIONS

The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each DG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DG subsystem. Complying with the Required Actions for one inoperable DG subsystem may allow for continued operation, and subsequent inoperable DG subsystem(s) are governed by separate Condition entry and application of associated Required Actions.

A.1

In this Condition, the requirements of SR 3.8.3.2.a are not met. Therefore, a DG will not be able to support 48 hours of continuous operation at minimum safeguards load and replenishment of the DG fuel oil storage tanks will be required in less than 48 hours following an accident. The DG associated with the DG fuel oil storage tank not within limits must be declared inoperable immediately because replenishment of the DG fuel oil storage tank requires that fuel be transported from the offsite DG fuel oil reserve by truck and the volume of fuel oil remaining in the DG fuel oil storage tank may not be sufficient to allow continuous DG operation while the fuel transfer is planned and conducted under accident conditions.

This Condition is preceded by a Note stating that Condition A is applicable only in MODES 1, 2, 3 and 4. This Note provides recognition that reduced DG loading required to respond to events in MODES 5 and 6 significantly reduces the amount of fuel oil required in the DG fuel oil storage tanks when in these MODES.

(continued)

BASES

ACTIONS (continued)

B.1

In this Condition, the requirements of SR 3.8.3.2.b are not met. With less than the total required minimum fuel oil in one or more DG fuel oil storage tanks, the one or two DGs required to be operable in MODES 5 and 6 and during movement of irradiated fuel may not have sufficient fuel oil to support continuous operation while a fuel transfer from the offsite DG fuel oil reserve or from another offsite source is planned and conducted under accident conditions. Fuel oil credited to meet this requirement must be in one or more storage tanks associated with the operable DG(s) because the fuel transfer pump in each tank may depend on power from that DG.

This condition requires that all DGs be declared inoperable immediately because minimum fuel oil level requirements in SR 3.8.3.2.b is a condition of Operability of all DGs when in the specified MODES.

This Condition is preceded by a Note stating that Condition B is applicable only in MODES 5 and 6 and during the movement of irradiated fuel. This Note provides recognition that reduced DG loading required to respond to events in MODES 5 and 6 significantly reduces the amount of fuel oil required in the DG fuel oil storage tanks when in these MODES.

C.1

In this Condition, the fuel oil remaining in the offsite DG fuel oil reserve is not sufficient to operate 2 of the 3 DGs at minimum safeguards load for 7 days.

Therefore, all 3 DGs are declared inoperable immediately.

This Condition is preceded by a Note stating that Condition D is applicable only in MODES 1, 2, 3 and 4 because the offsite DG fuel oil reserve is required to be available only in these MODES. This Note provides recognition that reduced DG loading required to respond to events in MODES 5 and 6 significantly reduces the amount of fuel oil required when in these MODES.

(continued)

BASES

ACTIONS (continued)

D.1

This Condition is entered as a result of a failure to meet the acceptance criteria of SR 3.8.3.3 or SR 3.8.3.4 when the DG fuel oil storage tanks or reserve storage tanks are verified to have particulate within the allowable value in Specification 5.5.12, Diesel Fuel Oil Testing Program. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, and particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7-day and 30-day Completion Times, for the onsite tanks and the reserve storage tanks, respectively, allows for further evaluation, resampling and re-analysis of the DG fuel oil.

E.1

This condition is entered as a result of a failure to meet the acceptance criteria of SR 3.8.3.3 or SR 3.8.3.4 when the DG fuel oil storage tanks or reserve storage

tanks are verified to have properties (other than particulates) within the allowable values of Specification 5.5.12, Diesel Fuel Oil Testing Program. A period of 30 days is allowed to restore the properties of the fuel oil in the DG fuel oil storage tank to within the limits established by Specification 5.5.12. This period provides sufficient time to test the stored fuel oil to determine that the new fuel oil, when mixed with previously stored fuel oil, remains acceptable, or to restore the stored fuel oil properties. This restoration may involve feed and bleed procedures, filtering, or combinations of these procedures. Even if a DG start and load was required during this time interval and the fuel oil properties were outside limits, there is a high likelihood that

(continued)

BASES

ACTIONS

E.1. (continued)

the DG would still be capable of performing its intended function. A period of 60 days is allowed to restore the properties of the fuel oil stored in the affected reserve storage tank to within the limits established by Specification 5.5.12. This period provides sufficient time to perform the actions described above for the DG fuel oil storage tanks. The additional time allowed for the reserve tanks is acceptable because reserve oil is not immediately needed to support DG operation and reserve oil is available from more than one reserve tank. Reserve oil is also available from commercial suppliers in the vicinity of the plant.

F.1

With starting air receiver pressure < 250 psig, sufficient capacity for four successive DG start attempts does not exist. However, as long as the receiver pressure is $ 90 psig, there is adequate capacity for at least one start attempt, and the DG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable.

This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period. Entry into Condition F is not required when air receiver pressure is less than required limits while the DG is operating following a successful start.

G.1

With a Required Action and associated Completion Time not met, or one or more DG's fuel oil or starting air subsystem not within limits for reasons other than addressed by Conditions A through F, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the offsite DG fuel oil reserve to support 2 DGs at minimum safeguards load for 7 days assuming requirements for the DG fuel oil storage tanks and day tanks are met. The 7 day duration with 2 of the 3 DGs at minimum safeguards load is sufficient to place the unit in a safe shutdown condition and to bring in replenishment fuel from a commercial source.

The 24 hour Frequency was ~~is~~ needed because the DG fuel oil reserve is stored in fuel oil tanks that used to support the operation of gas turbine peaking units that are not under IP3 control. Specifically, the 26,826 gallons needed to support 7 days of DG operation is maintained in two 30,000 gallon tanks located in the Indian Point 1 Superheater Building and/or a 200,000 gallon tank in the Buchanan Substation. Although the volume of fuel oil required to support IP3 DG

operability is designated as for the exclusive use of IP3, the fact that the oil in the storage tanks is used for purposes other than IP3 DGs and oil consumption is not under the direct control of IP3 operators warrants frequent verification that required offsite DG fuel oil reserve volume is being maintained.

SR 3.8.3.2

SR 3.8.3.2.a provides verification when in MODES 1, 2, 3, and 4, that there is an adequate inventory of fuel oil in the storage DG fuel oil tanks to support each DG's operation for at least 48 hours of operation of minimum safeguards equipment when any two of the DG fuel oil storage tanks are available and 5,365 gallons of usable fuel oil is contained in each tank.

SR 3.8.3.2.b provides verification when in MODES 5 and 6 and during movement of irradiated fuel that the minimum required fuel oil for operation in these MODES is available in one or more DG fuel oil storage tanks. The minimum required volume of fuel oil

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.2 (continued)

takes into account the reduced DG loading required to respond to events in MODES 5 and 6 is sufficient to support the two DGs required to be operable in MODES 5 and 6 and during movement of irradiated fuel while a fuel transfer from the offsite DG fuel oil reserve or from another offsite source is planned and conducted under accident conditions.

This minimum volume required by SR 3.8.3.2.a and SR 3.8.3.2.b is the usable volume and does not include allowances for fuel not usable due to the fuel oil transfer pump cutoff switch (worst case 956 gallons for #33 tank and 915 gallons for #31 and #32 tanks) and margin (20 gallons per tank). If the installed level

indicators are used to measure tank volume, an additional allowance of 50 gallons for instrument uncertainty associated with the level indicators must be included. Appropriate adjustments are required for SR 3.8.3.2.b if the required volume is found in more than one DG fuel oil storage tank.

The 31 day Frequency is adequate to ensure that a sufficient supply of fuel oil is available, since low level alarms are provided and unit operators would be aware of any large uses of fuel oil during this period.

SR 3.8.3.3

This surveillance verifies that the properties of new and stored fuel oil meet the acceptance criteria established by Specification 5.5.12, "Diesel Fuel Oil Testing Program." Specific sampling and testing requirements for diesel fuel oil in accordance with applicable ASTM Standards are specified in the administrative program developed to ensure Specification.

New fuel oil is sampled prior to addition to the DG fuel oil storage tanks and stored fuel oil is periodically sampled from the DG fuel oil storage tanks. Requirements and acceptance

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.3 (continued)

criteria for fuel oil are divided into 3 parts as follows:
a) tests of the sample of new fuel sample and acceptance criteria that must be met prior to adding the new fuel to the DG fuel oil storage tanks; b) tests of the sample of new fuel that may be completed after the fuel is added to the DG fuel oil storage tanks; and, c) tests of the fuel oil stored in the DG fuel oil storage tanks. The basis for each of these tests is described below.

The tests of the sample of new fuel and acceptance criteria that must be met prior to adding the new fuel to the DG fuel oil storage tanks are a means of determining that the new fuel oil is of the appropriate grade and has not been contaminated with substances that would have an immediate, detrimental impact on diesel engine combustion. If results from these tests are within acceptable limits, the fuel oil may be added to the storage tanks without concern for contaminating the entire volume of fuel oil in the storage tanks. The tests, limits, and applicable ASTM Standards needed to satisfy Specification 5.5.12 are listed in the administrative program developed to implement Specification 5.5.12.

Failure to meet any of the specified limits is cause for rejecting the new fuel oil, but does not represent a failure to meet the LCO because the fuel oil is not added to the storage tanks.

The tests of the sample of new fuel that may be completed after the fuel is added to the DG fuel oil storage tanks must be completed Within 31 days. The fuel oil is analyzed to establish that the other properties of the fuel oil meet the acceptance criteria of Specification 5.5.12. The 31 day period is acceptable because the fuel oil properties of interest, even if they were not within stated limits, would not have an immediate

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.3 (continued)

effect on DG operation. Failure to meet the specified acceptance criteria requires entry into Condition E and restoration of the quality of the fuel oil in the DG fuel oil storage tank within the associated Completion

Time and explained in the Bases for Condition E. This Surveillance ensures the availability of high quality fuel oil for the DGs.

The periodic tests of the fuel oil stored in the DG fuel oil storage tanks verify that the length of time or conditions of storage has not degraded the fuel in a manner that could impact DG OPERABILITY. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. The particulate can cause fouling of filters and fuel oil injection equipment, however, which can cause engine failure. Particulate concentrations must meet the acceptance criteria of Specification 5.5.12. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing. Each DG fuel oil storage tank must be considered and tested separately.

The Frequency of this test takes into consideration fuel oil degradation trends that indicate that particulate concentration is unlikely to change significantly between Frequency intervals.

SR 3.8.3.4

The IP3 offsite fuel oil reserve is maintained by the operators of IP2, in accordance with formal agreements. The IP3 offsite DG fuel oil reserve is normally stored in the same tanks used to store the IP2 offsite DG fuel oil reserve. Fuel oil properties of new and stored fuel are controlled in accordance with IP2 Technical Specifications and FSAR in order to meet requirements for the Operability of IP2 and IP3 DGs.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.4 (continued)

Required testing of the properties of new and stored fuel in the offsite DG fuel oil reserve is performed by IP2 in accordance with programs established by IP2. IP3 performs periodic verification that fuel oil stored in the offsite DG fuel oil reserve meet the requirements of Specification 5.5.12.

Failure to meet the specified acceptance criteria, whether identified by IP2 or IP3, requires entry into Condition D or E and restoration of the quality of the fuel oil in the offsite DG fuel oil reserve within the associated Completion Time and explained in the Bases for Conditions D and E.

SR 3.8.3.5

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for a minimum of four engine starts without recharging. Failure of the engine to start within approximately 15 seconds indicates a malfunction at which point the overcrank relays terminate the start cycle. In this condition, sufficient starting air will still be available so that the DG can be manually started. The pressure specified in this SR is intended to reflect the lowest value at which the four starts can be accomplished.

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications
available in the control room, including alarms, to alert the operator to below normal air start pressure.

(continued)

SR 3.8.3.6

Microbiological fouling is a major cause of fuel oil degradation.There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel storage tanks once every 92 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, and contaminated fuel oil, and from breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are consistent with Regulatory Guide 1.137 (Ref. 2). This SR is for preventive maintenance. Unless the volume of water is sufficient that it could impact DG OPERABILITY, presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed within 7 days of performance of the Surveillance.

REFERENCES

1. FSAR, Section 8.2.

2. Regulatory Guide 1.137.

3. FSAR, Chapter 14.
