



January 9, 2015  
10 CFR 50.90  
SBK-L-14225  
Docket No. 50-443

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Seabrook Station  
Response to Request for Additional Information Regarding License Amendment Request 14-02  
Proposed Change to Increase Voltage Limit for Diesel Generator Load Rejection Surveillance Requirement

References:

1. NextEra Energy Seabrook letter SBK-L-14126, "License Amendment Request 14-02 Proposed Change to Increase Voltage Limit for Diesel Generator Load Rejection Surveillance Requirement," dated July 24, 2014 (ML14209A918).
2. NRC letter, "Request for Additional Information Regarding License Amendment Request to Increase Voltage Limit for Diesel Generator Load Rejection Surveillance Requirement (TAC No. MF4578)," dated November 24, 2014 (ML14324A637).

In Reference 1, NextEra Energy Seabrook, LLC (NextEra) requested, in part, to revise Technical Specification (TS) 3.8.1.1, "A.C. Sources – Operating," to increase the voltage limit for a full load rejection test of the emergency diesel generator specified in TS surveillance requirement (SR) 4.8.1.1.2.f.3.

In Reference 2, the NRC requested additional information (RAI) in order to complete its review of the license amendment request.

Attachment 1 of this letter provides the responses to NRC RAIs 1 and 2. Attachment 2 contains the single line diagrams requested by NRC RAI 3.

This letter contains no new regulatory commitments.

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If you have any questions regarding this report, please contact Mr. Michael Ossing, Licensing Manager, at (603) 773-7512.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on January 9, 2015.

Sincerely,

NextEra Energy Seabrook, LLC



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Dean Curtland  
Site Vice President

#### Attachments

cc: NRC Region I Administrator  
J.G. Lamb, NRC Project Manager, Project Directorate 1-2  
NRC Senior Resident Inspector

Mr. Perry Plummer  
Director Homeland Security and Emergency Management  
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Mr. John Giarrusso, Jr., Nuclear Preparedness Manager  
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Framingham, MA 01702-5399

**Attachment 1 to SBK-L-14225**

**Response to NRC RAIs Regarding  
License Amendment Request 14-02  
Proposed Change to Increase Voltage Limit for Diesel Generator Load Rejection  
Surveillance Requirement**

## **Response to NRC RAIs Regarding License Amendment Request 14-02 Proposed Change to Increase Voltage Limit for Diesel Generator Load Rejection Surveillance Requirement**

### **NRC RAI No. 1.**

On page 1 of the license amendment request (LAR), the licensee states: “When an EDG [emergency diesel generator] is operated in parallel with the grid for the purpose of the full load rejection test, the emergency bus voltage is further increased as excitation is adjusted to meet the required VAR [volt-ampere reactive] loading.”

Please provide the value of the required VAR loading considered for the full load rejection test and the basis for that value. Since the overvoltage limit is also dependent on the VAR loading, please explain why the VAR loading is not considered as part of SR 4.8.1.1.2.f.3.

### **NextEra Response**

There is no Technical Specification requirement for a specific VAR loading associated with the EDG full load rejection. The existing TS overvoltage limit of 4784V was not based on any specific VAR loading requirement. The existing VAR loading requirement for the full load rejection test as described in station procedure OX1426.34, “Diesel Generator 1A 18 Month Operability Surveillance,” is 3900 kVAR (3700 – 4100 kVAR range). Section 1.2.24 of OX1426.34 describes the basis for this value. OX1426.32, “Diesel Generator 1B 18 Month Operability Surveillance,” contains the same requirement.

OX1426.34 (OX1426.32) Section 1.2.24 states:

NRC IN 91-13 identified a concern with EDG tests not using adequate kW and kVAR loading. Seabrook's review of IN 91-13 is documented in Yankee Memo SBP-91-580, dated 10/16/91. The memo included a recommendation to increase the kVAR loading used during the tests when the EDG was paralleled with offsite power. The memo also indicated that it was acceptable to continue testing if the specified kVAR loading could not be achieved as long as an evaluation was performed to determine whether the limitation was because of grid conditions (high voltage) or was a problem with the EDG excitation system. The EDG T.S. Background Document (Memo CEM-98-061, dated 2/19/98) identified that the procedure steps, which accepted a kVAR loading less than the limits, also specify that an evaluation be performed to verify that the kVAR limitation is due to grid conditions and not problems with the voltage regulator. For this evaluation an observation that grid & bus voltages are higher than normal, that EDG VARS can be raised and lowered indicating VAR control, and no abnormal EDG operating parameters that could indicate a voltage regulator problem will be utilized.

The referenced “TS Background document” further describes that the selected VAR loading verifies that the EDG surveillance is performed at a power factor that represents the design load as determined in the EDG loading calculation.

The Tech Spec Bases 3/4.8.1 state:

Note that although no power factor requirements are established by SR 4.8.1.1.2a.6), the EDG is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine overloading of the EDG. Routine overloading may result in more frequent tear down inspections in accordance with vendor recommendations in order to maintain EDG OPERABILITY. Similarly, though not stated in footnote \*\*\*\*, momentary kVAR transients above the limit do not invalidate the test.

Per UFSAR 8.1, Seabrook is licensed to IEEE 387-77 and RG 1.9 Rev. 2. Previous reviews by the station have concluded that Seabrook EDG surveillance testing meets these requirements.

### **NRC RAI No. 2.**

On pages 2 and 3 of the LAR, the licensee states: "NextEra evaluated why previous voltage excursions on April 24, 2005 and December 7, 2005, on EDG-1B did not affect its ability to perform its safety function of providing backup power to the emergency bus. The subject voltage excursions lasted approximately 4.7 minutes and 5.3 minutes. The evaluation concluded that a voltage of about 6000 volts, although undesirable, will not damage the generator or exciter components."

Please provide the peak voltages experienced during the previous voltage excursions on EDG-1B on April 24, 2004, and December 7, 2005, and explain the reasons for these voltage excursions.

### **NextEra Response**

Engineering Evaluation EE-05-021 addresses the April 24, 2005 and December 7, 2005 voltage excursions on DG-1B.

April 24, 2005 event: MCB voltage indicator went off scale at about 5200V. The exact upper value was indeterminate due to instrument limitations.

Per AR170423 (CR 05-05540), the Apparent Cause Evaluation and Engineering Evaluation EE-05-022 identified a rectifier chassis SCR failure as the most probable cause for the voltage excursion.

December 7, 2005 event: MCB voltage indicator went off scale at about 5331V. The exact upper value was indeterminate due to instrument limitations.

Per AR88835 (CR 05-14748), the Apparent Cause Evaluation identified a degraded voltage regulator gate firing circuit board as the apparent cause.

**NRC RAI No. 3.**

Please provide a copy of the single line diagram showing the connection of one of the EDGs to an emergency bus and associated protections (protective relays, etc.) provided for the EDG.

**NextEra Response**

See Attachment 2 for drawing 1-NHY-310007, 4160V Switchgear Bus 1-E5 One Line Diagram. This drawing shows Bus-E5 and DG-1A,

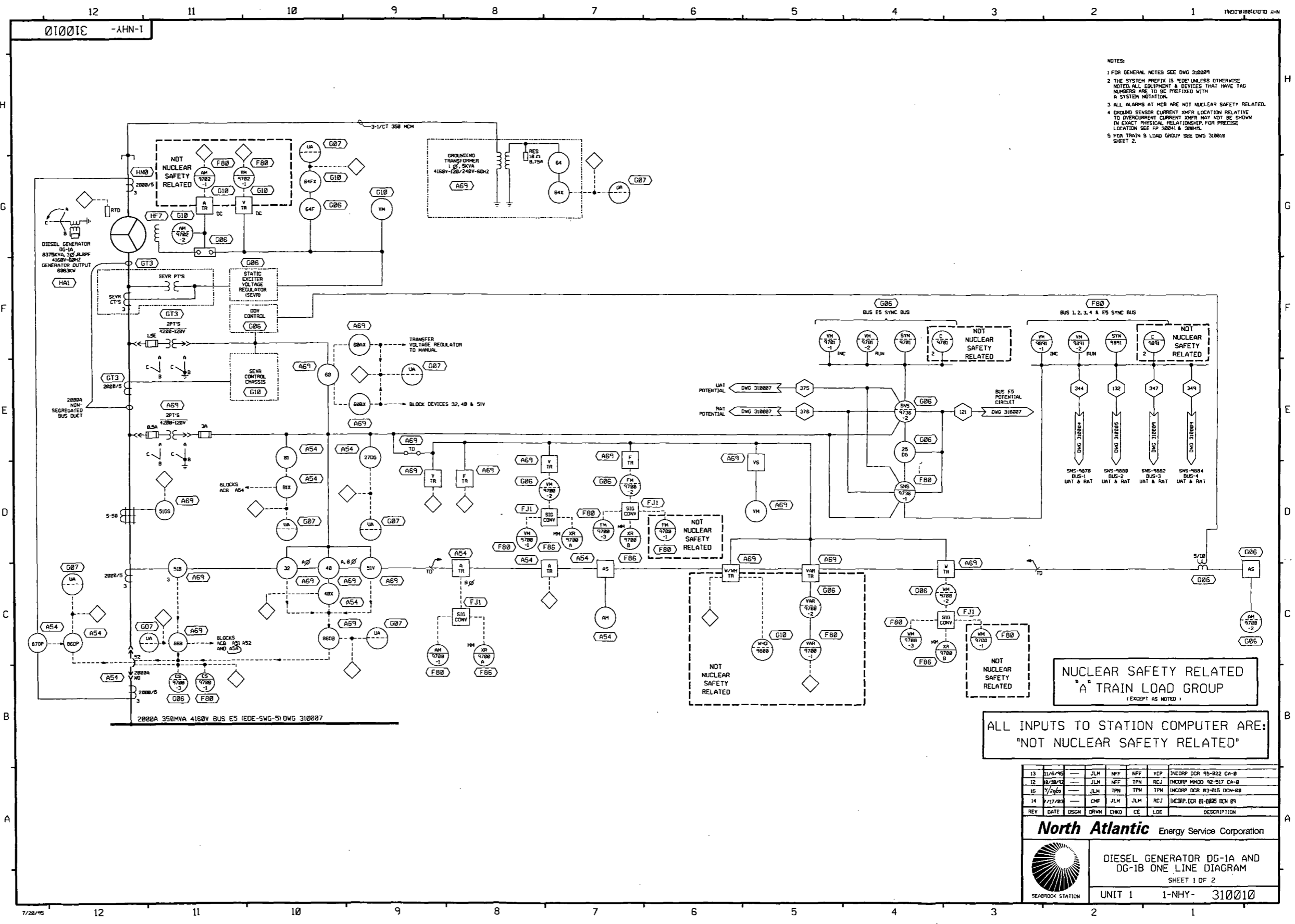
See Attachment 2 for drawing 1-NHY-310010, Sh. 1, Diesel Generator DG-1A and DG-1B One Line Diagram, for DG-1A protective relays.

**Attachment 2 to SBK-L-14225**

**Drawing 1-NHY-310007, 4160V Switchgear Bus 1-E5 One Line Diagram**

**Drawing 1-NHY-310010, Sh. 1, Diesel Generator DG-1A and DG-1B One Line Diagram**

**DG-1A protective relays**




- NOTES:
- 1 FOR GENERAL NOTES SEE DWG 3100P9
  - 2 THE SYSTEM PREFIX IS "00" UNLESS OTHERWISE NOTED. ALL EQUIPMENT & DEVICES THAT HAVE TAG NUMBERS ARE TO BE PREFIXED WITH A SYSTEM NOTATION.
  - 3 ALL ALARMS AT MCB ARE NOT NUCLEAR SAFETY RELATED.
  - 4 GROUND SENSOR CURRENT XFR LOCATION RELATIVE TO OVERCURRENT CURRENT XFR MAY NOT BE SHOWN IN EXACT PHYSICAL RELATIONSHIP. FOR PRECISE LOCATION SEE FP 30041 & 30045.
  - 5 FOR TRAIN B LOAD GROUP SEE DWG 3100I0 SHEET 2.

NUCLEAR SAFETY RELATED  
A TRAIN LOAD GROUP  
(EXCEPT AS NOTED)

ALL INPUTS TO STATION COMPUTER ARE:  
"NOT NUCLEAR SAFETY RELATED"

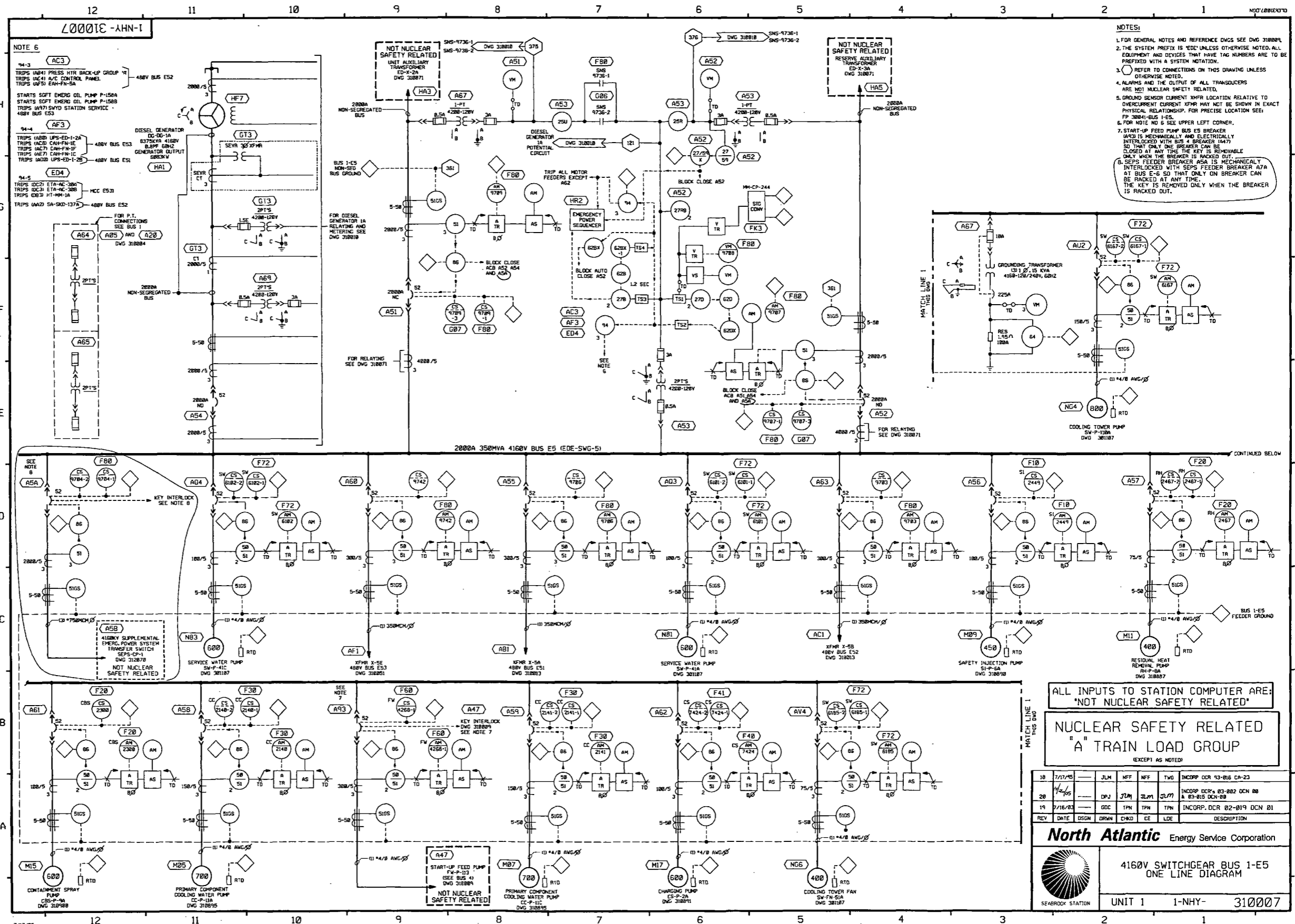
13	11/6/95	JLM	NFF	NFF	VEP	INCORP DCR 95-022 CA-0	
12	8/28/95	JLM	NFF	TPN	RCJ	INCORP MMOD 92-517 CA-0	
15	1/2/95	JLM	TPN	TPN	TPN	INCORP DCR 93-015 DCH-00	
14	1/17/93	DMF	JLM	JLM	RCJ	INCORP DCR 01-005 DCN 01	
REV	DATE	DSGN	DRWN	CHKD	CE	LDE	DESCRIPTION

**North Atlantic** Energy Service Corporation



DIESEL GENERATOR DG-1A AND DG-1B ONE LINE DIAGRAM  
SHEET 1 OF 2  
UNIT 1 1-NHY- 310010





- NOTES:**
1. FOR GENERAL NOTES AND REFERENCE DWGS SEE DWG 31000P.
  2. THE SYSTEM PREFIX IS EDE UNLESS OTHERWISE NOTED. ALL EQUIPMENT AND DEVICES THAT HAVE TAG NUMBERS ARE TO BE PREFIXED WITH A SYSTEM NOTATION.
  3. REFER TO CONNECTIONS ON THIS DRAWING UNLESS OTHERWISE NOTED.
  4. ALARMS AND THE OUTPUT OF ALL TRANSDUCERS ARE NOT NUCLEAR SAFETY RELATED.
  5. GROUND SENSOR CURRENT XPMR LOCATION RELATIVE TO OVERCURRENT CURRENT XPMR MAY NOT BE SHOWN IN EXACT PHYSICAL RELATIONSHIP. FOR PRECISE LOCATION SEE: FP 3804-BUS 1-E5.
  6. FOR NOTE NO 5 SEE UPPER LEFT CORNER.
  7. START-UP FEED PUMP BUS ES BREAKER (A47) IS MECHANICALLY AND ELECTRICALLY INTERLOCKED WITH BUS 4 BREAKER (A47) SO THAT ONLY ONE BREAKER CAN BE CLOSED AT ANY TIME. THE KEY IS REMOVABLE ONLY WHEN THE BREAKER IS RACKED OUT.
  8. SEPS FEEDER BREAKER (A7A) IS MECHANICALLY INTERLOCKED WITH SEPS FEEDER BREAKER (A7A) AT BUS E-6 SO THAT ONLY ONE BREAKER CAN BE RACKED AT ANY TIME. THE KEY IS REMOVABLE ONLY WHEN THE BREAKER IS RACKED OUT.

**NOTE 6**

94-3 (AC3)  
TRIPS (A41) PRESS WTR BACK-UP GROUP  
TRIPS (A41) A/C CONTROL PANEL  
TRIPS (A45) EAH-FN-5A

STARTS SOFT EMERG OIL PUMP P-150A  
STARTS SOFT EMERG OIL PUMP P-150B  
TRIPS (A71) STATION SERVICE - 480V BUS E53

94-4 (AF3)  
TRIPS (A80) UPS-ED-1-2A  
TRIPS (A82) COH-FN-1E  
TRIPS (A87) COH-FN-1F  
TRIPS (A87) COH-FN-1C  
TRIPS (A80) UPS-ED-1-2B

94-5 (E04)  
TRIPS (DC2) ETA-AC-300  
TRIPS (DC3) ETA-AC-300  
TRIPS (DC3) ET-MW-10  
TRIPS (A42) SA-SKD-137A

FOR R.T. CONNECTIONS SEE BUS 1 DWG 31000A

(A64) (A85) AND (A20)  
2P1'S

(A65)  
2P1'S

ALL INPUTS TO STATION COMPUTER ARE:  
"NOT NUCLEAR SAFETY RELATED"

NUCLEAR SAFETY RELATED  
"A" TRAIN LOAD GROUP  
(EXCEPT AS NOTED)

18	7/17/85	JLM	NFF	NFF	TWG	INCORP DCR 93-016 CA-23
20	7/20/85	DPJ	JLM	3LM	DU/M	INCORP DCR 93-002 DCN 00 & 93-015 DCN 00
19	7/16/85	GDC	TPN	TPN	TPN	INCORP DCR 92-019 DCN 01
REV	DATE	DSGN	DRWN	CHKD	CE	LOE

**North Atlantic** Energy Service Corporation



4160V SWITCHGEAR BUS 1-E5  
ONE LINE DIAGRAM

UNIT 1 1-NHY- 310007