Entergy

Entergy Operations, Inc.
River Bend Station
5485 U.S. Highway 61N
St. Francisville, LA 70775
Tel 225-381-4374

Eric Olson
Site Vice President

RBG-47572

June 3, 2015

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to Request for Information - Change to Technical Specification 3.8.1, "AC Sources – Operating"
River Bend Station, Unit 1
Docket No. 50-458
License No. NPF-47

References
1. Entergy letter, Application for Change to Technical Specification 3.8.1, "AC Sources – Operating" dated July 9, 2014 (RBG-47461)
2. NRC email, River Bend Station Unit 1 License Amendment Request for Change to Technical Specifications 3.8.1, "AC Sources - Operating" (MF4421) dated January 20, 2015
3. Entergy letter, Response to Request for Information - Change to Technical Specification 3.8.1, "AC Sources — Operating" dated May 7, 2015
4. NRC email, River Bend Station Unit 1 License Amendment Request for Change to Technical Specifications 3.8.1, "AC Sources - Operating" (MF4421) dated May 04, 2015

Dear Sir or Madam:

In Reference 1 Entergy submitted a request for an amendment to the Technical Specifications (TS) for River Bend Station (RBS), Unit 1, modifying the existing Surveillance Requirements (SRs) related to Technical Specification 3.8.1, "AC Sources – Operating." In References 2 and 3, are NRC Staff requested additional information to continue their review of the request and Entergy's response.

In reference 4 the NRC Staff requested plant documents identified in the response to the initial request for information.

A001
NRR

These documents are attached as follows;

Attachment 1 provides corrective action program information,
Attachment 2 provides Updated Safety Analysis Report changes associated with this request, and
Attachment 3 provides information on the design changes associated with this request.

Please contact Mr. J. A. Clark at (225) 381-4177, if you have any questions.

I declare under penalty of perjury that the foregoing is true and correct. Executed on June 3, 2015.

Sincerely,

EO/JAC/bmb

Attachments:
1. Corrective Action Program Information
2. Updated Safety Analysis Report changes
3. Design Change Information

cc: Regional Administrator
U. S. Nuclear Regulatory Commission, Region IV
1600 East Lamar Blvd.
Arlington, TX 76011-4511

NRC Senior Resident Inspector
P. O. Box 1050
St. Francisville, LA 70775

U. S. Nuclear Regulatory Commission
Attn: Mr. Alan Wang
MS O-8B1
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Department of Environmental Quality
Office of Environmental Compliance
Radiological Emergency Planning and Response Section
Ji Young Wiley
P.O. Box 4312
Baton Rouge, LA 70821-4312

Public Utility Commission of Texas
Attn: PUC Filing Clerk
1701 N. Congress Avenue
P. O. Box 13326
Austin, TX 78711-3326

RBF1-15-0078
LAR 2014-02

Attachment 1

RBG-47572

Corrective Action Program Information

1. By the letter dated February 24, 2015, in response to RAI 4, the licensee stated that "The CDBI [Component Design Basis Inspection] finding was documented in the River Bend corrective action program." Please provide from the corrective action program relative information regarding this amendment.

Response

Corrective Action Program information enclosed.

Extracted from CR-RBS-2011-7132

Entergy	**CONDITION REPORT**	**CR-RBS-2011-07132**

Originator: Blackledge,Charles
Originator Group: Eng DE Electrical Staff RBS
Supervisor Name: Arms,Jason C
Discovered Date: 09/30/2011 10:29

Originator Phone: 4896
Operability Required: Y
Reportability Required: Y
Initiated Date: 09/30/2011 12:11

Condition Description:

During Component Design Basis Inspection at River Bend Station, the NRC inspector questioned if the Surveillance Requirement (SR) for testing the Standby DGs is acceptable.

Division I and II DGs are tested at 3030-3130 kW per the 24-Hour run Tech Spec surveillance (3.8.1.14). This surveillance requires demonstration once per 24 months that the DGs can start and run continuously for an interval of not less than 24 hours at a load greater than or equal to the maximum expected post accident load.

E-192 is the Standby Diesel Generator Loading Calculation. The purpose of this calculation is to determine the loading of the standby diesel generators during a loss of coolant accident (LOCA) concurrent with a loss of offsite power (LOP) under various conditions. In order to account for worst case loading conditions, maximum Tech Spec allowed voltage of 4580 VAC is used for calculating static loads and the maximum Tech Spec allowed frequency of 61.2 Hz is used for calculating total motor loads. Using this methodology, maximum total automatically started loads is 3122.06 kW and 2971.59 kW for division I and II DGs, respectively.

The specific challenge of adequacy involves whether or not the Division I maximum calculated loading (3122.06 kW) is sufficiently tested by the Surveillance Requirement of 3030-3130 kW. The Division II DG calculated maximum loading is less than the lower limit used for the Surveillance Requirement, therefore it meets SR 3.8.1.14 requirements.

Immediate Action Description:

Discussed with STA and Design Engineering Electrical Supervisor. Initiated condition report.

Suggested Action Description:

REFERENCE ITEMS:

Type Code	Description
CALCULATION	E-192
ECR/EC	EC 40578
NON CITED VIOLATION	2011 CDBI - IR 2011-08
NRC MINOR VIOLATION	2011 CDBI - MV on motor efficiencies also included in this CR
OTHER	LAR 2012-06

TRENDING (For Reference Purposes Only):

Trend Type	Trend Code
REPORT WEIGHT	3
HEP FACTOR	H
INPO BINNING	CM1
KEYWORDS	KW-HU LOW
KEYWORDS	KW-CALCULATION
CA	ESDE
KEYWORDS	KW-EMERGENCY DIESEL GENERATOR
KEYWORDS	KW-MARGIN REVIEW
LT-NRC RESPONSE	CA-15

~~TRENDING (For Reference Purposes Only):~~

Trend Type	Trend Code
LT-NRC RESPONSE	CA-17
LT-MOD/DESIGN	CA-16

Entergy	**OPERABILITY**	**CR-RBS-2011-07132**

OperabilityVersion: 1

Operability Code: OPERABLE-OP EVAL

Immediate Report Code: NOT REPORTABLE

Performed By: Wilson,Daniel W 10/01/2011 03:14

Approved By: Carter,Steven T 10/01/2011 03:26

Operability Description:

This condition report documents that during Component Design Basis Inspection at River Bend Station, the NRC inspector questioned if the Surveillance Requirement (SR) for testing the Standby DGs is acceptable.

The onsite standby power source for each 4.16 kV ESF bus is a dedicated DG. A DG starts automatically on loss of coolant accident (LOCA) signal (i.e., low reactor water level signal or high drywell pressure signal) or on an ESF bus degraded voltage or undervoltage signal (refer to LCO 3.3.8.1, "Loss of Power (LOP) Instrumentation"). In the event of a loss of preferred power, the ESF electrical loads are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a Design Basis Accident (DBA) such as a LOCA.

Division I and II DGs are tested at 3030-3130 kW per the 24-Hour run Tech Spec surveillance (3.8.1.14). This surveillance requires demonstration once per 24 months that the DGs can start and run continuously for an interval of not less than 24 hours at a load greater than or equal to the maximum expected post accident load.

The kW band referenced above does not sufficiently test diesel loading for the worst case postulated loading as calculated in E-192, Standby Diesel Generator Loading Calculation. This worst case loading is based on generator output frequency and voltage having drifted to their highest values allowed by TS. It can be shown, however, that the worst case calculated loading based on historical values for frequency and voltage is exceeded by diesel load testing. By demonstrating that the diesel load testing exceeds the worst case calculated loading based on historical frequency and voltage, it is shown that the diesel is capable of supplying all anticipated loading, and thus meeting the intention of the load testing surveillances.

Based on previous ECCS testing (9/2009 & 1/2011) of the Division I DG, maximum frequency and voltage were determined to be 60.21 Hz and 4149.70 VAC, respectively. The maximum loading during Surveillance Requirement (SR) 3.8.1.14 testing of the Division I DG (6/2011 & 12/2009) was 3100 kW.

Based on the test data and factoring in margin for instrument inaccuracies, a new worst case DG loading was calculated to be 3022.83 kW (calculation below) with a worst case actual loading of 3068.32 kW. Since the calculated loading is less than the actual test loading, the surveillance requirement is met.

Calculation:

Frequency

Instrument inaccuracy 1.0002%
Max tested freq 60.21 Hz
Calculated freq 60.82 Hz (60.21 x 1.010002)
Nominal motor load 2666.06 kW (from E-192)
Max motor load 2776.61 kW (2666.06 x (60.82/60.00)3)

Voltage

Instrument inaccuracy 1.1180%
Max tested voltage 4149.70 VAC
Calculated voltage 4196.09 VAC (4149.70 x 1.011180)
Nominal static load 242 kW (from E-192)
Max static load 246.22 kW (242 x (4196.09/4160)2)

Total Load

Total load 3022.83 kW (2776.61 + 246.22)

Power

Instrument inaccuracy□ 1.0220%
Max tested power□□3100 kW
Calculated power□□3068.32 kW□(3100 - (3100 x 0.010220))

Per EN-OP-104 Rev 5, this condition is marked with an Operability Code of "OPERABLE - OP EVAL". CA-1 is being issued to perform an operability evaluation for this condition. See the attached EN-OP-104 Attachment 9.2. The condition is not immediately reportable per EN-LI-108.

Approval Comments:

Attachments:

Opperability Description
9.2

Entergy	**OPERABILITY**	**CR-RBS-2011-07132**

OperabilityVersion: 2

Operability Code: OPERABLE DNC

Immediate Report Code: NOT REPORTABLE

Performed By: Hall,Douglas W 10/07/2011 21:55

Approved By: Naylor,Thomas M 10/07/2011 23:00

Operability Description:

Based on the engineering evaluation attached to CR-RBS-2011-71132 CA-1, and discussions with Operations, Engineering recommends the Division 1 DG be considered Operable Degraded/Non conforming condition (OPERABLE-DNC). The evaluation concludes that the Division I Diesel generator is capable of performing its safety function. It is demonstrated that the Division I Diesel is capable of carrying the worst case expected load given the known condition of the generator governor and voltage regulator. This conclusion is based on past ECCS test results and data recorded during the most recent Division 1 DG monthly run.

The tested load band used in the 24-hour run surveillance, and the related Tech Spec / Bases, are non conservative in relation to the worst case expected loading calculated in E-192. As a result, short term measures are outlined in the engineering evaluation. Therefore per EN-OP-104 Rev 5, this condition is marked with an Operability Code of "Operable-DNC" and will be monitored per EN-OP-104 Rev 5 section 5.6. No further functionality review needs to be performed. The condition is not immediately reportable per EN-LI-108.

Approval Comments:

Entergy	**OPERABILITY**	**CR-RBS-2011-07132**

OperabilityVersion: 3

Operability Code: OPERABLE

Immediate Report Code: NOT REPORTABLE

Performed By: Morrissette,Troy 03/16/2013 03:17

Approved By: Carter,Steven T 03/16/2013 07:27

Operability Description:

Version 3 Operablity is being performed based on engineering input from CA-15.

Calculation E-192, Standby Diesel Generator Loading Calculation, has been revised to remove some of the inherent over-conservatism in the calculation. This was done by performing a pump power analysis to more accurately depict diesel loads. In addition, a License Amendment Request (LAR 2012-06) was prepared to lower the maximum allowable Technical Specification frequency and voltage. This will provide additional margin since the loading calculation considers maximum frequency and voltage when calculating worst case post accident diesel loading. The LAR also raises the lower surveillance requirement test band to 3050 kW. The main control room heater, HVC-CH1A was evaluated and removed from the automatically started loads on the Division I Diesel Generator (DG). Lighting panel LAC-PNL1C9 was also removed from the automatically started loads since this load is normally connected to the Division II DG.

Procedure changes have been made to limit diesel generator frequency and voltage to the new proposed Technical Specification maximum and raise the surveillance requirement test band to the new proposed lower limit until the LAR is approved and the Technical Specifications are changed. Procedural guidance is provided to allow the HVC-CH1A and LAC-PNL1C9 loads to be added to the Division I DG after the Low Pressure Core Spray (LPCS) pump is secured, 10 minutes after Loss of Coolant Accident (LOCA) initiation.

The result of the calculation and procedure changes ensures that the worst case post accident loading as calculated by E-192 (2933 kW) is below the lower limit of the surveillance requirement test band (3050 kW) at all times. This provides verification that the Division I diesel generator is capable of performing its design function to supply AC power for electrical loads which are required for a safe reactor shutdown and to mitigate the consequences of a LOCA.

Since Division I diesel generator is capable of performing its design function to supply AC power for electrical loads which are required for a safe reactor shutdown and to mitigate the consequences of a LOC, Division I diesel generator is OPERABLE.

No Degraded or Nonconforming Condition exists per EN-OP-104 Revision 6 Attachment 9.1 Table 1. Therefore per EN-OP-104 Rev 6, this condition is marked with an Operability Code of "Operable" and no further functionality review needs to be performed. The condition is not immediately reportable per EN-LI-108.

Approval Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 1

	Group	Name
Assigned By:	Operations Mgmt RBS	Naylor,Thomas M
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :	Eng DE Electrical Staff RBS	Blackledge,Charles

Originated By:	Wilson,Daniel W	9/30/2011 19:35:43
Performed By:	Arms,Jason C	10/7/2011 21:26:22
Subperformed By:	Blackledge,Charles	10/7/2011 21:24:43
Approved By:		
Closed By:	Naylor,Thomas M	10/7/2011 21:45:07

Current Due Date: 10/07/2011 **Initial Due Date:** 10/07/2011

CA Type: OPERABILITY INPUT **CA Priority:**

Plant Constraint: NONE

CA Description:

Perform an Operability Evaluation to determine whether or not the Division I maximum calculated loading (3122.06 kW) is sufficiently tested by the Surveillance Requirement of 3030-3130 kW.

See attached EN-OP-104 Attachment 9.2.

Response:

approved. Ken Klamert prepared the Op Eval. Jason Arms and Faleisha Corley performed reviews.

Subresponse :

See attached Op Eval for the Division I DG.

Closure Comments:

The Operability Evaluation attached to the sub response meets the expected requirements. No additional actions are required for this corrective action.

Attachments:

Subresponse Description
Div 1 DG op eval

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 2

	Group	Name
Assigned By:	NSA Licensing Staff RBS	Williamson,Danny H
Assigned To:	NSA Licensing Staff RBS	Williamson,Danny H
Subassigned To :		

Originated By:	Williamson,Danny H	10/4/2011 06:25:05
Performed By:	Williamson,Danny H	10/18/2011 06:42:1[illegible]
Subperformed By:		
Approved By:		
Closed By:	Williamson,Danny H	10/18/2011 06:42:2[illegible]

Current Due Date: 10/19/2011 **Initial Due Date:** 10/19/2011

CA Type: REGULATORY **CA Priority:**

Plant Constraint: NONE

CA Description:

Revaluate the reportability of this condition.

Response:

The engineering evaluation confirmed that the DGs have been and remain capable of performing their safety function. Per the guidance of NRC Administrative Letter 98-10, a nonconservative Technical Specification is to be treated as a degraded / nonconforming condition, with appropriate compensatory action taken, including timely action to amend the operating license to correct the condition.

Subresponse :

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 3

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Corley,Faleisha W
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :	Eng DE Electrical Staff RBS	Blackledge,Charles

Originated By:	Zzrbscrg	10/4/2011 12:03:52
Performed By:	Arms,Jason C	10/27/2011 18:56:27
Subperformed By:	Arms,Jason C	10/27/2011 18:56:17
Approved By:		
Closed By:	Arms,Jason C	10/27/2011 18:56:27

Current Due Date: 10/27/2011 **Initial Due Date:** 10/27/2011

CA Type: DISP - CA **CA Priority:**

Plant Constraint: NONE

CA Description:

You have been assigned as the Responsible Manager for this Category "C", Non-Significant Condition Report by the CRG Address/correct the identified condition per EN-LI-102. Perform disposition review, investigate as needed, and ensure actions are assigned as applicable to correct the problem

Response:

approved.

Subresponse :

This CR is being taken to CRG for closure to CR11-07308. CA 6 initiated to present to CRG.

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 4

	Group	Name
Assigned By:	Eng P&C Mgmt RBS	Antoine,Jane E
Assigned To:	Eng Sys Mgmt RBS	Wilson,Adrainne J
Subassigned To :	Eng Sys Mgmt RBS	Whetstone,Alisha Lyn Frederickson

Originated By:	Antoine,Jane E	10/11/2011 15:20:0[illegible]
Performed By:	Wilson,Adrainne J	10/27/2011 03:32:3[illegible]
Subperformed By:	Whetstone,Alisha Lyn Frederickson	10/26/2011 15:24:5[illegible]
Approved By:		
Closed By:	Wilson,Adrainne J	10/27/2011 03:32:3[illegible]

Current Due Date: 10/28/2011 **Initial Due Date:** 10/28/2011

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Establish a testing method to test diesel load to an indicated 3130kW to bound the worst case expected load during 24-hour and 1-hour Division 1 DG runs prior to the next STP-309-0201 surveillance. This is an administrative action identified during the performance of the operability evaluation of the condition in this CR. The due date is selected to support the performance of the next one hour run, currently scheduled for 11/2/11.

Response:

approved.

Subresponse :

STP-309-0201, STP-309-0206, and STP-309-0611 have been revised to increase the load to 3130kW indicated on a Fluke 45 for 5 min after the completion of a successful STP run.

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 5

	Group	Name
Assigned By:	Eng P&C Mgmt RBS	Antoine,Jane E
Assigned To:	Operations Mgmt RBS	Krause,Glenn M
Subassigned To :	Operations Procedure Staff RBS	Melancon,August P

Originated By:	Antoine,Jane E	10/11/2011 15:22:19
Performed By:	Krause,Glenn M	10/25/2011 17:50:39
Subperformed By:	Rouchon,Anthony A	10/25/2011 16:05:20
Approved By:		
Closed By:	Schenk,Timothy A	10/26/2011 05:42:35

Current Due Date: 10/28/2011 **Initial Due Date:** 10/28/2011

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Change diesel procedures to capture the frequency and voltage from ERIS when the diesel is isochronous (i.e. ? prior to closing the output breaker during 1hr and 24hr runs, and during ECCS testing). Voltage or frequency above 4151 VAC and 60.22 Hz, respectively, may invalidate this op eval and require further evaluation. Initiate a Condition Report if either of these conditions occurs. This is an administrative action identified during the performance of the operability evaluation of the condition in this CR. The due date is selected to support the performance of the next one hour run, currently scheduled for 11/2/11.

Response:

Agree with sub-response, this action may be closed.

Subresponse :

STP-309-0201 Rev 46, STP-309-0206 Rev 19, and STP-309-0611 Rev 36 issued 10/25/2011 were revised to capture the frequency and voltage from ERIS prior to making any adjustments or closing the output breaker during 1hr, 184 day, and 24hr runs (sufficient ERIS data is already collected in the existing revision of the ECCS test). A step was also added that if voltage or frequency is noted above 4151 VAC and 60.22 Hz, respectively, then initiate a Condition Report. This action is complete and should be closed.

Closure Comments:

Action completed and acceptable for closure.

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 6

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Arms,Jason C	10/27/2011 18:57:1[illegible]
Performed By:	Blackledge,Charles	11/10/2011 14:05:4[illegible]
Subperformed By:		
Approved By:		
Closed By:	Blackledge,Charles	11/10/2011 14:05:4[illegible]

Current Due Date: 11/11/2011 **Initial Due Date:** 11/11/2011

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Present to CRG to close this CR to B level CR-RBS-2011-07308.

Response:

Based on discussion with CA&A, it was determined that PCRS will not permit closure of a CR with an Operability code of OP-DNC. Therefore this action is no longer required.

Subresponse :

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 7

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Corley,Faleisha W
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :		

Originated By:
Performed By:
Subperformed By:
Approved By:
Closed By: Zzrbscrg 10/31/2011 13:18:5(

Current Due Date: 11/22/2011 **Initial Due Date:** 11/23/2011
CA Type: ACTION **CA Priority:**
Plant Constraint: NONE

CA Description:

Per the CRG, CR-RBS-2011-07740 was Administratively Closed to this CR. As Responsible Manager for this CR, ensure that the condition documented in that CR is appropriately addressed within the scope of this CR?s Corrective Action Plan.

CR Condition Summary: This condition does not impact the design function of the standby diesel generators (DG).

During NRC Component Design Basis Inspection (CDBI), two errors were found in calculation E-192 (Standby Diesel Generator Loading Calculation) in the section for calculating running kilowatts for each component. It was discovered that the efficiencies used for two components do not match the values found in the motor data sheets. This results in a non-conservative calculated value for running kilowatts in one instance.

Low Pressure Core Spray, Standby Gas Treatment Fans, Drywell Unit Coolers, Standby Service Water Pumps, Residual Heat Removal Pumps, Control Building Chillers, and Containment Unit Coolers were reviewed. Of these components, the Standby Gas Treatment Fans (GTS-FN1A/B) have a non-conservative error in efficiency that adds 0.37 kW to the automatically started loads in E-192 for each division (see attached calculation).

Adding this increase to the most limiting division?s loading for automatically started loads (3122.06 kW, Div I DG) that is currently shown in E-192, gives a value of 3122.43 kW, which is below the continuous DG rating of 3130 kW indicated. This does not impact the design function of the DGs, nor does it affect the conclusion of the operability evaluation performed for the Division I DG under CR-RBS-2011-7132.

The Drywell Unit Coolers (DRS-UC1A-F) were also found to have an error in efficiency. This error results in no additional kW loading because the efficiency used (90.5%) is more conservative than the efficiency from the motor data sheets (91.5%). When using the actual efficiency of 91.5% along with the Brake Horsepower (BHP) from the motor performance curves (58 BHP), the kW loading obtained is 47.3 kW for the Drywell Unit Coolers. Likewise, using 90.5% efficiency with 57.4 BHP (actual average BHP) results in a load of 47.3 kW. Since the calculated BHP is the same using both methods, there is no additional loading added to E-192 due to this error.

Response:

Subresponse :

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 8

	Group	Name
Assigned By:	Operations Mgmt RBS	Zahorchak,Russell L
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :	Eng DE Electrical Staff RBS	Blackledge,Charles

Originated By:	Zahorchak,Russell L	11/4/2011 00:09:21
Performed By:	Arms,Jason C	11/17/2011 16:48:09
Subperformed By:	Blackledge,Charles	11/17/2011 15:30:48
Approved By:		
Closed By:	Arms,Jason C	11/17/2011 16:48:09

Current Due Date: 11/17/2011 **Initial Due Date:** 11/17/2011

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Based on STP data documented in CR-2011-7872, Evaluate follow up monitoring actions provided in CR-2011-7132 operability evaluation and revise as required.

Response:

approved

Subresponse :

This is a duplicate corrective action (CA). See CR-RBS-2011-7872 CA-3 for response.

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 9

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Arms,Jason C	11/17/2011 16:56:0(
Performed By:	Arms,Jason C	1/19/2012 23:29:55
Subperformed By:		
Approved By:		
Closed By:	Arms,Jason C	1/19/2012 23:29:55

Current Due Date: 01/19/2012 **Initial Due Date:** 01/19/2012

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

This CA was created because CA7 was inadvertently closed.

Per the CRG, CR-RBS-2011-07740 was Administratively Closed to this CR. As Responsible Manager for this CR, ensure that the condition documented in that CR is appropriately addressed within the scope of this CR?s Corrective Action Plan.

CR Condition Summary: This condition does not impact the design function of the standby diesel generators (DG).

During NRC Component Design Basis Inspection (CDBI), two errors were found in calculation E-192 (Standby Diesel Generator Loading Calculation) in the section for calculating running kilowatts for each component. It was discovered that the efficiencies used for two components do not match the values found in the motor data sheets. This results in a non-conservative calculated value for running kilowatts in one instance.

Low Pressure Core Spray, Standby Gas Treatment Fans, Drywell Unit Coolers, Standby Service Water Pumps, Residual Heat Removal Pumps, Control Building Chillers, and Containment Unit Coolers were reviewed. Of these components, the Standby Gas Treatment Fans (GTS-FN1A/B) have a non-conservative error in efficiency that adds 0.37 kW to the automatically started loads in E-192 for each division (see attached calculation).

Adding this increase to the most limiting division?s loading for automatically started loads (3122.06 kW, Div I DG) that is currently shown in E-192, gives a value of 3122.43 kW, which is below the continuous DG rating of 3130 kW indicated. This does not impact the design function of the DGs, nor does it affect the conclusion of the operability evaluation performed for the Division I DG under CR-RBS-2011-7132.

The Drywell Unit Coolers (DRS-UC1A-F) were also found to have an error in efficiency. This error results in no additional kW loading because the efficiency used (90.5%) is more conservative than the efficiency from the motor data sheets (91.5%). When using the actual efficiency of 91.5% along with the Brake Horsepower (BHP) from the motor performance curves (58 BHP), the kW loading obtained is 47.3 kW for the Drywell Unit Coolers. Likewise, using 90.5% efficiency with 57.4 BHP (actual average BHP) results in a load of 47.3 kW. Since the calculated BHP is the same using both methods, there is no additional loading added to E-192 due to this error.

Response:

EC 32640 has been prepared/reviewed/approved to fix the condition noted in the Condition Report related to incorrect efficiencies in calculation E-192 for Standby Gas Treatment Fans and Drywell Unit Coolers. No further action is required. EC32640 is at Closed status. EC markups may be incorporated once this EC status is achieved.

Subresponse :

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 10

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Borazanci,Erkan R
Subassigned To :		

Originated By:	Arms,Jason C	12/16/2011 12:05:1
Performed By:	Borazanci,Erkan R	12/28/2011 13:27:5
Subperformed By:		
Approved By:		
Closed By:	Matzke,Paul R	12/29/2011 08:27:0

Current Due Date: 12/29/2011 **Initial Due Date:** 12/29/2011

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Prepare contract for Sargent and Lundy to perform study on restoration of Diesel operability.

Response:

Contract Requisition (CR) No. 2165927 has been prepared and released for review for the Contract Order. The CR is required to be reviewed by reviewer, Echelon, RBS-SBM, and RBS DE-Manager prior to approval. The required action per this CA is completed.

Subresponse :

Closure Comments:

Approved

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 11

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Arms,Jason C	12/16/2011 12:09:0
Performed By:	Blackledge,Charles	4/17/2012 10:36:29
Subperformed By:		
Approved By:		
Closed By:	Arms,Jason C	4/18/2012 15:30:19

Current Due Date: 04/19/2012 **Initial Due Date:** 04/19/2012

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Hold meeting (DE, SE, Ops, and Licensing) to discuss long term solutions (i.e. surveillance change, calculation change), based on input from the Engineering Study.

Response:

A meeting was conducted on 4/3/12 with Operations (Gates), Licensing (Burmeister), Systems Engineering (Frederickson/Klamert), and DE Electrical (Blackledge/Arms).

Issues dicussed included the following proposed methods to restore margin to the Standby Diesel Generators:

1. Change the Standby Diesel Generator governor setpoint. The engineering work will be performed by S&L. The field work will be completed by I&C maintenance during the Standby Diesel Generator super outages, scheduled for 12/2012 (Division 1) and 2013 (Division 2).

2. Revise the Diesel Generator loading calculations to reduce loads (pump power analysis). This will be performed by S&L.

3. Lower Tech Spec maximum frequency (from 61.2 Hz to 60.2 Hz). The License Amendment Request (LAR) preparation will be performed by S&L. Nuclear Regulatory Commission (NRC) approval of the LAR is expected to be completed by 09/2013.

4. Modify procedures to raise the minimum testing band from 3000 kW to 3050 kW. LAR preparation will be performed by S&L. NRC approval of the LAR is expected to be completed by 09/2013.

There were no challenges raised that would prevent the design and implementation of the proposed solutions. There was a recommendation from Operations that we contact other sites within the industry that have undergone similar design changes to get a list of challenges they faced. LO-WTRBS-2008-00027 CA-00771 has been initiated to track completion of this task. No further actions are required.

Subresponse :

Closure Comments:

approved

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 12

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Arms,Jason C	12/16/2011 12:10:4[illegible]
Performed By:	Blackledge,Charles	4/24/2012 11:01:14
Subperformed By:		
Approved By:		
Closed By:	Arms,Jason C	5/2/2012 06:05:43

Current Due Date: 05/03/2012 **Initial Due Date:** 05/03/2012

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Provide the updated solution to URT for approval.

Response:

The options to resolve the Division I Diesel Generator Non-Comformance were presented to the URT on 4/9/12. The proposed options are as follows:

1. Change the Standby Diesel Generator governor setpoint. The engineering work will be performed by S&L and the field work will be completed by I&C maintenance.

2. Revise Diesel Generator loading calculations to reduce loads (pump power analysis). This Engineering Change will be performed by S&L.

3. Lower Tech Spec maximum frequency (from 61.2 Hz to 60.2 Hz). The License Amendment Request (LAR) preparation will be performed by S&L.

4. Modify procedures / Tech Specs to raise the minimum testing band from 3000 kW to 3050 kW. LAR preparation will be performed by S&L.

These actions will adequately address the non-conformance such that all testing conditions required by Tech Spec Surveillance Requirements will be bounded by the calculated worst case accident loading. These options were accepted by the URT.

CA-15 has been initiated to track completion of the revision to calculation E-192, Standby Diesel Generator Loading (due 10/18/12).

CA-16 has been initiated to track completion of the governor setpoint change for the Division 1 diesel (due 12/21/12).

CA-17 has been initiated to track completion of the Tech Spec frequency change and raising the minimum Surveillance Requirement test band to 3050 kW following License Ammendment Request approval from the Nuclear Regulatory Commission (due 10/15/13).

No further action is required.

Subresponse :

Closure Comments:

approved

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 13

	Group	Name
Assigned By:	NSA Director RBS	Roberts,Jerry C
Assigned To:	Eng Design Mgmt RBS	Corley,Faleisha W
Subassigned To :	Eng DE Electrical Staff RBS	Blackledge,Charles

Originated By:	Zzrbscrg	12/16/2011 22:36:2[illegible]
Performed By:	Matzke,Paul R	3/16/2013 03:55:42
Subperformed By:	Blackledge,Charles	3/16/2013 03:42:02
Approved By:		
Closed By:	Roberts,Jerry C	3/16/2013 06:39:19

Current Due Date: 03/27/2013 **Initial Due Date:** 03/27/2013

CA Type: ODNC **CA Priority:** 4

Plant Constraint: RF17 - MODE 2

CA Description:

Operable-DNC or Comp Meas condition (formerly SDNC)

This Condition Report has been flagged as an Operable - Degraded Non-conforming or Operable-Compenstory Measures condition CR. You have been assigned as the responsible manager for this CR and this action has been flagged as both a restraint to the next refueling outage and as an Operable-DNC or Comp Meas CA Type action. OSRC Approval to Extend the Operability for another cycle is required prior to H/U from the next Outage of sufficient Duration (OSD) if the correction of this condition is deferred.

You should issue a specific action to resolve the Operable-DNC or Comp Meas condition and mark it as both an outage restraint and Operable-DNC or Comp Meas CA Type action.

IF a Work Order will be utilized to correct this condition, THEN contact CA&A or PS&O and ensure the GL 91-18 Plant Effect code is added to Task 1 of the Work Order.

This action or a similar administrative action will remain open in this CR until the degraded condition is resolved to track approval of any extensions beyond an operating cycle.

Response:

Approved

Subresponse :

This action was initiated to issue a specific action to resolve the Operable-DNC or Comp Measure condition and mark it as both an outage restraint and Operable-DNC or Comp Meas CA Type action.

CA-15 has been initiated to track completion of the revision to calculation E-192, Standby Diesel Generator Loading. This action has been marked as an Operable-DNC type / outage restraint action. CA-15 is now closed as calc E-192 is in MODIFIED status. No further action is required.

Closure Comments:

Concur with closure.

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 14

	Group	Name
Assigned By:	NSA CA&A Mgmt RBS	Vines,Christopher Dale
Assigned To:	Eng Design Mgmt RBS	Corley,Faleisha W
Subassigned To :	Eng Design Mgmt RBS	Arms,Jason C

Originated By:	Phillips,Susan M	4/9/2012 07:46:08
Performed By:	Arms,Jason C	4/25/2012 14:40:33
Subperformed By:	Blackledge,Charles	4/24/2012 17:02:55
Approved By:		
Closed By:	Arms,Jason C	4/25/2012 14:40:33

Current Due Date: 04/26/2012 **Initial Due Date:** 04/26/2012

CA Type: PERIODIC REVIEW **CA Priority:**

Plant Constraint: NONE

CA Description:

Interim and Periodic Review Required
(NOTE - an Interim Review requires both "Responsible Manager" AND a Director or Above" approval).
Conduct and document an interim review of this Condition Report using the "CR Interim and Periodic Review Checklist", Attachment 9.8 of EN-LI-102 which is available via the Reference Library ECH Site in the Nuclear Management Manual Common Forms section. Consider any open CAs for Long Term classification per Attachment 9.9 of EN-LI-102.

Response:

approved

Subresponse :

The interim review required by this corrective action is complete and documented in the attached EN-LI-102 Attachment 9.8.

It was identified that corrective actions 15-17 should be classified as long term. Long Term Corrective Action (LTCA) forms (Attachment 9.9) were completed and are attached.

CR-RBS-2012-02816 was initiated to document that the due date extension in CA-9 does not provide an adequate basis for why it is acceptable to extend the due date, contrary to EN-LI-102.

No further action is required.

Closure Comments:

Attachments:

Subresponse Description
LTCA 17

Subresponse Description
LTCA 16

Subresponse Description
LTCA 15

Subresponse Description
periodic review

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 15

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Blackledge,Charles	4/23/2012 16:49:46
Performed By:	Arms,Jason C	3/15/2013 13:13:52
Subperformed By:		
Approved By:		
Closed By:	Arms,Jason C	3/15/2013 13:13:52

Current Due Date: 10/15/2013 **Initial Due Date:** 10/15/2013

CA Type: ODNC **CA Priority:** 4

Plant Constraint: RF17 - MODE 2

CA Description:

Revise calculation E-192, Standby Diesel Generator Loading, to perform pump power analysis and account for new frequency upper analytical limit.

Response:

Calculation E-192 has been revised by EC 40578 which is now in MODIFIED status in Asset Suite, resolving the diesel generator load margin for Div 1 and 3 emergency diesel generators. The License Amendment Request (LAR 2012-06) has been prepared and implementation will be tracked by LO-LAR-2013-00055. No further action is required.

Subresponse :

Closure Comments:

Attachments:

CA Description
LTCA

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 16

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Blackledge,Charles	4/24/2012 10:55:39
Performed By:	Blackledge,Charles	12/17/2012 09:16:07
Subperformed By:		
Approved By:		
Closed By:	Arms,Jason C	12/20/2012 17:19:48

Current Due Date: 12/21/2012 **Initial Due Date:** 12/21/2012

CA Type: CAT C-CORRECT **CA Priority:** 3

Plant Constraint: NONE

CA Description:

Complete the governor setpoint change for the Division I Diesel Generator (DG). This includes preparing the Nuclear Change EC as well as implementing the change during the Div I DG super outage in December 2012.

Response:

EC 38515 has been prepared for the Division 1 diesel generator governor setpoint change. This EC was implemented during the Div 1 DG super outage in December 2012. No further action is required.

Subresponse :

Closure Comments:

approved

Attachments:

CA Description
LTCA

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07132**

CA Number: 17

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Blackledge,Charles	4/24/2012 10:58:17
Performed By:	Blackledge,Charles	3/11/2013 22:00:05
Subperformed By:		
Approved By:		
Closed By:	Corley,Faleisha W	3/18/2013 14:13:25

Current Due Date: 10/15/2013 **Initial Due Date:** 10/15/2013

CA Type: CAT C-CORRECT **CA Priority:** 3

Plant Constraint: NONE

CA Description:

Complete the implementation of the Tech Spec frequency change and raising of the minimum Surveillance Requirement test band to 3050 kW following License Ammendment Request approval from the Nuclear Regulatory Commission.

Response:

This action was initiated to complete the implementation of the Tech Spec frequency change and raising of the minimum Surveillance Requirement test band to 3050 kW following License Amendment Request (LAR) approval from the Nuclear Regulatory Commission.
LAR 2012-06 has been prepared to raise surveillance requirement test bands and lower the maximum Technical Specification frequency for all three emergency diesel generators. The LAR also evaluates lowering the Division I/II maximum Tech Spec voltage limit.

LO-LAR-2013-00055 has been initiated to track all of the required actions necessary to support submittal, approval and implementation of this LAR. Since the LO-LAR-2013-00055 action will track implementation of the LAR, CA-17 is no longer required. It should be noted that CA-17 is not tied to the OP-DNC condition for the Division I diesel generator, and the LAR is not needed to address the degraded condition. The OP-DNC condition will be cleared as a result of revising the diesel generator loading calculation (E-192) in conjunction with procedure changes. No further action is required.

Subresponse :

Closure Comments:

Manager review finds this condition acceptable for closure. See closure review attached.

Attachments:

CA Description
LTCA
Closure Description
Mgr Closure

CR-RBS-2011-07132 CA-017
CLOSURE REVIEW

BACKGROUND

CR-RBS-2011-07132 was written when during the 2011 Component Design Basis Inspection, the NRC questioned if the Surveillance Requirement (SR) for testing the Standby DGs was acceptable. Engineering review concluded the tested load band in Tech Spec SR 3.8.1.14 (24-hour run) and SR 3.8.1.3 (One-hour run) for Division I EDG does NOT bound the worst case accident loading when accounting for worst case operating frequency as calculated in the Standby Diesel Generator Loading Calculation, E-192.

REVIEW

The immediate concern was addressed by Corrective Actions #1, #4, and #5. CA #1 was assigned to Design Engineering to perform an Operability Evaluation to determine if the Division I EDG remained capable of performing its design function. The Operability Evaluation was attached to the corrective action sub-response and concluded the EDG remained capable of performing its design basis function. The evaluation further concluded that the tested load band used in the 24-hour run surveillance, and the related Tech Spec / Bases, are non conservative in relation to the worst case expected loading calculated in E-192. However, the evaluation determined interim measures could be established to ensure worst case calculated loading is bounded by tested loading and the condition was statused as "OPERABLE-DNC". Sort term measures were provided in CA#4 and CA#5.

CA#4 was assigned to System Engineering to establish an interim testing method for the Division I EDG. The test required the EDG to be tested to an indicated 3130kW during 24-hour and 1-hour Division 1 DG runs in order to bound the worst case expected design loading. The action required revision of the test procedures prior to the next performance. This action was appropriately closed with issuance of STP-309-0201 R/46, STP-309-0206 R/19, and STP-309-0611 R/36. It should be noted that CR-RBS-2013-00011 CA#21 has been issued to remove the steps added by these revisions.

CA#5 was assigned to Operations to change diesel procedures to capture the frequency and voltage from ERIS when the diesel is isochronous and initiate a condition report if values were outside established bounds that ensure continued Operability. This action was appropriately closed with issuance of STP-309-0201 R/46, STP-309-0206 R/19, and STP-309-0611 R/36. It should be noted that CR-RBS-2013-00011 CA#21 has been issued to remove the steps added by these revisions.

Corrective Actions #3 and #6are associated with the initial disposition. CA#3 was issued to Design Engineering to perform the initial disposition and was closed assuming the CRG would approve closure of the condition to CR-RBS-2011-07308. CA#6 was issued to track presentation to the CRG. Upon presentation, closure was rejected as it was

determined the CR could not be closed to CR-RBS-2011-07308 given the OPERABLE-DNC status.

Corrective Actions #10, #11, #12, #13, #15 and #17 were issued to Design Engineering to determine and implement the best method of correcting the condition long term. CA#10 was issued to issue a contract to perform a study to determine the best method to correct the condition. The action was appropriately closed with issuance of Contract Requisition (CR) No. 2165927. Upon completion of the study, several actions were recommended as follows:

1. Revise Division I EDG loading calculation (E-192) to reduce loads (pump power analysis).

2. Modify Operating procedures (Div I: STP-309-0201 STP-309-0206, STP-309-0611) to raise the minimum testing band from 3000 kW to 3050 kW.

3. Change the Division I EDG governor setpoint.

4. Lower Tech Spec (SR 3.8.1.2, 3.8.1.7, 3.8.1.11, 3.8.1.12, 3.8.1.15, 3.8.1.19, 3.8.1. 3.8.1.20) maximum frequency (from 61.2 Hz to 60.2 Hz).

   It should be noted that after the study was issued, during preparation of the Evaluation EC, it was determined that a TS reduction in voltage (4580 to 4368) would also be required to fully restore load margin. The SR for Voltage are the same as those for frequency listed above.

5. Modify Tech Spec (SR 3.8.1.3, 3.8.1.15, 3.8.1.10, 3.8.1.14) to raise the minimum testing band from 3000 kW to 3050 kW.

Although not specifically documented in the response or actions associated with CR-RBS-2011-07132, it should be noted that only items 1 and 2 were required to be completed in order to resolve the OPERABLE-DNC concern. Once actions 1 and 2 were completed, the station was left with non-conservative Technical Specifications to be addressed by items 4 and 5 AND low Operating Margin to be addressed by item 3.

CA#11 was issued to obtain team member (DE, SE, Ops, and Licensing) concurrence with the method chosen to correct the condition (i.e. items 1 through 5 above). This action was appropriately closed after conducting the meeting and documenting concurrence of the team with the proposed solution. Note that non-CAP related suggestions from the meeting were tracked by LO-WTRBS-2008-00027 CA#771. CA#12 was issued to obtain URT approval to proceed with the proposed solution. This action was appropriately closed with URT approval to proceed. CA#15 was issued to track completion of the design change to address items 1 and 2 above. This action was appropriately closed with issuance of EC-40578. Note that the EC was an Engineering Evaluation with no implementation tracking required. The EC includes all Operating Procedure changes and calculation changes necessary to correct the non-conforming

condition identified by CR-RBS-2011-07132. In addition, the EC included a License Amendment Request (LAR-2012-06) to address items 4 and 5 above. CA#17 was issued to track approval of the LAR. However, tracking of NRC approval of the LAR is not required to be tracked by this Condition Report as it simply addresses the non-conservative Technical Specification and not the non-conforming condition of an EDG test band that fails to bound the worst case design basis loading. The non-conforming condition has been addressed via design basis calculation revisions and Operating Procedure revisions associated with EC-40578. Therefore, CA#17 was closed with reference to LO-LAR-2013-00055 that will track all required actions necessary to support submittal, approval and implementation of this LAR.

Corrective Action #13 was issued to track final resolution of the Operable DNC condition and was appropriately closed with concurrence of Licensing after completion of CA#10, #11, #12, #15 and #17 as discussed above.

In order to address Operating Margin, CA#16 was issued to address item 3 above by completing a design change to revise the Division I EDG governor setpoint. This action was appropriately closed with issuance / implementation of EC-38515 via WO #316504.

CR-RBS-2011-07740 was closed to this CR as documented in CA#7. CR-RBS-2011-07740 documented errors found in calculation E-192 during the 2011 Component Design Basis Inspection. Specifically, discrepancies were identified in the efficiency documented in the calculation versus that documented in the motor data sheets for Standby Gas Treatment Fans (GTS-FN1A/B) and Drywell Unit Coolers (DRS-UC1A-F). CA#7 was inadvertently closed; however, the condition was corrected as documented in CA#9. EC-32640 was issued to correct the noted conditions and the CA was appropriately closed.

Corrective Action #8 was inappropriately issued to evaluate the condition identified by CR-RBS-2011-07872 to determine if additional interim revisions were needed to Operating Procedures (i.e. changes other than those documented in CA#4 and CA#5). The action was appropriately closed noting the action was addressed via CR-RBS-2011-07872 CA#3.

Corrective Action #2 was associated with Licensing review of the condition for reportability consideration. This action was appropriately closed upon completion of the Licensing review.

Corrective Action #14 was associated with procedurally required interim review of the condition and was appropriately closed after review.

CONCLUSION

CR-RBS-2011-07132 CA-017
CLOSURE REVIEW

The above issued corrective actions are sufficient to correct the identified condition. All corrective actions have been verified appropriately closed. This condition report is ready for closure.

Extracted from CR-RBS-2011-7294

Entergy	**CONDITION REPORT**	**CR-RBS-2011-07294**

Originator: Blackledge,Charles
Originator Group: Eng DE Electrical Staff RBS
Supervisor Name: Arms,Jason C
Discovered Date: 10/07/2011 20:31

Originator Phone: 4390
Operability Required: Y
Reportability Required: Y
Initiated Date: 10/07/2011 21:03

Condition Description:

The Division III DG is tested at 2750-2850 kW for two hours and 2500-2600 kW for 22 hours per the 24-Hour run Tech Spec surveillance (3.8.1.14). This surveillance requires demonstration once per 24 months that the Division III DG can start and run continuously at full load capability for an interval of not less than 24 hours ? 22 hours of which is at a load equivalent to the continuous rating of the DG, and two hours of which is at a load equivalent to 110% of the continuous duty rating of the DG.

The test load band referenced above does not test diesel loading for the worst case expected loading as calculated in G13.18.3.6*019, Division III Diesel Generator Loading, for the entire duration of the test. This worst case loading is based on generator output frequency having drifted to its highest values allowed by TS. It can be shown, however, that the worst case calculated loading is exceeded by diesel load testing for a portion of the DG run. By demonstrating that the diesel load testing exceeds the worst case expected loading, it is shown that the diesel is capable of supplying all anticipated loading, and thus meeting the load testing surveillance.

The maximum loading during Surveillance Requirement (SR) 3.8.1.14 testing of the Division III DG (07/29/2009) was 2800 kW.

Based on the test data and factoring in margin for instrument inaccuracies in the watt meter reading, it is demonstrated that actual load exceeded the worst case expected load; therefore the surveillance requirement is met.

Calculation:
Worst Case Expected Load□2581.16 kW□(from G13.18.3.6*019)

Power
Instrument uncertainty□ 3.00%□□(conservative estimate)
Max tested load□□2800 kW□□(from STP-309-0613, 7/29/09)
Actual Load□□2716 kW□□(2800 - (2800 x 0.03))

Actual Load > Worst Case Expected Load

Immediate Action Description:

Informed DE electrical supervisor and OSM. Initiated Condition Report.

Suggested Action Description:

REFERENCE ITEMS:

Type Code	Description
CALCULATION	G13.18.3.6*019
CR	CR-RBS-2011-07132
ECR/EC	EC 40578
NON CITED VIOLATION	2011 CDBI - IR 2011-08
OTHER	LAR 2012-06

~~TRENDING (For Reference Purposes Only):~~

Trend Type	Trend Code
KEYWORDS	KW-EMERGENCY DIESEL GENERATOR
HEP FACTOR	P
REPORT WEIGHT	1
INPO BINNING	EN1
AA	ESDE
CA	ESDE
KEYWORDS	KW-TEST PARAMETERS
KEYWORDS	KW-CALCULATION
KEYWORDS	KW-HU LOW
LT-MOD/DESIGN	CA-9
DPIC REVIEW SAT	ESDE

Entergy	**OPERABILITY**	**CR-RBS-2011-07294**

OperabilityVersion: 1

Operability Code: OPERABLE-OP EVAL

Immediate Report Code: NOT REPORTABLE

Performed By: Hall,Douglas W 10/07/2011 22:35

Approved By: Naylor,Thomas M 10/08/2011 02:33

Operability Description:

This condition report documents that the test load band for the Division III DG does not test diesel loading for the worst case expected loading as calculated in G13.18.3.6*019, Division III Diesel Generator Loading, for the entire duration of the test. The Division III DG is tested at 2750-2850 kW for two hours and 2500-2600 kW for 22 hours per the 24-Hour run Tech Spec surveillance (3.8.1.14). This surveillance requires demonstration once per 24 months that the Division III DG can start and run continuously at full load capability for an interval of not less than 24 hours, 22 hours of which is at a load equivalent to the continuous rating of the DG, and two hours of which is at a load equivalent to 110% of the continuous duty rating of the DG.

The onsite standby power source for each 4.16 kV ESF bus is a dedicated DG. A DG starts automatically on loss of coolant accident (LOCA) signal (i.e., low reactor water level signal or high drywell pressure signal) or on an ESF bus degraded voltage or undervoltage signal (refer to LCO 3.3.8.1, "Loss of Power (LOP) Instrumentation"). In the event of a loss of preferred power, the ESF electrical loads are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a Design Basis Accident (DBA) such as a LOCA.

The test load band referenced above does not test diesel loading for the worst case expected loading as calculated in G13.18.3.6*019, Division III Diesel Generator Loading, for the entire duration of the test. This worst case loading is based on generator output frequency having drifted to its highest values allowed by TS. It can be shown, however, that the worst case calculated loading is exceeded by diesel load testing for a portion of the DG run. By demonstrating that the diesel load testing exceeds the worst case expected loading, it is shown that the diesel is capable of supplying all anticipated loading, and thus meeting the load testing surveillance.

The maximum loading during Surveillance Requirement (SR) 3.8.1.14 testing of the Division III DG (07/29/2009) was 2800 kW.

Based on the test data and factoring in margin for instrument inaccuracies in the watt meter reading, it is demonstrated that actual load exceeded the worst case expected load; therefore the surveillance requirement is met.

Calculation:
Worst Case Expected Load□2581.16 kW□(from G13.18.3.6*019)

Power
Instrument uncertainty□ 3.00%□□(conservative estimate)
Max tested load□□2800 kW□□(from STP-309-0613, 7/29/09)
Actual Load□□2716 kW□□(2800 - (2800 x 0.03))

Actual Load > Worst Case Expected Load

Per EN-OP-104 Rev 5, this condition is marked with an Operability Code of "OPERABLE - OP EVAL". CA-1 is being issued to perform an operability evaluation for this condition. See the attached EN-OP-104 Attachment 9.2. The condition is not immediately reportable per EN-LI-108.

Approval Comments:

See attachment 9.2 attached to the Operability Description above.

Attachments:

Opperability Description
9.2

Entergy	**OPERABILITY**	**CR-RBS-2011-07294**

OperabilityVersion: 2

Operability Code: OPERABLE DNC

Immediate Report Code: NOT REPORTABLE

Performed By: Thomas,Douglas L 10/09/2011 20:53

Approved By: Zahorchak,Russell L 10/09/2011 21:26

Operability Description:

The tested load band used in the 24-hour run surveillance, and the related Tech Spec / Bases, are non conservative in relation to the worst case expected loading calculated in E-192. As a result, short term administrative measures are outlined in the engineering evaluation.

Based on the engineering evaluation attached to CR-RBS-2011-7294 CA-1 the Division 3 Diesel generator is currently capable of performing its safety function. It is demonstrated that the Division 3 Diesel is capable of carrying the design required load based on the minimum indicated load of 2775 kW observed in the last two 24-hour runs when the diesel was loaded to 110% of its rating for the first two hours of each test. The 2775 kW load minus instrument uncertainty of 97.42 kW results in a theoretical minimum test load of 2677.58 kW which is higher that the calculated maximum test load of 2647.43 kW.

Therefore per EN-OP-104 Rev 5, this condition is marked with an Operability Code of "Operable-DNC" and will be monitored per EN-OP-104 Rev 5 section 5.6. No further operability review needs to be performed. The condition is not immediately reportable per EN-LI-108.

Approval Comments:

Entergy	**OPERABILITY**	**CR-RBS-2011-07294**

OperabilityVersion: 3

Operability Code: OPERABLE

Immediate Report Code: NOT REPORTABLE

Performed By: Hall,Douglas W 03/16/2013 10:11

Approved By: Carter,Steven T 03/16/2013 11:51

Operability Description:

Version 3 operability is being performed based on engineering input from CA-9.

Calculation G13.18.3.6*019, HPCS (Division III) Diesel Generator Loading, has been revised to remove some of the inherent over-conservatism in the calculation. This was done by performing a pump power analysis to more accurately depict diesel loads. In addition, a License Amendment Request (LAR 2012-06) was prepared to lower the maximum allowable Technical Specification frequency. This will provide additional margin since the loading calculation considers maximum frequency when calculating worst case post accident diesel loading. The LAR also raises the lower surveillance requirement test band to 2525 kW.

Procedure changes have been made to limit diesel generator frequency to the new proposed Technical Specification maximum and raise the surveillance requirement test band to the new proposed lower limit until the LAR is approved and the Technical Specifications are changed. The result of the calculation and procedure changes ensures that the worst case post accident loading as calculated by G13.18.3.6*019 (2430.98 kW) is below the lower limit of the surveillance requirement test band (2525 kW) at all times. This provides verification that the Division III diesel generator is capable of performing its design function to supply AC power for electrical loads which are required for a safe reactor shutdown and to mitigate the consequences of a Loss of Coolant Accident (LOCA).

Since Division III diesel generator is capable of performing its design function to supply AC power for electrical loads which are required for a safe reactor shutdown and to mitigate the consequences of a Loss of Coolant Accident (LOCA), Divison III diesel generator is OPERABLE.

No Degraded or Nonconforming Condition exists per EN-OP-104 Revision 6 Attachment 9.1 Table 1. Therefore per EN-OP-104 Rev 6, this condition is marked with an Operability Code of "Operable" and no further functionality review needs to be performed. The condition is not immediately reportable per EN-LI-108.

Approval Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 1

	Group	Name
Assigned By:	Operations Mgmt RBS	Naylor,Thomas M
Assigned To:	Eng P&C Mgmt RBS	Antoine,Jane E
Subassigned To :	Eng Outage Staff RBS	Fichtenkort,Brian C

Originated By:	Hall,Douglas W	10/7/2011 23:21:44
Performed By:	Antoine,Jane E	10/9/2011 17:44:49
Subperformed By:	Fichtenkort,Brian C	10/9/2011 17:06:29
Approved By:		
Closed By:	Zahorchak,Russell L	10/9/2011 20:47:33

Current Due Date: 10/09/2011 **Initial Due Date:** 10/09/2011

CA Type: OPERABILITY INPUT **CA Priority:**

Plant Constraint: NONE

CA Description:

Perform an Operability Evaluation to determine whether or not the Division III EDG maximum calculated loading is sufficiently tested by the Surveillance Requirement.

See attached EN-OP-104 Attachment 9.2.

Response:

The evaluation attached to the sub-response was reviewed and approved by Engineering Quality Review Team on 10/9/11. Reviewed by A. Frederickson and K. Klamert as documented in CA 2 to this condition report. Manager approval is by F. Corley per telecon on 10/9/11. This action is complete.

Subresponse :

The operability evaluation requested by this CA is attached. The response to this CA was jointly prepared by B. Fichtenkort, D. Aslin, and R. Findish.

Closure Comments:

The attached Operability Evaluation is satisfactory to support Operable DNC classification of the Division III EDG

Attachments:

CA Description
9.2

Subresponse Description
CR11-07294 CA01 Operability Evaluation

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 2

	Group	Name
Assigned By:	Eng Sys EFIN Staff RBS	Fichtenkort,Brian C
Assigned To:	Eng Sys Mech Staff RBS	Klamert,Kenneth R
Subassigned To :		

Originated By:	Fichtenkort,Brian C	10/9/2011 13:35:33
Performed By:	Whetstone,Alisha Lyn Frederickson	10/9/2011 17:19:01
Subperformed By:		
Approved By:		
Closed By:	Whetstone,Alisha Lyn Frederickson	10/9/2011 17:19:01

Current Due Date: 10/09/2011 **Initial Due Date:** 10/09/2011

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Perform review of the operability evaluation contained in CR-RBS-2011-07294 CA01.

Response:

A review of the operability evaluation contained in CR-RBS-2011-07294 CA01 was completed by Ken Klamert and Alisha Whetstone.

Subresponse :

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 3

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Corley,Faleisha W
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :	Eng DE Electrical Staff RBS	Tiwari,Sital

Originated By:	Zzrbscrg	10/11/2011 11:36:17
Performed By:	Arms,Jason C	1/26/2012 23:29:15
Subperformed By:	Arms,Jason C	1/26/2012 23:29:06
Approved By:		
Closed By:	Arms,Jason C	1/26/2012 23:29:15

Current Due Date: 01/26/2012 **Initial Due Date:** 01/26/2012

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Per the CRG, CR-RBS-2011-07301 was Administratively Closed to this CR. As Responsible Manager for this CR, ensure that the condition documented in that CR is appropriately addressed within the scope of this CR?s Corrective Action Plan.

CR Condition Summary: Electrical calculation, G13.18.3.6*019, is entitled ?HPCS (Division III) Diesel Generator Loading.? The purpose of this calculation is to document the loading on the Division III High Pressure Core Spray (HPCS) diesel generator, E22-EGS001 (E22-S001G1C1)during a Loss of Coolant Accident (LOCA) concurrent with a Loss of Offsite Power (LOOP). The calculation is used to verify that the maximum loading does not exceed diesel ratings. The errors discussed below that affect the KW tabulation are conservative in that the value shown in KW in the calculation is higher than the actual value. Because these errors are conservative and result in a total kW loading less than that in the current calculation, there is no impact to the conclusion of the calculation that the total load assigned to the Div III Diesel Generator does not exceed the diesel rating.

During the preparation of the EN-OP-104 Operability Evaluation for CR-RBS-2011-07294, the calculation G13.18.3.6*019, HPCS (Division III) Diesel Generator Loading was reviewed. Several errors were found in the tables at the back of the calculation that result in the required KW load of the Division III Generator being less than stated in the calculation on Table 7. Therefore the errors are conservative. The errors are listed below:

On Table 2.0, Reordered data with xmfr losses
1)□The E22-S001GSH load is incorrectly shown as 3.13 KVA and 3.27 KVA. The correct value is 3 KVA based on Table 1.0 and EE-001SA.
2)□The E22-S001DGH load is incorrectly shown as 16.33 KVA. The correct value is 15 KVA based on Table 1.0 and EE-001SA.
3)□The KW @ 100% Loading for E22-S003 is incorrectly shown as 7.43 KW and the correct value is 6.68 KW.
On Table 4.0, Impacts of MOV Operation
1)□The PF for MCC S002 Margin is shown as 86.00. The other tables list the PF as 84.80.
2)□The Percent Load for HVP-FN6C is shown as 90%. The other tables list this as 100%.
3)□The Percent Load for SCV-XDS002 is shown as 6%. The other tables list the percent load as 11%.
4)□The Percent load for HVR-UC5 is shown as 90%. The other tables list this as 84%.
5)□EGF-P1C is shown as 17% load. The other tables show 100% load.
6)□HVC-FN3F is shown as 0% load. The other tables show 100% load.
On Table 5.0, which is RBS USAR TABLE 8.3-3 and Table 6.0, which is included in SDC 305/409
1)□The 3 KW load of E22-S001GSH is incorrectly shown as 3.1 KW.
2)□The 15 KW load of E22-S001DGS is incorrectly shown as 16.3 KW
On Table 7.0
1)□The Percent Load for E22-C001, HVP-FN6C, SCV-XDS002, HVR-UC5, EGF-P1C, HVC-FN3F, and HVC-FN3C are incorrectly shown. The Percent Load shown on this table is not an input into the KW loading calculated in this table, so the error is editorial only.

2)□The KVA for EGF-P1C does not have the factor for 61.2 Hz operation correctly applied.
3)□The 3 KVA load for E22-S001GSH is incorrectly shown as 3.13 KVA, and the factor for increased voltage is applied to that incorrect value.
4)□The KVA and KVAR for E22-S001COP does not have the factor for 61.2 Hz operation correctly applied.
5)□The loads for E22-S003 are shifted over one column which affects the totals.
6)□The KVA for HVP-FN3A does not have the factor for 61.2 Hz operation correctly applied.

Response:

a complete verification was completed for this calculation due to the large number of errors found. The associated USAR figure was identified to be updated as well as AOP-0004 LOOP. This action may be closed.

Subresponse :

CR-RBS-2011-07294 CA3 identified editorial errors associated with Calculation G13.18.3.6*019. EC 32834 was initiated to correct the errors in the CALC. The EC has been completed and is now at "Modified" status in Passport. Once an EC is at 'Modified" or "Closed" status, the associated drawings are considered as-built in accordance with EN-DC-132. There is no field work to be completed for this EC as this is an administrative change to the drawing. Therefore, no further actions are required and this corrective action is acceptable for closure.

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 4

	Group	Name
Assigned By:	Eng P&C Mgmt RBS	Antoine,Jane E
Assigned To:	Eng Sys Mgmt RBS	Wilson,Adrainne J
Subassigned To :	Eng Sys Mgmt RBS	Whetstone,Alisha Lyn Frederickson

Originated By:	Antoine,Jane E	10/11/2011 15:34:0
Performed By:	Wilson,Adrainne J	10/18/2011 19:30:0
Subperformed By:	Whetstone,Alisha Lyn Frederickson	10/18/2011 11:57:2
Approved By:		
Closed By:	Wilson,Adrainne J	10/18/2011 19:30:0

Current Due Date: 10/21/2011 **Initial Due Date:** 10/21/2011

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Establish a testing method to test the Division 3 DG at a load that bounds the expected steady state load plus instrument uncertainty; during a 1-hour monthly Division 3 DG run (STP-309-0203).
The current test range in STP-309-0613 of 2750 ? 2850 kW for the first two hours of the test will remain unchanged by this operability evaluation. The test range used for the final 22 hours of STP-309-0613 will be changed to match the test required by monthly STP-309-0203. This is an administrative action identified during the operability evaluation performed for this CR. The due date is selected based on the next scheduled one hour run of the division 3 diesel on 10/24/11.

Response:

approved

Subresponse :

Problem Statement:

Establish a testing method to test the Division 3 DG at a load that bounds the expected steady state load plus instrument uncertainty; during a 1-hour monthly Division 3 DG run (STP-309-0203).

Action to fix:

Using the meter in the control room maintain Division 3 D/G at 2700-2800kW for five minutes after the successful completion of STP-309-0203, Diesel Generator Monthly operability test. The STP procedure has been revised to reflect this change.

Closure Comments:

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 5

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Corley,Faleisha W
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :	Eng DE Electrical Staff RBS	Blackledge,Charles

Originated By:	Zzrbscrg	10/14/2011 13:45:4
Performed By:	Arms,Jason C	11/9/2011 20:06:25
Subperformed By:	Blackledge,Charles	11/9/2011 19:24:58
Approved By:		
Closed By:	Arms,Jason C	11/9/2011 20:06:25

Current Due Date: 11/09/2011 **Initial Due Date:** 11/09/2011

CA Type: DISP - CA **CA Priority:**

Plant Constraint: NONE

CA Description:

You have been assigned as the Responsible Manager for this Category "C", Non-Significant Condition Report by the CRG Address/correct the identified condition per EN-LI-102. Perform disposition review, investigate as needed, and ensure actions are assigned as applicable to correct the problem.

Response:

CA 7 was initiated to present to URT the options for long term resolution of the Division 3 Diesel non conformance. Additional CAs will be assigned as appropriate based on the URT conclusion.

Subresponse :

An Operability Evaluation was performed for the Division III Diesel Generator (DG). The DG was determined to be Operable - Degraded or Non Conforming (DNC), based on the worst case expected loading calculated not bounding the surveillance testing requirements under all testing conditions.

An Engineering Issue Action was prepared for the Division III DG. A scoping letter was submitted to determine the cost of an Engineering Study that will provide the long term solution to the nonconforming Technical Specification. In the short term, operations procedures have been updated to operate the DG at a load above the worst case expected load calculated in G13.18.3.6*019 (Division III DG Loading Calculation) during the monthly Division III DG run.

Plan of Action is attached. No further action is required.

Closure Comments:

Attachments:

Subresponse Description
POA

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 6

	Group	Name
Assigned By:	NSA Director RBS	Roberts,Jerry C
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :	Eng Design Mgmt RBS	Blackledge,Charles

Originated By:	Zzrbscrg	10/14/2011 13:47:51
Performed By:	Arms,Jason C	12/17/2012 16:00:0[illegible]
Subperformed By:	Blackledge,Charles	12/17/2012 14:09:4[illegible]
Approved By:		
Closed By:	Roberts,Jerry C	12/18/2012 16:20:2[illegible]

Current Due Date: 12/20/2012 **Initial Due Date:** 12/20/2012

CA Type: ODNC **CA Priority:** 4

Plant Constraint: RF17

CA Description:

Operable-DNC or Comp Meas condition (formerly SDNC)

This Condition Report has been flagged as an Operable - Degraded Non-conforming or Operable-Compenstory Measures condition CR. You have been assigned as the responsible manager for this CR and this action has been flagged as both a restraint to the next refueling outage and as an Operable-DNC or Comp Meas CA Type action. OSRC Approval to Extend the Operability for another cycle is required prior to H/U from the next Outage of sufficient Duration (OSD) if the correction of this condition is deferred.

You should issue a specific action to resolve the Operable-DNC or Comp Meas condition and mark it as both an outage restraint and Operable-DNC or Comp Meas CA Type action.

IF a Work Order will be utilized to correct this condition, THEN contact CA&A or PS&O and ensure the GL 91-18 Plant Effect code is added to Task 1 of the Work Order.

This action or a similar administrative action will remain open in this CR until the degraded condition is resolved to track approval of any extensions beyond an operating cycle.

Response:

approved

Subresponse :

CR-RBS-2011-07294 CA-9 has been initiated to revise G13.18.3.6*019, Division III Diesel Generator Loading. This action was marked with a plant constraint of DEGRADED-NONCONFORMING (DNC). In addition, the corrective action (CA-9) description states this is both an outage restraint (RF-17) and an Operable-DNC action. The action to revise the calculation will resolve the DNC condition.

Closure Comments:

Approved

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 7

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Arms,Jason C	11/9/2011 20:05:13
Performed By:	Blackledge,Charles	4/23/2012 16:12:01
Subperformed By:		
Approved By:		
Closed By:	Arms,Jason C	5/2/2012 06:06:13

Current Due Date: 05/03/2012 **Initial Due Date:** 05/03/2012

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Present to URT the options for long term resolution of the Division 3 Diesel non conformance. Assign CAs as appropriate based on the URT conclusion.

Response:

The options to resolve the Division III Diesel Generator Non Comformance were presented to the URT on 4/9/12. The recommended option is to revise the Division III Diesel Generator loading calculation to reduce loads (pump power analysis). This will adequately address the non-conformance such that all testing conditions required by Tech Spec Surveillance Requirements will be bounded by the calculated worst case accident loading. This option was accepted by the URT.

CA-9 has been initiated to track completion of the revision to calculation G13.18.3.6*019, Division III Diesel Generator Loading. No further action is required.

Subresponse :

Closure Comments:

approved

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 8

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng DE Electrical Staff RBS	Blackledge,Charles
Subassigned To :		

Originated By:	Blackledge,Charles	1/25/2012 14:12:44
Performed By:	Blackledge,Charles	4/16/2012 12:56:51
Subperformed By:		
Approved By:		
Closed By:	Arms,Jason C	4/19/2012 08:40:59

Current Due Date: 04/19/2012 **Initial Due Date:** 04/19/2012

CA Type: ACTION **CA Priority:**

Plant Constraint: NONE

CA Description:

Hold meeting (DE, SE, Ops, and Licensing) to discuss long term solutions (i.e. surveillance change, calculation change), based on input from the Engineering Study.

Response:

A meeting was conducted on 4/3/12 with Operations (Gates), Licensing (Burmeister), Systems Engineering (Frederickson/Klamert), and DE Electrical (Blackledge/Arms).

Issues dicussed included the following proposed method to restore margin to the Division III Diesel Generator:

1. Revise the Division III Diesel Generator loading calculation to reduce loads (pump power analysis).

There were no challenges raised that would prevent the design and implementation of the proposed solution. There was a recommendation from Operations that we contact other sites within the industry that have undergone a similar design change to get a list of challenges they faced. LO-WTRBS-2008-00027 CA-00771 has been initiated to track completion of this task. No further actions are required.

Subresponse :

Closure Comments:

accepted

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 9

	Group	Name
Assigned By:	NSA Director RBS	Roberts,Jerry C
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :	Eng DE Electrical Staff RBS	Blackledge,Charles

Originated By:	Blackledge,Charles	4/23/2012 16:11:09
Performed By:	Matzke,Paul R	3/16/2013 02:58:21
Subperformed By:	Blackledge,Charles	3/16/2013 02:52:40
Approved By:		
Closed By:	Roberts,Jerry C	3/16/2013 06:37:14

Current Due Date: 03/17/2013 **Initial Due Date:** 03/17/2013

CA Type: ODNC **CA Priority:** 4

Plant Constraint: RF17 - MODE 2

CA Description:

Resolve the Operable-DNC condition of the Division III Diesel Generator by revising electrical calculation G13.18.3.6*019 (Division III Diesel Generator Loading). This revision shall perform a pump power analysis. The action is both an outage restraint (RF-17) and an Operable-DNC action.

Response:

Approved

Subresponse :

Calculation G13.18.3.6*019 has been revised by EC 40578 which is now in MODIFIED status in Asset Suite, resolving the diesel generator load margin for Div 1 and 3 emergency diesel generators. The License Amendment Request (LAR 2012-06) has been prepared and implementation will be tracked by LO-LAR-2013-00055. No further action is required.

Closure Comments:

Concur with closure.

Attachments:

CA Description
LTCA

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 10

	Group	Name
Assigned By:	NSA CA&A Mgmt RBS	Vines,Christopher Dale
Assigned To:	Eng Design Mgmt RBS	Corley,Faleisha W
Subassigned To :	Eng Design Mgmt RBS	Arms,Jason C

Originated By:	Phillips,Susan M	6/8/2012 14:26:07
Performed By:	Arms,Jason C	6/20/2012 16:23:52
Subperformed By:	Blackledge,Charles	6/20/2012 15:50:01
Approved By:		
Closed By:	Arms,Jason C	6/20/2012 16:23:52

Current Due Date: 06/21/2012 **Initial Due Date:** 06/21/2012

CA Type: PERIODIC REVIEW **CA Priority:** 4

Plant Constraint: NONE

CA Description:

Interim and Periodic Review Required
(NOTE - an Interim Review requires both "Responsible Manager" AND a Director or Above" approval).
Conduct and document an interim review of this Condition Report using the "CR Interim and Periodic Review Checklist", Attachment 9.8 of EN-LI-102 which is available via the Reference Library ECH Site in the Nuclear Management Manual Common Forms section. Consider any open CAs for Long Term classification per Attachment 9.9 of EN-LI-102.

Response:

approved

Subresponse :

The interim review required by this corrective action is complete and documented in the attached EN-LI-102 Attachment 9.8.

It was identified that corrective action 9 should be classified as long term. Long Term Corrective Action (LTCA) form (Attachment 9.9) was completed and is attached.

No further action is required.

Closure Comments:

Attachments:

Subresponse Description
interim review

Subresponse Description
LTCA 9

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 11

	Group	Name
Assigned By:	Eng Design Mgmt RBS	Arms,Jason C
Assigned To:	Eng Design Mgmt RBS	Arms,Jason C
Subassigned To :		

Originated By:	Zzrbscrg	3/16/2013 15:58:20
Performed By:	Corley,Faleisha W	3/18/2013 17:40:01
Subperformed By:		
Approved By:		
Closed By:	Corley,Faleisha W	3/18/2013 17:40:01

Current Due Date: 04/03/2013 **Initial Due Date:** 04/03/2013

CA Type: CR CLOSURE REVIEW **CA Priority:** 4

Plant Constraint: NONE

CA Description:

This action is being issued by CA&A, per EN-LI-102. Verify all corrective actions are complete and the specific condition identified is corrected or resolved. Document your satisfactory review, and any basis for closure, or issue additional actions by the stated due date.

Response:

Manager review finds this condition acceptable for closure. Refer to attached for further details.

Subresponse :

Closure Comments:

Attachments:

Response Description
Closure Review

BACKGROUND

CR-RBS-2011-07294 was written when during the 2011 Component Design Basis Inspection, the NRC questioned if the Surveillance Requirement (SR) for testing the Standby DGs was acceptable. Engineering review concluded the tested load band in Tech Spec SR 3.8.1.14 (24-hour run) and SR 3.8.1.3 (One-hour run) for Division III EDG does NOT bound the worst case accident loading when accounting for worst case operating frequency as calculated in the HPCS Diesel Generator Loading Calculation, G13.18.3.6*019.

REVIEW

The immediate concern was addressed by Corrective Actions #1, #2 and #4. CA #1 was assigned to Design Engineering to perform an Operability Evaluation to determine if the Division III EDG remained capable of performing its design function; CA#2 documented a review of the Op Eval. The Operability Evaluation was attached to the corrective action sub-response and concluded the EDG remained capable of performing its design basis function. The evaluation further concluded that the tested load band used in the 24-hour run surveillance, and the related Tech Spec / Bases, were non conservative in relation to the worst case expected loading calculated in G13.18.3.6*019. However, the evaluation determined interim measures could be established to ensure worst case calculated loading is bounded by tested loading and the condition was given a status of "OPERABLE-DNC".

CA#4 was assigned to System Engineering to establish an interim testing method for the Division III EDG. The test required the EDG to be tested to an indicated 2700-2800kW for five minutes during 24-hour and 1-hour Division III DG runs in order to bound the worst case expected design loading. The action required revision of the test procedures prior to the next performance. This action was appropriately closed with issuance of STP-309-0203 R310. It should be noted that CR-RBS-2013-00011 CA#21 has been issued to remove the steps added by these revisions.

Corrective Actions #5, #6, #7, #8, and #9 are associated with correcting the identified condition long term. CA#5 was assigned to Engineering Design Management to perform disposition review, investigate as needed, and ensure actions are assigned as applicable to correct the problem. The initial disposition determined a study was needed to determine the optimum solution. The study was tracked by CR-RBS-2011-07132 CA#10. The study determined the optimum solution was as follows:

a. Revise Division III EDG loading calculation (G13.18.3.6*019) to reduce loads (pump power analysis).

In addition, during preparation of the evaluation to revise the Division III EDG loading calculation, it was determined that the following additional steps would be required in order to fully resolve the Div III diesel loading margin issue.

b. Decrease the maximum allowable Technical Specification frequency 61.2 Hz to 60.2 Hz (SR 3.8.1.2, 3.8.1.7, 3.8.1.11, 3.8.1.12, 3.8.1.15, 3.8.1.19, 3.8.1. 3.8.1.20).
c. Raise the Division III minimum Technical Specification Surveillance Requirement testing band from 2500 kW to 2525 kW (SR 3.8.1.3, 3.8.1.15, 3.8.1.10, and 3.8.1.14).

CA#8 was issued to hold a meeting (DE, SE, Ops, and Licensing) to discuss the proposed long term solution as outlined above. The action was appropriately closed after agreement was obtained in a meeting with the vested parties.

CA#7 was issued to present to URT the proposed solution for long term resolution of the Division III Diesel non conformance and assign CAs as appropriate based on the URT conclusion. The options to resolve the Division III Diesel Generator Non Conformance were presented to the URT on 4/9/12. The proposed solution was accepted by the URT.

CA#9 was initiated to track completion of the revision to calculation G13.18.3.6*019, Division III Diesel Generator Loading. EC-40578 was completed to address changes to G13.18.3.6*019. The EC includes all Operating Procedure changes and calculation changes necessary to correct the non-conforming condition identified by CR-RBS-2011-07294. In addition, the EC included a License Amendment Request (LAR-2012-06) to address items b. and c. above. It should be noted that tracking of NRC approval of the LAR is not required to be tracked by this Condition Report as it simply addresses the non-conservative Technical Specification and not the non-conforming condition of an EDG test band that fails to bound the worst case design basis loading. The non-conforming condition has been addressed via design basis calculation revisions and Operating Procedure revisions associated with EC-40578. Therefore, LO-LAR-2013-00055 has been issued to track all required actions necessary to support submittal, approval and implementation of this LAR.

CA#6 was issued to track final resolution of the Operable DNC condition and was appropriately closed with concurrence of Licensing after completion of #5, #7, #8, and #9 as discussed above.

CA#3 was issued to Design Engineering to correct editorial errors associated with Calculation G13.18.3.6*019. EC 32834 was completed to correct the errors in the calculation.

CA#10 was associated with procedurally required interim review of the condition and was appropriately closed after review.

CA#11 was issued as the manager closure action.

CONCLUSION

The above issued corrective actions are sufficient to correct the identified condition. All corrective actions have been verified appropriately closed. This condition report is ready for closure.

Entergy	**CORRECTIVE ACTION**	**CR-RBS-2011-07294**

CA Number: 12

	Group	Name
Assigned By:	NSA CA&A Mgmt RBS	Lucky,Peggy J
Assigned To:	NSA Licensing Staff RBS	Huffstatler,Kristi Y
Subassigned To :		

Originated By:	Zzrbscrg	3/18/2013 16:21:52
Performed By:	Huffstatler,Kristi Y	3/18/2013 16:23:27
Subperformed By:		
Approved By:		
Closed By:	Huffstatler,Kristi Y	3/18/2013 16:23:27

Current Due Date: 04/02/2013 **Initial Due Date:** 04/02/2013

CA Type: CR CLOSURE REVIEW **CA Priority:** 4

Plant Constraint: NONE

CA Description:

ARE NCV/MINOR VIOLATIONS/NRC ISSUES ADDRESSED

Review this Condition Report for closure readiness based upon the actual or potential regulatory interest in this issue. Verify that the condition has been adequately addressed. Issue additional actions as required if the review finds the issue has not been adequately addressed

Response:

During the Component Design Basis Inspection (CDBI) conducted in 2011, the NRC identified a non-cited violation for failure to ensure surveillance testing procedures of Division I and III standby diesel generators incorporated the correct acceptance limits for maximum expected load at max frequency and voltage specified in design basis documents. The corrective actions taken to address this violation are as follows:

CR 11-7132, CA#4 - STP-309-0201, 206, & 611 revised to increase load to 3130 kW (Div. I) indicated on a Fluke 45 for 5 minutes after the completion of a successful STP run.
CR 11-7294, CA#4 - STP-309-0203 revised to use meter in Control Room to maintain Div. III diesel generator at 2700 kW - 2800 kW for 5 minutes after completion of STP.

These corrective actions adequately address the NRC's concerns. Condition Report can be closed.

Subresponse :

Closure Comments:

Attachment 2

RBG-47572

Updated Safety Analysis Report changes

2. By the letter dated February 24, 2015, in response to RAI 5, the licensee stated that "The affected RBS USAR [Updated Safety Analysis Report] pages were updated as a result of updated EDG loading requirements." Please provide the affected USAR pages.

Response

Updated Safety Analysis Report pages enclosed.

RBS USAR

TABLE 8.3-2a

AUTOMATIC AND MANUAL LOADING OF ESF BUSES

Division I - 1EGS*EG1A

LOAD DESCRIPTION	Load ID	No. on Bus	No. Req.	Loss-of-Coolant Accident: Nameplate HP/KW[2]	Running: BHP[2]	Running: KW[2]	Time Start[1]	Time Stop	Block Load Total KW
•→4									
Charcoal Filter Heater	1HVC*FLT3AH	1	1	23KW	NA	~~22.0~~ 25.0	10 sec	(3)	
Filter Train Booster Fan	1HVC*FN1A	1	1	25HP	20.0	17.3	10 sec	(3)	
Battery Room Exhaust Fan	1HVC*FN3A/D	2	1	1.5HP	1.0	1.1	10 sec	(3)	
•→14 •→12 •→7									
Auxiliary Building Unit Coolers	1HVR*UC2	1	1	7.5HP	3.13	2.74	10 sec	(3)	
	1HVR*UC3	1	1	7.5HP	5.1	4.6	10 sec	(3)	
	1HVR*UC6	1	1	40HP	40	31.68	10 sec	(3)	
	1HVR*UC7	1	1	15HP	11.7	9.9	10 sec	(3)	
Filter Train Exhaust Blower	1HVF*FN3A	1	1	40HP	30 ~~33.0~~	~~28.0~~ 25.4	10 sec	(3)	
Filter Train Heater	1HVF*FLT2AH	1	1	57KW	NA	~~57.0~~ 62.1	10 sec	(3)	
Stby Serv Wtr Pp Hse Supply Fan	1HVY*FN1A	1	1	7.5HP	6.66	5.77	10 sec	(3)	
120 V AC Standby Power	MISC	MISC	-	----	----	~~51.9~~ 67.5	10 sec	(3)	
•→11									
Motor-Operated Valves	MISC	MISC	-	----	----	92.68	10 sec	(3)	
Standby Vital Bus-UPS System	1ENB*INV01A/01A1	2	1	20KVA	NA	0.0	10 sec	(18,21)	
125 V DC Battery Charger	1ENB*CHGR1A	1	1	47.5KW	NA	47.5	10 sec	(3,19)	
11←•									
Standby Cooling Tower Swgr Fan	1HVY*FN2A/2C	2	2	3HP	4.06	3.64	10 sec	(3)	
Standby D.G. Fuel Trans Pump	1EGF*P1A	1	1	3HP	3.0	2.93	10 sec	(3)	
Misc. Transformers Losses	1EJS*X1A,2A,3A	-	-	----	----	~~28.5~~ 21.6	10 sec	(3)	
~~Lighting Transformer Control Room~~	~~1LNC*MLC9~~	~~1~~	~~1~~	~~15KVA~~	~~NA~~	~~11.3~~	~~10 sec~~	~~(3)~~	
RCIC Disch Line Fill Pump	1E51*C003	1	1	5HP	2.9	2.8	10 sec	(3)	
Exciter Panel Cooling Fan	1HVP*FN6A	1	1	2HP	1.7	1.6	10 sec	(3)	
LPCS Discharge Line Fill Pump	1E21*C002	1	1	3HP	2.3	2.2	10 sec	(3)	
Stby Clg Twr Remote Intake Fan	1HVY*FN32A	1	1	5HP	3.34	3.1	10 sec	(3)	
Stby Clg Twr Rmte Intake Heater	1HVY*CH6A	1	1	12KW	NA	~~12.0~~ 13.1	10 sec	(3)	
Contmt Monitoring Sample Pump	1CMS*P7A	1	1	1HP	----	0.9	10 sec	(3)	
Auxiliary Building Unit Cooler	1HVR*UC8	1	1	15HP	10.5 ~~14.4~~	~~12.2~~ 9	10 sec	(3)	
Stdby D. G. Rear Air Compressor	EGA-C4A	1	1	20HP	20.0	16.2	10 sec	(3)	
Stdby D. G. Forward Compressor	EGA-C5A	1	1	20HP	20.0	16.2	10 sec	(3)	
Fan Margin						~~6.5~~ 4.8		(20)	
12←•									
TOTAL 10 SECOND LOAD BLOCK									491.3 ~~493.04~~
14←•									
Low Pressure Core Spray Pump	1E21*C001	1	1	1250HP	1180.6 ~~1150~~	~~917.5~~ 943.1	12 sec	(3,11)	
TOTAL 10-15 SECOND LOAD BLOCK									943.1 ~~917.5~~
4←• 7←•									

TABLE 8.3-2a (Cont)

LOAD DESCRIPTION	Load ID	No. on Bus	No. Req.	Loss-of-Coolant Accident: Nameplate HP/KW[2]	Running: BHP[2]	Running: KW[2]	Time Start[1]	Time Stop	Block Load Total KW
•→4									
Residual Heat Removal Pump A	E12*C002A	1	1	700HP	583.7 ~~580~~	~~470.3~~ 472.4	17 sec	(3)	
TOTAL 15-20 SECOND LOAD BLOCK									472.4 ~~470.3~~
•→12 •→7									
Stdby D.G. Room Vent Fan	1HVP*FN2A	1	1	100HP	41.9	34.3	34 sec	(3,12)	
Annulus Mixing System Fan (Disabled)	1HVR*FN11A	1	1	150HP	127	101.8	34 sec	(3)	
Stby Gas Treatment Fan	1GTS*FN1A	1	1	60HP	54.3	~~44.6~~ 44.91	40 sec	(3)	
Stby Gas Treatment Heater	1GTS*FLT1AH	1	1	85KW	NA	~~85.0~~ 92.6	40 sec	(3)	
Aux Bldg Unit Cooler	1HVR*UC11A	1	1	75HP	67.5	54.3	30 sec	(3)	
Control Bldg Chilled Water Pump	1HVK*P1A/P1C	2	1	50HP	18.5 ~~37~~	~~30.8~~ 15.6	40 sec	(3,14, 22)	
Equip Rm Air Cond Unit Motor	1HVC*ACU3A	1	1	5HP	1.93	2.1	40 sec	(3,14,15, 22)	
Stby Swgr Room Exhaust Fan	1HVC*FN2A	1	1	30HP	22.4 ~~23.4~~	18.3	40 sec	(3,14,15, 22)	
Fan Margin						~~7.7~~ 5.5			
TOTAL 30-40 SECOND LOAD BLOCK									267.6 ~~277.1~~
7←•									
Cont Rm Air Conditioning Unit	1HVC*ACU1A	1	1	75HP	60.0	49.0	60 sec	(3, 22)	
•→11									
Stby Swgr Rm Air Handling Unit	1HVC*ACU2A	1	1	75HP	63.8	53.2	60 sec	(3, 22)	
Stby Service Water Pump	1SWP*P2A	1	1	450HP	412.1 ~~413~~	~~329.3~~ 328.8	70 sec	(3)	
Control Room Heater	1HVC*CH1A	1	1	65KW	NA	~~65.0~~ 0	60 sec	(17, 22)	
Fan Margin						5.1 ~~5.5~~	60 sec	(20)	
TOTAL 60-90 SECOND LOAD BLOCK									436.1 ~~302.2~~
11←• •→14 •→7									
Control Building Chiller	1HVK*CHL1A/1C	2	1	250HP	250	~~203.0~~ 202.7	211 sec	(3,12,13, 22)	
Control Bldg Chiller-L.O. Pump	1HVK*CHL1APL/ 1HVK*CHL1CPL	2	1	1.5HP	NA	1.4	211 sec	(3,13, 22)	
Control Bldg Chilled Recirc Pump	1SWP*P3A/P3C	2	1	15HP	6.3	5.9	180 sec	(3,15,16, 22)	
TOTAL 1.5-10 MINUTE LOAD BLOCK									210 ~~210.3~~
7←•									
Containment Unit Cooler	1HVR*UC1A	1	1	150HP	119.6	96.6	10 min,10 S	(3)	
Leakage Control Air Compressor	1LSV*C3A	1	1	50HP	NA	43.0	10 min	(3)	
•→8A •→8									
Drywell Hydrogen Mixing Fan (+)	1CPM*FN1A	1	1	1.5HP	0.81	0.9	10 min,10 S	(5)	
Fan Margin						~~4.9~~ 4.8		(20)	
TOTAL 10-12 MINUTE LOAD BLOCK									145.3 ~~145.4~~
•→11									
125 Vdc Battery Charger	1ENB*CHGR1A	1	1	47.5KW max 32.4KW cont	NA	-47.5 32.4	10 min 10 sec		
Motor Operated Vavles	MISC	MISC	-	----	----	-92.68	10 sec	(3)	
Load Reduction at ~10 minutes									-107.8 ~~107.78~~
11←• •→7									
Maximum Coincidence Load Which Could Automatically Start									2858.0 ~~2908.00~~
4←• 7←• 8←• 8A←• 12←• 14←•									

TABLE 8.3-2a (Cont)

LOAD DESCRIPTION	Load ID	No. on Bus	No. Req.	Loss-of-Coolant Accident: Nameplate HP/KW[2]	Running: BHP[2]	Running: KW[2]	Time Start[1]	Time Stop	Block Load Total KW
•→4 •→7									
Auxiliary Building MCC Misc	1NHS-MCC102A	1	1	26.4KW	NA	26.4	>2.0 hr	(3)	
7←• •→14 •→12 •→11 •→10									
Drywell Unit Cooler	1DRS-UC1A	1	1	30HP/60HP	18.3/58.0	15.0/47.3	>2.0 hr	(5)	
	1DRS-UC1C	1	1	30HP/60HP	18.3/58.0	15.0/47.3	>2.0 hr	(5)	
	1DRS-UC1E	1	1	30HP/60HP	18.3/58.0	15.0/47.3	>2.0 hr	(5)	
10←• 11←• 12←• ←•14									
Control Room Charcoal Filter	1HVC*FN8A	1	1	0.5HP	0.15	0.3	>2.0 hr		
F.B. Filter Dcy Heat Removal Fan	1HVF*FN7A	1	1	0.5HP	0.15	0.3	>2.0 hr		
SGTS Filter Dcy Heat Removal Fan	1GTS*FN2A	1	1	0.5HP	0.15	0.3	>2.0 hr		
Normal Battery Charger	1BYS-CHGR1A	1	1	NA	NA	~~48.1~~ 58.5	>2.0 hr	(5)	
Standby Cooling Tower Fans	1SWP*FN1A	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1C	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1E	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1G	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1J	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1L	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1N	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1Q	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1S	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1U	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
Fuel Pool Cooling Pumps	1SFC*P1A	1	1	100HP	75.0	60.6	>2.0 hr	(5)	
•→8A									
8A←•									
Standby Liquid Control Pump	1C41*C001A	1	1	40HP	35.0	28.4	>2.0 hr	(5)	
Hydrogen Recombiner	1HCS*RBNR1A	1	1	75KW	NA	~~75.0~~ 81.7	>2.0 hr	(5)	
Hydrogen Ignitor	1HCS*XD01A	1	1	15KVA	NA	15.0	>2.0 hr	(5)	
Lighting Transformer Control Room	1LAC-XLC9	1	1	15KVA	NA	11.3	>2.0 hr	(3)	
Control Room Heater	HVC-CH1A	1	1	65 kW	NA	70.8	>2.0 hr	(3)	
Additional Misc Transformer Losses	EJS-X1A EJS-X2A EJS-X3A					2.6	>2.0 hr		

TABLE 8.3-2b
AUTOMATIC AND MANUAL LOADING OF ESF BUSES
Division II - EGS*EG1B

LOAD DESCRIPTION	Load ID	No. on Bus	No. Reg.	Loss-of-Coolant Accident: Nameplate HP/KW[2]	Running: BHP[2]	Running: KW[2]	Time Start[1]	Time Stop	Block Load Total KW
•→14 •→12 •→7 •→4									
Control Bldg Chilled Water Pump	1HVK*P1B/D	2	1	50HP	18.5 ~~37.0~~	~~38.0~~ 15.6	10 sec	(3)	
Equip Rm Air Cond Unit Motor	1HVC*ACU3B	1	1	5HP	1.93	2.1	10 sec	(3)	
Stby Swgr Room Exhaust Fan	1HVC*FN2B	1	1	30HP	22.4	18.3	10 sec	(3)	
Charcoal Filter Heater	1HVC*FLT3BH	1	1	23KW	NA	~~23.0~~ 25	10 sec	(3)	
Filter Train Booster Fan	1HVC*FN1B	1	1	25HP	20.0	17.3	10 sec	(3)	
Battery Room Exhaust Fan	1HVC*FN3B/E	2	1	1.5HP	1.0	1.1	10 sec	(3)	
Auxiliary Bldg Unit Coolers	1HVR*UC4	1	1	7.5HP	4.25	3.74	10 sec	(3)	
	1HVR*UC9	1	1	30HP	26.6	21.8	10 sec	(3)	
	1HVR*UC10	1	1	5HP	1.81	1.7	10 sec	(3)	
Filter Train Exhaust Blower	1HVF*FN3B	1	1	40HP	30 ~~33.0~~	~~28.0~~ 25.4	10 sec	(3)	
Filter Train Heater	1HVF*FLT2BH	1	1	57KW	NA	~~57.0~~ 62.1	10 sec	(3)	
Stby Serv Wtr Pp Hse Supply Fan	1HVY*FN1B/1D	2	2	7.5HP	13.32	11.53	10 sec	(3)	
•→11									
Motor-Operated Valves	MISC	MISC	-	----	----	97.09	10 sec	(3,4)	
11←•									
120 V AC Standby Power	MISC	MISC	-	----	----	~~49.0~~ 60.01	10 sec	(3)	
•→15 •→11									
Standby Vital Bus-UPS System	1ENB*INV01B/01B1	2	1	20KVA	NA	0.0	10 sec	(18, 21)	
15←•									
125 V DC Battery Charger	1ENB*CHGR1B	1	1	47.5KW	NA	47.5	10 sec	(3)	
Lighting Transformer-Control Room	1LAC-XLC9	1	1	15KVA	NA	11.3	10 sec	(3)	
Standby Cooling Tower Swgr Fan	1HVY*FN2B/2D	2	2	3HP	4.06	3.64	10 sec	(3)	
Standby D.G. Fuel Trans Pump	1EGF*P1B	1	1	3HP	3.0	2.93	10 sec	(3)	
Misc. Transformers Losses	1EJS*X1B,2B,3B	-	-	----	----	~~20.5~~ 20.4	10 sec	(3)	
Exciter Panel Cooling Fan	1HVP*FN6B	1	1	3HP	2.7	2.7	10 sec	(3)	
RHR Discharge Line Fill Pump	1E12*C003	1	1	3HP	2.06	2.1	10 sec	(3)	
Standby Clg Twr Remote Intake Fan	1HVY*FN32B	1	1	5HP	3.34	3.1	10 sec	(3)	
Standby Clg Twr Rmte Intake Heater	1HVY*CH6B	1	1	12KW	NA	~~12.0~~ 13.1	10 sec	(3)	
Contmt Monitoring Sample Pump	1CMS*P7B	1	1	1HP	----	0.9	10 sec	(3)	
Aux Bldg Floor Drain Pump	1DFR*P5A	1	1	3.0HP	3.0	2.8	10 sec	(3)	
Aux Bldg Floor Drain Pump	1DFR*P5B	1	1	3.0HP	3.0	2.8	10 sec	(3)	
Aux Bldg Floor Drain Pump	1DFR*P5D	1	1	3.0HP	3.0	2.8	10 sec	(3)	
Aux Bldg Floor Drain Pump	1DFR*P5E	1	1	3.0HP	3.0	2.8	10 sec	(3)	
Stby D. G. Rear Air Compressor	EGA-C4B	1	1	20HP	20	16.2	10 sec	(3)	
Stby D. G. Forward Air Compressor	EGA-C5B	1	1	20HP	20	16.2	10 sec	(3)	
Fan Margin						~~5.9~~ 4.6		(20)	
TOTAL 10 SECOND LOAD BLOCK									518.7 ~~527.24~~
7←• 11←• 12←• 14←•									
Residual Heat Removal Pump C	1E12*C002C	1	1	700HP	590.6 ~~580~~	~~476.3~~ 477.9	12 sec	(3)	
TOTAL 10-15 SECOND LOAD BLOCK									477.9 ~~476.3~~
4←•									

TABLE 8.3-2b (Cont)

LOAD DESCRIPTION	Load ID	No. on Bus	No. Req.	Nameplate HP/KW[2]	Loss-of-Coolant Accident Running BHP[2]	Loss-of-Coolant Accident Running KW[2]	Time Start[1]	Time Stop	Block Load Total KW
•→4									
Residual Heat Removal Pump B	1E12*CO02B	1	1	700HP	589.2 ~~580~~	~~470.3~~ 476.8	17 sec	(3)	
TOTAL 15-20 SECOND LOAD BLOCK									476.8 ~~470.3~~
•→12									
Stby D.G. Room Vent Fan	1HVP*FN2B	1	1	100HP	41.9	34.3	34 sec	(3,12)	
Annulus Mixing System Fan (Disabled)	1HVR*FN11B	1	1	150HP	127	101.8	34 sec	(3)	
Stby Gas Treatment Fan	1GTS*FN1B	1	1	60HP	54.3	~~41.6~~ 44.91	40 sec	(3)	
Stby Gas Treatment Heater	1GTS*FLT1BH	1	1	85KW	NA	~~85.0~~ 92.6	40 sec	(3)	
Aux Bldg Unit Cooler	1HVR*UC11B	1	1	75HP	67.5	54.3	30 sec	(3)	
Standby Service Water Pump	1SWP*P2B	1	1	450HP	338 ~~413.0~~	~~329.5~~ 269.7	40 sec	(3)	
Fan Margin						~~6.7~~ 4.4		(20)	
TOTAL 30-40 SECOND LOAD BLOCK									500.2 ~~554.1~~
Cont Rm Air Conditioning Unit	1HVC*ACU1B	1	1	75HP	60.0	49.0	60 sec	(3)	
•→11									
Stby Swgr Rm Air Handling Unit	1HVC*ACU2B	1	1	75HP	63.8	53.2	60 sec	(3)	
11←•									
Stby Service Water Pump	1SWP*P2D	1	1	450HP	350.1 ~~413~~	~~329.5~~ 279.3	70 sec	(3)	
Control Room Heater	1HVC*CH1B	1	1	65KW	NA	~~65.0~~ 70.8	60 sec	(17)	
Fan Margin						~~5.5~~ 5.1		(20)	
•→11									
TOTAL 60-90 SEC LOAD BLOCK									457.4 ~~502.2~~
11←• •→14 •→7									
Control Building Chiller	1HVK*CHL1B/D	2	1	250HP	NA	~~203.0~~ 202.7	211 sec	(3,12,13)	
Control Bldg Chiller-L.O. Pump	1HVK*CHL1BPL /1HVK*CHL1DPL	2	1	1.5HP	1.5	1.4	211 sec	(3,13)	
Control Bldg Chilled Recirc Pump	1SWP*P3B or D	1	1	15HP	6.3	5.9	180 sec	(3,15,16)	
TOTAL 1.5-10 MINUTE LOAD BLOCK									210 ~~210.3~~
Containment Unit Cooler	1HVR*UC1B	1	1	150HP	119.6	96.6	10 min,10 S	(3)	
Leakage Control Air Compressor	1LSV*C3B	1	1	50HP ~~60HP~~	~~NA~~ 50	43.0	10 min	(3)	
14 ←• •→8A									
Drywell Hydrogen Mixing Fan	1CPM*FN1B	1	1	1.5HP	0.81	0.9	>2.0 hr	(5)	
Fan Margin						~~1.9~~ 4.8		(20)	
TOTAL 10-12 MINUTE LOAD BLOCK									145.3 ~~145.1~~
•→11									
125 Vdc Battery Charger	1ENB*CHGR1B	1	1	47.5KW max 32.4KW cont.	NA	-47.5 32.4	10 min 10 min	(3,19)	
Motor-Operated Valves	MISC	MISC	-	----	----	-97.09	10 min	(3,4)	-112.2
Load Reduction at ~10 min									~~112.15~~
11←• •→14									
Maximum Coincidence Load Which Could Automatically Start									2674.1 ~~2767.35~~
4←• 7←• 8A←• 12←• 14←•									

TABLE 8.3-2b (Cont)

LOAD DESCRIPTION	Load ID	No. on Bus	No. Req.	Loss-of-Coolant Accident: Nameplate HP/KW[2]	Running: BHP[2]	Running: KW[2]	Time Start[1]	Time Stop	Block Load Total KW
•→4 •→7									
Auxiliary Building MCC Misc	1NHS-MCC102B	MISC	MISC	26.4KW	NA	26.4	>2.0 hr	(3)	
7←• •→12 •→11 •→10									
Drywell Unit Cooler	1DRS-UC1B	1	1	30HP/60HP	18.3/~~58.0~~ 58	15/47.3	>2.0 hr	(5)	
	1DRS-UC1D	1	1	30HP/60HP	18.3/~~58.0~~ 58	15/47.3	>2.0 hr	(5)	
	1DRS-UC1F	1	1	30HP/60HP	18.3/~~58.0~~ 58	15/47.3	>2.0 hr	(5)	
10←• 11←• 12←•									
Containment Unit Cooler	1HVR-UC1C	1	1	150HP	119.6	96.6	>2.0 hr		
Control Room Charcoal Filter	1HVC*FN8B	1	1	0.5HP	0.15	0.3	> 2.0 hr		
F.B. Filter Dcy Heat Removal Fan	1HVF*FN7B	1	1	0.5HP	0.15	0.3	> 2.0 hr		
SGTS Filter Dcy Heat Removal Fan	1GTS*FN2B	1	1	0.5HP	0.15	0.3	> 2.0 hr		
Normal Battery Charger	1BYS-CHGR1B	1	1	NA	NA	~~48.4~~ 58.5	>2.0 hr		
Turbine Bldg MCC	1NHS-MCC101	MISC	MISC	NA	NA	199.4	>2.0 hr		
Info Sys Handling Battery Chgr	1IHS-CHGR1D	1	1	80KVA	NA	~~48.4~~ 58.5	>2.0 hr		
Standby Cooling Tower Fans	1SWP*FN1B	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1D	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1F	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1H	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1K	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1M	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1P	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1R	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1T	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
	1SWP*FN1V	1	1	40HP	34.7	29.7	>2.0 hr	(5)	
Fuel Pool Cooling Pumps	1SFC*P1B	1	1	100HP	75.0	60.6	>2.0 hr	(5)	
•→8A 8A←•									
Standby Liquid Control Pump	1C41*C001B	1	1	40HP	35.0	28.4	>2.0 hr	(5,7)	
Hydrogen Recombiner	1HCS*RBNR1B	1	1	75KW	NA	~~75.6~~ 81.7	>2.0 hr	(5)	
Hydrogen Ignitor	1HCS*XD01B	1	1	15KVA	NA	15.0	>2.0 hr	(5)	
•→7									
Hydrogen Purge Fan Motor	1CPP-FN1	1	1	1HP	1.0	0.9	>2.0 hr		
7←• 4←•									
Additional Misc Transformer Losses	EJS-X1B EJS-X2B EJS-X3B					2.7	> 2.0 hr		

TABLE 8.3-2b (Cont)

•→4
4←•

NOTES FOR TABLES 8.3-2a and 8.3-2b

(1) The time indicated in this column is calculated from the instant LOCA and/or LOOP signals given to emergency diesel generators. Maximum time for standby diesel generators to start and attain rated speed and frequency, including diesel generator air circuit breaker (ACB) closure, is 10 sec.

(2) Nameplate horsepower and brake horsepower are supplied by vendors for their furnished equipment. The required kilowatts for each load are calculated by using brake horsepower and the efficiency data supplied by vendors of the respective equipment.

(3) This load starts and/or stops automatically with satisfactory complete actuation or energization of its associated pump, valves, pressure or temperature switches' interlocks, or energization of the required buses from the standby power sources.

(4) Motor operators of the MOVs stop automatically when the valve action is completed. All MOV loads complete their intended operation and are deenergized within 10 min of diesel generator ACB closing. MOV actuation after 10 min is assumed to occur on an individual and random basis, and the resultant loads are assumed to be inconsequential.

•→8A •→8 •→9
(5) Started and/or stopped manually by operator. The SCT fans will be started one hour into a LOP-LOCA.
8←• 8A←• 9←•

•→3 3←•
(6) 1LAC-XLC9 has two sources of power from which it may select. This is not tripped on LOCA and is normally connected to diesel generator 1EGS*EG1B. On diesel generator 1EGS*EG1B failure, 1LAC-XLC9 can be manually connected to diesel generator 1EGS*EG1A. after the LCPS pump is turned off.

(7) 1C41*C001A and B may be energized at the discretion of the plant operator.

(8) The attached load profile is a representative loading considering a single failure during LOCA and loss of offsite power. At 2 hr, operators' manual actions are shown to trip and start loads which must not exceed the DG allowable loading limits.

(9) 1HVY*FN1A is supplied from diesel generator 1EGS*EG1A. 1HVY*FN1C and 1SWP*P2C are supplied from 1E22*S001G1C independently. The operator shall shut off either 1HVY-FN1A or 1HVY*FN1C at his discretion if both fans operate simultaneously.

See notes and Load Profile (Fig. 8.3-14a and b, and 15) for effective loads.

TABLE 8.3-2b (Cont)

(10) Times and load values shown are for information only. Actual setpoints are shown on the setpoint calculations.

(11) See Table 8.3-3 for loading of Division III ESF buses.

(12) Indicated kW demand is based on actual heat release loads of the equipment.

•→3
(13) Chiller 1HVK*CHL1B or D and its lube oil pump are given load sequencing permissive at 160 sec, but due to chillers internal program logic, it would start at 211 sec. Operation of chiller 1HVK*CHL1A or C will be in the following manner.

a. If 1HVK*P1B or D fails to start at time zero (10 sec), chiller 1HVK*CHL1A or C and its associated lube oil pump shall start automatically after 211 sec.

b. If there is low chilled water flow (0153 GPM) thru chiller 1HVK*CHL1B or D at any time during diesel loading, chiller 1HVK*CHL1A or C start will be initiated after 30 sec. If diesel sequence timer has already timed out (150 sec.), chiller 1HVK*CHL1A or C will start after an additional 51 sec. time delay.

c. If the normal chilled water flow thru chiller 1HVK*CHL1B or D is established, i.e. 1HVK*CHL1B or D started operating satisfactorily, then 1HVK*CHL1A or C and its associated pumps, fans, and a/c units will not start.

(14) The time indicated in this column includes 30 sec time delay after signal initiation of low chilled water flow thru chiller 1HVK*CHL1B or D.

(15) The time indicated in this column includes 20 sec time for valve opening.

(16) The time indicated in this column includes 160 sec for chiller initiation signal.

(17) With circuit breaker closed, this load starts, stops and/or modulates automatically to maintain the control room temperature at set point.

•→15 •→11
(18) ENB-INV01A (01A1) and ENB-INV01B (01B1) are conservatively assumed operating on the 125 Vdc supply rather than the 480 Vac source. Thus these loads are reflected in the ENB-CHRGR1A and CHGR1B loading.

(19) Loading on the chargers ENB-CHGR1A and ENB-CHGR1B assumed to maximum loading of 47.5KVA for the first 10 minutes, after which the loading is assumed to drop to 32.4KVA.

11←• 3←• •→12
(20) A margin is added to each step to allow for minor variations in fan BHP due to pitch settings to minimize USAR updates.

12←•
(21) ENB-INV01A (01A1) and ENB-INV01B (01B1) are divisionally redundant Vital Bus inverters. Only one of the two inverters will be in service for a division at one time.

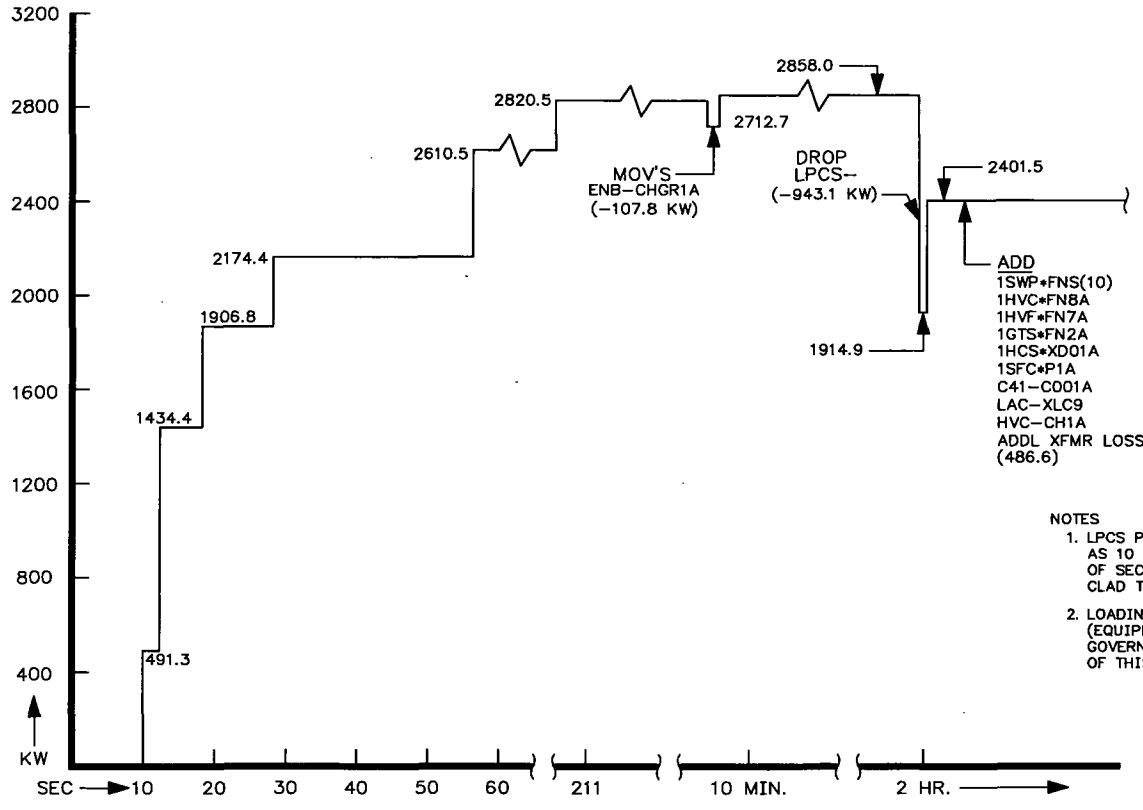
15←•
(22) These loads have divisionally redundant loads supplied by EGS-EG1B. ~~These loads will not be accounted for when DG1A and DG1B are operating with DG1C failed. (See Figure 8.3-15)~~

Table 8.3-3

Description	EquipName	KVA Connected	HP	Percent Load	Maximum Running KW
HPCS pump motor	E22-C001	2181.0 ~~2179.1~~	2500.0	92.9 ~~95.0~~	~~1896.2~~ 1862.4
Margin	MCCS002-MARGIN	6.1		90.0	~~4.7~~ 4.6
Gen. Vent Supply Fan	HVP-FN6C	1.5	1.0	90 ~~100.0~~	~~1.0~~ 0.9
120 VAC Dist. Pnl.	SCV-XDS002	15.0		19 ~~11.0~~	~~1.3~~ 2.3
Standby service water pump room vent fan	HVY-FN1C	7.6 ~~7.5~~	7.5	100.0	~~6.5~~ 6.6
HPCS pump & room Unit Cooler	HVR-UC5	49.4 ~~49.3~~	50.0	75.2 ~~84.0~~	~~35.7~~ 32
Fuel Oil xfer pump	EGF-P1C	3.6	3.0	100.0	2.9
Gen. Battery Room Exhaust Fan	HVC-FN3F	2.0	1.5	100.0	1.5
Gen. Battery Room Exhaust Fan	HVC-FN3C	2.0	1.5	100.0	1.5
Misc. Motor Operated Valves		63.8 ~~67.6~~		100.0	~~60.8~~ 57.4
Turbocharger Lube Oil Pump	E22-S001ACP	1.4 ~~1.1~~	0.7	100.0	~~0.7~~ 0.9
DG Lube Oil Immersion Heater @ 480V	E22-S001GSH	3.3 ~~3.1~~		100.0	3.3
120 VAC Dist Pnl.	E22-S002PNL	10.0		38	3.0
DG Battery Charger	E22-S001CGR	25.0		100.0	20.0
HPCS Discharge Line Fill Pump	E22-C003	4.8 ~~5.4~~	5.0	100.0	~~4.6~~ 4.3
DG Circulating Oil Pump	E22-S001COP	1.8 ~~1.6~~	1.0	100.0	~~1.1~~ 1.0
Transformer losses 225KVA @ 3.3%Z	E22-S003	7.4		100.0	6.7
DG IMRS heater @ 480V	E22-S001DGH	16.3		100.00	16.3
	Total Initial Load	~~2403.6~~ 2402.0			~~2067.8~~ 2027.56
20 second load Block					
DG Room Vent Fan (delayed approximately 20 sec from diesel start.)	HVP-FN3A	~~90.7~~ 90.8	100.0	~~94.0~~ 94.2	~~76.0~~ 76.2
	Subtotal.				
	20 sec. Total load				~~2143.9~~ 2103.76
30 second load Block					
Standby Service Water Pump Motor	SWP-P2C	~~412.5~~ 420.0	450.0	~~96.0~~ 90.6	~~344.2~~ 325.4
Standby Service Water Pump discharge valve	SWP-MOV40C	~~1.8~~ 1.6	0.7	100.0	~~1.6~~ 1.4
	30 sec. subtotal				~~345.9~~ 326.8
	Max load after 30 sec.	~~2908.7~~ 2914.4			~~2409.0~~ 2430.60
Less normally closed valves not required to operato for LOCA.					~~15.0~~ 35.8
Adjusted Total					~~2474.8~~ 2394.78
Less all MOV loads. Max operating time is approximately 90 seconds which impacts 7 KW only.					58.9
					~~62.4~~ ~~2427.3~~ 2371.74
HPCS continuous rating*					2600.0
HPCS 2,000 hr/yr rating**					2850.0
HPCS generator 30-min rating**					3050.0

*The continuous rating is subject to a 10% overload for 2 hrs out of a 24 hr period of operation.

**The 2000 hr/yr and 30-min ratings are not subject to overload.

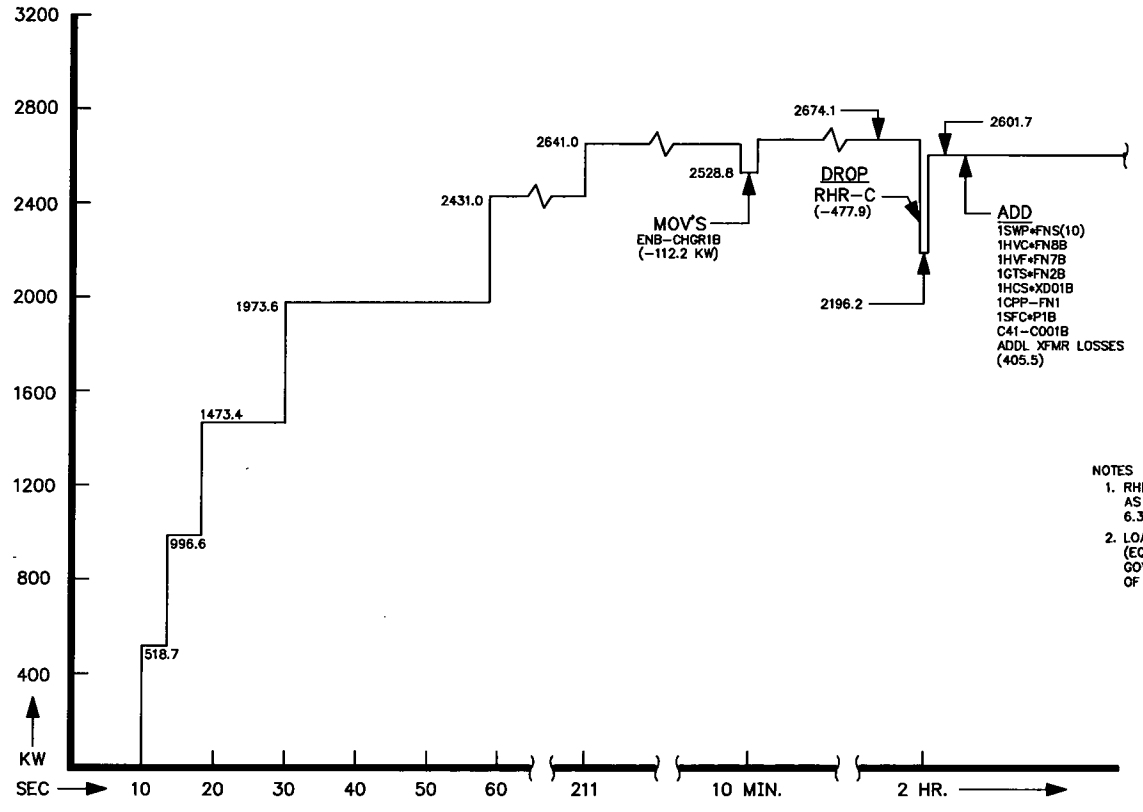


NOTES

1. LPCS PUMP CAN BE DROPPED AS EARLY AS 10 MINUTES POST DBA PER REQUIREMENTS OF SECTION 6.3.1.1.2 AND THE WATER LEVEL AND CLAD TEMPERATURE TREND PLOTS IN SECTION 6.3.
2. LOADING SHOWN IS CONSERVATIVELY AT 60 HZ (EQUIPMENT RATED FREQUENCY) VS. 59.7 HZ GOVERNOR NOMINAL SETPOINT. PREVIOUS VERSIONS OF THIS DIAGRAM ALSO SHOWED LOADING AT 60 HZ.

FIGURE 8.3–14a

LOAD PROFILE – DG1A
DG1A & DG1C OPERATING
DG1B FAILED

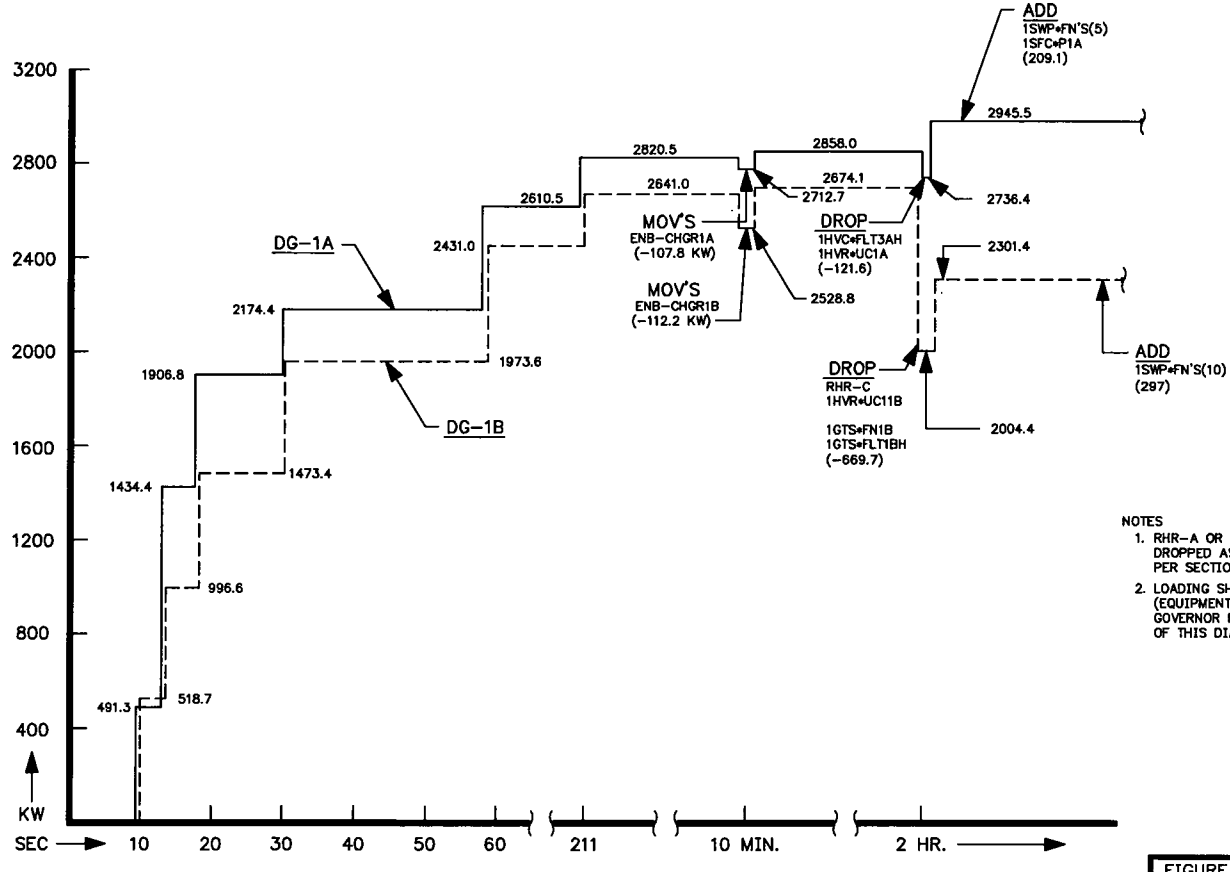


NOTES

1. RHR-C PUMP CAN BE DROPPED AS EARLY AS 10 MINUTES POST DBA PER SECTION 6.3.1.1.2.
2. LOADING SHOWN IS CONSERVATIVELY AT 60 HZ (EQUIPMENT RATED FREQUENCY) VS. 59.7 HZ GOVERNOR NOMINAL SETPOINT. PREVIOUS VERSIONS OF THIS DIAGRAM ALSO SHOWED LOADING AT 60 HZ.

FIGURE 8.3-14b

LOAD PROFILE - DG1B
DG1B & DG1C OPERATING
DG1A FAILED



NOTES

1. RHR-A OR RHR-B, AND RHR-C PUMPS CAN BE DROPPED AS EARLY AS 10 MINUTES POST DBA PER SECTION 6.3.1.1.2.
2. LOADING SHOWN IS CONSERVATIVELY AT 60 HZ (EQUIPMENT RATED FREQUENCY) VS. 59.7 HZ GOVERNOR NOMINAL SETPOINT. PREVIOUS VERSIONS OF THIS DIAGRAM ALSO SHOWED LOADING AT 60 HZ.

FIGURE 8.3-15

LOAD PROFILE – DG1A & DG1B
DG1A & DG1B OPERATING
DG1C FAILED

RIVER BEND STATION
UPDATED SAFETY ANALYSIS REPORT
REVISION 22

•→12 •→6
Note: The electric heating coils (duct heaters - 1HVC*CH1A, B) are described as part of the Main Control Room Air Conditioning Subsystem. ~~Dependent upon weather conditions, these heaters may be required for operability of the control room air conditioning system to maintain design humidity within specification.~~
6←• 12←•

Two outside air charcoal filter trains are provided to filter the main control room outside air supply during and after a LOCA. One serves as a full capacity spare. A detailed description of the emergency air filtration system and its components is provided in Section 6.4.2.

During normal and plant shutdown conditions, a mixture of outside air and recirculation air is filtered for dust before delivery to the main control room. The supply air to exhaust air ratio is sufficient to maintain a positive pressure above atmospheric pressure which prevents outside air and air from other control building areas from leaking into the main control room. A maximum outside air quantity of 4,000 cfm can be provided for pressurization of the main control room. The following factors were taken into consideration to determine the volume of air for pressurization:

1. Net volume of the main control room and the associated pressure boundary areas is 240,700 cu ft.

2. An adequate maximum outside air supply of approximately one air change/hr is provided for comfort of personnel in the main control room.

No noxious gases are stored near the main control room outside air intakes. For further description see Section 2.2.3.

The main control room pressure envelope is maintained at a positive pressure relative to the adjoining areas, as described in Section 6.4. Two separate outside air intakes are furnished to provide alternate sources of outdoor air for the main control room. The local air intake is located on the roof of the control building, and the remote air in-take is located inside the standby cooling tower, a Seismic Category I structure. The control building intake locations are shown in Fig. 6.4-1. The remote air intake controls are located in the main control room.

The air intakes are located so that under a variety of wind conditions one of the air intakes continually ensures air free of objectionable contamination for main control room

•→12 •→6 •→3
~~unit chilled water valve. Main control room air handling unit heaters (CH1A,B) are modulated by controllers to maintain relative humidity within design limits. Pushbutton controls are provided in the main control room for~~ manual operation of the heater breakers. The heaters are modulated automatically
3←• 6←• 12←•
Control switches are provided in the main control room for manual operation of the isolation valves (MOV 1A,B) for the main control room air handling units. A LOCA signal or a high radiation condition in the control building local air intake closes the isolation valve.

Local and remote outside air intake radioactivity levels are monitored, and a high radiation level condition activates an alarm in the main control room. The control building ventilation system and area radiation monitors are described in Section 12.3.4.

Control switches are provided in the main control room for either manual or automatic operation of the main control room charcoal filter train local outside air intake dampers (AOD 19C,D,E,F) and booster fans (FN1A,B). In the automatic mode the dampers open and the fans start on a LOCA signal or a high radiation condition in the local outside air intake. The operator has the option of drawing outside air from the remote air intake. Control switches are provided in the main control room for manual operation of the motor-operated remote outside air intake dampers (MOD 7A,B) and air-operated control room charcoal filter remote outside air intake dampers (AOD 19A,B).

Charcoal filter trouble alarms are provided in the main control room. Abnormal conditions are monitored by the plant computer. Charcoal filter bed inlet temperature is monitored, and a high temperature condition activates an alarm in the main control room.

Control logic is provided for automatic startup of the spare booster fan when an operating fan fails and a high radiation condition in local outside air intake or LOCA condition exists. A booster fan failure condition is re- presented by a low air flow signal. The booster fans (FN1A,B) are interlocked with their air-operated discharge and inlet dampers (AOD 3A,B and AOD 43A,B), so that the fan start signal will open the dampers and the fan will start after the inlet damper is fully open. This prevents potential damage to the upstream ductwork caused by operating the booster fan with the inlet damper closed.

insert

when the HVC-CH1A(B) pushbutton is in START and adequate system flow exists.

Attachment 3

RBG-47572

Design Change Information

3. By the letter dated February 24, 2015, in response to RAI 7, the licensee references the "Engineering Change package." Please provide from the Engineering Change package relative information regarding this amendment.

Response

Design Change information enclosed.

Extracted from EC 40578

1.0 Description

1.1 Structure, System, or Component Description

Division I and II Diesel Generators

The Standby Diesel Generator (SDG) System consists of two diesel engines, engine control system, generator exciter/voltage regulator system, supporting auxiliary systems, protection devices, instrumentation, and power output up to but not including the DG output breaker.

The SDGs function to provide emergency power to essential auxiliaries for safe shutdown in the event of a Loss of Offsite Power (LOP) or LOP coincident with a Loss of Coolant Accident (LOCA). Two SDGs are permanently assigned to two of the three electrical system 4.16 kV busses (Division I and II). The third bus is supplied by the High Pressure Core Spray (HPCS) diesel generator (Division III), whose requirements are discussed in SDC 309/405.

If, during testing, a LOCA and/or LOP occurs, the diesel generator output circuit breaker is tripped. If a LOP occurs, or LOP concurrent with LOCA, the diesel generator governor and exciter-regulator controls automatically revert and reset to their emergency, nonparallel modes. In order to begin sequential loading, the diesel generator breaker re-closes to the bus, after load shed, if offsite power is not available.

The engine speed and load control system for each diesel generator consists of a suitable governor, complete with all necessary equipment, for controlling the engine speed from no load to full load, and for providing load control while the unit is operating in synchronism with the live standby bus, during maintenance or testing.

A separate overspeed device, independent of the governor, must be provided to prevent engine runaway in the event of any failure which may render the governor inoperable.

The speed control components must be suitable for operation on a 125 VDC supply.

Division III Diesel Generator

In the event of a loss of preferred (offsite) power, the HPCS DG System shall supply power for the startup, and operation of the HPCS System, Standby Service Water (SSW) Pump 2C motor, diesel ventilation fans [HVP-FN3A], [HVP-FN6C] and miscellaneous auxiliaries. The diesel generator auxiliary systems operate to support the operation of the HPCS DG System.

With the diesel in standby mode, the diesel can be started via the control room start switch. After a diesel start, the generator will not automatically transfer to the 4.16 kV bus unless a sustained bus undervoltage condition exists.

The engine shall be provided with an automatic overspeed trip device independent of speed governor to trip fuel oil supply on overspeed. The speed governor shall be equipped with a reversible dc motor for speed adjustments from both local and remote control panels. The motor shall be suitable for use with the available dc voltage. Provision is provided for automatic restoration of governor setting to approximate rated conditions before a manual or automatic unit start.

1.2 Reason for Change

The River Bend Station (RBS) Division I, II, and III Diesel Generators (DG) are tested on both a monthly and 24-month basis per the Technical Specification Surveillance Requirements. The Technical Specification requires the tested load for Divisions I and II to be greater than the worst case expected load as determined in the station electrical loading calculations. During the 2008 Component Design Basis Inspection (CDBI) by the NRC, it was found that the diesel generator electrical load calculations did not account for the maximum allowable frequency and voltage in the Technical Specification (TS) and, therefore, did not provide for the maximum expected load conditions. The loading calculations were subsequently changed to include the maximum TS allowable frequency and voltage, however the calculation change failed to consider the impact to the surveillance test band, which no longer bounds the worst case accident loading.

The existing Division I, II, and III Diesel Generators have Technical Specification allowable maximum frequencies of 61.2 Hz, which results in a 6.12% increase in motor loading on the diesel generator when operating at that upper limit versus operation at nominal (60 Hz) frequency. This is due to the fact that the motor loading on the generator is related to the cube of the difference between the maximum frequency and the nominal frequency, where loading is typically calculated, as it is in this case. Limiting this maximum Tech Spec frequency will reduce the motor loading on the diesel generator under worst case conditions.

This EC will decrease the maximum allowable Technical Specification frequency from 61.2 Hz to 60.2 Hz for all three Diesel Generators, as well as decreasing the maximum allowable Technical Specification voltage from 4580V to 4368V for the Division I and II Diesel Generators. These changes combined with a change to raise the lower end of the surveillance test band will clear the non-conforming condition on the Division I and II DGs by restoring adequate margin.

The load test band for all three Diesel Generators will also be changed by this modification. By increasing the lower bound of the testing band for all three Diesel Generators it provides more margin for the tested load to be greater than the worst case expected load determined by the electrical loading calculations.

As a precursor to EC 40578, the DG governor setpoint was reduced from 60 Hz to 59.7 Hz under EC 38515 for the Division I and II Diesel Generators. EC 40571(Child 1 to Parent EC 38515) was implemented for Division I to provide an appropriate operating margin above the Technical Specification minimum frequency (58.8 Hz) and below the proposed Technical Specification maximum frequency (60.2 Hz). EC 40572 (Child 2 to Parent EC 38515) has not yet been implemented for Division II, however the loading for the Division II DG has been evaluated at both 59.7 Hz and 60 Hz (see Attachment 9.1).

1.3 Design Objective to Resolve Problem -

The scope of Evaluation EC 40578 includes the following:

a) Revise calculation E-192, "Standby Diesel Generator Loading", to gain additional margin by removing conservatisms in the individual load calculations. Calculation E-192 will also be revised to decrease the maximum allowable Technical Specification frequency from 61.2 Hz to 60.2 Hz and lower the maximum allowable Technical Specification voltage from 4580V to 4368V. Calculation E-192 will use an analyzed maximum frequency of 60.5 Hz to determine the loading. Two loads will also be impacted by this revision, a control room heater, HVC-CH1A, will be removed as an automatic load on Division I, and lighting panel LAC-PNL1C9 will not be a load on the Division I Diesel Generator for the first ten minutes of operation.

b) Create new I&C calculation G13.18.6.2-002 to determine the uncertainty associated with instrumentation loops used during surveillance testing in accordance with Surveillance Testing Procedures.

c) Revise calculation G13.18.3.6*019, "HPCS (Division III) Diesel Generator Loading" to gain additional margin by removing conservatisms in the individual load calculations. Calculation G13.18.3.6*019 will also be revised to decrease the maximum allowable Technical Specification frequency 61.2 Hz to 60.2 Hz. Calculation G13.18.3.6*019 will use an analyzed maximum frequency of 60.49 Hz to determine the loading.

d) Provide the basis for a License Amendment Request (LAR) which will describe lowering the Division I, II, and III DG Technical Specification maximum frequency from 61.2 Hz to 60.2 Hz. The LAR will also raise both the upper and lower limit of the Division I and II Technical Specification Surveillance Requirement testing band for SR 3.8.1.3 and SR 3.8.1.15. The lower limit of the testing band will be increased

from 3000 kW to 3050 kW and the upper limit will be raised from 3100 kW to 3130 kW. For the Division I and II Technical Specification Surveillance Requirement testing band for SR 3.8.1.14 only the lower limit of the testing band will be raised from 3030 kW to 3050 kW since the existing upper test band limit is at 3130 kW. The LAR will also describe raising the Division III minimum Technical Specification Surveillance Requirement testing band from 2500 kW to 2525 kW and will not change the upper limit of the testing band nor the maximum steady state voltage.

As described in Attachment 9.7 to EC 40578, the Division III DG will not have a governor setpoint change.

3.0 Evaluation/Design Summary

3.1 Evaluation Resolution

3.1.1 Control Room Heater Removal

SDC-402/410, Control Building HVAC System Design Criteria, states that the HVC system is designed to maintain temperature and humidity in the main control room during both normal and accident conditions as follows:

Condition	Temperature	Humidity
Normal	65-75 F	20-70%
Accident	65-80 F	20-70%

G13.18.2.1*067 Rev. 02 determines the relative humidity inside the control room during LOCA-LOP conditions. The psychometric process used in Attachment B of G13.18.2.1*067, Rev. 02 for the winter case shown is NOT correct. The chilled water cooling coil exit condition for the winter case and summer case is assumed to be the same in the current calculation, which is incorrect. This approach needs to be revised to use the appropriate exit condition for the wet bulb temperature. See EC markup of G13.18.2.1*067 in p2e. This EC markup will need to be incorporated in the next revision to G13.18.2.1*067.

After review of G13.18.2.1*067, it is understood that the moisture content in the outside air during winter conditions at 25 Deg. F is very low. The relative humidity in the space during winter without humidification is approximately 20-30%. In order to maintain the relative humidity above 20-30% during the winter, a humidification system to add moisture to the supply air is required. Therefore, heater HVC-CH1A is not required to maintain the humidity in the control room below 70% during the winter months. During the summer months the relative humidity is maintained by modulating

the main control room air handling unit chilled water valve (Ref. USAR Section 9.4.1.5). Therefore, the heater is not required to maintain the relative humidity.

G13.18.2.1*067 also discusses Main Control Room temperature in the winter months. The conclusion of this calculation is that sufficient heat is available whereby HVC-CH1A/B are not required to maintain the control room temperature above minimum design limits during both normal and LOP-LOCA conditions.

Since the heaters are not required to satisfy the design requirements of the HVC system, the heaters can be removed from auto loading on the EDG and can be manually loaded if required once it is verified there is adequate margin available.

CR No. 97-0182 performed an operability assessment based on calculation G13.18.2.1*067 Rev. 1 and revised USAR Section 9.4.1.2.1 and background section of TS B3.7.3 to add the following wording:

"Dependant upon weather conditions, the heater coils may be required for Control Room AC System to maintain humidity within design specification."

However, TS 3.7.3 has no requirements under LCO for the humidity and additionally the heating coils are not used for humidity control. Therefore, the statement added by CR No. 97-0182 is incorrect and should be removed from USAR Section 9.4.1.2.1 and TS B3.7.3.

3.1.2 Lighting Panel LAC-PNL1C9

RBS lighting systems are described in USAR Section 9.5.3: USAR Section 9.5.3.2 and Table 9.5-2 describe the Main Control Room (MCR) lighting system, and the lighting system arrangement is depicted in UFSAR Figure 9.5-9. The normal AC lighting system feeds 60% of the MCR lighting fixtures. Another 20% of the MCR fixtures are normally connected to a Division II Class 1E bus, but are manually transferable to a Division I Class 1E bus. No minimum time to perform this transfer is specified. The remaining 20% of the MCR lighting is safety AC lighting, which receives power from the normal uninterruptible power supply (UPS) system. Batteries furnishing power to these UPS's are sized for a minimum of 2 hours. Finally, emergency DC lighting is provided for egress. The emergency DC lighting battery packs are designed to sustain the illumination level for a period of 8 hours.

This modification will alter the configuration of the manually transferable lighting panel (LAC-PNL1C9) normally connected to Division II by requiring that, in the event of LOCA-LOP conditions, the panel not be connected to Division I until the LPCS pump has been turned off (This can occur ten minutes after the accident). Once some loads can be turned off after roughly 10 minutes, the additional load of the lighting will not reduce available diesel generator margin. The 20% of the control room lighting fed from the battery-backed UPS system

is available for up to 2 hours under LOP conditions, which would cover the approximate ten-minute period of time before LAC-PNL1C9 would be switched to Division I. UFSAR Table 9.5-2 indicates that the illumination provided by the battery-backed UPS system is equivalent to that provided by panel LAC-PNL1C9. Therefore, the operators will still be able to perform required actions in the Main Control Room. Procedure AOP-0004 will need to be updated to reflect this change for the ten-minute time period where LAC-PNL1C9 is unavailable.

3.1.3 Test Band Changes

The Technical Specification requires the tested load to be greater than the worst case expected load as determined in the station Division I and II electrical loading calculation, E-192 and the Division III electrical loading calculation, G13.18.3.6*019. This EC will update the Technical Specification frequency, voltage, and test bands for the Division I and II Diesel Generators in order to meet this requirement as well as the frequency and test bands for the Division III Diesel Generators.

For the Division I and II Diesel Generators, the lower limit of the test band has been increased to 3050 kW, and the upper limit of the test band has been increased to 3130 kW, to create a new test band of 3050 kW to 3130 kW (Note: This change is only applicable to SR 3.8.1.3 and SR 3.8.1.15, the existing test band in these Surveillance Requirements is 3000 kW to 3100 kW). For Surveillance Requirement 3.8.1.14 only the lower limit of the test band will be increased to 3050 kW, to create a new test band of 3050 kW to 3130 kW (Note: The existing test band in this Surveillance Requirement is 3030 kW to 3130 kW).

3130 kW is the maximum derated continuous rating of the Division I and II Diesel Generators per Reference 2.3.1.

Figures 1 and 2 as shown below provide the new test band in relation to the worst case loading scenario for the Division I and II Diesel Generators respectively. Since the proposed test loading is within the operating limit of the Diesel Generators and does not impose additional stress on the Division I and II Diesel Generators, the new test band is considered acceptable.

Figure 1 – Division I

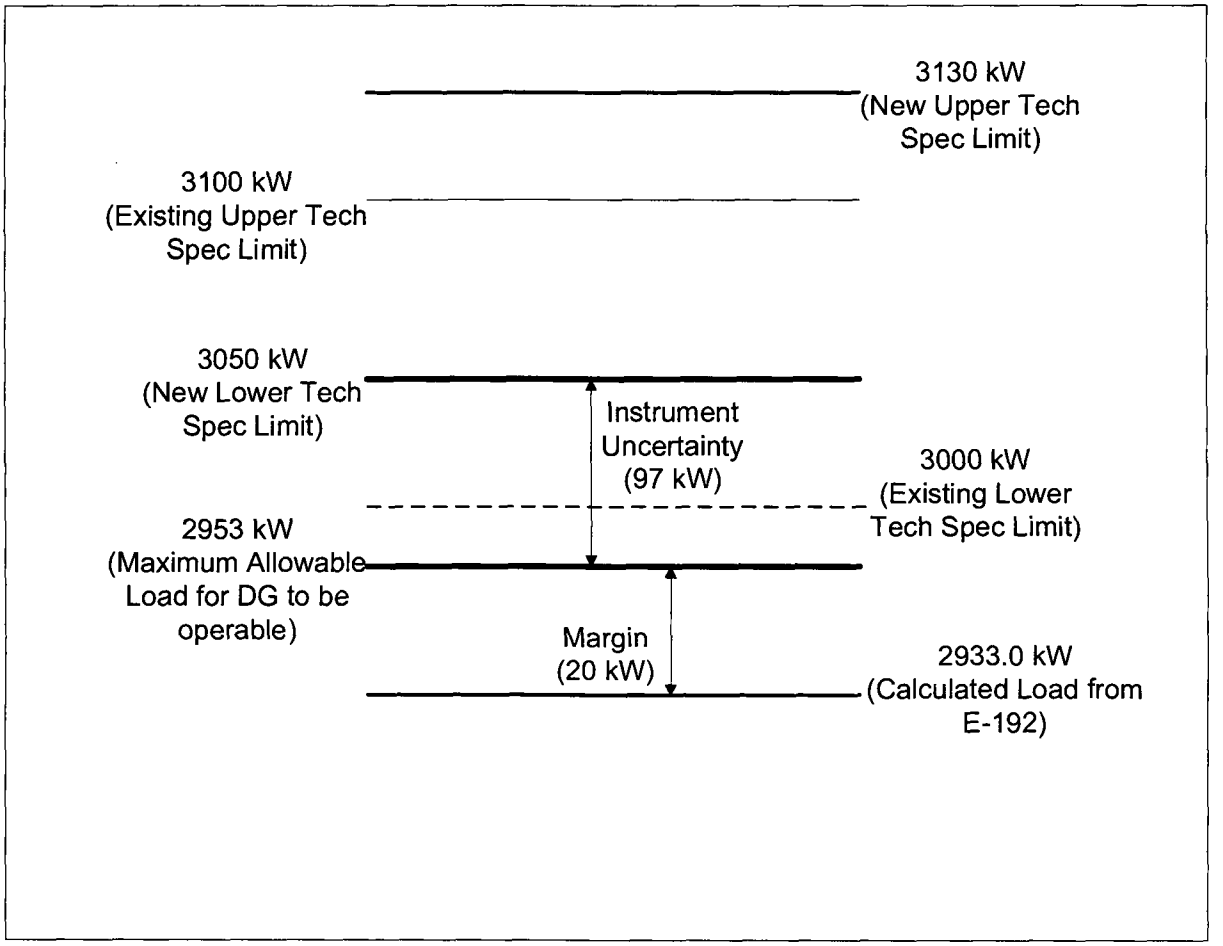
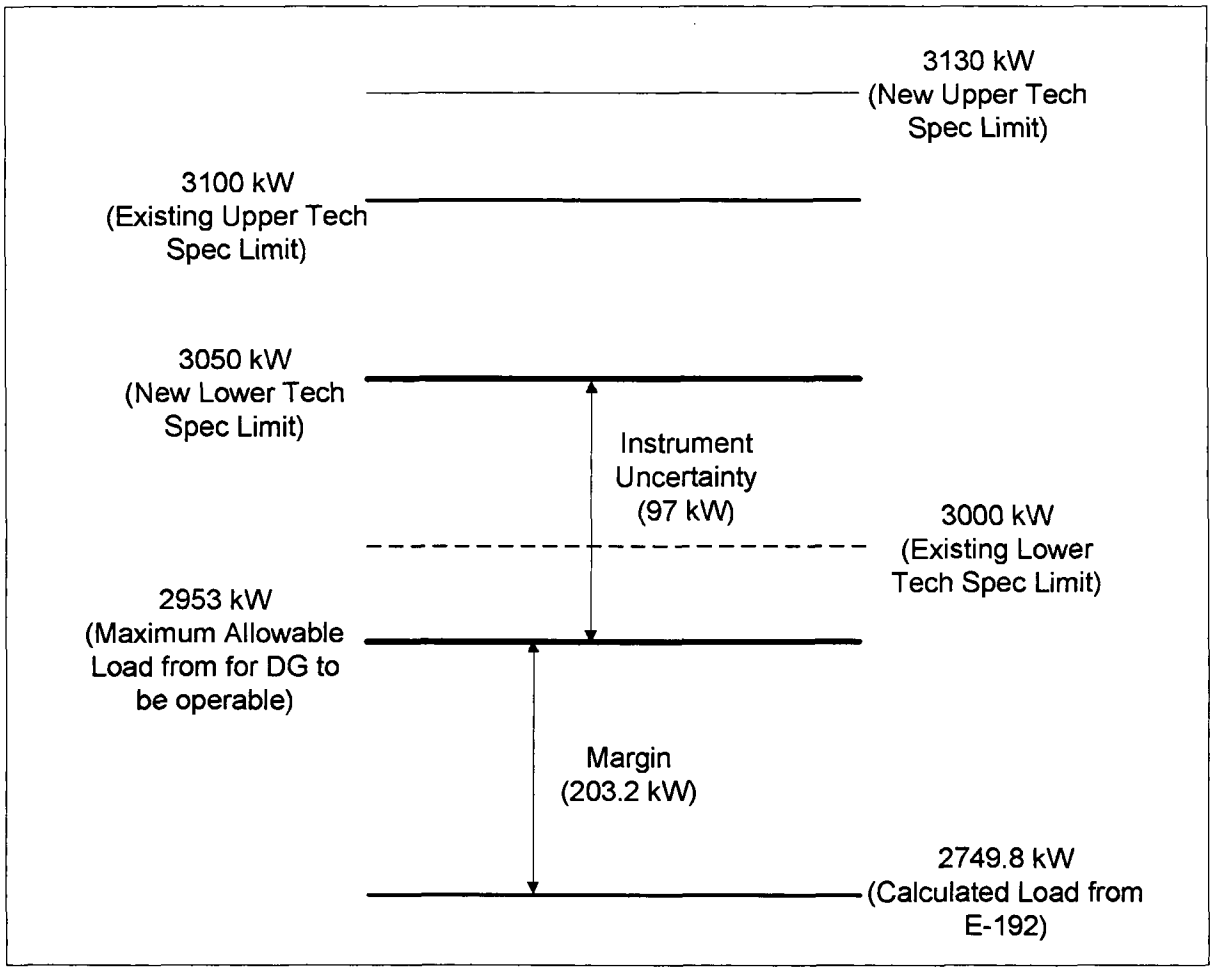
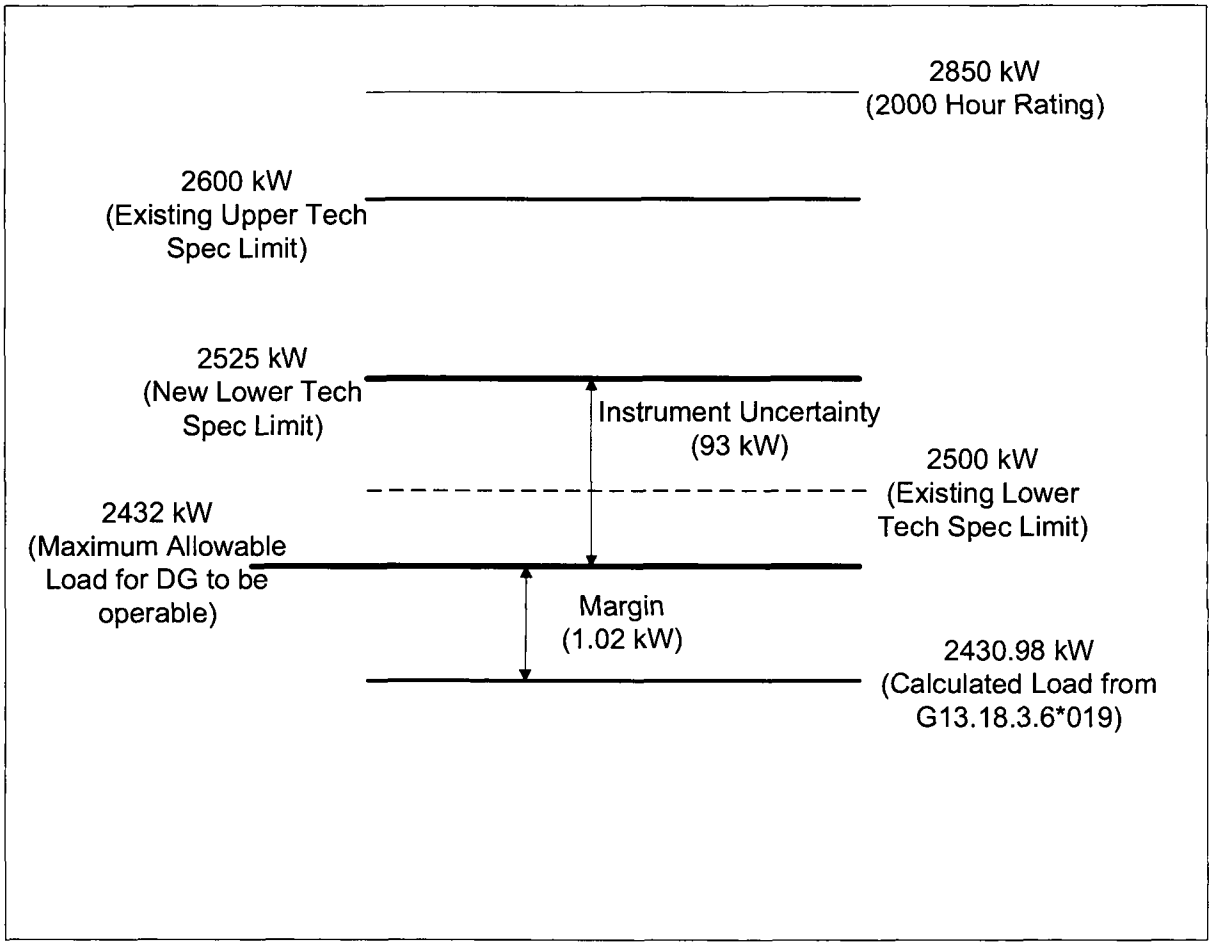


Figure 2 – Division II



For the Division III Diesel Generator, the lower limit of the test band has been increased to 2525 kW to create a new test band of 2525 kW to 2600 kW (Note: The existing test band is 2500 kW to 2600 kW). The Diesel Generator has a 2,000 hour rating of 2850 kW, and the 75 kW allowance is sufficient to ensure that controls currently in place can maintain the Surveillance Requirement test load runs below the operating limit of 2600 kW indicated. Figure 3 shows that there is sufficient margin to accommodate the maximum calculated test load and loop uncertainty. In addition, there is sufficient margin to ensure that the operating limit, 2600 kW, will not be exceeded. Since the proposed test loading is more restrictive, and does not impose additional stress on the Division III Diesel Generator, the new test band is considered acceptable.

Figure 3 – Division III



3.1.4 Division I and II Uninterruptible Power Supplies (UPS's) / Inverters

The design of the safety-related uninterruptible power supplies is such that the outputs of the inverters are synchronized to the frequency of the normal AC sources to the inverters (480V buses fed from the DGs).

There are three relevant frequency bands for the inverter. First is the allowable input frequency range. Per Specification 244.514 Sections 3.2 and 3.4, the steady-state frequency variation of the 480V AC input to the inverter is ±5% of nominal, or 57 Hz to 63 Hz.

Second is the frequency range within which the inverter will synchronize between the input and output frequency. Per ARP-808-87 pgs 10/11 and Specification 244.514 Section 4.1, the existing inverters will synchronize to the

normal sources if they are within 60 Hz ±1.3%, or 59.2 Hz to 60.8 Hz. If the 480V bus frequency is outside the 1.3% range, the inverter synchronizes to its own internal standard. If the output is still outside the 1.3% range (which should have been corrected by use of the internal reference), a "SUPS output off frequency" alarm is generated.

Third is the point at which the inverter will re-synchronize after the input frequency has fallen outside the synchronization band. If the output frequency is being generated based on the internal reference frequency and the 480V input source returns to 60 Hz ±0.5%, or 59.7 Hz to 60.3 Hz, the output will "re-synchronize" with the 480V input frequency after a one second delay (Ref. Specification 244.514). A separate setpoint will provide an alarm in the control room if the inverter output frequency is outside the range 60 Hz ±0.5%, or 59.7 Hz to 60.3 Hz.

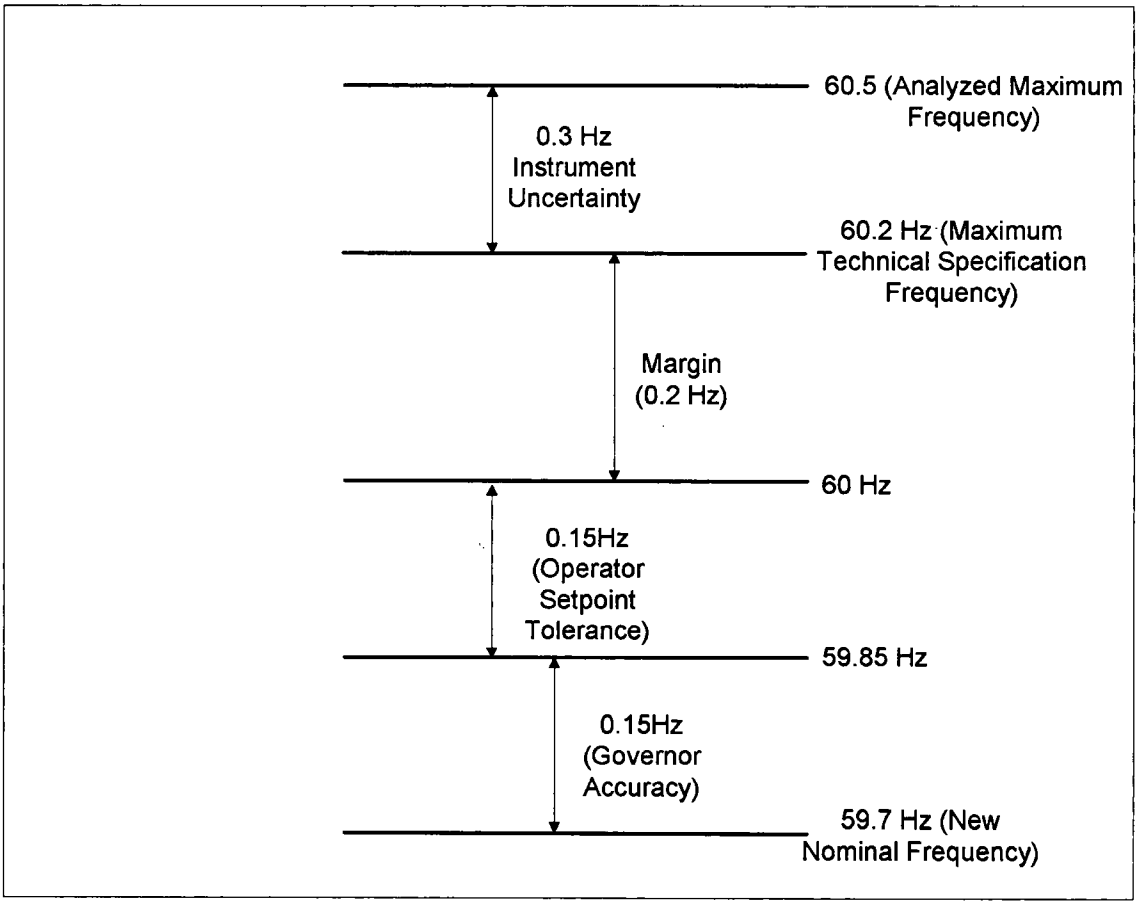
EC 38515 evaluated these inverters for the governor setpoint change to 59.7 Hz. This EC will lower the Technical Specification maximum frequency to 60.2 Hz. This change will have no impact on the UPS / Inverter as 60.2 Hz is within all three tolerance bands stated above. The interaction of the DG output frequency band with the inverter control and alarm bands and proposed Technical Specification limits are shown below.

60.30 Hz	Upper nominal limit of UPS off-frequency alarm
60.24 Hz	Limit below which UPS will re-synchronize to alternate supply
60.20 Hz	New Technical Specification DG maximum steady-state frequency limit per EC 40578
60.00 Hz	Upper limit of DG output frequency
59.76 Hz	Limit above which UPS will re-synchronize to alternate supply
59.70 Hz	DG nominal output frequency AND lower nominal limit of UPS alarm
59.40 Hz	Lower limit of DG output frequency
59.36 Hz	Limit below which UPS will use internal reference frequency
58.80 Hz	Existing Technical Specification DG minimum steady-state frequency limit

3.1.5 Frequency Band Changes

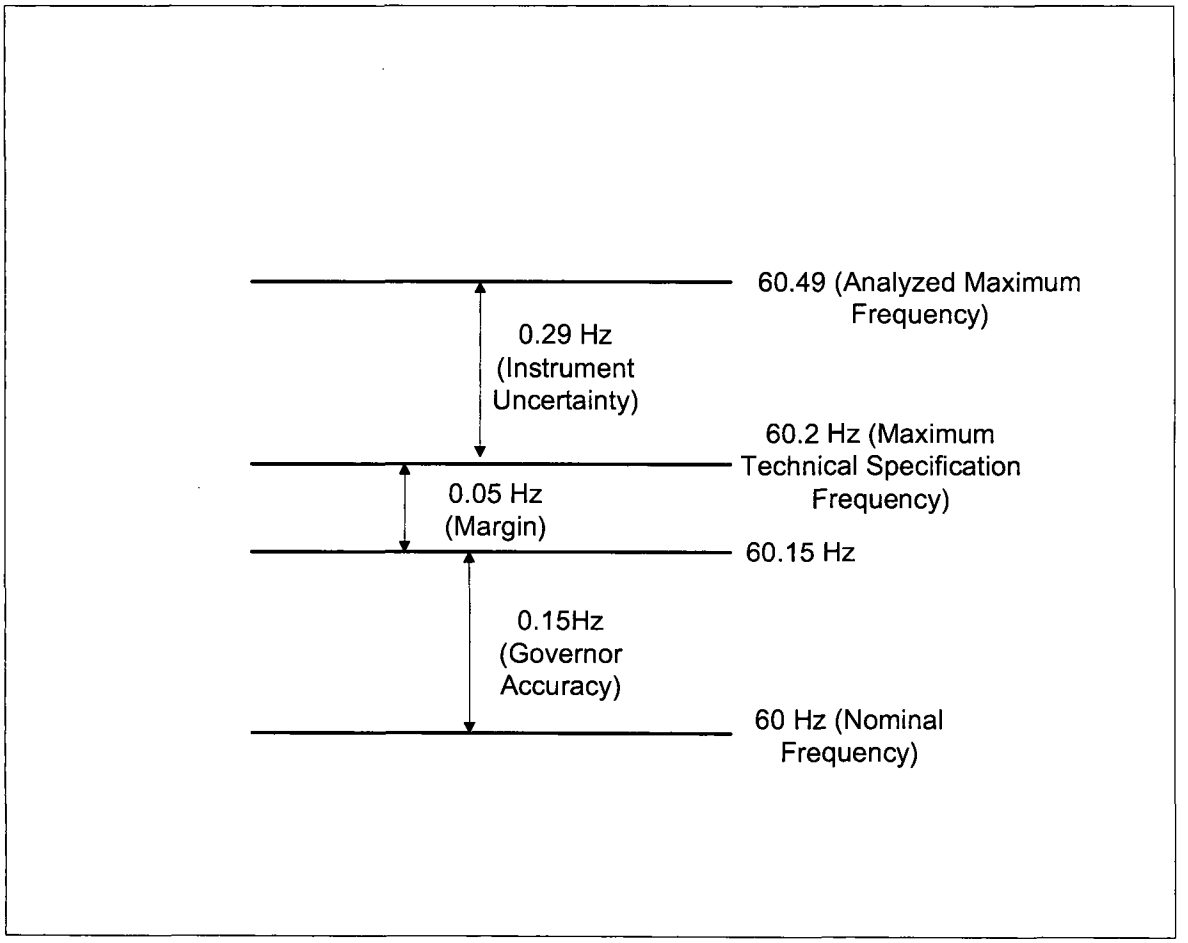
For the Division I and II Diesel Generators, the upper limit of the Technical Specification frequency band has been decreased from 61.2 to 60.2 Hz to create a new frequency band of 58.8 Hz to 60.2 Hz (Note: The existing frequency band is 58.8 Hz to 61.2 Hz). The 60.2 Hz limit has been evaluated in Sections 3.2.1 and 3.2.3 and is deemed acceptable. The new nominal governor setpoint of 59.7 Hz as well as the lower Technical Specification limit of 58.8 Hz was previously evaluated under EC 38515. A limit of 60.2 Hz was selected taking into account an operator setpoint tolerance of 0.15Hz (for revising the governor setpoint) and an accuracy value of 0.15Hz, which is the governor's ability to control at the setpoint. This approach results in 0.2 Hz of margin between the maximum allowable Technical Specification limit of 60.2 Hz and the new nominal frequency. Figure 4 illustrates the aforementioned frequency band changes for Division I and II.

Figure 4- Division I and II Frequency Band



For the Division III Diesel Generator, the upper limit of the Technical Specification frequency band has been decreased from 61.2 to 60.2 Hz to create a new frequency band of 58.8 Hz to 60.2 Hz (Note: The existing frequency band is 58.8 Hz to 61.2 Hz). Per Attachment 9.7, 60.2 Hz is an acceptable value as there is a 0.2 Hz difference between the nominal setpoint of 60 Hz and the new Technical Specification limit of 60.2 Hz. Since the governor setpoint remains unchanged for Div III, allowance for an operator setpoint tolerance is not applied; that is to say, setting tolerance is already included in the existing setpoint. However, similar to Div I and II, an accuracy value of 0.15Hz, which is the governor's ability to control at the setpoint is applied. This approach results in 0.05 Hz of margin between the maximum allowable Technical Specification frequency and the nominal frequency. The Technical Specification limit of 60.2 Hz leads to a new analyzed maximum frequency of 60.49 Hz due to 0.29 Hz of instrument uncertainty. Figure 5 illustrates all of the aforementioned frequency band changes for Division III.

Figure 5- Division III Frequency Band



3.1.6 Calculation E-192 Changes

The objective of this calculation is to determine the loading of the standby diesel generators (EGS-EG1A and EGS-EG1B) during a Loss of Coolant Accident (LOCA) concurrent with a Loss of Offsite Power (LOP) for the following conditions:

EGS-EG1A and E22-EGS001 operating, failed EGS-EG1B
EGS-EG1B and E22-EGS001 operating, failed EGS-EG1A
EGS-EG1A and EGS-EG1B operating, E22-EGS001 failed

Division II will be evaluated for nominal frequencies of 60 Hz as well as 59.7 Hz. The maximum loading for a nominal frequency of 59.7 Hz will only be valid after the implementation of EC 40572 for Division II. Before that point, the loading for a nominal frequency of 60 Hz should be used. Division I will only be evaluated at 59.7 Hz since EC 40571 has been implemented.

EC 40578 is updating this calculation in order to determine the new load at the proposed Technical Specification maximum of 60.2 Hz. The motor loads considered in the E-192 calculation are directly impacted by this change as their running KW value is related to the frequency. An analyzed maximum frequency of 60.5 Hz was chosen to evaluate the loads in the E-192 calculation. The analyzed maximum frequency value was chosen at 60.5 Hz in order to calculate the load on the Division I and II Diesel Generators assuming the DGs are running at a worst case 60.2 Hz with 0.3 Hz of instrument uncertainty. The new loading can be seen in detail in the EC Markup to E-192 (see Attachment 9.1).

EC Markup 30846 to calculation E-192 Revision 008 documented margin for the upper and lower technical specification limit for the division I and II diesel generator frequency. EC Markup 30846 will not be incorporated to calculation E-192 Revision 009 performed under Evaluation EC 40578. The upper limit frequency evaluation performed in EC markup for EC 30846 is superseded by the revised (maximum analyzed) frequency calculations performed under E-192 Revision 009. The lower limit evaluation performed in EC 30846 has been superseded by evaluations performed in EC 38515, which discussed the RHR Pumps (A, B, C), LPCS Pump and SWP Pumps (A, B and D) performance and available margin at the lower frequency limit of 58.8 Hz.

3.1.7 Calculation G13.18.3.6*019 Changes

The objective of this calculation is to determine the loading of the standby HPCS diesel generator (E22-EGS001). This EC markup modified the Tech Spec maximum frequency, added the consideration of instrument uncertainties, and combined the effects of voltage and frequency variations under square root of the sum of the squares methodology. The new loading can be seen in detail in the EC Markup to G13.18.3.6*019 (see Attachment 9.8).

An analyzed maximum frequency of 60.49 Hz was chosen to evaluate the loads in the G13.18.3.6*019 calculation. The analyzed maximum frequency value was chosen at 60.49 in order to calculate the load on the Division III Diesel Generator assuming the DG is running at a worst case 60.2 Hz with 0.29 Hz of instrument uncertainty.

The upper limit frequency evaluation performed in the EC markup 30846 to G13.18.3.6*019 Revision 302 is superseded by the revised frequency (maximum analyzed) calculations performed under G13.18.3.6*019 Revision 303. Therefore, the upper frequency limit discussion included in EC Markup 30846 has not been incorporated to calculation G13.18.3.6*019 Revision 303.

It is also recognized that information contained within an EC markup for calculation G13.18.3.6*019 Revision 302 per EC 30846 does not utilize the correct methodology for determining low frequency operational margin for the ECCS pumps. Therefore, the EC markup for EC 30846 lower limit frequency evaluation has not been incorporated in Revision 303 of calculation G13.18.3.6*019.

3.1.8 Pump Motor Load Evaluation

Calculation 2012-08026 (Ref. 2.3.45) was completed to determine motor power requirements for pumps which are automatically loaded on the Division I, II, and III Standby Diesel Generators. The calculation determines the 4000 V motor loads for the Low Pressure Core Spray Pump (LPCS), Residual Heat Removal (RHR) Pump, High Pressure Core Spray (HPCS) Pump, and the Standby Service Water (SSW) Pumps and the 460 V motor loads for the Control Building Chilled Water (HVK) Pumps. Design basis documents, such as factory acceptance pump curves and motor efficiency tables were examined to find the flow at which peak power occurs in order to determine the motor power requirements. This evaluation then compared these computed pump motor loads with those currently identified in DG Loading Calculations E-192 and G13.18.3.6*019 to determine the impact on the load margins for the Division I, II, and III Standby Diesel Generators. The margin that may be recovered by revising inputs and portions of the methodology of the diesel generator loading

calculations per pump motor load evaluation calculation 2012-08026 was then provided as input to the revision of the DG Loading Calculations E-192 and G13.18.3.6*019 performed in this EC.

3.1.9 Fan Margin Removal

The 5% kW fan margin added for variations in setting fan pitch previously added in the Division I and II Diesel Generator loading calculation was evaluated for removal. The 5% margins on the following centrifugal fans have been removed from the E-192 calculation revision: HVC-FN1A, HVC-FN3A/D, HVP-FN6A, GTS-FN1A, HVC-FN1B, HVC-FN3B/E, HVP-FN6B, GTS-FN1B, CPM-FN1A and CPM-FN1B. The impact and design basis discussion for the removal of this fan margin is discussed in Section 3.2 below.

3.1.10 Misc. Mechanical Equipment Loaded on the Diesel Generators

In addition to the pump motor load calculation 2012-08026, this EC evaluated the inputs for the mechanical equipment loaded on the Division I, II and III Diesel Generators. The equipment evaluated met the follow two criteria: (1) The running motor load is greater than 10 kW, and (2) the load is one of the Automatic Start Loads less than 2 hours after the onset of the accident in the Division I, II, and III load profile. The mechanical equipment evaluated consisted of fans, heaters, air conditioners, blowers, chillers, air handling units, compressors, coolers, MOVs and motors. The inputs used in the DG loading calculations were validated for accuracy and for the purposes of removing any conservatism in order to achieve addition kW margin. The revised kW loads for the components validated were then provided in DIT-12-RVB-001, which is included as an attachment to the DG Loading Calculations E-192 and G13.18.3.6*019 revised under this EC.

3.2 Design Bases Discussion

3.2.1 Frequency Effects on Division I and II Electrical Equipment

Normal & Standby Battery Chargers

Per Specifications 244.523, "Standby Static Battery Chargers", and 244.524, "Normal Static Battery Chargers", the safety-related battery chargers which can be supplied by the Standby Diesel Generators are required to be able to operate with an input power supply frequency of 60 Hz ±5%, or 57 Hz to 63 Hz. The new limit, 60.2 Hz, is well within the qualified frequency limit. Therefore, there will be no adverse impact on battery charger operation.

4.16 kV/480 V Transformers & 480 V Load Centers

Per Specification 242.533, "Standby 480V Load Centers", there are no specific frequency tolerances specified for the safety-related 4.16kV/480V transformers and the 480 V load centers they supply; only the nominal frequency of 60 Hz is identified. However, the Specification requires that the equipment is qualified as Class 1E per IEEE 323-1974, which states in Section 6.3.1.5 that the applied frequency shall be ±5% unless otherwise specified. 60.2 Hz is well within the qualified frequency limits. Therefore, there will be no adverse impact on 4.16 kV/480 V transformer or 480 V load center operation.

Heaters (Charcoal Filter (HVC-FLT3AH/BH), Filter Train (HVF-FLT2AH/BH), Standby Cooling Tower Remote Intake (HVY-CH6A/6B), and Standby Gas Treatment (GTS-FLT1AH/BH))

Per Specifications 215.325, "Electric Air Duct Heaters" and 225.220, "Standby Gas Treatment Unit", there are no specific frequency tolerances specified for the safety-related heaters that can be supplied by the DGs; only the nominal frequency of 60 Hz is identified. However, Specifications 215.325 and 225.220 require that the equipment is qualified as Class 1E per IEEE 323-1974, which states in Section 6.3.1.5 that the applied frequency shall be ±5% unless otherwise specified. 60.2 Hz is well within the qualified frequency limit. Therefore, there will be no adverse impact on heater operation.

Heater (Control Room)

Per Specification 216.200, "for Control Building Air Conditioning Units with ASME III, Class 3 Coils", there are no specific frequency tolerances specified for the safety-related control room heaters that can be supplied by the DGs; only the nominal frequency of 60 Hz is identified. However, heaters are not typically frequency-sensitive components, with the exception of the control circuits and silicon-controlled rectifier supplied with them in this case (Reference drawing 0216.200-113-033). A frequency tolerance of ±5% is typical for these types of components. Therefore, 60.2 Hz is well within the typical frequency limits. Therefore, there will be no adverse impact on heater operation.

Hydrogen Recombiner

Per Specification 224.520, "Hydrogen Recombiners", there are no specific frequency tolerances specified for the hydrogen recombiners that can be supplied by the DGs; only the nominal frequency of 60 Hz is identified. However, the Specification requires that the equipment is qualified as Class 1E

per IEEE 323-1974, which states in Section 6.3.1.5 that the applied frequency shall be ±5% unless otherwise specified. The new limit, 60.2 Hz, is well within the qualified frequency limit. Therefore, there will be no adverse impact on hydrogen recombiner operation.

Hydrogen Igniter

Per Specification 211.161, "Nonengineered Items", page 1090A, the hydrogen igniters which can be supplied by the Standby Diesel Generators are required to be able to operate with an input power supply frequency of 60 Hz ±5%, or 57 Hz to 63 Hz. The new limit, 60.2 Hz, is well within the qualified frequency limits. Therefore, there will be no adverse impact on hydrogen igniter operation.

480 V/120 V Static Transformers

Per Specification 242.132, "Misc. Small Dry Transformers – Standby", there are no specific frequency tolerances specified for the safety-related 480/120 V transformers; only the nominal frequency of 60 Hz is identified. The Specification requires that the equipment is qualified as Class 1E per IEEE 323-1974, which states in Section 6.3.1.5 that the applied frequency shall be ±5% unless otherwise specified. 60.2 Hz is well within the qualified frequency limits. Therefore, there will be no adverse impact on 480/120 V transformer operation.

120 V Panelboards

Per Specification 242.421, "Standby Distribution Panelboads", there are no specific frequency tolerances specified for the safety-related 120 V panelboards; additionally, the nominal frequency is not identified, but a frequency of 60 Hz is standard for this application. The Specification requires that the equipment is qualified as Class 1E per IEEE 323-1974, which states in Section 6.3.1.5 that the applied frequency shall be ±5% unless otherwise specified. 60.2 Hz is within the qualified frequency limits. Therefore, there will be no adverse impact to the 120V panelboards.

480 V/120 V Lighting Transformers

Per Specification 242.131, "Lighting and Misc. Small Dry Transformers – Normal", there are no specific frequency tolerances specified for the 480/120 V lighting transformers; only the nominal frequency of 60 Hz is identified. Similarly sized transformers are qualified to a frequency range of ±5%, which is a reasonable range to expect the control room lighting transformer to be able to operate within. The new limit, 60.2 Hz, is well within the qualified frequency

limits. Therefore, there will be no adverse impact on 480/120 V lighting transformers.

480 V/120 V Voltage-Regulated Transformers

Per Specification 244.512, "UPS – Standby", the safety-related voltage-regulated transformers which can be supplied by the Standby Diesel Generators are required to be able to operate with an input power supply frequency of 60 Hz ±3 Hz, or 57 Hz to 63 Hz. A review of drawing 0244.512-271-004 indicates that there are no under frequency alarms provided with the transformer control and monitoring logic. The new limit, 60.2 Hz, is well within the qualified frequency limits. Therefore, there will be no adverse impact on 480/120 V transformer operation.

480 V Standby MCCs

Per Specification 242.562, "Standby and Normal Motor Control Centers 480VAC and 125VDC", there are no specific frequency tolerances specified for the 480 V MCCs and associated equipment that can be supplied by the DGs; only the nominal frequency of 60 Hz is identified. However, the Specification requires that the equipment is qualified as Class 1E per IEEE 323-1974, which states in Section 6.3.1.5 that the applied frequency shall be ±5% unless otherwise specified. The new limit, 60.2 Hz, is well within the qualified frequency limits. Therefore, there will be no adverse impact on MCC operation.

Uninterruptible Power Supplies (UPS's) / Inverters

Per Specification 244.514, "Static UPS", Sections 3.2 and 3.4, the steady-state frequency variation of the input to the inverter is ±5% of nominal, or 57 Hz to 63 Hz. The new limit, 60.2 Hz, is well within the qualified frequency limit. Therefore, there will be no adverse impact on UPS operation.

Miscellaneous 120 V Equipment

There are not individual specifications for the majority of 120 V equipment, but a frequency of 60 Hz is standard for this application. Typical frequency tolerances for these components are ±5%. The new limit, 60.2 Hz, is well within the typical frequency limits. Therefore, there will be no adverse impact on miscellaneous 120 V equipment operation.

3.2.2 Voltage Effects on Division I and II Electrical Equipment

Per Specification 244.700, "Standby Diesel Generator Systems", the diesel generators were purchased to NEMA MG-1 and ANSI C50.12. Both of these standards allow synchronous generators to operate successfully at not more than 5% above their nameplate voltage rating. Since the Diesel Generators are 4160V machines, operating them up to 4368V (= 4160V x 1.05) is acceptable.

The proposed Diesel Generator maximum steady-state voltage limit of 4368V is more restrictive than the existing 4580V, and meets the intent of Regulatory Guide (RG) 1.9. The station's safety-related 4000V motors can operate continuously at 4400V (4000V x 1.1; per NEMA MG-1, as invoked by Specifications 0221.431-000-005, 232.920 and 0221.421-000-002A). Therefore, the proposed Diesel Generator maximum steady-state voltage limit of 4368V provides better consistency with equipment allowable voltage capabilities than the existing 4580V steady-state voltage limit. The Diesel Generators will continue to provide adequate voltage to the safety-related loads and mitigate accidents as described in the UFSAR.

Per Specification 244.700 the voltage regulators on the Division I and II Diesel Generators have a regulation band of ±0.5% of nominal voltage (4160V). This range (4139V to 4181V) is well within the new Technical Specification voltage range of 3740V to 4368V. Therefore, the voltage regulators on the Division I and II Diesel Generators are acceptable.

3.2.3 Frequency Effects on Division I and II Mechanical Equipment

Standby Diesel Generators

The minimum allowable steady-state frequency of the Diesel Generators is 58.8 Hz; the current maximum allowable steady-state frequency is 61.2 Hz. This is consistent with Regulatory Guide 1.9 and IEEE Std 387-1977. This EC will be affecting the upper limit of 61.2 Hz by lowering it to 60.2 Hz for the Division I and II Diesel Generators. The new maximum frequency limit of 60.2 Hz is within the tolerance band of ±2% of the nominal frequency established in Reg Guide 1.9. Therefore, there will be no adverse impact to the Standby Diesel Generators' ability to perform their function during a design basis accident.

Auxiliary Building Floor Drain Pumps DFR-P5A/B/D/E and RHR Discharge Line Fill Pump E12-PC003

These pumps were procured to specification 237.160, "Miscellaneous Horizontal Centrifugal Pumps," which requires that "All motors shall operate

continuously on a voltage variation, frequency variation or a combination in accordance with NEMA MG 1, sections 12.43, 12.44, and 12.45." Section 12.44 of the NEMA standard requires that alternating-current motors shall operate successfully under running conditions at rated load with a variation in the voltage or the frequency up to plus or minus 5 percent of rated frequency with rated voltage.

The auxiliary building floor drain pumps are sized to provide adequate removal of liquid leakage into the auxiliary building floor drains. The RHR fill pump provides the fill source for the RHR loops B and C to keep the discharge lines full of water to provide makeup to compensate for any water leakage. The rated frequency of these pump motors is 60 Hz per Specification 237.160. Operating these pumps at the new technical specification limit of 60.2 Hz does not adversely affect the pump flow rate or its ability to meet its design function. Therefore, there are no adverse impacts as a result of this EC.

Fuel Pool Cooler Pumps SFC-P1A/B

The spent fuel pool cooling system is designed for heat removal from the spent fuel pool following fuel offloads. Fuel pool heat loads are reduced during normal plant operation. Operators manually load the fuel pool cooling pumps onto the diesel generators following an accident, at which time the fuel pool heat load is lower than the design offload scenarios. Each fuel pool heat exchanger is rated for 9.77 MBtu/hr heat removal per RBS Specification 223.311, and the fuel pool heat loads during operation are typically on the order of 5 MBtu/hr. Therefore, there is sufficient margin in the cooling capacity of the fuel pool cooling system post-accident such that a one percent decrease in fuel pool cooling flow as a result of decreasing the Technical Specification frequency from 61.2-60.2 Hz does not impact system performance, such as flow requirements. In addition, refueling is not anticipated to occur with the pool cooling pumps operating off of the diesel generators during a design basis accident.

Standby Liquid Control (SLC) Pump C41-C001A/B

The SLC pumps and motors were procured to Specification 0221.241-000-001E and 0221.241-000-007, which requires that the motors shall operate continuously on a voltage variation, frequency variation or a combination in accordance with NEMA MG 1. Section 12.44 of the NEMA standard requires that alternating-current motors shall operate successfully under running conditions at rated load with a variation in the voltage of plus or minus 10 percent or the frequency up to plus or minus 5 percent of rated frequency with rated voltage.

Each SLC pump shall be capable of pumping the net content of the standby liquid storage tank into the reactor and injecting flow into the reactor. Per SDC-201, the SLC pumps shall be designed to produce a flow rate of 43 gpm. Technical Specification section 3.1.7 requires that each pump develop a flow rate greater than or equal to 41.2 gpm. In addition, the most recent copy of surveillance test procedure STP-201-6312, "SLC Quarterly Valve Operability and Pump Flow Test Division II," contains a 44.7 gpm flow requirement with an allowable range of 42.0 to 45.5 gpm. The most recent test results recorded a flow of 44.5 gpm. EC 38515 calculated an estimated SLC system flow at a frequency of 59.7 Hz to be approximately 44.1 gpm, which is within the limits of the allowable test band and still above the design basis requirements outlined in SDC-201 and Technical Specification section 3.1.7. Therefore, there is no adverse effect on SLC pump performance due to a reduction in the diesel generator Technical Specification maximum frequency from 61.2 Hz to 60.2 Hz.

Core Cooling Requirements

Safety related 4000 V motors, which drive the RHR, LPCS, and SSW pumps, are designed for continuous operation at a frequency $\geq$ 58.5 Hz. The RHR, SSW and LPCS pumps were procured to Specifications 0221.431-000-005, 232.920 and 0221.421-000-002A which requires that all motors shall operate continuously on a voltage variation, frequency variation or a combination in accordance with NEMA MG 1. Section 12.44 of the NEMA standard requires that alternating-current motors shall operate successfully under running conditions at rated load with a variation in the voltage of plus or minus 10 percent or the frequency up to plus or minus 5 percent of rated frequency with rated voltage.

Per RBS Specification 221.431-000-005 the core cooling water supply requirements of the RHR and LPCS systems include margins which are sufficient to permit pump speed operation at a frequency of 58.8 Hz. The change in pump capacity allowed under Technical Specification Surveillance Requirements 3.5.1.4 and 3.5.2.5 and the combined instrument uncertainties of the surveillance testing are also considered. Attachment 9.9 in EC 38515 confirms that EGS-EG1A and EGS-EG1B support the safety functions of rotating loads they feed at the minimum allowable frequency of 58.8 Hz, and there are no adverse impacts as a result of reducing the Technical Specification maximum limit from 61.2 Hz to 60.2 Hz.

Calculation G13.18.4.0*046 Rev. 01, Standby Service Water Pump Capacity Verification Without Flow Through Drywell Unit Coolers Including 5% Pumps Degradation, verifies that each division of the SSW system is capable of supplying adequate flows to the safety related loads under the most restrictive

post LOCA-LOP conditions. The conditions include reduction in SSW pump head and flow to account for operation at the 58.8 Hz DG under frequency. In addition, the SSW pump head and flow are each reduced by 3% to account for In-Service Test (IST) instrument uncertainty and the SSW pump head and flow are each reduced by 5% to account for allowable pump degradation. Therefore, the SSW system hydraulic calculation accounts for the allowable DG frequency degradation, and there are no adverse impacts to the SSW system as a result of reducing the Technical Specification maximum limit from 61.2 Hz to 60.2 Hz.

Containment Analysis Requirements

Containment analysis requires three inputs as outlined below.

- SSW flow to the containment unit coolers and the RHR heat exchanger.
- RHR flow to the RHR heat exchanger.
- Fan air flow operation through the containment unit coolers.

These flows are not impacted by this modification because the minimum acceptable diesel frequency of 58.8 Hz previously evaluated under EC 38515 is not changing. Therefore, the flow inputs do not have to be re-evaluated and there are no impacts to containment analysis requirements as a result of this EC.

Motor Operated Valves

A number of the safety related Motor Operated Valves (MOV) are powered by 480 V systems that are supplied by the Divisions I and II Diesel Generators (EGS-EG1A/B) as part of DG sequencing following LOP. As a result, the safety related MOV stroke times are directly affected by a change in frequency. EC 38515 evaluated the safety related MOVs when powered from the Divisions I and II Diesel Generators at 59.7 Hz and concluded that the MOVs would still stroke within their specification and surveillance requirements. As a result of EC 40578, the Technical Specification maximum DG frequency is reduced from 61.2 Hz to 60.2 Hz. The new frequency limit of 60.2 Hz is greater than 59.7 Hz previously evaluated in EC 38515. The MOV motors are rated at 60 Hz and the new Technical Specification limit is 60.2 Hz, which represents an approximately 0.33% increase in frequency. Operating the MOVs at a frequency higher than 60 Hz could cause an increase in motor speed, which would result in decreased stroke times. Decreased stroke times caused by an increase in motor speed due to higher than nominal Diesel Generator frequency will not adversely affect the valve performance as long as the frequency is greater than 59.7 Hz per EC 38515. An increase in motor speed could also cause an increase in MOV stem inertia and thrust. However, an increase of

approximately 0.33% in MOV motor speed should not adversely impact the valves, motors or the MOVs ability to meet the existing performance requirements. Therefore, this EC does not create additional adverse impacts to the MOVs.

Fuel Oil Consumption

A review of the diesel generator fuel oil consumption calculation, G13.18.10.1*014, Rev. 0 was performed. A decrease in the Technical Specification maximum frequency by approximately 1% (61.2 Hz to 60.2 Hz) of the Diesel Generators will result in a decrease in maximum allowable diesel generator motor speed. A decrease in motor speed will result in a decrease in the maximum allowable fuel oil consumption rate for both Division I and II Diesel Generators (EGS-EG1A/B). Therefore, this EC does not adversely impact the Diesel Generator fuel oil consumption or the total effective fuel storage tank volume.

Fans, Blowers, Chillers and Unit Coolers

Safety related 460 V motors which drive essential Control Building chilled water (HVK) pumps, essential chiller compressors, essential ventilation fans, and essential motor operator valves conform to NEMA MG-1, Section 12.44. These components are, therefore, designed for continuous operation at a frequency of 60 Hz $\pm$ 5% (57 Hz to 63 Hz).

RBS Technical Specification 5.5.7, "Ventilation Filter Testing Program," requires that each ESF ventilation system be tested at $\pm$10% of the specified system flow rate. Therefore, if the fan speed and corresponding airflow do not vary more than $\pm$10% of the specified system flow rate from the effect of DG frequency and voltage variation, the fan for that system can be said to be performing within its expected operating range. From fan affinity laws, volume flow rate is directly proportional to fan speed, so a diesel generator frequency of 60.2 Hz results in a fan flow of 60.2/60 = 100.3% of design.

In addition, RBS Specification 216.200, "for Control Building Air Conditioning Units with ASME III, Class 3 Coils" requires that "All motors shall operate continuously on a voltage variation, frequency variation or a combination in accordance with NEMA MG 1, sections 12.43, 12.44, and 12.45." This same requirement is repeated in Specification 215.400, "Centrifugal Fans and Air Blowers," Specification 215.350, "Axial Flow Fans," and Specification 215.360, "Axial Flow Fans," Specification 215.252, "Containment Unit Coolers and Auxiliary Building Unit Coolers."

Section 12.44 of the NEMA standard requires that "alternating-current motors shall operate successfully under running conditions at rated load with a variation in the voltage or the frequency up to the following:

"c. Plus or minus 5 percent of rated frequency with rated voltage"

Therefore, there is no adverse effect on fan or unit cooler performance due to the maximum operating limit being set at 60.2 Hz.

3.2.4 Frequency Effects on Division III Diesel Generator Equipment

This EC will be affecting the upper Technical Specification limit of 61.2 Hz by lowering it to 60.2 Hz for the Division III Diesel Generator. The new maximum frequency limit of 60.2 Hz is within the tolerance band of ±2% established in Reg. Guide 1.9. Therefore, there will be no adverse impact to the Standby Diesel Generators' ability to perform its function during a design basis accident.

Unlike the Division I and II Diesel Generators, the Division III Diesel Generator will NOT have a governor setpoint change (Attachment 9.7). The nominal setpoint remains at the current frequency of 60 Hz. The new maximum Technical Specification frequency is 60.2 Hz and the components loaded on the Division III DG during a design basis accident are rated at 60 Hz, which is below the new TS limit. The change to the Division III upper frequency limit does not impact acceptability of the components, or the performance of the systems which depend on the operation of the components, since their safety functions are designed to be performed at the unchanged nominal frequency (60 Hz). Therefore, the components loaded on the Division III DG will not be adversely impacted as a result of this EC.

3.2.5 Mechanical Equipment Evaluated in this EC

Pumps

Calculation 2012-08026 was completed to determine motor power requirements for pumps which are automatically loaded on the Division I, II, and III Standby Diesel Generators. The calculation determines the 4000 V motor loads for the Low Pressure Core Spray Pump (LPCS), Residual Heat Removal (RHR) Pump, High Pressure Core Spray (HPCS) Pump, and the Standby Service Water (SSW) Pumps and the 480 V motor loads for the Control Building Chilled Water (HVK) Pumps. Design basis documents, such as factory acceptance pump curves and motor efficiency tables were examined to find the flow at which peak power occurs in order to determine the motor power requirements. This evaluation then compared these computed pump motor loads with those currently identified in DG Loading Calculations E-192 and

G13.18.3.6*019 to determine the impact on the load margins for the Division I, II, and III Standby Diesel Generators.

3.2.6 Other Calculations Impact

3.2.6.1 E-129, Load Tabulation 13.8 and 4.16 KV Systems:
Calculation E-129 requires an update due to the changes in Brake Horsepower (BHP) to several large loads in the diesel loading calculations. Since E-129 uses total horsepower to calculate KVA, the change in BHP does not adversely impact this calculation. E-129 does provide the BHP data in a table and therefore needs to be updated.

3.2.6.2 E-222, 480 VAC Load Center and Motor Control Center Load Tabulation and Cable Sizing Criteria:
Calculation E-222 sub-calculations require an update to document the changes in BHP to several loads. The overall impact to each sub-calculation is a net decrease in KVA. Therefore, there is no adverse impact to these calculations. During review of this calculation, several typographical errors were corrected. These changes did not result in a loss of margin to these sub-calculations.

3.2.6.3 G13.18.3.6*018, ETAP Database Input Source Study:
Calculation G13.18.3.6*018 requires an update to document the changes in BHP (motor loading) to several loads. Since this calculation only documents parameters, there is no adverse impact to the calculation due to these changes.

3.2.6.4 G13.18.3.6*016, Degraded Voltage Calculation for Class 1E Buses and 480 V Motor Operated Valves:
Utilizing the updated ETAP database, load flow analysis module was run to evaluate impacts on calculation G13.18.3.6*016. The load flow module was run with the worst case study established in the calculation. It has been determined that the motor loading changes evaluated in this EC have a negligible impact on this calculation. The conclusions established in the calculation are unaffected by these changes. Therefore, revision of calculation G13.18.3.6*016 is not necessary.

3.2.6.5 E-131, Station Service Short Circuit Analysis:
Utilizing the updated ETAP database, short circuit analysis module was run to evaluate impact of calculation E-131. The short circuit module was run with the worst case study established in the calculation. It has been determined that the motor loading changes evaluated in this EC have a negligible impact on this calculation. The conclusions established in the calculation are unaffected by these changes. Therefore, revision of calculation E-131 is not necessary.

3.2.6.6 E-132, Voltage Profile:
Utilizing the updated ETAP database, load flow analysis module was run to evaluate impacts on calculation E-132. The load flow module was run with the worst case study established in the calculation. It has been determined that the motor loading changes evaluated in this EC have a negligible impact on this calculation. The conclusions established in the calculation are unaffected by these changes. Therefore, revision of calculation E-132 is not necessary.

Control Room Heater Removal

SDC-402/410, Control Building HVAC System Design Criteria, states that the HVC system is designed to maintain temperature and humidity in the main control room during both normal and accident conditions as follows:

Condition	Temperature	Humidity
Normal	65-75 F	20-70%
Accident	65-80 F	20-70%

G13.18.2.1*067 Rev. 02 determines the relative humidity inside the control room during LOCA-LOP conditions. The psychometric process used in Attachment B of G13.18.2.1*067, Rev. 02 for the winter case shown is NOT correct. The chilled water cooling coil exit condition for the winter case and summer case is assumed to be the same in the current calculation, which is incorrect. This approach needs to be revised to use the appropriate exit condition for the wet bulb temperature. See EC markup of G13.18.2.1*067 in p2e. This EC markup will need to be incorporated in the next revision to

G13.18.2.1*067.

After review of G13.18.2.1*067, it is understood that the moisture content in the outside air during winter conditions at 25 Deg. F is very low. The relative humidity in the space during winter without humidification is approximately 20-30%. In order to maintain the relative humidity above 20-30% during the winter, a humidification system to add moisture to the supply air is required. Therefore, heater HVC-CH1A is not required to maintain the humidity in the control room below 70% during the winter months. During the summer months the relative humidity is maintained by modulating the main control room air handling unit chilled water valve (Ref. USAR Section 9.4.1.5). Therefore, the heater is not required to maintain the relative humidity.

G13.18.2.1*067 also discusses Main Control Room temperature in the winter months. The conclusion of this calculation is that sufficient heat is available whereby HVC-CH1A/B are not required to maintain the control room temperature above minimum design limits during both normal and LOP-LOCA conditions.

Since the heaters are not required to satisfy the design requirements of the HVC system, the heaters can be manually removed from auto loading on the EDG at the onset of a LOP-LOCA and can be manually loaded if required once it is verified there is adequate margin available.

CR No. 97-0182 performed an operability assessment based on calculation G13.18.2.1*067 Rev. 1 and revised USAR Section 9.4.1.2.1 and background section of TS B3.7.3 to add the following wording:

"Dependant upon weather conditions, the heater coils may be required for Control Room AC System to maintain humidity within design specification."

However, TS 3.7.3 has no requirements under LCO for the humidity and additionally the heating coils are not used for humidity control. Therefore, the statement added by CR No. 97-0182 is incorrect and should be removed from USAR Section 9.4.1.2.1 and TS B3.7.3.

Fans

The fans loaded on the Division I and II Diesel Generators consist of Axial and Centrifugal Fans designed to RBS specifications 215.360 or 215.400. The centrifugal fans are direct drive and the fan blades are not adjustable. Therefore, the 5% kW margin added for variations in setting fan pitch does not apply to centrifugal fans loaded on the Division I and II Diesel Generators. The

5% margin on the following centrifugal fans been removed from the E-192 calculation revision: HVC-FN1A, HVC-FN3A/D, HVP-FN6A, GTS-FN1A, HVC-FN1B, HVC-FN3B/E, HVP-FN6B, GTS-FN1B, CPM-FN1A and CPM-FN1B.

Misc. Mechanical Equipment Loaded on the Diesel Generators

The mechanical equipment evaluated in DG Loading Calculations E-192 and G13.18.3.6*019 consisted of fans, heaters, air conditioners, blowers, chillers, air handling units, compressors, coolers, MOVs and motors. The inputs used in the DG loading calculations were validated for accuracy and for the purposes of removing any conservatism in order to achieve addition kW margin. The design inputs used to validate this mechanical equipment, such as RBS specifications, vendor technical data sheets and calculations, are provided as references in DIT-12-RVB-001, which is an attachment to the DG Loading Calculations E-192 and G13.18.3.6*019 revised under this EC.

Extracted from EC 38515

1.2 Reason for Change

The station's Division I, II, and III diesel generators are tested on both a monthly and 24-month basis per the Technical Specification Surveillance Requirements. The Technical Specification requires the tested load to be greater than the worst case expected load as determined in the station electrical loading calculations. During the 2008 Component Design Basis Inspection (CDBI) by the NRC, it was found that the diesel generator electrical load calculations did not account for the maximum allowable frequency and voltage in the Technical Specification (TS) and, therefore, did not provide for the maximum expected load conditions. The loading calculations were subsequently changed to include the maximum TS allowable frequency and voltage, however the calculation change failed to consider the impact to the surveillance test band, which no longer bounds the worst case accident loading.

The existing Division I and II Diesel Generators have Technical Specification allowable maximum frequencies of 61.2 Hz, which results in a 6.12% increase in loading on the diesel generator when operating at that upper limit versus operation at nominal (60 Hz) frequency. This is due to the fact that the loading on the generator is related to the cube of the difference between the maximum frequency and the nominal frequency, where loading is typically calculated, as it is in this case. Evaluation EC 40578 will decrease that maximum allowable frequency, therefore decreasing the maximum accident loading to be considered on the EDGs. This change combined with a change to the lower end of the surveillance test band (also evaluated in EC 40578) will clear the non-conforming condition on the Division I DG. As a result of the reduction in allowable maximum frequency under EC 40578, the DG governor setpoint is required to be reduced from 60 Hz to 59.7 Hz in order to provide an appropriate operating margin above the TS minimum frequency (58.8 Hz) and below the proposed TS maximum frequency (60.2 Hz).

Revision of the nominal frequency itself from 60 Hz to 59.7 Hz will not impact the loading calculation, as the new TS frequency band (58.8 – 60.2 Hz) is enveloped by the existing TS band (58.8 – 61.2 Hz), which is evaluated by EC 40578. However, this change will require a change in setpoints on the DGs along with required follow-up testing to ensure appropriate operating margin is maintained.

1.3 Design Objective to Resolve Problem

The objective of this Nuclear EC (EC 38515) is to provide appropriate operating margin above the TS minimum frequency and below the proposed TS maximum frequency by reducing the Division I and II (EGS-SC90A and EGS-

SC90B) Diesel Generator (DG) governor frequency setpoint from 60.0 Hz to 59.7 Hz. This EC does not impact the current non-conformance to the Division I DG; it only changes the frequency setpoint at which the DGs start and thus provides additional operating margin to the proposed TS maximum allowable frequency value.

Engineering Change 38515 is the Parent EC and includes the overall background, program impacts, license impacts, and engineering requirements for both Division I and II. There are two (2) Child ECs (EC 40571 and EC 40572) that include the ADL/AEL and test plan that are specific to Division I and II governor setpoint changes. The Child ECs point back to the Parent EC for the appropriate sections.

Separately, Evaluation EC 40578 is being prepared in parallel to Nuclear Change EC 38515. The scope of Evaluation EC 40578 includes the following:

a) Revise calculations E-192, "Standby Diesel Generator Loading," and G13.18.3.6*019, "Division III Diesel Generator Loading" to gain additional margin by removing conservatisms in the individual load calculations. Calculation E-192 will also be revised to decrease the maximum allowable Technical Specification frequency from 61.2 Hz to 60.2 Hz.

b) Complete a License Amendment Request (LAR) which will describe lowering the Division I and II DG Technical Specification maximum frequency from 61.2 Hz to 60.2 Hz. The LAR will also raise the minimum Division I and II Technical Specification Surveillance Requirement testing band from 3000 kW to 3050 kW.

The reduction in the Division I and II DG governor frequency setpoint change does not directly affect the Division I, II and III DG loading calculations being updated in Evaluation EC 40578 nor does it affect the LAR that lowers the Technical Specification maximum frequency.

3.0 Evaluation/Design Summary

3.1 Evaluation Resolution

The objective of this EC (EC38515) is to provide appropriate operating margin above the TS minimum frequency and below the proposed TS maximum frequency by reducing the Division I and II (EGS-SC90A and EGS-SC90B) Diesel Generator (DG) governor frequency setpoint from 60.0 Hz to 59.7 Hz.

Per the Technical Specification 3.8.1 (Ref. 2.3.4), the Emergency Diesel Generators are operable between a frequency of 58.8 and 61.2 Hz. A review of Divisions I and II Diesel Generator Engine Speed Control (Governor) Replacement Modification ER-RB-2000-0081-000/-003 (Ref. 2.3.8 and Ref. 2.3.24) indicated that the Woodward 2301A Speed Control Governor installed on Divisions I and II Diesel Generators control the frequency at ±0.25% (±0.15 Hz). The Technical Specification lower frequency limit of 58.8 Hz will remain unchanged and applying the frequency meter uncertainty of 0.3 Hz to a Technical Specification limit of 60.2 Hz, a maximum frequency limit of 60.5 Hz is calculated as an upper analytical limit in EC 40578.

3.1.1 Licensing Requirements

USAR Section 3.1.2.18 states:

> The onsite power systems, consisting of the standby diesel generators with their associated switchgear assemblies (supplying power to safety-related equipment) and the associated battery systems, are designed and arranged for periodic testing of each system independently. During refueling shutdowns, a test is conducted to prove the operability of the automatic starting and load sequencing capability of the standby diesel generators. The testing procedure simulates a loss of bus voltage to start each standby diesel generator and connect it to its bus. The normal loading sequence is carried out.

The change in the governor setpoint will not change the testing or the function of the diesel generators. The setpoint change will provide appropriate operating margin above the TS minimum frequency and below the proposed TS maximum frequency for plant operations to help meet surveillance requirements for the diesel generators, but will not adversely affect them.

USAR Section 8.3 states:

> The diesel generator 1EGS*EG1A supports standby 4.16-kV bus 1ENS*SWG1A and diesel generator 1EGS*EG1B supports

standby 4.16-kV bus 1ENS*SWG1B. Each standby diesel generator is physically separated from the others and is located in the Seismic Category I diesel generator building. Failure of one diesel will not impede the operation of the other two diesel generators.

This EC will not impact the busses supported by the diesel generators or impact their seismic rating or redundancy.

Technical Specification Bases B3.8.1 (Ref. 2.3.22) explicitly states the nominal frequency as 60 Hz and the range as 58.8 Hz-61.2, ±2% of the 60 Hz nominal frequency. As a result of this EC, the nominal frequency is 59.7 Hz. Technical Specification Bases B3.8.1 will be revised to reflect the new nominal frequency of 59.7 Hz under LAR 2012-06. See Attachment 9.5 of this EC for the LBDCR Technical Specification Bases markup.

3.1.2 Electrical Distribution System Impacts

The existing Technical Specification (Ref. 2.3.4) allowable frequency range for the Division I and II Standby Diesel Generators is 58.8 Hz to 61.2 Hz, which is ±2% for the nominal frequency (60 Hz) and more restrictive than needed for equipment operability (refer to Section 3.2 for component design basis evaluations). The proposed setpoint change will alter the nominal frequency slightly, but the diesel generators will still be required to operate within the bounds of the Technical Specification limits (Ref. 2.3.4). Therefore, the electrical equipment supplied by the Division I and II DGs will continue to operate within the previously-qualified frequency parameters.

Since the standby diesel generator nominal frequency is being reduced, the "ready to load" speed setpoint above which the DG output breaker will close must be verified to be below the new nominal frequency of the generator set. Per pages 24 and 25 of 1.ILEGS.136 (Ref. 2.3.19), the nominal and upper limit of the speed portion of the "ready to load" setpoint are 468 CPS and 477.4 CPS, respectively. These correlate to 430 RPM and 438.6 RPM [Ref. 1.ILEGS.136 for 468 CPS = 430 RPM; (430 RPM / 468 CPS) * 477.4 CPS = 438.6 RPM]. Thus, the nominal speed of the DG must be above 438.6 RPM. For conservatism, the lower bound of the Technical Specification allowable frequency for the generator set can be considered, 58.8 Hz, which corresponds to 441 RPM. Therefore, the DG sets will be able to start and load at the new frequency setpoint of 59.7 Hz.

The decrease in nominal frequency of the Diesel Generators will cause the Motor Operated Valve stroke times to increase. Their protective devices (i.e. thermal overload heaters) are intended to allow the MOVs to operate within minimum and maximum stroke times. See "Frequency Effects on Mechanical

Equipment" section for discussions on stroke time increases as a result of this EC.

The frequency setpoints on the governor controllers for both Emergency Diesel Generators (EGS-SC90A & EGS-SC90B) will be changed from 60 Hz to 59.7 Hz. The lower Technical Specification frequency will stay the same (58.8 Hz). The Technical Requirements Manual (3.3.8.2) nominal trip setpoint for underfrequency trip of the EPA breakers is 57 Hz - 58.14 Hz, per setpoint calculation G13.18.6.1.RPS*001 (Ref. 2.3.23). Therefore, this EC does not impact the EPA trip for underfrequency.

The decrease in nominal frequency will reduce the power drawn by motor loads due to the relationship between motor input frequency and speed applied to the load (Ref. E-192 for additional discussion). This will reduce the nominal loading on the Standby Diesel Generator sets. However, since the Technical Specification frequency limits are not impacted by this Engineering Change, calculation E-192 is not being revised. Note that the change will not impact normal system loading, as the nominal station frequency remains 60 Hz.

The reduced current drawn by the motors [per E-192, current is related to the difference in speed (frequency) cubed, or $I_2 / I_1 \alpha (f_2 / f_1)^3 = (59.7 \text{ Hz} / 60 \text{ Hz})^3 = 0.985$] will not impact breaker coordination as trip settings are not being revised. Since the protective device settings are designed to protect the equipment from damage and the damage thresholds of equipment are not being changed, no change to the settings are required. Additionally, normal operation of the equipment is still at a nominal frequency of 60 Hz. The reduced power draw will not increase the likelihood of trips or reduce the protection of the motor and the change is therefore acceptable.

The revised setpoint for the diesel generator will be present when the generator sets are operating in isochronous mode, where the generator sets control their own speed and are not synchronized to the offsite power source. By extension, the revised setpoint will also impact the initial difference in frequency between the generator and the offsite power, increasing the amount of speed adjustment that will need to be made when synchronizing to the grid, though the methodology used to synchronize will not be affected. The revised setpoint will not directly impact the frequency of the generator when synchronized to the grid during operation in droop mode, but the frequency setpoint will return to 59.7 Hz if an emergency start signal is received while paralleled.

See Section 3.2 for component design basis evaluation of the electrical equipment.

Uninterruptible Power Supplies (UPSs) / Inverters

The design of the safety-related uninterruptible power supplies is such that the outputs of the inverters are synchronized to the frequency of the normal AC sources to the inverters (480V buses fed from the DGs).

There are three relevant frequency bands for the inverter. First is the allowable input frequency range. Per Specification 244.514 Sections 3.2 and 3.4, the steady-state frequency variation of the 480V AC input to the inverter is +/- 5% of nominal, or 57 Hz to 63 Hz.

Second is the frequency range within which the inverter will synchronize between the input and output frequency. Per ARP-808-87 pgs 10/11 and Spec 244.514 Section 4.1, the existing inverters will synchronize to the normal sources if they are within 60 Hz +/- 1.3%, or 59.2 Hz to 60.8 Hz. If the 480V bus frequency is outside the 1.3% range, the inverter synchronizes to its own internal standard. If the output is still outside the 1.3% range (which should have been corrected by use of the internal reference), a "SUPS output off frequency" alarm is generated.

Third is the point at which the inverter will re-synchronize after the input frequency has fallen outside the synchronization band. If the output frequency is being generated based on the internal reference frequency and the 480V input source returns to 60 Hz +/- 0.5%, or 59.7 Hz to 60.3 Hz, the output will "re-synchronize" with the 480V input frequency after a one second delay (Ref. Specification 244.514). A separate setpoint will provide an alarm in the control room if the inverter output frequency is outside the range 60 Hz +/- 0.5%, or 59.7 Hz to 60.3 Hz.

The new DG nominal frequency is 59.7 Hz, with a governor tolerance of +/- 0.15 Hz, and a setting tolerance of +/- 0.15 Hz (Per Child EC installation instruction, a tolerance of +/- 4Hz on the setting is allowed, and per Section 3.1.4, the relationship between generator frequency and MPU frequency is 27, therefore, 4 Hz tolerance / 27 = 0.148 rounded up to 0.15 Hz), for a minimum steady-state frequency of 59.4 Hz. Note that the setting will be left as close as possible to nominal to minimize the potential 0.15 Hz tolerance. The inverter output can synchronize with the DG frequency when it is above the 59.2 Hz minimum, and as long as the frequency has entered the "re-synchronize" range. However, when the Standby Diesel Generators are running at the new nominal frequency, an alarm signal may be received indicating "inverter off frequency". Given that the governor nominal setpoint of 59.7 Hz is identical to the minimum portion of the alarm band, an alarm may be present when the governor is controlling the speed below that setpoint.

A review of drawings 0244.514-000-004 and -024 shows the alarm setpoint at +/- 0.5%.

It should be recognized that if the output of the inverter is not in synchronization with the alternate/bypass supply provided to the UPS, the static transfer switch may not be able to automatically transfer from the inverted supply to the bypass supply. The output would not be in synchronization with the bypass supply if the 480V source was lost and did not enter the 0.5% "re-synchronization" band, which could be possible if the diesel generator is started in isochronous mode at the reduced frequency setpoint. In the event of a fault, automatic transfer to the bypass supply would provide higher fault current in order to trip protective devices more quickly. This is an existing design feature and operation methodology of the UPS which is not being affected by this change. Coordination Calculation G13.18.3.6*5 Appendix 7.M evaluates a fault when connected to the inverted supply with no automatic transfer to bypass; therefore, no further analysis is required on this aspect.

Reviews of ARP-808-87 and 0244.514-000 series vendor drawings do not identify any other expected alarms.

Additionally, it should be noted that the allowable inverter input synchronizing frequency range of 59.2 Hz to 60.8 Hz is more restrictive than the existing allowable DG output frequency range of 58.8 Hz to 61.2 Hz and the input requirements of 57 Hz to 63 Hz as identified in Sections 3.2 and 3.4 of Specification 244.514. The inverter output frequency range is designed to be narrower than the existing Tech Spec allowable output of the DGs to the inverter.

It is noted that the ranges indicated above are "nominal". Further discussion below considers the impact of tolerance on these ranges.

The acceptability of the governor setpoint with relationship to the UPS/inverter setpoints and alarms as well as the new Tech Spec limit to be proposed by EC 40578 is as follows:

As mentioned above, the inverter "make" and "break" points are +/- 0.3 Hz and +/- 0.8 Hz, respectively. Per S250-0100 Sync Board Technical Description Section, the tolerance on these settings is +/- 20%. Therefore, the greatest minimum limit below which the UPS could break synchronization and use its own internal frequency is 60 Hz – (0.8 Hz * 0.8) = 59.36 Hz. Likewise, the greatest minimum limit above which the UPS could re-synchronize to the alternate source is 60 Hz – (0.3 Hz * 0.8) = 59.76 Hz.

As also mentioned above, the new Tech Spec maximum frequency limit to be proposed by EC 40578 is 60.2 Hz.

With a nominal DG governor setpoint of 59.7 Hz, a setpoint tolerance of +/- 0.15 Hz, and a governor tolerance of +/- 0.15 Hz, an operating band of 59.4 Hz to 60.0 Hz may be possible. Therefore, the interaction of the DG output frequency band with the inverter control and alarm bands and proposed Tech Spec limits are shown below.

60.30 Hz Upper nominal limit of UPS off-frequency alarm
60.24 Hz Limit below which UPS will re-synchronize to alternate supply
60.20 Hz New Tech Spec DG maximum steady-state frequency limit per EC 40578
60.00 Hz Upper limit of DG output frequency
59.76 Hz Limit above which UPS will re-synchronize to alternate supply
59.70 Hz DG nominal output frequency AND lower nominal limit of UPS alarm
59.40 Hz Lower limit of DG output frequency
59.36 Hz Limit below which UPS will use internal reference frequency
58.80 Hz Existing Tech Spec DG minimum steady-state frequency limit

The above tabulation indicates that when operating at the new nominal DG output frequency setpoint of 59.7 Hz, the UPS will be unsynchronized while the DG is initially starting and may not enter the "re-synchronization" band of the UPS, so the UPS will still be producing an output based on its own internal reference frequency. The UPS will also produce an "off frequency" alarm when operating below 59.7 Hz.

3.1.3 Regulatory Requirements for Testing

Based on a review of River Bend Licensing Basis documents, the parameters which could be impacted by the DG frequency setpoint change are the ability of the DGs to perform the following:

1. Start from standby and achieves frequency ≥ 58.8 Hz in ≤ 10 seconds
2. Recovery of frequency to within 2 percent of nominal within 40 percent of the sequencing interval of 5 seconds.

In order to test that these requirements are met, it is recommended that the following tests be performed, given that a transient model of the system does not presently exist:

1. Start from standby and achieve frequency ≥ 58.8 Hz in ≤ 10 seconds

2. A test which would challenge the ability of the DG to recover frequency after large motor starting. Acknowledging that a Full ECCS Load sequence test when isolated from Offsite Power may not be practical to be performed with the unit operating, similarity may be able to be shown by performing a single motor start of the motor has been shown to cause the largest frequency recovery time during past ECCS Load Sequence tests.

Below are the USAR commitments and how the Division I and II DGs meet the requirements.

- The selection, design, and qualification of the Division I and II standby diesel generators, 1EGS*EG1A and 1EGS*EG1B, comply with Regulatory Guide 1.9, Rev. 2, dated December 1979. [USAR Table 1.8-1]
- Comply with Regulatory Guide 1.108, Rev. 1. [USAR Table 1.8-1]
- The sequencing of large loads at predetermined intervals (Table 8.3-2) ensures that large motors will have reached rated speed and that voltage and frequency will have stabilized before the succeeding loads are applied. The decrease in frequency and voltage has been verified to be within 95 and 80 percent of nominal, respectively. Recovery of voltage and frequency to within 10 percent and 2 percent of nominal, respectively, has been verified to be accomplished within 40 percent of the sequencing interval of 5 sec. Step loading and disconnection of the total diesel generator nameplate-rating load does not cause the standby diesel generator to exceed 110 percent of normal speed, thus precluding an inadvertent overspeed trip. [USAR 8.3.1.2.2.1]
- Licensed to IEEE 387-1977 [USAR 8.1.7.2]

Below are the requirements of RG 1.9, Rev 2, as they relate to transient frequency testing as supplements to the requirements of IEEE 387-1977:

- The diesel generator unit design should be such that at no time during the loading sequence should the frequency decrease to less than 95 percent of nominal.
- Frequency should be restored to within 2 percent of nominal within 60 percent of each load-sequence time interval.
- During recovery from transients caused by step load increases or resulting from the disconnection of the largest single load, the speed of the diesel generator unit should not exceed the nominal speed plus 75% of the difference between nominal speed and the overspeed trip setpoint or 115% of nominal, whichever is lower. Further, the transient following the complete loss of load should not cause the speed of the unit to attain the overspeed trip setpoint.

Below are the periodic testing requirements of IEEE 387-1977:

- The diesel generator unit shall be given one cycle of the following tests, at acceptable intervals, to demonstrate its continued capability of performing its required function:
  a. Starting test
  b. Load acceptance test
  c. Design load tests
  d. Load rejection tests
  e. Electrical Tests
  f. Subsystem tests

Below are the RBS Technical Specification tests related to transient frequency testing of the Div I and II DGs.

- Verify each DG starts from standby conditions and achieves: For DG 1A and DG 1B: in ≤ 10 seconds, frequency ≥ 58.8 Hz. [3.8.1.7]
- Verify each DG rejects a load greater than or equal to its associated single largest post accident load and following load rejection, the engine speed is maintained less than nominal plus 75% of the difference between nominal speed and the overspeed trip setpoint or 15% above nominal, whichever is lower. [3.8.1.9]

Since it may not be practical to perform a full ECCS load sequencing in order to verify frequency recovery of the generator set after load application, starting the individual largest loads on each of the diesel generators can be performed. Loading conditions similar to those experienced during an ECCS signal may also be tough to mimic during online testing. Therefore, starting large motor loads with minimal pre-loading on the bus will provide a conservative and bounding simulation of frequency recovery. This is true because heavy motor pre-loading on a bus would provide inertial resistance to any changes in system frequency, as would be experienced during starting of additional motor loads. Discussion with system engineering indicates that typical loading on the buses supplied by the DGs is approximately 100 kW to 200 kW. This is below the maximum expected initial loading on each of the buses calculated in E-192; therefore, starting of large motor loads with minimal pre-load on the bus is acceptable.

Determination of Test Acceptance Criteria

Suggested tests have been provided with the individual Child ECs for each division. The testing performed by the Child ECs are intended to prove compliance with Surveillance Requirements, FSAR statements, and Regulatory Guide 1.9 requirements related to frequency response of the Standby Diesel Generators. Additionally, in place of full ECCS sequence testing, the worst case (in terms of frequency response) loads on each DG will be started, based on a review of load blocks and historical surveillance test results, to ensure