MITSUBISHI HEAVY INDUSTRIES, LTD.
16-5, KONAN 2-CHOME, MINATO-KU
TOKYO, JAPAN

November 22, 2011

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

Attention: Mr. Jeffrey A. Ciocco,

Docket No. 52-021
MHI Ref: UAP-HF-11403

Subject: Amended MHI's Response to US-APWR DCD RAI No. 388-2858 Revision 0 (SRP 08.03.02)

References: 1) "Request for Additional Information No. 388-2858 Revision 0, SRP Section: 08.03.02 DC Power Systems (Onsite), Application Section: 8.3.2," dated (June, 11, 2009).
2) "MHI's Response to US-APWR DCD RAI No. 388-2858 Revision 0", dated July 13, 2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Amended Response to Request for Additional Information No. 388-2858 Revision 0." This amended response is submitted to address SER Open Item 08.03.02-1.

Enclosed is the response to Question 08.03.02-22 that is contained within Enclosure 1.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of the submittals. His contact information is below.

Sincerely,

Atsushi Kumaki for

Yoshiki Ogata,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosures:

1. Amended Response to Request for Additional Information No. 388-2858 Revision 0

D081
NRO

CC: J. A. Ciocco
C. K. Paulson

Contact Information
C. Keith Paulson, Senior Technical Manager
Mitsubishi Nuclear Energy Systems, Inc.
300 Oxford Drive, Suite 301
Monroeville, PA 15146
E-mail: ck_paulson@mnes-us.com
Telephone: (412) 373-6466

Docket No. 52-021
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Enclosure 1

UAP-HF-11403
Docket No. 52-021

Amended Response to Request for Additional Information
No. 388-2858 Revision 0

November, 2011

SUPPLEMENTAL RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

11/22/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 388-2858 REVSION 0**
SRP SECTION:	**08.03.02 – DC Power Systems (Onsite)**
APPLICATION SECTION:	**08.03.02**
DATE OF RAI ISSUE:	**06/11/2009**

QUESTION NO. 08.03.02-22

In response to Question # 08.03.02-12, MHI indicated that the current requirement depended on procurement specifications. In a teleconference meeting with MHI on March 23, 2009, Staff indicated that MHI needed to explain the current requirements for loads such as load sequencer, dc solenoids, ground detector, auxiliary relays, indicating lights, etc., and confirm that all the loads listed above are included in battery load calculations. MHI provided a brief discussion on the conservatism used in sizing of the loads and the associated protection of the loads. MHI indicated that its assumptions for these types of loads were made based on Japanese experience and products. MHI agreed to provide a more in depth explanation on this issue which will be incorporated in the upcoming FSAR revisions. The staff requests that MHI docket its response confirming the above actions on part of MHI to resolve the above RAI question.

ANSWER:

The load current requirements in DCD Rev. 1 included Japanese experience and Japanese product base requirements. MHI has reconfirmed the 125V DC Class 1E Load Current Requirement of DCD Table 8.3.2-1 in consideration of US manufacturers' information and differences from the Japanese reference plant. MHI has also reviewed the basis for Japanese products and found them comparable. Where differences existed the load estimate was adjusted. Please see Attachment-1 for the basis and Attachment 2, DCD markups for the revised dc loads. Although load currents have been changed, the rating of Class 1E batteries does not require modification.

The load current requirements of the Reactor Building DC Distribution Panel included the current requirements of the Class 1 E solenoid valves as shown in DCD Rev. 1. The load current requirements of these solenoid valves are described separately from the Reactor Building DC Distribution Panel in DCD Rev.2.

The assumed current requirements for auxiliary components (e.g., multifunctional relay) are included in each load. The explanation has been added in Table 8.3.2-1 as notes in DCD Rev.2. In addition, the load sequencer and the ground detector loads are not separately included in the dc power load

because the load sequence is included in the UPS load, and the ground detector is included in auxiliary component loads.

Impact on DCD

See attached markup of DCD Table 8.3.2-1 (Attachment 2).

Impact on R-COLA

There is no impact on R-COLA.

Impact on S-COLA

There is no impact on S-COLA.

Impact on PRA

There is no impact on PRA.

Impact on Technical/Topical Report

There is no impact on a Technical/Topical Report.

ATTACHMENT 1 (1/1)

Description	DCD Rev.3 Load Current	Revised Load Current	Basis of Revision
Class 1E 6.9kV Switchgear	0 to 1 min ; 44 (A)	100 (A)	Revised in consideration of US manufacturer's typical values. Load current of 0 to 1 min. is current for the trip coils of all circuit breakers. Load current of 119 to 120 min. is current for the close coil of one offsite power incoming breaker.
	119 to 120 min ; 34 (A)	30 (A)	
Class 1E 480V Load Center	Normal Current ; 4 (A)	No change (Change was incorporated in DCD Rev.2.)	Revised in consideration of US manufacturer's typical values. Load current of 0 to 1 min. is current for the trip coils of all circuit breakers.
	0 to 1 min ; 24 (A)		
	1 to 119 min ; 4 (A)		
	119 to 120 min ; 4 (A)		
Class 1E GTG Exciter	Normal Current ; 1 (A)	Deleted	Excitation current for the Class 1E GTG is supplied by a permanent magnetic generator.
	0 to 1 min ; 175 (A)		
	1 to 119 min ; 0 (A)		
	119 to 120 min ; 0 (A)		
UPS unit	Normal Current ; 438 (A)	0 (A)	UPS unit normally draws AC power from 480V MCC. UPS unit only draws DC power when AC power is not available.
Battery Charger Control Circuit	0 to 1 min (A) ; 2 (A)	0 (A)	Control power for the battery charger is not supplied from the battery.
	1 to 119 min ; 2 (A)	0 (A)	
	119 to 120 min ; 2 (A)	0 (A)	
Emergency Feed Water Pump Emergency Oil Pump	Normal Current ; N/A; New	35 (A)	Emergency Feed Water Pump Emergency Oil Pump receives power from the DC power system. Rated current has been included in the battery sizing evaluation.
	0 to 1 min ; N/A; New	56 (A)	
	1 to 119 min N/A; New	35 (A)	
	119 to 120 min ; N/A; New	35 (A)	

Table 8.3.2-1 125V DC Class 1E Load Current Requirement
(Sheet 1 of 4)
Train A

Load Description	Normal Current (A)	Maximum Load Current			
		0 to 1 min (A)	1 to 119 min (A)	119 to 120 min (A)	
A Switchboard Control Circuit	2	2	2	2	
A Class 1E 6.9kV Switchgear	4	~~44~~100	4	~~34~~30	DCD_08.03.02-22
A Class 1E 480V Load Center	4	24	4	4	
A Class 1E GTG Control Board	1	5	5	5	
~~A Class 1E GTG Exciter~~	~~1~~	~~175~~	~~0~~	~~0~~	DCD_08.03.02-22
A UPS Unit	~~43~~80	438	438	438	
A&B MOV Inverter	1	1440	1	1	DCD_08.03.02-22
A Reactor Building DC Distribution Panel	11	15	11	11	
A Solenoid Valve Distribution Panel	20	20	20	20	
A Battery Charger Control Circuit	2	~~2~~0	~~2~~0	~~2~~0	DCD_08.03.02-22
A Emergency Lighting	10	10	10	10	
A MCR Radiation Monitor Pump	30	30	30	30	
A Emergency Feedwater Pump Emergency Oil Pump	35	56	35	35	DCD_08.03.02-22
Total	~~52~~4120	~~220~~62140	~~52~~7560	~~55~~7586	DCD_08.03.02-22
Random Load			For One Minute - 195	195	

Table 8.3.2-1 125V DC Class 1E Load Current Requirement
(Sheet 2 of 4)
Train B

Load Description	Normal Current (A)	Maximum Load Current			
		0 to 1 min (A)	1 to 119 min (A)	119 to 120 min (A)	
B Switchboard Control Circuit	2	2	2	2	
B Class 1E 6.9kV Switchgear	4	~~44~~100	4	~~34~~30	DCD_08.03.02-22
B Class 1E 480V Load Center	4	24	4	4	
B Class 1E GTG Control Board	1	5	5	5	
~~B Class 1E GTG Exciter~~	~~1~~	~~175~~	~~0~~	~~0~~	DCD_08.03.02-22
B UPS Unit	~~43~~80	438	438	438	
A&B MOV Inverter	1	1440	1	1	
B Reactor Building DC Distribution Panel	11	15	11	11	
B Solenoid Valve Distribution Panel	20	20	20	20	
B Battery Charger Control Circuit	2	~~2~~0	~~2~~0	~~2~~0	DCD_08.03.02-22
B Emergency Lighting	10	10	10	10	
A MCR Radiation Monitor Pump	30	30	30	30	
Total	~~52~~485	~~2205~~2084	~~527~~525	~~557~~551	DCD_08.03.02-22
Random Load			For One Minute - 195	195	

Table 8.3.2-1 125V DC Class 1E Load Current Requirement
(Sheet 3 of 4)
Train C

Load Description	Normal Current (A)	Maximum Load Current			
		0 to 1 min (A)	1 to 119 min (A)	119 to 120 min (A)	
C Switchboard Control Circuit	2	2	2	2	
C Class 1E 6.9kV Switchgear	4	~~44~~100	4	~~34~~30	DCD_08.03.02-22
C Class 1E 480V Load Center	4	24	4	4	
C Class 1E GTG Control Board	1	5	5	5	
~~C Class 1E GTG Exciter~~	~~1~~	~~175~~	~~0~~	~~0~~	DCD_08.03.02-22
C UPS Unit	~~43~~80	438	438	438	
C&D MOV Inverter	1	1440	1	1	
C Reactor Building DC Distribution Panel	11	15	11	11	
C Solenoid Valve Distribution Panel	20	20	20	20	
C Battery Charger Control Circuit	2	~~2~~0	~~2~~0	~~2~~0	DCD_08.03.02-22
C Emergency Lighting	10	10	10	10	
B MCR Radiation Monitor Pump	30	30	30	30	
Total	~~52~~485	~~2205~~2084	~~527~~525	~~557~~551	DCD_08.03.02-22
Random Load			For One Minute - 195	195	

Table 8.3.2-1 125V DC Class 1E Load Current Requirement (Sheet 4 of 4) Train D

Load Description	Normal Current (A)	Maximum Load Current			
		0 to 1 min (A)	1 to 119 min (A)	119 to 120 min (A)	
D Switchboard Control Circuit	2	2	2	2	
D Class 1E 6.9kV Switchgear	4	~~44~~100	4	~~34~~30	DCD_08.03.02-22
D Class 1E 480V Load Center	4	24	4	4	
D Class 1E GTG Control Board	1	5	5	5	
~~D Class 1E GTG Exciter~~	~~1~~	~~175~~	~~0~~	~~0~~	DCD_08.03.02-22
D UPS Unit	~~43~~80	438	438	438	
C&D MOV Inverter	1	1440	1	1	
D Reactor Building DC Distribution Panel	11	15	11	11	
D Solenoid Valve Distribution Panel	20	20	20	20	
D Battery Charger Control Circuit	2	~~20~~	~~20~~	~~20~~	DCD_08.03.02-22
D Emergency Lighting	10	10	10	10	
B MCR Radiation Monitor Pump	30	30	30	30	
B Emergency Feedwater Pump Emergency Oil Pump	35	56	35	35	DCD_08.03.02-22
Total	~~524~~120	~~2205~~2140	~~527~~560	~~557~~586	DCD_08.03.02-22
Random Load			For One Minute - 195	195	

Notes:

1. Each Class 1E 6.9kV switchgear and 480V Load Center includes multifunction relays, auxiliary relays and indication lights for each incoming breakers and feeder breakers, and undervoltage relays.
2. Load requirement for auxiliary parts
   Multifunction relay: 0.15A
   Auxiliary relay: 0.1A
   Indication light: 0.1A
   Undervoltage relay: 0.05A
3. ~~The DC loads are preliminary and typical, and are subject to change during detailed design.~~ DCD_08.03.02-22