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November 30, 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-11414

Subject: MHI's Responses to the Questions at ACRS Full-committee Meeting on September 9, 2011 regarding the Technical Report MUAP-10023

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") the responses to the questions that have been discussed during the ACRS Full-committee meeting on September 9, 2011 regarding the Technical Report "Initial Type Test Result of Class 1E GTG System" (MUAP-10023).

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

Sincerely,



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

Enclosure:

1. Mark-up of MUAP-10023 R4

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

Contact Information

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Enclosure 1

UAP-HF-11414
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Mark-up of MUAP-10023 R4

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Although MHI evaluates it is appropriate to use both 1) and 2) above to perform Bayesian approach, MHI performs evaluation using only data of 2) conservatively.

- (6) Reliability estimation of GTGs based on industry operational experience
- Applicable data
 - 1433 demands with 0 failure
 - 2224 run hours with 0 failure
 - Uncertainty of failure rate/probability
 - Estimated applying simplified constrained non-informative distribution

Table F.3.0-3 Reliability Estimation of GTGs Based on Industry Operational Experience

	5%	Mean	95%	Distribution		
				Type	a	b
Fail to start	1.4E-6	3.5E-4	1.3E-3	Beta	0.5	1433
Fail to run	8.9E-7	2.2E-4	8.3E-4	Gamma	0.5	2224

(7) Reliability Comparison between EDG and GTG

NUREG –CR/6928 defines the EDG system boundary to include the diesel engine with all components in the exhaust path, electrical generator, generator exciter, output breaker, combustion air, lube oil systems, fuel oil system, starting compressed air system, and local instrumentation and control circuitry. Per figure 4.0-1 of this report all of the support systems listed in NUREG-CR/6928 were included in the initial type testing with the exception of the output circuit breaker. Consequently, the estimated failure rate includes the GTG and its supporting system failure rates with the exception of the output circuit breaker. The output circuit breaker is in series with the GTG; therefore, the open/close failure rate and the spurious operation failure rate for the output circuit breaker are added to the estimated failures rate for the GTG. The comparison is shown in Tables F.3.0-4 and F.3.0-5.

Table F.3.0-4 Start Reliability

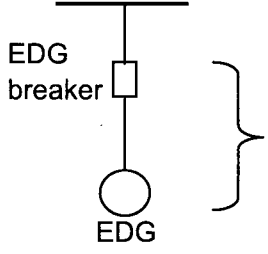
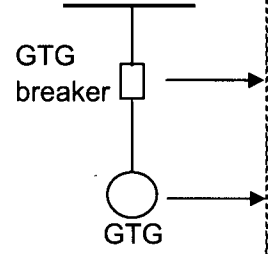
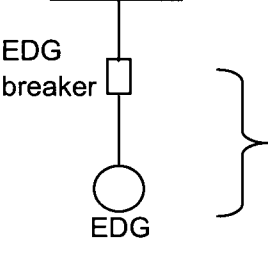
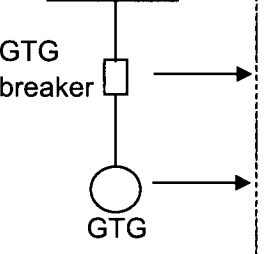
<u>NUREG 6928</u> <u>EDG</u>	<u>Failure rate</u> <u>(/ demand)</u>	<u>US-APWR</u> <u>GTG</u>	<u>Failure rate (/ demand)</u>
<p>Class 1E Medium Voltage Bus</p> 	5.0×10^{-3} (Fail to start)	<p>Class 1E Medium Voltage Bus</p> 	2.55×10^{-3} (Fail to open/close; NUREG6928)
			3.5×10^{-4} (Fail to start; MHI estimated)
<u>Total</u>	<u>5.0×10^{-3}</u>	<u>Total</u>	<u>2.9×10^{-3}</u>

Table F.3.0-5 Run Reliability

<u>NUREG 6928</u> <u>EDG</u>	<u>Failure rate</u> <u>(/ hr)</u>	<u>US-APWR</u> <u>GTG</u>	<u>Failure rate (/ hr)</u>
<p>Class 1E Medium Voltage Bus</p> 	8.0×10^{-4} (Fail to run)	<p>Class 1E Medium Voltage Bus</p> 	1.71×10^{-7} (Spurious operation; NUREG6928)
			2.2×10^{-4} (Fail to run; MHI estimated)
<u>Total</u>	<u>8.0×10^{-4}</u>	<u>Total</u>	<u>2.20171×10^{-4}</u>