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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

PLANT HATCH - UNITS 1, 2
NRC DOCKETS 50-321, 50-366
OPERATING LICENSES DPR-57, NPF-5
RESPONSE TO BULLETIN 88-05
NONCONFORMING MATERIAL

Gentlemen:

The subject NRC Bulletin (NRCB) 88-05, dated May 6, 1988, "Nonconforming Material Supplied by Piping Supplies, Inc. at Folsom, New Jersey and West Jersey Manufacturing Company at Williamstown, New Jersey" requested that Georgia Power Company (GPC) submit information regarding materials from Piping Supplies, Inc. (PSI) and West Jersey Manufacturing Company (WJM) that provide assurance that materials comply with the American Society of Mechanical Engineers' (ASME) Boiler and Pressure Vessel Code Section III, American Society of Testing and Materials (ASTM), and applicable procurement specification requirements, or that demonstrate that such materials are suitable for their intended service. It further stated that the licensee should document and maintain for inspection a basis for continued plant operation if the program stated above had not been completed within 120 days of the date of receipt of the subject NRCB. The Bulletin was received by GPC on May 11, 1988 and GPC began an extensive program including a document search of existing procurement records to identify material from PSI or WJM. This letter is to report the results of our investigation into the subject NRCB.

The issuance of Supplement 1 to the NRCB, June 15, 1988, narrowed the scope of review from ASME and ASTM certified materials to fittings and flanges. It also instructed the affected licensees to commence appropriate testing of accessible flanges and fittings promptly to identify conformance of materials to ASME and ASTM materials specifications on an accelerated schedule. The NRC issued Supplement 2 to the NRCB on August 3, 1988. The second supplement added an additional company, Chews Landing Metal Manufacturers, Inc. (CLM), to the search and modified the testing and reporting requirements. As a result of Supplement 2, we have suspended further testing of material from CLM, PSI or WJM.

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During construction, Plant Hatch followed ASME Section III Code requirements for material procurement and installation of piping systems. Contractors involved with the fabrication, installation and supply of ASME Code materials/equipment were properly certified by ASME, or, in the case of some suppliers and manufacturers, either ASME or the Certificate Holders. ASME Section III requires that pressure retaining material be supplied to an N-type Certificate Holder by an organization qualified in accordance with specific ASME rules. Although CLM materials have not been used at Plant Hatch, the PSI and WJM materials used were supplied to N-type Certificate Holders, such as Bechtel. The PSI material at Plant Hatch all tested within specifications. WJM has been surveyed, audited and qualified by ASME or Bechtel (and other N-type Certificate Holders) in compliance with the ASME Code rules. After Plant Hatch was ASME Code stamped, repair and replacement activities has been performed under ASME Section XI Code requirements. Work has been performed and material certified in compliance with ASME code requirements. NRCB 88-05 raised an important question regarding possibly fraudulently documented materials furnished by WJM. Subsequently, blind flanges found at some nuclear plants did not appear to meet ASME Code requirements. This does not, however, demonstrate that all materials supplied to the nuclear industry by WJM failed to meet ASME Code requirements.

It has been recognized in the pressure vessel and piping industry for many years that the certified physical test results of a material lot tested at a steel mill may vary from tensile tests performed on that lot's formed product. There are a number of reasons for these variations. Tests on products often must be taken on a specimen with different orientation, depth or size than the original. Subsize tensile test specimens may yield more conservative (lower) results than full-size specimens. Other reasons for variations are: the fact that steel is not homogenous, different amounts of work on the material goes into the manufacturing of various product forms, and cooling rates may vary. The American Iron and Steel Institute (AISI) performed an elaborate study of plates and shapes to determine what tensile test variances could be expected between the results of mill tests and product test for carbon steel. This study was issued in September, 1974 and showed that material with test coupons acceptable at the mill, when tested as products, can have tensile test results as much as 14,000 psi lower or higher than the results reported on the CMTR (10-20% variance). Variances were found to be greater for shapes than for plate products. The results of tests on structural shapes would be expected to be closer to the results for flanges and fittings because of configuration, product method and amount of working. The results of the AISI Study on variances in carbon steel strength were reported to the ASME Code Committee with the suggestion that allowable stresses be reduced for ASME Code materials. The ASME Code Committee considered the AISI Study and determined that no changes in allowable stresses were necessary. However, the Code Committee did acknowledge that variances, as reported by AISI, were a known phenomena.

After publication of NRCB 88-05, NUMARC/EPRI initiated an independent testing program to: (1) determine through destructive testing the tensile strength and other physical properties of approximately 250 pieces of warehoused carbon steel materials supplied by PSI or WJM to various utilities, (2) develop a correlation between Equotip hardness test results and tensile strength values for carbon steel, and (3) perform magnetic testing, alloy analysis and physical testing on a sampling of the small percentage of stainless steel materials furnished by PSI and WJM. Results obtained from the independent laboratory destructive testing revealed a bell-shaped tensile strength distribution curve very similar to the results obtained in the earlier AISI Study. The tensile strength test results were within the range expected for carbon steel materials with the exception of certain blind flanges. The interim results of the NUMARC/EPRI carbon steel study were presented to the NRC on July 29, 1988. Additionally, a chemistry evaluation of the items tested proved to meet material specification requirements. NUMARC/EPRI supervised testing of the stainless steel specimens supplied by PSI or WJM to various utilities showed that the tested material was within the expected limits of the material specification requirements.

We have found no evidence of PSI or CLM nonconforming materials being supplied to Plant Hatch. To assure that unacceptable material was not installed in Plant Hatch, a program was undertaken to review and test WJM material which had been discovered. The purpose of the investigation was to assure that nonconforming material was not installed in an ASME Code stamped system. The initial action was to perform a documentation review to identify material. The review included both primary and secondary suppliers. Then separate tests were developed for carbon steel and stainless steel materials. The testing of carbon steel (SA-105) consisted of measuring the hardness of each accessible piece. The purpose of the hardness testing was to determine by direct conversion to tensile strength if any of the material appeared to have a lower tensile strength than would be expected for SA-105 materials. Because of its availability, ease of use, and general acceptance, the Equotip hardness tester was selected, both for the industry-wide NUMARC/EPRI program and for the Plant Hatch test program. Initially, each temperature corrected Equotip hardness test value was converted to a Brinell value, which in turn, was compared to the specified hardness value for SA-105 material. The conversion to Brinell values was taken because no direct conversion from hardness to tensile strength was then available for Equotip testing. Apparently, as a consequence of the double conversion rather than direct from Equotip to tensile strength, the initial hardness data erroneously indicated low strength material with the result that 43 items were reported as nonconforming to specification requirements because NRCB 88-05, Supplement 1, required Justification for Continued Operation (JCO) for "any deviation from the specification." The NUMARC/EPRI Study provided the necessary direct conversion from Equotip to tensile strength

which was unavailable during most of the initial evaluation period (when the failures were reported to the NRC). The stainless steel material was tested by a magnet to verify that the material was austenitic stainless steel.

Upon further review, it was evident that the Equotip hardness test results had a bell-shaped distribution similar to the NUMARC/EPRI study. Moreover, these results are also consistent with the AISI Study which performed product tests on material that had already met specification requirer nts by the official mill test. On this basis, it was demonstrated that the carbon steel meets ASME Code requirements. Therefore a number of flanges which were initially, conservatively, reported to the NRC as nonconforming have been re-evaluated as meeting the Code specifications. Additionally, GPC personnel performed magnet tests to assure that the WJM provided stainless steel was austenitic. The material at issue which is installed in Plant Hatch has been tested, and it has been determined, using the NUMARC/EPRI carbon steel study presented to the NRC on July 29, 1988, as a basis, that only an extremely small percentage (approximately 1%) of the carbon steel or stainless steel material tested at Plant Hatch is discrepant. Therefore, there is basis to conclude that ASME Code requirements have been met for the vast majority of the WJM material. For those unique cases where the material specifications were not met appropriate life-of-the-plant JCOs are on file. GPC, when the NUMARC final report becomes available, may re-evaluate the discrepant components and, if justified, remove them from the list of nonconforming material.

The plant specific response for Plant Hatch to the subject NRCB is enclosed to this letter. If you have any further questions in this regard, please contact this office.

Mr. W. G. Hairston, III states he is Senior Vice President of Georgia Power Company and is authorized to execute this oath on behalf of Georgia Power Company, and to the best of his knowledge and belief, the facts set forth in this letter are true.

GEORGIA POWER COMPANY

By: W. G. Hairston III
W. G. Hairston, III

Sworn to and subscribed before me this 8th day of September, 1988.

Mae H. Battle
Notary Public

Notary Public, Fulton County, Ga.
My Commission Expires Nov. 2, 1991

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Enclosure: Plant Hatch Response to Bulletin 88-05

MJB:ju

c: Georgia Power Company
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U. S. Nuclear Regulatory Commission, Region II
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Mr. J. E. Menning, Senior Resident Inspector - Hatch

Georgia Power

ENCLOSURE 1

PLANT HATCH - UNITS 1, 2
NRC DOCKETS 50-321, 50-366
OPERATING LICENSES DPR-57, NPF-5
RESPONSE TO BULLETIN 88-05
NONCONFORMING MATERIAL

PLANT HATCH RESPONSE TO BULLETIN 88-05

Plant Hatch has identified 459 safety-related and non-safety-related flanges and fittings that were supplied by WJM or PSI. Hardness tests were conducted on 152 of the 459 to determine if the WJM or PSI supplied materials conformed to the applicable code requirements or procurement specifications. Due to Supplement 2, hardness testing was terminated after 152 flanges and fittings had been tested and evaluated. All WJM and PSI flanges and fittings located in the warehouse and safety-related systems had been identified before Supplement 2 was issued. Hardness tests were conducted on flanges and fittings classified in three areas: found in the warehouse (56), installed in the plant during construction (91), and installed in the plant after construction (5).

Based on the initial hardness testing, there were 43 flanges which did not conform to the literal ASTM procurement specifications. All 43 flanges were manufactured by WJM. There were 13 blind flanges which were not yet installed in safety-related systems at Plant Hatch and 30 flanges which were installed in safety-related systems. Based on further evaluation using the NUMARC/EPRI methodology, GPC has determined that 41 of the 43 flanges met the procurement specifications. There is one blind flange in the warehouse and one installed in safety-related systems which do not meet the NUMARC/EPRI criteria.

Attachment 1, to this enclosure, contains information requested by NRCB 88-05 for the 2 flanges which did not meet the criteria of the NUMARC/EPRI evaluation. Included is the Hatch testing identification (e.g., C280), the duty in which these materials are to be used (e.g., ASME Code Section III Class 2), the application in which these materials are used (e.g., Plant System 2PSW), the material specification (e.g., ASTM A105), nature of the component (e.g., Flange Type RFWN), pipe size, pressure rating, and chain of purchase (e.g., Supplier 1 is WJM, Supplier 2 is Hub, Inc.). Although not requested by the NRC, the Heat Number was included as part of the information provided for each flange.

As required by NRCB 88-05, Plant Hatch has demonstrated that the supplied materials are suitable for the intended service by a JCO. None of these flanges will require replacement. The 13 WJM flanges which are not yet

installed in safety-related systems will be retained until advised further by the NRC. As requested, documentation of the specific actions taken for the identified materials will be maintained until after closure of the NRCB by the NRC. Attachment 2 lists the flanges which were initially found to be nonconforming but which have been re-evaluated using the NUMARC criteria as meeting the procurement specifications. As allowed by Supplement 2, Plant Hatch is suspending temporarily the field measurements, testing, records review and the JCO process until further notice.

In summary, NRCB 88-05 material in-situ testing was stopped, due to the Supplement 2 suspension of testing. A documentation review has revealed that CLM materials have not been procured or installed at Plant Hatch, but PSI and WJM supplied flanges and fittings. There were no indications of PSI material being in nonconfomance with procurement specifications. The WJM flanges and fittings tested at Plant Hatch have been largely determined to be in conformance with applicable code requirements and procurement specifications. Those flanges which have been determined to be in nonconformance have appropriate life-of-the-plant JCOs on-file.

Attachments 1 and 2 present the findings of our investigation at Plant Hatch. Due to the large sample and acceptable test results obtained on WJM flanges and fittings installed in safety-related systems GPC nuclear plants, there is substantial evidence to conclude that WJM supplied materials used in system that are non-safety-related are suitable for their intended use. GPC believes this conclusion answers NRCB Action Requested Item 4.

ENCLOSURE 1 (continued)

PLANT HATCH RESPONSE TO BULLETIN 88-05

ATTACHMENT 1

Flanges Which Did Not Meet The Evaluation Criteria

HATCH I.D.	ASME CLASS	PLANT SYS (1)	ASTM SPEC.	FLANGE TYPE(2)	PIPE SIZE	PRESS. RATING	HEAT NO.	SUPPLIER 1*	SUPPLIER 2**
W14	2	N/A	A105	Blind	1.50"	300#	R627	WJM	CP
P110	2	2RCIC	A105	RFSW	1.00"	1500#	80508	WJM	HUB

1. Plant Syst. - Systems which have reported WJM material installed.
   - N/A - Not yet installed (located in warehouse)
   - 2RCIC - Unit 2 Reactor Core Isolation Cooling
   - 2PSW - Unit 2 Plant Service Water
   - 2RHR - Unit 2 Residual Heat Removal
   - 2CS - Unit 2 Core Spray
   - ITWCU - Unit 1 Torus Water Clean Up

2. Flange Type - type of flange installed
   - RFWN - Raised Face Weld Neck
   - RFSO - Raised Face Screw on
   - RFWN - Raised Face Weld Neck
   - RFSO - Raised Face Screw on
   - RFSW - Raised Face Socket Weld

* WJM is West Jersey Manufacturing
** CP is Capital Pipe and Steel Products Co.
** HUB is Hub, Inc.
** KEL is M. W. Kellogg/Pullman Kellogg/Pullman Power Products
** GA is Guyon Alloys, Inc.

Abbreviations also apply to Attachment 2

ATTACHMENT 2

Flanges Which Were Initially Found to be
Nonconforming but Which Have Been Re-evaluated
As Meeting the Procurement Specifications

HATCH I.D.	ASME CLASS	PLANT SYS (1)	ASTM SPEC.	FLANGE TYPE(2)	PIPE SIZE	PRESS. RATING	HEAT NO.	SUPPLIER 1*	SUPPLIER 2**
W13	[illegible]	[illegible]A	A105	Blind	1.50"	300#	R627	WJM	CP
W15	[illegible]	[illegible]	A105	Blind	1.50"	300#	R627	WJM	CP
W31	[illegible]	[illegible]	A105	Blind	4.00"	1500#	2022	WJM	HUB
[illegible]	[illegible]	[illegible]A	A105	Blind	4.00"	1500#	2022	WJM	HUB
[illegible]	[illegible]	[illegible]A	A105	Blind	4.00"	1500#	2022	WJM	HUB
[illegible]	[illegible]	[illegible]/A	A105	Blind	4.00"	1500#	2022	WJM	HUB
[illegible]	[illegible]	[illegible]/A	A105	Blind	0.75"	300#	CHV	WJM	GA
[illegible]	[illegible]	N/A	A105	Blind	0.75"	300#	CHV	WJM	GA
[illegible]	[illegible]	N/A	A105	Blind	0.75"	300#	CHV	WJM	GA
[illegible]	2	N/A	A105	Blind	0.75"	300#	CHV	WJM	GA
[illegible]	2	N/A	A105	Blind	0.75"	300#	CHV	WJM	GA
W52	2	N/A	A105	Blind	0.75"	300#	CHV	WJM	GA
C100	2	2CS	A181	RFWN	3.0"	300#	BH	WJM	KEL
C101	2	2CS	A181	RFWN	3.0"	300#	BH	WJM	KEL
C107	2	2CS	A181	RFWN	3.0"	300#	BH	WJM	KEL
P134	6	1TWCU	A350	RFWN	8.0"	150#	B3482	WJM	HUB
C225	2	2RHR	A181	RFWN	16.0"	300#	BN	WJM	KEL
C226	2	2RHR	A181	RFWN	16.0"	300#	BN	WJM	KEL
C227	3	2RHR	A105	RFWN	10.0"	300#	B3	WJM	KEL
C228	3	2RHR	A105	RFWN	10.0"	300#	B3	WJM	KEL
C229	3	2RHR	A105	RFWN	10.0"	300#	B3	WJM	KEL
C230	3	2RHR	A105	RFWN	10.0"	300#	B3	WJM	KEL
C231	2	2RHR	A181	RFWN	3.0"	300#	BB	WJM	KEL
C232	2	2RHR	A181	RFWN	3.0"	300#	BB	WJM	KEL
C233	2	2RHR	A181	RFWN	3.0"	300#	BB	WJM	KEL
C234	2	2RHR	A181	RFWN	3.0"	300#	BB	WJM	KEL
C235	2	2RHR	A181	RFWN	3.0"	300#	BB	WJM	KEL
C236	2	2RHR	A181	RFWN	3.0"	300#	BB	WJM	KEL
C237	2	2RHR	A181	RFWN	3.0"	300#	BB	WJM	KEL
C238	2	2RHR	A181	RFWN	3.0"	300#	BB	WJM	KEL
C243	2	2RHR	A181	RFWN	4.0"	300#	BL	WJM	KEL
C278	3	2PSW	A105	RFSO	6.0"	300#	S5	WJM	KEL
C279	3	2PSW	A105	RFSO	6.0"	300#	S5	WJM	KEL
C280	3	2PSW	A105	RFWN	6.0"	150#	B2	WJM	KEL
C285	3	2PSW	A105	RFWN	6.0"	150#	B2	WJM	KEL
C288	3	2PSW	A105	RFWN	6.0"	150#	B2	WJM	KEL
C292	3	2PSW	A105	RFWN	6.0"	150#	B2	WJM	KEL
C294	3	2PSW	A105	RFSO	6.0"	300#	GL	WJM	KEL
C295	3	2PSW	A105	RFWN	6.0"	150#	B2	WJM	KEL
C296	3	2PSW	A105	RFWN	6.0"	150#	B2	WJM	KEL
C298	3	2PSW	A105	RFSO	6.0"	300#	SS	WJM	KEL

ENCLOSURE 1 (continued)

PLANT HATCH RESPONSE TO BULLETIN 88-05

ATTACHMENT 3

Brinell Hardness

HATCH ID	AS FOUND	ACCEPTABLE
W14	97	137
P110	102	137
W13	107	137
W15	115	137
W31	128	137
W32	134	137
W33	124	137
W34	130	137
W41	120	137
W42	130	137
W43	118	137
W44	115	137
W50	120	137
W52	134	137
C100	120	137
C101	120	137
C107	130	137
P134	128	137
C225	127	137
C226	121	137
C227	127	137
C228	134	137
C229	133	137
C230	136	137
C231	130	137
C232	131	137
C233	131	137
C234	127	137
C235	134	137
C236	135	137
C237	133	137
C238	131	137
C243	134	137
C278	131	137
C279	135	137
C280	187	186
C285	190	186
C288	227	186
C292	208	186
C294	198	186
C295	192	186
C296	199	186
C298	128	137