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EURY, L. W. Carolina Power & Light Co.
RECIP. NAME RECIPIENT AFFILIATION
GRACE, J. N. Region 2, Ofc of the Director

SUBJECT: Responds to 871106 NRC Compliance Bulletin 87-002, "Fastener Testing to Determine Conformance W/Applicable Matls Specs." Thirty-six of 38 fasteners tested met applicable ASTM specs.

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JAN 22 1988

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Senior Vice President
Operations Support

Dr. J. Nelson Grace, Regional Administrator
United States Nuclear Regulatory Commission
101 Marietta Street, NW
Atlanta, GA 30303

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
RESPONSE TO COMPLIANCE BULLETIN NO. 87-02

Dear Dr. Grace:

Carolina Power & Light Company (CP&L) hereby submits information requested by NRC Compliance Bulletin No. 87-02, "Fastener Testing to Determine Conformance with Applicable Material Specifications," dated November 6, 1987. The subject bulletin required that licensees review fastener receipt inspection requirements and internal controls, the testing of a sampling of fasteners to determine if required specifications are met, and a safety significance evaluation for those fasteners which did not meet applicable specifications.

This letter provides the results of CP&L's review and testing program and is submitted within the time frame as discussed with Mr. C. W. Hehl (NRC-Region II) on January 15, 1988. The attached information is formatted such that the specific subheadings correspond to the bulletin item topics.

Thirty-six of the 38 fasteners tested met the applicable ASTM specifications. The 2 fasteners not in complete compliance with their specifications were evaluated and determined to be acceptable for their intended use.

Should you have any questions regarding this submittal, please contact Mr. Arnold Schmich of my staff at (919) 836-8759.

Yours very truly,

L. W. Eury

LWE/AWS/mss (5362AWS)

Attachments

L. W. Eury, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, contractors, and agents of Carolina Power & Light Company.

Ruby R. Morgan
Notary (Seal)

My commission expires: 11/27/89

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RESPONSE TO NRC COMPLIANCE BULLETIN NO. 87-02

The following sections provide specific detail for each of the Bulletin 87-02 action items:

Action 1: Describe a) the characteristics currently examined during receipt inspection of fasteners (i.e., head markings for grade and manufacturer symbols, review of certified material test report or certificate of conformance), and b) internal controls utilized during storage and issuance from stock to ensure the appropriate use of fasteners.

CP&L Response

Inspections are performed in accordance with applicable receipt inspection procedures (OQA-402, Receipt Inspection, and OQA-403, Material Verification). Specific inspection characteristics include dimensions as specified by purchase order, head markings as required by material specification and tolerances as specified by ANSI B18.2.1 for square and hex screws and bolts and ANSI B18.2.2 for square and hex nuts. Vendor supplied documentation (i.e., certificates of compliance and certified material test reports) are reviewed for compliance to applicable purchase order and material specifications. Additionally, nondestructive and destructive testing may be performed as described by OQA-403, Material Verification.

Procedures require that material control (stores) personnel receive, package, and store fasteners in accordance with the storage and maintenance sheet. Storage levels are assigned by Engineering Technical Support personnel. These storage levels are indicated on the storage and maintenance data sheets and the supply inventory system data base. Prior to use of fasteners, procedures require that the equipment data base system (EDBS), technical manuals, supply inventory system (SIS), consumables list, and procedures and drawings be reviewed for proper application of replacement parts. If the repair part or consumable (fastener) is not listed on the EDBS reference parts listing for that component, on the approved consumables list, on an approved procedure, or on the SIS screen for that application, an engineering evaluation must be performed on that part/consumable prior to its use. Changes, including field revisions and equipment substitutions in safety-related systems, are subject to control measures commensurate with the constraints applied to the original design. Changes are reviewed and approved by the organization that approved the original design or other responsible organization. In addition, the part used is identified by CP&L part number and the purchase order number for each installation package thus providing traceability to manufacturer's documents.

Action 2: Select a minimum sample of ten (10) nonsafety related fasteners (studs, bolts, and/or cap screws) and ten (10) safety-related fasteners (studs, bolts, and/or cap screws) from current, in-use stock. The sample is to be obtained by the licensee with the participation of an NRC inspector. Fasteners procured to meet the following chemical and mechanical properties are of interest: A-193 Grades B7, B8, and BV16; SAE J429 Grades 5 and 8; A-449; A-325 Types 1, 2, or 3; A-354 Grades BB, BC, BD; A-490; A-320 LTM; A-307; A-563; or equivalent.

CP&L Response

Refer to our response for Action 3.

Action 3: For the selected sample of fasteners in Item 2, include a sample of typical nuts that would be used with each fastener (one-for-one). In particular, nuts purchased to the chemical and mechanical specifications of A-194 are of interest.

CP&L Response

A total of 38 nuts and bolts were sampled, 27 of which are safety-related. The remaining 11 are "structural" nuts and bolts which are not used in plant systems. Please note that SHNPP uses safety-related fasteners for any plant system and has no nonsafety classification for plant fasteners. The sampling of the "structural" fasteners as SHNPP nonsafety related fasteners was concurred with by the NRC inspector participating in the sampling activity.

Action 4: Chemical testing shall be performed on all samples. Mechanical testing shall be performed on each safety-related fastener. Hardness testing shall be performed on each nut and nonsafety-related fastener. All testing shall be performed by a laboratory which the licensee has qualified for this type of testing and appears on the licensee's approved vendor list. Testing performed shall be done in accordance with the requirements of the fastener's specification, grade, and class, and the test shall evaluate the ultimate tensile strength, hardness, and chemical properties as required by the fastener's specification, grade, and class. Each sample shall be tagged with the sample's ID number.

CP&L Response

Mechanical testing of each safety-related fastener and hardness testing for each nut and nonsafety-related fastener samples was performed by CP&L's Metallurgy Laboratory which falls under CP&L's Corporate Quality Assurance Program and meets the qualifications necessary to perform the testing. Per discussions with Mr. J. T. Conway (NRC) on November 18, 1987 and Mr. P. E. Fredrickson (NRC-Region II) on December 1, 1987, the NRC concurred with the use of the CP&L Metallurgy Laboratory.

Chemical testing of the samples was performed by National Spectrographic Laboratories which is on CP&L's approved vendor list.

The testing program was in accordance with ASTM-approved methods required by the fastener's specification, grade, and class. Each sample was provided a unique identification number.

Action 5: The results of all tests, together with supporting information, are to be reported to the NRC utilizing the format shown in Attachments 1 and 2 of this bulletin. Include the names and addresses of suppliers and manufacturers of safety-related fasteners and, to the extent possible, of nonsafety related fasteners. For any fastener found out of specification, provide an evaluation of the safety significance including consideration of the most limiting application.

CP&L Response

Results of the CP&L Bulletin 87-02 testing are presented on Table 1, "SHNPP Fastener Testing Data Summary." Table 1 is formatted in the manner suggested by the bulletin. The fasteners are categorized by the applicable ASTM specification and are listed by their unique identification number assigned at the time of sampling. Results which do not meet the applicable specification requirement are denoted by an asterisk (*).

Table 2 lists the fastener supplier and manufacturer names and addresses.

Two of the 38 SHNPP fasteners (Sample Nos. HNP-SA193-B8-25 and HNP-SA193-B8M-08) were determined to be out of compliance with their applicable ASTM specifications. Sample No. HNP-SA193-B8-25 was procured as SA193, Grade B8 material without a class designation. The material is a 1/2 inch by 13 thread threaded rod designated for use in a variety of safety-related system applications. The CMTR received with this rod identified it as SA193, Grade B8, Class 1 material; however, testing done per the requirements of this bulletin identified it as Class 2 material. Either class is acceptable for the CP&L applications of this rod since Class 2 is a higher strength material than Class 1. This sample met the ASTM requirements for Class 2 except for hardness (a measured value of 37 Rockwell C scale versus a code allowable maximum of 35 Rockwell C). The difference between measured and allowable hardness is minimal and has no significant effect on the ability of the material to perform its safety-related function. This is supported by its higher strength Class 2 properties where Class 1 strength is acceptable. Testing of sample No. HNP-SA193-B8M-08 demonstrated that it meets its code requirements except for hardness. The testing measured hardness as 24 Rockwell C scale versus the code allowable maximum of 96 Rockwell B scale. (The ASTM standard indicates that a 96 Rockwell B scale is approximately equal to 17 Rockwell C scale although direct correlation is not recommended.) This material is used in a variety of safety-related system applications; however, there are no applications where the increased hardness would significantly effect the ability of the material to perform its safety-related function. Therefore, it is CP&L's position that the fasteners are acceptable for use in safety-related applications, and no further actions are required regarding these fasteners.

Action 6: Based on the results of the testing and review of current procedures, describe any further actions being taken to ensure that fasteners used in the plant meet the requisite specifications and requirements and that the operability of safety-related plant components is not affected.

CP&L Response

Based on the results of CP&L's review and testing program, we believe that our receipt inspection and material handling programs are adequate and meet or exceed the applicable requirements. No further actions are therefore considered to be necessary.

NRC Compliance Bulletin No. 87-02
Table 1
SHNPP Fastener Testing Data Summary

	MECHANICAL ANALYSIS					CHEMICAL ANALYSIS								
ID NUMBER	HARDNESS	UTS	YS	RA	EL	C	Mn	P	S	Si	Cr	Ni	Mo	Other
	ASTM A 193 Gr7													
HNP-SA-193-B7-09	N/R	146,000	132,500	50.00	32.00	0.440	0.88	0.018	0.012	0.34	0.89	N/R	0.17	
HNP-SA-193-B7-12	N/R	136,500	124,000	60.00	21.00	0.420	0.75	0.012	0.025	0.21	0.90	N/R	0.19	
HNP-SA-193-B7-13	N/R	143,250	132,500	60.00	39.00	0.380	0.90	0.012	0.028	0.25	1.00	N/R	0.20	
HNP-SA-193-B7-14	N/R	144,000	132,000	60.00	42.00	0.410	0.87	0.008	0.012	0.21	0.87	N/R	0.18	
HNP-SA-193-B7-15	N/R	135,400	119,000	60.00	22.00	0.390	0.97	0.020	0.015	0.31	1.00	N/R	0.21	
HNP-SA-193-B7-16	N/R	157,200	105,000	60.00	16.00	0.400	0.90	0.015	0.025	0.24	0.96	N/R	0.20	
HNP-SA-193-B7-17	N/R	141,800	125,000	60.00	17.00	0.420	0.82	0.019	0.031	0.24	0.96	N/R	0.21	
	ASTM A 193 GRB8													
HNP-SA-193-B8-06	Rb 88	97,200	53,000	84.00	69.00	0.042	1.15	0.025	0.002	0.34	18.51	8.25	N/R	
HNP-SA-193-B8-07	Rb 80	89,200	54,000	80.00	64.00	0.064	1.37	0.033	0.017	0.49	18.89	8.65	N/R	
HNP-SA-193-B8-25	*Rc 37	142,000	102,500	60.00	32.00	0.061	1.27	0.029	0.024	0.50	19.45	8.17	N/R	
	ASTM A 193 GrB8M													
HNP-SA-193-B8M-08	*Rc 24	94,200	60,000	80.00	53.00	0.062	1.50	0.040	0.016	0.59	17.05	11.11	2.12	
	ASTM A 194 Gr2H													
HNP-A-194-2H-01	Rc 26	N/R2	N/R2	N/R2	N/R2	0.460	N/R	0.027	0.033	N/R	N/R	N/R	N/R	
HNP-SA-194-2H-02	Rc 25	N/R2	N/R2	N/R2	N/R2	0.440	N/R	0.009	0.029	N/R	N/R	N/R	N/R	
HNP-A-194-2H-26	Rc 29	N/R2	N/R2	N/R2	N/R2	0.440	N/R	0.028	0.010	N/R	N/R	N/R	N/R	
HNP-A-194-2H-27	Rc 27	N/R2	N/R2	N/R2	N/R2	0.430	N/R	0.020	0.016	N/R	N/R	N/R	N/R	
HNP-SA-194-2H-28	Rc 34	N/R2	N/R2	N/R2	N/R2	0.480	N/R	0.009	0.026	N/R	N/R	N/R	N/R	
HNP-SA-194-2H-29	Rc 27	N/R2	N/R2	N/R2	N/R2	0.440	N/R	0.009	0.026	N/R	N/R	N/R	N/R	
HNP-SA-194-2H-30	Rc 25	N/R2	N/R2	N/R2	N/R2	0.450	N/R	0.009	0.030	N/R	N/R	N/R	N/R	
HNP-A194-2H-36	Rc 25	N/R2	N/R2	N/R2	N/R2	0.440	N/R	0.019	0.017	N/R	N/R	N/R	N/R	

(2456NEL/jm)

NRC Compliance Bulletin No. 87-02
Table 1
SHNPP Fastener Testing Data Summary

ID NUMBER	MECHANICAL ANALYSIS					CHEMICAL ANALYSIS								
	HARDNESS	UTS	YS	RA	EL	C	Mn	P	S	Si	Cr	Ni	Mo	Other
	ASTM A 194 Gr6													
HNP-SA-194-Gr6-04	Rc 23	N/R2	N/R2	N/R2	N/R2	0.120	0.50	0.026	0.002	0.39	12.58	N/R	N/R	
HNP-SA-194-Gr6-31	Rc 24	N/R2	N/R2	N/R2	N/R2	0.140	0.50	0.030	0.002	0.41	12.82	N/R	N/R	
HNP-SA-194-Gr6-32	Rc 25	N/R2	N/R2	N/R2	N/R2	0.150	0.50	0.027	0.002	0.40	12.81	N/R	N/R	
HNP-SA-194-Gr6-33	Rc 23	N/R2	N/R2	N/R2	N/R2	0.140	0.51	0.030	0.002	0.41	12.81	N/R	N/R	
	ASTM A 194 Gr8													
HNP-SA-194-Gr8-03	Rb 86	N/R2	N/R2	N/R2	N/R2	0.570	0.96	0.026	0.028	0.41	18.45	9.50	N/R	
	SAE J429													
HNP-SAE-J429-Gr5-10	Rc 30	N/R2	N/R2	N/R2	N/R2	0.310	N/R	0.015	0.011	N/R	N/R	N/R	N/R	
HNP-SAE-J429-Gr5-11	Rc 27	N/R2	N/R2	N/R2	N/R2	0.400	N/R	0.018	0.013	N/R	N/R	N/R	N/R	
HNP-SAE-J429-Gr5-34	Rc 30	N/R2	N/R2	N/R2	N/R2	0.310	N/R	0.014	0.012	N/R	N/R	N/R	N/R	
HNP-SAE-J429-Gr5-35	Rc 26	N/R2	N/R2	N/R2	N/R2	0.360	N/R	0.025	0.011	N/R	N/R	N/R	N/R	
HNP-SAE-J429-Gr5-37	Rc 27	N/R2	N/R2	N/R2	N/R2	0.350	N/R	0.024	0.012	N/R	N/R	N/R	N/R	
HNP-SAE-J429-Gr5-38	Rc 30	N/R2	N/R2	N/R2	N/R2	0.350	N/R	0.026	0.024	N/R	N/R	N/R	N/R	
	ASTM A 453 Gr660													
HNP-SA-453-Gr660-21	HBN 313	156,000	112,500	40.00	25.00	0.046	0.13	0.007	0.004	0.12	14.56	24.57	1.20	Ti 2.18 Al 0.16 V 0.29 B 0.006
HNP-SA-453-Gr660-22	HBN 313	157,600	117,500	60.00	27.00	0.038	1.34	0.010	<0.001	0.58	14.13	24.78	1.29	Ti 2.28 Al 0.16 V 0.20 B 0.01
HNP-SA-453-Gr660-23	HBN 331	162,000	121,000	60.00	25.00	0.048	0.09	0.007	0.003	0.12	14.56	24.47	1.22	Ti 2.20 Al 0.17 V 0.29 B 0.007
HNP-SA-453-Gr660-24	HBN 322	162,600	116,500	40.00	25.00	0.020	1.18	0.010	<0.001	0.48	14.62	25.01	1.31	Ti 2.30 Al 0.16 V 0.26 B 0.006

(2456NEL/jm)

NRC Compliance Bulletin No. 87-02
Table 1
SHNPP Fastener Testing Data Summary

ID NUMBER	MECHANICAL ANALYSIS					CHEMICAL ANALYSIS									
	HARDNESS	UTS	YS	RA	EL	C	Mn	P	S	Si	Cr	Ni	Mo	Other	
	ASTM A 564 Gr630														
HNP-SA-564-Gr630-18	Rc 34	155,800	153,000	60.00	20.00	0.044	0.46	0.019	0.017	0.61	15.96	4.34	N/R	Cu 3.19	Cb+Ta 0.26
HNP-SA-564-Gr630-19	Rc 37	165,600	165,000	60.00	19.00	0.033	0.41	0.014	0.024	0.55	16.18	4.35	N/R	Cu 3.48	Cb+Ta 0.26
HNP-SA-564-Gr630-20	Rc 37	159,800	159,800	60.00	17.00	0.039	0.47	0.036	0.024	0.54	16.03	4.41	N/R	Cu 3.29	Cb+Ta 0.29
	SPECIFICATION UNKNOWN														
HNP-SAE-Gr5-05	Rb 91	N/R2	N/R2	N/R2	N/R2	0.094	0.39	0.005	0.050	N/D	N/D	N/D	N/D		

*: OUT OF SPECIFICATION
N/R: NOT REQUIRED BY SPECIFICATION
N/R2: TESTING NOT REQUIRED BY NRC BULLETIN 87-02
N/D: NOT DETERMINED

NOTE: UTS-ULTIMATE TENSIL STRENGTH, PSI; YS-YIELD STRENGTH, PSI; RA-% REDUCTION OF AREA; EL-% ELONGATION; C-CARBON, Mn-MANGANESE; P-PHOSPHOROUS; S-SULFUR; Si-SILICON; Mo-MOLYBDENUM; Cr-CHROMIUM; Ni-NICKEL; Ti-TITANIUM; Al-ALUMINUM; V-VANADIUM; B-BORON; N-NITROGEN; Cb-COLUMBIUM; Ta-TANTALUM

(2456NEL/jm)

Table 2

SHNPP Fastener Supplier and Manufacturer Names and Addresses

Fastener ID No.: HNP-SA-194-2H-02
HNP-SA-194-GR8-03
HNP-SA-193-B8-06
HNP-SA-193-B7-09
HNP-SA-193-B7-16
HNP-SA-193-B7-17
HNP-SA-564-GR630-18
HNP-SA-564-GR630-19
HNP-SA-564-GR630-20
HNP-SA-193-B8-25
HNP-SA-194-2H-28
HNP-SA-194-2H-29
HNP-SA-194-2H-30

Supplier - Texas Bolt, P. O. Box 1211, Houston, Texas 77251
Manufacturer - Texas Bolt, P. O. Box 1211, Houston, Texas 77251

Fastener ID No.: HNP-SA-194-GR6-04
HNP-SAE-GR5-05
HNP-SA-194-GR6-31
HNP-SA-194-GR6-32
HNP-SA-194-GR6-33

Supplier - Siemens Allis, Inc., 3203 Womans Club Drive, Raleigh, North Carolina 27612
Manufacturer - Cannot be determined

Fastener ID No: HNP-SA-193-B8-07
HNP-SA-193-B7-12
HNP-SA-193-B7-13

Supplier - Ronson Mfg. Inc., 1491E. 363rd St., Eastlake, Ohio 44094
Manufacturer - Josyln Stainless Steels, P. O. Box 630, Fort Wayne, Indiana 46801

Fastener ID No.: HNP-SA-193-B8M-08

Supplier - Ronson Mfg. Inc., 1491E. 363rd St., Eastlake, Ohio 44094
Manufacturer - Ronson Mfg. Co., 9933 Chillicothe Rd., Kirkland, Ohio 44094
Manufacturer - Al Tech Speciality Steel Corp., Willowbrook Ave., Dunkirk, NY 14048 - Stock Mfg.

Fastener ID No. HNP-SA-193-B7-14

Supplier - Ronson Mfg. Inc., 1491E. 363rd St., Eastlake, Ohio 44094
Manufacturer - Ronson Mfg. Inc., 1491 E. 363rd St., Eastlake, Ohio 44094

Fastener ID No.

HNP-SA-193-B7-15
HNP-SA-453-GR660-21
HNP-SA-453-GR660-22
HNP-SA-453-GR660-23
HNP-SA-453-GR660-24

Supplier - A&G Engineering Co., Inc., 4640 E. La Palma Avenue, Anaheim, CA 92906
Manufacturer - A&G Engineering Co., Inc., 4640 E. La Palma Ave., Anaheim, CA 92906

Fastener ID No.

HNP-A-194-2H-01
HNP-SAE-J429-GR5-10
HNP-SAE-J429-GR5-11
HNP-A-194-2H-26
HNP-A-194-2H-27
HNP-J429-GR5-34
HNP-SAE-J429-GR5-35
HNP-A-194-2H-36
HNP-SAE-J429-GR5-37
HNP-SAE-J429-GR5-38

Supplier - Bowman Distribution, 31 Misty Morning Drive, Hilton Head Island, SC 29928
Manufacturer - Cannot be determined

Original Bar Stock - Republic Steel - Cannot determine address
Manufacturer - Earle M. Jorgensen Co., 1900 Mitchell Blvd., Schaumburg, Illinois 60194

Original Bar Stock - Bliss & Laughlin Steel, 281 East 155th St., Harvey, Illinois 60426
Manufacturer - Earle M. Jorgensen Co., P. O. Box 1900, Schaumburg, Illinois 60494