

OPPD

Omaha Public Power District
1623 Harney Omaha, Nebraska 68102-2247
402/536-4000

March 23, 1988
LIC-88-096

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

- References:
1. Docket No. 50-285
 2. NRC Compliance Bulletin 87-02
 3. Letter from OPPD (R. L. Andrews) to NRC (Document Control Desk) dated January 19, 1988 (LIC-88-023)

Gentlemen:

SUBJECT: Revised Response to NRC Compliance Bulletin 87-02

Omaha Public Power District (OPPD) completed sample tests of both safety and non-safety related fasteners in accordance with Reference 2. The results of the testing, transmitted by Reference 3, indicated that the Critical Quality Element (CQE) fasteners met specifications with the exception of one (1) CQE nut (labeled FC-C6N) which was low in carbon content. Six (6) non-safety related bolts/studs and two (2) nuts were outside of the requirements of their material specification. A non-conformance report was initiated for the CQE nut. The remaining nuts still in stores from the same lot have been tagged as non-conforming. Additional testing was initiated on CQE nuts from this same lot to determine the extent of non-conformance. An engineering evaluation was also initiated on both the CQE and non-CQE fasteners to determine any impact on safety.

When the samples were returned from the testing laboratory and opened, CQE nut FC-C6N was found in the untested condition. The extra nut for FC-C7N was found to have been tested and retested by mistake. The remaining samples were examined to ensure that all other fasteners were tested. OPPD advised the NRC of this error and nut FC-C6N was resubmitted to the testing laboratory. It was tested, and met the requirements for ASTM A-194-2H. All CQE fasteners tested now meet their requirements. Revised testing results are attached for your review.

OPPD believes that the corrective actions initiated as described in Reference 3, as a result of the incorrectly reported failure of one CQE nut (FC-C6N) are not required, as all CQE nuts tested meet specifications. The nuts tagged as

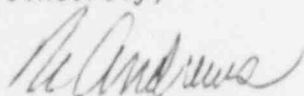
8803300182 880323
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IEH
||

non-conforming will be re-designated as conforming and the non-conformance report issued for CQE nut FC-C6N will be dispositioned "use-as-is". The engineering evaluation of the CQE fasteners is no longer required; however, the evaluation will be completed for the non-CQE fasteners to determine any impact on safety. An update is planned upon the completion of this evaluation.

OPPD apologizes for the testing error. If you have any questions concerning this matter, please contact us.

Sincerely,



R. L. Andrews
Division Manager
Nuclear Production

RLA/me

cc: LeBoeuf, Lamb, Leiby & MacRae
1333 New Hampshire Ave., N.W.
Washington, DC 20036

R. D. Martin, NRC Regional Administrator
A. Bournia, NRC Project Manager
P. H. Harrell, NRC Senior Resident Inspector

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-C1 Bolt/Nut

Fastener Description: 1" x 6 1/2" Stud bolt/ H Hex Nut

Description of Sample Stock Location: CQE Storage 621.5200/ 621.4403

Material Specification as Documented by Licensee Records: A193 GrB7/ A194-2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: CQE/CQE

General Plant Application (e.g., Pressure Boundary, Structural)

Vendor: P. Kiewit / Chicago Tube and Iron

QA Requirements Imposed on Vendor: Traceability per USAS B31.7 / ASME NCA-3800

Licensee Representative: Gary R. Fleischmann

Signature Gary Fleischmann

Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-C2 Bolt/Nut

Fastener Description: $\frac{1}{2}$ " x $2\frac{1}{2}$ " Machine bolt / H Hex nut

Description of Sample Stock Location: CQE Storage 621.5002/ 621.4202

Material Specification as Documented by Licensee Records: A193 GrB7/ A194-2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: USAS B31.7/ CQE-ASME Sec.III C1 1'

General Plant Application (e.g., Pressure Boundary, Structural)

Vendor: P. Kiewit/ Acimet Mfg.

QA Requirements Imposed on Vendor: Traceability USAS B31.7/ ASME III NCA-3800

Licensee Representative: Gary R. Fleischmann

Signature

Gary Fleischmann

Date

1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

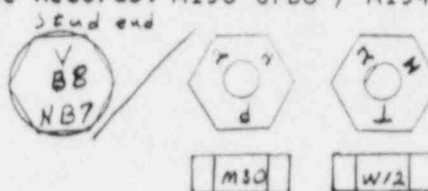
*Sample ID# FC-C3 Bolt/Nut

Fastener Description: 1" x 8" Stud Bolt / H Hex nuts

Description of Sample Stock Location: CQE Storage 621.6406 / 621.1403

Material Specification as Documented by Licensee Records: A193 GrB8 / A194-2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: CQE / CQE-ASME C11

General Plant Application (e.g., Pressure Boundary, Structural)

Vendor: Combustion Engineering / Borg Warner Ind. Prod. Inc.

QA Requirements Imposed on Vendor: ASME III NQA-1 / ASME III NCA-3800

Licensee Representative: Gary R. Fleischmann

Signature

Gary R. Fleischmann

Date

1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Ft. Calhoun IEB 87-02 response Attachment 1

Fastener Testing Data Sheet

*Sample ID# FC-C4 Screw/Nut

Fastener Description: 3/4" x 4 1/2" Hex Head Cap Screw / H Hex nut

Description of Sample Stock Location: CQE Storage P.O. 48207/ 621.4301

Material Specification as Documented by Licensee Records: A325 Tp1 / A194-2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: CQE/CQE

General Plant Application (e.g., Pressure Boundary, Structural) Pipe Supports

Vendor: John Day Co. / Chicago Tube and Iron

QA Requirements Imposed on Vendor: App. Vendor /ASME NCA-3800

Licensee Representative: Gary R. Fleischmann

Signature

Gary R. Fleischmann

Date

1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Ft. Calhoun IEB 87-02 response **Attachment 1**


Fastener Testing Data Sheet

*Sample ID# FC-C5 Bolt/Nut

Fastener Description: 5/8" x 3 1/2" Stud Bolt/ H Hex nuts

Description of Sample Stock Location: CQE Stores 621.5044/ 621.5057

Material Specification as Documented by Licensee Records: A193 GrB7 / A194-2H

Head Marking (Specification and Manufacturer): ^{stud ends} (S B7) (NI 33) / 

**Class/Procurement Level: CQE / CQE-ASME III C12

General Plant Application (e.g. Pressure Boundary, Structural)

Vendor: P. Kiewit / Hub Inc. (MS) - Cardinal (MM)

QA Requirements Imposed on Vendor: Traceability to USAS B31.7 / NCA-3800

Licensee Representative: Gary R. Fleischmann

Signature  Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Ft. Calhoun IEB 87-02 response Attachment 1

Fastener Testing Data Sheet

*Sample ID# FC-C6 Screw/Nut

Fastener Description: 3/4" x 3 1/2" Hex Head Cap Screw / H Hex nut

Description of Sample Stock Location: CQE Stores upper level 621.5021/ 621.4301

Material Specification as Documented by Licensee Records: A193 GrB8/ A194-2H (B)

Head Marking (Specification and Manufacturer): none/



**Class/Procurement Level: CQE/CQE

General Plant Application (e.g., Pressure Boundary, Structural)

Vendor: Combustion Engineering / Chicago Tube and Iron

QA Requirements Imposed on Vendor: ASME NQA-1 / ASME NCA-3800

Licensee Representative: Gary R. Fleischmann

Signature

Gary Fleischmann

Date

1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Ft. Calhoun IEB 87-02 response **Attachment 1**

Fastener Testing Data Sheet

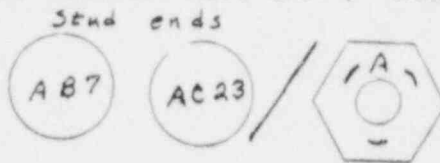
*Sample ID# FC-C7 Bolt/Nut

Fastener Description: 7/8" x 12" Stud bolt / H Hex nuts

Description of Sample Stock Location: CQE Stores for # 621.6351 and 621.1351

Material Specification as Documented by Licensee Records: A193 GrB7 / A325 Tpl

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: CQE/ Limited CQE

General Plant Application (e.g., Pressure Boundary, Structural) Pipe Supports

Vendor: Acimet / Bosco Fastening Services

QA Requirements Imposed on Vendor: ASME NCA-3800 / N.A. for limited CQE

Licensee Representative: Gary R. Fleischmann

Signature Gary Fleischmann Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-C8

Bolt/Nut

Fastener Description: $\frac{1}{2}$ " x $2\frac{1}{2}$ " Bolt (Unistrut)/ Spring Nut

Description of Sample Stock Location: CQE Store upper level P.O. 8506/ P.O. 1824

Material Specification as Documented by Licensee Records: A307 GrA / A675 Gr60

Head Marking (Specification and Manufacturer):
Commercial grade dedicated



**Class/Procurement Level: CQE/ limited CQE

General Plant Application (e.g., Pressure Boundary, Structural) Electrical Supports

Vendor: Crescent Electric / Porter Trustin & Carlson (Unistrut Nebraska)

QA Requirements Imposed on Vendor: NA for Commercial grade dedicated / NA for limited CQE

Licensee Representative: Gary R. Fleischmann

Signature

Date

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-C9

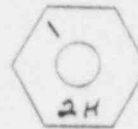
Stud/Nut

Fastener Description: 5/8" x 8 1/2" All thread stud/ H Hex nuts

Description of Sample Stock Location: CQE Stores upper level P.O. 68125/ P.O. 70639

Material Specification as Documented by Licensee Records: A307 / A194-2H

Head Marking (Specification and Manufacturer): none /



**Class/Procurement Level: limited CQE/ limited CQE

General Plant Application (e.g., Pressure Boundary, Structural)

Vendor: Great Plains Industrial Supply/ Service Supply CO.

QA Requirements Imposed on Vendor: NA for limited CQE/ NA for limited CQE

Licensee Representative: Gary R. Fleischmann

Signature Gary R. Fleischmann

Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Fastener Testing Data Sheet

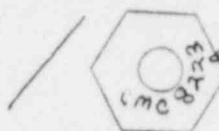
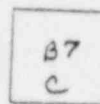
*Sample ID# FC-C10 Bolt/Nut

Fastener Description: 1" x 8" sq. Head bolt/ H Hex nut

Description of Sample Stock Location: CQE Stores 621.1401/ 621.2521

Material Specification as Documented by Licensee Records: A193 GrB7/ A193-B7

Head Marking (Specification and Manufacturer):



vibracotech

**Class/Procurement Level: CQE/CQE

General Plant Application (e.g., Pressure Boundary, Structural)

Vendor: Borg Warner Ind./ Combustion Engineering

QA Requirements Imposed on Vendor: ASME III NCA-3800/ ASME NQA-1

Licensee Representative: Gary R. Fleischmann

Signature *Gary Fleischmann*

Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-1

Screw/Nut

Fastener Description: 7/16" x 1" Hex Head Cap Screw/ Nut

Description of Sample Stock Location: Non-CQE Stores 021.1612/ 021.1536

Material Specification as Documented by Licensee Records: SAE Gr5/ SAE Gr5

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Prime
Vendor: Service Supply Company for screw and nut

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature Gary Fleischmann

Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-2

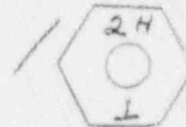
Screw/Nut

Fastener Description: $\frac{1}{4}$ " x $4\frac{1}{2}$ " Hex Head Cap Screw/ Nut

Description of Sample Stock Location: Non-CQE Stores 21.1048/ 21.1530

Material Specification as Documented by Licensee Records: SAE Gr5/ SAE Gr5

Head Marking (Specification and Manufacturer): none



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Prime

Vendor: Service Supply Co. both

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature

Date

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

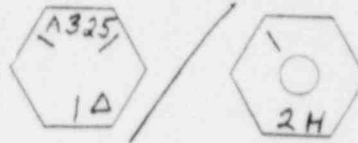
*Sample ID# FC-3 Screw/Nut

Fastener Description: 3/4" x 2" Hex Head Cap Screw/ HH Nut

Description of Sample Stock Location: Non-CQE Stores 621.1302/ 621.4302

Material Specification as Documented by Licensee Records: A325/ A325

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Prime
Vendor: John Day for both

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature Gary Fleischmann

Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-4

Screw/Nut

Fastener Description: 3/4" x 2" Hex Head Cap Screw/ Nut

Description of Sample Stock Location: Non-CQE Stores 21.1654/ 21.3210

Material Specification as Documented by Licensee Records: SAE Gr5/ A194-8M

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Prime

Vendor: Service Supply for both

QA Requirements Imposed on Vendor:

Licensee Representative: Gary R. Fleischmann

Signature

Gary R. Fleischmann

Date

1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-5

Screw/Nut

Fastener Description: 3/8" x 3" Hex Head Cap Screw/ Hex Nut

Description of Sample Stock Location: Non-CQE Stores 21.1609/ 21.1533

Material Specification as Documented by Licensee Records: SAE Gr5/ SAE Gr5

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Prime Vendor: Service Supply Co. for both

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature Gary R. Fleischmann

Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

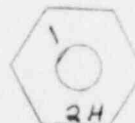
*Sample ID# FC-6 Screw/Nut

Fastener Description: 3/4" x 6" Heavy Hex Cap Screw/ H Hex nut

Description of Sample Stock Location: Non-CQE Stores 21.1665/ 21.1544

Material Specification as Documented by Licensee Records: SAE Gr5/ SAE Gr5

Head Marking (Specification and Manufacturer): None/



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Prime
Vendor: Service Supply Co. for both

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature

Gary R. Fleischmann

Date

1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun ICD 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-7

Screw/Nut

Fastener Description: 5/8" x 3³/₄" Hex Head Cap Screw/ H Hex Nut

Description of Sample Stock Location: Non-CQE Stores 21.1649/ 21.1542

Material Specification as Documented by Licensee Records: SAE Gr5/ SAE Gr5

Head Marking (Specification and Manufacturer): None/None

**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Prime
Vendor: Service Supply Co. for both

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature Gary R. Fleischmann

Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-8

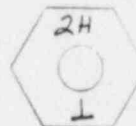
Screw/Nut

Fastener Description: 5/16" x 2 1/2" Hex Head Cap Screw/ H Hex Nut

Description of Sample Stock Location: Non-CQE Stores 21.1064/ 21.1531

Material Specification as Documented by Licensee Records: SAE Gr5/ SAE Gr5

Head Marking (Specification and Manufacturer): Screw has none/



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Vendor: Service Supply Co. for both

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature

Gary Fleischmann

Date

1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# FC-9

Screw/Nut

Fastener Description: 3/4" x 3 1/2" Hex Head Cap Screw/ H Hex Nut

Description of Sample Stock Location: Non-CQE Stores 21.1660/ 21.1544

Material Specification as Documented by Licensee Records: SAE Gr5/ SAE Gr5

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical

Prime

Vendor: Supply Service Co. for both

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature

Gary R. Fleischmann

Date

1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Attachment 1

Ft. Calhoun IEB 87-02 response

Fastener Testing Data Sheet

*Sample ID# Fc-10

Screw/Nut

Fastener Description: 5/16" x 1 1/4" Hex Head Cap Screw/ H Hex Nut

Description of Sample Stock Location: Non-CQE Stores 21.1593/ 21.1531

Material Specification as Documented by Licensee Records: SAE Gr5/ SAE Gr5

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-CQE

General Plant Application (e.g., Pressure Boundary, Structural) General Mechanical
Prime

Vendor: Service Supply Co. for both

QA Requirements Imposed on Vendor: None

Licensee Representative: Gary R. Fleischmann

Signature Gary R. Fleischmann Date 1/4/88

*The sample ID# shall have a prefix that contains the licensee facility initials.

**If applicable, please provide an explanation for your classification system.

Ft. Calhoun IEB 87-02 response

Non-CQE (Non-SR)

Nut

Attachment 2

Data Summary

<u>ID#</u>	<u>Mechanical Analysis</u>		<u>Chemical Analysis</u> ¹								
	<u>Hardness</u> R _C except 7	<u>UTS</u>	<u>0.2% YS</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Mo</u>	<u>Cr</u>	<u>Ni</u> 10.1
FC-1	31, 30, 30	-	--	.44	.64	.012	.007	.19	<.03	.06	
FC-2	30, 30, 30	-	--	.42	.74	.010	.017	.20	<.03	.05	
FC-3	31, 31, 30	-	--	.40	.60	.017	.013	.16	<.03	.06	
FC-4	*34, 33, 34	-	--	.05	1.23	.024	.018	.42	2.00	16.5	
FC-5	31, 31, 31	-	--	.38	.69	.017	.028	.19	<.03	.15	
FC-6	31, 30, 31	-	--	.44	.71	.015	.007	.15	<.03	.06	
FC-7	*96, 95, 92 R _b	-	--	*.07	.32	.017	.005	<.05	<.03	<.05	
FC-8	27, 27, 27	-	--	.37	.81	.018	.020	.18	<.03	.05	
FC-9	29, 28, 28	-	--	.45	.65	.016	.018	.16	<.03	.09	
FC-10	27, 26, 27	-	--	.36	.81	.020	.019	.18	<.03	.05	

*Did not meet specification

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

¹The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Ft. Calhoun IEB 87-02 response
 non-CQE (non-SR)
 Bolt/Stud

Attachment 2
 Data Summary

ID#	<u>Mechanical Analysis</u>		<u>Chemical Analysis</u> ¹							
	<u>Hardness</u>	<u>UTS</u>	<u>0.2% YS</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Mo</u>	<u>Cr</u>
FC-1	*98, 98, 98 R _b	-	--	* .19	.62	.017	.023	.15	<.03	.06
FC-2	*91, 91, 93 R _b	-	--	* .17	.46	.015	.009	<.05	<.03	<.05
FC-3	29, 29, 29 R _c	-	--	.39	.94	.012	.019	.24	<.03	.24
FC-4	30, 30, 30 R _c	-	--	.37	.80	.019	.009	.25	<.03	.09
FC-5	32, 32, 32 R _c	-	--	.33	.58	.024	.011	.16	<.03	.09
FC-6	*84, 84, 85 R _b	-	--	* .13	.40	.010	.012	<.05	<.03	<.05
FC-7	*85, 86, 85 R _b	-	--	* .15	.41	.012	.011	<.05	<.03	<.05
FC-8	*83, 84, 83 R _b	-	--	* .05	.41	.015	.012	<.05	<.03	<.05
FC-9	*96, 95, 96 R _b	-	--	* .18	.62	.010	.022	.13	<.03	.09
FC-10	34, 34, 32 R _c	-	--	.36	.73	.019	.005	<.05	<.03	.25

*Did not meet specification

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

¹The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Ft. Calhoun IEB 87-02 response
 CQE/SR
 Nut

Attachment 2
 Data Summary

ID#	Mechanical Analysis		Chemical Analysis ¹							
	Hardness R _C	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
FC-C1	25, 29, 32	--	--	.46	.74	.011	.017	.25	<.03	<.05
FC-C2	32, 32, 32	--	--	.43	.66	.020	.015	.17	<.03	<.05
FC-C3	29, 24, 24	--	--	.41	.79	.016	.014	.21	<.03	<.05
FC-C4	28, 28, 27	--	--	.41	.81	.007	.024	.21	.15	1.04
FC-C5	29, 30, 29	--	--	.41	.72	.023	.017	.25	<.03	.08
FC-C6	24, 24, 25	--	--	.42	.83	.007	.029	.22	<.18	.09
FC-C7	24, 25, 25	--	--	.31	.64	.017	.009	.22	<.03	.20
FC-C8	27, 25, 25	--	--	.20	.72	.013	.012	.18	<.03	.09
FC-C9	29, 29, 29	--	--	.45	.67	.009	.008	.23	<.03	.05
FC-C10	27, 26, 26	--	--	.42	.94	.011	.026	.31	.23	1.08

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

¹The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

Ft. Calhoun IEB 87-02 response
 CQE/SR
 Bolt/Stud

Attachment 2
 Data Summary

ID#	Mechanical Analysis		Chemical Analysis ¹								
	Hardness	UTS KSI	0.2% YS KSI	C	Mn	P	S	Si	Mo	Cr	
FC-C1	-	155	137	.41	.85	.021	.017	.29	.18	1.07	
FC-C2	-	144	129	.39	.82	.018	.015	.29	.19	1.05	
FC-C3	-	86.4	34.1	.06	1.71	.020	.021	.60	.33	18.42	N: 8.72
FC-C4	-	135	45,000 lbs. 10° Wedge Tensile	.31	.81	.022	.007	.25	<.03	.10	
FC-C5	-	132	119	.44	.77	.031	.026	.20	.19	.90	
FC-C6	-	87.7	30	.06	1.82	.025	.015	.51	.21	18.71	N: 9.07
FC-C7	-	149	132	.42	.95	.010	.018	.25	.19	1.03	
FC-C8	-	85.3	12,100 lbs. 10° Wedge Tensile	.05	.38	.018	.014	<.05	<.03	<.05	
FC-C9	-	62.8	14,200 lbs. Wedge Tensile	.06	.30	.013	.019	.10	<.03	.06	
FC-C10	-	154	135	.42	.90	.022	.014	.28	.17	1.02	

Note: UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr - Chromium.

¹The elements listed apply to ASTM A193 B7 or SA193 B7 material. The elements to be reported for other materials tested, shall conform to those reported in the applicable material specification. Properties found out of specification shall be noted with an asterisk.

ATTACHMENT 3
RECEIPT INSPECTION CHECKLIST GUIDELINES

CHECKLIST #2 - FASTENERS

P.O. # _____

Enter the purchase order number for the material.

Item # _____

Enter the item number of the material from the purchase order.

____ of ____

Enter the number of items that arrive to be inspected out of the quantity ordered on the purchase order.

References:

Document any section of any reference used during receipt inspection.

Sample Plan:

The sample plan to be used for receipt inspection shall be determined by the applicable QA Supervisor and shall be indicated on the Material Acceptance Plan. NOTE: Sampling does NOT apply to documentation required by the purchase order. All documentation shall be thoroughly reviewed by the inspector before accepting the material.

1. 100% Inspection

If 100% Inspection is marked on the Material Acceptance Plan, every item in the shipment shall be inspected. If every item in the shipment satisfactorily passes the receipt inspection, the 100% Inspection row should be marked "Sat" on the checklist. This row should be checked "Unsat" if any item fails to pass receipt inspection. If sampling is used during receipt inspection of the item, this row should be checked "N/A."

2. Sampling Plan

If sampling is used for receipt inspection, the applicable QA Supervisor shall assign an appropriate AQL level on the Material Acceptance Plan. If 100% Inspection is used, the Sampling Plan row shall be checked "N/A" on the checklist. The AQL level shall be copied to the Receipt Inspection Checklist by the inspector. Next, the inspector should refer to the Quality Assurance Sampling Plan to determine the appropriate sample size and the accept/reject criteria for the material. The sample size used shall also be copied to the checklist by the inspector. The sample shall then be randomly chosen from the items to be inspected.

Checklist #2 (continued)

The number of defects found during the inspection shall be recorded on the checklist. If no defects are found, the shipment is acceptable and the Sampling Plan row should be checked "Sat" on the checklist. If any defects are found, the inspector shall contact the OPS-QA Supervisor for further instruction.

The OPS-QA Supervisor has two options depending on whether or not the number of defects is within the acceptance level of the Quality Assurance Sampling Plan. To determine if the material is acceptable, the lot or batch size is cross-checked with the Acceptable Quality Levels (AQL) to get the acceptance and rejection numbers.

If the number of defects found in the sample is equal to or less than the acceptance number, the material is within the acceptance level of the Quality Assurance Sampling Plan. If the number of defects is equal to or greater than the rejection number, the material is not within the acceptance level.

If the material is within the acceptance level, the OPS-QA Supervisor can instruct the inspector to accept the shipment. In this case, the Sampling Plan row shall be marked "Sat" and any defects will be removed from the shipment as they are discovered by plant personnel. The other option available to the OPS-QA Supervisor is to have the inspector perform a 100% Inspection rejecting any defective items found in the shipment.

If the material is not within the acceptance level, the OPS-QA Supervisor can instruct the inspector to reject the shipment. In this case, the Sampling Plan row shall be marked "Unsat". The other option available to the OPS-QA Supervisor is to have the inspector perform a 100% Inspection rejecting any defects found in the shipment.

Inspection Points:

1. CQE MATERIAL SHIPPED FROM APPROVED VENDOR/LOCATION.

CQE items should be shipped from the vendor and address stated on the purchase order. If the material is not shipped from the appropriate vendor and address, the inspector should contact the Supervisor - Operations QA for further instructions. For all non-CQE material, this should be checked "N/A".

2. PACKAGING ANSI-M45.2.2 LEVEL _____.

The level of packaging required by the purchase order or Material Acceptance Plan shall be entered on the checklist. If no packaging level is specified, this item should be checked "N/A". The inspector should ensure that the material was shipped in accordance with that ANSI level before marking this row on the checklist.

Checklist #2 (continued)

3. MATERIAL IDENTIFIED AS REQUIRED BY SPECIFICATIONS OR P.O.

Any material that is required to be marked and have traceability should have its heat number(s) entered on the checklist. Any part number(s) should also be verified.

4. DOCUMENTATION AS SPECIFIED ON P.O.

Any documentation required by the purchase order shall be verified. The inspector should review the documentation for traceability [heat, serial and/or OPPD P.O. number(s)], completeness (signatures and correct references), and accuracy (results within specifications). The inspector should also stamp and sign the documentation after reviewing it.

5. PHYSICAL APPEARANCE (DAMAGE/DEFECTS/CLEANLINESS, ETC).

Damage - The items should be inspected for physical damage such as nicks, gouges, dents, and scrapes.

Defects - The items should be inspected for such defects as laps, seams, cracks, bursts, folds, voids, or tool marks. If more information is required, refer to the EPRI letter on fasteners.

Cleanliness - The items should be inspected for excessive amounts of moisture, foreign materials, and oxides or rust. If required, the items should be cleaned to permit proper inspection.

Workmanship - The items should be inspected to assure that the workmanship satisfactorily meets the intent of any applicable requirements.

6. DIMENSIONS AS SPECIFIED ON P.O.

The items should be examined for correct diameter, length, and length of threaded surface.

7. THREADS AS SPECIFIED ON P.O.

Using a thread gage, the items should be checked for the proper pitch. The threads should also be inspected to assure that they are the type (UNC, UNF, V, etc.) specified on the purchase order.

8. APPLICABLE THREAD DEPTHS.

The items should be inspected to ensure that thread engagement and uniform thread depth occur the entire length of the threaded surface.

Checklist #2 (continued)

9. NDE _____.

Any NDE inspections performed by OPPD Quality Control should be entered on the checklist along with the results of the inspection. If a QA inspector determines that a NDE inspection is needed, the OPS-QA Supervisor should be contacted. If he concurs, the OPS-QA Supervisor should add the NDE requirement to the Material Acceptance Plan and contact Quality Control to perform the NDE inspection.

10. SPECIAL COATINGS AS SPECIFIED ON P.O.

Any special coatings required by the purchase order should be checked to ensure that they meet required specifications.

11. OTHER SPECIAL REQUIREMENTS: _____.

Any other required inspection points such as protective covers/seals, inert gas blankets, desiccants, and lubricants/oils should be documented on the checklist.

Remarks:

Enter any special comments or additional data in the remarks section of the checklist. Additional remarks can be attached using the Receipt Inspection Checklist (cont.) page.

The Inspector shall sign and date the checklist when the inspection is completed.

RECEIPT INSPECTION CHECKLIST #2
 TITLE: Fasteners

Approved: Charles J. Brunner
 Date: 5-27-87

P.O. # _____ Item # _____ of _____

References:

- | | |
|---------------|----------------------|
| 1. ASME _____ | 4. EPRI Letter _____ |
| 2. ASTM _____ | 5. Other: _____ |
| 3. ANSI _____ | _____ |

Sample Plan:

	<u>Sat</u>	<u>Un-Sat</u>	<u>N/A</u>
1. 100% Inspection	()	()	()
2. Sampling Plan AQL Level _____ Sample Size _____ # Defects _____	()	()	()

Inspection Points:

- | | | | |
|--|-----|-----|-----|
| 1. CQE material shipped from approved vendor/location | () | () | () |
| 2. Packaging ANSI-N45.2.2 Level _____ | () | () | () |
| 3. Material identified as required by specifications
or P.O. Heat # _____ | () | () | () |
| 4. Documentation as specified on P.O. | | | |
| a. Certificate of Conformance/Compliance | () | () | () |
| b. CMTR | () | () | () |
| c. Chemical Analysis | () | () | () |
| d. Physical Tests | () | () | () |
| e. Other: _____ | () | () | () |
| 5. Physical appearance (damage/defects/cleanliness, etc) | () | () | () |
| 6. Dimensions as specified on P.O. | () | () | () |
| 7. Threads as specified on P.O. | () | () | () |
| 8. Acceptable thread depths | () | () | () |
| 9. NDE _____ | () | () | () |
| 10. Special coatings as specified on P.O. | () | () | () |
| 11. Other special requirements:
_____ | () | () | () |

Remarks:

Inspection conducted by: _____ on _____