

**Florida
Power**
CORPORATION

January 20, 1988
3F0188-18

Dr. J. Nelson Grace
Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street N.W., Suite 2900
Atlanta, GA 30323

Subject: Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72
NRC Bulletin 87-02
Fastener Testing To Determine Conformance With
Applicable Material Specifications

Dear Sir:

In response to the subject NRC Compliance Bulletin, Florida Power Corporation (FPC) performed additional actions to obtain information on the adequacy of fasteners utilized at the Crystal River Unit 3 Nuclear Power Plant. To assure clarity, actions taken as described in this report, directly correlate with the numbered actions requested in Bulletin No. 87-02. Information concerning receipt inspection, internal control procedures for fasteners and the results of independent testing of fasteners are addressed.

Item 1

As early as August, 1984, FPC recognized the need to perform a detailed inspection of fasteners upon receipt. Accordingly, in addition to normal receipt inspection activities, a Receipt Inspection Plan (RIP) was developed requiring applicable fasteners be subjected to material verification through the use of an alloy separator and a material hardness check utilizing a portable hardness tester. Receipt inspection criteria has continued to evolve and expand to include additional inspection characteristics as situations warranted. Currently, FPC qualified/certified Materials Quality Control (MQC) inspectors perform receipt inspection of safety-related fasteners to examine critical characteristics. The inspection criteria listed in the most current Receipt Inspection Plan (RIP) include the following as applicable.

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- a) Verification of overall critical dimensions;
- b) Verification of radius adjacent to head;
- c) Review/acceptance of documentation;
- d) Confirmation of applicable fastener identification such as grade, manufacturer's symbol, etc.;
- e) Verification of correct number of threads per inch;
- f) Material alloy verifications;
- g) Material hardness check to confirm that hardness/tensile strength conversion is in expected range.

Inspection results are documented on a Receiving Inspection Report and are retained as a quality assurance record.

Receipt inspection of non-safety related fasteners are performed by Warehouse personnel upon receipt of shipment. Inspection activities are performed to verify that the purchase order and packing list agree with the material received. Additionally, the fasteners are checked for quantity and physical condition. Upon completion of receipt inspection and acceptance, all fasteners are stored in assigned warehouse locations, coded for access and accountability.

Issuance of non-safety related fasteners is documented on a Systems Issue (SI) form. The SI document contains various information to provide pertinent data concerning fastener issuance and usage. Included in this information is:

- a) Crystal River location and Storeroom number;
- b) Identified work location referenced by an approved work request or MAR number;
- c) Applicable FPC part number (MMIS #);
- d) Quantity needed and units of issue;
- e) Complete description of item(S) needed.

Issuance of safety related fasteners is documented on a Quality Control Issue (QCI) document which links the procurement and use of safety related items. Only safety related fasteners bearing a valid release tag may be issued on a QCI document. The QCI lists the following pertinent information which allows control and traceability of the issued item:

- a) Approved work request and/or MAR number;
- b) FPC part number (MMIS #) as applicable;
- c) Quantity requested;
- d) Item description;
- e) Quantity issued;
- f) Heat/serial number;
- g) Vendor's name;
- h) Purchase order number;
- i) Warehouse location;
- j) Special handling information, as applicable.

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The work request and/or MAR number provides the needed information to determine specific usage and location of issued fasteners. The original copy of the QCI is then forwarded to the Nuclear Operations Records Management for permanent storage and retention.

Item(s) 2 and 3

On December 3, 1987, FPC randomly selected samples of non-safety related and safety related fasteners from current stock. The samples were obtained with the participation of Mr. T. F. Stetka, NRC Resident Inspector at Crystal River Unit 3. Additionally, a sample of typical nuts were also selected. Samples selected are shown on Attachments 1 and 2 to this report. The selection method attempted to obtain a representative sample of those fasteners and nuts of specific interest listed in the Compliance Bulletin.

FPC sample numbers CR3-1 through CR3-10 are safety related fasteners; CR3-11 through CR3-20 are safety related nuts; CR3-21 through CR3-30 were tested as non-safety related fasteners; and CR3-31 through CR3-40 were tested as non-safety related nuts. Samples CR3-41 and CR3-42 are additional fasteners selected at the request of Mr. Stetka to supplement testing of ASTM A-307 material.

Note: In order to meet the minimum quantity of 40 test samples it should be noted that samples 25, 26, 27, 28, 29, 30, 36, 37, 38, 41 and 42 were procured for safety related use but selected for non-safety related testing. This type selection was necessitated by the fact that FPC procures and stocks the majority of its fasteners as safety related.

Item(s) 4 and 5

Samples listed on Attachments 1 and 2 were sent to a qualified laboratory to have the appropriate testing performed. Testing requirements established in the Compliance Bulletin were delineated in the procurement document issued to the testing laboratory and all tests were performed in accordance with the requirements of the fastener/material specification. Each sample was identified with a specific FPC assigned identification number.

Supporting information for each sample selected is reported on Attachment 1 of this report. Laboratory results are reported on Attachment 2 of this report.

Of the forty-two (42) samples tested, results indicated that deviation from the specification exists on four (4) samples. Deviations were found on samples CR3-4, CR3-29, CR3-31 and CR3-41. Deviations are highlighted on Attachment 2 by an asterisk (*). The deviations are summarized on the following page.

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CR3-4

In order to accurately determine the 0.2% yield strength, a test specimen was machined from the sample bolt. Test results indicated that the yield strength meet the specification; however the ultimate tensile strength tested at 88 ksi. Specification A325 requires a minimum of 105 ksi tensile strength.

CR3-29

Sample tested at a hardness of 36 HRC. Specification (A307 Grade A) indicates a maximum hardness of HRB 100.

CR3-31

Sample exhibited a chrome content of 16.99 and a nickel content of 10.07. Specification (304SS) indicates a general requirement of chrome content 18.00 - 20.00 and nickel content of 8.00 - 10.50. In reviewing the elemental analysis it was determined that the readings indicate that the material appears to be 316SS. Further reinspection of stock material revealed that the bolts are marked 316SS and do not agree with the inventory description.

CR3-41

Sample tested at a hardness of HRC23. Specification (A307) indicates a maximum of HRB 100.

The deviations with supporting test results were submitted to FPC Nuclear Procurement Engineering for technical evaluation. Nuclear Procurement Engineering, based upon evaluation of test results, concluded that the noted deviations do not represent significant concerns by virtue of the fasteners end use. Conservatism employed in applications indicates that the obtained results taken on face value do not represent a design or installation concern.

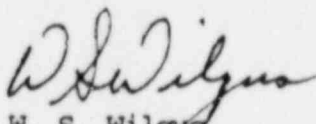
Item 5

Based on the overall results of the tests, FPC will take the necessary actions to continue to evaluate the deviations and disposition the remaining stock material. As required, suppliers will be contacted and appropriate corrective action will be taken and documented.

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In conjunction with FPC's improved receipt inspection capability for alloy determination and the continued verification of critical characteristics assures that incoming fasteners meet specification and design requirements.

Sincerely,



W. S. Wilgus
Vice President
Nuclear Operations

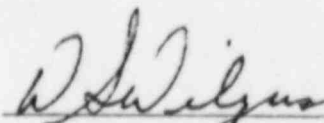
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Attachment

xc: Document Control Desk (original + copy)

Mr. T. F. Stetka
Senior Resident Inspector

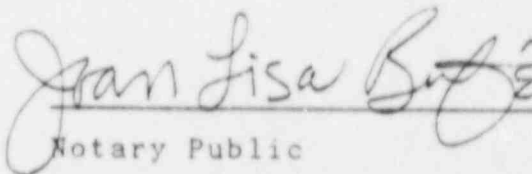
STATE OF FLORIDA
COUNTY OF CITRUS

W.S. Wilgus states that he is the Vice President, Nuclear Operations for Florida Power Corporation; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.



W.S. Wilgus, Vice President
Nuclear Operations

Subscribed and sworn to before me, a Notary Public in and for the State and County above named, this 20th day of January 1988.


Notary Public

Notary Public, State of Florida at Large,
My Commission Expires: June 21, 1991

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-1

Fastener Description: 7/16" - 14 x 4", HH Bolts

Description of Sample Stock Location: CR3 Warehouse; Location AF2G

Material Specification as Documented by Licensee Records: ASME SA-193, GR. B-7

Head Marking (Specification and Manufacturer): B7 S

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: 10 CFR 50, App. B
ASME Section III
NCA-3800

Licensee Representative:

Signature S. R. Leflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-2

Fastener Description: 7/8" - 9 x 3 1/2 " Hex Head Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AB13C

Material Specification as Documented by Licensee Records: ASTM A-325; Type 1 or 2

Head Marking (Specification and Manufacturer): A325

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**Class/Procurement Level: Commercial/Safety Related

General Plant Application (e.g. Pressure Boundry, Structural) NonPressure
Retaining

Vendor: Bolt Industries
Ocala, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Loflin

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-3

Fastener Description: 1/2" - 13 x 1 1/2 " Heavy Hex Head Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF4K

Material Specification as Documented by Licensee Records: ASTM A-307; GR. B

Head Marking (Specification and Manufacturer): D1 C

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Guyon Alloys
Charlotte, NC

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Lefler

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-4

Fastener Description: 3/4" - 10 x 2 1/2 " HH Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AB44A

Material Specification as Documented by Licensee Records: ASTM A325, Type 3

Head Marking (Specification and Manufacturer): A325 WR BIS

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Bolt Industries

Ocala, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S.R. Leflin

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-5

Fastener Description: 1 1/4" - 8 x 5 1/4 " HH Head Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AB14C

Material Specification as Documented by Licensee Records: ASME SA-193, GR. 8
Class 2 Modified

Head Marking (Specification and Manufacturer): B8 TB PK72

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Hub. Inc.

Tucker, GA

QA Requirements Imposed on Vendor: 10 CFR 50, App B
ASME Section III, NCA-3800

Licensee Representative:

Signature S. R. Loflin Date 11/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-6

Fastener Description: 5/8" - 11 x 4-1/2" HH Head Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF4C

Material Specification as Documented by Licensee Records: ASME SA-193, Gr. B-7

Head Marking (Specification and Manufacturer): Unknown

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S.R. Loflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-7

Fastener Description: 7/8" - 9 x 4" HH Head Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF6A

Material Specification as Documented by Licensee Records: ASME SA-1 93, Gr.B-7

Head Marking (Specification and Manufacturer): B7 S

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Guyon Alloys, Inc.
Houston, TX or Harrison, NJ

QA Requirements Imposed on Vendor: 10 CFR 50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S. R. Joffe Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-8

Fastener Description: 1/4" - 20 x 4" Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF5G

Material Specification as Documented by Licensee Records: ASTM A-193, Gr. B-8

Head Marking (Specification and Manufacturer):
B8

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: H. A. Pusbee Co.
Ocala, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S R. Ziegler Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-9

Fastener Description: 1/2" - 13 x 5" HH Head Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF4A

Material Specification as Documented by Licensee Records: ASME SA-193, Gr. B-7

Head Marking (Specification and Manufacturer): B7 S

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S.R. Loglin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-10

Fastener Description: 7/16" - 14 x 5-1/2" HH Head Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF2G

Material Specification as Documented by Licensee Records: ASME SA-193, Gr. B-7

Head Marking (Specification and Manufacturer): B7 S

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S. R. Leflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-11

Fastener Description: 7/16" - 14 Heavy Hex Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF1C

Material Specification as Documented by Licensee Records: ASME SA-194, Gr. 2H

Head Marking (Specification and Manufacturer): 2H S

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Cardinal Industries
Las Vegas, NV

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III

Licensee Representative:

Signature S. R. Loflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-12

Fastener Description: 7/8" - 9 UNC Heavy Hex Nut

Description of Sample Stock Location: CR3 Warehouse; Location AP36K

Material Specification as Documented by Licensee Records: ASME SA-194, Gr. 2H

Head Marking (Specification and Manufacturer): DH 2H D C A8

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Dubose Steel
Roseboro, NC

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S.R. Loflin Date 11/1/88

*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

FASTENER TESTING DATA SHEET

*Sample ID# CR3-13

Fastener Description: 1/2" - 13 TPI Heavy Hex Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF1E

Material Specification as Documented by Licensee Records: ASME SA-194, Gr. 2H

Head Marking (Specification and Manufacturer): DH 2K C

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Dubose Steel
Roseboro, NC

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S. R. Zoghbi Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-14

Fastener Description: 1/4" - 20 Hex Head Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF4B

Material Specification as Documented by Licensee Records: ASME SA-194, Gr. 8

Head Marking (Specification and Manufacturer): 8B C

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Guyon Alloys, Inc.
Harrison, NC/Houston, TX

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S.R. Loflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-15

Fastener Description: 3/4" - 10 UNC, HH Head Nut

Description of Sample Stock Location: CR3 Warehouse; Location A034E

Material Specification as Documented by Licensee Records: ASME A-563, Gr. C-3

Head Marking (Specification and Manufacturer): 3WR B/S

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Bolt Industries
Ocala, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature J. R. Zylinski Date 1/7/98

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-16

Fastener Description: 5/8" - 11 UNC, HH Head Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF1C

Material Specification as Documented by Licensee Records: ASME SA-194, Gr. 2-H

Head Marking (Specification and Manufacturer): 2H C Δ

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Dubose Steel, Inc.
Roseboro, NC

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S. R. Loflin

Date 1/7/88

*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


FASTENER TESTING DATA SHEET

*Sample ID# CR3-17

Fastener Description: 1-1/4" - 7 UNC, HH Head Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF1D

Material Specification as Documented by Licensee Records: ASME SA-194, Gr. 8

Head Marking (Specification and Manufacturer): B8304 8B 

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S. R. Zeff

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-18

Fastener Description: 5/16" - 18 HH Head Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF8L

Material Specification as Documented by Licensee Records: ASTM A563, Gr. C

Head Marking (Specification and Manufacturer): 2H T

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Lefler Date 11/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-19

Fastener Description: 7/8" - 9 HH Head Nut

Description of Sample Stock Location: CR3 Warehouse; Location AB13C

Material Specification as Documented by Licensee Records: ASTM A563, Gr. C

Head Marking (Specification and Manufacturer): Δ

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Bolt Industries
Ocala, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Zoflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-20

Fastener Description: 1-1/8" UNC HH Head Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF8A

Material Specification as Documented by Licensee Records: ASME SA-194, Gr. 2H

Head Marking (Specification and Manufacturer): 2H CD C

**Class/Procurement Level: Nuclear/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: 10CFR50, App. B
ASME Section III, NCA-3800

Licensee Representative:

Signature S.R. Zoflin

Date 1/7/87

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-21

Fastener Description: Cap Screw, HH, 5/16" - 18 x 2", 304SS

Description of Sample Stock Location: CR3 Warehouse; Location AE2L

Material Specification as Documented by Licensee Records: 304 Stainless Steel

Head Marking (Specification and Manufacturer): None

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S. R. Lyle Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-22

Fastener Description: Cap Screw, HH, 1/4" - 20 x 1-1/2", 18-8SS

Description of Sample Stock Location: CR3 Warehouse; Location AF42B

Material Specification as Documented by Licensee Records: 18-8 Stainless Steel

Head Marking (Specification and Manufacturer): None

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S. R. Loflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-23

Fastener Description: Cap Screw, SH, 5/16" - 18, 18-8SS

Description of Sample Stock Location: CR3 Warehouse; Location AE20

Material Specification as Documented by Licensee Records: 18-8 Stainless Steel

Head Marking (Specification and Manufacturer): None

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S. R. Loflin

Date 1/7/98

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-24

Fastener Description: Cap Screw, HH, 1/2" - 13 x 2-1/2", 316SS

Description of Sample Stock Location: CR3 Warehouse; Location AE4B

Material Specification as Documented by Licensee Records: 316 Stainless Steel

Head Marking (Specification and Manufacturer): 316

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S. R. Zylinski Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-25

Fastener Description: 1/2" - 13 x 2" HH Bolt

Description of Sample Stock Location: CR3 Warehouse; Location A032C

Material Specification as Documented by Licensee Records: ASTM A-449

Head Marking (Specification and Manufacturer):
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**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Loflin Date 1/1/81

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-26

Fastener Description: 5/16" - 18 x 1-1/4" HH Capscrew

Description of Sample Stock Location: CR3 Warehouse; Location AF8H

Material Specification as Documented by Licensee Records: ASTM A-449

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Commercial/Safety Related

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

Vendor: House of Threads
Tampa, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature J.R. Loflin

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-27

Fastener Description: 1/2" x 1-1/4" HH Capscrew

Description of Sample Stock Location: CR3 Warehouse; Location AA4B

Material Specification as Documented by Licensee Records: ASTM A-325

Head Marking (Specification and Manufacturer): A325

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Leflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-28

Fastener Description: 1/2" x 13 x 4 1/2" HH Capscrew

Description of Sample Stock Location: CR3 Warehouse; Location AB28B

Material Specification as Documented by Licensee Records: ASTM A-307, Gr. A

Head Marking (Specification and Manufacturer): No marking

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Morris Wheeler & Co.
Philadelphia, PA

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Loflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-29

Fastener Description: 1/2" x 13 x 2 1/2" Hex Socket Head Capscrew

Description of Sample Stock Location: CR3 Warehouse; Location AB30B

Material Specification as Documented by Licensee Records: ASTM A-307, Gr. A

Head Marking (Specification and Manufacturer): No marking

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Morris Wheeler & Co.
Philadelphia, PA

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S.R. Loflin

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-30

Fastener Description: 3/4" x 10 x 4 1/2" HH Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF8K

Material Specification as Documented by Licensee Records: ASTM A-325

Head Marking (Specification and Manufacturer): A325 T/B

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Bolt Industries
Ocala, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Loflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-31

Fastener Description: Nut, HH, 5/16" 304SS

Description of Sample Stock Location: CR3 Warehouse; Location AE2G

Material Specification as Documented by Licensee Records: 304 SS Material

Head Marking (Specification and Manufacturer): 316

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S.R. Loflin

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-32

Fastener Description: Nut, HL, 1/2" - 13, 316SS

Description of Sample Stock Location: CR3 Warehouse; Location AE2G

Material Specification as Documented by Licensee Records: 316 SS Material

Head Marking (Specification and Manufacturer): None

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S. R. Zeff Date 1/7/88

*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

FASTENER TESTING DATA SHEET

*Sample ID# CR3-33

Fastener Description: Nut, HH, 5/8", 304SS

Description of Sample Stock Location: CR3 Warehouse; Location AE2G

Material Specification as Documented by Licensee Records: 304 SS Material

Head Marking (Specification and Manufacturer): None

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S.R. Zylbi

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-34

Fastener Description: Nut, HH, 1" NC, 316SS

Description of Sample Stock Location: CR3 Warehouse; Location AE6E

Material Specification as Documented by Licensee Records: 316 SS Material

Head Marking (Specification and Manufacturer): 316

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S R. Loflin

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-35

Fastener Description: Nut, 11/32" x 1/8" Mach., 18-8SS

Description of Sample Stock Location: CR3 Warehouse; Location AE6L

Material Specification as Documented by Licensee Records: 18-8 Stainless Steel

Head Marking (Specification and Manufacturer): None

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for
all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S.R. Loflin

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-36

Fastener Description: 3/4" - 10 HH Nut

Description of Sample Stock Location: CR3 Warehouse; Location A032C

Material Specification as Documented by Licensee Records: ASTM A-563, Gr. B

Head Marking (Specification and Manufacturer): No markings

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Guyon Alloys
Houston, TX/Harrison, NJ

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S.R. Zepher Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-37

Fastener Description: 1-3/8" - 6 TPI HH Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF3A

Material Specification as Documented by Licensee Records: ASTM A-563, Gr. A

Head Marking (Specification and Manufacturer): D K35

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Joseph Dyson & Sons
East Lake, OH

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Loflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-38

Fastener Description: 1" UNC HH Nut

Description of Sample Stock Location: CR3 Warehouse; Location AF4J

Material Specification as Documented by Licensee Records: ASTM A-563, Gr. C

Head Marking (Specification and Manufacturer): \triangle

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Bolt Industries
Ocala, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S. R. Loflin Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-39

Fastener Description: Nut, EH, 3/4", NC, 316 SS

Description of Sample Stock Location: CR3 Warehouse; Location AE6D

Material Specification as Documented by Licensee Records: 316 Stainless Steel

Head Marking (Specification and Manufacturer): 316

**Class/Procurement Level: Non Safety procured for Non Safety application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for all general plant applications

Vendor: Various-Segregation by vendor not maintained on NSR stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S. R. Loflin

Date 1/7/89

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-40

Fastener Description: Nut, HH, 3/4", 304 SS

Description of Sample Stock Location: CR3 Warehouse; Location AE2G

Material Specification as Documented by Licensee Records: 304 Stainless Steel

Head Marking (Specification and Manufacturer): None

**Class/Procurement Level: Non Safety procured for Non Safety Application

General Plant Application (e.g. Pressure Boundry, Structural) Non Safety for all general plant application

Vendor: Various-Segregation by vendor not maintained on NSR Stock

QA Requirements Imposed on Vendor: None

Licensee Representative:

Signature S.R. Loflin

Date 1/7/78

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-41

Fastener Description: 1/2" x 2" Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF2A

Material Specification as Documented by Licensee Records: ASTM A-307

Head Marking (Specification and Manufacturer): Unknown

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: H. A. Busbee Co.
Ocala, FL

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S.R. Zylke

Date 1/7/88

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

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

Attachment 1

FASTENER TESTING DATA SHEET

*Sample ID# CR3-42

Fastener Description: 3/4" - 10 x 1-1/2" HH Head Bolt

Description of Sample Stock Location: CR3 Warehouse; Location AF2C

Material Specification as Documented by Licensee Records: ASTM A-307, Gr. B

Head Marking (Specification and Manufacturer): MK FTP

**Class/Procurement Level: Commercial/Safety Related

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

Vendor: Hub, Inc.
Tucker, GA

QA Requirements Imposed on Vendor: Commercial Quality Assurance Program

Licensee Representative:

Signature S.R. Zoflin

Date 1/7/89

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

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

FPC ID Number	Rockwell Hardness Avg. of at least 2 measurements	Tensile Properties		Chemical Analysis													
		Yield Strength (Ksi)	Ultimate Strength (Ksi)	C	Mn	P	S	Si	Cr	Ni	Mo	Cu	V	Ti	B	N	
CR3-27	28 HRC	N/A	N/A	0.328	0.739	0.026	0.021										
CR3-28	99 HRB	N/A	N/A			0.023	0.028										
CR3-29	*36 HRC	N/A	N/A			0.027	0.027										
CR3-30	29 HRC	N/A	N/A	0.399	0.633	0.024	0.014	0.309	0.048	<.02	<.05	<.02	<.05	<.05			
CR3-31	24 HRC	N/A	N/A	0.04	0.595	0.009	0.003	0.303	*16.99	*10.07	2.16					<.03	
CR3-32	33 HRC	N/A	N/A	0.061	1.51	0.016	0.006	0.364	16.5	10.47	2.29					0.059	
CR3-33	26 HRC	N/A	N/A	0.064	1.11	0.013	0.005	0.419	18.63	3.73						0.046	
CR3-34	23 HRC	N/A	N/A	0.07	1.18	0.011	0.008	0.311	16.54	10.62	2.09					0.047	
CR3-35	66 HRC	N/A	N/A	0.073	1.19	0.013	0.006	0.427	18.39	8.1						0.063	
CR3-36	91 HRB	N/A	N/A	0.065	0.411	0.021	0.007	<.05	0.053	<.02	<.05						
CR3-37	96 HRB	N/A	N/A	0.364	0.682	0.023	0.012	0.255	0.028	<.02		<.02					
CR3-38	29 HRC	N/A	N/A	0.257	1.29	0.019	0.013	0.217	0.086	0.078		0.121	<.05				
CR3-39	31 HRC	N/A	N/A	0.066	0.763	0.011	0.014	0.563	16.13	10.12	2.11					0.055	
CR3-40	33 HRC	N/A	N/A	0.064	1.71	0.009	0.01	0.483	18.25	9.97						<.03	
CR3-41	*23 HRC	N/A	N/A			0.026	0.028										
CR3-42	94 HRB	N/A	N/A			0.024	0.023										

Properties found out of specification are noted with an *.