PHILADELPHIA ELECTRIC COMPANY

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JOSEPH W. GALLAGHER
VICE PRESIDENT
NUCLEAR SERVICES

February 17, 1988

Docket No. 352
353

Mr. William T. Russell
Administrator, Region I
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Limerick Generating Station Units 1 & 2
NRC Compliance Bulletin 87-02
Fastener Testing to Determine Conformance
With Applicable Material Specification

Dear Mr. Russell:

The subject Bulletin required that licensees 1) review their receipt inspection requirements and internal controls for fasteners and 2) independently determine through testing whether fasteners (studs, bolts, cap, screws and nuts) in stores at their facilities meet required mechanical and chemical specification requirements.

To perform these functions, the Bulletin delineated six actions to be taken by the licensees. These actions are repeated along with Philadelphia Electric Company response to each of these actions.

Action 1:

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

Response:

Quality controlled material at Limerick can be purchased in three ways: by Bechtel Construction for equipment installations on Unit 2, with the possibility of subsequent

IE11
1/1

transfer to Unit 1; by the station for use in maintenance of existing plant equipment on Unit 1; or by PECo Engineering/Construction for installing plant modifications on Unit 1.

The majority of fasteners used for Limerick Generating Station Units 1 and 2 were, and will continue to be, obtained through Bechtel Construction and receipt inspected by Bechtel Quality Control. Fasteners used on Unit 1 since commercial operation have been procured by the station, including regular transfers from Unit 2 Bechtel warehouse stock. Bechtel Field Construction Procedure CP-F-2, "Receipt Inspection, Storage and Withdrawal of Materials/Equipment" provides instructions for the receipt storage, and issuance of material.

Following is a summary of the receipt inspection requirements imposed on the Bechtel Quality Control Inspectors by Section 5.0 and Appendix A of CP-F-2. The Bechtel inspection consists of sampling the fasteners and verifying that the manufacturer markings match the certification and purchase orders, and that the size and physical configuration match the certification. In addition, the appropriate documents are reviewed to ensure compliance with specified mechanical and chemical requirements if required by the purchase order. The entire lot of fasteners are put on "QC Hold" until this review is completed. The receipt inspection and supplemental documentation is required to verify conformance to purchase order requirements.

For items transferred from Unit 2 to Unit 1, Section 5.0 of Station Administrative Procedure A-27.4, "Administrative Procedure for Receipt Inspection of Quality Assured Items", instructs the Station Quality Control Inspector to review the "Certificate of Conformance" for completeness and accuracy, and verify that the transferred material is what is described in the transfer documents.

For fasteners purchased as safety-related for Limerick Unit 1, Station Quality Control is responsible for performing a documented receipt inspection on every item purchased for storeroom stock. Station Administration Procedure A-27.4, provides the method for control of Quality Assured spare or replacement parts during the receipt inspection process.

A summary of the receipt inspection requirements imposed on the Station Quality Control Inspectors by Section 5.0 of A-27.4 for Q-Listed material follows. These are general requirements for receipt inspected material and additional requirements may be described by the purchasing documents.

1. Visual inspection of entire shipment for shipping damage, such as: fire damage; high temperature exposure; environmental damage; environmental exposure; tie down failure; and container failure.

2. Visual inspection of individual items, including: markings and identification in accordance with purchase order requirements; and physical damage.

3. Verification that the documentation supplied by the vendor (including Certificate of Conformance) is complete and conforms to the purchase order requirements.

4. Additional review/inspection as required to assure conformance with purchase order requirements.

A receipt inspection requirement sheet (Appendix A) documents the receipt inspection, and lists nonconformances (including resolution of nonconformances). Each Requirement Sheet is unique to an item which is identified by material product code.

Materials for plant modifications are procured by Engineering or Construction in accordance with the design specification of the particular modification. Engineering and Research Department Procedure 7.1 (ERDP 7.1) "Procedure for Receipt, Inspection and Storage of Materials and Equipment" ensures that all Quality listed materials are received, receipt inspected, stored and maintained during storage in a prescribed manner. A summary of the receipt inspection requirements imposed on the Construction Quality Control Inspectors by Section 6.1.3 of RDP 7.1 for Q-Listed material follows. These are general requirements for receipt inspected material, and additional requirements may be described by the purchasing documents.

1. Visual inspection of entire shipment for shipping damage, including: fire; excessive exposure; environmental damage; and container failure.

2. Visual inspection of items, including: markings and identification; coatings and preservatives; cleanliness; protective covers and seals and physical damage.

3. Verification that documentation supplied by the vendor conforms to the purchase order requirements, including: Drawings; Mill Certification; Certificates of Compliance; Certificates of Conformance, and Certificates of Cleanliness.

4. Additional review/inspection as required to assure conformance with purchase order requirements, including: physical properties; dimensions; and workmanship.

5. Statistical sampling methods based on MIL-STD-105D criteria are acceptable for groups of similar items

(including: nuts, bolts, washers, etc.). These methods allow a visual inspection sample size proportional to the lot or batch size, from a normal visual inspection rate of 3 samples for lots containing 9 to 15 items, to a normal visual inspection rate of 200 samples for lots containing 3201 to 1000 items. Increased inspection rates up to 100% may be required.

A receipt inspection and storage report M-20640 (Appendix B) documents the required inspection, lists deficiencies and/or corrective action, identifies completed corrective action, and indicates storage requirements.

After acceptance, safety-related material is tagged and placed in appropriate storage locations segregated from nonsafety-related material within the storeroom in accordance with CP-F-2, A-27.4, or ERDP 7.1. Items within the storeroom are maintained by PECo stores personnel and items in the warehouse are maintained by Bechtel personnel until issuance.

Items which do not pass the receipt inspection are placed in "QC Hold" until corrective actions are taken. These actions include obtaining missing documentation, repair, rework, engineering evaluation, or rejection. Corrective action is documented in either Section 8.0 of report M-20640 for Unit 1 modifications, or Station Administrative Procedure A-27-8 "Administrative Procedure for Receipt Inspection Deficiencies" for Unit 1 spare or replacement parts, or Bechtel Field Construction Procedure CP-D-1 "Procedure for Processing of Nonconformance Reports (NCR)" for Unit 2 material.

When the station or Engineering/Construction requires the installation or replacement of safety related fasteners, correct usage is controlled by (1) procedures which identify the item by description and/or material code number and/or part number, and (2) Quality Control Inspections which verify that the correct parts are installed in accordance with applicable procedures and assure proper parts traceability.

Receipt inspection, storage, and issuance of non-safety related fasteners is accomplished through the use of station Stores Division Administration Procedures (SDA) for Unit 1, and CP-F-2 for Unit 2. Following Stores Division or Bechtel Construction receipt acceptance, the non-safety related material is tagged and physically segregated from the safety related material during storage.

In addition, material purchased through Bechtel Construction has been subjected to a random sampling program of testing since 1978. This testing is performed under the direction of PECo Quality Control and was established to assure the conformance of material (including fasteners and nuts) with mechanical and chemical specification requirements. Samples are

evaluated individually and specifically for the applicable requirements and deficiencies analyzed and dispositioned accordingly.

Action 2:

Select a minimum sample of ten (10) non-safety 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 B-16; 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.

LGS 1 & 2 Action 2 Response:

For Unit 1, a testing sample of 10 non-safety related and 11 safety related fasteners (studs, bolts, and/or cap screws) was selected from current in-use, storeroom stock. The sample selection was performed by station Quality Control and Engineering Maintenance, with the participation of the NRC site inspector. The selection was performed by reviewing Purchase Order Equipment Parts Lists to establish high usage items, and comparing the fastener types and grades requested in the Compliance Bulletin with the high usage items. When fasteners procured to the specifications of interest were found to be available from multiple suppliers/manufactures, the test sample was selected to represent the range of possible sources. The samples of fasteners are identified in the attachments.

For Unit 2, a testing sample of 15 non-safety related and 10 safety related fasteners was selected from current, in-use, warehouse stock. The test sample was determined by a committee comprised of Bechtel Construction Engineering, Project Engineering, Quality Control, Quality Assurance, Quality Engineering, and PECo Quality Assurance and Construction Engineering, and included participation of the NRC site inspector. The selection was performed by cross referencing the fastener types and grades requested in the Compliance Bulletin of material purchased for the Unit 2 warehouse, material stored in the warehouse, and an engineering evaluation of material installed in the plant.

Action 3:

For the selected sample of fasteners in action 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.

LGS 1 and 2 Action 3 Response:

A testing sample of 10 non-safety related nuts (including 2 cap screw/nut combinations) and 9 safety related nuts was selected from current storeroom stock for Unit 1, and 11 non-safety related and 12 safety related nuts were selected from current warehouse stock for Unit 2, to correspond with the fasteners selected for the test sample in Action 2. As requested in the Compliance Bulletin, a cross section of A-194 nuts was selected from the available material types and grades. The selection process was similar to that of Action 2 above.

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 non-safety 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 properties as required by the fastener's specification, grade, and class. Each sample shall be tagged with the sample's ID number.

LGS 1 and 2 Action 4 Response:

The testing of Limerick Unit 1 samples was performed by Laboratory Testing, Inc. of Dublin, Pennsylvania. Laboratory Testing has been approved to perform testing of safety related material as evidenced by inclusion on PECo's Evaluated Supplier List. The testing of Limerick Unit 2 samples was performed by Bethforge Laboratories. This laboratory has been approved to perform testing of safety related materials and is included on the Project Approved Vendor List. A portion of the Limerick Unit 2 testing samples was also forwarded to Laboratory Testing, Inc. due to failure of the Baldwin Tensile Testing Machine at Bethforge. All testing was performed in accordance with the requirements of the fasteners/nuts specification, grade, and class. The chemical content evaluation for all fastener and nut samples was performed by Spectrochemical Analysis. Wet Chemical Analysis was used when out of specification chemistry measurements dictated confirmation by retesting. The ultimate tensile strength testing of each safety related fastener was performed using a Baldwin Tensile Testing Machine at Laboratory Testing. The hardness testing of each non-safety related fastener and all nuts was performed using the Rockwell test method. The tests required by Compliance Bulletin 87-02 were supplemented by the following tests, including: hardness tests performed on each safety related fastener; proof load tests performed on each nut; and a full range of mechanical tests supplementing the ultimate tensile strength test, including yield

strength, % elongation, and area reduction performed on each safety related and non-safety related fastener. Upon removal from the storeroom/warehouse for testing, each test sample was tagged with a unique identification number to ensure traceability.

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 of the NRC Bulletin. Include the names and addresses of suppliers and manufactures of safety-related fasteners and to the extend possible, of non-safety related fasteners. For any fastener found out of specification, provide an evaluation of the safety significance including consideration of the most limiting application.

Response:

The results of this testing are summarized in Appendix C. The Testing Laboratory reports are attached in Appendix D. The names and addresses of suppliers and manufactures of safety related fasteners, and to the extent possible, non-safety related fasteners have been included. Those test samples which did not meet specification requirements have been evaluated by PECo for safety significance, including consideration of the most limiting application. A comprehensive summary of these evaluations is included as Appendix E. The testing results from LGS Unit are attached in a different format than the Bulletin requested. This format was discussed with the NRC technical contact for the Bulletin and found acceptable.

Action 6:

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

Response:

Based on the testing results, we conclude that the receipt inspection process is sufficiently regulated and controlled to assure traceability, conformance to material specification requirements, and appropriate issuance for fasteners. However, we are reviewing purchasing practices for possible improvements to assure that fasteners used in the plant meet the requisite specification requirements, including increased sampling. Evaluations of the test results indicate that the operability of safety related plant components has not

been compromised, even considering the most limiting application of fasteners which tested out-of-specification.

Very truly yours,

J. W. Gallagher

cc: Addressee
E. M. Kelly, Senior Resident Inspector

COMMONWEALTH OF PENNSYLVANIA :

: ss.

COUNTY OF PHILADELPHIA :

J W. Gallagher, being first duly sworn, deposes and says:

That he is Vice President of Philadelphia Electric Company, and that he has read the foregoing response to the NRC Compliance Bulletin 87-02 and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

J W Gallagher

Vice President

Subscribed and sworn to
before me this 17th day
of February, 1988

Patricia A Jones

Notary Public

PATRICIA A. JONES
Notary Public, Phila., Phila. Co.
My Commission Expires Oct 13, 1990

PURCHASE ORDER NUMBER _____

RECEIPT INSPECTION SHEETS FOR _____
REVISION 0 - DATE 07/29/86
MATERIAL RECEIVED DATE _____

Q.C.I.R. _____-____-_____ WHS. RECEIVER NO. _____

Visually inspect the shipping container and visually inspect the purchased item(s) for the following attributes, circle the results, initial and enter the date inspected.

INSPECTION CRITERIA:

1.1 EVIDENCE OF FIRE DAMAGE - CHARRED PAPER, WOOD OR PAINT - OR EVIDENCE OF EXPOSURE TO HIGH TEMPERATURE - WARPING OF PACKING MATERIAL OR ITEM MATERIAL.

SAT. UNSAT. INITIALS_____ DATE_____

1.2 EVIDENCE OF EXCESSIVE EXPOSURE - WEATHER-BEATEN, FRAYED, RUSTED, OR STAINED CONTAINERS INDICATING PROLONGED EXPOSURE DURING TRANSIT.

SAT. UNSAT. INITIALS_____ DATE_____

1.3 EVIDENCE OF ENVIRONMENTAL DAMAGE - WATER OR OIL MARKS, DAMP CONDITIONS, DIRTY AREAS, OR SALT FILM ON PACKING MATERIAL OR ITEM.

SAT. UNSAT. INITIALS_____ DATE_____

1.4 EVIDENCE OF TIE DOWN FAILURE - SHIFTED, BROKEN, LOOSE, OR TWISTED SHIPPING TIES, AND WORN MATERIAL UNDER TIES INDICATING IMPROPER BLOCKING AND TIE DOWN DURING SHIPMENT.

N/A SAT. UNSAT. INITIALS_____ DATE_____

1.5 EVIDENCE OF ROUGH HANDLING - SPLINTERED, TORN, OR CRUSHED CONTAINERS INDICATING IMPROPER HANDLING.

SAT. UNSAT. INITIALS_____ DATE_____

1.6 IDENTIFICATION AND MARKING - VERIFY IDENTIFICATION AND MARKING IS IN ACCORDANCE WITH PURCHASE ORDER REQUIREMENTS.

SAT. UNSAT. INITIALS_____ DATE_____

1.7 EVIDENCE OF PHYSICAL DAMAGE - PARTS OF ITEM(S) BROKEN, CRACKED, MISSING, DEFORMED, OR MISALIGNED. ROTATING PARTS BIND WHEN TURNED. ACCESSABLE EXTERNAL AND INTERNAL AREAS SHOW DETRIMENTAL GOUGES, DENTS, SCRATCHES, OR BURNS.

SAT. UNSAT. INITIALS_____ DATE_____

1.8 Verify receipt and proper completion of the following documents:

Philadelphia Electric Company Certificate of Conformance or equivalent.

1.9 Documentation is: _____Complete _____Incomplete

(If documentation is incomplete identify the missing documents below).

INITIALS_____ DATE_____

1.10 HOLD TAG REQUIRED. ____YES ____NO INITIALS_____

HOLD TAG NUMBER _____

INSPECTORS COMMENTS: (USE ADDITIONAL SHEETS AS REQUIRED)

_____SHEETS ATTACHED

INSPECTOR'S SIGNATURE_____ DATE_____

1.11 When all aspects of the inspection are satisfactory and the received item is to be placed in the storeroom, enter the item into the Storage Maintenance Program, if applicable.

APPENDIX B

M-20640 Rev. 3/87 (Sheet 1 of 5)
DOCTYPE 516
ERDP EXHIBIT 7.1-1

RECEIPT INSPECTION AND STORAGE REPORT

STATION _____

UNIT _____

MOD NO. _____

RI & SR NO. _____

[ ] Q- Listed
[ ] Fire Protection
[ ] RADWASTE (Reg. Guide 1.143)
[ ] Other _____

1.0 Date of Receipt Inspection _____.

2.0 Material Description (Include Quantity, Item Number of Procurement Document, Brief Description of Item, Serial Number, and Heat Code).

[ ] SEE ATTACHED SHEET

3.0 Procurement document which forms the basis of this receipt inspection

S.O. or P.O. No. or Letter No. _____

Vendor _____

Vendor's order number (if known) _____

4.0 QA documents required from vendor per procurement document.

	REQUIRED		EVIDENCE OF P.E.Co. RECEIPT & APPROVAL	
	NO	YES	NOT RECEIVED (DATE)	RECEIVED (DATE)
4.1 Drawings				
4.2 Mill Certification				
4.3 Certificate of Compliance				
4.4 Certificate of Conformance				
4.5 Certificate of Cleanliness				
4.6 _____				
4.7 _____				
4.8 _____				

5.0 Identification: State specifically how the material received was identified as being the same as the specified in the above documents.

6.0 STANDARD MATERIAL RECEIPT CHECKLIST

6.1 Shipping damage inspection, any evidence of:

YES	NO	
		FIRE
		EXCESSIVE EXPOSURE — Weather beaten, rust, water stains
		ENVIRONMENTAL DAMAGE — Water or oil marks, salt film mold, mildew, dirt, moisture
		TIE DOWN FAILURE — Shifted, broken, loose or twisted shipping ties, rub marks
		ROUGH HANDLING — Splintered, torn, crushed containers, review impact recorders

Inspected By: _____
C.D. QC Insp. Date

6.2 Item Inspection

SATISFACTORY	UNSATISFACTORY	NOT APPLICABLE	
			Special packing/Shipping requirements as specified in LTR/SPEC/PO. # _____ Paragraph _____
			Special identification and marking as specified in LTR/SPEC/PO. # _____ Paragraph _____
			Coatings and preservatives present as specified in LTR/SPEC/PO. # _____ Paragraph _____
			Inert gas blanket pressure within acceptable limits as specified in LTR/SPEC/PO. # _____ Paragraph _____
			Desiccant not saturated as specified in LTR/SPEC/PO. # _____ Paragraph _____
			Cleanliness as specified in LTR/SPEC/PO. # _____ Paragraph _____
			Protective covers and seals intact
			No physical damage (No broken, cracked, deformed, misaligned or missing parts; Rotating parts turn without binding; No detrimental gouges, dents, scratches, burns).

_____

Inspected By: _____
C.D. QC Insp. Date

7.0 ADDITIONAL INSPECTION: State any additional inspections performed to verify that the material complies to the applicable Specification/Procurement Document. Inspection shall include instructions from the mechanical or electrical project engineer, if any, and may include; physical properties, dimensions, weld preparations, Workmanship, lubricants and oil check, electrical insulation, etc. — per ANSI N 45.2.2, Paragraph 5.2.2. NOTE: This inspection may be waived if a similar inspection was performed and documented at the source prior to shipment.

Engineering Work Letter Revision No. _____ _____ Dated _____

Was sampling system (EXHIBIT 7.1-II) utilized? [ ] Yes [ ] No

Inspected By: _____
C.D. QC Insp. Date

8.0 STATUS: C.D. QC Inspector to sign and date in appropriate space(s):

8.1 ACCEPTANCE: Inspection is satisfactory and evidence of P.E.Co. receipt and approval of all required documentation is received.

_____
C.D. QC Insp. Date

8.2 CONDITIONAL ACCEPTANCE: Inspection is satisfactory but evidence of P.E.Co. receipt and approval of all required documentation is not received.

8.2.1 Hold until evidence of P.E.Co. receipt and approval of all required documentation is received

_____ Attached Hold Tag _____
C.D. QC Insp. Date

8.2.2 Install "as is" as authorized by _____ (Copy Attached)

_____
C.D. QC Insp. Date

8.2.3 Evidence of P.E.Co. receipt and approval of all required documentation is received, and follow-up inspection is satisfactory.

_____
C.D. QC Insp. Date

Removed Hold Tag _____
Date

8.3 REJECTION:

8.3.1 The material is rejected for the following deficiencies:

_____

_____

_____

Attached "Hold Tag" _____
C.D. QC Insp. Date

8.3.2 The following resolution is required to correct the deficiency:

_____

_____

_____

_____

NCR No. _____

8.3.2.1 Deficiency has been resolved, follow-up inspection is satisfactory, and material is conditionally acceptable (See PART 8.2)

_____

C.D. QC Insp. Date

8.3.2.2 Deficiency has been corrected, follow-up receipt inspection is satisfactory, and evidence of P.E.Co. receipt and approval of all required documentation is received.

_____

C.D. QC Insp. Date

Removed "Hold Tag" _____
Date

8.3.2.3 Deficiency can not be corrected and material is rejected for installation

_____

C.D. QC Insp. Date

8.3.2.3.1 Reason _____

_____

8.3.2.3.2 Disposition _____

_____

Section 8.0 of the RI &S Form is complete.

_____

C.D. QC Insp. Date

9.0 STORAGE

9.1 State the minimum level of storage (Level A - Special; Level B - Indoor, Temperature Controlled; Level C - Indoor, No Temperature Control; Level D - Outdoors)

STORAGE LEVEL: A B C D

9.2 State any special storage instructions or requirements per ERDP 7.1, SECTION 6.3.

9.3 Material assigned to Stores Div. For storage in accordance with applicable Stores Div. procedures under the following material code numbers:

ITEM NO.	DESCRIPTION	P.E.Co. STOREROOM CODE NUMBER

9.4 STORAGE STATUS

Material is on QC hold and has been assigned to Stores Div. for segregated storage in a controlled storage area for unacceptable material until the reason for QC hold is resolved.

_____ Date: _____
C.D. QC Insp.

Material is acceptable and has been assigned to Stores Div. for storage and subsequent issue in accordance with applicable Stores Div. procedures. THIS RI & S IS COMPLETE.

_____ Date: _____
C.D. QC Insp.

Material is acceptable and has been released to construction field forces for installation. THIS RI & S IS COMPLETE.

_____ Date: _____
C.D. QC Insp.

APPENDIX C

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-1-Q

Fastener Description: Bonnet Stud (9/16" x 3 5/8")

Description of Sample Stock Location: Bin 1-E374-A1
P.O. LS 221285
Code 114-43072

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): B7 ← HX other end

**Class/Procurement Level: Quality Assured

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

Vendor: Velan Valve

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Maggard Date 1/14/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS-1-1-Q

ASTM A-193 GR B7

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 29		111,445 psi	0.404	0.85	0.038	0.027	0.22	1.05	0.18

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

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

Attachment 1

Fastener Testing Data Sheet

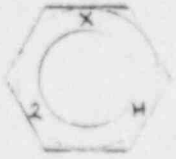
*Sample ID# LGS 1-1-Q

Fastener Description: Bonnet Nut (9/16")

Description of Sample Stock Location: Bin 1-E381-A3
P.O. LS221285
Code 114-43073

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Quality Assured

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

Vendor: Velan Valve

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Magnan 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.

Required Testing: Chemical Analysis & Hardness

LGS 1-1-Q

A 194 GR 2H

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 33			0.457		0.021	0.015			

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

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

Attachment 1

Fastener Testing Data Sheet

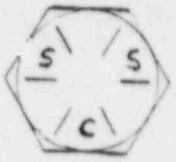
*Sample ID# LGS 1-2-Q

Fastener Description: Cap Screw (7/16")

Description of Sample Stock Location: Bin 1-E332-A3
P.O. LS296595
Code 114-38050

Material Specification as Documented by Licensee Records: J429 GR 8

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Quality Assured

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

Vendor: Colt Industries

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature [signature] Date 1/14/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS-1-2-Q

J429 GR 8

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 34	14,700 psi		0.328		0.013	0.014			

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

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

Attachment 1

Fastener Testing Data Sheet

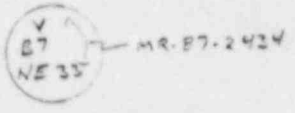
*Sample ID# LGS 1-3-Q

Fastener Description: Suction Head Stud (5/8" x 2 1/2")

Description of Sample Stock Location: Bin 1-E319-H1
P.O. LS225514
Code 114-46394

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Quality Assured

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

Vendor: Ingersoll Rand

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Mazzaferro Jr 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.

Required Testing: Chemical & Mechanical Analysis

LGS 1-3-Q

A-193 GR B7

Attachment 2

Data Summary

Mechanical Analysis		Chemical Analysis[1]							
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 30		134,693	0.445	0.94	0.016	0.021	0.23	0.19	1.05

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-3-Q

Fastener Description: Suction Head Nut (5/8")

Description of Sample Stock Location: Bin 1-E319-I1
P.O. LS225514
Code 114-46396

Material Specification as Documented by Licensee Records: A-194 GR 7

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Quality Assured

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

Vendor: Ingersoll Rand

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Reynolds Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-3-Q

A 194 GR 7

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 32			0.372	0.89	0.011	0.020	0.30	0.23	1.06

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-4-Q

Fastener Description: Bonnet Stud (3/4" x 4 1/4")

Description of Sample Stock Location: Bin 1-E317-B3
P.O. LS221285
Code 114-42272

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): B7 C — K2 other end

**Class/Procurement Level: Quality Assured

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

Vendor: Velan Valve

QA Requirements Imposed on Vendor: YES ; C of C required

Licensee Representative:

Signature John P Mayer Jr Date 1/1/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS 1-4-Q

A-193 GR B7

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 18	105,156 psi**	91,001 psi*	0.388	0.87	0.019	0.017	0.24	0.16	1.06

* 91,001 psi is less than the required yield strength of 105,000 psi

** 105,156 psi is less than the required tensile strength of 125,000 psi

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-4-Q

Fastener Description: Bonnet Nut (3/4")

Description of Sample Stock Location: Bin 1-E322-B1
P.O. LS221285
Code 114-42273

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer): 

**Class/Procurement Level:

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

Vendor: Velan Valve

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature [signature] Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-4-Q

A 194 GR 2H

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 30			0.499		0.019	0.031			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-5-Q

Fastener Description: Bonnet Stud (3/4" x 5")

Description of Sample Stock Location: Bin 1-E80-B1
P.O. LS297413
Code 114-26565

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): B7R AP

**Class/Procurement Level: Quality Assured

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

Vendor: Anchor Darling

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Maggard Date 1/14/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS 1-5-Q

A-193 GR B7

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 31	137,904 psi	125,834 psi	0.396	0.89	0.019	0.026	0.27	0.23	0.92

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

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

Attachment 1

Fastener Testing Data Sheet

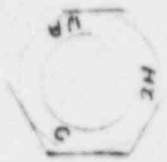
*Sample ID# LGS 1-5-Q

Fastener Description: Bonnet Nut (3/4")

Description of Sample Stock Location: Bin 1-E132-C3
P.O. LS297413
Code 114-26566

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Quality Assured

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

Vendor: Anchor Darling

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Maynard Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-5-Q

A 194 GR 2H

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 29			0.432		0.026	0.014			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-6-Q

Fastener Description: Stage Casing Stud (7/8" x 4 3/4")

Description of Sample Stock Location: Bin 1-E258-A1
P.O. LS225514
Code 114-46385

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer):

V
B7
C6 — MR 87-24-2

**Class/Procurement Level: Quality Assured

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

Vendor: Ingersoll Rand

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature [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.

Required Testing: Chemical & Mechanical Analysis

LGS 1-6-Q

A 193 GR B7

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 33	144,517 psi	130,116 psi	0.385	0.88	0.013	0.023	0.25	0.14	1.01

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

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

Attachment 1

Fastener Testing Data Sheet

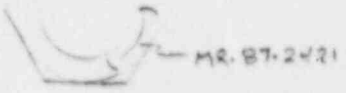
*Sample ID# LGS-1-6-Q

Fastener Description: Stage Casing Nut (7/8")

Description of Sample Stock Location: Bin 1-E208-B2
P.O. LS225514
Code 114-46387

Material Specification as Documented by Licensee Records: A-194 GR 7

Head Marking (Specification and Manufacturer): 7B 3DC



**Class/Procurement Level: Quality Assured

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

Vendor: Ingersoll Rand

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Maynard 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.

Required Testing: Chemical Analysis & Hardness

LGS-1-6-Q

A-194 GR 7

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 34			0.375	0.90	0.010	0.017	0.26	0.23	0.94

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-7-Q

Fastener Description: Cap Screw (3/4" x 2")

Description of Sample Stock Location: Bin 1-E332-B2
P.O. LS296595
Code 114-38065

Material Specification as Documented by Licensee Records: J-429 GR 5

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Quality Assured

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

Vendor: Colt Industries

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Mayer Jr Date 4/14/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS 1-7-Q

J 429 GR 5

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 37*			0.355		0.027	0.021			

* RC 37 is outside the SAE J429 Grade 5 limits of RC25-RC34

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-7-Q

Fastener Description: Nut (5/8") UNF

Description of Sample Stock Location: Bin 1-E333-B3
P.O. LS296595
Code 114-38125

Material Specification as Documented by Licensee Records: Fed. Spec. QQZ325, Typ 2, Class 2 (per Colt Ind.)

Head Marking (Specification and Manufacturer):

- No markings

**Class/Procurement Level: Qaulity Assured

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

Vendor: Colt Industries

QA Requirements Imposed on Vendor: Yes; C. of C. required

Licensee Representative:

Signature John L Magyar Jr Date 1/17/89

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-7-Q

A 563 GR B

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RB 92			0.070						

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

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

Attachment I

Fastener Testing Data Sheet

*Sample ID# LGS 1-8-Q

Fastener Description: Bonnet Stud (1" x 5")

Description of Sample Stock Location: Bin 1-E132-C4
P.O. LS297413
Code 114-22959

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): B7 R HAD

**Class/Procurement Level: Quality Assured

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

Vendor: Anchor Darling

QA Requirements Imposed on Vendor: Yes ; CMTR required

Licensee Representative:

Signature ______________________ Date 1/11/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS-1-8-Q

A 193 GR B7

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 32	120,515 psi***	94,239 psi**	0.380	0.85	0.012	0.021	0.41 wet*	0.21	1.04

*0.41 percent Si is above the required maximum 0.37 percent

**94,239 psi is less than the required 105,000 psi yield strength

***120,515 psi is less than the required 125,000 psi tensile strength

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-8-Q

Fastener Description: Bonnet Nut (1")

Description of Sample Stock Location: Bin 1-E80-C3
P.O. LS297413
Code 114-22960

Material Specification as Documented by Licensee Records: A-193 GR 2H

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Quality Assured

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

Vendor: Anchor Darling

QA Requirements Imposed on Vendor: Yes ; CMTR required

Licensee Representative:

Signature _____ Date 4/15/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-8-Q

A-194 GR 2H

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 27			0.463		0.029		0.018		

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-9-Q

Fastener Description: Bonnet Stud (1 1/4" x 5 1/4")

Description of Sample Stock Location: Bin 1-E36-A3
P.O. LS367369
Code 114-22983

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Quality Assured

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

Vendor: Anchor Darling

QA Requirements Imposed on Vendor: Yes ; CMTR required

Licensee Representative:

Signature _____ Date 1/14/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS 1-9-Q

A-193 GR B7

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 28	128,120 psi	109,271 psi	0.409	0.91	0.028	0.026	0.22	0.16	0.90

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

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

Attachment 1

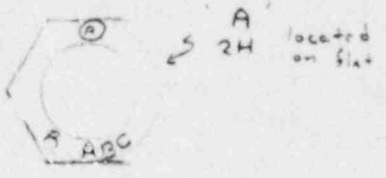
Fastener Testing Data Sheet

*Sample ID# LGS 1-9-Q

Fastener Description: Bonnet Nut (1 1/4")

Description of Sample Stock Location: Bin 1-E301-D1
P.O. LS367369
Code 114-22984

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer): 

**Class/Procurement Level: Quality Assured

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

Vendor: Anchor Darling

QA Requirements Imposed on Vendor: Yes ; CMTR required

Licensee Representative:

Signature John P Magnan Jr Date 4/4/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-9-Q

A 194 GR 2H

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 29			0.457		0.012	0.022			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-10-Q

Fastener Description: Bonnet Stud (5/8" x 3 5/8")

Description of Sample Stock Location: Bin 1-E351-F2
P.O. LS296619
Code 114-33540

Material Specification as Documented by Licensee Records: A-564 GR 630

Head Marking (Specification and Manufacturer): 630 V55

**Class/Procurement Level: Quality Assured

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

Vendor: Velan Valve

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John C. [signature] Date 1/14/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS-1-10-Q

A 564 GR 630

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
HB 342	137,048 psi	131,526	0.032	0.58	0.023	0.007	0.58		16.37

Ni	Cu	Columbium and Tantalum
4.39	3.45	0.259

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-10-Q

Fastener Description: Bonnet Nut (5/8")

Description of Sample Stock Location: Bin 1-E364-A1
P.O. LS296619
Code 114-33541

Material Specification as Documented by Licensee Records: A-194 GR 8M

Head Marking (Specification and Manufacturer): 8M8 located on flat

**Class/Procurement Level: Quality Assured

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

Vendor: Velan Valve

QA Requirements Imposed on Vendor: Yes ; C of C required

Licensee Representative:

Signature John P Mayer Jr Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS-1-10-Q

A 194 GR 8M

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]							
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr	Ni
RB 81			0.027	1.42	0.036	0.041 wet*	0.42	2.124	16.08	10.18

* 0.041 percent silicon is greater than the maximum allowable percent silicon (0.030%)

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-11-Q

Fastener Description: Stud, MSRV (1 3/8" x 10")

Description of Sample Stock Location: Bin 1-E200-A2
P.O. GS279702-38
Code 114 63000

Material Specification as Documented by Licensee Records: A-193 GR B16

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Quality Assured

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

Vendor: Target Rock

QA Requirements Imposed on Vendor: Yes ; CMTR required

Licensee Representative:

Signature [signature] Date 1/11/88

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

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

Required Testing: Chemical & Mechanical Analysis

LGS 1-11-Q

A-193 GR B16

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]							
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr	V
RC 31	131,912 psi	121,765 psi	0,419	0.54	0.017	0.020	0.32	0.60	1.11	0.326

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-1-N

Fastener Description: Bonnet Stud Assm. (Stud) (1/2" x 2-3/4")

Description of Sample Stock Location: Bin 1-G198-D3
Code 114-20506

Material Specification as Documented by Licensee Records:

A-193 GR B7

Head Marking (Specification and Manufacturer): B 7 T

**Class/Procurement Level:

Non-Q

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

Vendor: Crane Co.

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John P Maggio Date 1/11/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-1-N

A 193 GR B7

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 30			0.363	0.88	0.013	0.025	0.23	0.18	0.94

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

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

Attachment 1

Fastener Testing Data Sheet

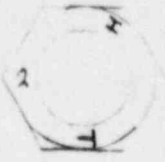
*Sample ID# LGS 1-1-N

Fastener Description: Bonnet Nut (1/2")

Description of Sample Stock Location: Bin 1-G198-D3
Code 114-20506

Material Specification as Documented by Licensee Records:
A-194 GR 2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level:
Non-Q

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

Vendor: Crane Co.

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature [signature] Date 1/11/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-1-N

A 194 GR 2H

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 31			0.451		0.018	0.027			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-2-N

Fastener Description: Cap Screw w/ Nut (9/16" x 4")

Description of Sample Stock Location: Bin 1-B72-C2
Code 194-57087

Material Specification as Documented by Licensee Records: J429 GR5

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Non-Q

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

Vendor: Various

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John C Maynard Date 1/17/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-2-N

J429 GR5

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 34			0.355		0.011	0.022			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# GS 1-3-N

Fastener Description: Bonnet Stud (5/8" x 3-3/8")

Description of Sample Stock Location: Bin 1-A308-C1
Code 114-23363

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): C B7

**Class/Procurement Level: Non-Q

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

Vendor: Pacific Valve

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John C Maynard Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-3-N

A 193 GR B7

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 31			0.397	0.90	0.019	0.018	0.26	0.15	1.06

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-3-N

Fastener Description: Bonnet Nut (3/8")

Description of Sample Stock Location: Bin 1A289-B4
Code 114-23364

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Non-Q

Genera[illegible]ant Application (e.g., Pressure Boundary, Structural)

Vendor: Pacific Valve

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature [signature] Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-3-N

A 194 GR 2H

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 29			0.446		0.034	0.030			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-4-N

Fastener Description: Bonnet Stud (5/8" x 3-5/8")

Description of Sample Stock Location: Bin 1-B18-C1
Code 114-33166

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): B7

**Class/Procurement Level: Non-Q

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

Vendor: Velan Valve

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John P Maggard Date 1/14/08

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-4-N

A 193 GR B7

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 33			0.399	0.93	0.021	0.029	0.36	0.19	1.03

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

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

Attachment 1

Fastener Testing Data Sheet

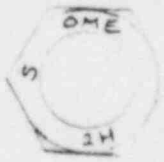
*Sample ID# LGS 1-4-N

Fastener Description: Bonnet Nut (5/8")

Description of Sample Stock Location: Bin 1-B18-E1
Code 114-33167

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-Q

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

Vendor: Velan Valve

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature _____ Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-4-N

A-194 GR 2H

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 39			0.462	0.022		0.037			

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

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

Attachment 1

Fastener Testing Data Sheet

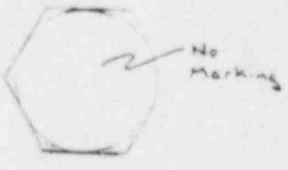
*Sample ID# LGS 1-5-N

Fastener Description: Cap Screw (5/8" x 3")

Description of Sample Stock Location: Bin 1-D42-C2
Code 114-25077

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

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-Q

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

Vendor: Joy Mfg. Co.

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature _____ Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-5-N

A 307 GR B

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RB 94					0.014	0.026			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-5-N

Fastener Description: Nut (5/8")

Description of Sample Stock Location: Bin 1-D42-C1
Code 114-25078

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

Head Marking (Specification and Manufacturer):

**Class/Procurement Level:

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

Vendor: Joy Mfg. Co.

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John P Mangan Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-5-N

A 563 GR B

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RB 93			0.097						

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-6-N

Fastener Description: Bonnet Stud (3/4" x 3-1/4")

Description of Sample Stock Location: Bin 1-D44-C5
Code 114-27413

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): RB7
B5G

**Class/Procurement Level: Non-Q

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

Vendor: Tudor Technology, Inc.

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John P Maynard Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS-1-6-N

A193 GR B7

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 33			0.449	0.99	0.030	0.024	0.28	0.23	1.05

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-6-N

Fastener Description: Bonnet Nut (3/4"_

Description of Sample Stock Location: Bin 1D44-B4
Code 114-27414

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Non-Q

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

Vendor: Tudor Technology, Inc.

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John P Maggard 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.

Required Testing: Chemical Analysis & Hardness

LGS 1-6-N

A-194 GR 2H

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 27			0.466		0.011	0.021			

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

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

Attachment 1

Fastener Testing Data Sheet

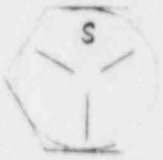
*Sample ID# LGS 1-7-N

Fastener Description: Cap Screw w/ Nut

Description of Sample Stock Location: Bin 2-D7-A2
Code 194-57110

Material Specification as Documented by Licensee Records: J429 GR5

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-Q

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

Vendor: Various

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John P Mangan Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-7-N
J429 GR 5

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 31			0.329		0.014	0.015			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS-1-8-N

Fastener Description: Bolt (3/4" x 3-1/4")

Description of Sample Stock Location: Bin 1-A256-A2
Code 114-41618

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): 18>

**Class/Procurement Level: Non-Q

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

Vendor: Graver Water Company

QA Requirements Imposed on Vendor: NO

Licensee Representative:

Signature John P Maggio Jr Date 1/11/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS-1-8-N
A 193 GR B7

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 30			0.406	0.93	0.027	0.012	0.31	0.16	0.96

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

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

Attachment 1

Fastener Testing Data Sheet

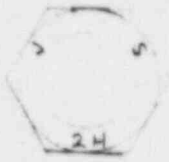
*Sample ID# LGS 1-8-N

Fastener Description: Nut (3/4")

Description of Sample Stock Location: Bin 1-A256-A2
Code 114-41618

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer):



**Class/Procurement Level: Non-Q

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

Vendor: Graver Water Co.

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John C Maggard Date 1/14/88

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

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

Required Testing: Chenmical Analysis & Hardness

LGS-1-8-N
A 194 2H

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 27			0.409		0.015	0.027			

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-9-N

Fastener Description: Bonnet Stud 1" x 5-3/4"

Description of Sample Stock Location: Bin 1-H252-E1
Code 114-29982

Material Specification as Documented by Licensee Records: A-193 GR B6

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Non-Q

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

Vendor: Byron Jackson

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John C Maggard Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS 1-9-N

A 193 GR B6

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 23			0.118	0.45	0.011	0.005	0.34		12.61

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-9-N

Fastener Description: Bonnet Nut (¾")

Description of Sample Stock Location: Bin 1-H279-C5
Code 114-29987

Material Specification as Documented by Licensee Records: A-194 GR6

Head Marking (Specification and Manufacturer): 3

**Class/Procurement Level: Non-Q

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

Vendor: Byron Jackson

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature [signature] Date 4/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS-1-9-N

A 194 GR6

Attachment 2

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 26			0.119	0.75	0.015	0.016	0.34		11.84

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-10-N

Fastener Description: Bonnet Stud (1-3/8" x 9-1/2")

Description of Sample Stock Location: Bin 1-D176-A2
Code 114-23541

Material Specification as Documented by Licensee Records: A-193 GR B7

Head Marking (Specification and Manufacturer): B
GTM

**Class/Procurement Level: Non-Q

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

Vendor: Pacific Valve

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John P Maggard 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.

Required Testing: Chemical Analysis & Hardness

LGS 1-10-N

A 193 GR B7

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 17			0.410	0.80	0.026	0.018	0.26	0.19	1.00

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

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

Attachment 1

Fastener Testing Data Sheet

*Sample ID# LGS 1-10-N

Fastener Description: Bonnet Nut (1-3/8")

Description of Sample Stock Location: Bin 1-D39-D1
Code 114-23540

Material Specification as Documented by Licensee Records: A-194 GR 2H

Head Marking (Specification and Manufacturer):

**Class/Procurement Level: Non-Q

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

Vendor: Pacific Valve

QA Requirements Imposed on Vendor: No

Licensee Representative:

Signature John P Magnan Date 1/14/88

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

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

Required Testing: Chemical Analysis & Hardness

LGS-1-10-N

A 194 GR 2H

Attachment 7

Data Summary

Mechanical Analysis			Chemical Analysis[1]						
Hardness	UTS	0.2% YS	C	Mn	P	S	Si	Mo	Cr
RC 24			0.451		0.019	0.025			

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

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

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 RAP

FASTENER TESTING DATA SHEET

LGS2- 01
sample I.d.#

FASTENER DESCRIPTION: 1 1/4" x 11" STUD (STOCK CODE: Y530760472-2)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED BIN, LABELLED STOCK CODE

MATERIAL SPECIFICATION: ASME SA-193 GRADE B7

HEAD MARKING: "B7" (GRADE), "DLH" (HEAT#), "↔" (MFG), "Ⓥ" (PIPING CLASS)

CLASS / PROCUREMENT LEVEL: PIPING CLASS 2, Q-LISTED, ASME, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: A & G ENGINEERING CO. II, INC. (SUPPLIER) (MFG): HAMANAKA NUT MFG. CO.
4640 EAST LA PALMA AVE. HIMEJI, JAPAN
ANAHEIM, CA.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III W/NA-3700-NCA-3800, 10CFR21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
	137 Ksi	118 KSI	21.0	61.0

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.40	.86	.020	.009	.28	.22	1.04

ADDITIONAL TESTING: Impact @ +30°F - 3 TESTS

FT/LBS	% FIB	LAT EXP.
69	100	.043 in.
71	100	.045 in.
69	100	.044 in.

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 02
sample I.d.#

FASTENER DESCRIPTION: 1 1/4" NUT (STOCK CODE: 4531060174-2)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELLED BIN

MATERIAL SPECIFICATION: SA-194 GRADE 7, ASME

HEAD MARKING: "T" (MFG), "7" (GRADE), "LN39" (HEAT NO.), "(2)" (PIPING CLASS)

CLASS / PROCUREMENT LEVEL: PIPING CLASS 2, Q-L-SIED, ASME, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: TEXAS BOLT COMPANY
3233 W. 11TH ST.
HOUSTON, TEXAS 77001

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III, WITH NA-3700/NCA3800, 10CFR 21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
267 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.43	.94	.008	.018	.24	.17	.96

ADDITIONAL TESTING: * NOTE: TEST LABORATORY UNABLE TO COMPLETE TESTING OF THIS SPECIMEN DUE TO TEST APPARATUS FAILURE, SEE LGS2-02D

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. Riscitelli C.A. RISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 02D
sample I.d.#

FASTENER DESCRIPTION: 1¼" NUT (STOCK CODE: Y531060174-2)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 7

HEAD MARKING: "T" (MFG), "7" (GRADE), "LN39" (HEAT NO.)

CLASS / PROCUREMENT LEVEL: PIPING CLASS 2, Q LISTED, ASME, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: TEXAS BOLT COMPANY
3233 W. 11TH ST.
HOUSTON, TEXAS 77001

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III, W/NA-3700/NCA-3800, 10 CFR 21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
26 RC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.484	.98	.013	.022	.25	.19	1.05

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD — 175,000 LBS
RESULT — SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G A CAPPUCCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1·22·88

FASTENER TESTING DATA SHEET

LGS2- 03
sample i.d.#

FASTENER DESCRIPTION: 1" x 5" STUD (STOCK CODE: Y530760022-1)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED L BELED BIN

MATERIAL SPECIFICATION: ASME SA-193 GRADE B7

HEAD MARKING: "C" (MFG.), "B7" (GRADE), "H2" (HEAT NO.), "①" (PIPING CLASS)

CLASS / PROCUREMENT LEVEL: ASME PIPING CLASS-1, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: CARDINAL INDUSTRIAL PRODUCTS
3873 WEST OQUENDO
LAS VEGAS, NEV.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III, WITH NA-3700/NCA-3800, 10CFR21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
–	159,000	151,000	14.0 ▲	56.0

▲ SEE NCR 12853

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.41	.96	.010	.021	.22	.16	.99

ADDITIONAL TESTING: IMPACT @ 0°F: 62 FT/LBS 100% FIB .043" LAT. EXP
62 " 100% " .038" "
74 " 100% " .045" "

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: C.A. POSITELLI date: 2·10·88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 2/2/88

FASTENER TESTING DATA SHEET

LGS2- 03E
sample I.d.#

FASTENER DESCRIPTION: 1" x 5" STUD (STOCK CODE: Y5307600 22-1)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-193 GRADE B7

HEAD MARKING: "C" (MFG), "B7" (GRADE), "H2" (HEAT NO.), "①" (PIPING CLASS)

CLASS / PROCUREMENT LEVEL: ASME PIPING CLASS-1, Q LISTED, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: CARDINAL INDUSTRIAL PRODUCTS
3873 WESTOBUENDO
LAS VEGAS, NEV.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III, WITH NA-3700/NCA-3800, 10CFR21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
31 RC	153,246	147,206	13.2	55.4

▲ SEE NCR #12853

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.463	.45	.018	.026	.25	.17	.98

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G A PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22 88 AAP

FASTENER TESTING DATA SHEET

LGS2- 04
sample I.d.#

FASTENER DESCRIPTION: 1" NUT (STOCK CODE: Y531060006-1)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 2H

HEAD MARKING: "C" (MFG), "2H" (GRADE), "H19" (HEAT NO.), "①" (PIPING CLASS)

CLASS / PROCUREMENT LEVEL: ASME, PIPING CLASS-1, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: CARDINAL INDUSTRIAL PRODUCTS
3873 W. OQUENDO
LAS VEGAS, NEV.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III, WITH NA-3700/NCA-3800 AND 10CFR21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
278 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.38▲	—	.016	.016	—	—	—

SEE NCR# 12853

ADDITIONAL TESTING: * NOTE: TEST LABORATORY UNABLE TO COMPLETE TESTING OF THIS SPECIMEN DUE TO TEST APPARATUS FAILURE, SEE LGS2-04D

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. ASCHELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MP

FASTENER TESTING DATA SHEET

LGS2- 04D
sample I.d.#

FASTENER DESCRIPTION: 1" NUT, (STOCK CODE: Y531060006-1)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 2H

HEAD MARKING: "C" (MFG.), "2H" (GRADE), "H19" (HEAT NO.), "①" (PIPING CLASS)

CLASS / PROCUREMENT LEVEL: ASME, PIPING CLASS-1, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION/PIPING

VENDOR: CARDINAL INDUSTRIAL PRODUCTS
3873 W. OQUENDO
LAS VEGAS, NEV.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME SECTION III, WITH NA-3700/NCA-3800 AND 10CFR 21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
29 RC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.401	—	.032	.025	—	—	—

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD — 106,000 LBS.
RESULT — SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AD

FASTENER TESTING DATA SHEET

LGS2- 05
sample I.d.#

FASTENER DESCRIPTION: 1¼" x 7¾" STUD, (STOCK CODE: Y530760455-3)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA 193 GRADE B16

HEAD MARKING: "T" (MFG.), "B16" (GRADE), "LN20" (HEAT NO.)

CLASS / PROCUREMENT LEVEL: ASME, PIPING CLASS-3, (ANSI B31.1), QUALIFIED, PERMANENT PLANT

PLANT APPLICATION: PIPING, SAFETY APPLICATION

VENDOR: TEXAS BOLT CO.
P.O. BOX 1211
HOUSTON, TX

QA REQUIREMENTS IMPOSED ON VENDOR: 50 LEVEL A, ASME III (ANSI B31.1), WITH NA-3700/NCA-3800 AND 10CFR21 INVOKED.

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
	126000	126000	16.0	58.0

▲ SEE NCR #12853

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.42	.64	.012	.019	.28	.50	1.04

ADDITIONAL TESTING: IMPACT TESTED @ +30°F — 87 FT/LB — 100% FIB — .057" LAT. EXP.
86 " 100 " .056" "
83 " 100 " .055" "

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2/10/88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 2/2/88

FASTENER TESTING DATA SHEET

LGS2- 05E
sample I.d.#

FASTENER DESCRIPTION: 1 1/4" x 7 3/4" STUD, (STOCK CODE: Y530760455-3

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-193 GRADE B16

HEAD MARKING: "T" (MFG), "B16" (GRADE), "LN20" (HEAT NO.)

CLASS / PROCUREMENT LEVEL: ASME, PIPING CLASS-3, (ANSI B31.1), Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: PIPING, SAFETY APPLICATION

VENDOR: TEXAS BOLT CO.
P.O. BOX 1211
HOUSTON, TX

QA REQUIREMENTS IMPOSED ON VENDOR: 50 LEVEL A, ASME III (ANSI B31.1), WITH NA-3700/NCA-3800 AND 10CFR21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
29 RC	139,909	119,526	15.2	55.4

▲ SEE NCR # 12853

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.395	.63	.013	.018	.34	.58	.01

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AAH

FASTENER TESTING DATA SHEET

LGS2- 06
sample I.d.#

FASTENER DESCRIPTION: 1 1/4" NUT (STOCK CODE: Y531060230-3)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 3

HEAD MARKING: "T" (MFG), "3" (GRADE), "LN21" (HEAT NO.)

CLASS / PROCUREMENT LEVEL: ASME, PIPING CLASS-3, (ANSI B31.1), Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: PIPING SAFETY APPLICATION

VENDOR: TEXAS BOLT CO.
P.O. Box 1211
HOUSTON, TX

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III (ANSI B31.1) WITH NA-3700 / NCA-3800 AND 10CFR 21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
313 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.21	.73	.014	.002	.28	.50	4.78

ADDITIONAL TESTING: * NOTE: TEST LABORATORY UNABLE TO COMPLETE TESTING OF THIS SPECIMEN DUE TO TEST APPARATUS FAILURE, SEE LGS2-06D

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yelid Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 06D
sample I.D.#

FASTENER DESCRIPTION: 1 1/4" NUT (STOCK CODE: Y531060230-3)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 3

HEAD MARKING: "T" (MFG), "3" (GRADE), "LN21" (HEAT NO.)

CLASS / PROCUREMENT LEVEL: ASME, PIPING CLASS-3, (ANSI B31.1), Q-LISTED, PERMANANT PLANT

PLANT APPLICATION: PIPING SAFETY APPLICATION

VENDOR: TEXAS BOLT CO.
P.O. BOX 1211
HOUSTON, TX

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III (ANSI B31.1), WITH NA-3700 / NCA 3800 INVOKED, INCLUDING 10CFR21

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
35 AC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.135	.54	.009	.002	.26	.53	5.80

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD — 175,000 LBS
RESULT — SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 asp

FASTENER TESTING DATA SHEET

LGS2- 07
sample I.d.#

FASTENER DESCRIPTION: 1 3/8" x 11 1/2" STUD (STOCK CODE: Y53D760471-1)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN.

MATERIAL SPECIFICATION: ASME SA-193 GRADE B7

HEAD MARKING: "↔" (MFG), "B7" (GRADE), "CDM" (HEAT CODE), "①" (PIPING CLASS)

CLASS / PROCUREMENT LEVEL: ASME, Q-LISTED, PIPING CLASS-1, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: A AND G ENGINEERING CO. (SUPPLIER) (MFG): HAMANAKA NUT MFG. CO.
4840 LA PALMA AVE. HIMEJI, JAPAN
ANAHEIM, CA

QA REQUIREMENTS IMPOSED ON VENDOR: 3Q LEVEL A, ASME SECTION III, WITH NA-3700/ NCA-3800 AND 10CFR 21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
—	138000	120000	21.0	62.0

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.41	.92	.024	.028	.29	.22	1.07

ADDITIONAL TESTING: IMPACT TEST @ +30°F 100 FT/LBS 100 %FIB .055" LAT. EXP
79 " 100 " .045" "
91 " 100 " .058" "

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MD

FASTENER TESTING DATA SHEET

LGS2-- 08
sample I.d.#

FASTENER DESCRIPTION: 1 3/8" NUT (STOCK CODE: Y531060175-1)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 7

HEAD MARKING: "H5" (MFG), "7" (GRADE), "SAE" (HEAT NO.), "①" PIPING CLASS

CLASS / PROCUREMENT LEVEL: ASME Q-LISTED, CLASS 1, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: MATERIAL SUPPLIER: ALLIED NUT & BOLT MATERIAL MFG: JOH. SMIT
520 HERTZOG BLVD. HOLLAND
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME SECTION III, WITH NA-3700/NCA-3800 AND 10CFR21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
278 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.42	.96	.013	.025	.29	.23	.99

ADDITIONAL TESTING: * NOTE: TEST LAB UNABLE TO COMPLETE TESTING OF THIS SPECIMEN DUE TO TESTING APPARATUS FAILURE
SEE LGS2-08D

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 08D
sample I.d.#

FASTENER DESCRIPTION: 1 3/8" NUT (STOCK CODE: 4531060175-1)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 7

HEAD MARKING: "HS" (MFG), "7" (GRADE), "5AE" (HEAT NO.), "①" (PIPING CLASS)

CLASS / PROCUREMENT LEVEL: ASME Q-LISTED, CLASS 1, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / PIPING

VENDOR: MATERIAL SUPPLIER: ALLIED NUT & BOLT CO. MATERIAL MFG: JOH. SMIT
520 HERTZOG BLVD. HOLLAND
KING of PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME SECTION III WITH NA-3700/NCA-3800 AND 10CFR-21 INVOKED.

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
25 RC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.418	.94	.017	.023	.30	.23	.97

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD — 215,800 LBS
RESULT — SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: C. A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 09
sample I.d.#

FASTENER DESCRIPTION: 1" x 4 1/2" BOLT (STOCKCODE: Y530660153)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A325 TYPE 1

HEAD MARKING: "LE" (MFG), "A325" (MAT'L)

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY PLANT APPLICATION / CIVIL

VENDOR: LAKE ERIE SCREW
13001 ATHENS AVE.
CLEVELAND, OHIO

QA REQUIREMENTS IMPOSED ON VENDOR: 5Q LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
—	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.35	1.12	.024	.011	—	—	—

ADDITIONAL TESTING: WEDGE TENSION TEST: LOAD - 95,000 LBS / FAILURE LOCATION: THREADS

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AMD

FASTENER TESTING DATA SHEET

LGS2- 10
sample I.d.#

FASTENER DESCRIPTION: 1" NUT (STOCK CODE: Y531060112)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A563 GRADE C

HEAD MARKING: "C" (MFG), 3 RADIAL LINES SPACED 120°

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-[illegible], PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / CIVIL

VENDOR: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
257 HB	–	–	–	–

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.33	–	.021	–	–	–	–

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD – 87264 LBS / PASS

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AHP

FASTENER TESTING DATA SHEET

LGS2- 11
sample I.D.#

FASTENER DESCRIPTION: 1"x 6" BOLT (STOCK CODE: 4530660176)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A490

HEAD MARKING: "LE" (MFG), "A490" (MATERIAL)

CLASS / PROCUREMENT LEVEL: NON ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / CIVIL

VENDOR: LAKE ERIE SCREW
13001 ATHENS AVE.
CLEVELAND, OHIO

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
–	–	–	–	–

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.39	–	.018	.013	–	–	–

ADDITIONAL TESTING: WEDGE TENSION TEST: LOAD - 103,000 LBS / FAILURE LOCATION - THREADS

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 12
sample I.d.#

FASTENER DESCRIPTION: 1" NUT (STOCK CODE: Y530660176)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194 GRADE 2H

HEAD MARKING: "MF" (MFG.), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY PLANT APPLICATION / CIVIL

VENDOR: MFG: METALS FORMING CORP.
775 INDIAN SPRINGS RD.
INDIANA, PA 15701

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10 CFR 21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
267 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.45	–	.012	.037	–	–	–

ADDITIONAL TESTING: * NOTE: TEST LABORATORY UNABLE TO COMPLETE TESTING OF THIS SPECIMEN DUE TO TEST APPARATUS FAILURE, SEE LGS2-12D

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: S.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 JHP

FASTENER TESTING DATA SHEET

LGS2- 12D
sample I.d.#

FASTENER DESCRIPTION: 1" NUT (STOCK CODE: Y530660176)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194 GRADE 2H

HEAD MARKING: "MF" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: HIGH SAFETY APPLICATION / CIVIL

VENDOR: MFG: METALS FORMING CORP.
775 INDIAN SPRINGS RD.
INDIANA, PA 15701

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10 CFR 21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
29RC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.488	—	.020	.032	—	—	—

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD — 106,000 LBS
RESULT — SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 13
sample I.d.#

FASTENER DESCRIPTION: 1½" NUT (STOCK CODE: Y531060106)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-194 GRADE 2H

HEAD MARKING: "5" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED GENERAL PLANT APPLICATION / CIVIL-PIPING-HANGERS, PERMANENT PLANT

VENDOR: FASTENER BROKERAGE

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A
257 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.47	–	.015	.027	–	–	–

ADDITIONAL TESTING: * NOTE: TEST LABORATORY UNABLE TO COMPLETE TESTING OF THIS SPECIMEN DUE TO TEST APPARATUS FAILURE, NOT THE SPECIMEN, SEE LGS2-13D.

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. Pascitelli date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AD

FASTENER TESTING DATA SHEET

LGS2- 13D
sample I.d.#

FASTENER DESCRIPTION: 1½" NUT (STOCK CODE: Y531060106)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-194 GRADE 2H

HEAD MARKING: "S" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED GENERAL PLANT APPLICATION / CIVIL-PIPING-HANGERS

VENDOR: FASTENER BROKERAGE

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10 CFR 21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
31 RC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.456	—	.011	.023	—	—	—

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD - 245,875 LBS
RESULT - SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AAP

FASTENER TESTING DATA SHEET

LGS2- 14
sample I.d.#

FASTENER DESCRIPTION: 3/4" x 2 1/4" BOLT (STOCK CODE: P151100958)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED CARTON

MATERIAL SPECIFICATION: A307 GRADE B

HEAD MARKING: "SL" (MFG)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED PLANT APPLICATION, GENERAL USE / CIVIL, HVAC, HANGERS, PIPING

VENDOR: ALLIED NUT & BOLT (MATERIAL SUPPLIER) / MFG: ST. LOUIS SCREW & BOLT
520 HERTZOG BLVD. — 6900 N. BROADWAY
KING OF PRUSSIA, PA — ST. LOUIS, MO

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
–	–	–	–	–

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
–	–	.015	.017	–	–	–

ADDITIONAL TESTING: WEDGE TENSION TEST: LOAD - 31,000# / FAILURE LOCATION: THREADS

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PASCIELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 15
sample I.d.#

FASTENER DESCRIPTION: 3/4" NUT (STOCK CODE: Y531064052)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED CARTON

MATERIAL SPECIFICATION: ASTM A563 TYPE A

HEAD MARKING: NONE

CLASS / PROCUREMENT LEVEL: NON-ASME, NON Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED PLANT APPLICATION, GENERAL USE / CIVIL, HVAC, HANGERS, PIPING

VENDOR: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
160 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.06	-	.015	-	—	-	—

ADDITIONAL TESTING: * NOTE: TEST LABORATORY UNABLE TO COMPLETE TESTING OF SPECIMEN DUE TO TEST APPARATUS FAILURE, SEE LGS2-15D

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: C.A. PASCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1·22·88

FASTENER TESTING DATA SHEET

LGS2- 15D
sample I.

FASTENER DESCRIPTION: 3/4" NUT (STOCK CODE: Y531069052)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED CARTON

MATERIAL SPECIFICATION: ASTM A563 TYPE A

HEAD MARKING: NONE

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED PLANT APPLICATION, GENERAL USE / CIVIL, HVAC, HANGERS, PIPING

VENDOR: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
94 RB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.088	—	—	—	—	—	—

ADDITIONAL TESTING: PROOF LOAD TEST; LOAD - 33,400 LBS
RESULT - SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 16
sample I.d.#

FASTENER DESCRIPTION: 1 5/8" x 11 1/4" STUD (STOCK CODE: P151100823)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED CARTON

MATERIAL SPECIFICATION: ASTM A193 GRADE B7

HEAD MARKING: "F" (MFG.), "B7" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED PLANT APPLICATION, GENERAL USE / CIVIL, HANGERS, PIPING

VENDOR: FASSCO

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
–	148000	138000	20.0	56.0

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.41	.82	.016	.018	.26	.15	1.00

ADDITIONAL TESTING: _____

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE: _____

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 17
sample I.d.#

FASTENER DESCRIPTION: 1 5/8" NUT (STOCK CODE: Y531060107)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-194 GRADE 2H

HEAD MARKING: "J" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY APPLICATION, CIVIL - FRICTION TYPE LOAD, PIPING

VENDOR:

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
327 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.43	-	.022	.020	-	-	-

ADDITIONAL TESTING: * NOTE: TEST LABORATORY UNABLE TO COMPLETE TESTING OF THIS SPECIMEN DUE TO TEST APPARATUS FAILURE, SEE LGS2-17D

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: C.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 2nd

FASTENER TESTING DATA SHEET

LGS2- 17D
sample I.d.#

FASTENER DESCRIPTION: 1 5/8" NUT (STOCK CODE: Y531060107)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-194 GRADE 2H

HEAD MARKING: "J" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, Q LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY APPLICATION, CIVIL-FAICTION TYPE LOAD, PIPING

VENDOR: MFG: JACOBSEN MFG. CO.
P.O. BOX J
KENILWORTH, NEW JERSEY

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
30RC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.448	—	.012	.024	—	—	-

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD - 311,500 LBS
RESULT - SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yalid Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PASCIRELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 18
sample I.d.#

FASTENER DESCRIPTION: 1½" x 10" STUD (STOCK CODE: Y530760423)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-193 GRADE B7

HEAD MARKING: "BTS" (MFG), "B7" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON SAFETY RELATED PLANT APPLICATION, GENERAL USE/CIVIL, HANGERS, PIPING

VENDOR: MFG: BETHLEHEM STEEL CORP.
1 CUMBERLAND ST.
LEBANON, PA

QA REQUIREMENTS IMPOSED ON VENDOR: 3Q LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
—	130,000	114,000	22.0	66.0

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.39	.90	.013	.017	.24	.19	.91

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum, Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.J. PASCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AP

FASTENER TESTING DATA SHEET

LGS2- 19
sample I.d.#

FASTENER DESCRIPTION: 3/4" x 3 3/4" STUD (STOCK CODE: Y530760013-2)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-193 GRADE B7

HEAD MARKING: "C" (MFG), "B7" (GRADE), "K4" (HEAT)

CLASS / PROCUREMENT LEVEL: ASME, Q-LISTED, PIPING CLASS-2, PERMANENT PLANT

PLANT APPLICATION: SAFETY PLANT APPLICATION / PIPING

VENDOR: CARDINAL INDUSTRIAL PRODUCTS
3873 W. QUGNDO
LAS VEGAS, NEV.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III, WITH NA/3700, NCA/3800 AND 10CFR21 INVOKED

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
---	141,000	138,000	20.0	58.0

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.40	.99	.025	.029	.25	.15	1.03

ADDITIONAL TESTING: ---

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE: ---

signature: R.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 20
sample I.d.#

FASTENER DESCRIPTION: 3/4" NUT (STOCK CODE: Y531060004-2)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 2H

HEAD MARKING: "⟷" (MFG), "2H" (GRADE), "HEB" (HEAT NO.)

CLASS / PROCUREMENT LEVEL: ASME, Q-LISTED, PIPING CLASS-2, PERMANENT PLANT

PLANT APPLICATION: SAFETY PLANT APPLICATION / PIPING

VENDOR: MFG: HANANAKA NUT MFG. CO. LTD. HIMEJI, JAPAN
SUPPLIER: A & G ENGINEERING CO. 4640 E. LA PALMA AVE. ANAHEIM, CA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III, WITH NA-3700/NCA-3800 AND 10CFR21 INVOKED.

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
257 HB	*	*	*	*

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.41	-	.015	.022	—	—	—

ADDITIONAL TESTING: * NOTE: TEST LABORATORY UNABLE TO COMPLETE TESTING OF THIS SPECIMEN DUE TO TEST APPARATUS FAILURE, SEE LGS2-20D

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE: _____

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 20D
sample I.d.#

FASTENER DESCRIPTION: 3/4" NUT (STOCK CODE: Y531060004-2)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASME SA-194 GRADE 2H

HEAD MARKING: "↔" (MFG), "2H" (GRADE), "HEB" (HEAT NO.)

CLASS / PROCUREMENT LEVEL: ASME, Q-LISTED, PIPING CLASS-2, PERMANENT PLANT

PLANT APPLICATION: SAFETY PLANT APPLICATION / PIPING

VENDOR: MFG: HAMANAKA NUT MFG. CO. SUPPLIER: A & G ENGINEERING CO.
HIMEJI, JAPAN 4640 E. LA PALMA AVE.
ANAHEIM, CA.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL A, ASME III WITH NA-3700 / NCA-3800 AND 10CFR21 INVOKED.

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
28 RC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.40	—	.024	.026	—	—	—

ADDITIONAL TESTING: PROOF LOAD TEST; LOAD - 58,450 LBS
RESULT - SATISFACTORY WITH NO FAILURES

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G A PISCHELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MD

FASTENER TESTING DATA SHEET

LGS2- 21
sample I.d.#

FASTENER DESCRIPTION: 7/8" x 5 1/2" BOLT (STOCK CODE: Y530660138)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED CARTON

MATERIAL SPECIFICATION: ASTM A325 TYPE 1

HEAD MARKING: "BIS" (MFG), "A325" (MATERIAL)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED PLANT APPLICATION, GENERAL USE / CIVIL

VENDOR: MFG: BETHLEHEM STEEL CORP.
1 CUMBERLAND ST.
LEBANON, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
267 HB	-	-	-	-

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.40	.83	.012	.016	-	-	-

ADDITIONAL TESTING: _____

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE: _____

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 22
sample I.d.#

FASTENER DESCRIPTION: 7/8" NUT (STOCK CODE: Y531060111)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A563 TYPE C

HEAD MARKING: "D" (MFG)

CLASS / PROCUREMENT LEVEL: NON ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY PLANT APPLICATION / CIVIL

VENDOR: SUPPLIER: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
182 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.04	—	.006	—	—	—	—

ADDITIONAL TESTING: —

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AMP

FASTENER TESTING DATA SHEET

LGS2- 23
sample I.d.#

FASTENER DESCRIPTION: 5/8" x 4" BOLT (STOCK CODE: E171104541N)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A307 GRADE B

HEAD MARKING: "BTS" (MFG.)

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY PLANT APPLICATION, ELECTRICAL / INSTRUMENTATION

VENDOR: BETHLEHEM STEEL CORP (MFG)
1 CUMBERLAND ST.
LEBANON, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
–	–	–	–	–

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
–	–	.012	.030	–	–	–

ADDITIONAL TESTING: WEDGE TENSION TEST; LOAD - 15,350 LBS
FAILURE LOCATION; THREADS STRIPPED

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AMD

FASTENER TESTING DATA SHEET

LGS2- 24
sample I.d.#

FASTENER DESCRIPTION: 5/8" NUT (STOCK CODE: E.1711045944N)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A563 TYPE A

HEAD MARKING: NONE

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY PLANT APPLICATION, ELECTRICAL / INSTRUMENTATION

VENDOR: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A
96 HRB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.06	-	.013	—	—	—	—

ADDITIONAL TESTING: PROOF LOAD TEST: LOAD - 16,950
RESULT - SATISFACTORY WITH NO FAILURE

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 25
sample I.d.#

FASTENER DESCRIPTION: 3/8" x 2 1/2" BOLT (STOCK CODE: E171104544N)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SECREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A307 GRADE B

HEAD MARKING: "S" (MFG.)

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY RELATED PLANT APPLICATION / ELECTRICAL, INSTRUMENTATION

VENDOR: PM FASTENERS (SUPPLIER)
HARLEYSVILLE, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
—	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
—	—	.015	.017	—	—	—

ADDITIONAL TESTING: WEDGE TENSION TEST; LOAD - 6,800 LBS
FAILURE LOCATION - THREADS

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. FISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MD

FASTENER TESTING DATA SHEET

LGS2- 26
sample I.D.#

FASTENER DESCRIPTION: ½" x 2½" STUD (STOCK CODE: Y530760002)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A193 GRADE B7

HEAD MARKING: "T" (MFG), "B7" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE / PIPING, CIVIL, HANGERS

VENDOR: TEXAS BOLT CO.
3233 W. 11TH ST
HOUSTON, TX

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
289 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.43	1.05	.013	.019	.29	.21	1.04

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.l.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 27
sample I.d.#

FASTENER DESCRIPTION: 1/2" NUT (STOCK CODE: Y531060002)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194-GRADE 2H

HEAD MARKING: "HN" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON SAFETY RELATED APPLICATION, GENERAL USE/PIPING, CIVIL, HANGERS

VENDOR: SUPPLIER: LAMAN-LOESCHE
302 MOORE ST.
PHILA. PA.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR 21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
215 HB ▲	—	—	—	—

SEE NCR #12853

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.40	—	.010	.043	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 2/2/88

FASTENER TESTING DATA SHEET

LGS2- 27E
sample I.d.#

FASTENER DESCRIPTION: 1/2" NUT (STOCK CODE: Y531060002)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194 GRADE 2H

HEAD MARKING: "T" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-QUSTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE/PIPING, CIVIL, HANGERS

VENDOR: SUPPLIER: LAMAN-LOESCHE
302 MOORE ST.
PHILA., PA

QA REQUIREMENTS IMPOSED ON VENDOR: SG LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
32 RC	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.446	—	.022	.029	—	—	—

ADDITIONAL TESTING: PROOF LOAD TEST – LOAD: 24830 LBS
RESULT: SATISFACTORY

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G. CAPISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MP

FASTENER TESTING DATA SHEET

LGS2- 28
sample i.d.#

FASTENER DESCRIPTION: 1¼" x 8" STUD (STOCK CODE: Y530760268)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A193 GRADE B7

HEAD MARKING: "R" (MFG), "B7" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE / PIPING, CIVIL, HANGERS

VENDOR: SUPPLIER: ALLIED NUT & BOLT CO.
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
278 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.40	.92	.009	.027	.23	.20	1.04

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 29
sample I.D.#

FASTENER DESCRIPTION: 1¼" NUT (STOCK CODE: Y531060102)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194 GRADE 2H

HEAD MARKING: "∞" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE / PIPING, CIVIL, HANGERS

VENDOR: INDETERMINATE

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
313 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.43	-	.021	.011	—	-	-

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MP

FASTENER TESTING DATA SHEET

LGS2- 30
sample I.d.#

FASTENER DESCRIPTION: 1" x 5 3/4" BOLT (STOCK CODE: Y530760025)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A193 GRADE B7

HEAD MARKING: "J" (MFG), "B7" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE / PIPING, CIVIL, HANGERS

VENDOR: SUPPLIER: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
257 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.41	.90	.019	.022	.22	.16	1.00

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MJ

FASTENER TESTING DATA SHEET

LGS2- 31
sample I.d.#

FASTENER DESCRIPTION: 1" NUT (STOCK CODE: Y531060006)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SECREGAIED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-194 GRADE 2H

HEAD MARKING: "J" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LIST, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE / PIPING, CIVIL, HANGERS

VENDOR: SUPPLIER: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
267 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.43	—	.020	.013	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AP

FASTENER TESTING DATA SHEET

LGS2- 32
sample I.d.#

FASTENER DESCRIPTION: 1 1/8" x 6" STUD (STOCK CODE: Y530660079)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A307 GRADE B

HEAD MARKING: "MD" (MFG)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE / CIVIL, HANGERS, HVAC, PIPING

VENDOR: MFG: MARYLAND BOLT & NUT CO.
1301 COVINGTON ST.
BALTIMORE, MD.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
121 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
—	—	.007	.019	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MD

FASTENER TESTING DATA SHEET

LGS2- 33
sample i.d.#

FASTENER DESCRIPTION: 1 1/8" NUT (STOCK CODE: Y531069055)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-194 GRADE 2H

HEAD MARKING: "T" (MFG), "2H" (GRADE) "Ⓝ" (SEE * BELOW)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE / PIPING, CIVIL, HANGERS

VENDOR: TEXAS BOLT CO.
3233 WEST 11TH ST.
HOUSTON, TX

SUPPLIER: ALLIED NUT & BOLT CO.
520 HERTZOG BLVD.
KING of PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: 50 LEVEL D, 10CFR21 NOT APPLICABLE

* Ⓝ THIS IS AN ETCHED SYMBOL ON THE NUT TO DENOTE NON-Q STATUS. ETCHING PERFORMED BY BECHTEL UPON RECEIPT AND/OR ISSUE.

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
327 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.45	—	.015	.018	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 34
sample I.d.#

FASTENER DESCRIPTION: 7/8" x 5 1/4" STUD (STOCK CODE: Y530760020)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A193 GRADE B7

HEAD MARKING: "B" (MFG), "B7" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATIONS, GENERAL USE / PIPING, CIVIL, HANGERS

VENDOR: INDETERMINATE

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
257 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.40	.84	.016	.015	.22	.17	1.06

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: B.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AP

FASTENER TESTING DATA SHEET

LGS2- 35
sample I.d.#

FASTENER DESCRIPTION: 7/8" NUT (STOCKCODE: YS31060005)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-194 GRADE 2H

HEAD MARKING: "I" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATIONS, GENERAL USE / PIPING, CIVIL, HANGERS

VENDOR: SUPPLIER: FASTENER BROKERAGE

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
267 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.44	-	.015	.014	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 AMD

FASTENER TESTING DATA SHEET

LGS2- 36
sample I.d.#

FASTENER DESCRIPTION: 5/8" x 2 3/4" BOLT (STOCK CODE: Y530660059)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SECREGATED LABELED BINS

MATERIAL SPECIFICATION: ASTM A307 GRADE B

HEAD MARKING: "TB" (MFG)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON SAFETY RELATED APPLICATIONS, GENERAL USE / CIVIL, HANGERS, HVAC, PIPING

VENDOR: MFG: TEXAS BOLT
HOUSTON, TX

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
182 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
—	—	.005	.020	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yelid Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 BMP

FASTENER TESTING DATA SHEET

LGS2- 37
sample I.D.#

FASTENER DESCRIPTION: 5/8" NUT (STOCK CODE: Y531060021)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A563 TYPE C

HEAD MARKING: 3 RADIAL LINES SPACED @ 120°

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATIONS, GENERAL USE / CIVIL, HANGERS, HVAC, PIPING

VENDOR: FASTENER BROKERAGE

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
165 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.04	-	.005	—	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 38
sample I.d.#

FASTENER DESCRIPTION: 7/8" x 4" SQUARE HD. BOLT (STOCK CODE: Y530660545)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: CARBON STEEL

HEAD MARKING: NONE

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q USED,

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION / PIPING

VENDOR: UNKNOWN

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
165 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr	Ni	Cu
.17	.41	.021	.029	.01	.01	.01	.01	.01

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.D. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 39
sample I.d.#

FASTENER DESCRIPTION: 5/8" x 4" BOLT (STOCK CODE: Y530660706)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A193 GRADE B8

HEAD MARKING: "J" (MFG), "B8" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION, GENERAL USE/PIPING, CIVIL, HANGERS

VENDOR: SUPPLIER: ALLIED NUT & BOLT CO.
520 HERTZOG BLVD.
KING OF PRUSSIA, PA.

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
142 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr	Ni
.07	1.42	.028	.007	.48	—	18.26	8.32

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: J. Williams & A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88 MP

FASTENER TESTING DATA SHEET

LGS2- 40
sample I.d.#

FASTENER DESCRIPTION: 5/8" NUT (STOCK CODE: Y531060318)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194 GRADE 8

HEAD MARKING: "B" (MFG), "8" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-QUALIFIED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION - PIPING, HANGERS

VENDOR: SUPPLIER: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: 50 LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
222 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr	Ni
.03	.72	.030	.001	.31	—	17.24 ▲	8.65

SEE NCR #12853

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 2/2/88

FASTENER TESTING DATA SHEET

LGS2- 40E
sample I.d.#

FASTENER DESCRIPTION: 5/8" NUT (STOCK CODE: Y531060318)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194 GRADE 8

HEAD MARKING: "B" (MFG), "8" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-QUSTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION / PIPING-HANGERS

VENDOR: SUPPLIER: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
RB 103	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr	Ni
.02	.82	.045	.007	.34	—	17.53 ▲	9.18

SEE NCR #12853

ADDITIONAL TESTING: NOTE: THIS TEST SPECIMEN IS THE SAME FASTENER WHICH WAS SENT TO BETHEARGE LABORATORY (SEE LGS2-40). THIS SPECIMEN IS A "REMNANT" OF THAT TEST.

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE: _____

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 41
sample I.d.#

FASTENER DESCRIPTION: 1/2" x 2" CAPSCREW (STOCKCODE: P151101075)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED CARTON

MATERIAL SPECIFICATION: ASTM A574

HEAD MARKING: NONE

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED PIPING APPLICATION

VENDOR: FASTENER BROKERAGE

QA REQUIREMENTS IMPOSED ON VENDOR: SG LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
38 HRC ▲	—	—	—	—

SEE NCR # 12853

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.33	-	.021	.008	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 42
sample I.d.#

FASTENER DESCRIPTION: 1" x 9 1/4" STUD (STOCK CODE: Y530760231)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-193 GRADE B7

HEAD MARKING: "R" (MFG), "B7" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q LISTED, PERMANENT PLANT

PLANT APPLICATION: NON SAFETY RELATED APPLICATION / PIPING, HANGERS

VENDOR: SUPPLIER: ALLIED NUT & BOLT
520 HEARTLOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR 21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
267 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.40	.91	.011	.023	.26	.18	1.02

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: C.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 43
sample I.d.#

FASTENER DESCRIPTION: 1" NUT (STOCK CODE: Y531060006)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194 GRADE 2H

HEAD MARKING: "K" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATIONS / PIPING, HANGERS

VENDOR: SUPPLIER: ALLIED NUT & BOLT
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
301 HB	-	-	-	-

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.48	-	.028	.022	-	-	-

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G. A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 44
sample I.d.#

FASTENER DESCRIPTION: 3/4" x 4 3/4" STUD (STOCK CODE: Y530760227)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A-193 GRADE B7

HEAD MARKING: "B" (MFG), "B7" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-QLISTED, PERMANENT PLANT

PLANT APPLICATION: NON SAFETY RELATED APPLICATION, PIPING/HANGERS

VENDOR: INDETERMINATE

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
289 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.41	.97	.037	.033	.31	.16	1.05

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: C. A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 45
sample I.d.#

FASTENER DESCRIPTION: 3/4" NUT (STOCK CODE: Y531060004)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A194 GRADE 2H

HEAD MARKING: "T" (MFG), "2H" (GRADE)

CLASS / PROCUREMENT LEVEL: NON-ASME, NON-Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: NON-SAFETY RELATED APPLICATION / PIPING, HANGERS

VENDOR: FASTENER BROKERAGE

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL D, 10CFR21 NOT APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
301 HB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.44	-	.013	.029	-	—	—

ADDITIONAL TESTING: _____

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE: _____

signature: G. A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1·22·88

FASTENER TESTING DATA SHEET

LGS2- 46
sample I.d.#

FASTENER DESCRIPTION: 3/8" NUT (STOCK CODE: E597561755)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A563 TYPE A

HEAD MARKING: NONE

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY APPLICATION / ELECTRICAL - INSTRUMENTATION

VENDOR: ALLIED NUT & BOLT Co.
520 HERTZOG BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
88 HRB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.12	—	.016	—	—	—	—

ADDITIONAL TESTING:

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2·10·88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 49
sample I.D.#

FASTENER DESCRIPTION: ½" x 5" BOLT (STOCK CODE: E171104550N)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A307 GRADE B

HEAD MARKING: "5" (MFG.)

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANENT PLANT

PLANT APPLICATION: SAFETY RELATED APPLICATION / ELECTRICAL - INSTRUMENTATION

VENDOR: ALLIED NUT & BOLT
520 HEARTLAND BLVD.
KING OF PRUSSIA, PA

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
—	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
—	—	.016	.010	—	—	—

ADDITIONAL TESTING: WEDGE TENSION TEST: LOAD - 10,925 LBS
FAILURE LOCATION -- THREADS

NOTE: U.T.S.-Ultimate Tensile Strength; Y.S.-Yeild Strength; C-Carbon; Mn-Manganese; P-Phosphorous; S-Sulfur; Si-Silicon; Mo-Molybdenum; Cr-Chromium; E.L.-Elongation; R.A.-Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: G.A. PISCITELLI date: 2-10-88

TEST DATA	FASTENER REVIEW PER NRC COMPLIANCE BUL.87-02
SOURCE: MATERIAL CONTROL GROUP	DATE: 1-22-88

FASTENER TESTING DATA SHEET

LGS2- 50
sample I.d.#

FASTENER DESCRIPTION: 1/2" NUT (STOCK CODE: E171106516N)

DESCRIPTION OF SAMPLE STOCK LOCATION: WAREHOUSE, SEGREGATED LABELED BIN

MATERIAL SPECIFICATION: ASTM A563 TYPE A

HEAD MARKING: NONE

CLASS / PROCUREMENT LEVEL: NON-ASME, Q-LISTED, PERMANANT PLANT

PLANT APPLICATION: SAFETY RELATED APPLICATION / ELECTRICAL - INSTRUMENTATION

VENDOR: SHUR-KUT SUPPLY

QA REQUIREMENTS IMPOSED ON VENDOR: SQ LEVEL C, 10CFR21 APPLICABLE

DATA SUMMARY

MECHANICAL ANALYSIS

HARDNESS	U.T.S.	0.2% Y.S.	%E.L.	% R.A.
97 HRB	—	—	—	—

CHEMICAL ANALYSIS

C	Mn	P	S	Si	Mo	Cr
.09	-	.013	—	—	—	—

ADDITIONAL TESTING: PROOF LOAD TEST; LOAD - 9644 LBS
RESULT - SATISFACTORY NO FAILURE

NOTE: U.T.S. - Ultimate Tensile Strength; Y.S. - Yeild Strength; C - Carbon; Mn - Manganese; P - Phosphorous; S - Sulfur; Si - Silicon; Mo - Molybdenum; Cr - Chromium; E.L. - Elongation; R.A. - Reduction in Area.

▲ Denotes outside specification tolerance.

LICENSEE REPRESENTATIVE:

signature: C.A. PISCITELLI date: 2-10-88

APPENDIX D

215/249-9698

Certificate of Conformance No. 29259

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

LABORATORY TESTING INC.

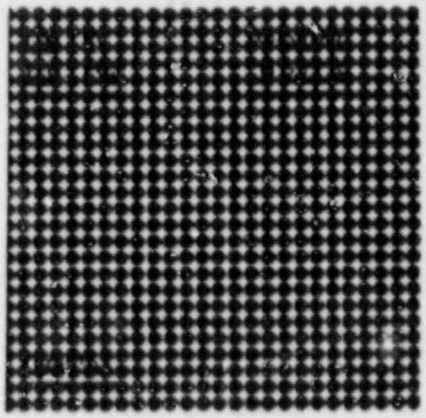
P.O. Box 249 Dublin, Pennsylvania 18917

SHIPPING ADDRESS
120 MILL STREET, DUBLIN, PA 18917

SOLD TO
Philadelphia Electric Company
2301 Market Street
P.O. Box 8699
Philadelphia, PA 19101

SHIP TO
Philadelphia Electric Company
P.O. Box 650
Valley Forge, PA 19482
ATTN: John Diletto

CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS-271511-AN	TC-6841.1	Complete	1/8/88



DESCRIPTION

15 pcs. Nuts - ASTM A-194
See attached sheet for breakdown

Reference: Charge No. 5412-0928
Metallurgy Lab Note No. 87-307 Limerick I
NRC Bulletin 87-02
Transaction No. 947002

A. The above referenced Test Specimens were submitted to chemical content evaluation by Spectrochemical Analysis and Wet Chemical Analysis and (11) pieces were found to be in conformance to ASTM A-194, Grade 2H; (2) pieces were found to be in conformance to ASTM A-194, Grade 7; (1) piece was found NOT to be in conformance to ASTM A-194, Grade 8M; and (1) piece was found to be in conformance to ASTM A-194, Grade 6. See attached sheet for results.

B. A Hardness test was performed on the above Test Specimens and (11) pieces were found to be in conformance to ASTM A-194, Grade 2H; (2) pieces were found to be in conformance to ASTM A-194, Grade 7; (1) piece was found to be in conformance to ASTM A-194, Grade 8M; and (1) piece was found to be in conformance to ASTM A-194, Grade 6. See attached sheet for results.

C. A Proof Load test was performed on the above Test Specimens and (11) pieces were found to be in conformance to ASTM A-194, Grade 2H; (2) pieces were found to be in conformance to ASTM A-194, Grade 7; (1) piece was found to be in conformance to ASTM A-194, Grade 8M; and (1) piece was found to be in conformance to ASTM A-194, Grade 6. See attached sheet for results.

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By: Robert W. McVaugh
AUTHORIZED SIGNATURE

A breakdown of pieces received is as follows:

1 pc. 9/16" - 12 Bonnet Nut, LGS-1 1-Q, Material Code #114-43073
1 pc. 5/8" - 11 Suction Head Nut, LGS-1 3-Q, Material Code #114-46396
1 pc. 3/4" - 10 Bonnet Nut, LGS-1 4-Q, Material Code #114-42273
1 pc. 7/8" - 9 Bonnet Nut, LGS-1 5-Q, Material Code #114-26566
1 pc. 7/8" - 9 Stage Casing Nut, LGS-1 6-Q, Material Code #114-46387
1 pc. 1-1/8" - 8 Bonnet Nut, LGS-1 8-Q, Material Code #114-22960
1 pc. 1-1/4" - 7 Bonnet Nut, LGS-1 9-Q, Material Code #114-22984
1 pc. 5/8" - 11 Bonnet Nut, LGS-1 10-Q, Material Code #114-33541
1 pc. 1/2" - 13 Nut, LGS-1 1-N, Material Code #114-20506N
1 pc. 5/8" - 11 Bonnet Nut, LGS-1 3-N, Material Code #114-23364
1 pc. 5/8" - 11 Bonnet Nut, LGS-1 4-N, Material Code #114-33167
1 pc. 3/4" - 10 Bonnet Nut, LGS-1 6-N, Material Code #114-27414
1 pc. 3/4" - 10 Nut, LGS-1 8-N, Material Code #114-41618N
1 pc. 1" - 8 Bonnet Nut, LGS-1 9-N, Material Code #114-29987
1 pc. 1-3/8" - 8 Bonnet Nut, LGS-1 10-N, Material Code #114-23540

A. CHEMICAL ANALYSIS RESULTS:

ASTM A-194, GRADE 2H

SAMPLE NO.	CARBON	PHOSPHORUS	SULFUR
Required	0.40 minimum	0.040 maximum	0.050 maximum
114-23540	0.451	0.019	0.025
114-22960	0.463	0.029	0.018
114-22984	0.457	0.012	0.022
114-26566	0.432	0.026	0.014
114-20506N	0.451	0.018	0.027
114-27414	0.466	0.011	0.021
114-43073	0.457	0.021	0.015
114-33167	0.462	0.022	0.037
114-23364	0.446	0.034	0.030
114-42273	0.499	0.019	0.031
114-41618N	0.409	0.015	0.027

ASTM A-194, GRADE 7

ELEMENT	REQUIRED	SAMPLE #114-46396	SAMPLE #114-46387
Carbon	0.37 - 0.49	0.372	0.375
Manganese	0.65 - 1.10	0.89	0.90
Phosphorus	0.04 maximum	0.011	0.010
Sulfur	0.04 maximum	0.020	0.017
Silicon	0.15 - 0.35	0.30	0.26
Chromium	0.75 - 1.20	1.06	0.94
Molybdenum	0.15 - 0.25	0.23	0.23

ASTM A-194, GRADE 8M

ELEMENT	REQUIRED	SAMPLE #11433541
Carbon	0.08 maximum	0.027
Manganese	2.00 maximum	1.42
Phosphorus	0.045 maximum	0.036
Sulfur	0.030 maximum	*0.041 (by Wet Analysis)
Silicon	1.00 maximum	0.42
Nickel	10.00 - 14.00	10.18
Chromium	16.00 - 18.00	16.08
Molybdenum	2.00 - 3.00	2.124

* Over Maximum Requirement.

ASTM A-194, GRADE 6

ELEMENT	REQUIRED	SAMPLE #114-29987
Carbon	0.15 maximum	0.119
Manganese	1.00 maximum	0.75
Phosphorus	0.040 maximum	0.015
Sulfur	0.030 maximum	0.016
Silicon	1.00 maximum	0.34
Chromium	11.50 - 13.50	11.84

B. HARDNESS TEST RESULTS:

ASTM A-194, GRADE 2H

REQUIRED: RC 24 - RC 38

#114-43073 - RC 33 / #114-42273 - RC 30 / #114-26566 - RC 29
#114-22960 - RC 27 / #114-22984 - RC 29 / #114-20506N - RC 31
#114-23364 - RC 29 / #114-33167 - RC 29 / #114-27414 - RC 27
#114-41618N - RC 27 / #114-23540 - RC 24

ASTM A-194, GRADE 7

REQUIRED: RC 24 - RC 38

#114-46396 - RC 32 / #114-46387 - RC 34

ASTM A-194, GRADE 8M

REQUIRED: RB 60 - RB 105

#114-33541 - RB 81

ASTM A-194, GRADE 6

REQUIRED: RC 20 - RC 28

#114-29987 - RC 26

C. PROOF LOAD TEST RESULTS:

ASTM A-194, GRADE 2H

Sample #114-43073 tested at 27,300# - Satisfactory with no failures.
Sample #114-42273 tested at 50,100# - Satisfactory with no failures.
Sample #114-26566 tested at 69,300# - Satisfactory with no failures.
Sample #114-22960 tested at 118,500# - Satisfactory with no failures.
Sample #114-22984 tested at 145,350# - Satisfactory with no failures.
Sample #114-20506N tested at 21,280# - Satisfactory with no failures.
Sample #114-23364 tested at 33,900# - Satisfactory with no failures.
Sample #114-33167 tested at 33,900# - Satisfactory with no failures.
Sample #114-27414 tested at 50,100# - Satisfactory with no failures.
Sample #114-41618N tested at 50,100# - Satisfactory with no failures.
Sample #114-23540 tested at 185,000# - Satisfactory with no failures.

ASTM A-194, GRADE 7

Sample #114-46396 tested at 33,900# - Satisfactory with no failures.
Sample #114-46387 tested at 69,300# - Satisfactory with no failures.

ASTM A-194, GRADE 8M

Sample #114-33541 tested at 16,950# - Satisfactory with no failures.

ASTM A-194, GRADE 6

Sample #114-29987 tested at 81,810# - Satisfactory with no failures.

215/249-9898

Certificate of Conformance No. 29259

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

LABORATORY TESTING INC.

P.O. Box 249 Dublin, Pennsylvania 18917

SHIPPING ADDRESS
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SOLD TO
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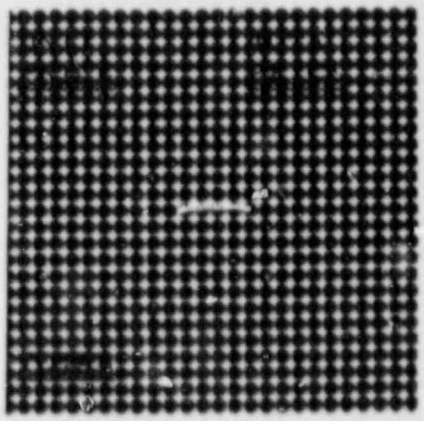
Valley Forge, PA 19482
ATTN: John Diletto

CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS-271511-AN	TC-6841.2	Complete	1/8/88



DESCRIPTION

15 pcs. Studs - ASTM A-193
See attached sheet for breakdown

Reference: Charge No. 5412-0928
Metallurgy Lab Note No. 87-307
NRC Bulletin 87-02
Transaction No. 947002

A. The above referenced Test Specimens were submitted to chemical content evaluation by Spectrochemical Analysis and Wet Chemical Analysis and (12) pieces were found to be in conformance to ASTM A-193, Grade B7; (1) piece was found NOT to be in conformance to ASTM A-193, Grade B7; (1) piece was found to be in conformance to ASTM A-193, Grade B6; and (1) piece was found to be in conformance to ASTM A-193, Grade B16. See attached sheet for results.

B A Hardness test was performed on the above Test Specimens in accordance with ASTM A-193, Grades B7, B6 and B16. See attached sheet for results.

C. A Tensile test was performed (per ASTM E-8/A-370) on the above Test Specimens and (10) pieces were found to be in conformance to ASTM A-193, Grade B7; (3) pieces were found NOT to be in conformance to ASTM A-193, Grade B7; (1) piece was found NOT to be in conformance to ASTM A-193, Grade B6; and (1) piece was found to be in conformance to ASTM A-193, Grade B16. See attached sheet for results.

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By: Robert W. McVaugh
AUTHORIZED SIGNATURE

A breakdown of pieces received is as follows:

1 pc. 9/16 x 3-5/8" long Bonnet Stud, LGS-1 1-Q, Code #114-43072
1 pc. 5/8 x 2-1/2" long Suction Head Stud, LGS-1 3-Q, Code #114-46394
1 pc. 3/4 x 4-1/4" long Bonnet Stud, LGS-1 4-Q, Code #114-42272
1 pc. 3/4 x 5" long Bonnet Stud, LGS-1 5-Q, Code #114-26565
1 pc. 7/8 x 4-3/4" long Stage Casing Stud, LGS-1 6-Q, Code #114-46385
1 pc. 1 x 5" long Bonnet Stud, LGS-1 8-Q, Code #114-22959
1 pc. 1-1/4 x 5-1/4" long Bonnet Stud, LGS-1 9-Q, Code #114-22983
1 pc. 1-3/8 x 10" long MSRV Stud, LGS-1 11-Q, Code #114-63000
1 pc. 1/2 x 2-3/4" long Bonnet Stud Assm., LGS-1 1-N, Code #114-20506B
1 pc. 5/8 x 3-3/8" long Bonnet Stud, LGS-1 3-N, Code #114-23363
1 pc. 5/8 x 3-5/8" long Bonnet Stud, LGS-1 4-N, Code #114-33166
1 pc. 3/4 x 3-1/4" long Bonnet Stud, LGS-1 6-N, Code #114-27413
1 pc. 3/4 x 3-1/4" long Bolt, LGS-1 8-N, Code #114-41618B
1 pc. 1 x 5-3/4" long Bonnet Stud, LGS-1 9-N, Code #114-29982
1 pc. 1-3/8 x 9-1/2" long Bonnet Stud, LGS-1 10-N, Code #114-23541

A. CHEMICAL ANALYSIS RESULTS:

ASTM A-193, GRADE B7

ELEMENT	REQUIRED	SAMPLE #114-26565	SAMPLE #114-20506B	SAMPLE #114-23363
Carbon	0.35 - 0.51	0.396	0.363	0.397
Manganese	0.61 - 1.14	0.89	0.88	0.90
Phosphorus	0.040 maximum	0.019	0.013	0.019
Sulfur	0.045 maximum	0.026	0.025	0.018
Silicon	0.13 - 0.37	0.27	0.23	0.26
Chromium	0.70 - 1.25	0.92	0.94	1.06
Molybdenum	0.13 - 0.27	0.23	0.18	0.15

ELEMENT	SAMPLE #114-23541	SAMPLE #114-22959	SAMPLE #114-27413	SAMPLE #114-46394
Carbon	0.410	0.380	0.449	0.445
Manganese	0.80	0.85	0.99	0.94
Phosphorus	0.026	0.012	0.030	0.016
Sulfur	0.018	0.021	0.024	0.021
Silicon	0.26	*0.41 (wet)	0.28	0.23
Chromium	1.00	1.04	1.05	1.05
Molybdenum	0.19	0.21	0.23	0.19

* Over Maximum Requirement.

ASTM A-193, GRADE B7 (Continued)

ELEMENT	REQUIRED	SAMPLE #114-33166	SAMPLE #114-22983
Carbon	0.35 - 0.51	0.399	0.409
Manganese	0.61 - 1.14	0.93	0.91
Phosphorus	0.040 maximum	0.021	0.028
Sulfur	0.045 maximum	0.029	0.026
Silicon	0.13 - 0.37	0.36	0.22
Chromium	0.70 - 1.25	1.03	0.90
Molybdenum	0.13 - 0.27	0.19	0.16

ELEMENT	SAMPLE #114-41618B	SAMPLE #114-46385	SAMPLE #114-43072	SAMPLE #114-42272
Carbon	0.406	0.385	0.404	0.388
Manganese	0.93	0.88	0.85	0.87
Phosphorus	0.027	0.013	0.038	0.019
Sulfur	0.012	0.023	0.027	0.017
Silicon	0.31	0.25	0.22	0.24
Chromium	0.96	1.01	1.05	1.06
Molybdenum	0.16	0.14	0.18	0.16

ASTM A-193, GRADE B6

ELEMENT	REQUIRED	SAMPLE #114-29982
Carbon	0.16 maximum	0.118
Manganese	1.03 maximum	0.45
Phosphorus	0.045 maximum	0.011
Sulfur	0.035 maximum	0.005
Silicon	1.05 maximum	0.34
Chromium	11.35 - 13.65	12.61

ASTM A-193, GRADE B16

ELEMENT	REQUIRED	SAMPLE #114-63000
Carbon	0.34 - 0.49	0.419
Manganese	0.42 - 0.73	0.54
Phosphorus	0.040 maximum	0.017
Sulfur	0.045 maximum	0.020
Silicon	0.13 - 0.37	0.32
Chromium	0.75 - 1.20	1.11
Molybdenum	0.47 - 0.68	0.60
Vanadium	0.22 - 0.38	0.326

B. HARDNESS RESULTS:

ASTM A-193, GRADE B7

NO REQUIREMENTS

#114-43072 - RC 29 / #114-46394 - RC 30 / #114-42272 - RC 18
#114-26565 - RC 31 / #114-46385 - RC 33 / #114-22959 - RC 32
#114-22983 - RC 28 / #114-20506B - RC 30 / #114-23363 - RC 31
#114-33166 - RC 33 / #114-27413 - RC 33 / #114-41618B - RC 30
#114-23541 - RC 17

ASTM A-193, GRADE B6

REQUIRED: None

#114-29982 - RC 23

ASTM A-193, GRADE B16

NO REQUIREMENTS

#114-63000 - RC 31

C. TENSILE TEST RESULTS:

ASTM A-193, GRADE B7

SAMPLE NO.	TENSILE STRENGTH	(.2%) YIELD STRENGTH	ELONGATION	REDUCTION OF AREA
Required	125,000 PSI	105,000 PSI	16%	50%
114-43072	131,024 PSI	111,445 PSI	23.2%	59.7%
114-46394	148,979 PSI	134,693 PSI	19.8%	56.9%
114-42272	*105,156 PSI	*91,001 PSI	25.7%	65.7%
114-26565	137,904 PSI	125,834 PSI	18.7%	58.3%
114-46385	144,517 PSI	130,116 PSI	20.3%	57.9%
114-22959	*120,515 PSI	*94,239 PSI	17.5%	51.4%
114-22983	128,120 PSI	109,271 PSI	22.0%	62.5%
114-20506B	145,408 PSI	134,693 PSI	19.8%	61.0%
114-23363	138,888 PSI	113,168 PSI	16.8%	50.0%
114-33166	137,368 PSI	125,263 PSI	19.0%	58.8%
114-27413	144,927 PSI	133,022 PSI	20.7%	60.5%
114-41618B	134,057 PSI	122,153 PSI	19.8%	58.5%
114-23541	*104,932 PSI	*87,569 PSI	27.0%	66.0%

* Does not meet Specification Requirements.

215/249-9898

Certificate of Conformance No. 29259

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

LABORATORY TESTING INC.

P.O. Box 249 Dublin, Pennsylvania 18917

SHIPPING ADDRESS
120 MILL STREET, DUBLIN, PA 18917

SOLD TO
Philadelphia Electric Company
2301 Market Street
P.O. Box 8699
Philadelphia, PA 19101

SHIP TO
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P.O. Box 650
Valley Forge, PA 19482
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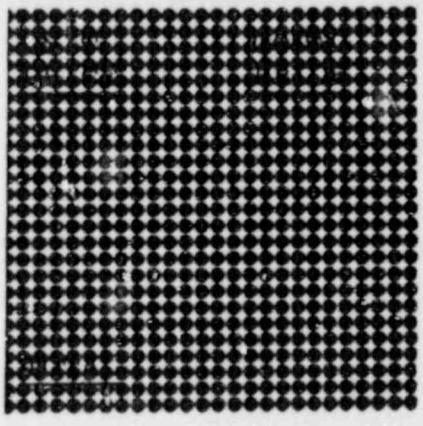
CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS-271511-AN	TC-6841.3	Complete	1/8/88

DESCRIPTION

4 pcs. Hex Head Capscrews - SAE J429
See attached sheet for breakdown

Reference: Charge No. 5412-0928
Metallurgy Lab Note No. 87-307
NRC Bulletin 87-02
Transaction No. 947002



A. The above referenced Test Specimens were submitted to chemical content evaluation by Spectrochemical Analysis and (3) pieces were found to be in conformance to SAE J429, Grade 5; and (1) piece was found to be in conformance to SAE J429, Grade 8. See attached sheet for results.

B. A Hardness test was performed on the above Test Specimens and (2) pieces were found to be in conformance to SAE J429, Grade 5; (1) piece was found NOT to be in conformance to SAE J429, Grade 5; and (1) piece was found to be in conformance to SAE J429, Grade 8. See attached sheet for results.

C. An Axial Tensile test was performed on the above Test Specimens and (3) pieces were found to be in conformance to SAE J429, Grade 5 and (1) piece was found to be in conformance to SAE J429, Grade 8. See attached sheet for results.

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By: _____
AUTHORIZED SIGNATURE

SUBJECT TO TERMS AND CONDITIONS PRINTED ON REVERSE SIDE OF THIS FORM.

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ASTM A-193, GRADE B6

SAMPLE NO.	TENSILE STRENGTH	(.2%) YIELD STRENGTH	ELONGATION	REDUCTION OF AREA
Required	110,000 PSI	85,000 PSI	15%	50%
114-29982	117,293 PSI	98,245 PSI	22.0%	64.5%

ASTM A-193, GRADE B16

SAMPLE NO.	TENSILE STRENGTH	(.2%) YIELD STRENGTH	ELONGATION	REDUCTION OF AREA
Required	125,000 PSI	105,000 PSI	18%	50%
114-63000	131,912 PSI	121,765 PSI	22.0%	62.1%

A breakdown of pieces received is as follows:

1 pc. 3/8" - 24 x 2" long Hex Head Capscrew, LGS-1 2-Q, Code #114-38050
1 pc. 5/8" - 18 x 2" long Hex Head Capscrew, LGS-1 7-Q, Code #114-38065
1 pc. 9/16" - 12 x 4" long Hex Head Capscrew, LGS-1 2-N, Code #194-57087
1 pc. 1" - 8 x 5" long Hex Head Capscrew, LGS-1 7-N, Code #194-57110

A. CHEMICAL ANALYSIS RESULTS:

SAE J429, GRADE 5

ELEMENT	REQUIRED	SAMPLE #114-38065	SAMPLE #194-57110	SAMPLE #114-57087
Carbon	0.28 - 0.55	0.355	0.329	0.355
Phosphorus	0.048 maximum	0.027	0.014	0.011
Sulfur	0.058 maximum	0.021	0.015	0.022

SAE J429, GRADE 8

ELEMENT	REQUIRED	SAMPLE #114-38050
Carbon	0.28 - 0.55	0.328
Phosphorus	0.040 maximum	0.013
Sulfur	0.045 maximum	0.014

B. HARDNESS TEST RESULTS:

SAE J429, GRADE 5

REQUIRED: RC 25 - RC 34

#114-38065 - *RC 37 / #194-57087 - RC 34 / #194-57110 - RC 31

SAE J429, GRADE 8

REQUIRED: RC 33 - RC 39

#114-38050 - RC 34

* Does not meet Specification Requirements.

C. AXIAL TENSILE RESULTS:

SAE J429, GRADE 5

Sample #114-38065 tested at 30,700# minimum - 45,200# TF
Sample #194-57087 tested at 21,800# minimum - 25,850# TF
Sample #194-57110 tested at 72,700# minimum - 84,300# TF

SAE J429, GRADE 8

Sample #114-38050 tested at 13,200# minimum - 14,700# TF

215/249-9898

Certificate of Conformance No. 29259

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

LABORATORY TESTING INC.
P.O. Box 249 Dublin, Pennsylvania 18917

SHIPPING ADDRESS
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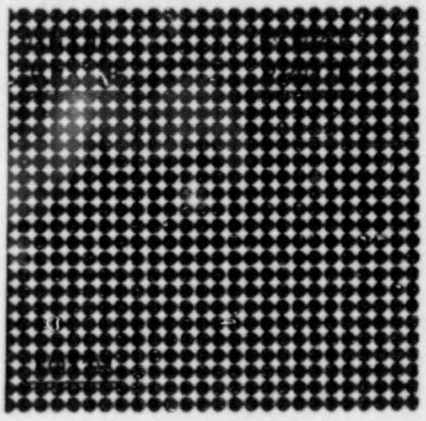
ATTN: John Diletto

CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS-271511-AN	TC-6841.4	Complete	1/8/88

DESCRIPTION

2 pcs. Nuts - ASTM A-563
See attached sheet for breakdown

Reference: Charge No. 5412-0928
Metallurgy Lab Note No. 87-307
NRC Bulletin 87-02
Transaction No. 947002



A. The above referenced Test Specimens were submitted to chemical content evaluation by Spectrochemical Analysis and (2) pieces were found to be in conformance to ASTM A-563, Grade B. See attached sheet for results.

B. A Hardness test was performed on the above Test Specimens and (2) pieces were found to be in conformance to ASTM A-563, Grade B. See attached sheet for results.

C. A Proof Load test was performed on the above Test Specimens and (2) pieces were found to be in conformance to ASTM A-563, Grade B. See attached sheet for results.

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By: Robert W. McVaugh
AUTHORIZED SIGNATURE

A breakdown of pieces received is as follows:

1 pc. 5/8" - 11 Nut, LGS-1 5-N, Material Code #114-25078
1 pc. 5/8" - 18 Nut, LGS-1 7-Q, Material Code #114-38125

A. CHEMICAL ANALYSIS RESULTS:

ASTM A-563, GRADE B

ELEMENT	REQUIRED	SAMPLE #114-25078	SAMPLE #114-38125
Carbon	0.58 maximum	0.097	0.070

B. HARDNESS RESULTS:

ASTM A-563, GRADE B

REQUIRED: RB 69 - RC 32

Sample #114-25078 - RB 93 / Sample #114-38125 - RB 92

C. PROOF LOAD TEST RESULTS:

Sample #114-25078 tested at 20,340# - Satisfactory with no failures.
Sample #114-38125 tested at 23,040# - Satisfactory with no failures.

215/249-9898

Certificate of Conformance No. 29259

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

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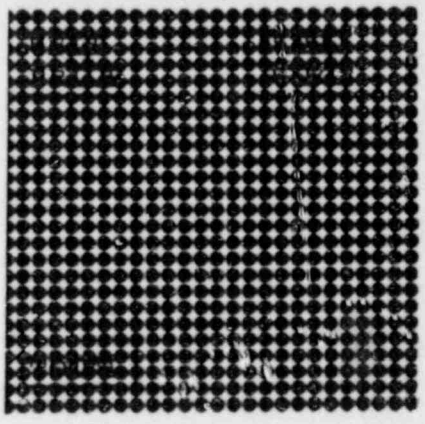
ATTN: John Diletto

CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS-271511-AN	TC-6871.5	Complete	1/8/88



DESCRIPTION

1 pc. Hex Head Capscrew - ASTM A-307
See attached sheet for breakdown

Reference: Charge No. 5412-0928
Metallurgy Lab Note No. 87-307
NRC Bulletin 87-02
Transaction No. 947002

A. [illegible] referenced Test Specimen was submitted to chemical [illegible] valuation by Spectrochemical Analysis and it was found to be in conformance to ASTM A-307, Grade B. See attached sheet for results.

B. A Hardness test was performed on the above Test Specimen and it was found to be in conformance to ASTM A-307, Grade B. See attached sheet for results.

C. A 10-degree Wedge Tensile test was performed on the above Test Specimen and it was found to be in conformance to ASTM A-307, Grade B. See attached sheet for results.

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By: R. W. McVaugh
AUTHORIZED SIGNATURE

SUBJECT TO TERMS AND CONDITIONS PRINTED ON REVERSE SIDE OF THIS FORM.

CUSTOMER COPY ORIGINAL

A breakdown of pieces received is as follows:

1 pc. 5/8" - 11 x 3" long Hex Head Capscrew, LGS-1 5-N, Code #114-25077

A. CHEMICAL ANALYSIS RESULTS:

ASTM A-307, GRADE B

ELEMENT	REQUIRED	SAMPLE #114-25077
Phosphorus	0.04 maximum	0.014
Sulfur	0.05 maximum	0.026

B. HARDNESS TEST RESULTS:

ASTM A-307, GRADE B

REQUIRED: RB 69 - RB 95

Sample #114-25077 - RB 94

C. WEDGE TENSILE TEST RESULTS:

ASTM A-307, GRADE B

#114-25077 tested at 13,550# minimum / 22,600# maximum - 19,000# TF

215/249-9898

Certificate of Conformance No. 29259

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

LABORATORY TESTING INC.

P.O. Box 249 Dublin, Pennsylvania 18917

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120 MILL STREET, DUBLIN, PA 18917

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Philadelphia Electric Company
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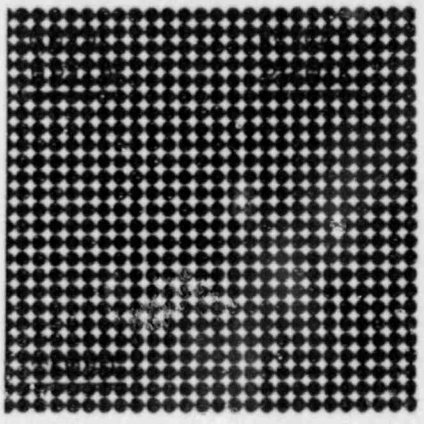
Valley Forge, PA 19482
ATTN: John Diletto

CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS-271511-AN	TC-6841.6	Complete	1/8/88



DESCRIPTION

1 pc. Bonnet Stud - ASTM A-564, Type 630
See attached sheet for breakdown

Reference: Charge No. 5412-0928
Metallurgy Lab Note No. 87-307
NRC Bulletin 87-02
Transaction No. 947002

A. The above referenced Test Specimen was submitted to chemical content evaluation by Spectrochemical Analysis and it was found to be in conformance to ASTM A-564, Type 630. See attached sheet for results.

B. A Hardness test was performed on the above Test Specimen and it was found to be in conformance to ASTM A-564, Type 630. See attached sheet for results.

C. A Tensile test was performed (per ASTM A-370/E-8) on the above Test Specimen in accordance with ASTM A-564, Type 630. See attached sheet for results.

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By: Robert W. McVaugh
AUTHORIZED SIGNATURE

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A breakdown of pieces received is as follows:

1 pc. 5/8" x 3-5/8" long Bonnet Stud, LGS-1 10-Q, Code #114-33540

A. CHEMICAL ANALYSIS RESULTS:

ASTM A-564, TYPE 630

ELEMENT	REQUIRED	SAMPLE #114-33540
Carbon	0.07 maximum	0.032
Manganese	1.00 maximum	0.58
Phosphorus	0.040 maximum	0.023
Sulfur	0.030 maximum	0.007
Silicon	1.00 maximum	0.58
Nickel	3.00 - 5.00	4.39
Chromium	15.00 - 17.50	16.37
Copper	3.00 - 5.00	3.45
Columbium + Tantalum	0.15 - 0.45	0.259

B. HARDNESS TEST RESULTS:

ASTM A-564, TYPE 630

REQUIRED: HB 363 maximum

Sample #114-33540 - HB 342

C. TENSILE TEST RESULTS

ASTM A-564, TYPE 630

	SAMPLE #114-33540
Tensile Strength	137,048 PSI
Yield Strength (.2%)	131,526 PSI
Elongation	18.8%
Reduction of Area	58.8%

215/249-9898

Certificate of Conformance No. 29812

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

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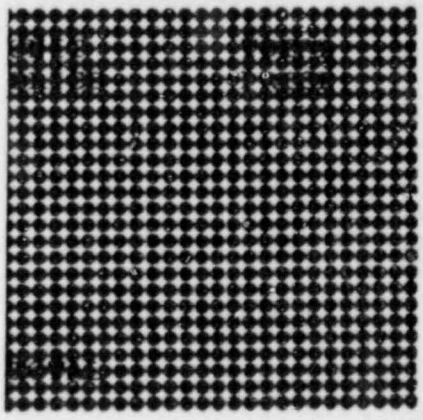
Valley Forge, PA 19482
ATTN: John Diletto

CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS271511-AN	TC-449.1	Complete	1/29/88

DESCRIPTION

Fastener Samples No. 88-327:
1 pc. 1 - 8 x 5" long Stud, ASTM A-193, Grade B7, ID #LGS2-03E

Reference: Transaction #947005, Code #700-08595
Charge #401501-303
Met. Lab Note #88-327



A. The above referenced sample was submitted to chemical content evaluation by Spectrochemical Analysis and found to be in conformance to ASTM A-193, Grade B7. The results are as follows:

ELEMENT	REQUIRED	ACTUAL
Carbon	0.35 - 0.51	0.463
Manganese	0.61 - 1.14	0.95
Phosphorus	0.040 maximum	0.018
Sulfur	0.045 maximum	0.028
Silicon	0.13 - 0.37	0.25
Chromium	0.70 - 1.25	0.98
Molybdenum	0.13 - 0.27	0.17

B. A Tensile test was performed (per ASTM A-370/E-8) on the above Test Specimen and it was found NOT to be in conformance to ASTM A-193, Grade B7 per the following results:

	REQUIRED	ACTUAL
Tensile Strength	125,000 PSI	153,246 PSI
Yield Strength (.2%)	105,000 PSI	147,206 PSI
Elongation	16.0%	*13.2%
Reduction of Area	50.0%	55.4%

*Under Minimum Requirement.

C. A Hardness test was performed on the above Test Specimen in accordance with ASTM A-193, Grade B7 and it was found to have a hardness of RC 31.

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By: Robert W. McVaugh
AUTHORIZED SIGNATURE

215/249-9898

Certificate of Conformance No. 29812

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

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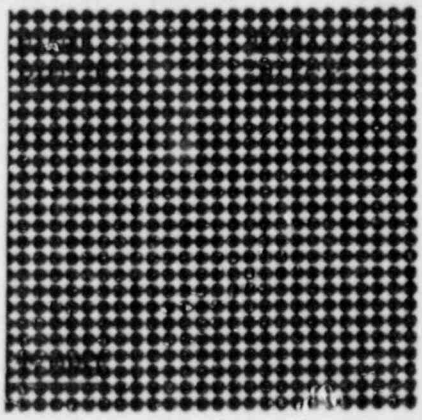
CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS271511-AN	TC-449.2	Complete	1/29/88

DESCRIPTION

Fastener Samples No. 88-327:
1 pc. 1-1/4 - 8 x 7-3/4" long Stud, ASTM A-193, Grade B-16, ID #LGS2-05E

Reference: Transaction #947005, Code #700-08595
Charge #401501-303
Met. Lab Note #88-327



A. The above referenced sample was submitted to chemical content evaluation by Spectrochemical Analysis and found to be in conformance to ASTM A-193, Grade B16. The results are as follows:

ELEMENT	REQUIRED	ACTUAL
Carbon	0.34 - 0.49	0.395
Manganese	0.42 - 0.73	0.63
Phosphorus	0.040 maximum	0.013
Sulfur	0.045 maximum	0.018
Silicon	0.13 - 0.37	0.34
Chromium	0.75 - 1.20	1.01
Molybdenum	0.47 - 0.68	0.58
Vanadium	0.22 - 0.38	0.265

B. A Tensile test was performed (per ASTM A-370/E-8) on the above Test Specimen and it was found NOT to be in conformance to ASTM A-193, Grade B16 per the following results:

	REQUIRED	ACTUAL
Tensile Strength	125,000 PSI	139,909 PSI
Yield Strength (.2%)	105,000 PSI	119,526 PSI'
Elongation	18.0%	*15.2%
Reduction of Area	50.0%	55.4%

*Under Minimum Requirement.

C. A Hardness test was performed on the above Test Specimen in accordance with ASTM A-193, Grade B16 and it was found to have a hardness of RC 29.

Robert W. McVaugh
President

By: Robert W. McVaugh
AUTHORIZED SIGNATURE

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

215/249-9898

Certificate of Conformance No. 29812

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

LABORATORY TESTING INC.

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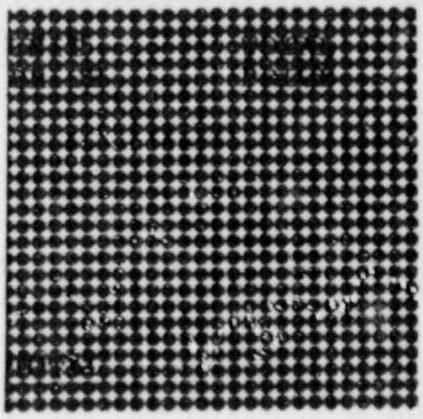
ATTN: John Diletto

CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS271511-AN	TC-449.3	Complete	1/29/88

DESCRIPTION

Fastener Samples No. 88-327:
1 pc. 1/2 - 13 Nut, ASTM A-194, Grade 2H
ID #LGS2-27E

Reference: Transaction #947005, Code #700-08595
Charge #401501-303
Met. Lab Note #88-327



A. The above referenced sample was submitted to chemical content evaluation by Spectrochemical Analysis and found to be in conformance to ASTM A-194, Grade 2H. The results are as follows:

ELEMENT	REQUIRED	ACTUAL
Carbon	0.40 minimum	0.446
Phosphorus	0.040 maximum	0.022
Sulfur	0.050 maximum	0.029

B. A Proof Load test at 24,830# was performed on the above Test Specimen and it was found to be in conformance to ASTM A-194, Grade 2H with no failures.

C. A Hardness test was performed on the above Test Specimen and it was found to be in conformance to ASTM A-194, Grade 2H per the following results:

REQUIRED: RC 24 - RC 38
ACTUAL: RC 32

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By: Robert W. McVaugh
AUTHORIZED SIGNATURE

215/249-9898

Certificate of Conformance No. 29812

TERMS: NET CASH - 10 DAYS

SERVICE CHARGE OF 1½% PER MONTH AFTER 10 DAYS.

LABORATORY TESTING INC.

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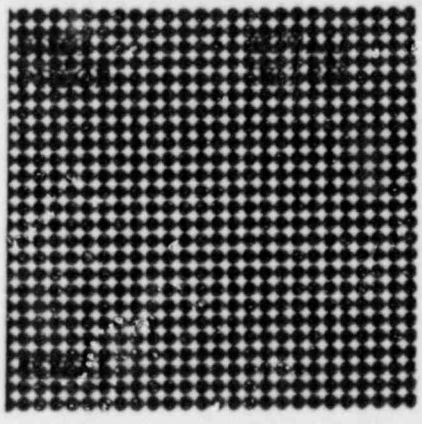
ATTN: John Diletto

CUST. P.O.	LAB REPORT NO.	SHIPMENT	INVOICE DATE
TS271511-AN	TC-449.4	Complete	1/28/88



DESCRIPTION

Fastener Samples No. 88-327:
1 pc. 5/8 - 11 Nut, ASTM A-194, Grade 8
ID #LGS2-40E

Reference: Transaction #947005, Code #700-08595
Charge #401501-303
Met. Lab Note #88-327

A. The above referenced sample was submitted to chemical content evaluation by Spectrochemical Analysis and Wet Chemistry and found NOT to be in conformance to ASTM A-194, Grade 8. The results are as follows:

ELEMENT	REQUIRED	ACTUAL
Carbon	0.08 maximum	0.020
Manganese	2.00 maximum	0.82
Phosphorus	0.045 maximum	0.030
Sulfur	0.030 maximum	0.007
Silicon	1.00 maximum	0.34
Chromium	18.00 - 20.00	*17.53
Nickel	8.00 - 10.50	9.18

*Under Minimum Requirement.

FOR CUSTOMER INFORMATION ONLY: Material is within the range of a 304 Copper Grade.

B. A Hardness test was performed on the above Test Specimen and it was found to be in conformance to ASTM A-194, Grade 8 per the following results:

REQUIRED: RB 60 - RB 105
ACTUAL: RB 103

MERCURY CONTAMINATION - During the testing and inspection, the product did not come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment.

Robert W. McVaugh
President

By. Robert W. McVaugh
AUTHORIZED SIGNATURE

88-327

To: J. Diletto

Date: 12/28/87

From: J. Brightman

Subject. Limerick Generating Station, Unit 2
Construction Division
NRC Compliance Bulletin No. 87-02
Fastner Testing to Determine Conformance
with Applicable Material Specifications.

Please initiate the testing in accordance with the Bulletin 87-02. Each sample is seperately tagged with a unique number. Return test samples and results to LGS-2, Jeff Brightman (X2941).
Charge to 401501-303.

J. Brightman

TEST RESULTS SUMMARY

Of the 38 Limerick Unit 1 samples 5 did not meet their specified requirements.

1) A193 Grade B7, Code #114-22959, Q stud (Anchor Darling bolted bonnet valve application). Measured silicone content 0.41 vs. a permissible range of 0.13-037, and measured tensile strength of 120,515 psi vs. a required tensile strength of 125,000 ps. (yield strength measurement are also below the specified requirements).

2) A193 Grade B7, Code #114-23541, non-A stud (Pacific Valve bolted bonnet valve application). Measured tensile strength of 104,932 psi vs. a required tensile strength of 125,000 psi (yield strength measurement are also below the specified requirements).

3) A193 Grade B7, Code #114-42272, Q stud (Velan Valve bolted bonnet valve application). Measured tensile strength of 105,156 psi vs. a required tensile strength of 125,000 psi (yield measurements are also below the specified requirements).

4) A194 Grade 8M,Code #114-33541, Q nut (Velan Valve bolted bonnet valve application). Measured sulfur content 0.041 vs. a maximum permissible sulfur content of 0.030.

5) SAE J429 Grade 5, Code #114-38065, Q cap screw (Colt Industried Diesel Generator applications). Measured hardness RC 37 vs. a permissible range of RC 25 - RC 34.

Of the 48 Limerick Unit 2 samples 6 did not meet their specified requirements. (Note: an additional 9 samples were retested due to failure of the Baldwin Tensile Testing machine).

1) SA 193 Grade B7, ID #LGS2-03, Q stud (Safety related piping application). Measured % elongation of 14% vs. a minimum permissible elongation of 16%.

2) SA 193 Grade B16, ID #LGS2-05, Q stud (Safety related piping application). Measured % elongation of 16% vs. a minimum permissible elongation of 18%.

3) A194 Grade 2H, ID #LGS2-27, non-Q nut (general plant applications). Measured hardness of 215 HB vx. a minimum permissible hardness of 248 HB.

4) A194 Grade 8, ID #LGS-40, non-Q nut (general plant applications). Measured Chromium content of 17.24% vs. a minimum permissible Chromium content of 18%.

5) A574, ID #LGS2-41, non-Q cap screw (general plant application). Measured hardness of 38 HRC below permissible range.

6) SA-194 Grade 2H, ID #LGS2-04, A nut (Safety related piping applications). Measured Carbon content of 0.38 vs. a minimum permissible Carbon content of 0.4.

Discussion

Fasteners and/or nuts are routinely considered bulk items when purchased for Limerick Generating Station applications. As bulk commodities, the manufacturer's confirmation of chemical, mechanical, hardness characteristics, and physical properties, is performed on a sampling basis. Variables in acceptable raw material chemical composition, and variations in the manufacturing process allowed by the specific material grades and types results in deviations in the final product which may not conform to the specifications. The sampling requirements in bolting material specification allow a margin or likelihood of fasteners being out-of-specification. Therefore, products may meet all fabrication and quality control aspects of production and still not conform to final specification characteristics.

A specific evaluation was performed for each of the out of specification conditions observed on Limerick fasteners and nuts. Anomalies on safety related samples were documented on Non-conformance Reports (NR). These NR's are in the process of being dispositioned according to the following evaluations. Anomalies on non safety related samples were evaluated for restricted use, and verbal authorization was given to the station regarding the acceptability of the non-Q samples. Specific evaluation of each out-of-specification condition follow:

Evaluation

- Limerick Unit 1

1) A193 Grade B7, Code #114-22959, Q stud for use in Anchor Darling bolted bonnet valve applications.

The chemical analysis indicated a higher than prescribed Silicon content. This has no effect on tensile strength and yield strength, or the specific application of these

studs on a valve body to bonnet, the ASME Code derives acceptable bolting stresses based on a percentage of the ultimate tensile strength of the material. The measured tensile strength of 120,515 assures the capability of the bolts to conform to the design requirements imposed by the ASME Code for bolted bonnet valves. Therefore, the test results assure the capability of the stud to accommodate the mechanical requirements of the intended application.

2&3) A193 Grade B7, Code #'s 114-23541 and 42272, non-Q and Q studs applicable for use on bolted bonnet valve applications.

The tensile strength and yield strength test results indicate mechanical strengths below that required by material properties. For the specific application of these studs on a valve body to bonnet, the ASME Code derives acceptable bolting stresses based on a percentage of the ultimate tensile strength of the material. The measured tensile strengths of 104,932 psi and 105,156 psi assure the capability of the bolts to conform to the design requirements imposed by ASME (and also ANSI for non-A valves). Therefore, the test results assure the capability of the studs to accommodate the mechanical requirements of the intended application.

4) A194 Grade 8M, Code #114-33541, A nut for use on bolted bonnet valve applications.

The chemical analysis indicates a higher than prescribed sulfur content. Acceptable hardness and tensile test results confirm the adequacy of the nut to accommodate the mechanical requirements of A194 Grade 8M nuts for A valve body to bonnet applications. Therefore, the sulfer content of the sample which is slightly higher than the maximum required does not prevent the nut from performing satisfactorily in its intended application.

5) SAE J429, Code #11438065, Q cap screw for use on the Emergency Diesel Generators.

The hardness test describing a higher than prescribed hardness indicates an increased tensile strength and lower toughness. Acceptable tensile tests confirm the mechanical strength of the cap screw. Additionally, the cap screws would not be subjected to loads which would be a concern for low toughness. Therefore, the adequacy of the cap screw to accommodate the mechanical requirements of SAE J429 is confirmed.

- Limerick Unit 2

1&2) SA 193 Grade B7 and B16, ID #'s LGS2-03 and LGS2-05, Q studs for safety related piping applications.

The measured elongation was below the minimum prescribed values by a small margin. This has no effect on bolt performance. Therefore, the adequacy of the studs to accommodate the mechanical requirements of SA103 Grades B7 and B16 is confirmed.

3) A194 Grade 2H, ID #LGS2-27, non-Q for general non-safety related plant applications.

The hardness test indicated a lower than prescribed hardness. Acceptable proof load tests confirm the mechanical strength of the nut. Therefore, the adequacy of the nut to accommodate the requirements of A194, Grade 2H for general non-safety related plant applications is confirmed.

4) A194 Grade 8, ID #LGS2-40, non-Q nut for general non-safety related plant applications.

The chemical analysis describing lower than prescribed chromium content may result in decreased corrosion resistance in strong acids. Acceptable hardness and proof load test results confirm the adequacy of the nut to accommodate the requirements of A194 Grade 8 nuts for general non-safety related plant applications. In typical applications, nuts are not subjected to corrosive process fluids. Therefore, the low Chromium content does not prevent the nut from satisfactory performance in general non-Q applications.

5) A574, ID #LGS2-41, non-Q cap screw for use in general non-safety related plant applications.

The hardness test indicated an average of 39 HRC against 38 HRC maximum required. This may be regarded as acceptable because it is within a probable error of +/-1 HRC. Additionally, Tensile strength and yield strength measurement confirm the mechanical strength of the cap screw. Therefore, the adequacy of the cap screw to accommodate the mechanical requirements of A574 cap screws for general non-safety related plant applications is confirmed.

6) SA194 Grade 2H, ID #LGS2-04, Q nut for safety related piping applications.

The chemical analysis describing a lower than prescribed Carbon content may indicate decreased strength. A carbon content of 0.38% in a product analysis is deemed acceptable for a 0.40% requirement. The difference of 0.02% is within the product analysis tolerance. Due to failure of the Tensile Test machine during the proof load test, the mechanical strength of this particular nut is indeterminable. However, test sample LGS2-04D was selected for testing due to the indeterminate test results of LGS2-04 and was found to be within specifications for all measured characteristics.