

Maine Yankee

RELIABLE ELECTRICITY FOR MAINE SINCE 1972

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January 15, 1988
MN-88-06

GDW-88-17

Region I
United States Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Attention: Mr. William T. Russell, Regional Administrator

References: (a) License No. DPR-36 (Docket No. 50-309)
(b) NRC Compliance Bulletin No. 87-02: Fastener Testing to
Determine Conformance with Applicable Material
Specifications

Subject: Response to NRC Compliance Bulletin 87-02

Gentlemen:

Reference (b) requested specific information concerning receipt inspection and internal control procedures for fasteners at Maine Yankee and the results of independent testing of fastener material.

Our response is enclosed. Based on the information provided herein, we believe that our receipt inspection and administrative controls for material issuance are adequate to maintain material traceability.

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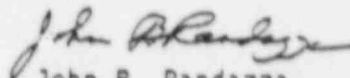
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We conclude that fasteners presently installed at the plant meet the necessary material requirements such that the operability of safety related components is not adversely affected.

Very truly yours,

MAINE YANKEE



John B. Randazza
Executive Vice President

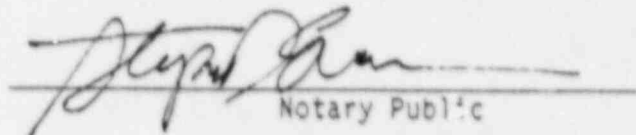
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Enclosure: (118 Pages)

cc: Document Control Desk
Mr. Richard H. Wessman
Mr. Cornelius F. Holden
Mr. Pat Sears

STATE OF MAINE

Then personally appeared before me, John B. Randazza, who being duly sworn did state that he is Executive Vice President of Maine Yankee Atomic Power Company, that he is duly authorized to execute and file the foregoing response in the name and on behalf of Maine Yankee Atomic Power Company, and that the statements therein are true to the best of his knowledge and belief.


Notary Public

STEPHEN D. EVANS
NOTARY PUBLIC, MAINE
MY COMMISSION EXPIRES OCTOBER 3, 1992

MAINE YANKEE RESPONSE
TO
NRC COMPLIANCE BULLETIN 87-02

NRC ITEM 1

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

MAINE YANKEE RESPONSE

1.a Receipt Inspections

The following characteristics are currently examined during the receipt inspection of fasteners or nuts:

- A. Cleanliness.
- B. Identification/Marking - verify letter designation of anchor bolts with manufacturers' length code, check the bolt head markings for proper material grade and markings.
- C. Dimensions.
- D. Workmanship - visual inspection for any damage, cracks, etc.
- E. Manufacturing/Vendor Documentation - Certificate of Compliances, etc.
- F. Physical/Chemical Test Reports - verification that physical/chemical properties conform to code, specifications, purchase order and drawings.
- G. Approved Vendor - verify an approved vendor was utilized or that a vendor source surveillance was performed.

1.b Administrative Controls

Once the material has been satisfactorily receipt inspected, the item is, if practicable, physically labeled with information to facilitate traceability of the item to its pedigree. Where physical identification is impractical, physical separation by bagging, tagging and/or bin location separation or other appropriate means is employed. Procedures specify the appropriate storage requirements for safety class¹ material. Special storage requirements prescribed by vendors are also utilized as deemed necessary.

¹See Attachment A for a description of Maine Yankee's safety classification and procurement level systems.

A Material Issue (MI) slip is generated by the user department whenever material is removed from storage for use or installation in a safety class system or component. The MI slip is used to maintain traceability of the material from the work document, which provides direction for installing the material, back to the pedigree in the purchase order file. These measures assure that identification of the item is maintained either on the item or on records traceable to the item throughout fabrication, erection, installation, and service life of the item. These identification and control measures are designed to prevent the inadvertent use of incorrect or defective material, parts, and components.

Material issued and not used is returned to the stockroom and designated as "returned material" on the original MI Slips, or a Material Return Slip is generated if the original MI slip has been processed. Any material which was placed in service or required maintenance before being returned to stores receives another receipt inspection to verify that the material is still acceptable for use.

NRC ITEM 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 B16; 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.

MAINE YANKEE RESPONSE

Safety Class Fasteners

Ten safety class fasteners were selected from the Stores stock based upon the following criteria:

- Selection of fastener grades identified in Item 2 above (from Reference [b]),
- Selection of fastener grades which represents a cross-section of those most frequently used in the plant.
- Selection of fasteners which represents a cross-section of those available as general stock and those procured for specific applications.
- Selection of fasteners which represents a cross-section of vendors and manufacturers most frequently used.

General stock fasteners represented the majority of items selected and the most prevalent fastener grade was ASTM-A-193. Mr. Richard Freudenberger, NRC Resident Inspector, was present during the selection of the fasteners. All the necessary information was recorded to ensure traceability of the selected fasteners.

Non-Nuclear Safety Class (NNS) Fasteners

The selection criteria and process for the ten (10) NNS fasteners paralleled those used for safety class fasteners. Fasteners composed of ASTM A-193, Grade B7 and SAE J429 Grade 5 made up 40% and 30%, respectively, of the ten fasteners selected. NNS fasteners generally can be identified by markings only (specification and manufacturer), because the purchase orders do not normally list material specifications or require certified material test reports. Consequently, most of the sampled fasteners are not traceable to specific stock codes, purchase orders, or vendors.

NRC ITEM 3

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

MAINE YANKEE RESPONSE

Safety Class nuts were selected for each fastener selected using the same criteria and rationale utilized for the fastener selection process. As was the case for the NNS fasteners, many NNS nuts cannot be positively identified by material specification, manufacturer or vendor. In order to provide meaningful data, nuts were selected for testing that could be identified by specification and manufacturer (i.e., ASTM A-194, Grade 2H). As a result, six of the nuts chosen were ASTM A-194, Grade 2H and one of the nuts did not have a corresponding fastener of the same size. This approach was discussed with the Senior Resident Inspector and a NRC Staff technical contact for this bulletin.

NRC ITEM 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 test shall evaluate the ultimate tensile strength, hardness and chemical properties as required by the fastener's specification, grade, and class. Each sample shall be tagged with the sample's ID number.

MAINE YANKEE RESPONSE

All of the selected fasteners and nuts were shipped to J. Dirats and Company, Inc. of Westfield, Massachusetts for testing. J. Dirats appears on the Yankee Atomic Electric Company Approved Vendors List (YAEC AVL).

The following tests were performed:

<u>ITEMS</u>	<u>CHEMICAL PROPERTIES</u>	<u>ULTIMATE TENSILE STRENGTH</u>	<u>HARDNESS</u>	<u>YIELD STRENGTH</u>
Safety Class Fasteners	X	X	X	X
Safety Class Nuts	X		X	
NNS Fasteners	X		X	
NNS Nuts	X		X	

Because some general stock NNS fasteners and nuts are not traceable to any specifications as previously described, additional mechanical testing was performed on four items (1 fastener, 3 nuts) where no specifications had been identified. Testing for other selected fasteners was performed in accordance with the applicable requirements of the fastener's/nut's specification, grade, class and type.

NRC ITEM 5

The results of all tests, together with supporting information, are to be reported to the NRC utilizing the format shown in Attachments 1 and 2 of this bulletin. Include the names and addresses of suppliers and manufacturers of safety-related fasteners and, to the extent possible, of 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.

MAINE YANKEE RESPONSE

Attachment B provides a summary of the mechanical and chemical test results for the 40 fasteners and nuts selected by specification, grade, class and/or type as applicable.

Attachment C provides a detailed description of each fastener and nut including stock code, storage location, purchase order, material specification, markings, safety class, procurement level, plant application, vendor, and QA requirements imposed on the vendor.

Vendor test reports are included in Attachment D; edited reports correct typographical errors and show any retests that were performed.

Seven of the 40 fasteners and nuts analyzed did not meet the specification requirements for mechanical or chemical properties. A summary of the fastener deviations and our analysis of the safety significance of the observed deviations from the sampled fasteners are presented in Tables 1 and 2, respectively.

Two of the three safety class fasteners that did not meet the specification requirements exhibited nonconformance with chemical requirements. However, neither of these fasteners were installed in plant equipment. In both cases, one alloy was substituted for another (see Table 2). In the case of MY-SC-01, 304 stainless steel was substituted for 316 stainless steel. Both materials are approved for use by ASME SA193 and both have provided satisfactory service at Maine Yankee. For MY-SC-03, the material supplied (303 stainless steel) is not allowed by SA193. Although 303 stainless steel is not a desirable substitute for 304 stainless steel, it does provide adequate strength based on the results of mechanical testing and the recognized corrosion resistance of 300 series stainless steel.

The remaining five items (two bolts and three nuts) did not meet the hardness requirements. The variability observed for two bolts (MY-SC-02 and MY-NNS-07) are not significant and can be considered to be within normal limits for a hardness test. Tensile mechanical tests on MY-SC-02 confirm this conclusion. It is concluded that the NNS fastener has adequate strength to perform its intended function. The higher hardness values and head markings on safety class nuts (SC-01N and SC-09N) indicate that these nuts are grade 8M rather than the specified 8MA; this difference does not present a significant concern to the form, fit, or function of these nuts.

Furthermore, a "proof load" test performed on duplicates of the safety class nuts that were out of specification revealed that no stripping would occur in these nuts at the applied specified load, (see Attachment D, Items 41, 42 and 44). This provides additional assurance that the observed deviations would not significantly affect performance. All the nonconforming items were removed from available stock.

Based on our evaluation, we believe that the material properties of fasteners installed at the plant are adequate to ensure that the operability of safety class components is not adversely affected.

TABLE 1. Fastener Deviations Identified by Testing
Required in NRC Compliance Bulletin 87-02

I.D. NO. (ITEM)	SPECIFICATION	REQUIRED CHARACTERISTIC AND TOLERANCE	AS FOUND CHARACTERISTIC
MY-SC-01 (Stud)	ASME SA193 Gr. B8M	Cr=16-18% \pm .20% Ni=10-14% \pm .15% Mo=2-3% \pm .10%	Cr=18.49% Ni=8.27% Mo=.17%
MY-SC-02 (Bolt)	ASME SA193 Gr. B8M	HRB 100 Max	HRB 103
MY-SC-03 (Stud)	ASTM A193 Gr. B8	S=.030% Max + .005% Cr=18-20% \pm .20%	S=.233% Cr=17.54%
MY-SC-01N (Nut)	ASTM A194 Gr. 8MA	HRB 60-90	HRB 99
MY-SC-04N (Nut)	ASTM A194 Gr. 8	Cr=18-20% \pm 0.2%	Cr=17.50
MY-SC-09N (Nut)	ASTM A194 Gr. 8MA	HRB 60-90	HRB 105
MY-NNS-07 (Bolt)	SAE J429 Gr. 5	HRC 24-34	HRC 34.5

NOTE: Hardness values have been converted from the tested units to those stated in the applicable material specification.

TABLE 2. Analysis of the Significance of
Reported Fastener Deviations

ID NO.	ANALYSIS OF DEVIATION
MY-SC-01	Chemistry indicates that the material supplied is Grade B8 (type 304 stainless steel) rather than Grade B8M (type 316 stainless steel) per ASME SA193. Both grades of stainless are interchangeable based on mechanical properties. Type 316 has improved corrosion resistance, but type 304 has been used successfully throughout the plant and its use does not present a concern from this view. Similar studs should be appropriately reclassified to their correct material designation. Followup checks on issues from the warehouse indicate that these studs have not been installed in the plant.
MY-SC-02	Higher hardness value is not a concern since tensile mechanical properties indicate this material has adequate strength and ductility.
MY-SC-03	Chemistry indicates that the material supplied is type 303 stainless steel rather than ASME SA193, Grade B8 (type 304 stainless steel) as indicated on the Certificate of Compliance or Grade B8S (18Cr-8Ni-4Si+N) as indicated on the stud. Since type 303 stainless steel is not considered to be an acceptable stud material per SA193, it should not be classified as such nor used in applications requiring SA193 studs. A followup check on issues of this material from the warehouse has shown that it has not been installed in any plant systems. It should also be noted that if it had, it would have met the mechanical requirements of a B8 stud material and would not have posed a structural concern.
MY-SC-01N MY-SC-09N	Both higher hardness values and the nut identification markings (B8MW) indicate that these nuts are ASTM A194 grade 8M, rather than grade 8MA as indicated on the material Certificate of Compliance. The A indicates the nut has been carbide solution treated and concurrently annealed. Annealing will relieve the cold work effects and result in a lower maximum hardness (HRB 90) than the grade 8M nuts (HRB 105). Use of grade 8M nuts has provided satisfactory service at Maine Yankee.
MY-SC-04N	The slightly lower than specification value for chromium is not a concern from a structural or corrosion resistance viewpoint. It is most likely attributable to the minor variations which often result when comparing heat and product analyses.
MY-NNS-07	The slightly elevated hardness test result is within the experimental accuracy of the test and does not pose a concern.

NRC ITEM 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.

MAINE YANKEE RESPONSE

Maine Yankee currently has in effect a program for randomly selecting and sending safety class material to an independent materials testing laboratory for analysis in order to verify that test reports supplied by the vendor are correct. The program was initiated in 1983 in response to NRC IE Notice 83-60, Falsification of Test Results for Protective Coatings.

Since the NRC has, through Reference (b), identified a widespread problem with the mechanical and chemical specification requirements of fasteners:

1. Maine Yankee will, by May 30, 1988, revise appropriate procedures to require independent testing of fasteners and nuts on a periodic basis.

This enhancement to our materials test report validation program will be reevaluated after one year of implementation to determine its continued appropriateness.

The applicable material receipt inspection requirements and administrative controls governing the issuance of fasteners have been determined to be adequate.

ATTACHMENT A

Mechanical, Electrical and Instrumentation systems, components and structures at Maine Yankee have been designated and categorized as to their nuclear safety classification (SC) as described in the Maine Yankee Operational Quality Assurance Program. Components are delineated as Safety Class 1,2,3, IE, Non-Nuclear Safety Class (NNS) and Quality Assurance Related (QAR). Safety Class 1,2 and 3 follow the definitions in ANSI N18.2. Safety Class IE follows the definition in IEEE-308 and IEEE-279. Items which require a degree of quality between Non Nuclear Safety and Safety Class 1,2, and 3 are designated as Quality Assurance Related. Quality Assurance Related materials and components are in compliance with those parts of the Maine Yankee Operational Quality Assurance Program necessary to achieve the desired intermediate level of quality.

Maine Yankee's procurement system has three (3) different levels:

- a. Procurement Level 1 is for a Safety Class or Quality Assurance Related system in which the following statements are true:
 - * 10 CFR 21 may or may not apply.
 - * An approved vendor or vendor surveillance is normally required.
 - * Detailed QA requirements are necessary.
- b. Procurement Level 2 may also apply to the purchase for a Safety Class or Quality Assurance Related system with the following statements being true:
 - * 10 CFR 21 does not apply.
 - * The item is a catalog or commercial grade item.
 - * No specific QA requirements are necessary to assure adequate quality.
 - * An approved vendor is not necessary.
- c. Procurement Level 3 purchases apply only to a Non Nuclear Safety system in which no additional Quality Assurance requirements are necessary.

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION A-193, GRADE B7

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>UTS (KSI)</u>	<u>0.2% YS (KSI)</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Mo</u>	<u>Cr</u>
MY-SC-05	HRC32.0	152.8	138.2	.38	.82	.007	.028	.22	.22	.99
MY-SC-06	HRC31	146.1	132.8	.40	.95	.03	.028	.20	.15	1.05
MY-SC-07	HRC26	126.7	110.6	.39	.84	.021	.021	.19	.17	.95
MY-SC-08	HRC32.5	156.1	147.1	.41	.93	.013	.02	.23	.22	1.03
MY-SC-10	HRC30.0	142.8	124.8	.39	.94	.019	.025	.26	.21	1.05
MY-NNS-01	HRC29.5	N/A	N/A	.43	.88	.007	.018	.21	.18	.94
MY-NNS-02	HRC33.0	N/A	N/A	.43	.90	.008	.019	.18	.20	1.00
MY-NNS-03	HRC33.0	N/A	N/A	.43	.90	.009	.021	.23	.22	.92
MY-NNS-04	HRC29.5	N/A	N/A	.37	.78	.016	.029	.19	.17	1.03

Note: 1. UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon; Mo-molybdenum; Cr-chromium (All in percent by weight).

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION ASTM A-193, Grade B8

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>UTS (KSI)</u>	<u>0.2% YS (KSI)</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>Mo</u>
MY-SC-03	HRB93	116.5	53.1	.09	1.12	.022	*.233	.51	*17.54	8.45	.07

Notes: 1. UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon; Mo-molybdenum; Cr-chromium; Ni-Nickel (All in percent by weight).

* Property out of specification.

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION ASME SA-193, Grade B8M, Class 1

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>UTS (KSI)</u>	<u>0.2% YS (KSI)</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>Mo</u>
MY-SC-01	HRB 88	96.8	50.2	.05	1.25	.025	.025	.31	*18.49	*8.27	*.17
MY-SC-02	*HRB 103 (Note 2)	105.1	90.7	.06	1.42	.031	.011	.40	16.81	12.10	2.20

- Notes: 1. UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon; Mo-molybdenum; Cr-chromium; Ni-Nickel (All in percent by weight).
2. Hardness value converted from the reported value.
- * Property out of specification.

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION ASTM A-193, Grade B3M, Class 2

<u>Mechanical Analysis</u>				<u>Chemical Analysis</u>							
<u>I.D. #</u>	<u>HARDNESS</u>	<u>UTS (KSI)</u>	<u>0.2% YS (KSI)</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>Mo</u>
MY-SC-09	HRC30.5	145	129.2	.02	1.71	.033	.025	.43	16.47	10.25	2.12

Note: 1. UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon; Mo-molybdenum; Cr-chromium; Ni-Nickel (All in percent by weight).

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION ASTM A-564, Type 630 (1100°F)

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>UTS</u> <u>(KSI)</u>	<u>0.2% YS</u> <u>(KSI)</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>Mo</u>	<u>Cu</u>	<u>Ta</u>	<u>Nb</u>
MY-SC-04	HRC37	162.3	160.8	.04	.88	.03	.003	.33	15.71	4.12	.27	3.38	.01	.31

Note: 1. UTS-ultimate tensile strength; YS-yield strength; C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon; Cr-chromium; Ni-Nickel; Cu-copper; Nb - Niobium (Columbium); Ta-Tantalum (All in percent by weight).

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION SAE J429, Grade 5

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>C</u>	<u>P</u>	<u>S</u>
MY-NNS-05	HRC27.5	.32	.028	.015
MY-NNS-06	HRC26.5	.36	.013	.025
MY-NNS-07	*HRC34.5	.33	.007	.019

Note: 1. C-carbon; P-phosphorus; S-sulfur; (All in percent by weight).

* Property out of specification.

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION ASTM A-325, Type 1

Mechanical Analysis:

<u>I.D. #</u>	<u>HARDNESS</u>	<u>C</u>
MY-NNS-08	HRC 28.5	.31

Chemical Analysis

<u>Mn</u>	<u>P</u>	<u>S</u>
.81	.008	.012

Note: 1. C-carbon; Mn-Manganese; P-phosphorus; S-sulfur (All in percent by weight).

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION MS 35308/Material To AISI 300 Series (See Note 1)

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>C</u>	<u>Cr</u>	<u>Mn</u>	<u>Ni</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Mo</u>
MY-NNS-09	HRB93	.05	18.17	.89	9.20	.017	.009	.46	.19

- Notes: 1. MS 35308 requires material to be AISI 300 Series - Actual results indicate that the material is AISI Type 304 with chemical and mechanical properties equivalent to those of an ASTM A-193, Grade B8 fastener.
2. C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon; Cr-chromium; Ni-Nickel; Mo-Molybdenum (All in percent by weight).

ATTACHMENT B

FASTENER DATA SUMMARY

SPECIFICATION-NONE SPECIFIED-STAINLESS STEEL (See Note 1)

Mechanical Analysis				Chemical Analysis							
I.D. #	HARDNESS	UTS (KSI)	0.2% YS (KSI)	C	Mn	P	S	Si	Cr	Ni	Mo
MY-NNS-10	HRB88.5	100.9	47.6	.07	.96	.026	.008	.43	17.93	8.49	.20

Notes: 1. Actual test results show that the material has mechanical and chemical properties equivalent to those of an ASTM A-193, Grade BB fastener.

2. UTS-Ultimate Tensile Strength; YS-Yield Strength; C-carbon; Mn-manganese; P-phosphorus; S-sulfur; Si-silicon; Cr-chromium; Ni-nickel; Mo-molybdenum (All in percent by weight).

ATTACHMENT B

NUT DATA SUMMARY

SPECIFICATION ASTM A-194, Grade 2H (See Note 2)

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Mo</u>
MY-SC-05N	HRC28.5	.42	.75	.012	.015	.23	.01
MY-SC-06N	HRC31.5	.44	.76	.028	.023	.23	.03
MY-SC-07N	HRC26	.40	.70	.012	.013	.20	.02
MY-SC-08N	HRC29.5	.41	.75	.014	.029	.22	.05
MY-SC-10N	HRC26	.40	.72	.010	.012	.21	.02
MY-NNS-01N	HRC30.5	.40	.73	.018	.017	.23	.03
MY-NNS-02N	HRC28.5	.41	.73	.004	.023	.31	.02
MY-NNS-04N	HRC29.5	.44	.70	.018	.013	.21	.02
MY-NNS-05N	HRC24.5	.46	.73	.013	.032	.25	.01
MY-NNS-07N	HRC27	.45	.78	.014	.017	.26	.01
MY-NNS-08N	HRC29.5	.41	.61	.015	.018	.28	.03

Notes: 1. C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon; Mo-Molybdenum (All in percent by weight).

2. MY-SC-06N was purchased to ASME SA-193, which is identical to ASTM A-193 with regards to the listed properties.

ATTACHMENT B

NUT DATA SUMMARY

SPECIFICATION ASTM A-194, Grade 8/8B

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>
MY-SC-04N	HRB83	.05	1.38	.023	.002	.64	*17.50	10.50
MY-HNS-09N	HRB83.3	.08	1.58	.045	.027	.50	18.37	8.98

RETEST OF ADDITIONAL MATERIAL FROM SAME LOT:

MY-SC-0-4N-R	HRB84	.05	1.38	.016	.001	.55	* 17.69	10.09
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PROOF LOAD (NOT REQUIRED BY NRC COMPLIANCE BULLETIN 87-02):

	<u>AREA</u>	<u>APPLIED LOAD (lbs)</u>	<u>RESULTS</u>
MY-SC-04N-R	.334	25,050	No Stripping

Notes: 1. C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon; Cr-chromium; Ni-nickel (All in percent by weight).

* Property found out of specification.

ATTACHMENT BNUT DATA SUMMARY

SPECIFICATION ASTM A-194, Grade 8F

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>
MY-SC-03N	HRB98 (See Note 2)	.05	1.59	.010	.325	.52	17.76	8.89

RETEST OF ADDITIONAL MATERIAL FROM SAME LOT

MY-SC-03N-R	HRB98	.05	1.59	.013	.318	.53	17.95	8.75
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PROOF LOAD (NOT REQUIRED BY NRC COMPLIANCE BULLETIN 87-02):

<u>AREA</u>	<u>APPLIED LOAD (lbs)</u>	<u>RESULTS</u>
MY-SC-03N-R	.226	16,950
		No Stripping

Notes: 1. C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon;
Cr-chromium; Ni-nickel (All in percent by weight).

2. Hardness value is converted from the reported value (reported value is HRC21 for MY-SC-03N).

ATTACHMENT B

NUT DATA SUMMARY

SPECIFICATION ASTM A-194, Grade 8MA

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>Mo</u>
MY-SC-01N	*HRB99 (See Note 2)	.06	1.38	.035	.014	.45	16.56	11.03	2.12
MY-SC-09N	*HRB105 (See Note 2)	.04	1.08	.033	.009	.36	16.05	12.20	2.06

RETEST OF ADDITIONAL MATERIAL FROM SAME LOT:

MY-SC-01N-R	* HRB102 (See Note 2)	.04	1.21	.031	.009	.42	16.42	12.14	2.16
MY-SC-09N-R	* HRB104 (See Note 2)	.04	1.10	.028	.003	.48	16.44	12.17	2.18

PROOF LOAD (NOT REQUIRED BY NRC COMPLIANCE BULLETIN 87-02):

	<u>AREA</u>	<u>APPLIED LOAD (lbs)</u>	<u>RESULTS</u>
MY-SC-01N-R	.226	18,080	No Stripping
MY-SC-09N-R	.1419	10,640	No Stripping

Notes: 1. C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon;
Cr-chromium; Ni-nickel; Mo-molybdenum (All in percent by weight).

2. The hardness values are converted from the reported values.

* Property found out of specification.

ATTACHMENT B

NUT DATA SUMMARY

SPECIFICATION ASTM A-194, Grade 8MB

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Cr</u>	<u>Ni</u>	<u>Mo</u>
MY-SC-02N	HRB76.5	.07	.49	.038	.025	.38	17.02	10.08	2.00

Note: 1. C-carbon; Mn-Manganese; P-phosphorus; S-sulfur; Si-silicon;
Cr-chromium; Ni-nickel; Mo-molybdenum.

ATTACHMENT B

NUT DATA SUMMARY

SPECIFICATION-NONE SPECIFIED-CARBON STEEL (See Note 1)

<u>Mechanical Analysis</u>			<u>Chemical Analysis</u>					
<u>I.D. #</u>	<u>HARDNESS</u>	<u>FAILURE STRESS (KSI)</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>Mo</u>
MY-NNS-03N	HRB88	121.2	.07	.51	.002	.043	.04	.01
MY-KNS-06N	HRB91	126.4	.11	.43	.007	.020	.05	.01

Notes: 1. Actual test results show that the material has mechanical and chemical properties similar to those of SAE J995, Grade 2 nuts.

2. C-carbon; Mn-manganese; P-phosphorous; S-sulfur; Si-silicon; Mo-molybdenum.

ATTACHMENT B

NUT DATA SUMMARY

SPECIFICATION-NONE SPECIFIED-STAINLESS STEEL (See Note 1)

Mechanical AnalysisChemical Analysis

<u>I.D. #</u>	<u>HARDNESS</u>	<u>FAILURE STRESS (KSI)</u>	<u>C</u>	<u>Mn</u>	<u>P</u>	<u>S</u>	<u>Si</u>	<u>CR</u>	<u>Ni</u>	<u>Mo</u>
MY-NVS-10N	HRC32	224.8	.04	1.68	.03	.009	.34	18.19	9.07	.16

Notes: 1. Actual test results show that the material has mechanical and chemical properties equivalent to those of an ASTM F-594, Alloy Group 1 nut.

2. UTS-Ultimate Tensile Strength; YS-Yield Strength; C-carbon; Mn-manganese; P-phosphorous; S-sulfur; Si-silicon; Cr-chromium; Ni-nickel; Mo-molybdenum.

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 1 of 40

Sample I.D. No. MY-SC-01

Fastener Description: 5/8-11 UNC x 5" stud

Description of Sample Stock Location: Stock Code 26068
Purchase Order 27995
Bin Location EGH22

Material Specification as Documented by Licensee Records: ASME-SA-193 Grade B8M

Head Marking (Specification and Manufacturer): WB8

Class/Procurement Level: Nuclear Safety Class 1

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

Gland stud for 2" 1500 lb. bolted bonnet motor operated gate valve

Vendor: Velan Valve Corp.
Avenue C, Griswold Industrial Park
Williston, VT 05495

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification noted in Purchase Order.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date

1/8/88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 2 of 40

Sample I.D. No. MY-SC-02

Fastener Description: 3/4-10 UNC x 1 3/4" bolt

Description of Sample Stock Location: Stock Code 31904
Purchase Order 44461
Bin Location GBF31

Material Specification as Documented by Licensee Records: ASME-SA-193 Grade B8M

Head Marking (Specification and Manufacturer): B8M HS 316

Class/Procurement Level: Nuclear Safety Class 1
Procurement Level 1

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

General Plant Stock

Vendor: Hardware Specialty Company
48-75 Street
Long Island City, N.Y. 11101

QA Requirements Imposed on Vendor:

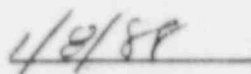
Certificate of Compliance to the material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date



ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 3 of 40

Sample I.D. No. MY-SC-03

Fastener Description: 5/8-11 UNC x 2 3/4" Stud

Description of Sample Stock Location: Stock Code 17660
Purchase Order 21875
Bin Location DIE22

Material Specification as Documented by Licensee Records: ASTM-A-193 Gr B8

Head Marking (Specification and Manufacturer): B8S

Class/Procurement Level: Nuclear Safety Class 2

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

Body to bonnet stud for ITT Hammel Dahl 1 1/2" 1500 lb. globe valve

Vendor: ITT Hammel Dahl
175 Post Road
Warwick, RI 02888

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date

1/8/88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 4 of 40

Sample I.D. No. MY-SC-04

Fastener Description: 3/4 - 10 UNC x 3 1/4" Stud

Description of Sample Stock Location: Stock Code 31875
Purchase Order 44332
Bin Location DGH15

Material Specification as Documented by Licensee Records:

ASTM-A-564 Type 630, Heat treatment temperature 1100°F.

Head Marking (Specification and Manufacturer): C 630 K12

Class/Procurement Level: Procurement Level 1, Nuclear Safety Class 2

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

Bonnet to body stud for Anchor Darling swing check valve.

Vendor: Anchor Darling Valve Corp., Williamsport, PA
Fastener Manufacturer - Cardinal Industrial Products
3873 Oquendo Road
Las Vegas, NV 89118

QA Requirements Imposed on Vendor:

Certified Material test reports.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature Will Sherman Date 1/8/88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 5 of 40

Sample I.D. No. MY-SC-05

Fastener Description: 1 - 8 UNC x 6" Stud

Description of Sample Stock Location: Stock Code 32666
Purchase Order 34987
Bin Location 3JG612

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

Head Marking (Specification and Manufacturer): B 7 W

Class/Procurement Level: Nuclear Safety Class 1

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

• General Stock

Vendor: Gundry Metal Products
Division of Warren Fastening
121 Hudson Street
New York, N.Y. 10013

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification

Licensee Representative: Will Sherman, Q.C. Engineer

Signature Will Sherman Date 4/8/88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 6 of 40

Sample I.D. No. MY-SC-06

Fastener Description: 1/2 - 13 UNC x 1 1/4" Bolt

Description of Sample Stock Location: Stock Code 32343
Purchase Order 44279
Bin Location 3JK411

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

Head Marking (Specification and Manufacturer): CEEC1 JB7

Class/Procurement Level: Procurement Level 1
Nuclear Safety Class 1

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

General Stock

Vendor: Hardware Specialty Company
48-75 Street
Long Island City, N.Y. 11101

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature Will Sherman Date 4/8/88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 7 of 40

Sample I.D. No. MY-SC-07

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

Description of Sample Stock Location: Stock Code 32378
Purchase Order 46175
Bin Location 3JJ211

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

Head Marking (Specification and Manufacturer): L7 B7 C-U


Class/Procurement Level: Procurement Level 1
Nuclear Safety Class 1

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

Vendor: Cardinal Industrial Products, Inc.
3873 Oquendo Road
Las Vegas, NV 89118

QA Requirements Imposed on Vendor:
Certificate of Compliance to material specification.

Licensee Representative: Will Shorman, Q.C. Engineer

Signature  Date 11/8/88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 8 of 40

Sample I.D. No. MY-SC-08

Fastener Description: 5/8 - 11 UNC x 8" Stud

Description of Sample Stock Location: Stock Code 32641
Purchase Order 5569
Bin Location 3JH411

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

Head Marking (Specification and Manufacturer): B7W SC1

Class/Procurement Level: Nuclear Safety Class 1

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

General Stock

Vendor: Gundry Metal Products
Division of Warren Fasteners Corp.
121 Hudson Street
New York, N.Y. 10013

QA Requirements Imposed on Vendor:

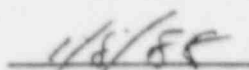
Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date



0731Q

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 9 of 40

Sample I.D. No. My-SC-09

Fastener Description: 1/2 - 13 UNC x 2 3/8" Stud

Description of Sample Stock Location: Stock Code 32996
Purchase Order 47890
Bin Location EH643

Material Specification as Documented by Licensee Records:

ASTM-A-193 Grade B8M CL-2

Head Marking (Specification and Manufacturer): B 8M 2C

Class/Procurement Level: Procurement Level 1
Nuclear Safety Class 1

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

General Stock

Vendor: Cardinal Industrial Products, Inc.
3873 Oquendo Road
Las Vegas, NV 89118

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature Will Sherman Date 1/18/88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 10 of 40

Sample I.D. No. MY-SC-10

Fastener Description: 7/8 - 9 UNC x 4 1/2" Stud

Description of Sample Stock Location: Stock Code 32654
Purchase Order 46478
Bin Location 3JG711

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

Head Marking (Specification and Manufacturer): B 7 C

Class/Procurement Level: Procurement Level 1
Nuclear Safety Class 1

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

General Stock

Vendor: Cardinal Industrial Products, Inc.
3873 Oquendo Road
Las Vegas, NV 89118

QA Requirements Imposed on Vendor:

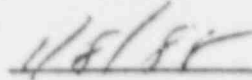
Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date



0731Q

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 11 of 40

Sample I.D. No. MY-NNS-01

Fastener Description: 1 1/4" x 5 1/2" Stud

Description of Sample Stock Location: Stock Code 27024
Purchase Order 32372
Bin Location AAB13

Material Specification as Documented by Licensee Records:

None specified - ASTM A-193, Grade B7 per the markings.

Head Marking (Specification and Manufacturer): B7*

Class/Procurement Level: NNS/Procurement Level 3

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

Condensate pump last stage studs.

Vendor: Ingersoll Rand
225 Old New Brunswick Road
Piscataway, NJ 08854

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature

Scott A Bailey

Date

1-8-88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 12 of 40

Sample I.D. No. MY-NNS-02

Fastener Description: 5/8" x 4 1/2" Stud

Description of Sample Stock Location: Stock Code 30246
Purchase Order 39526
Bin Location 3H061

Material Specification as Documented by Licensee Records: ASTM A-193, Grade B7

Head Marking (Specification and Manufacturer): B7R

Class/Procurement Level: NNS/Procurement Level 3

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

Bonnet clamp stud for 8", 600# gate valve.

Vendor: W.L. Blake
79-85 Commercial Street
P.O. Box 579
Portland, Me. 04112

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88
0731Q

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 13 of 40

Sample I.D. No. MY-NNS-03

Fastener Description: 5/8" x 3" Stud

Description of Sample Stock Location: General Stock (Warehouse)

Material Specification as Documented by Licensee Records:

None Specified, ASTM A-193, Grade B7 per the markings.

Head Marking (Specification and Manufacturer): B7 H

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature

Scott A. Bailey

Date

1-8-88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 14 of 40


Sample I.D. No. MY-NNS-04

Fastener Description: 1 1/8" x 7" Bolt

Description of Sample Stock Location: General Stock (Warehouse)

Material Specification as Documented by Licensee Records:

None specified, ASTM A-193, Grade B7 per the markings.

Head Marking (Specification and Manufacturer): J B7 

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 15 of 40

Sample I.D. No. MY-NNS-05

Fastener Description: 1/2" x 1" Bolt

Description of Sample Stock Location: General Stock (Warehouse)

Material Specification as Documented by Licensee Records:

None specified, SAE J429, Grade 5 per the markings.

Head Marking (Specification and Manufacturer):



Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

0731Q

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 16 of 40

Sample I.D. No. MY-NNS-06

Fastener Description: 9/16" x 3" Bolt

Description of Sample Stock Location: General Stock (Stockroom)

Material Specification as Documented by Licensee Records:

None specified, SAE J429, Grade 5 per the markings.

Head Marking (Specification and Manufacturer):



Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88
0731Q

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 17 of 40

Sample I.D. No. MY-NNS-07

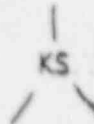
Fastener Description: 1/2" x 1 1/2" Bolt

Description of Sample Stock Location: General Stock (Warehouse)

Material Specification as Documented by Licensee Records:

None specified, SAE J429, Grade 5 per the markings.

Head Marking (Specification and Manufacturer):



Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A Bailey Date 1-8-88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 18 of 40

Sample I.D. No. MY-NNS-08

Fastener Description: 7/8" x 2 1/2" Bolt

Description of Sample Stock Location: General Stock (Warehouse)

Material Specification as Documented by Licensee Records:

None specified, ASTM A-325, type 1 per the markings.

Head Marking (Specification and Manufacturer): A325 NF

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 19 of 40

Sample I.D. No. MY-NNS-09

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

Description of Sample Stock Location: General Stock (Warehouse)

Material Specification as Documented by Licensee Records:

None specified, MS 35308 per the markings.

Head Marking (Specification and Manufacturer): \ /

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A Bailey Date 1-8-08

ATTACHMENT C

FASTENER TESTING DATA SHEET

Page 20 of 40

Sample I.D. No. MY-NNS-10

Fastener Description: 1/2" x 8" Bolt

Description of Sample Stock Location: General Stock (Warehouse)

Material Specification as Documented by Licensee Records: None specified.

Head Marking (Specification and Manufacturer): None

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 21 of 40

Sample I.D. Nos. MY-SC-01N, MY-SC-01N-R

Nut Description: 5/8 - 11 UNC Nut

Description of Sample Stock Location: Stock Code 23827
Purchase Order 34978
Bin Location GFH41

Material Specification as Documented by Licensee Records: ASTM A-194 Grade 8MA

Marking (Specification and Manufacturer): B8MW

Class/Procurement Level: Nuclear Safety Class 1

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

Gland stud nut for 1500 lb. bolted bonnet motor operated gate valve.

Vendor: Velan Valve Corp.
Avenue C, Griswold Industrial Park
Williston, VT 05495

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date



ATTACHMENT C

NUT TESTING DATA SHEET

Page 22 of 40

Sample I.D. No. MY-SC-02N

Nut Description: 3/4 - 10 UNC Nut

Description of Sample Stock Location: Stock Code 23829
Purchase Order 22997
Bin Location GFH41

Material Specification as Documented by Licensee Records: ASTM A-194 Grade 8MB

Marking (Specification and Manufacturer): B8Md 316 45-15

Class/Procurement Level: Nuclear Safety Class 1

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

General Plant Stock

Vendor: Liberty Industries Inc.
598 Deming Road
Berlin, CT 06037

QA Requirements Imposed on Vendor:

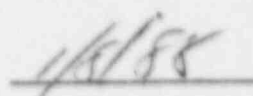
Certificate of Compliance to material specification, grade, class, and heat treatment condition.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date



ATTACHMENT C

NUT TESTING DATA SHEET

Page 23 of 40

Sample I.D. Nos. MY-SC-03N, MY-SC-03N-R

Nut Description: 5/8 - 11 UNC Nut

Description of Sample Stock Location: Stock Code 17661
Purchase Order 21875
Bin Location DIE21

Material Specification as Documented by Licensee Records: ASTM A-194 Grade 8F

Marking (Specification and Manufacturer): 8FB 303

Class/Procurement Level: Nuclear Safety Class 2

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


Std nut for ITT Hammel Dahl 1 1/2" 1500 lb. globe valve.

Vendor: ITT Hammel Dahl
175 Post Road
Warwick, RI 02888

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature  Date 4/1/88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 24 of 40

Sample I.D. Nos. MY-SC-04N, MY-SC-04N-R

Nut Description: 3/4 - 10 UNC Nut

Description of Sample Stock Location: Stock Code 31866
Purchase Order 44332
Bin Location DGH15

Material Specification as Documented by Licensee Records: ASTM A-194 Grade 8

Marking (Specification and Manufacturer): TPK 18

Class/Procurement Level: Procurement Level 1, Nuclear Safety Class 2

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

Bonnet to body stud nut for Anchor Darling swing check valve.

Vendor: Anchor Darling Valve Corp., Williamsport, PA
Fastener Manufacturer - Texas Bolt

QA Requirements Imposed on Vendor: Certified Material Test Reports

Licensee Representative: Will Sherman, Q.C. Engineer

Signature Will Sherman Date 1/8/58

ATTACHMENT C

NUT TESTING DATA SHEET

Page 25 of 40

Sample I.D. No. MY-SC-05N

Nut Description: 1-8 UNC Nut

Description of Sample Stock Location: Stock Code 23726
Purchase Order 47982
Bin Location 3JI411

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

Marking (Specification and Manufacturer): 2 H A

Class/Procurement Level: Procurement Level 1
Nuclear Safety Class 1

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

General Stock


Vendor: Cardinal Industrial Products, Inc.
3873 Oquendo Road
Las Vegas, NV 89118

QA Requirements Imposed on Vendor:

Certificate of Compliance to Material Specification

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date

1/8/88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 26 of 40

Sample I.D. No. MY-SC-06N

Nut Description: 1/2 - 13 UNC Nut

Description of Sample Stock Location: Stock Code 14121
Purchase Order 48574
Bin Location 3JI612

Material Specification as Documented by Licensee Records: ASME SA-194 Grade 2H

Marking (Specification and Manufacturer): 2 H (—)

Class/Procurement Level: Procurement Level 1
Nuclear Safety Class 1

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

General Stock

Vendor: A&G Engineering
4640 East LaPalma Avenue
Anaheim, CA 42807
Manufacturer: Hamanaka Nut Manufacturing Co., LTD

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature Will Sherman Date 11/8/84

ATTACHMENT C

NUT TESTING DATA SHEET

Page 27 of 40

Sample I.D. No. MY-SC-07N

Nut Description: 7/8 - 9 UNC nut

Description of Sample Stock Location: Stock Code 14124
Purchase Order 40774
Bin Location 3JIS13

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

Marking (Specification and Manufacturer): (—) 2H AMD

Class/Procurement Level: Procurement Level 1
Nuclear Safety Class 1

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

General Stock

Vendor: Hardware Specialty Company
48-75 Street
Long Island City, NY 11101
Manufacturer: A&G Engineering, Anaheim, CA

QA Requirements Imposed on Vendor:

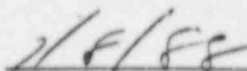
Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date



ATTACHMENT C

NUT TESTING DATA SHEET

Page 22 of 40

Sample I.D. No. MY-SC-08N

Nut Description: 5/8 - 11 UNC Nut

Description of Sample Stock Location: Stock Code 14122
Purchase Order 37119
Bin Location 3JIG14

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

Marking (Specification and Manufacturer): 2H JS

Class/Procurement Level: Nuclear Safety Class 1

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

General Stock

Vendor: Hardware Specialty Company
48-75 Street
Long Island City, N.Y. 11101

QA Requirements Imposed on Vendor:

Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature Will Sherman Date 1/8/84

ATTACHMENT C

NUT TESTING DATA SHEET

Page 29 of 40

Sample I.D. Nos. MY-SC-09N, MY-SC-09N-R

Nut Description: 1/2 - 13 UNC Nut

Description of Sample Stock Location: Stock Code 23825
Purchase Order 34978
Bin Location 6FH21

Material Specification as Documented by Licensee Records: ASTM A-194 Grade 8MA

Marking (Specification and Manufacturer): B 8 MW

Class/Procurement Level: Nuclear Safety Class 1

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

General Stock

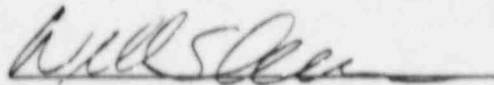
Vendor: Gundry Metal Products, Inc.
Division of Warren Fastenings Corp.
121 Hudson Street
New York, NY 10013

QA Requirements Imposed on Vendor:

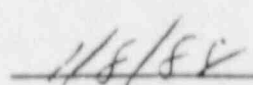
Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date



ATTACHMENT C

NUT TESTING DATA SHEET

Page 30 of 40

Sample I.D. No. MY-SC-10N

Nut Description: 7/8 - 9 UNC Nut

Description of Sample Stock Location: Stock Code 14124
Purchase Order 40774
Bin Location 3JIS13

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

Marking (Specification and Manufacturer): (—) 2H AMD

Class/Procurement Level: Procurement Level 1
Nuclear Safety Class 1

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

General Stock

Vendor: Hardware Specialty Company
48-75 Street
Long Island, N.Y. 10013

Manufacturer Hamanaka Nut Manufacturing Co., LTD via A&G Engineering

QA Requirements Imposed on Vendor:

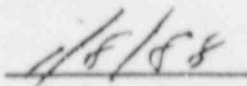
Certificate of Compliance to material specification.

Licensee Representative: Will Sherman, Q.C. Engineer

Signature



Date



ATTACHMENT C

NUT TESTING DATA SHEET

Page 31 of 40

Sample I.D. No. MY-NNS-01N

Nut Description: 1 1/4" Nut

Description of Sample Stock Location: Stock Code 27025
Purchase Order 32372
Bin Location AAB14

Material Specification as Documented by Licensee Records:

None Specified, ASTM A-194, Grade 2H per the markings.

Marking (Specification and Manufacturer): 2HK

Class/Procurement Level: NNS/Procurement Level 3

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

Condensate pump last stage nuts.

Vendor: Ingersoll Rand
225 Old New Brunswick Road
Piscataway, NJ 08854

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88
0731Q

ATTACHMENT C

NUT TESTING DATA SHEET

Page 32 of 40

Sample I.D. No. MY-NNS-02N

Nut Description: 5/8" Nut

Description of Sample Stock Location: Stock Code 30247
Purchase Order 39526
Bin Location 3H061

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

Marking (Specification and Manufacturer): 2HS

Class/Procurement Level: NNS/Procurement Level 3

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

Bonnet clamp stud nuts for 8", 600 # gate valve.

Vendor: W.L. Blake
79-85 Commercial Street
P.O. Box 579
Portland, ME 04112

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 33 of 40

Sample I.D. No. MY-NNS-03N

Nut Description: 5/8" Nut

Description of Sample Stock Location: General Stock (Stockroom)

Material Specification as Documented by Licensee Records: None specified

Marking (Specification and Manufacturer): None

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A Bailey Date 1-8-88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 34 of 40

Sample I.D. No. MY-NNS-04N

Nut Description: 1 1/8" Nut

Description of Sample Stock Location: Purchase Order #6946
General Stock (Warehouse)

Material Specification as Documented by Licensee Records:

None specified, ASTM A-194, Grade 2H per the markings.

Marking (Specification and Manufacturer): 2HJ

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Norwood Tool and Industrial Supply Company
P.O. Box 186
Norwood, MA 02062

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A Bailey Date 1-8-88
0731Q

ATTACHMENT C

NUT TESTING DATA SHEET

Page 35 of 40

Sample I.D. No. MY-NNS-05N

Nut Description: 1/2" Nut

Description of Sample Stock Location: General Stock (Stockroom)

Material Specification as Documented by Licensee Records:

None specified, ASTM A-194, Grade 2H per the markings.

Marking (Specification and Manufacturer): 2HS

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 36 of 40

Sample I.D. No. MY-NNS-06N

Nut Description: 9/16" Nut

Description of Sample Stock Location: General Stock (Stockroom)

Material Specification as Documented by Licensee Records: None specified

Marking (Specification and Manufacturer): None

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 37 of 40

Sample I.D. No. MY-NNS-07N

Nut Description: 1 1/8" Nut

Description of Sample Stock Location: Stock Code 27444
Purchase Order 33155
Bin Location DDB13

Material Specification as Documented by Licensee Records:

None specified, ASTM A-194, Grade 2H per the markings.

Marking (Specification and Manufacturer): 2HJS

Class/Procurement Level: NNS/Procurement Level 3

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

Bonnet Nut for 18" relief valve.

Vendor: Dresser
Industrial Valve Operations
Box 1430
Alexandria, LA 71301

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 38 of 40

Sample I.D. No. MY-NNS-08N

Nut Description: 7/8" Nut

Description of Sample Stock Location: General Stock (Stockroom)

Material Specification as Documented by Licensee Records:

None specified, ASTM A-194, Grade 2H per the markings.

Marking (Specification and Manufacturer): 2HJ

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A Bailey Date 1-8-88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 39 of 40

Sample I.D. No. MY-NNS-09N

Nut Description: 3/4" Nut

Description of Sample Stock Location: General Stock (Warehouse)

Material Specification as Documented by Licensee Records:

None specified, ASTM A-194, Grade 8B per the markings.

Marking (Specification and Manufacturer): 8BH

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature

Scott A. Bailey

Date

1-8-88

ATTACHMENT C

NUT TESTING DATA SHEET

Page 40 of 40

Sample I.D. No. MY-NNS-10N

Nut Description: 1/2" Nut

Description of Sample Stock Location: General Stock (Stockroom)

Material Specification as Documented by Licensee Records: None specified

Marking (Specification and Manufacturer): None

Class/Procurement Level: NNS/Procurement Level 3

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

General Stock

Vendor: Unknown

QA Requirements Imposed on Vendor: None

Licensee Representative: Scott Bailey, Q.C. Engineer

Signature Scott A. Bailey Date 1-8-88

ATTACHMENT D
LABORATORY TEST REPORTS
J. DIRATS AND COMPANY
53 PAGES, 44 ITEMS

Report Number	47159-EDITED
Report Date	29-DEC-87
	4-JAN-88
Client Number	514600
Client Order	49117-00
Release	ITEM 1

Client Number	514600
Client Order	49117-00
Release	ITEM 1

QUANTITATIVE ANALYSIS BY XRF & COMB

TENSION TEST AT ROOM TEMP

HARDNESS TEST

WE CERTIFY THIS IS A TRUE COPY OF OUR RECORDS
Signed for J. Dirats and Co. by Eric Dirats, Clerk
NOTE: The recording of false, fictitious or fraudulent statements or entries on this
document may be punished as a felony under federal law.

DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES

J. DIRATS AND CO., INC. 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 T1X 95-5439

Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47159
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 1

RECEIVED 1 Sample Stud
Size: 5/8"-11UNCx5"
IDENT AS MY-SC-01 Marked: WB8
MATL/COND ASME SA193 Grade B8M
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.025	Si	.31
Mn	1.25	Ni	8.27	Cr	18.49
Mo	.17	S	.025	C	.05

TENSION TEST AT ROOM TEMP

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
96.8	50.2	70.2	79.7

HARDNESS TEST

Hardness
HRB 88.0

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Scott Bailey
Maine Yankee Atomic Power Co.

P.O. Box 408
Wiscasset, ME 04578

Report Number 47160-EDITED
Report Date 29-DEC-87
4-JAN-88
Client Number 514600
Client Order 49117-00
Release ITEM 2

RECEIVED 1 Sample Bolt
Size: 3/4" - 10UNCx1 3/4"
IDENT AS MY-SC-02 Marked: B8M HS 316
MATL/COND ASME SA193 Grade B8M
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

FL	%	EL	%	EL	%
Fe	REM	P	.031	Si	.40
Cu	.37	Mn	1.42	Ni	12.10
Cr	16.81	Co	.22	Mo	2.20
S	.011	C	.06		

TENSION TEST AT ROOM TEMP ON MACHINED SPECIMEN

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
105.1	90.7	46.2	71.6

HARDNESS TEST

Hardness
HRC 25.5, Average of 3

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47160
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 2

RECEIVED 1 Sample Bolt
Size: 3/4"-10UNCx1 3/4"
IDENT AS MY-SC-02 Marked: B8M HS 316
MATL/COND ASME SA193 Grade B8M
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.031	SI	.40
Cu	.37	Mn	1.42	NI	12.10
Cr	16.81	Co	.22	Mo	2.20
S	.011	C	.06		

TENSION TEST AT ROOM TEMP ON MACHINED SPECIMEN

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
105.1	90.7	46.2	71.6

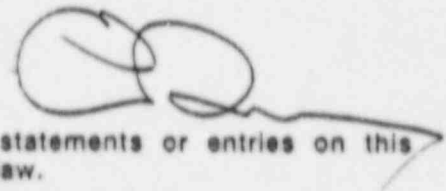
HARDNESS TEST

Hardness
HRC 25.5

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Scott Bailey
Maine Yankee Atomic Power Co.

P.O. Box 408
Wiscasset, ME 04578

Report Number 47161-EDITED
Report Date 29-DEC-87
4-JAN-88
Client Number 514600
Client Order 49117-00
Release ITEM 3

RECEIVED 1 Sample Stud
Size: 5/8" x 11UNC x 2 3/4"
IDENT AS MY-SC-03 Marked: B8S
MATL/COND ASTM A193 Grade B8
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.022	Si	.51
Mn	1.12	Ni	8.45	Cr	17.54
Mo	.07	S	.233, .229, .232		
C	.09				

TENSION TEST AT ROOM TEMP ON MACHINED SPECIMEN

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
116.5	53.1	55.6	47.5

HARDNESS TEST

Hardness
HRB 93.0, Average of 3

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47161
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 3

RECEIVED 1 Sample Stud
Size: 5/8"-11UNCx2 3/4"
IDENT AS MY-SC-03 Marked: B8S
MATL/COND ASTM A193 Grade B8
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.022	Si	.51
Mn	1.12	Ni	8.45	Cr	17.54
Mo	.07	S	.233	C	.09

TENSION TEST AT ROOM TEMP ON MACHINED SPECIMEN

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
116.5	53.1	55.6	47.5

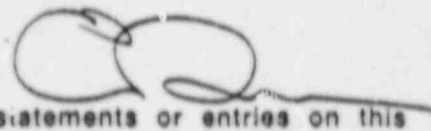
HARDNESS TEST

Hardness
HRB 93.0

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47162
Report Date 29-DEC-87
Client Number 514500
Client Order 49117-00
Release ITEM 4

RECEIVED 1 Sample Stud
Size: 3/4" - 10UNCx3 1/4"
IDENT AS MY-SC-04 Marked: C630K12
MATERIAL/COND ASTM A564 Type 630 / 1100 Deg F
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.030	Si	.33
Cu	3.38	Mn	.88	Ni	4.12
Cr	15.71	Mo	.27	Ta	<.01
Nb	.31	S	.003	C	.04

TENSION TEST AT ROOM TEMP

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
162.3	160.8	15.5	67.1

HARDNESS TEST

Hardness
HRC 37.0

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47163
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 5

RECEIVED 1 Sample Stud
Size: 1"-8UNCx6"
IDENT AS MY-SC-05 Marked: B7W
MATL/COND ASTM A193 Grade B7
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.007	Si	.22
Mn	.82	Cr	.99	Mo	.22
S	.028	C	.38		

TENSION TEST AT ROOM TEMP

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
152.8	138.2	16.0	63.1

HARDNESS TEST

Hardness
HRC 32.0

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47164
29-DEC-87
514600
49117-00
ITEM 6

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47165
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 7

RECEIVED 1 Sample Bolt
Size: 7/8"-9UNCx3 1/2"
IDENT AS MY-SC-07 Marked: L7, B7, C-U
MATL/COND ASTM A193 Grade B7
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.021	Si	.19
Mn	.84	Cr	.95	Mo	.17
S	.021	C	.39		

TENSION TEST AT ROOM TEMP

Tensile	Yield @ Poin'	Elg in 4D	R/A
KSI	KSI	%	%
126.7	110.6	19.0	61.7

HARDNESS TEST

Hardness
HRC 26.0

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47166
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 8

RECEIVED 1 Sample Stud
Size: 5/8"-11UNCx8"
IDENT AS MY-SC-08, Marked: B7W, SC-1
MATL/COND ASTM A193 Grade B7
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.013	Si	.23
Mn	.93	Cr	1.03	Mo	.22
S	.020	C	.41		

TENSION TEST AT ROOM TEMP

Tensile	Yield @ Point	Elg In 4D	R/A
KSI	KSI	%	%
156.1	147.1	16.8	63.9

HARDNESS TEST

Hardness
HRC 32.5

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J. DIRATS AND CO., INC. 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 Tlx 95-5439

Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47167
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 9

RECEIVED 1 Sample Stud
Size: 1/2"-13UNCx2 3/8"
IDENT AS MY-SC-09 Marked: B8M2C
MATL/COND ASTM A193 Grade B8M CL 2
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.033	Si	.43
Mn	1.71	Ni	10.25	Cr	16.47
Mo	2.12	S	.025	C	.02

TENSION TEST AT ROOM TEMP ON MACHINED SPECIMEN

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
145.0	129.2	23.6	69.7

HARDNESS TEST

Hardness
HRC 30.5

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47168
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 10

RECEIVED 1 Sample Stud
Size: 7/8"-.9UNCx4 1/2"
IDENT AS MY-SC-10 Marked: B7C
MATL/COND ASTM A193 Grade B7
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.019	Si	.26
Cu	.44	Mn	.94	Cr	1.05
Mo	.21	S	.025	C	.39

TENSION TEST AT ROOM TEMP

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
142.8	124.8	17.1	58.0

HARDNESS TEST

Hardness
HRC 30.0

WE CERTIFY THIS IS A TRUE COPY OF OUR RECORDS
Signed for J. Dirats and Co. by Eric Dirats, Clerk

NOTE: The recording of false, fictitious or fraudulent statements or entries on this document may be punished as a felony under federal law.

J. DIRATS AND CO., INC. 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 FAX 95-5439

DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES

Scott Bailey
Maine Yankee Atomic Power Co.

P.O. Box 408
Wiscasset, ME 04578

Report Number 47169-EDITED
Report Date 29-DEC-87
4-JAN-88
Client Number 514600
Client Order 49117-00
Release ITEM 11

RECEIVED 1 Sample Nut
Size: 5/8"-11UNC Heavy Hex
IDENT AS MY-SC-01N Marked: B8MW
MATL/COND ASTM A194 Grade 8MA
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.035	Si	.45
Mn	1.38	Ni	11.03	Cr	16.56
Mo	2.12	S	.014	C	.06

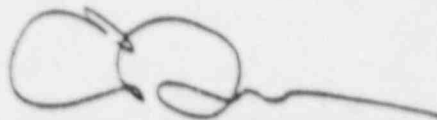
HARDNESS TEST

Hardness
HRC 22.5, Average of 3

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47169
Report Date 29-DEC-87
Client Number 514800
Client Order 49117-00
Release ITEM 11

RECEIVED 1 Sample Nut
Size: 5/8"-11UNC Heavy Hex
IDENT AS MY-SC-01N Marked: B8MW
MATL/COND ASTM A194 Grade 8MA
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.035	Si	.45
Mn	1.38	Ni	11.03	Cr	16.56
Mo	2.12	S	.014	C	.06

HARDNESS TEST

Hardness
HRC 22.5 /

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47170
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 12

RECEIVED 1 Sample Nut
Size: 3/4"-10UNC
IDENT AS MY-SC-02N Marked: B8dM, 316, 4S-15
MATL/COND ASTM A194 Grade 8MB
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Worked performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.038	Si	.38
Mn	.49	Ni	10.08	Cr	17.02
Mo	2.00	S	.025	C	.07

HARDNESS TEST

Hardness
HRB 78.5

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Scott Bailey
Maine Yankee Atomic Power Co.

P.O. Box 403
Wiscasset, ME 04578

Report Number 47171-EDITED
Report Date 29-DEC-87
4-JAN-88
Client Number 514600
Client Order 49117-00
Release ITEM 13

RECEIVED 1 Sample Nut
Size: 5/8"-11UNC
IDENT AS MY-SC-03N Marked: 8FB, S, 303
MATL/COND ASTM A194 Grade 8F
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Worked performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.010	Si	.52
Mn	1.59	Ni	8.89	Cr	17.76
Mo	.27	S	.325, .331, .325		
C	.05				

HARDNESS TEST

Hardness
HRC 21.0 Average of 3

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47171
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 13

RECEIVED 1 Sample Nut
Size: 5/8"-11UNC
IDENT AS MY-SC-03N Marked: 8FB, S, 303
MATL/COND ASTM A194 Grade 8F
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Worked performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.010	Si	.52
Mn	1.59	Ni	8.89	Cr	17.76
Mo	.27	S	.325	C	.05

HARDNESS TEST

Hardness
HRC 21.0

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J. DIRATS AND CO., INC. 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 T1X 95-5439

Scott Bailey
Maine Yankee Atomic Power Co.

P.O. Box 408
Wiscasset, ME 04578

Report Number 47172-EDITED
Report Date 29-DEC-87
4-JAN-88
Client Number 514600
Client Order 49117-00
Release ITEM 14

RECEIVED 1 Sample Nut
Size: 3/4"-10UNC
IDENT AS MY-SC-04N Marked: T, 8, PK1
MATL/COND ASTM A194 Grade 8
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.023	Si	.64
Ti	.40	Mn	1.38	Ni	10.50
Cr	17.50, 17.55	Mo	.39	S	.002
C	.05				

HARDNESS TEST

Hardness
HRB 83.0 Average of 3

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47172
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 14

RECEIVED 1 Sample Nut
Size: 3/4"-10UNC
IDENT AS MY-SC-04N Marked: T, 8, PK1
MATL/COND ASTM A194 Grade 8
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.023	Si	.64
Ti	.40	Mn	1.38	Ni	10.50
Cr	17.50	Mo	.39	S	.002
C	.05				

HARDNESS TEST

Hardness
HRB 83.0

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47173
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 15

RECEIVED 1 Sample Nut
Size: 1"-8UNC
IDENT AS MY-SC-05N Marked: 2HA
MATL/COND ASTM A194 Grade 2H
TEST TO FO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.012	Si	.23
Mn	.75	Cr	.02	Mo	.01
S	.015	C	.42		

HARDNESS TEST

Hardness
HRC 28.5

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47174
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 16

RECEIVED 1 Sample Nut
Size: 1/2"-13UNC
IDENT AS MY-SC-06N Marked: 2H(-)
MATL/COND ASME SA194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.028	Si	.23
Mn	.76	Cr	.19	Mo	.03
S	.023	C	.44		

HARDNESS TEST

Hardness
HRC 31.5

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J. DIRATS AND CO., INC. 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 T1X 95-5439

47175
29-DEC-87
514600
49117-00
ITEM 17

RECEIVED 1 Sample Nut
Size: 7/8"-9UNC
IDENT AS MY-SC-07N Marked: (-), 2H, AMD
MATL/COND ASTM A194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.012	Si	.20
Mn	.70	Cr	.13	Mo	.02
S	.013	C	.40		

HARDNESS TEST

Hardness
HRC 26.0

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J. DIRATS AND CO., INC., 41 AIRPORT ROAD, P.O. BOX 39, WESTFIELD, MA 01086 413-568-1571 Tlx 95-5439

47176
29-DEC-87
514600
49117-00
ITEM 18

RECEIVED 1 Sample Nut
Size: 5/8"-11UNC
IDENT AS MY-SC-08N Marked: 2H, J, S
MATL/COND ASTM A194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.014	Si	.22
Mn	.75	Cr	.14	Mo	.05
S	.029	C	.41		

HARDNESS TEST

Hardness
HRC 29.5

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J. DIRATS AND CO., INC., 41 AIRPORT ROAD, P.O. BOX 39, WESTFIELD, MA 01086 413-568-1571 FAX 95-5439

Scott Bailey
Maine Yankee Atomic Power Co.

P.O. Box 408
Wiscasset, ME 04578

Report Number 47177-EDITED
Report Date 29-DEC-87
4-JAN-88
Client Number 514600
Client Order 49117-00
Release ITEM 19

RECEIVED 1 Sample Nut
Size: 1/2" - 13UNC
IDENT AS MY-SC-09N Marked: B8MW
MATL/COND ASTM A194 Grade 8MA
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.033	Si	.36
Mn	1.08	Ni	12.20	Cr	16.05
Mo	2.06	S	.009	C	.04

HARDNESS TEST

Hardness
HRC 30.0 Average of 3

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number
Report Date
Client Number
Client Order
Release

47177
29-DEC-87
514600
49117-00
ITEM 19

RECEIVED 1 Sample Nut
Size: 1/2"-13UNC
IDENT AS MY-SC-09N Marked: B8MW
MATERIAL/COND ASTM A194 Grade 8MA
TEST TO PQ Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.033	Si	.36
Mn	1.08	Ni	12.20	Cr	16.05
Mo	2.06	S	.009	C	.04

HARDNESS TEST

Hardness
HRC 30.0 r

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Signed for J. Dirats and Co. by Eric Dirats, Clerk

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47178
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 20

RECEIVED 1 Sample Nut
Size: 7/8" - 9UNC
IDENT AS MY-SC-10N Marked: (-), 2H, AMD
MATL/COND ASTM A194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.010	Si	.21
Mn	.72	Cr	.13	Mo	.02
S	.012	C	.40		

HARDNESS TEST

Hardness
HRC 26.0

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number
Report Date
Client Number
Client Order
Release

47179
29-DEC-87
514600
49117-00
ITEM 21

RECEIVED 1 Sample Stud
Size: 1 1/4" x 5 1/2"
IDENT AS MY-NNS-01 Marked: B7, *
MATL/COND ASTM A193 Grade B7
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%
Fe	REM
Mn	.88
S	.018

EL	%
P	.007
Cr	.94
C	.43

EL	%
Si	.21
Mo	.18

HARDNESS TEST

Hardness
HRC 29.5

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47180
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 22

RECEIVED 1 Sample Stud
Size: 5/8"x4 1/2" Bonnet Stud
IDENT AS MY-NNS-02 Marked: B7, R
MATL/COND ASTM A193 Grade B7
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.008	Si	.18
Mn	.90	Cr	1.00	Mo	.20
S	.019	C	.43		

HARDNESS TEST

Hardness
HRC 33.0

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Signed for J. Dirats and Co. by Eric Dirats, Clerk

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47181
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 23

RECEIVED 1 Sample Stud
Size: 5/8"x3"
IDENT AS MY-NNS-03 Marked: B7, H
MATL/COND ASTM A193 Grade B7
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.009	Si	.23
Mn	.90	Cr	.92	Mo	.22
S	.021	C	.43		

HARDNESS TEST

Hardness
HRC 33.0

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47182
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 24

RECEIVED 1 Sample Bolt
Size: 1 1/8" x 7"
IDENT AS MY-NNS-04 Marked: J-B7
MATL/COND ASTM A193 Grade B7
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.016	Si	.19
Mn	.78	Cr	1.03	Mo	.17
S	.029	C	.37		

HARDNESS TEST

Hardness
HRC 29.5

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47183
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 25

RECEIVED 1 Sample Bolt
Size: 1/2"x1" - Plated
IDENT AS MY-NNS-05 Marked: /
MATL/COND SAE J429 Grade 5
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.028	Si	.25
Mn	.82	Cr	.04	Mo	.01
S	.015	C	.32		

PLATING TYPE: Zinc

HARDNESS TEST

Sample Location Hardness
Core HRC 27.5

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47184
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 26

RECEIVED 1 Sample Bolt
Size: 9/16"x3" - Plated
IDENT AS MY-NS-06 Marked: 1
MATL/COND SAE J429 Grade 5
TEST TO PC Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.013	Si	.27
Mn	.82	Cr	.09	Mo	.02
S	.025	C	.36		

PLATING TYPE: Zinc

HARDNESS TEST

Sample Location	Hardness
Core	HRC 26.5

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47185
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 27

RECEIVED 1 Sample Bolt
Size: 1/2"x1 1/2" - Plated
IDENT AS MY-NNS-07 Marked: K S
MATL/COND SAE J429 Grade 5
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.007	Si	.25
Mn	.73	Cr	.06	Mo	.02
S	.019	C	.33		

PLATING TYPE: Zinc

HARDNESS TEST

Location Hardness
Core HRC 34.5

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Signed for J. Dirats and Co. by Eric Dirats, Clerk

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Scott Bailey
Maine Yankee Atomic Power Co.

P.O. Box 408
Wiscasset, ME 04578

Report Number 47185-EDITED
Report Date 29-DEC-87
4-JAN-88
Client Number 514600
Client Order 49117-00
Release ITEM 27

RECEIVED 1 Sample Bolt
Size: 1/2"x1 1/2" - Plated
IDENT AS MY-NNS-07 Marked: 5'3
MATL/COND SAE J429 Grade 5
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.007	Si	.25
Mn	.73	Cr	.06	Mo	.02
S	.019	C	.33		

PLATING TYPE: Zinc

HARDNESS TEST

Location Hardness
Core HRC 34.5 Average of 3

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Signed for J. Dirats and Co. by Eric Dirats, Clerk

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47186
29-DEC-87
514600
49117-00
ITEM 28

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47187
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 29

RECEIVED 1 Sample Bolt
Size: 3/4" x 2 1/2" Stainless Steel
IDENT AS MY-NNS-09 Marked: V
MATERIAL/COND MS 35308
TEST TO PQ Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.17	Si	.46
Cu	3.37	Mn	.89	Ni	9.20
Cr	18.17	Mo	.19	S	.010
C	.49				

HARDNESS TEST

Hardness
HRB 93.0

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Signed for J. Dirats and Co. by Eric Dirats, Clerk

NOTE: The recording of false, fictitious or fraudulent statements or entries on this document may be punished as a felony under federal law.

P.O. Box 408
Wiscasset, ME 04578

Report Number	47187-EDITED
Report Date	29-DEC-87
	4-JAN-88
Client Number	514600
Client Order	49117-00
Release	ITEM 29

RECEIVED 1 Sample Bolt
Size: 3/4" x 2 1/2" Stainless Steel
IDENT AS MY-NNS-09 Marked: V
MATL/COND MS 35308
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.017	Si	.46
Cu	3.37	Mn	.89	Ni	9.20
Cr	18.17	Mo	.19	S	.009
C	.05, .05				

HARDNESS TEST

Hardness
HRB 93.0 Average of 3

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DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES

J. DIRATS AND CO., INC. 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 FAX 95-5439

Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47188
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 30

RECEIVED 1 Sample Bolt
Size: 1/2"x8"
IDENT AS MY-NNS-10 Marked: -
MATL/COND Stainless Steel
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.026	Si	.43
Mn	.96	Ni	8.49	Cr	17.93
Mo	.20	S	.008	C	.07

TENSION TEST AT ROOM TEMP

Tensile	Yield @ .2	Elg in 4D	R/A
KSI	KSI	%	%
100.9	47.6	68.5	68.7

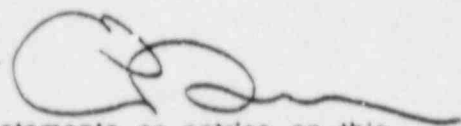
HARDNESS TEST

Hardness
HRB 88.5

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 40
Wiscasset, ME 04578

Report Number 47189
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 31

RECEIVED 1 Sample Nut
Size 1 1/4"
IDENT AS MY-NNS 71N Marked: 2H, K
MATL/COND ASTM A194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.018	Si	.23
Mn	.73	Cr	.07	Mo	.03
S	.017	C	.40		

HARDNESS TEST

Hardness
HRC 30.5

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Report Number	47190
Report Date	29-DEC-87
Client Number	514600
Client Order	49117-00
Release	ITEM 32

Hardness
HRC 28.5

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DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES

J. DIRATS AND CO., INC., 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 Tlx 95-5439

Report Number	47191
Report Date	29-DEC-87
Client Number	514600
Client Order	49117-00
Release	ITEM 33

QUANTITATIVE ANALYSIS BY XRF, COMB.

HARDNESS TEST

STRIPPING TEST OF NUT

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J. DIRATS AND CO., INC., 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 Tlx 95-5439

DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES DIRATS LABORATORIES

Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number	47192
Report Date	29-DEC-87
Client Number	514600
Client Order	49117-00
Release	ITEM 34

RECEIVED 1 Sample Nut
Size: 1 1/8"
IDENT AS MY-NNS-04N Marked: 2H, J
MATL/COND ASTM A194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Worked performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.018	Si	.21
Mn	.70	Cr	.14	Mo	.02
S	.013	C	.44		

HARDNESS TEST

Hardness
HRC 29.5

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J. DIRATS AND CO., INC. 41 AIRPORT ROAD P.O. BOX 39 WESTFIELD, MA 01086 413-568-1571 FAX 95-5439

Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47193
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 35

RECEIVED 1 Sample Nut
Size: 1/2"
IDENT AS 'MY-NNS-05N Marked: 2H, S
MATL/COND ASTM A194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.013	Si	.25
Mn	.73	Cr	.02	Mo	.01
S	.032	C	.46		

HARDNESS TEST

Hardness
HRC 24.5

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Maine Yankee Atomic Power Co.
P.O. Box 406
Wiscasset, ME 04578

Report Number 47194
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 36

RECEIVED 1 Sample Nut
Size: 9/16"-12
IDENT AS MY-NNS-06N Marked: -
MATL/COND Carbon Steel
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.007	Si	.05
Mn	.43	Cr	.01	Mo	.01
S	.020	C	.11		

STRIPPING TEST OF NUT

Area	Failure Load Lbs.	Failure Stress KSI	Results
.182	23000	126.4	Nut Stripped

HARDNESS TEST

Hardness
HRB 91.0

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47195
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 37

RECEIVED 1 Sample Nut
Size: 1 1/8" Bonnet Nut
IDENT AS MY-NNS-07N Marked: 2H, J, S
MATL/COND ASTM A194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.014	Si	.26
Mn	.78	Cr	<.01	Mo	.01
S	.017	C	.45		

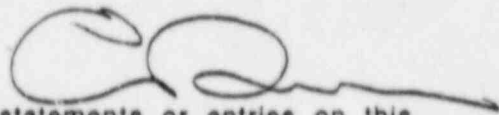
HARDNESS TEST

Hardness
HRC 27.0

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47196
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 38

RECEIVED 1 Sample Nut
Size: 7/8"
IDENT AS MY-NNS-08N Marked: 2H, J
MATL/COND ASTM A194 Grade 2H
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Worked performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.015	Si	.28
Mn	.61	C	.15	Mo	.03
S	.018	C	.41		

HARDNESS TEST

Hardness
HRC 29.5

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Scott Bailey
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47197
Report Date 29-DEC-87
Client Number 514600
Client Order 49117-00
Release ITEM 39

RECEIVED 1 Sample Nut
Size: 3/4"
IDENT AS MY-NNS-09N Marked: 8BH
MATL/COND ASTM A194 Grade 8B
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.045	Si	.50
Mn	1.58	Ni	8.98	Cr	18.37
Mo	.06	S	.027	C	.08

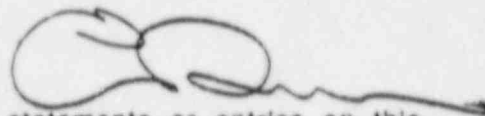
HARDNESS TEST

Hardness
HRB 83.3

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Report Number	47198
Report Date	29-DEC-87
Client Number	514600
Client Order	49117-00
Release	ITEM 40

RECEIVED 1 Sample Nut
Size: 1/2"-13
IDENT AS MY-NNS-10N Marked: -
MATL/COND Stainless Steel
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
Supply 2 Original Reports
PHONE 207-882-6321 X143

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM		.030	Si	.34
Mn	1.08		9.07	Cr	18.19
Mo	.16		.009	C	.04

STRIPPING TEST OF NUT

Area	Failure Load Lbs.	Failure Stress KSI	Results
.1419	31900	224.8	Nut Stripped

HARDNESS TEST

Hardness
HRC 32.0

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Scott Bailey, QAD
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47875
Report Date 5-JAN-88
Client Number 514600
Client Order 49117
Release ITEM 41

RECEIVED 1 Sample Nut
Size: 5/8"-11 Heavy Hex
IDENT AS MY-SC-01N-R Marked: B8MW
MATL/COND ASTM A194 Grade 8MA
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
FAX Rpt / Fed Xpress 2 Original Rpt
PHONE 207-882-6321 X177

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.031	Si	.42
Mn	1.21	Ni	12.14	Cr	16.42
Mo	2.16	S	.009	C	.04

HARDNESS TEST


Hardness
HRC 24.0

PROOF LOAD TEST OF FASTENER

Area	Applied Lbs.	Results
.226	18080	No Stripping

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Signed for J. Dirats and Co. by Eric Dirats, Clerk

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Scott Bailey, QAD
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number 47877
Report Date 5-JAN-88
Client Number 514600
Client Order 49117
Release ITEM 42

RECEIVED 1 Sample Nut
Size: 5/8"-11
IDENT AS MY-SC-03N-R Marked: 8FBS303
MATL/COND ASTM A194 Grade 8F
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
FAX Rpt / Fed Xpress 2 Original Rpt
PHONE 207-882-6321

QUANTITATIVE ANALYSIS BY XRF & COMB

EL	%	EL	%	EL	%
Fe	REM	P	.013	Si	.53
Mn	1.59	Ni	8.75	Cr	17.95
S	.318	C	.05		

HARDNESS TEST

Hardness
HRB 98.0


PROOF LOAD TEST OF FASTENER

Area	Applied Lbs.	Results
.226	16950	No Stripping

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Scott Bailey, QAD
Maine Yankee Atomic Power Co.
P.O. Box 408
Wiscasset, ME 04578

Report Number
Report Date
Client Number
Client Order
Release

47879
5-JAN-88
514600
49117
ITEM 43

RECEIVED 1 Sample Nut
Size: 3/4"-10
IDENT AS MY-SC-04N-R Marked: T, 8, PKI
MATL/COND ASTM A194 Grade 8
TEST TO PO Instructions & NRC Bu. #87-02
SPEC INST Work performed per Dirats QA Manual
FAX Rpt / Fed Xpress 2 Original Rpt
PHONE 207-882-6321

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.016	Si	.55
Ti	.44	Mn	1.38	Ni	10.09
Cr	17.69	Mo	.38	S	.001
C	.05				

PROOF LOAD TEST OF FASTENER

Area	Applied Lbs.	Results
.334	25,050	No stripping

HARDNESS TEST

Hardness
HRB 84.0

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47882
5-JAN-88
514600
49117
ITEM 44

RECEIVED 1 Sample Nut
Size: 1/2"-13
IDENT AS MY-SC-09N-R Marked: B8MW
MATL/COND ASTM A194 Grade 8MA
TEST TO PO Instructions & NRC Bu. #87-02

SPEC INST Work performed per Dirats QA Manual
FAX Rpt / Fed Xpress Original Rpt
PHONE 207-882-6321 X177

QUANTITATIVE ANALYSIS BY XRF, COMB.

EL	%	EL	%	EL	%
Fe	REM	P	.028	Si	.48
Mn	1.10	Ni	12.17	Cr	16.44
Mo	2.18	S	.003	C	.04

PROOF LOAD TEST OF FASTENER

Area	Applied Lbs.	Results
.1419	10,640	No stripping

HARDNESS TEST

Hardness
HRC 29.0

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