

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

September 14, 1979

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
Attn: Mr. A. Schwencer, Chief  
Operating Reactors Branch No. 1  
Division of Operating Reactors  
U.S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Serial No: 607/072079  
PO/HSM:svm  
Docket Nos.: 50-280  
50-281  
License Nos.: DPR-32  
DPR-37

Dear Mr. Denton:

In your letter of July 20, 1979 additional information was requested on the use of high strength maraging steel in the reactor coolant pump supports. Enclosed herewith are the answers to your request for additional information.

If you require any further information we would be pleased to discuss this matter with your staff.

Very truly yours,

*C. M. Stallings*

C. M. Stallings  
Vice President - Power Supply  
And Production Operations

HSM/svm:lm1

Attachment

cc: Mr. James P. O'Reilly, Director  
Office of Inspection and Enforcement - Region II

REGULATORY DOCKET FILE COPY

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DRUGS TO:  
FILES  
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QUESTION 1: Provide details of inspections performed on the monoball assemblies prior to installation into the plant. Provide significant results of any inspections. Include the threaded connection.

RESPONSE: Prior to fabrication all of the Vascomax used in the reactor coolant pump supports was subjected to a 100% ultrasonic inspection. In addition the actual physical property data (tensile, yield, impact, and chemistry) was provided for each material heat. Copies of these are attached. During fabrication all welds were liquid penetrant tested with magnetic particle testing used as an alternate. Prior to installation all of the support pieces were cleaned and visually inspected with particular attention given to the threaded area of the monoball assemblies.



QUESTION 2: Indicate the consequences of a complete failure of the reactor coolant pump supports during normal and postulated accident conditions.

RESPONSE: During normal operation the loads and stresses for piping, component connections, and other remaining component supports due to the complete failure of the reactor coolant pump supports are not sufficient to cause the failure of the reactor coolant system piping. Summarized below are the maximum stresses that can be expected in the reactor coolant piping as a result of failure of the reactor coolant pump supports during normal operation. These loads are within the allowable nozzle loads for both the steam generator nozzle and the reactor pressure vessel nozzles. The allowable stresses for the reactor coolant pipe material (A376 Tp 316) are also summarized below. While several of these values are above yield at 650°F, they are all less than 50% of the material's ultimate strength at that temperature. The reactor coolant pipe material has an  $S_n$  (Code allowable for normal operation) of 16 ksi at 650°F and the faulted allowable stress would be  $1.85 S_n$  or 28.8 ksi. All of the loads summarized below are within this faulted allowable with the exception of the pressurizer inlet. However, thermal stresses have been conservatively included and their deletion brings the stress levels well within the allowables.

During any postulated accident condition, i.e. seismic and/or pipe breaks, a concurrent complete failure of the reactor coolant pump support would result in unacceptable consequences throughout the reactor coolant loop piping in terms of loads and stresses.

If these supports were to fail during operation it would be detected as there is vibration monitoring instrumentation on both the shaft and the frame of the reactor coolant pumps. The amount of vibration is indicated in the control room (it is recorded twice per shift) and any excessive vibration would cause an annunciator alarm to sound in the control room. The amounts of vibration necessary to trigger the annunciator alarms are vibration greater than 3 mils on the frame and greater than 15 mils on the pump shaft.

SUMMARY OF STRESS FOR FAILURE OF  
REACTOR COOLANT PUMP SUPPORT  
DURING NORMAL OPERATION

<u>Location</u>	<u>Loop</u>	<u>Stress (psi)</u>
Steam Generator Outlet	A	20,291
	B	17,388
	C	20,743
Reactor Vessel Inlet	A	16,943
	B	18,337
	C	21,060
Crossover Leg	A	21,940
	B	13,292
	C	20,196
Pressurizer Inlet	C	32,728

Material Properties (A376 Tp 316)

<u>°F</u>	<u>S<sub>yield</sub></u>	<u>S<sub>ult</sub></u>
100	30 ksi	75 ksi
600	18.8 ksi	71.8 ksi
650	18.5 ksi	71.8 ksi

QUESTION 3: Provide any alternative NDE methods available which could be used to inspect those areas of the monoball assembly not accessible except by disassembly.

RESPONSE: NDE of the inaccessible parts of the monoball assemblies is not warranted when taking into consideration the stress levels in that assembly. The areas of the monoball assembly which are not accessible are also the least stressed. As an example, the maximum shear stress in the threaded portion of the monoball assembly is only approximately 2400 psi.

The maximum stress occurs in the lug and clevis (items 1 & 2 in drawing 11448-FM-53C, attached to response to question 5) at the hole where the pin fits. The stress is very local in nature and drops off rapidly away from the hole.

During normal operating conditions the stresses in the monoball assembly are below the industry accepted threshold value (20 ksi) for the initiation of stress corrosion cracking. In addition all of the Vascomax parts are coated with heresite coating to prevent moisture intrusion in order to further protect them from stress corrosion cracking. Considering the aforementioned information it would seem that in lieu of disassembly a Holiday test (see description in attachment to question 6) of the coating would be called for to ensure that the coating is intact or if it isn't that the coating may be repaired.

QUESTION 4 . Indicate the impact on your steam generator repair schedule of inspecting fully one monoball assembly on the reactor coolant pump support.

RESPONSE: The inspection program provided in question 6 has already been performed and has had little or no impact on the overall steam generator replacement schedule. If further inspections requiring disassembly are to be performed there may be some impact to the overall steam generator replacement schedule as will be described. Disassembly of the reactor coolant pump supports cannot be done until the welding of the reactor coolant pipe is completed in a particular loop due to the possibility of ruining the alignment of the piping between the reactor coolant pump and the steam generator. In order to not impact any of the major evolutions in the schedule, the inspection (disassembly and reassembly) would have to be completed before the reinstallation of the reactor coolant pump motors which is scheduled to occur about 7 days after the completion of the reactor coolant pipe welding. The reactor coolant pipe welding is presently anticipated to be completed for "B" loop about September 21, for "C" loop about September 30, and for "A" loop about October 15. It would not be possible to just disassemble just one monoball assembly as is suggested in your letter of July 20 as the only way that the supports may be disassembled is to remove one whole leg assembly (items 1-4 or 5-8, drawing 11448-FM-53A). In addition there is the uncertainty of possibly damaging these pieces during disassembly. These items are specialty items and have a long lead time for replacement.

QUESTION 5: Provide the maximum stress and stress state seen by any of the monoball assembly parts under normal operation and postulated accidents.

RESPONSE: The stresses on the monoball assembly are summarized in Table I and Table II. Table I shows the stresses during normal operation and Table II shows the stresses during accident conditions.

TABLE I

## REACTOR COOLANT PUMP SUPPORTS STRESS SUMMARY - NORMAL OPERATION

Drawing No.	Item No./Description	Material	Allowable		$F_c$ (kips)	Calculated		$F$ (kips)	Min. Factor of Safety
			$\sigma_t$ (ksi)	$\sigma_s$ (ksi)		$\sigma_t$ (ksi)	$\sigma_s$ (ksi)		
11448-FM-53B	1-4 Upper Leg: pipe cap pipe	Al05 Gr II	29.52	19.68	--	1.40	0.88	--	
		Al06 Gr B	28.71	--	830.6	1.40	--	0	
	5-8 Lower Leg: pipe cap pipe	Al05 Gr II	29.52	19.68	--	1.4	0.93	--	
		Al06 Gr B	28.71	--	810.8	1.44	--	0	
	26 Clevis	Al05 Gr II	29.52	19.68	--	0.15	0.14	--	
	37 Clevis	Al05 Gr II	29.52	19.68	--	0.42	0.14	--	
11448-FM-53C	1 Lug End	350 CVM	292	195	--	18.09	4.59	--	
	2 Clevis End	350 CVM	292	195	--	17.82	3.43	--	
	3 3 3/4 $\phi$ pin	350 CVM	--	195	--	--	3.62	--	
11448-FM-53D	9 Horizontal: pipe cap pipe	Al05 Gr II	29.52	19.68	-- (-)	1.22	1.12	--	
		Al06 Gr B	28.71	--	156.5(-)	1.22	--	13.14	
	10 Upper Diag. pipe cap pipe	Al05 Gr II	29.52	19.68	--	0.11	0.10	--	
		Al06 Gr B	28.71	--	157.2	0.11	--	0	
	35 Lower Diag. pipe cap pipe	Al05 Gr II	29.52	19.68	--	0.49	--	--	
		Al06 Gr B	28.71	--	322.6	0.49	0.62	0	
11448-FM-53H	16,33 4 3/4 $\phi$ pin	Al93 B7	--	41.94	--	--	0	--	
	17,18 Support Beam: Rod Clevis Pipe	350 CVM	292	195	103.2	0	0	0	
		300 CVM	243	162	--	0	0	--	
		Al06 Gr B	28.71	--	837.6	0	--	0	
	19,20 Support Beam: Clevis Pipe	300 CVM	243	162	--	0	0	--	
		Al06 Gr B	28.71	--	837.6	0	--	0	

-- Indicates no stress imposed in that direction.

 $F_c$  Critical load for buckling.

TABLE II

## REACTOR COOLANT PUMP SUPPORTS STRESS SUMMARY - ACCIDENT CONDITIONS

Drawing No.	Item No./Description	Material	Allowable		F <sub>c</sub> (kips)	Calculated		F (kips)	Min. Factor of Safety
			σ <sub>t</sub> (ksi)	σ <sub>s</sub> (ksi)		σ <sub>t</sub> (ksi)	σ <sub>s</sub> (ksi)		
11448-FM-53B	1-4 Upper leg: pipe	A106 Gr B	28.71	--	830.6	8.32	--	562.32	1.48
		pipe cap A105 Gr II	29.52	19.68	--	8.32	6.40	--	3.08
	5-8 Lower Leg: pipe	A106 Gr B	28.71	--	950.6	11.15	--	815.51	1.17
		pipe cap A105 Gr II	29.52	19.68	--	11.15	9.47	--	2.08
	26 Clevis	A105 Gr II	29.52	19.68	--	7.39	6.66	--	2.95
	37 Clevis	A105 Gr II	29.52	19.68	--	20.45	6.86	--	1.44
11448-FM-53C	1 Lug End	350 CVM	292	195	--	107.84	27.34	--	2.71
	2 Clevis End	350 CVM	292	195	--	138.47	26.62	--	2.11
	3 3 3/4 φ pin	350 CVM	--	195	--	--	36.92	--	5.28
11448-FM-53D	9 Horizontal: pipe	A106 Gr B	28.71	--	156.5	7.76	--	79.89	1.96
		pipe cap A105 Gr II	29.52	19.68	--	7.76	7.10	--	2.77
	10 Upper Diag. pipe	A106 Gr B	28.71	--	157.2	5.50	--	47.77	3.29
		pipe cap A105 Gr II	29.52	19.68	--	5.50	5.04	--	3.90
	35 Lower Diag. pipe	A106 Gr B	28.71	--	322.6	12.17	--	192.11	1.68
		pipe cap A105 Gr II	29.52	19.68	--	12.17	15.34	--	1.28
16,33 4 3/4 φ pin	A193 B7	--	41.94	--	--	23.92	--	1.75	
11448-FM-53H	17,18 Support Beam:	Rod 350 CVM	292	195	276.4	23.40	8.82	111.65	2.47
		Clevis 300 CVM	243	162	--	122.84	24.26	--	1.98
		Pipe A106 Gr B	28.71	--	837.6	12.73	--	446.60	1.88
		19,20 Support Beam: Clevis 300 CVM	243	162	--	144.68	28.57	--	1.68
	Pipe A106 Gr B	28.71	--	837.6	14.99	--	379.47	1.91	

-- Indicates no stress imposed in that direction.



QUESTION 6 Provide the procedures that are intended to be used to inspect the reactor coolant pump supports.

RESPONSE: Attached is a copy of the procedure used to inspect the reactor coolant pump supports. No significant findings resulted from this inspection other than the need for touchup of the heresite coatings.

# SURRY POWER STATION

## VIRGINIA ELECTRIC AND POWER COMPANY

APPENDIX A

30010-P-2-U2

TO:

VEPCO Resident Engineer -- Construction

DESIGN CHANGE TITLE:

Nondestructive Examination of RC Pump and Pressurizer Supports

DESIRED IMPLEMENTATION DATE:

FINAL DESIGN CONTROLLING PROCEDURE:

PROCEDURE SHALL CONSIST OF:

1. PURPOSE; 2. INITIAL CONDITIONS; 3. PRECAUTIONS; 4. INSTRUCTIONS;

☒ COPY ATTACHED

FINAL DESIGN TESTING: Not Required.

PROCEDURE SHALL CONSIST OF:

1. PURPOSE; 2. INITIAL CONDITIONS; 2. PRECAUTIONS; 4. INSTRUCTIONS;

3. ACCEPTANCE CRITERIA.

COPY ATTACHED:

☐ MECHANICAL TESTING☐ ELECTRICAL TESTING☐ INSTRUMENT TESTING☐ CHEMICAL TESTING

FINAL DESIGN CONTROLLING AND TESTING PROCEDURES:

SUBMITTED BY PROJECT ENGINEER:

7

DATE:

7-16-78

REVIEWED BY DESIGN CONTROL ENGINEER:

11

DATE:

7-16-78

RECOMMENDED APPROVED BY SUPERVISOR-ENGINEERING SERVICES:

13

DATE:

REVIEWED BY QUALITY CONTROL:

15

DATE:

APPROVED BY STATION NUCLEAR SAFETY AND OPERATING COMMITTEE:

17

DATE:

CHAIRMAN'S SIGNATURE:

REMARKS:

## CONTROLLING PROCEDURE:

## 1.0 PURPOSE

The purpose of this procedure is to describe the means by which the RC Pump and Pressurizer Supports shall be nondestructively examined to verify their compliance with the original design.

Initials Date

## 2.0 INITIAL CONDITIONS

2.1 Cleanliness requirements of Attachment I are met.

2.2 EMP obtained. EMP No. \_\_\_\_\_

2.3 Lighting available.

2.4 Electrical power and magnetic particle inspection and visual inspection materials are available (Daniel Procedures QCP-505 and MI-A-G-77-V5).

## 3.0 PRECAUTIONS

(To be signed off prior to commencing work.)

3.1 During cleaning of the castings and supports, do not scratch or gouge the metal surfaces or coating. When cleaning with a liquid, use only hot water with Spic and Span or alcohol.

## 4.0 INSTRUCTIONS

(Perform the visual inspection prior to the magnetic particle inspection. The other steps may be completed in any order, as necessary.)

4.1 Perform a complete visual inspection of all the supports listed in Table 1. Visual examination shall be performed in accordance with Daniel Procedure No. QCP-505, Rev. 1 and the requirements of Section V of the ASME Code, Paragraph T293 and/or Section XI of the ASME Code, Paragraph XIA-2210. A description of the specific methods to be used is as follows:

## A. Direct Visual Method:

For this method, the eye must be placed within 24 inches of the surface to be examined and at an angle no less than 30 degrees with the surface to be examined.

## CONTROLLING PROCEDURE:

Initials   Date

## B. Remote Visual Method:

This method may be used where conditions exist that do not permit direct visual examination. In this method, use is made of visual aids such as telescopes, periscopes, boroscopes, fiber optics, or TV cameras and monitoring systems.

## C. Lighting:

For Section V of the code, the area subject to examination shall have a minimum of 15-foot candles (160 lux) for general examination and a minimum of 50-foot candles (540 lux) for detection of small indications. For Section XI of the code, the light shall be sufficient to resolve a 1/32" black line on the surface or a similar surface to that being examined. Mirrors may be used to improve the angle of vision which is not to be less than 30 degrees with the surface to be examined. Welds in components being inspected shall be examined by using the direct or remote visual methods as described in Section 4.1 - A or 4.1 - B. Examinations shall include the weld and the adjacent base metal for at least one thickness on each side of the weld.

## D. Studs and Nuts:

Studs, nuts, bolts, and washers shall be examined in place. In-place-examination shall consist of checking for tightness and all exposed surfaces of threads, nuts, etc., shall be examined to insure they are free of cuts, cracks, or oxidation.

4.1.1 Acceptance criteria for welds is included in Daniel Procedure QIP-505. Component surfaces other than welds shall be free of cuts, cracks, or oxidation.

4.1.2 Initial and date Table I as each component is visually inspected. Also, note on Table I under "comments" whether the component inspected is satisfactory or unacceptable.

## CONTROLLING PROCEDURE:

<u>Initials</u>	<u>Date</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

4.2 Perform a magnetic particle inspection of the components listed in Table 2, as well as any suspect areas found during the inspection. Perform the magnetic particle inspection in accordance with Daniel Procedure No. MI-A-0-77-VS, Revision 0.

4.2.1 Acceptance criteria for all surfaces shall be as defined in Daniel Procedure No. MI-A-0-77-VS, Revision 0.

4.2.2 Initial and date Table 2 as each component is magnetic particle inspected. Also note on Table 2 under "Comments" whether the component inspected is satisfactory or unacceptable.

4.3 The items listed in Table 3 are made of Vacocon and are to be visually inspected for coating integrity using the procedure in Appendix A.

4.3.1 Acceptance criteria shall be as noted in the procedure in Appendix A.

4.3.2 Initial and date Table 3 as each component is inspected. Also note on Table 3 under "Comments" whether the component inspected is satisfactory or unacceptable.

Completed by \_\_\_\_\_  
Date \_\_\_\_\_

STEAM GENERATOR REPLACEMENT

Recommended Approval: \_\_\_\_\_

Date: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Date: \_\_\_\_\_

Approved By: \_\_\_\_\_

Chairman, Station Nuclear Safety, and  
Operating Committee

Date: \_\_\_\_\_

List of Effective Revisions:

Section

Date

Attachments

## APPENDIX A

### PROCEDURE FOR VERIFYING CONTINUITY OF MERESITE VR-914 PHENOLIC COATING FOR VASCOMAX BOLTS

PURPOSE -- The purpose of this procedure is to establish a means of inspection with a low-voltage, non-sparking holiday detector device, the coating applied to Vascomax material.

INSPECTION DEVICE -- Use a Tinker & Rascor Model M/1 Holiday Detector which utilizes a 6.75-V battery as a source of current. The current is imposed upon the surface to be inspected by a means of a sponge-type probe. A film discontinuity causes a flow of current to "ground" which causes an audible sound to be emitted from the annunciator box.

TEST METHOD -- Any freshly applied coating shall have been dried at least 24 hours prior to testing. One hundred percent (100%) of the surface area which is physically accessible to the sponge probe shall be checked.

The procedure for assembling and operating the "M/1" shall be as set forth in Attachment I. A wetting agent, such as "Varexero 100" by Dow Corning Corporation or Photo Flo-200 by Eastman Kodak, shall be added to the water used to wet the sponge to enhance the sensitivity (the latter product is available from most photographic services agencies). Periodically inspect the ground to ensure that the unit is properly grounded; this can be accomplished by intentionally placing the probe on an obvious discontinuity or a grounded, uncoated conductive metal surface. An audible signal indicates a coating flaw. Turn the sponge or end, using the corner only, to zero on a suspected flaw.

When a pinhole is located, the flaw shall be designated by encircling with chalk or a comparable, easily removable marking.

ACCEPTANCE CRITERIA -- Any discontinuities shall be referred to Engineering for evaluation and disposition.

## APPENDIX A

### PROCEDURE FOR VERIFYING CONTINUITY OF MERESITE VR-314 PHENOLIC COATING FOR VASCOMAX BOLTS

PURPOSE -- The purpose of this procedure is to establish a means of inspection with a low-voltage, non-sparking holiday detector device, the coating applied to Vascomax material.

INSPECTION DEVICE -- Use a Finkler & Rasco Model M/I Holiday Detector which utilizes a 6.75-V battery as a source of current. The current is imposed upon the surface to be inspected by a means of a sponge-type probe. A film discontinuity causes a flow of current to "ground" which causes an audible sound to be emitted from the annunciator box.

TEST METHOD -- Any freshly applied coating shall have been dried at least 24 hours prior to testing. One hundred percent (100%) of the surface area which is physically accessible to the sponge probe shall be checked.

The procedure for assembling and operating the "M/I" shall be as set forth in Attachment I. A wetting agent, such as "Versene 100" by Dow Corning Corporation or Photo Flo-200 by Eastman Kodak, shall be added to the water used to wet the sponge to enhance the sensitivity (the latter product is available from most photographic services agencies). Periodically inspect the ground to ensure that the unit is properly grounded; this can be accomplished by intentionally placing the probe on an obvious discontinuity or a grounded, uncoated conductive metal surface. An audible signal indicates a coating flaw. Turn the sponge or end, using the corner only, to pass on a suspected flaw.

When a pinhole is located, the flaw shall be designated by encircling with chalk or a comparable, easily removable marking.

ACCEPTANCE CRITERIA -- Any discontinuities shall be referred to Engineering for evaluation and disposition.



Yascomar Coating Inspected

<u>Initials</u>	<u>Date</u>	<u>Comments</u>
-----------------	-------------	-----------------

## 3. 2-RC-P-1C Reactor Coolant Pump Supports - Ref. Dwg. 11442-FM-53C and H

- |   |       |       |
|---|-------|-------|
| 1. Eight (8) Lug ends (Item 1, FM-53C).       | _____ | _____ |
| 2. Eight (8) Clevis ends (Item 2, FM-53C).    | _____ | _____ |
| 3. Eight (8) Pins (Item 3, FM-53C).           | _____ | _____ |
| 4. Two (2) Clevis's (Item 18 and 20, FM-53H). | _____ | _____ |
| 5. Four (4) Rods (Item 17, FM-53H).           | _____ | _____ |

## 4. 2-RC-R-2 Pressurizer Support - Ref. Dwg. 11448-FM-52B

- |  |       |       |
|--|-------|-------|
| 1. Four (4) Clevis's (Item 2).         | _____ | _____ |
| 2. Four (4) Pins (Item 3).             | _____ | _____ |
| 3. Eight (8) Guide Brackets (Item 52). | _____ | _____ |
| 4. Twelve (12) Bracket Pins (Item 53). | _____ | _____ |
| 5. Eight (8) Trunnion Caps (Item 5).   | _____ | _____ |
| 6. Four (4) Trunnion Mounts (Item 6).  | _____ | _____ |
| 7. Four (4) Invert Pins (Item 7).      | _____ | _____ |

TABLE 2 - VASCOMAX CORROSION IN REACTOR

Item	Description	Vascomax Corrosion Inspected	
		Date	Comments
1	Co-Pol Reactor Coolant Pump Supports - Ref. Dwg. 11403-N-536		
1	Right (8) Lug ends (Item 1, RM-536).		
2	Right (8) Clevis ends (Item 2, RM-536).		
3	Right (8) Pin (Item 3, RM-536).		
4	Two (2) Clevis (Item 17 and 19, RM-536).		
5	Four (4) Rods (Item 17, RM-536).		
6	Co-Pol Reactor Coolant Pump Supports		
7	Right (8) Lug ends (Item 1, RM-536).		
8	Right (8) Clevis ends (Item 2, RM-536).		
9	Right (8) Pin (Item 3, RM-536).		
10	Two (2) Clevis (Item 17 and 19, RM-536).		
11	Four (4) Rods (Item 17, RM-536).		

Magnetic Particle Inspected

	<u>Initials</u>	<u>Date</u>	<u>Comments</u>
3. 2-XC-P-1C Reactor Coolant Pump Support - Ref. Dwg. 11448-FM-53A			
1. The four upper legs (Item 1-4, FM-53A) including the welds between the pipe and plug.	_____	_____	_____
2. The four lower legs (Items 5-8, FM-53A) including the welds between the pipe and plug.	_____	_____	_____
3. The four horizontal pipe braces (Item 9, FM-53A) including the weld between the pipe and plug.	_____	_____	_____
4. The four upper support diagonals (Item 10, FM-53A) including the three welds between pipe and plug and two welds between plug and plate.	_____	_____	_____
5. The support beam assemblies (Items 19 and 20, FM-53A): The 16-inch Sch. 12 pipe, including end pieces, details 2, 3, 7, and 8 - FM-53H and welds between pipe and end pieces.	_____	_____	_____
6. The two lower support diagonals (Item 35, FM-53A) including welds between pipe and end pieces.	_____	_____	_____
7. The Clavis's (Items 25, 34, 36, and 37, FM-53A).	_____	_____	_____
4. 2-XC-B-2 Pressurizer Support - Ref. Dwg. 11448-FM-52A and B			
1. Entire length of each support rod (FM-52A).	_____	_____	_____
2. All accessible welds (FM-52A).	_____	_____	_____
3. Welds on trunnion mount (Item 6, FM-52B).	_____	_____	_____

Magnetic Particles Inspected

Initials      Date      Comments

2. 2-RC-P-12 Reactor Coolant Pump Support - Ref. Dwg. 11443-FM-53A

1. The four upper legs (Items 1-4, FM-53A) including the welds between the pipe and plug.

\_\_\_\_\_

2. The four lower legs (Items 5-8, FM-53A) including the welds between the pipe and plug.

\_\_\_\_\_

3. The four horizontal pipe braces (Item 9, FM-53A) including the weld between the pipe and plug.

\_\_\_\_\_

4. The four upper support diagonals (Item 10, FM-53A) including the three welds between pipe and plug and two welds between plug and plate.

\_\_\_\_\_

5. The support beam assemblies (Items 17 and 19, FM-53A):

The 16 in. 3/4 in. 12 pipe, including end pieces, details 2, 3, 7, and 8 - FM-53H and welds between pipe and end pieces.

\_\_\_\_\_

6. The two lower support diagonals (Item 35, FM-53A) including welds between pipe and end pieces.

\_\_\_\_\_

7. The Clavis's (Items 26, 34, 36, and 37, FM-53A).

\_\_\_\_\_

TABLE 2 -- COMPONENTS TO BE MAGNETIC PARTICLE INSPECTED

		<u>Magnetic Particle Inspected</u>		
		<u>Initials</u>	<u>Date</u>	<u>Comments</u>
1.	2-RC-F-1A Reactor Coolant Pump Support - Ref. Dwg. 11448-FM-53A			
1.	The four upper legs (Items 1-4, FM-53A) including the welds between the pipe and plug.	_____	_____	_____
2.	The four lower legs (Items 5-8, FM-53A) including the welds between the pipe and plug.	_____	_____	_____
3.	The four horizontal pipe braces (Item 9, FM-53A) including the weld between the pipe and plug.	_____	_____	_____
4.	The four upper support diagonals (Item 10, FM-53A) including the three welds between pipe and plug and two welds between plug and plate.	_____	_____	_____
5.	The support beam assemblies (Items 17 and 19, FM-53A):  The 16-inch Sch. 12 pipe, including end pieces, details 2, 3, 7, and 8 - FM-53H and welds between pipe and end pieces.	_____	_____	_____
6.	The two lower support diagonals (Item 33, FM-53A) including welds between pipe and end pieces.	_____	_____	_____
7.	The Clevis's (Items 25, 26, 26, and 27, FM-53A).	_____	_____	_____

Visually Inspected

	<u>Initials</u>	<u>Date</u>	<u>Comments</u>
4. 2-AC-Z-2 Pressuriser Support - Ref. Dwg. 11448-FM-523			
1. Clevis (Item 2)			
2. Pin (Item 3) Limited Access			
3. Stop Plate (Item 4)			
4. Trunnion Cap (Item 5)			
5. Trunnion Mount (Item 6)			
6. Insert Plate (Item 7)			
7. Guide Bracket (Item 52)			
8. Bracket Pin (Item 53)			
9. Support Rods - FM-52A			

Visually Inspected

## 3. 2-RC-P-1C Reactor Coolant Pump Supports - Ref. Dwg. 11448-PH-33A

	<u>Initials</u>	<u>Date</u>	<u>Comments</u>
1. Upper Leg (Item 1)			
2. Upper Leg (Item 2)			
3. Upper Leg (Item 3)			
4. Upper Leg (Item 4)			
5. Lower Leg (Item 5)			
6. Lower Leg (Item 6)			
7. Lower Leg (Item 7)			
8. Lower Leg (Item 8)			
9. Horizontal Pipe Brace (Item 9)			
10. Upper Support Diagonal (Item 10)			
11. Adjustable Clevis (Item 12)			
12. Adjustable Clevis (Item 13)			
13. Support Beam Assembly (Item 18)			
14. Support Beam Assembly (Item 20)			
15. Clevis (Item 26)			
16. Clevis (Item 34)			
17. Lower Support Diagonal (Item 35)			
18. Clevis (Item 36)			
19. Adjustable Clevis (Item 37)			

Visually Inspected

## 2. 2-RQ-F-18 Reactor Coolant Pump Supports - Ref. Dwg. 11448-WM-53A

	<u>Initials</u>	<u>Date</u>	<u>Comments</u>
1. Upper Leg (Item 1)			
2. Upper Leg (Item 2)			
3. Upper Leg (Item 3)			
4. Upper Leg (Item 4)			
5. Lower Leg (Item 5)			
6. Lower Leg (Item 6)			
7. Lower Leg (Item 7)			
8. Lower Leg (Item 8)			
9. Horizontal Pipe Brace (Item 9)			
10. Upper Support Diagonal (Item 10)			
11. Adjustable Clevis (Item 12)			
12. Adjustable Clevis (Item 13)			
13. Support Beam Assembly (Item 17)			
14. Support Beam Assembly (Item 19)			
15. Clevis (Item 26)			
16. Clevis (Item 34)			
17. Lower Support Diagonal (Item 35)			
18. Clevis (Item 36)			
19. Adjustable Clevis (Item 37)			



TABLE 1 -- COMPONENTS TO BE VISUALLY INSPECTED

	<u>Visually Inspected</u>		
	<u>Initials</u>	<u>Date</u>	<u>Comments</u>
1. 2-RC-F-1A Reactor Coolant Pump Supports - Ref. Dwg. 11448-FM-53A			
1. Upper Leg (Item 1)			
2. Upper Leg (Item 2)			
3. Upper Leg (Item 3)			
4. Upper Leg (Item 4)			
5. Lower Leg (Item 5)			
6. Lower Leg (Item 6)			
7. Lower Leg (Item 7)			
8. Lower Leg (Item 8)			
9. Horizontal Pipe Brace (Item 9)			
10. Upper Support Diagonal (Item 10)			
11. Adjustable Clevis (Item 12)			
12. Adjustable Clevis (Item 13)			
13. Support Beam Assembly (Item 17)			
14. Support Beam Assembly (Item 19)			
15. Clevis (Item 25)			
16. Clevis (Item 34)			
17. Lower Support Diagonal (Item 35)			
18. Clevis (Item 36)			
19. Adjustable Clevis (Item 37)			

SECTION B

Item - Vasco Clevis (Lug End)

Drawing - 11448-FX-53C, Item 1

No. Pcs. - 4                      Heat No. - 1971A(2 Pcs.); 2041A(1 Pc.); 2133A(1 Pc.)

Raw Material - NSC Purchase Order 104N-7431-4, Item 1-A

I.R. No. 33.8.3(32)

I.R. No. 33.8.3(59)

Machining - NSC Purchase Order 104N-5849-4, Item 1

I.R. 33.8.3(149)

Heat Chart No. - BE-623

# NUCLEAR SERVICE AND CONSTRUCTION COMPANY, INC.

INSPECTION REPORT

CM- Yes

CONTRACT NO.

104N

INSPECTION DATE

January 30, 1970

OP ☐ INSTALLATION

☒ Receipt OTHER

CHARGE NO.

104N

FILE NO.

33.8.3(32)

VASCO Steel

P.O. NO.

104N-7432-4

PROCEDURE NO.

33-1 (Procurement - Raw Materials)

WING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS
	1	7	VASCO Steel, 8-1/8" x 12-1/4" x 20", Heat Number 1971A
	1	9	VASCO Steel, 8-1/8" x 12-1/4" x 20", Heat Number 2041A
<p>NOTES:</p> <ol style="list-style-type: none"> <li>1. No deficiencies noted.</li> <li>2. All stamped with heat number.</li> <li>3. All mill test reports received.</li> <li>4. Inspected at NNS &amp; DD Co.</li> </ol>			

DISPOSITION:

One & Webster/Mr. H. G. Selevsky

T. W. Kilpatrick, Jr./JLP/File

A. F. Ciannavei/LNW

E. G. Adams/SRY

W. R. Graham 1 - Mr. B. P. Hill

DISPOSITION OF MATERIAL

Satisfactory - Released

RECTOR

DATE

LATROBE, PA. 15650

# ANALYSIS REPORT

NOV 27 '70



NUCLEAR SERVICE AND  
CO. SIMULATION CO., INC.

Customer: Newport News Shipbuilding & Dry Dock Company  
Newport News, Virginia

Order No. 1044-7432-4

Order No. V-251712

Material: CVM Vasco Max 350 Solution Annealed

Spec: Stone & Webster INC. 234 Revised November 27, 1969

SIZE: BARS

WEIGHT

HEAT NO.

DATE SHIPPED

12-1/4" x 20" 7 pcs.

4122H

1971-A

1/28/70

Mechanical Tensile Properties Anneal Temp. 950° Time 3 HOURS

	2341R1	2341R2	2341R3	2341R4
Y. Poi	34200	341300	335700	336700
U. Poi	331000	331600	330900	330500
Yield 0.2 Percent				
Reduction %	14.6	16.9	12.4	12.4
Elongation %	3.0	3.0	3.0	3.0

Anneal Re - 32.3

Grain Size - 6.1

Acid Etch - Satisfactory to NEL-STD 430, S-2, R-2, & C-2

Ultrasonic Inspection - Satisfactory to Stone & Webster NUS-214

Revised November 27, 1969

## Non-Destructive Testing

A	B	C	D	E
Thin Heavy	Thin Heavy	Thin Heavy	Thin Heavy	Thin Heavy
0 0	0 0	0 0	0 0	1 1/2
0 0	0 0	0 0	0 0	2 1/2

Impact Toughness

K<sub>IC</sub>

2B = 31.8, 31.5, 34.3

234X = 39.5, 40.0, 37.7

## Analysis

	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
As	.011	.02	.03	.007	.004				4.74	11.80	12.52
Al	.11		1.35		.02		.011		Ca .05 Added		

born and subscribed to before me  
23rd day of January, 1970:

Certified Correct

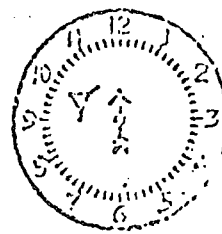
JOHN J. ANTH, NOTARY PUBLIC  
BEAVER COUNTY

LABORATORY MANAGER

LATRODE, PA. 15650

ANALYSIS REPORT

JUN 27 70



Order No. Newport News Shipbuilding & Dry Dock Company  
Newport News, Virginia

Order No. 104427431-4

Order No. V-251712

Material: CUM Vasco Max 350 Solution Annealed  
Spec: Steno & Webster NUS 214 Revised November 27, 1969  
SIZE: 12-1/4" x 20" 9 pc. WEIGHT: 5276# HEAT No. 2048-A

DATE SHIPPED 1/21/70

Additional Tensile Properties Aging Temp. 950° Time 3 Hours

2X-1R1	1D-1R1
S. Psi 337600	339100
S. Psi 330200	331000
Yield 0.2 Percent	
Reduction % 13.2	17.6
Elongation % 2.5	3.0

annealed Rc = 33.7 Acid Etch = Satisfactory to NTL-STD 490, S-2, R-2, & C-2

Grain Size = 6.0 Ultrasonic Inspection = Satisfactory to Steno & Webster NUS-214  
Revised November 27, 1969

Non-Metallic Rating

A		B		C		D		E	
Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
0	0	0	0	0	0	0	0	3/4	0
0	0	0	0	0	0	0	0	1/2	1/2

Fracture Toughness K<sub>IC</sub> 2X = 34.6, 35.3, 33.9  
1D = 36.4, 34.6, 34.3

Analysis

C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
.026	.04	.02	.003	.003				4.73	11.97	18.54
Al .12		Ti 1.33	B .005		Zr .007		Ca .05 Added			

Order and subscribed to before me

Certified Correct

23rd day of January, 1970

*John J. Auth*

*James J. ...*

# NUCLEAR SERVICE AND CONSTRUCTION COMPANY, INC.

P

## INSPECTION REPORT

CM - Yes

CONTRACT NO. 104N	INSPECTION DATE February 6, 1970
----------------------	-------------------------------------

SHOP	<input type="checkbox"/> INSTALLATION	<input checked="" type="checkbox"/> Receipt	OTHER	CHANGE NO. 104N-1	FILE NO. 33.2.3/100
ECT		P.O. NO. 104N-7432-4		PROCEDURE NO. 33-1 (Procurement - Raw Materials)	
VASCO Steel Block					

DRAWING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS
-------------	----------	------	------------------------------------

	1	1	<p>One Pc. VASCO Steel Block, 8-1/8" x 12-1/4" x 20-1/4" to Stone &amp; Webster Specification NUS-214. Inspected. Heat Number 2133A stamped on block.</p> <p>NOTES:</p> <ol style="list-style-type: none"> <li>1. No deficiencies noted.</li> <li>2. Material test report received.</li> <li>3. Material at NNS &amp; DD Co.</li> </ol>
--	---	---	---

SA:ecc

DISTRIBUTION:

TWK/AFC

Mr. Salevsky

LMW

BPH

CSM

JLP/FILE

WRG

Mr. R. M. Donaldson

<p>DISTRIBUTION:</p> <p>Mr. R. M. Donaldson</p>	<p>DISPOSITION OF MATERIAL</p> <p>Satisfactory - Released</p>
---	---



STEELTAK COMPANY

VASCO  
LATROBE, PA. 15350

FORM VIDE 304-2.00

ANALYSIS REPORT

Customer: Newport News Shipbuilding & Dry Dock Company  
Newport News, Virginia

1-PC-

our Order No. 104N 7431 4 Part

ir Order No. V-251712

and: CVM Vasco Max 350 Solution Annealed  
Spec: Stone & Webster NUS 214 Revised November 27, 1968

SIZE BARS WEIGHT HEAT No. DATE SHIPPED

" x 12-1/4" x 20" 1g.  
2 pcs. 585# 2133-A 1/27/70

Longitudinal Tensile Properties Aging Temp 950° Time 6 Hours

No.	1B-MR	1BMX-MR
T.S. Psi	348400	344400
Y.S. Psi	335400	335300
Offset 0.2 Percent		
Reduction %	10.0	14.7
Elongation %	2.0	3.0

Annealed Rc 29.6 Acid Etch - Satisfactory to MIL-STD 430, S-2, R-2, & C-2  
Grain Size 6.1 Ultrasonic Inspection - Satisfactory to Stone & Webster NUS-214  
Revised November 27, 1968

Non-Metallic Rating

	A		B		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
T	0	0	0	0	0	0	0	0	3/4	0
B	0	0	0	0	0	0	0	0	1 1/4	0

Fracture Toughness will be reported at a later date.

Analysis

	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
3-A	.012	.04	.04	.005	.004				4.66	11.83	15.1
	Al .11		Ti 1.38		B .002		Zr .005		Ca .05 Added		

Form and subscribed to before me

17th day of February, 1970:

Certified Correct

*[Signature]*

*[Signature]*

SECTION H

Item - VASCO Clevis End

Drawing - 11448-FM-53C, Item 2

No. Pcs. - 8

Heat No. 2027A on 2

Heat No. 2147A on 3

Heat No. 1967A on 3

Raw Material

NSC Purchase Order 104N-7431-4, Item 2  
I.R. No. 33.8.3(80), (43)

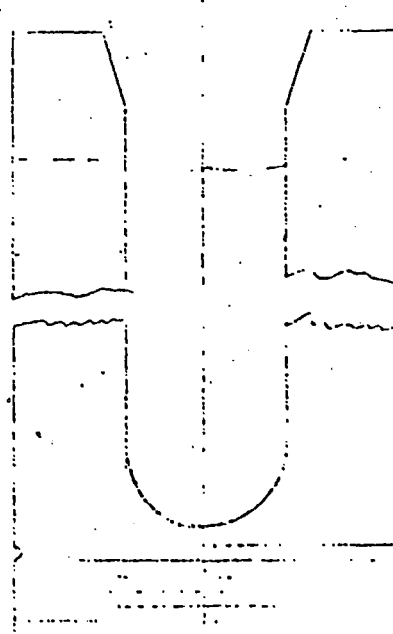
Stress Relieve Heat Chart No. BE-623

Machining -

NSC Purchase Order 104N-5849-4, Item 2  
I.R. No. 33.8.3(138)



CONTRACT NO.		INSPECTION DATE	
TYPE	INSTALLATION	OTHER	CHARACTER
P.C. NO.		P.C. NO.	

DRAWING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS																
SC 300-1 10-530-1 250.0.	2	3 Pcs.	<p>RIGHT SIDE'S DIMENSIONS INSPECTED AFTER IT WAS INSPECTED AS FOLLOWS: (NOTE: RIGHT CHART NO. BE-223, 10-530-1)</p> <table border="1"> <thead> <tr> <th>MACHINE SHOP PZ, 10-530-1</th> <th>HEAT NO. - 2017A</th> </tr> </thead> <tbody> <tr> <td>-435</td> <td>-17500</td> </tr> <tr> <td>-450</td> <td>-17500</td> </tr> <tr> <td>-564</td> <td>-17500</td> </tr> <tr> <td>-537</td> <td>-17500</td> </tr> <tr> <td>-452</td> <td>-17500</td> </tr> <tr> <td>-452</td> <td>-17500</td> </tr> <tr> <td>-435A</td> <td>-17500</td> </tr> </tbody> </table> <p>THE FOLLOWING CORRECTION WAS NOTED ON ONE OF THE PARTS BY MS-452, HEAT NO. - 2027A: GROUDED OUT FOR REPAIRS. BEEN WASHED OUT BY BUFFING. IS SHOWN ON THE CHART. ACCEPTED BY NSC MEMBER P.T. CIPRIANO:</p> <p>A ←</p>  <p>"A-A"</p>	MACHINE SHOP PZ, 10-530-1	HEAT NO. - 2017A	-435	-17500	-450	-17500	-564	-17500	-537	-17500	-452	-17500	-452	-17500	-435A	-17500
MACHINE SHOP PZ, 10-530-1	HEAT NO. - 2017A																		
-435	-17500																		
-450	-17500																		
-564	-17500																		
-537	-17500																		
-452	-17500																		
-452	-17500																		
-435A	-17500																		

DISTRIBUTION:  
TWK/AFC  
1/2/5/10/15/20/25/30/35/40/45/50/55/60/65/70/75/80/85/90/95/100

DISTRIBUTION:	Mr. Salevsky	DISPOSITION OF MATERIAL	SATISFACTORY - To be supplied to NSC
	LNW EPH GSK ZEP/FILE WRG		
ON INSPECTION	DATE	260	

# NUCLEAR SERVICE AND CONSTRUCTION COMPANY INC

## INSPECTION REPORT

CH- Yes

CONTRACT NO.

104N

INSPECTION DATE

February 6, 1970

FORM 17

☐ SHOP

☐ INSTALLATION

☒ Receipt OTHER

CHARGE NO.

104N-100

FILE NO.

33.8.3.46

SUBJECT

VASCO Steel Blocks

P.O. NO.

104N-7453-1(2)

PROCEDURE NO.

33-1 (Procurement - Raw Materials)

DRAWING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS
	2	12	<p>12 Pcs. of VASCO Steel Blocks to Stone &amp; Webster Specification NUS-214, Purchase Order Size, 8-1/8" x 9-1/4" x 22-1/8" were inspected. Actual sizes and heat numbers are as follows:</p> <p>3 Pcs. - 8-1/8" x 9-1/4" x 22-1/8", Heat Number 2027A          6 Pcs. - 8-1/8" x 9-1/4" x 22-1/4", Heat Number 2027A          3 Pcs. - 8-1/8" x 9-1/4" x 22-3/8", Heat Number 2027A</p> <p>NOTES:"</p> <ol style="list-style-type: none"> <li>Heat Numbers stamped on each piece.</li> <li>Mill test report received.</li> <li>No deficiencies noted.</li> <li>Material at N.N.S. &amp; D.D. Co.</li> </ol>

EGA:ecc

### DISTRIBUTION:

- 1 - Mr. H. G. Salevsky/S&W Repr. - NNS & DD Co.
- 1 - Mr. T. W. Kilpatrick, Jr./JLP/File
- 1 - Mr. A. F. Ciannavei/LWW
- 1 - Mr. E. G. Adams/SEM
- 1 - Mr. B. P. Hill
- 1 - Mr. W. R. Graham

### DISPOSITION OF MATERIAL

Satisfactory - Released

DATE

## ANALYSIS REPORT

Customer: **Norfolk Navy Shipbuilding & Dry Dock Company**  
**Norfolk Navy, Virginia**

Your Order No. **1042-7731-4 Part**

Our Order No. **V-251773**

Brand: **CW Vasco Man 350 Solution Annealed**  
**Spec: Stone & Webster HUS 214 Revised November 27, 1963**

SIZE

BARS

WEIGHT

HEAT No.

DATE SHIPPED

**8-1/8" x 9-1/4" x 22-1/8"**

**12 lbs.**

**500#**

**2027-A**

**1/20/70**

Identified: 1-Tensile Properties Against Tens. Spec. Time 2 Hours

No.	2T-1R1	23-1R2
T.S. Ref	353000	353700
Y.S. Ref	343000	330000
Offset 0.2 Percent		
% Reduction	11.6	19.0
% Elongation	2.0	3.0

Annealed Re - 34.3

Acid Etch - Satisfactory to NBS-STD 400, S-2, R-2, & C-2

Grain Size - 6.0

Ultrasonic Inspection - Satisfactory to Stone & Webster HUS 214  
 Revised November 27, 1963

Non-Destructive Testing

	A		D		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
T	0	0	0	0	0	0	0	0	1/2	0
D	0	0	0	0	0	0	0	0	1/2	1

Fracture Toughness  
 $K_{Ic}$

2T = 32.1, 29.9, 29.3  
 2D = 35.5, 37.2, 34.2

Heat No.	Analysis										
	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
2027-A	.019	.03	.03	.003	.003				4.00	11.03	10.15
	Al .13	Ti 1.37	B .003	Zr .011	Ca .05 Added						

Sworn and subscribed to before me  
 this 2nd day of February, 1970:

Certified Correct

*[Signature]*  
 JAMES L. ZIMMERMAN, Notary Public  
 Notary Public for Chester County, Beaver County  
 My Commission Expires Feb. 1, 1972

*[Signature]*  
 LABORATORY MANAGER

# NUCLEAR SERVICE AND CONSTRUCTION COMPANY INC

## INSPECTION REPORT

CH - Yes

CONTRACT NO.

104N

INSPECTION DATE

March 5, 1970

FORM 17

☐ SHOP

☐ INSTALLATION

☒ Receipt OTHER

CHARGE NO.

104N

FILE NO.

33.8.3(80)

SUBJECT

VASCO Steel

P.C. NO.

104N-7431-4

PROCEDURE NO.

35-1 (Procurement - Raw Materials)

DRAWING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS
	2	9	<p>VASCO Steel 9-1/4" x 8-1/8" x 22-1/8" Long, Heat Number 2147A</p> <p>NOTES:</p> <ol style="list-style-type: none"> <li>1. No defects noted.</li> <li>2. All die stamped with heat numbers.</li> <li>3. Material at N.N.S. &amp; D.D. Co.</li> </ol>

CDC:ecc

### DISTRIBUTION:

TWK/AFC

Mr. Salevsky

DISTRIBUTION:

LWW

BPH

GSM

JLP/FILE

WAG

DISPOSITION OF MATERIAL

Satisfactory - Released

CH INSPECTOR: C. D. Crocch

Sheet 1 of 1

DATE

March 5, 1970

ANALYSIS REPORT

Customer: Newport News Shipbuilding & Dry Dock Company  
Newport News, Virginia 23607

Your Order No. 104N-7431-4 Part

Our Order No. V-251713

Brand: CVM Vasco Max 350 Solution Annealed  
Spec: Stone & Webster NUS 214 Revised November 27, 1968

SIZE	BARS	WEIGHT	HEAT No.	DATE SHIPPED
S-1/8" x 9-1/4" x 22-1/8"	9 pcs.	4395#	2147-A	2/26/70

Longitudinal Tensile Properties Ageing Temp 950° Time 3 Hours

No.	18	3X
T.S. Psi	344100	337600
Y.S. Psi	338100	330900
Offset 0.2 Percent		
Reduction %	23.0	22.0
Elongation %	5.0	5.0

Annealed Rc - 34.3 Acid Etch - Satisfactory to MIL-STD 430, S-2, R-2, & C-2

Grain Size - 6.1 Ultrasonic Inspection - Satisfactory to Stone & Webster NUS-214  
Revised November 27, 1968

Non-Metallic Ratios

	A		B		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
T	0	0	0	0	0	0	0	0	1 1/2	0
B	0	0	0	0	0	0	0	0	1 1/4	0

Fracture toughness will be reported at a later date.

Heat No.	Analysis										
	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
2147-A	.013	.03	.05	.005	.004				4.67	11.81	18.02
	Al .11	Ti 1.41	B .002	Zr .008	Ca .05	Added					

Sworn and subscribed to before me  
this 2nd day of March, 1970:

Certified Correct

*John J. Smith*  
JOHN J. SMITH, Notary Public  
Notary Public, State of Virginia

*James S. Seng*  
LABORATORY MANAGER

AT 1  
SECTION -B-

Item - Vasco Clevis End  
Dwg. - 11448-FM-53C, Item 2  
No. Pcs. - 8  
Heat No. 2027A, 2147A, 2143A

Raw Material  
Purchase Order No. 104N-7431-4, Item 2  
I.R. No. 33.8.3 (43) in Section H of NSC/5206  
I.R. No. 33.8.3 (130) 104N/179

Machining  
Purchase Order No. 104N-5849-4, Item 2  
Shipyard Inspection Report

Ageing Chart No. BE-634

(Copy of heat chart in certification package dated June 12, 1970,  
File No. NSC/5073, 104N/171)

INSTALLATION ☐

THE FOLLOWING MATERIAL HAS BEEN INSPECTED AND IS RELEASED FOR: SHIPMENT FROM YARD

EST FINAL INSPECTION	NNS & DD CO. P.O. ORDER NO. 5248-V
NT X53 MACHINE SHIP	DATE 5/19/70
S. COAST GUARD NOT REQUIRED	SIGNED (ADS) NOT REQUIRED
OPERATING COMPANY CLEAN SERVICE & CONSTR. CO.	SIGNED (with initials) H. S. C. L. E. P. [unclear]

IG NO.	ITEM NO.	NAME OF PART	NO. PARTS ON ORDER	NO. PARTS ACCEPTED TODAY	NO. PARTS STILL DUE
069	1	CLEVIS	48	8	32
C	2	CLEVIS	48	8	32
THE ABOVE MATERIAL IS SATISFACTORY.					

Ins P.

True!

by Venn

Mr. King

✓ vi. 1.7

REMARKS

☐ ORDER COMPLETED

☒ ORDER NOT COMPLETED

☒ FINAL SHOP

N. N. INSP. SIGNATURE

Bill Jones MS#12

# NUCLEAR SERVICE AND CONSTRUCTION COMPANY INC

SECTION REPORT

CM-YES

CONTRACT NO.

104N

INSPECTION DATE

4-15-70

SHOP



INSTALLATION



RECEIPT/OTHER

CHARGE NO.

104N

FILE NO.

93.2.2(120)

SCO STEEL

P.O. NO.

104N-7431-4

PROCEDURE NO.

23-1 (PROCEDURE OF SCHEMATIC)

DRAWING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS
	2	5	<p>VASCO STEEL 8 1/8" x 9 1/4" x 22 1/8"</p> <p>HEAT NO-2171A ON 4 pc</p> <p>" " - 2143A on 1 pc</p> <p>NO DEFECTS NOTED</p> <p>ALL STAMPED WITH HEAT NO.</p> <p>INSPECTED AT N.N.S. &amp; D.D.CO.</p>

TRIBUTION:

/AFC  
Salevsky

DISPOSITION OF MATERIAL

SATISFACTORY-

/FILE

LECTOR  
A. [Signature]

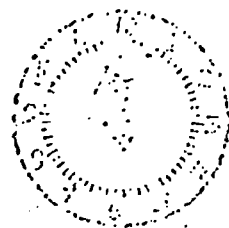
DATE

4-15-70



VASCO  
LATROBE, PA. 15650

ANALYSIS REPORT



SERVICE AND  
EQUIPMENT CO., INC.

Customer:

Nuclear Service & Construction Company  
4101 Washington Avenue  
Newport News, Virginia - 23607

Order No.

104N-7431-4 Part

Order No.

V-251713

and:

Consumable Vacuum Melted VascoMax 350 Solution Annealed  
Spec: Stone & Webster NUS-214 Revised November 27, 1968  
BARS WEIGHT HEAT No. DATE SHIPPED

SIZE

1/8" x 9 1/2" x 22-1/8"

1 piece

485#

2143-A

4/1/70

Longitudinal Tensile Properties Ageing Temp. 950° - 3 Hours

Test No.	4T-MR1	4T-MR2	1B-MR1	1B-MR2
Tensile Strength PSI	338300	336400	342100	342200
Yield Strength PSI	335700	331300	338100	341600
Offset 0.2 Percent				
Percent Reduction	8.0	4.0	4.0	2.0
Percent Elongation	1.0	1.0	1.0	1.0

Non-metallic Rating

	A		B		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
T.	0	0	0	0	0	0	0	0	3/4	1
B.	0	0	0	0	0	0	0	0	1 1/2	0

Annealed Hardness Rc = 34.9

Acid Etch - Satisfactory to Mil-Std 430, S-2, R-2, & C-2

Grain Size - 6.0

Ultrasonic Inspection - Satisfactory to Stone & Webster NUS 214  
Revised November 27, 1968

Fracture toughness test results will be reported at a later date.

Analysis

Heat No.	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
43-A	.014	.03	.03	.010	.004				4.66	11.96	18.13
	Al .14	Ti 1.38	B .002	Zr .008	Ca .05	Added					

worn and subscribed to before me  
this 2nd day of April, 1970

*Thomas A. McLean*  
THOMAS A. McLEAN, NOTARY PUBLIC  
MONACA BOROUGH, DEWEY COUNTY

Certified Correct

*William H. White*  
Supervisor - Finish Testing



VASCO  
LANROBE, PA. 15650

ANALYSIS REPORT

Customer: Newport News Shipbuilding & Dry Dock Company  
Newport News, Virginia

Fracture Toughness Results  
Additional Information

Order No. 104N 7431 4 Part

Order No. V-251713

Material: CVM Vasco Max 350 Solution Annealed

Spec: Stone & Webster NUS 214 Revised November 27, 1968

SIZE	BARS	WEIGHT	HEAT No.	DATE SHIPPED
x 9-1/4" x 22-1/8"	11pcs.	5401#	2143-A	3/6/70

Fracture Toughness Results

K<sub>IC</sub>

4T - 35.5, 36.7, 35.6  
1B - 39.7, 34.6, 33.2

Analysis

C Si Mn S P W Cr V Mo Co Ni

born and subscribed to before me  
13th day of April, 1970:

Certified Correct

*Thomas A. McLean*

*William W. White*

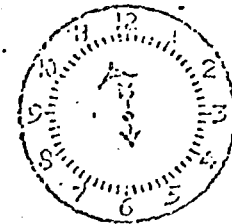
THOMAS A. McLEAN, NOTARY PUBLIC  
MONACA BOROUGH, DEAVER COUNTY  
MY COMMISSION EXPIRES JULY 2, 1973

SUPERVISOR - FINISH TESTING

LATROBE, PA. 15650

## ANALYSIS REPORT

MR 6 TO

SERVICE AND  
CO., INC.

Customer: Nuclear Service & Construction Company  
4101 Washington Avenue  
Newport News, Virginia - 23607

Order No. 104N-7431-4 Part

Order No. V-251713

Material: Consumable Vacuum Melted VascoMax 350 Solution Annealed.

Spec: Stone & Webster NUS 214 Revised November 27, 1968

SIZE BARS WEIGHT HEAT No. DATE SHIPPED

1/8" x 9 1/2" x 22-1/8"

4 pieces

19925

2171-A

4/1/70

Longitudinal Tensile Properties Ageing Temp. 950° - 6 Hours

Test No.	1B-MR1	1B-MR2	2X-MR1	2X-MR2
Tensile Strength PSI	353900	354000	346400	341800
Yield Strength PSI	344700	346800	339000	331600
Offset 0.2 Percent				
Percent Reduction	27.0	25.9	27.3	20.4
Percent Elongation	5.5	5.5	5.0	4.5

Non-metallic rating

	A		B		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	heavy
T.	0	0	0	0	0	0	0	0	1	1 1/2
B.	0	0	0	0	0	0	0	0	1	0

Annealed Hardness Rc - 35.1

Acid Etch - Satisfactory to Mil-Std 430, S-2, R-2, & C-2

Grain Size - 6.0

Ultrasonic Inspection - Satisfactory to Stone & Webster NUS 214  
Revised November 27, 1968

Fracture toughness test results will be reported at a later date.

Analysis

	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
1-A	.021	.02	.03	.005	.003				4.71	11.76	18.47
	Al .11	Ti 1.36	B .003	Zr .003	Ca .05 added						

Witnessed and subscribed to before me

on 2nd day of April, 1970.

Certified Correct

*William W. White*  
Supervisor - Finish Testing

*Thomas A. McLean*  
THOMAS A. McLEAN, NOTARY PUBLIC

**VASCO**  
LATROBE, PA. 15650

ANALYSIS REPORT

Customer: Nuclear Service & Construction Company  
Newport News, Virginia

Fracture Toughness Results  
Additional Information

Order No. 104N 7431 4 Part

Order No. V-251713

Spec: CVM Vasco Max 350 Solution Annealed  
Stone & Webster NUS 214 Revised

November 27, 1968

SIZE

BARS

WEIGHT

HEAT No.

DATE SHIPPED

x 9/4" x 22-1/8" 4 pcs.

1992#

2171-A

4/1/70

Fracture Toughness Results

K<sub>IC</sub>

2X - 33.5, 35.3, 36.8

1B - 32.2, 31.0, 32.8

Analysis

C Si Mn S P W Cr V Mo Co Ni

and subscribed to before me

13th day of April, 1970:

Certified Correct

THOMAS A. MCLEAN, NOTARY PUBLIC  
MONACA BOROUGH, DEWEY COUNTY

SUPERVISOR - FINISH TESTING

## SECTION A

Item - VASCO Pins

Drawing - 11448-FM-53C, Item 3

No. Pcs. - 8

Heat Nos. 1858A M.S.-610  
1858A M.S.-603  
1975A M.S.-614  
1837A M.S.-597

Heat Nos. 1858A M.S.-592  
1975A M.S.-617  
1975A M.S.-616  
1858A M.S.-605

Raw Material:

Purchase Order No. 104N-7431-4, Item 5

I.R. No. 33.8.3(13)

33.8.3(12) and (18) in Section J of NSC/5016, 104N/168

Purchase Order No. 104N-5849-18, Item 2

I.R. 33.8.3(74)A in Section J of NSC/5016, 104N/168

Machining:

Purchase Order No. 104N-5849-4, Item 3

I.R. No. 33.8.3(234)

Heat Chart No. B.H.-698

# NUCLEAR SERVICE AND CONSTRUCTION COMPANY INC

CTION REPORT

CH - Yes

CONTRACT NO.

104N

INSPECTION DATE

January 2, 1970

TOP

☐ INSTALLATION

☒ Receipt OTHER

CHARGE NO.

104N

FILE NO.

33.8.3(13)

P. O. NO.

104N-7431-4

PROCEDURE NO.

33-1 (Procurement - Raw Materials)

20 Steel

AWING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS
	5	1	VASCO Steel (Machined), 17-5/16" x 20" x 27-5/8", Heat Number 1963A
	5	1	VASCO Steel (Machined), 17-1/4" x 19-15/16" x 27-1/2", Heat Number 1788A
	5	1	VASCO Steel (Machined), 17-3/8" x 20" x 27-3/8", Heat Number 1963A
	5	1	VASCO Steel (Machined), 17-3/8" x 20" x 27-3/16", Heat Number 1837A, and 7BMX
	5	1	VASCO Steel (Machined), 17-3/8" x 20" x 27-5/8", *Heat Number 2001A
			*Heat Number tagged and painted on two sides with paint stick marker.
			Other four die stamped. Heat number stamped on block.
			++Dimension 27-3/16" should be 27-1/4", O.K. for release by W. Wells.
			Inspected at Newport News Shipbuilding and Dry Dock Company.

DISPOSITION:

Stone - Mr. H. G. Solevsky

Mr. T. W. Kilpatrick, Jr./JLP/File

Mr. A. F. Ciannavei/LW

Mr. E. G. Adams/SHM

Mr. B. P. Hill

1 - Mr. W. R. Graham

DISPOSITION OF MATERIAL

Satisfactory - Released

SPECTOR

Adams R. G. D. Receipt

S. F. W. S. F. W. S. F. W.

DATE

January 9, 1970

# QUALITY CONTROL DEFICIENCY REPORT

STANDARD PRACTICE		FILE NO. <b>33.8.3 (234)</b>	DISTRIBUTION: LWW BPH GSM
SPECIAL PRACTICE		DR NO. <b>104N-50</b>	JLP/FILE
CONTROLLED MATERIAL		INSP. DATE <b>6/22/70</b>	WRG
ENGINEER <b>F.D.D. Co.</b>	SUBJECT <b>WASCO PINS</b>	CONTRACT NO. <b>104/105 N</b>	SITE <b>F. H. S. E. D. Co.</b>
ON		<input checked="" type="checkbox"/> NSC PO/INS. <input type="checkbox"/> CONTR. FURN <input type="checkbox"/> NAVY/GVT. FURN.	
RECEIVING	<input type="checkbox"/> INSTALLED <input checked="" type="checkbox"/> SHOP OR STORAGE	CONTRACTOR WITNESSED YES/NO	

FACTORY BECAUSE OF:  
 PINS (PINS) WERE DAMAGED AS DESCRIBED AND REPORTED BY F.H.S.E.D. Co.  
 REPAIR REPORT FILE NO. 00983 (ATTACHED).

IDENTIFICATION (MACHINE SHOP NO.)	HEAT NO.	IDENTITY (MACHINE SHOP NO.)	HEAT NO.
M.S.-618	1975A	M.S.-604	1858A
M.S.-595	1873A	M.S.-601	1832A
M.S.-619	1975A	M.S.-620	1975A
M.S.-576	1858A	M.S.-591	1858A

Use Additional Sheets as Necessary

F.D.D. Co.	P.O. NO. <b>104N-5849-4 (311)</b>	SERIAL NO. <b>LISTED ABOVE</b>	DWG. NO. <b>FM-53C-1</b>
OR <b>F. H. S. E. D. Co.</b>	COMPONENT IDENT. <b>LISTED ABOVE</b>	CC <b>[Signature]</b>	DATE <b>6/21/70</b>
ACTION FOR RESOLUTION OF UNSATISFACTORY CONDITION: <b>attached sheet</b>			CHARGE NO.

ENGINEER <b>[Signature]</b>	DATE <b>6/23/70</b>	CONCURRING AUTHORITY (VENDOR, CONTRACTOR, OR GOVERNMENT REPRESENTATIVE) <b>M. Schabner per TWX dated 6/24/70</b>
		DATE

AS BEEN COMPLETED SATISFACTORILY AS REQUIRED BY RESOLUTION ABOVE.

REPORT IS: ☐ SELF-CLEARING    ☒ CLEARED    ☐ REMARKS BELOW

PT AND UT TESTS WERE CONDUCTED ON EACH PIN. REPORTS ARE ATTACHED.

DENTS AND CRACKS WERE GROUND OUT AND FAIRED IN. REWORKED PINS WERE INSPECTED BY MR. SALEVSKY OF STONE AND WEBSTER.

W. R. R. R. R.	CONCURRING AUTHORITY <b>[Signature]</b>	REPORT NO. <b>33.8.3 (234)</b>
----------------	--	-----------------------------------

RESOLUTION FOR DR. 1040-50

6/24/70

## 1. PINS NOT VISIBLY DAMAGED:

- a. DYE PENETRANT AND ULTRASONIC TEST EACH PIN.
- b. REPORT ALL DEFECTS (PT OR ULTRASONIC) TO NSC FOR EVALUATION. PROVIDE CERTIFIED TEST REPORTS.

## 2. DENTED PINS (MS 591, 595, 604, 619, 620 AND 625):

- a. GRIND OUT DENTS AND FAIR IN AT A MINIMUM OF A 4:1 RATIO.
- b. AFTER GRINDING DYE PENETRANT AND ULTRASONIC TEST EACH PIN.
- c. REPORT ALL DEFECTS (PT OR ULTRASONIC) TO NSC FOR EVALUATION. PROVIDE CERTIFIED TEST REPORTS.

## 3. CRACKED PINS (MS 601 AND 618):

- a. SAME RESOLUTION AS #2 ABOVE. HOWEVER, IF CRACK CONTINUES BEYOND THE BOTTOM OF THE RETAINING RING ~~GROOVE~~ GROOVE, SCRAP THE PIN AND REPLACE WITH A NEW PIN. NSC WILL FURNISH ADDITIONAL MATERIAL, IF REQUIRED.

## 4. ALL RE-WORKED PINS TO BE INSPECTED BY STONE &amp; WEBSTER.

A. Cannoli 6/24/70

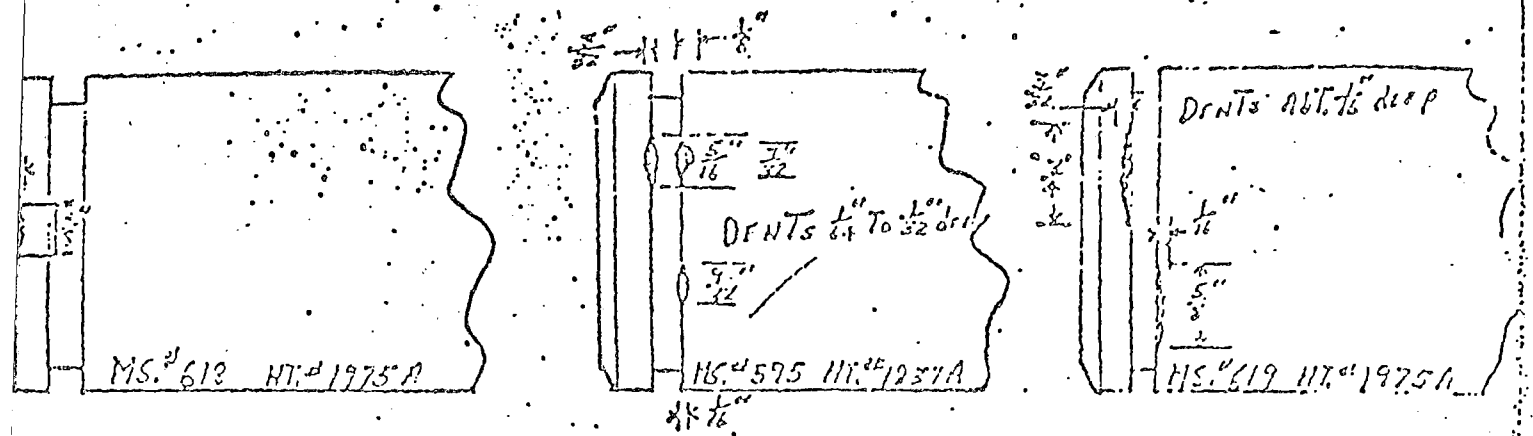
Mr. M. Schreiber per TWX dated 6/24/70 etc



# FINDINGS

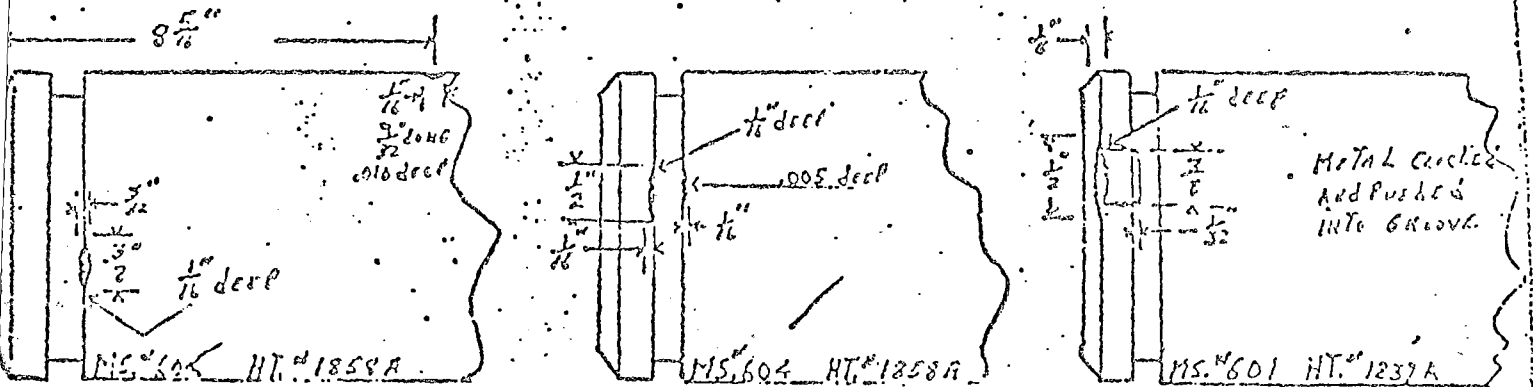
DISCREPANCY

☐ SEE ATTACHMENT



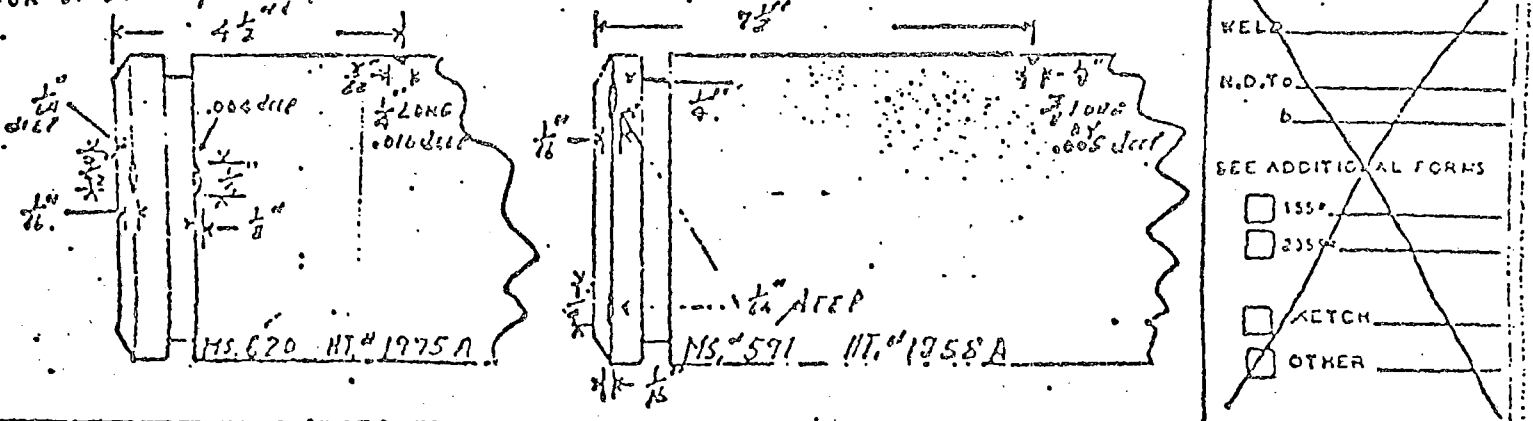
DISCREPANCY

☒ SEE ATTACHMENT



ON OF DISCREPANCY

☐ SEE ATTACHMENT



APPLICABLE REPAIR PROCEDURE

WELD

N.D.T.O.

b.

SEE ADDITIONAL FORMS

☐ 155P

☐ 235P

☐ SKETCH

☐ OTHER

Q/A COORDINATOR

CROSS REFERENCE

#

00983

to EGA/JLP/JBH/TWK/File 104N.7

## U.T. OF VASCO PINS

AN ULTRASONIC INSPECTION WAS CONDUCTED ON 29 VASCO PINS USING THE FOLLOWING EQUIPMENT AND TEST METHOD.

INSTRUMENT - BRANSON SONORAY, MODEL 301

TRANSDUCER -  $\frac{1}{2}$ " DIA. 3.5 MHz BRANSON, TYPE ES

COUPLANT - WATER SOLUBLE OIL (KUTWELL U.O)

CALIBRATION STANDARD - A  $3\frac{3}{4}$ " DIA. VASCO PIN

CONTAINING  $\frac{1}{32}$ " DIA. AND  $\frac{1}{16}$ " DIA. FLAT BOTTOM HOLES DRILLED  $\frac{1}{2}$ " DEEP AND 1" DEEP RESPECTIVELY.

CALIBRATION PROCEDURE - THE REFLECTION FROM THE  $\frac{1}{16}$ " DIA FLAT BOTTOM HOLE WAS SET AT 90% OF FULL SCREEN. AT THIS GAIN SETTING THE SIGNAL FROM THE  $\frac{1}{32}$ " DIA. HOLE WAS APPROXIMATELY 5% OF FULL SCREEN.

SCANNING - THE PINS WERE SCANNED 100% BOTH AXIALLY AND RADIALY.

DEFECT EVALUATION - ANY DISCERNABLE FLAW INDICATION WAS TO BE EVALUATED BY 115° AND STONE AND WEBSTER, HOWEVER, NO FLAW INDICATIONS WERE FOUND.

NOTES (1) AT THE TEST SENSITIVITY LEVEL A  $\frac{3}{64}$ " DIA REFLECTOR SHOULD HAVE BEEN DETECTABLE. IT SHOULD BE NOTED THAT ALTHOUGH THE SIGNAL FROM THE  $\frac{1}{32}$ " DIA. HOLE WAS ONLY 5% OF FULL SCALE, THIS WAS AT A DEPTH OF  $3\frac{1}{4}$ ". ANY  $\frac{1}{32}$ " DIA REFLECTOR AT A DEPTH LESS THAN THIS WOULD HAVE YIELDED A SIGNAL LARGER THAN 5% AND SINCE THE PART WAS SCANNED 360°, ANY DEFECT SHOULD HAVE BEEN SEEN AT A DEPTH OF NO MORE THAN  $\frac{1}{2}$  THE DIA. OF THE PIN OR 1 $\frac{1}{2}$ ".

(2) THE NOISE LEVEL VARIED FROM 10% TO 40% IN SOME OF THE PINS AND PREVENTED THE USE OF A HIGHER TEST SENSITIVITY. ALTHOUGH THE NOISE LEVEL VARIED, IT FOLLOWED A PATTERN THAT WOULD HAVE ALLOWED DISCONTINUITIES WITH

SIGNAL AMPLITUDES, LOWEST AND HIGHEST

LEVEL TO BE DETECTED. THE VARIATION IN THE

NOISE LEVEL APPEARED TO BE CAUSED BY SOUND

VARIATIONS IN THE MICROPHONE OF THE OBS.

(3) A TRANSDUCER OF A LOWER FREQUENCY (20-250 Hz)

WAS TRIED IN AN ATTEMPT TO REDUCE THE

ALIAS LEVEL. THE NOISE LEVEL WAS REDUCED,

HOWEVER THE  $\frac{1}{2}$ " DIA. HOLE ABOUT 10 FEET

AT THIS FREQUENCY. THEORETICALLY THE SIGNAL

DETECTABLE FLAW IS  $\frac{1}{2}$  THE WAVELENGTH. THE

WAVELENGTH OF A 2.75 MHz TRANSDUCER IS APPROX.

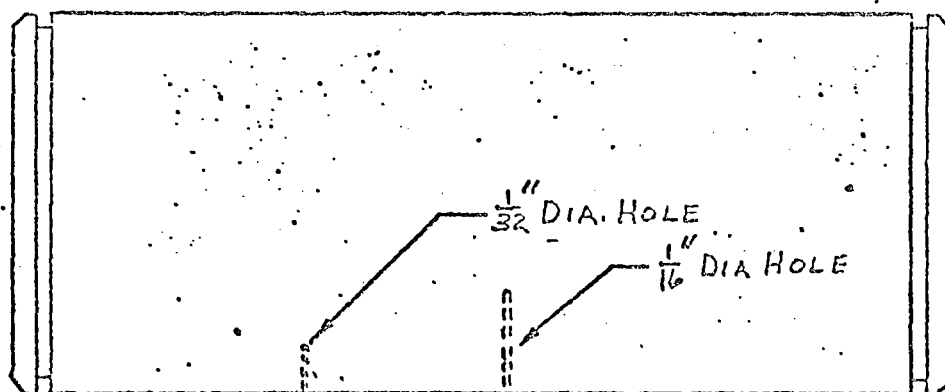
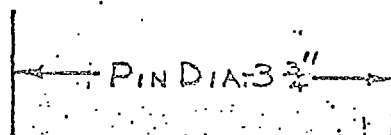
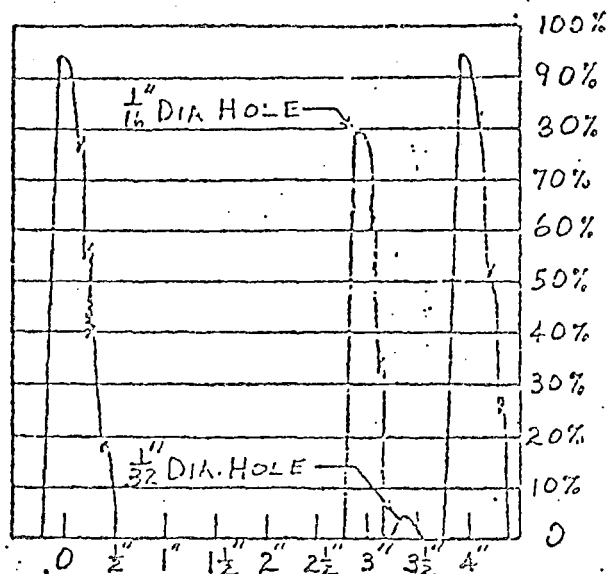
.050". THIS EXPLAINS THE INABILITY TO DETECT A

.0315" DIA FLAT BOTTOM HOLE.

(4) THE HRP COULD NOT BE GENERATED WITH

A 5.0 MHz TRANSDUCER WITH ENOUGH POWER

TO RESOLVE THE  $\frac{1}{2}$ " DIA HOLE.



U.T. CALIBRATION STANDARD

1005 (REV. 11)

## INSTALLATION

THE FOLLOWING MATERIAL HAS BEEN INSPECTED AND IS RELEASED FOR: SHIPMENT FROM YARD

ING NO.	ITEM NO.	NAME OF PART	NO. PARTS ON ORDER	NO. PARTS ACCEPTED TODAY	NO. PARTS STILL DUE																																																																								
069	3	PIN																																																																											
D		<p>DYE PENETRANT CHECK OF 31 PINS, M.S. No. + HEAT No. LISTED BELOW, WAS SATISFACTORY. THIS INCLUDES THE SPKS THAT WERE DAMAGED WHEN DROPPED. THE DEFECTS WERE GROUND OUT AND POLISHED.</p> <table border="1"> <thead> <tr> <th colspan="2">ITEM # 3</th> <th colspan="2">ITEM # 3</th> </tr> <tr> <th>M.S. No.</th> <th>HEAT No.</th> <th>M.S. No.</th> <th>HEAT No.</th> </tr> </thead> <tbody> <tr><td>593</td><td>1837A</td><td>600</td><td>1837A</td></tr> <tr><td>610</td><td>1858A</td><td>612</td><td>1975A</td></tr> <tr><td>609</td><td>1858A</td><td>607</td><td>1858A</td></tr> <tr><td>616</td><td>1975A</td><td>613</td><td>1975A</td></tr> <tr><td>596</td><td>1837A</td><td>615</td><td>1975A</td></tr> <tr><td>599</td><td>1837A</td><td>608</td><td>1858A</td></tr> <tr><td>617</td><td>1975A</td><td>540</td><td>2019A</td></tr> <tr><td>597</td><td>1837A</td><td>601</td><td>1837A</td></tr> <tr><td>611</td><td>1975A</td><td>606</td><td>1858A</td></tr> <tr><td>598</td><td>1837A</td><td>604</td><td>1858A</td></tr> <tr><td>547</td><td>1858A</td><td>618</td><td>1975A</td></tr> <tr><td>602</td><td>1837A</td><td>619</td><td>1975A</td></tr> <tr><td>614</td><td>1975A</td><td>595</td><td>1837A</td></tr> <tr><td>592</td><td>1858A</td><td>620</td><td>1975A</td></tr> <tr><td>603</td><td>1858A</td><td>591</td><td>1858A</td></tr> <tr><td>605</td><td>1858A</td><td></td><td></td></tr> </tbody> </table>				ITEM # 3		ITEM # 3		M.S. No.	HEAT No.	M.S. No.	HEAT No.	593	1837A	600	1837A	610	1858A	612	1975A	609	1858A	607	1858A	616	1975A	613	1975A	596	1837A	615	1975A	599	1837A	608	1858A	617	1975A	540	2019A	597	1837A	601	1837A	611	1975A	606	1858A	598	1837A	604	1858A	547	1858A	618	1975A	602	1837A	619	1975A	614	1975A	595	1837A	592	1858A	620	1975A	603	1858A	591	1858A	605	1858A		
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REMARKS	
1	2

→ Ineq.

11/11/11	<input type="checkbox"/> ORDER COMPLETED
	<input type="checkbox"/> ORDER NOT COMPLETED

☐ FINAL  
☐ SHOP

N. N. INSP. SIGNATURE

N. H. INSP. SIGNATURE

SECTION J

Item - Vasco Pins

Drawing - 11448-FM-53C, Item 3

No. Pcs. - 8

Heat No. - 2 Pcs (2019A); 6 Pcs. (1858A)

Raw Material - NSC Purchase Order 104N-7431-4 (Item 5)  
I.R. No. 33.8.3 (18) and (12)

Pre-cut Blocks - NSC Purchase Order 104N-5849-18 (Item 2)  
I.R. No. 33.8.3(74A)

Machining (Blocks) - NSC Purchase Order 104N-5849-18 (Item 1)  
I.R. No. 33.8.3(74A)

Machining to Dim. - NSC Purchase Order 104N-5849-4 (Item 3a)  
I.R. No. 33.8.3(179)

Ageing/Heat Treat  
Heat Chart No. BH-693

# NUCLEAR SERVICE AND CONSTRUCTION COMPANY INC

## INSPECTION REPORT

CM- Yes

CONTRACT NO.

104N

INSPECTION DATE

January 16, 1970

☐ SHOP

☐

INSTALLATION

☒

Receipt OTHER

CHARGE NO.

104N

FILE NO.

33.8.3(17)

SUBJECT

VASCO Steel

P. O. NO.

104N-7431-4

PROCEDURE NO.

33-1 (Procurement - Raw Materials)

DRAWING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS
	5	3	<p>VASCO 300, Annealed, 260,000 psi Minimum Yield</p> <p>1 Pc. - 27-7/16" x 19-7/8" x 17-3/8", Heat Number 2019A  1 Pc. - 27-1/2" x 19-7/8" x 17-3/8", Heat Number 1975A  1 Pc. - 27-3/8" x 19-7/8" x 17-3/8", Heat Number 1975A</p> <p>NOTES:</p> <ol style="list-style-type: none"> <li>1. No deficiencies noted.</li> <li>2. Material die stamped with heat number.</li> <li>3. Inspected at MacTavish.</li> </ol>

M:ecc

### DISTRIBUTION:

- Stone & Webster/Mr. Selenski  
- MacTavish Machine 1 - Mr. L. W. Wells  
- Mr. T. W. Kilpatrick, Jr./JLP/Filo  
- Mr. B. P. Hill 1 - Mr. A. F. Ciannavei  
- Mr. W. R. Graham 1 - Mr. E. G. Adams

### DISPOSITION OF MATERIAL

Satisfactory - Released



VASCO  
LATRODE, PA. 15650

FORM V186C 30M.1.69

ANALYSIS REPORT

Customer: Nuclear Service & Construction Co.  
Newport News, Virginia

Your Order No. 104447431-24

Our Order No. V-251716

Brand: CVM Vasco Max 300 Solution Annealed w/ Spec: Stone & Webster NUS-198

SIZE	BARS	WEIGHT	HEAT No.	DATE SHIPPED
1/4" x 19-3/4" x 27-1/4"	2 pcs.	5499#	1975-A	1/5/70

Longitudinal Tensile Properties Anneal Temp. 900° Time 6 HOURS

No.	3B-MR1	3B-MR2	3BMX-MR1	3BMX-MR2
T.S. Psi	281100	281100	281100	280100
Y.S. Psi	273600	273600	273100	273100
Offset 0.2 Percent				
Reduction %	28.7	29.3	31.9	28.1
Elongation %	5.0	5.0	6.0	5.5

Annealed Rc = 30.7

Acid Etch = Satisfactory to MIL-STD 430, S=2, R=2, & C=2

Grain Size = 6.6

Ultrasonic Inspection = Satisfactory to MIL-I-8950A = Modified per Stone & Webster  
NUS-198 Revised November 27, 1968

NON-METALLIC RATING

	A		B		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
T	0	0	0	0	0	0	1	0	1	1/2
B	0	0	0	0	0	0	0	0	1	1

Fracture Toughness will be reported at a later date.

Heat No.	Analysis										
	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
1975-A	.020	.030	.030	.005	.005				4.78	9.00	18.07
	Al .10		Ti .65	B .003		Zr .012			Ca .05 Added		

Sworn and subscribed to before me  
this 8th day of January, 1970:

Certified Correct

NOTARY PUBLIC  
JOHN J. LATH, NOTARY PUBLIC  
MONTICELLO, BLAVER COUNTY

LABORATORY MANAGER





VASCO  
LATRODE, PA. 15650

FORM VASCO 304.3-69

ANALYSIS REPORT

Customer:

Newport News Shipbuilding & Dry Dock Company  
Newport News, Virginia

Additional Information  
Fracture Toughness Results

Order No.

10411-7431

Order No.

V-251716

Brand:

CVM Vasco Max 300 Solution Annealed

Spec: Stone & Webster RUS 198

SIZE

BAR

WEIGHT

HEAT No.

DATE SHIPPED

1/4" x 19-3/4" x 27-1/4"

2 pcs.

549911

1975-A

1/5/70

Fracture Toughness

K<sub>IC</sub>

3B - 64.4, 64.4, 62.2

3BM - 65.9, 69.2, 71.9

Heat  
No.

C

Si

Mn

S

P

W

Cr

V

Mo

Co

Ni

Analysis

Sworn and subscribed to before me

this 22nd day of January, 1970:

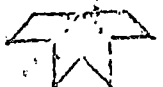
*John J. Aum*

JOHN J. AUM, NOTARY PUBLIC  
MONROE COUNTY, SEVEN COUNTY

Certified Correct

*James Scraggs*

LABORATORY MANAGER



STEELTONE COMPANY

**VASCO**  
LATROBE, PA. 15650

FORM VIDE 304-2-68

# ANALYSIS REPORT

Customer: Nuclear Service & Construction Co.  
Newport News, Virginia

Your Order No. 104867421-4

Our Order No. V-251716

Brand: CVM Vasco Max 300 Solution Annealed  
Spec: Stone & Webster NUS-193  
SIZE: BARS WEIGHT

HEAT No.

DATE SHIPPED

7-1/4" x 19-3/4" x 27-1/4"  
1 pc.

27464

2019-A

1/5/69

## Longitudinal Tensile Properties Approx Temp. 900° Time 6 Hours

No.	3-1	3-2	3X-1	3X-2
T.S. Psi	285500	287300	285700	284700
Y.S. Psi	284400	282700	280600	279600
Offset 0.2 Percent				
Reduction %	34.0	37.0	37.0	37.0
Elongation %	7.0	7.5	7.5	8.5

Annealed Re. = 31.1

Acid Etch = Satisfactory to MIL-STD 430, S-2, R-2, & C-2

Grain Size = 6.2

Ultrasonic Inspection = Satisfactory to MIL-I-5950A - Modified per  
Stone & Webster NUS-193 Revised November 27, 1968

## Non-Metallic Rating

	A		B		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
T	0	0	0	0	0	0	0	0	3/4	1 1/2
B	0	0	0	0	0	0	0	0	1	2

Fracture Toughness will be reported at a later date.

Heat No.	Analysis										
	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
2019-A	.020	.04	.02	.005	.005				4.84	9.03	18.46
	Al .09		Ti .63		B .004	Zr .011		Ca .05	Added		

Sworn and subscribed to before me  
this 8th day of January, 1970:

Certified Correct

JOHN J. AUM, NOTARY PUBLIC

LABORATORY MANAGER

# ANALYSIS REPORT

Customer: Nuclear Service & Construction Co.  
 Newport News, Virginia

Order No. 704447437-4

Order No. V0357755

and: UVM Vasco Non 300 Solution Annealed

Spec: ST023 V0357755 NUS-198

SIZE	BARS	WEIGHT	HEAT No.	DATE SHIPPED
1/2" x 19-3/4" x 27-1/4"	2 pcs.	5499#	1975-A	7/2/70

Longitudinal Tensile Properties Anneal Temp. 900° Time 6 HOURS

No.	3B-MR1	3B-MR2	3BXM-MR1	3BXM-MR2
T.S. Psi	281100	281100	281100	280100
Y.S. Psi	273600	273600	273100	273100
Offset 0.2 Percent				
Reduction %	22.7	29.3	31.9	28.7
Elongation %	5.0	5.0	6.0	5.5

Annealed Rc = 35.7  
 Acid Etch = Satisfactory to MIL-STD 430, Sec 2, Rc2, & Cc2  
 Grain Size = 6.6  
 Ultrasonic Inspection = Satisfactory to MIL-STD 4950A - Modified per Steno & Webster  
 NUS-198 Revised November 27, 1968

NON-METALLIC RATING									
A		B		C		D		E	
Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
0	0	0	0	0	0	1	0	1	1/2
0	0	0	0	0	0	0	3	1	1

Fracture Toughness will be reported at a later date.

Analysis										
C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
0.020	0.030	0.030	0.005	0.005				4.73	9.00	10.07
Al 0.10	Ti 0.55		D 0.003		Zr 0.012	Ca 0.05	Added			

Witnessed and subscribed to before me

on 28th day of January, 1970:

*[Signature]*

Certified Correct

*[Signature]*

JOHN J. AUTH, NOTARY PUBLIC  
 NOTARY PUBLIC EDMOND HURDICH, HANOVER COUNTY  
 MY COMMISSION EXPIRES FEB. 1, 1972

LABORATORY MANAGER

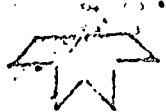


SECTION REPORT		CM - Yes	CONTRACT NO. 104N	INSPECTION DATE December 23, 1969
SHOP	<input type="checkbox"/> INSTALLATION	<input checked="" type="checkbox"/> Receipt	OTHER	CHARGE NO. 104N
P.C. NO. 104N-7431-4		PROCEDURE NO. 33-1 (Procurement - Raw Materials)		

DRAWING NO.	ITEM NO.	QTY.	DESCRIPTION AND INSPECTION REMARKS
	5	2	Vasco Steel (Machined), 19-3/4" x 17-1/4" x 27-1/4", Heat Number 1858A
	2	5	Vasco Steel (Machined), 9-1/4" x 8-1/8" x 22-1/8", Heat Number 1867A
			NOTES:  1. No deficiencies noted.  2. Material die stamped with heat number.  3. Inspection at Newport News Shipbuilding and Dry Dock Company.

Y: ecc

DISPOSITION:	DISPOSITION OF MATERIAL
- Mr. Selenski/Stone & Webster - Mr. T. W. Kilpatrick, Jr./JLP/File - Mr. B. P. Hill - Mr. A. F. Ciannavei - Mr. L. W. Wells 1- Mr. S. R. McCraw	Satisfactory - Released



TELETYPE COMPANY

VASCO

LATROSE, PA. 15650

FORM V106C 309-2 11

# ANALYSIS REPORT

Customer: Newport News Shipbuilding & Dry Dock  
Newport News, Virginia

Your Order No. 104N-7431-4-Balance (5)

Our Order No. V-251716 #3

Brand: CVM Vasco Max 300 Solution Annealed

SIZE Spec: Stone & Webster NUS 193 Revised November 27, 1968  
BARS WEIGHT HEAT No.

DATE SHIPPED

1/4" x 19-3/4" x 27-1/4"

2 pcs.

5538#

1858-A

12/16/69

## Longitudinal Tensile Properties - Ageing Temp 900° Time 3 Hours

No.	53MR1	53MR1
T.S. Psi	283200	280300
Y.S. Psi	274500	272600
Offset 0.2 Percent		
% Reduction	33.5	28.8
% Elongation	7.0	6.0

Annealed Rc = 30.7

Acid Etch = Satisfactory to MIL-STD 430, S-2, R-2, & C-2

Grain Size = 6.0

Ultrasonic Inspection = Satisfactory to MIL-I-8950A - Modified per Stone & Webster NUS-193 Revised November 27, 1968

## Non-Metallic Rating

	A		B		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
Top	0	0	0	0	0	0	0	0	2	2
Bottom	0	0	0	0	0	0	0	0	1	1

Fracture Toughness will be reported at a later date.

Heat No.	Analysis										
	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
1858-A	.006	.02	.02	.007	.004				4.83	8.98	18.48
	Al .09	Ti .59	B .004	Zr .008	Ca .05	Added					

Sworn and subscribed to before me  
this 19th day of December 1969:

Certified Correct

NOTARY PUBLIC



VASCO  
LATROBE, PA. 15650

FORM VTR6C JUN-2-69

ANALYSIS REPORT

Customer: Newport News Shipbuilding & Dry Dock Company  
Newport News, Virginia

Additional Information  
Fracture Toughness Results

Our Order No. 104N-7031-4 Balance

Our Order No. V-251716 #3

Stand: CVM Vasco Max 300 Solution Annealed  
Spec: S. O. & Webster 108 Revised November 27, 1968

SIZE

BARS

WEIGHT

HEAT No.

DATE SHIPPED

1" x 19-3/4" x 27-1/4"

2 pcs.

5538#

1858-A

12/16/69

Fracture Toughness  
K<sub>IC</sub>

5B - 61.1, 66.0, 67.9  
5B MX - 61.5, 69.0, 65.6

Heat No.	Analysis									
	C	Si	Mn	S	P	W	Cr	V	Mo	Co

Sworn and subscribed to before me  
this 22nd day of January, 1970:

Certified Correct

*[Signature]*

*[Signature]*



VASCO  
LATROBE, PA. 15650

FORM V100C 304-2-64

### ANALYSIS REPORT

Customer: Newport News Shipbuilding & Dry Dock  
Newport News, Virginia

Your Order No. 104R-7431-4 Part (2)

Our Order No. V-251713 Part

Brand: CVM Vasco Max 350 Solution Annealed

Spec: Stone & Webster NUS 214 Revised November 27, 1968

SIZE BARS WEIGHT

HEAT No.

DATE SHIPPED

1/8" x 9-1/4" x 22-1/8"

5 pcs.

2467#

1967-A

12/16/69

#### Longitudinal Tensile Properties Aging Temp 950° Time 3 Hours

No.	1B-1	1BX-1
T.S. Psi	341100	339200
Y.S. Psi	336000	330900
Offset 0.2 Percent		
% Reduction	19.0	17.0
% Elongation	3.5	2.5

Annealed Rc = 34.1

Acid Etch = Satisfactory to MIL-STD 430, S-2, R-2, & C-2

Grain Size = 6.0

Ultrasonic Inspection = Satisfactory to Stone & Webster NUS-214  
Revised November 27, 1968

#### Non-Metallic Rating

	A		B		C		D		E	
	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
Top	0	0	0	0	0	0	0	0	1 1/2	1 1/2
Bottom	0	0	0	0	0	0	0	0	1	1 1/2

Fracture Toughness will be reported at a later date.

Heat No.	Analysis										
	C	Si	Mn	S	P	W	Cr	V	Mo	Co	Ni
1967-A	.011	.03	.03	.006	.004				4.74	11.64	18.46
	Al .11	Ti 1.45	B .003	Zr .010	Ca .05	Added					

Sworn and subscribed to before me

this 19th day of December, 1969

Certified Correct

Notary Public

JOHN J. AUTH, NOTARY PUBLIC  
MONACA BOROUGH, DEANER COUNTY  
EXPIRES FEB. 1, 1972

Laboratory Manager





VASCO  
LATROBE, PA. 15650

FORM VIBSC 30M-2-69

(2)

ANALYSIS REPORT

Customer: Newport News Shipbuilding & Dry Dock Company  
Newport News, Virginia

Additional Information  
Fracture Toughness Results

Buy Order No. 104N-7431-4

Buy Order No. V-251713

Brand: CVMVasco Max 350 Solution Annealed

Spec: Stone & Webster NUS 214 Revised November 27, 1968

SIZE	BARS	WEIGHT	HEAT No.	DATE SHIPPED
------	------	--------	----------	--------------

8" x 9-1/4" x 22-1/8"

5 pcs.

2467#

1967-A

12/16/69

Fracture Toughness

K

ic

1B - 35.7, 35.9, 36

1BX - 38.6, 36.2, 37.6

Heat  
No.

C

Si

Mn

S

P

W

Cr

V

Mo

Co

Ni

Analysis

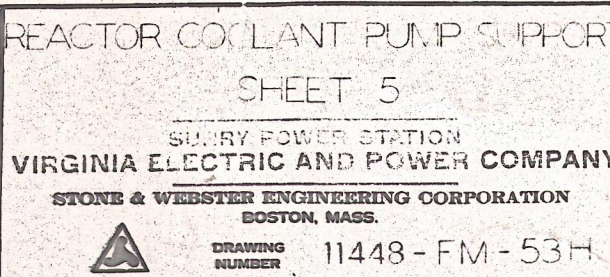
Sworn and subscribed to before me  
this 22nd day of January, 1970:

Certified Correct

JOHN J. AULIN, NOTARY PUBLIC  
HARRIS COUNTY

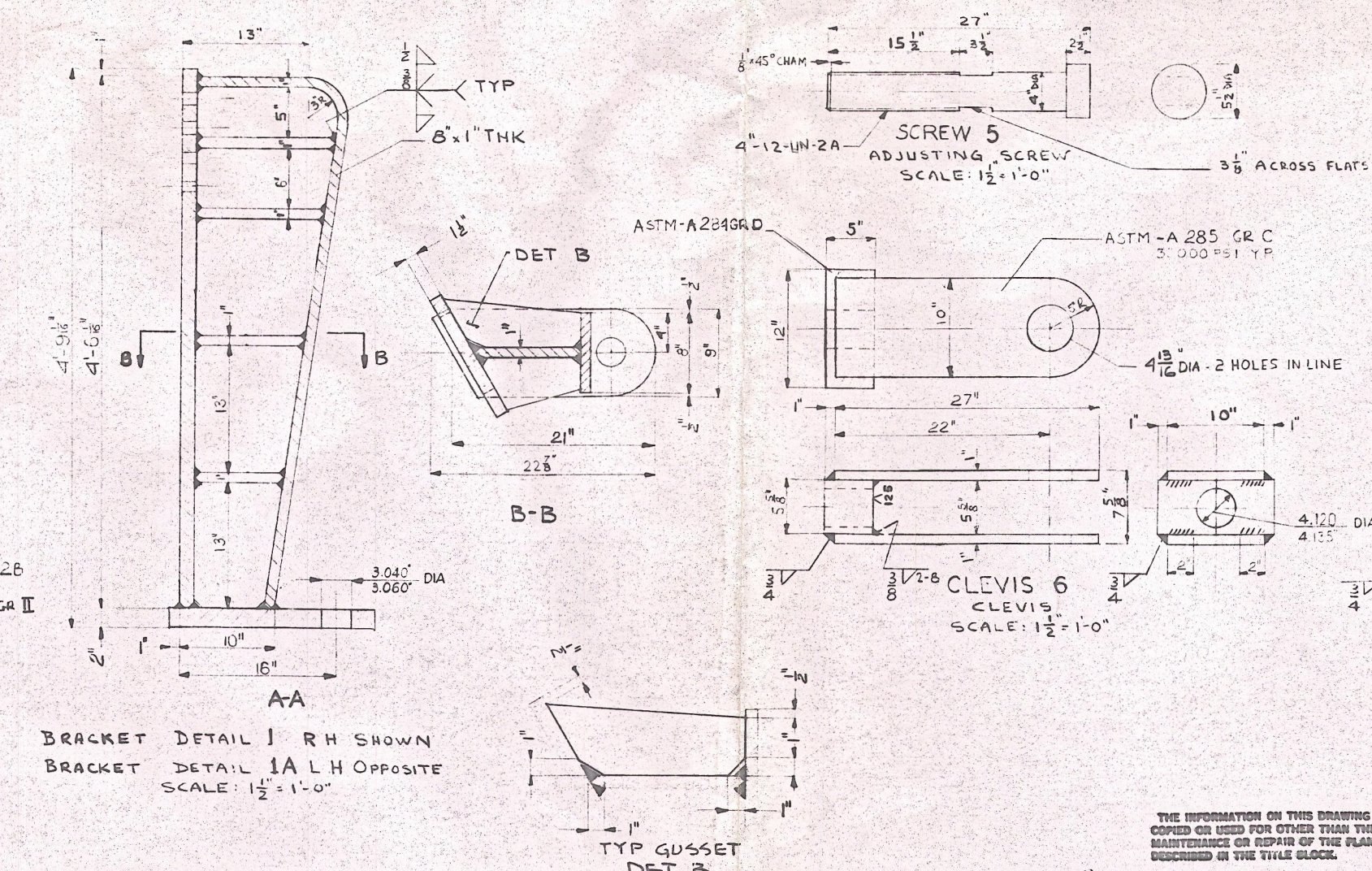
*[Signature]*



[illegible]



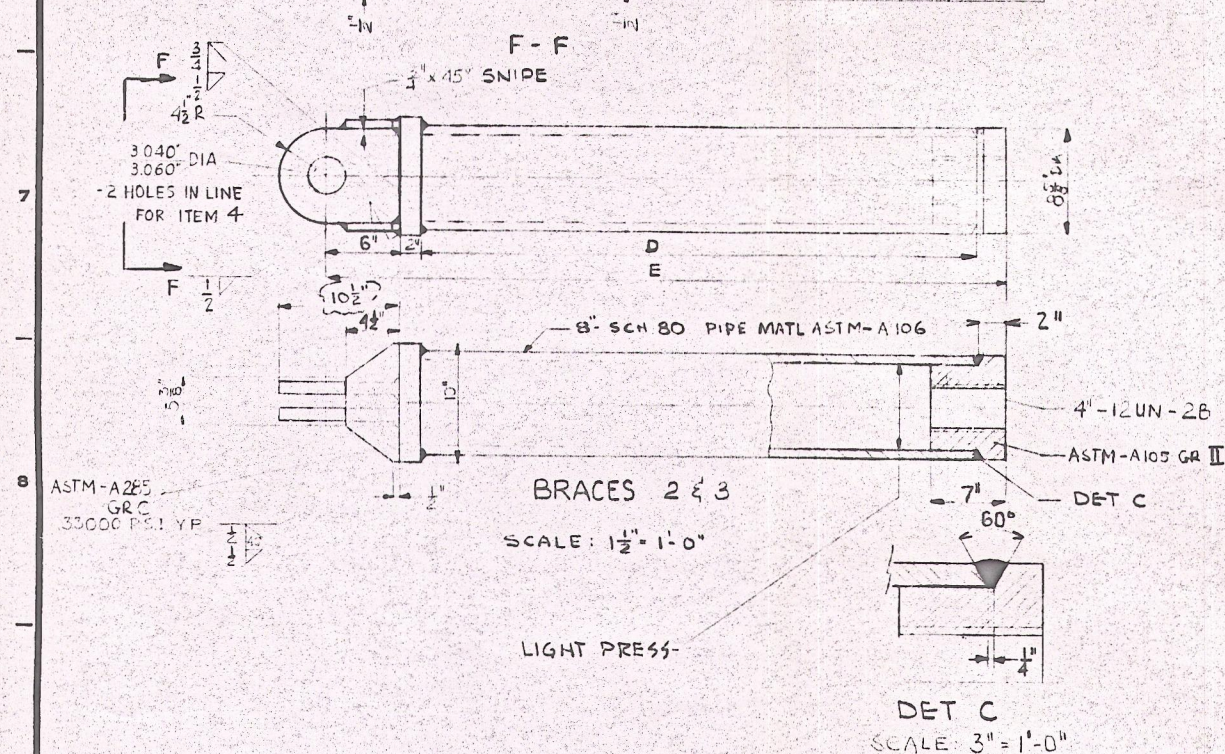
ITEM \	A	B	C
8	$3\frac{1}{8}''$	$6''$	$\frac{1}{4}''$
10	$4\frac{7}{8}''$	$7''$	$\frac{1}{4}''$



HORIZONTAL SUPPORT LEG AREA

SCALE:  $\frac{1}{2}'' = 1'-0''$

DIM.	ITEM 2	ITEM 3
D	2'-7 $\frac{3}{4}$ "	3'-8"
E	3'-0"	4'-7"



REFERENCE DWGS:  
REACTOR COOLANT PUMP SUPPORTS GEN ARR. FM-53A

COMMONWEALTH OF VIRGINIA  
R. M. SIMONETTI  
NO. 04123  
CERTIFIED PROFESSIONAL ENGINEER

APPROVED R. M. Simonetti  
CERTIFIED PROFESSIONAL ENGINEER, NO. 04123  
COMMONWEALTH OF VIRGINIA

**SURRY POWER STATION**  
**VIRGINIA ELECTRIC AND POWER COMPANY**  
**STONE & WEBSTER ENGINEERING CORPORATION**  
**BOSTON, MASS.**

ORIGINAL ISSUE	244	40	100	100
ISSUED FOR J.O. 11448	10	10	10	10
ISSUED FOR J.O. 11548	10	10	10	10

6					5					4					3	10 1/2 DIM ON ITEM 2 & 3 WAS 10"	2	MIN YP ADDED TO ITEM NOS 4, 5, 7, 9 & 10	1	ORIGINAL ISSUE ISSUED FOR J.O. 11498 ISSUED FOR J.O. 11548			
ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE	ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE	ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE	ISSUE	DESCRIPTION	CHKD	CORR	APPR	DATE

[illegible]

Designed by \_\_\_\_\_ Drawn by J.V. GILL  
Des. Chk'd by \_\_\_\_\_ Chk'd by F. LINDA

Doc # 50-280/281  
Control # 790919 0390  
Date 9/4/79 of Documents  
REGULATOR DECKET FILE



11448-FM-53D

51.1 FROM C OF CASING

SUPPORT LEG  
DET A TO H FM-53B

3"-8N-2B RH

3"-8N-2B LH

2"-12UN-2B RH

2"-12UN-2B LH

125

ITEMS 14, 15, 23 (FM-53A)

	A	B	C
ITEM 15	4 1/2"	7"	1 1/4"
ITEM 23	3 1/2"	3 1/2"	1 1/4"
ITEM 14	2 1/2"	2 1/2"	1 1/4"

ITEM 35 (FM-53B)  
SCALE: 3"=1'-0"ITEM 9 (FM-53A)  
SCALE: 3"=1'-0"

ASTM A-105 GR II

ASTM A285 GRC

ITEM 10 (FM-53A)  
SCALE: 3"=1'-0"

.010" R MAX

BILL OF MATERIAL (NO. REQUIRED PER 3 PUMP SUPPORTS)

ITEM NO.	QTY	NAME	DIMENSIONS	MATERIAL	REMARKS
1	12	MAIN HANGER STUD	4 1/2"-8UN-2B	AISI-4340 100,000 PSI 1Y	
2	24	BEV. TO SPHERICAL WASHER	5" ID, 10" OD	AISI-4140 60,000 PSI MIN YP	
3	24	SPHERICAL WASHER	5" ID, 10" OD	AISI-4140 60,000 PSI MIN YP	
4	24	HANGER STUD NUT	4 1/2"-8UN-2B	AISI-4140 60,000 PSI MIN YP	
5	36	CHECK NUT	4 1/2"-5UN-2B	AISI-4140 60,000 PSI MIN YP	

NOTES:  
SCALE: AS NOTED  
BREAK ALL SHARP CORNERS  
ALL FINISHED SURFACES 125 UNLESS OTHERWISE NOTED

REFERENCE DWGS:  
REACTOR COOLANT PUMP SUPPORTS GEN ARR. FM-53A

REACTOR COOLANT PUMP SUPPORTS  
DETAILS SH 3

SURRY POWER STATION  
VIRGINIA ELECTRIC AND POWER COMPANY  
STONE & WEBSTER ENGINEERING CORPORATION  
BOSTON, MASS.



DRAWING NUMBER 11448-FM-53D

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DESCRIBED IN THE TITLE BLOCK.

ORIGINAL ISSUE  
ISSUED FOR JO 11443  
ISSUED FOR JO 11548

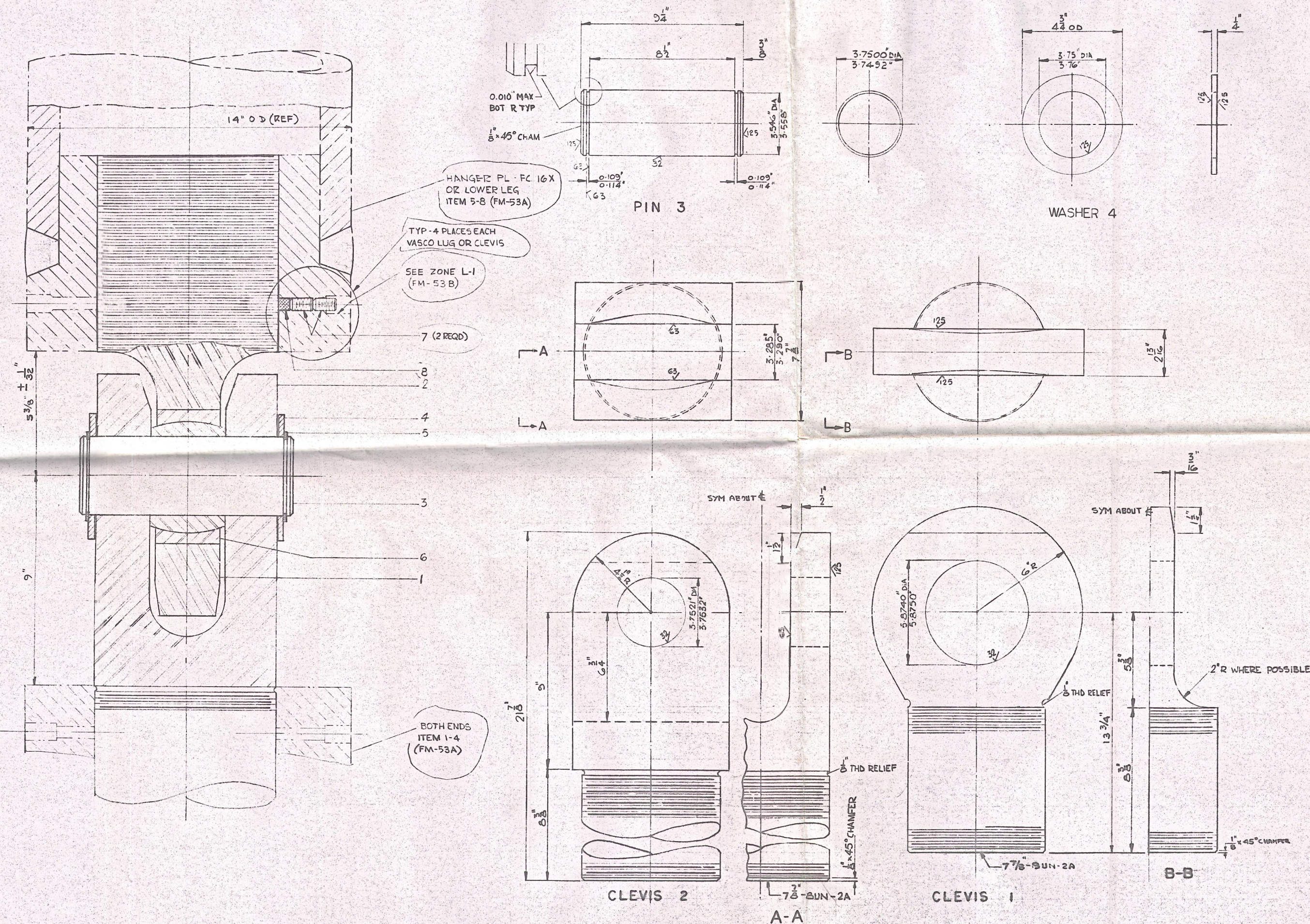
Designed by  
Des. Chk'd by

Drawn by J.V. GILBERT  
Chk'd by F. LINDSEY

Detail # 20-2801281  
Drawing # 1909190390  
Date 9/19/90  
Revision 1



ITEM NO.	NO. REQD	NAME	DIMENSIONS	MATERIAL	REMARKS
1	8	LUG END		VASCO MAX 350 330,000 PSI MIN TP	
2	8	CLEVIS END			
3	8	PIN		↓	
4	16	WASHER		AISI-M 1020	
5	16	RETAINING RING		WALD64 TEUARC 5100- 375	
6	8	MINIBALL AND WASHER	3/75" ID x 5-8750 OD	SOUTHWEST PRODUCTS BHR2-60004	
7	128	HEX SOC SET SCREW	5/8" UNC-3A x 1 1/4"		CUP POINT
8	64	NYLON INSERT	1" DIA	COMMERCIAL NYLON ROD	



NOTES:  
SCALE:  $\frac{3}{8}'' = 1''$  UNLESS OTHERWISE NOTED  
BREAK EDGES

REFERENCE DWGS:  
REACTOR COOLANT PUMP SUPORT GEN ARR. FM-53A

MONOBALL ASSEMBLY  
SCALE: HALF SIZE

REACTOR COOLANT PUMP SUPPORTS  
DETAILS SH 2

**SURRY POWER STATION**  
**VIRGINIA ELECTRIC AND POWER COMPANY**  
**STONE & WEBSTER ENGINEERING CORPORATION**  
**BOSTON, MASS.**

DRAWING NUMBER 11448-FM-53C

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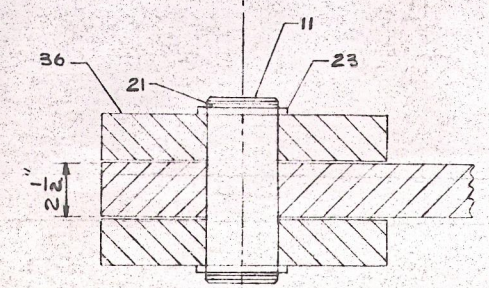
ORIGINAL ISSUE		FILED	DATE
ISSUED FOR J.O. 11448		05	4-50
ISSUED FOR J.O. 11548			
IF	DESCRIPTION	CHWD	CORR

A circular professional engineer seal for the State of Virginia. The outer ring contains the text "COMMONWEALTH OF VIRGINIA" at the top and "CERTIFIED PROFESSIONAL ENGINEER" at the bottom. In the center, the name "R. M. SIMONETTI" is printed above the number "NO. 04123".

APPROVED: *Robert M. Simone*  
LICENSED PROFESSIONAL ENGINEER, NO. 04123  
COMMONWEALTH OF VIRGINIA

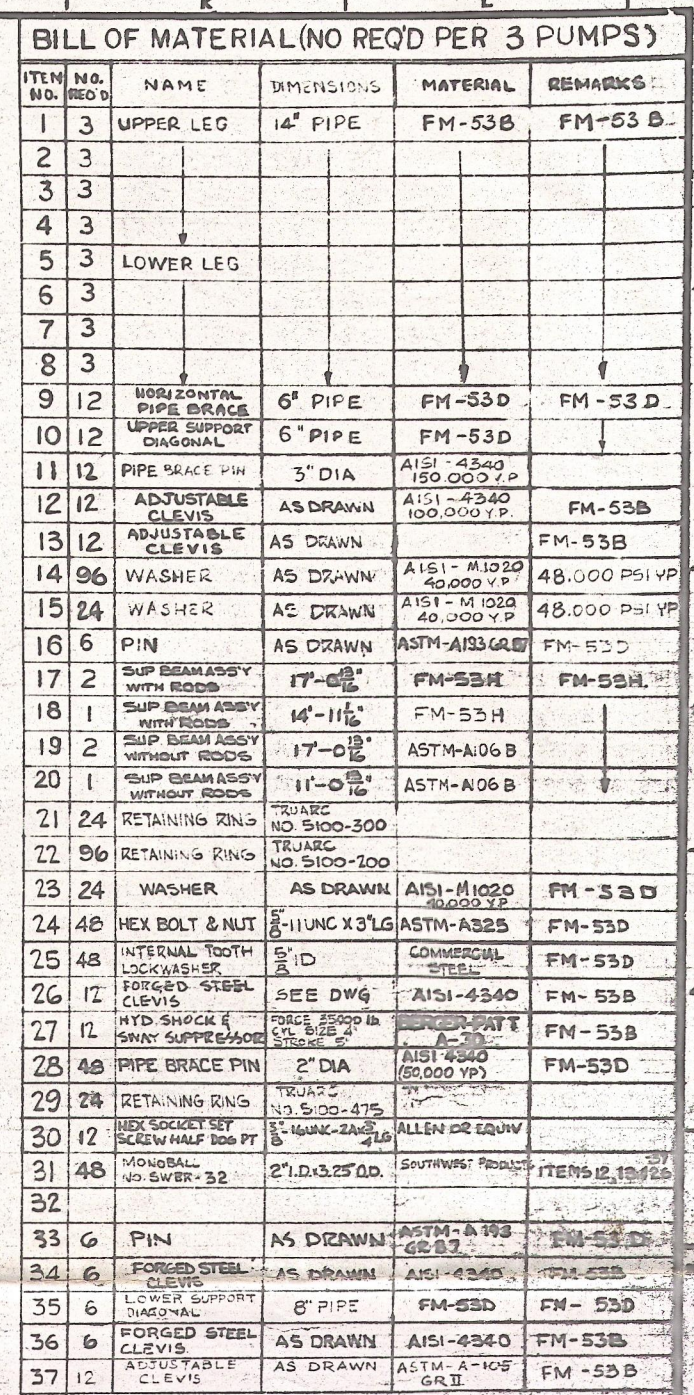
Doc# 50-2801281  
Control # 7909190390  
Date 9/4/79 of Document  
REGULATORY BOOKLET FILE





Docket # 5D-280/281  
 Exhibit # 7709190390  
 Page 9/4179 of Documents  
 REGULATORY DOCKET FILE





TOTAL MATERIAL- J011448 COOLANT PUMP SUPPORTS.

GENERAL NOTES:  
SCALE: AS NOTED

3 x NUTS  
(1GT)

REFERENCE DWGS:  
REACTOR COOLANT PUMP SUPPORT DET 3N1 FM532  
3N2 FM533  
3N3 FM534  
3N4 FM535  
3N5 FM536

SPEC- REACTOR COOLANT PUMP SUPPORT NUTS 94-  
REACTOR COOLANT PIPE RESTRAINT 3N1 FM537  
3N2 FM538

SUPPRESSOR TUBULATION FM-53A-1

REACTOR COOLANT PUMP SUPPORTS  
GEN ARRANGEMENT  
SURREY POWER STATION  
VIRGINIA ELECTRIC AND POWER COMPANY  
STONE & WEBSTER ENGINEERING CORPORATION  
BOSTON, MASS.  
DRAWING NUMBER 11448-FM-53 A

[illegible]

Designed by  
 Don Chidley

Printed by  
 Chidley

J.M. GILLES  
 F. LINDSEY

Date: # SD-280/as1  
 Serial # 7909190390  
 Date 8/4/79  
 of Document  
 REGULATORY DOCKET FILE