ATTACHMENT #3 met 3-18-85

CPS CENTRAL FILE
ACCEPTED
NOV 28 1984
TRANSMITTAL # NSE-84-003

ILLINOIS POWER COMPANY
EQ/SQRT QUALIFICATION PACKAGE REVIEW
SIGN-OFF SHEET

EQ DOCUMENTATION PACKAGE

SQRT DOCUMENTATION PACKAGE

VENDOR/MFG: PACIFIC SCIENTIFIC

TYPE/MODEL: PSA-¼, PSA-½, PSA-1, PSA-3, PSA-10, PSA-35, PSA-100

MPL OR PLANT ID NUMBER: SEE TAB D

EQUIPMENT NAME: SNUBBERS, MECHANICAL

QUALIFICATION PACKAGE DOCUMENT NUMBER: EQ-CL056 Rev 05

The following documentation package for the above-stated equipment has been reviewed and Illinois Power Company concludes:

✓ (EQ) The component meets the requirements of NUREG 0588 Category I.

(SQRT) The component meets the requirements of NUREG 0588 and Regulatory Guide 1.100.

Reviewed by: Roderick J. Lamothe Y.A. Mujo 9-20-84 Date 9/17/84
Qualification Task Force

Approved by: M. E. Wolf Date 09/20/84
Coordinator - EQ Task Force

MED19/B

AUTHENTICATED
BY [illegible] 10-17-84
DATE 10/5/84

ILLINOIS POWER COMPANY

CLINTON POWER STATION UNIT 1

ENVIRONMENTAL QUALIFICATION OF MECHANICAL SNUBBERS PACIFIC SCIENTIFIC MODELS: PSA-1/4, PSA-1/2, PSA-1, PSA-3, PSA-10, PSA-35, PSA-100

Compiled by

THE COMPONENT QUALIFICATION DIVISION

SARGENT & LUNDY ENGINEERS

Project No.: 4536-32

Volume: EQ-C1056

CQD No.: 006418

Rev. 05 Date: 9-15-84

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EQ-CL056

CQD No.: 006418

Rev. 05 Date: 9-15 84

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05	Title Page I Table of Content II Issue Summary Tab A: Pages A1, A2, A4, A5 Tab C: Pages C1-C5, C8	PREPARED BY: Patrick Ho	Tabs A & C	9-15-84
		REVIEWED BY: N/A	Tab	9-15-84
		REVIEWED BY: A. Jurcon	Tab C	9-15-84
		APPROVED BY: R. Mahajan	Tabs A & C	9-15-84
		PREPARED BY:		
		REVIEWED BY:		
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		REVIEWED BY:		
		APPROVED BY:		

ISSUE SUMMARY

COMPONENT QUALIFICATION DIVISION

SARGENT & LUNDY ENGINEERS

PROJ. NO.: 4536-32

CQD- 006418

REV	COMMENTS	RESPONSIBILITY	SECTIONS	DATE
00	ORIGINAL ISSUE	PREPARED BY: Bernard L. Semand	Tab A thru E	3-24-83
		REVIEWED BY: Bernard L. Semand	Tab F and G	3-24-83
		REVIEWED BY: Valentine Pillai	Tab C, D and E	3/16/83
		APPROVED BY: R Horn	Tab A thru G	6/10/83
01	(1) REVISED TITLE PAGE, ISSUE SUMMARY SHEET & TABLE OF CONTENTS (2) REVISED PAGES A1 & A2 OF TAB A.	PREPARED BY: B L Semand	TAB A	8-1-83
		REVIEWED BY: NOT REQUIRED		
		REVIEWED BY: NOT REQUIRED		
		APPROVED BY: R Horn	TAB A	8/3/83
02	Tab C: Revised thru C5 & C12 Tab H: Added · H1 & H2	PREPARED BY: D H Chung	Tab C & H	9/15/83
		REVIEWED BY: NOT REQUIRED	—	—
		REVIEWED BY: B L Semand	TAB C & H	9/15/83
		APPROVED BY: R Horn	TABS C & H	9/15/83
03	Revised: Title Page Table of Contents Issue Summary Tab A: pages A1, A2, A6-A9	PREPARED BY: B L Semand	TAB A	4/6/84
		REVIEWED BY: NOT REQUIRED		
		REVIEWED BY: NOT REQUIRED		
		APPROVED BY: J Bumpass	TAB A	4/6/84
04	Title Page Table of Contents Issue Summary Tab A: All pages Tab C: All pages	PREPARED BY: Patricia Ho	Tabs A & C	8-30-84
		REVIEWED BY: Patricia Ho	Tab F	8-30-84
		REVIEWED BY: G J Swan	Tab C	9-5-84
		APPROVED BY: R Raheja	Tabs A & C	9-10-84

ISSUE SUMMARY

COMPONENT QUALIFICATION DIVISION

SARGENT & LUNDY ENGINEERS

PROJ. NO.: 4536-32

COD- 006418

GENERIC CHECKLIST

Project No.: 4536-32

Volume: EQ-CL056

CQD No.: 006418

Rev. 05 Date: 9-15-84

Calc. No: COD- 006418
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Proj. No: 4536-32
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Project Name: CLINTON - 1 | Project No.: 4536-32 | File No.: CQD- 006418 Revision 05

Reviewed By: Patrick Ho (signature) Date: 9-15-84

Review Approved By: [signature] (signature) Date: 9/15/84

☑ BWR ☐ PWR

☑ BOP ☐ NSSS

Spec. No. and Title: K-2894 : COMPONENT SUPPORTS

Vendor/Manufacturer: BASIC ENGINEERS / PACIFIC SCIENTIFIC

Equipment Name: MECHANICAL SNUBBERS

Equipment Number(s): See Tab "D"

Equipment Model Number(s): PSA - 1/4 , 1/2 , 1, 3, 10, 35, 100

Qualification Report No., Title, Revision, and Date: Qualification Test Reports No. TR841 Rev. A, dated Jan. 21, 1980 & No. TR808 dated Jan. 6, 1977. See Tabs F4 & F5.

Qualification Report Status: ☒ Approved ☐ Not Approved ☐ Not Applicable

Source for Environmental Conditions: FSAR TABLE 3.11-5

A. CONCLUSION OF REVIEW

☑ Accepted ☐ Rejected

Comments EQUIPMENT IS QUALIFIED FOR THE LIFE OF THE PLANT.

PROPRIETARY

B. METHOD OF QUALIFICATION

☐ Certificate of Compliance ☒ Analysis ☐ Operating Experience ☐ Type Testing

☐ Other

C. INSTRUCTIONS

C1. Review all reports against Sections B, D, and E and (depending on the qualification method shown in B) against the applicable Section(s) F, G, H or I

C2. Provide additional information and page number of the report (where necessary) to qualify "YES," "NO" or "NOT APPLICABLE" in the space provided for comments

D. REFERENCES

This qualification meets the requirements of the following documents:

D1. NRC letter dated 6-23-82 on Environmental Qualification of Mechanical Equipment

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MECHANICAL DEPARTMENT STANDARD

CHECKLIST FOR ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED MECHANICAL EQUIPMENT

FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY

SARGENT & LUNDY ENGINEERS

MAS-COD-29

Form MAS-COD-29 Approved by [signature] Dept. Mgr.
Rev. Orig (11-11-82)

Project No.: 4536-32 | File No.: COD- 006418 Revision: 04

E. EQUIPMENT DESCRIPTION

E1. Has all the equipment in the report been identified by manufacturer and model number?

☑ Yes ☐ No

Comments BASIC ENGINEERS LETTER DATED 3-2-82

E2. Is the equipment listed in the report identical to that being supplied under the specification?

☑ Yes

☐ No - justify if acceptable: SEE E-1

E3. Equipment Location:

a. Building & Elevation: ALL LOCATIONS

b. Environmental Zone: EXCEPT H-28

F. QUALIFICATION BY OPERATING EXPERIENCE NOT APPLICABLE

Qualification by operating experience is judged solely upon the availability of adequate documentation. Does the documentation clearly identify each of the following for the operating equipment (upon which qualification of the new equipment is based)?

F1. Physical locations of operating equipment in their respective facilities.

☐ Yes ☐ No

Comments

F2. Mounting arrangement of operating equipment.

☐ Yes ☐ No

Comments

PROPRIETARY

F3. Performance characteristics of operating equipment as called for in each specification.

☐ Yes ☐ No

Comments

F4. Records of failures and trends for operating equipment.

☐ Yes ☐ No

Comments

F5. Log of periodic maintenance and inspections for operating equipment.

☐ Yes ☐ No

Comments

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Rev. Orig (11-11-82)

F6 Record of environment where the operating equipment is located.

☐ Yes ☐ No

Comments

F7 Demonstration with margin that new equipment will be placed in an environment whose physical boundaries are less severe than those of operating equipment.

☐ Yes ☐ No

Comments

F8 Statement of qualified life which does not exceed the life of operating equipment.

☐ Yes ☐ No

Comments

G QUALIFICATION BY ANALYSIS

PROPRIETARY

Does the analysis include the following details?

G1. **Mathematical Model**

G1.1 Description of mathematical model (a regression analysis is considered a mathematical model.)

☒ Yes ☐ No

Comments Material Analysis

G1.2 Principles by which model was developed (e.g., standards, test data, operating experience)

☒ Yes ☐ No

Comments Model was developed by using manufacturer's Letter (See Tab F1)

G1.3 A description of the equipment performance requirements.

☐ Yes ☒ No

Comments The function of the mechanical snubbers are to limit piping movements during seismic disturbances and line breaks.

G1.4 A listing of the environmental variables which affect equipment performance.

☒ Yes ☐ No

Comments Temperature, humidity, radiation

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G2. **Extrapolation of the Model**

G2.1 Identification of postulated equipment failure modes

☒ Yes ☐ No

Comments Hardening of lubricant

G2.2 The postulated failure modes for the equipment should be shown to be the same as those produced by the model.

☒ Yes ☐ No

Comments The snubbers will not be able to move freely to perform their safety-related function if the lubricant hardened.

PROPRIETARY

G2.3 The extrapolation of the model out to the desired life must be justified by using

a. Confidence bounds.

☐ Yes ☐ No ☒ Not Applicable

b. Thermal testing of a component based on the aging rate of the regression line and to same failure criteria.

☐ Yes ☐ No ☒ Not Applicable

c. Through surveillance requirements.

☐ Yes ☐ No ☒ Not Applicable

d. Other: Material Analysis

Comments

G3. **Determination of Qualified Life.** Through the model it must be demonstrated that equipment performance exceeds requirements for an environment as severe as that anticipated in service.

☒ Yes ☐ No

Comments The equipment is qualified for 40 years of normal service conditions plus 100 days of accident conditions.

G4. **Maintenance.** A description of periodic maintenance and replacement requirements

☐ Yes ☒ No

Comments NO E.Q. related maintenance is required.

H **QUALIFICATION BY CERTIFICATE OF COMPLIANCE (COC)** Not Applicable

H1. Was the COC properly signed by the Responsible Engineer from the Manufacturer/Vendor and dated?

☐ Yes ☐ No

Comments

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Form MAS-COD-2.9
Rev Orig (11-11-82)

H2. Does the COC identify the equipment purchased and the procurement specification?

☐ Yes ☐ No

Comments

H3 **Comparison of Requirements of Design/Purchase Specification and Vendor's Parameters for the Equipment.**

H3.1 Do vendor's parameters for the equipment envelop specification requirements?

☐ Yes ☐ No

Comments

H3.2 Were Maintenance & Surveillance requirements established by the Manufacturer/Vendor?

☐ Yes ☐ No

Comments

H3.3 Has the Vendor established a qualified life?

☐ Yes ☐ No

Comments

PROPRIETARY

I **QUALIFICATION BY TYPE TESTING** N/A

I1 **Performance/Acceptance Criteria.** Does the report outline:

a. Equipment performance characteristics ☐ Yes ☐ No

b. Limiting values for failure ☐ Yes ☐ No

Comments

I2 **Thermal/Radiation Aging.** Does the report identify:

a. Accelerated aging parameters	☐ Yes	☐ No	☐ Not Applicable
b. Equipment real time	☐ Yes	☐ No	☐ Not Applicable
c. Source of activation energy	☐ Yes	☐ No	☐ Not Applicable
d. Operation during thermal aging	☐ Yes	☐ No	☐ Not Applicable
e. Radiation dose (state whether acceptable or unacceptable in comments)	☐ Yes	☐ No	☐ Not Applicable

Comments

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Form MAS-CQD-2.9
Rev. Orig (11-11-82)

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13. **Cyclic or Wear Aging.** Does the report:

a. Include cyclic aging	☐ Yes	☐ No	☐ Not Applicable
b. Define cycle rate	☐ Yes	☐ No	☐ Not Applicable

Comments _____

14. **DBA.** Does the report:

a. Simulate nozzle connections during testing	☐ Yes	☐ No	☐ Not Applicable
b. Demonstrate operability during and after testing	☐ Yes	☐ No	☐ Not Applicable
c. Expose the equipment to entire time frame of accident	☐ Yes	☐ No	☐ Not Applicable
d. Identify post-accident function time	☐ Yes	☐ No	☐ Not Applicable
e. Subject equipment to chemical and/or demineralized water spray	☐ Yes	☐ No	☐ Not Applicable
f. Address seismic qualification	☐ Yes	☐ No	☐ Not Applicable
g. Identify any abnormalities	☐ Yes	☐ No	☐ Not Applicable

Comments _____

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Service Conditions. Does the report:

a. Include test values that envelop specification requirements	☐ Yes	☐ No	☐ Not Applicable
b. Identify type of DBA tested (state LOCA, HELB, Seismic or other in comments)	☐ Yes	☐ No	☐ Not Applicable
c. Identify abnormal service conditions (state page no. in comments)	☐ Yes	☐ No	☐ Not Applicable

Comments _____

16. **Test Equipment/Results/Conclusion/Maintenance & Inspection.** Does the report:

a. Include test instrumentation used and reference to calibration records	☐ Yes	☐ No	☐ Not Applicable
b. Identify results of all type tests	☐ Yes	☐ No	☐ Not Applicable
c. State equipment's qualified life	☐ Yes	☐ No	☐ Not Applicable
d. Address maintenance & inspection of equipment	☐ Yes	☐ No	☐ Not Applicable

Comments _____

Form MAS-COD-2.9
Rev Orig (11-11-82)

Project No.: 4536-32 File No.: CQD- 006418 Revision 04

J QUALIFIED LIFE

Comments The snubbers are qualified for 40 years of normal service conditions plus 100 days @ accident conditions.
No E.Q. related maintenance and surveillance schedules required.

PROPRIETARY

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Form MAS-CQD-29
Rev. Orig (11-11-82)

CQD FILE 006418

COMPONENT UNIQUE CHECKLIST
(NOT APPLICABLE)

Project No.: 4536-32

Volume: EQ-CL056

CQD No.: 006418

Rev.00 Date: 6-18-83

JUSTIFICATION/ANALYSIS

Project No.: 4536-32

Volume: EQ-CL056

CQD No.: 006418

Rev. 05 Date: 9-15-84

(C)

Calc. No: COD- 006418
Rev: 05 Date 9-15-84
Proj. No: 4536-32
Page C 1 of C9

PROJECT: CLINTON

PROJECT NO.: 4536-32

CALC. NO.: CQD-006418 REVISION: 05

REVIEWED BY: [signature] (signature) DATE: 9-15-84

A. CONCLUSION OF REVIEW

☒ Accepted ☐ Rejected

Comments:

B. DESIGN INPUT DATA

PROPRIETARY

B1. Has the input data been approved for use?

☒ Yes ☐ No

Comments:

B2. Is the input data applicable for this analysis?

☒ Yes ☐ No

Comments:

C. DOCUMENTATION

C1. Does the analysis include, as applicable, purpose, input data, assumptions, and references?

☒ Yes ☐ No

Comments:

C2. Is the analysis properly documented, in accordance with Quality Assurance Procedure GO-3 08?

☒ Yes ☐ No

Comments:

D. TYPE OF ANALYSIS (Check one or both, as applicable)

☐ Hand-prepared design calculation.

☐ Computer-aided design calculation. MATERIAL ANALYSIS

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E. TECHNICAL ADEQUACY

E1. Assumptions. Are the assumptions used valid? ☒ Yes ☐ No

Comments:

Form MAS-COD-2.1 Approved by [signature] Dept. Mgr.
Rev. Orig. (11-11-82)

MECHANICAL DEPARTMENT STANDARD

CHECKLIST FOR NONSTANDARD NUCLEAR SAFETY-RELATED ANALYSES

FOR OFFICE USE ONLY - NOT TO BE SENT OUTSIDE OF SARGENT & LUNDY

SARGENT & LUNDY ENGINEERS

PROJECT NO _____ | CALC. NO.: CQD-_____ REVISION:_____

E2. Model. Is the analytical model(s) used adequate for this application?

☑ Yes ☐ No

Comments: _____

Complete E3 and/or E4, depending on the type of calculation.

E3. Hand-prepared calculation N/A

E3.1 Method of review. The review was conducted using:

☐ A detailed review of the original calculation.
☐ A review by an alternate, simplified or approximate method of calculation.
☐ A review of a representative sample of repetitive calculations.
☐ A review of the calculation against a similar calculation previously performed.

E3.2 Are the hand-prepared calculations technically adequate?

☐ Yes ☐ No

Comments: _____

_____

E4. Computer-aided design calculation N/A

E4.1 Program Acronym: _____ Program Number: _____

E4.2 Run I.D.(s)/Date(s): _____

E4.3 Is the computer program applicable for this calculation ?

☐ Yes ☐ No

E4.4 Is the program maintained in Computer Services Division-controlled files?

☐ Yes
☐ No-Has the program been validated in accordance with Appendix H of CSD Standards and Procedures Manual (GOP 4-1)?

☐ No
☐ Yes-a) Provide validation documentation file no.: _____

b) Has it been documented that the program used is identical to the one validated?

☐ Yes ☐ No

E4.5 Is the computer program input correct?

☐ Yes ☐ No

E4.6 Does the program input contain sufficient accuracy to produce results within any numerical limitations of the program?

☐ Yes ☐ No

E4.7 Are the computer results consistent with the input?

☐ Yes ☐ No

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PROPRIETARY

Form MAS-CQD-2.1
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E4.8 Are the results correct and within stated assumptions and limitations of the program?

☐ Yes ☐ No

E4.9 Are the computer-aided calculations technically adequate?

☐ Yes ☐ No

Comments: _____

F COMMENTS

PROPRIETARY

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Form MAS-CQD-2.1
Rev. Orig. (11-11-82)

SARGENT & LUNDY ENGINEERS CHICAGO

Calcs. For PACIFIC SCIENTIFIC SNUBBERS		Calc. No. QD-006418
		Rev. 05 Date 9-15-84
X Safety-Related	Non-Safety-Related	Page C5 of C9

Client IPC		Prepared by Patrick Ho	Date 9-15-84
Project CLINTON 1		Reviewed by Florence Jason	Date 9-15-84
Proj. No. 4536-32	Equip. No. See Pages D2-D44	Approved by R. Marrero	Date 9-15-84

I. PURPOSE

To show that the PSA-Type Snubbers are qualified for the life of the plant (40 years)

II. REFERENCES

1. Letter from Paul Scholar of National Valve and Manufacturing Co. to J. A. Dudeck of S&L, dated March 2, 1982.
2. Letter from Floyd Fredrickson of Pacific Scientific to Benny Serrano of S&L, dated Jan 7, 1983
3. Letter from Floyd Fredrickson of Pacific Scientific to Benny Serrano of S&L, dated Jan 28, 1983
4. "Qualification Testing Report No. TR841" Pacific Scientific, dated Jan 21, 1980
5. "Qualification Test Report No. TR808" Pacific Scientific, dated Jan 6, 1977

Form GO-3.08.1 Rev. 2

II. QUALIFICATION PROCEDURE

A. Synopsis:

We have taken the following approach in qualifying the snubbers for 40 years of plant life:

1. Identify non-metallic components
2. Determine which non-metallic components would affect equipment performance of their safety-related functions.
3. Identify composition of each non-metallic component and determine its application in each component
4. Determine if any of the component composition (with a safety-related function) is susceptible to aging; i.e. thermal, pressure, humidity and radiation.
5. If none are susceptible to aging and the plant parameters are enveloped by the component design parameters, then they are qualified for the 40 year life of the plant.
6. If aging mechanisms are determined, a replacement or maintenance and surveillance program will be recommended.

B. Environmental Parameters

The snubbers are located in all CPS-1 Harsh zones, except zone H-28, the environmental parameters for both normal service conditions and accident conditions are shown as follows. These values are taken from the worst case as considered in the CPS-FSAR Table 3.11-5.

	Normal	Accident
Temperature (°F)	150	330 *
Pressure (PSIG)	2	30 +
Humidity (%)	100	steam
Radiation (rads)	5×10^7	2×10^8

* 330°F for 3 hrs, ramp down to 310°F in 3 hrs, ramp down to 250°F in 18 hrs, ramp down to 100°F in 99 days.

+ 30 PSIG for 40 sec., ramp down to 15 PSIG in 5 sec., at 15 PSIG for 1 hr., ramp down to 5 PSIG, ramp down to 0 PSIG till 100 days.

To qualify the snubbers, it is necessary to establish the compatibility of their non-metallic materials within the above boundary limits.

C. Non-metallic components

As per Reference 1, page 1, the only non-metallic component in the Snubbers is lubricant. This lubricant is used to prevent the increase in breakaway friction force in the Snubbers as the Snubbers have to perform their safety-related function.

The analysis of this lubricant is shown in the following pages.

D. Material Analysis on Lubricant

The lubricants use for the Snubbers are NRRG-159 Grease and NRRG 335 Grease. Both greases are manufactured by Chevron USA Inc. (Reference 2)

Temperature

As per Reference 2, the snubbers had been tested up to 392°F, and. As per Reference 4, pages 8 and 9, the snubbers had been placed in an all steam chamber at 330°F over 3 hours. These temperature values envelop both our normal and accident conditions.

Pressure

Pressure is not applicable to lubricant

Humidity

As per Reference 4, pages 8 and 9, the snubbers had been placed in steam chamber at 330°F over 3 hours and also 100% humidity for over 2 days. Humidity did not affect the performance of the Snubbers.

Radiation

Per Reference 2, the lubricants will not degrade the shock arrestors performance at 3×10^9 rads. This value envelops our TID of 2×10^8 rads.

The lubricants are able to sustain the above environment. They are environmentally qualified for use in the snubbers in all zones, except zone H-28.

Spray & Submergency

As per Reference 5, page 4 of 11, submergence was performed through Salt Spray, and the result was successful. Submergency is only momentary due to pool swell.

IV. CONCLUSION

Based on the above analysis, it can be concluded that the lubricants can sustain the environmental parameters as temperature, humidity, radiation and spray and submergency. The snubbers are thus environmentally qualified for 40 years of normal service condition plus 100 days of accident conditions for all zones in CPSS-1 except H-28.

CQD 006418

EQUIPMENT IDENTIFICATION

Project No.: 4536-32

Volume: EQ-CL056

CQD No.: 006418

Rev. 00 Date: 6-18-83

(D)

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ENVIRONMENTAL QUALIFICATION
EQUIPMENT IDENTIFICATION

Project Name: Clinton
Project Number: 4536-32
CQD File No.: 006418

Prepared by: Benigno L. Serrano Date: 3-14-83
Reviewed by: Vasyl Seeman Date: 3-16-83
Approved by: R. Von Date: 6/18/83

S&L Tag Number	Equipment Name	Manufacturer & Model	Spec. No.	System	Location			Data Sheet/ Drawing No.
					Bldg. El.	Mtg.	Zone	
SEE SUBSEQUENT PAGES FOR TAG NO.	MECHANICAL SNUBBERS	PACIFIC SCIENTIFIC (P.S.) / PSA ¼	K-2884	VAR.	ALL.	Vert/ horiz.	ALL ZONES EXCEPT H-28	1801104-05
		P.S. / PSA ½						1801104-07
		P.S. / PSA 1						1801102-05
		P.S. / PSA 3						1801106-05
		P.S. / PSA 10						1801103-07
		P.S. / PSA 35						1801112-11, -13
		P.S. / PSA 100						1801119-11 -13

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CPS-1

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1AS320088	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1HG160113	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010078	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010098	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010148	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010168	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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CPB-FSAR

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1IS010209	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010229	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010279	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010299	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010339	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010409	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010429	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010469	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010489	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010539	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010559	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010749	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS010759	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS030109	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS030109	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS030139	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1IS030189	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1LP160029	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1LP160039	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS10201S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS10301S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS10401S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1MS10501S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS10602S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS38072S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS46001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1/4	H*
K-2884	1MS48003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS48005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS49003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1/4	H*
K-2884	1MS49005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS50001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1MS84008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1NB01003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1NB01006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1NB01008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1NB01009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1NB01011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1NB01014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1NB01017S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1NB01019S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB12513S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1/4	H*
K-2884	1RB21513S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1/4	H*
K-2884	1RB21593S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1/4	H*
K-2884	1RB21596S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*

H* = ALL HAPSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RB21597S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21598S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21599S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21608S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21609S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21610S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21611S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21614S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21615S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB21616S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB31529S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB32520S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB33516S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB33517S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RB34512S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RH73002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1R10301JS	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RR29014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RR32001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RR33001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1R10104SS	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1R103002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RT03003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT03004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT03008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT03009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT04002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT04003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT04004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT04008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT04009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1RT07006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1TD44006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1TD45007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/4	H*
K-2884	1AS30009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1AS32010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1HG15010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1IS03008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1IS03015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1IS03016S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1IS04015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1IS04018S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS05022S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS05023S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1MS05028S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS54005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS84002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS85002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS85009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS85010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS86001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS86002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS87002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1MS87010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1NB01002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1NB01020S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RB31514S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RB31516S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RE02021S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH13015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH13036S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH15017S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH17002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH18006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1/2	H*
K-2884	1RH23018S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH23020S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-29

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH62011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH64004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH71006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH71018S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RH72015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RI02008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RI02009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT01031S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT01042S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT01044S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT01048S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT02074S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05039S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05041S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05043S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05053S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05059S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05071S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05078S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05079S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT05082S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RT06009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT06014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT06015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT06018S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT06022S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT06029S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT06031S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT06033S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT06040S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT07009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT07036S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT07037S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT07048S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1RT07049S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1/2	H*
K-2884	1AS24001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1AS25006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1AS26001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1AS27007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1AS30007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1DG02G09S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1DG06010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1FC03076S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1FC03081S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1FW03035S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1HC01002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1HC01007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1HC02001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1HC02002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1HC02007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1HP03013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1HP03032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1IS01035S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1IS03017S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1LP04021S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1MS05004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1MS05020S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1MS05021S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1MS05024S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1MS05025S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1MS05034S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1MS05035S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1MS84006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1MS86008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1MS87009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*

H* - ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RF030139	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH07035S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH07042S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH07110S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH07124S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH16011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH16034S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH16035S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH17007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH23003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH23006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH63017S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH70016S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH71011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH71013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH80005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RH81005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RI02003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RI02016S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RI02018S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RI03009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•
K-2884	1RI08017S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H•

H• - ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RI08034S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RI10010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RI29016S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT01002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT01003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT01015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1RT01043S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT01050S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT02026S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT02067S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT02078S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT02079S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05038S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05052S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05066S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05067S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05068S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT05072S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-20

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RT05077S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT06026S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1RT06037S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT07014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1RT07020S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT07022S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1RT07028S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1RT07032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1RT07040S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PBA 1	H*
K-2884	1RT07042S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1RT07044S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1RT07052S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1SX19004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1SX30006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1SX30008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1SX38013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 1	H*
K-2884	1VG01023S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1VG10012S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 1	H*
K-2884	1CC07055S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 3	H*
K-2884	1DG02001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 3	H*
K-2884	1DG04001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 3	H*
K-2884	1DG04009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 3	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-78

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1DG040129	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1DG040179	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1DG060018	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1DG060178	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1FC010148	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1FC010169	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1FC010229	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1FC030359	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1FC110059	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1FW030349	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HG010159	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HG020139	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP030069	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP030149	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP030289	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP030299	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP030309	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP030499	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP040039	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP040169	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP080049	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1HP080069	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-29

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1HP08025S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1IS03005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1LP03006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1LP03015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1LP04012S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS05001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS05009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS05013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS05019S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS05026S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS05027S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS07084S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS07090S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS07091S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS07092S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1MS07093S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH02006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH02008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH02010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH02014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH02015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH02018S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-29

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH02021S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07017S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07020S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07022S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07025S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07029S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07030S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07033S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07036S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07037S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07040S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07041S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07045S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07047S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07048S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07049S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07050S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07052S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07058S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•

H• = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH07067S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07069S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07072S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07073S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07094S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07017S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07111S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07114S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07119S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07122S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH07123S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08017S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08018S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08020S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•
K-2884	1RH08026S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H•

H• = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH08029S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08045S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08047S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08049S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08059S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08065S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08068S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08069S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08070S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08073S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08076S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08081S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08083S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08086S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08088S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08090S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08093S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08096S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08100S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08102S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08103S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH08105S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08107S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH08112S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09033S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09034S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09036S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09037S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09038S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09042S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09044S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09045S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09048S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09053S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09060S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09062S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09065S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09067S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09068S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09069S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09070S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09071S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*

H* = ALL HARSH AND HELD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH09075S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09081S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09082S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09083S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09084S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09086S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09087S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09088S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09089S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09090S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH09091S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH10008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH10011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH11009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH11011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH12002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH14006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH14007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH14008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH14009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH14010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH14013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-20

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TABLE 3.11-20

ENVIRONMENT/ QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH21050S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH21051S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH22049S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH22050S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH22051S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH23013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH80006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RH81006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI01007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI01008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI03010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI03015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI07018S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI08010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI10007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI10008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RI10009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT01020S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT01024S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT01025S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT01032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT01037S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-20

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RT01046S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT01047S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT01049S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT01051S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT02002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT02003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT02004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT02072S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT02084S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05023S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05024S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05064S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05065S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05069S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05070S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05076S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05080S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT05084S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT06044S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT07024S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1R1000075	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RT090129	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1RT120049	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	18X090169	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	18X120109	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	18X150196	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	19X170169	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	19X170278	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	16X190019	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	16X190148	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1SX200109	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1SX220078	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1SX220128	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	19X240178	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC010098	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC010218	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC010369	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC020196	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC020209	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC020249	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC030029	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC030169	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VC030189	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1VG030255	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VQ090015	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VQ110045	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VQ110105	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VQ110255	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VG110415	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VG120025	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VQ120055	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VQ160265	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 3	H*
K-2884	1VR040035	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110115	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110125	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110265	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110325	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110345	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110355	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110365	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110375	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110385	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110395	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110405	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB110425	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1CB11043S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB11044S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1DG02002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1DG02012S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1DG02013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1DG04002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1DG04013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1DG06008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1FW01007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1FW01010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1FW01011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1FW01012S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1FW02007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1FW02010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1FW02011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1FW02012S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1HP03010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1LP02003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1LP03003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1LP03016S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS07032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS07033S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1MS070695	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS070035	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS070855	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS110075	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS280045	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS300115	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS320055	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS320095	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS330065	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1MS360095	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH020135	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH040125	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH040315	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH040585	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH040595	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH040605	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH060235	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH070035	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH070105	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH070265	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH070285	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH070655	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH07108S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH07115S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH07118S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH07121S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH07125S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08012S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08024S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08043S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08053S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08055S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08058S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08066S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08071S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08077S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08082S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08087S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08101S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH08111S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH09054S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH09055S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH09059S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH09076S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-20

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TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH09079S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH12007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH21049S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RH22056S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RT01021S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RT01022S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RT05025S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1RT08003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1SX01032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1VC11029S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1VC13055S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1VQ01003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1VQ05032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1VR04002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 10	H*
K-2884	1CB11014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW01004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW01006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW02004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW02006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW03019S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW03020S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW03021S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

CPS-FSAR

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1FW030229	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW030425	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW030535	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW031045	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW031055	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1HP030425	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1HP040068	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1HP040225	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1LP020029	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1LP020068	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070059	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070068	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070085	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070095	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070129	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070175	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070185	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070195	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070205	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070235	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070245	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070295	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-20

CPS-FSAR

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1MS07030S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07035S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07036S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07041S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07042S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07044S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07045S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07048S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07063S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07070S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07086S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07087S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS07088S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS13008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS21007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS21004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS21006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS21008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS22004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS22006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS22007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS23004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

CPS-FSAR

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1MS23005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS23007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS23009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS24004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS24005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS24006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS24010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS25004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS25005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS25006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS25009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS26004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS26005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS26008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS26009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS26010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS27001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS27010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS27011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS27012S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS28007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 35	H*
K-2884	1MS28009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 35	H*

H* - ALL HARSH AND MILD ZONES EXCEPT H-28

CPS-FSAR

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1MS28010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS29003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS29005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS29006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS29007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS29009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS30001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS30002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS30004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS30010S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS30012S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS30013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS30015S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS31002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS31005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS31007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS32002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS32003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS32008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS33008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS33009S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 35	H*
K-2884	1MS34004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI	PSA 35	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

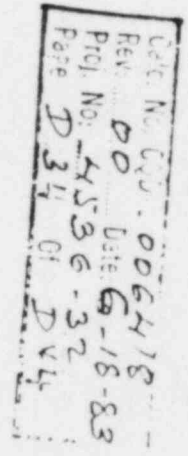
CPS-FSAR

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1MS34005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS34008S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS340108	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS34011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS340128	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS340148	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS340168	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS350018	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS350028	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS350058	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS350108	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS350118	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS360018	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS360068	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS360088	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS360108	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS360118	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS360128	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1MS070578	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH040138	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH040338	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH040558	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28



CPS-FSAR

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1RH06002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH06004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH06006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH06022S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH07006S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH07032S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH07087S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH07096S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH08048S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH08092S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH08094S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH08095S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH08098S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH09027S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH09029S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH09031S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH09056S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH34002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH34003S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH34004S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH34005S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1RH34007S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

CPS-FSAR

TABLE 3.11-20

ENVIRONMENTAL QUALIFICATION LIST
OF ACTIVE NSSS & BOP MECHANICAL EQUIPMENT

SPECIFICATION NUMBER	EQUIPMENT NUMBER	EQUIPMENT NAME	MANUFACTURER	TYPE/MODEL	ENVR ZONE
K-2884	1SM01002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1SM02002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1VQ01001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 35	H*
K-2884	1FW01001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1FW01002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1FW02001S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1FW02002S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1FW03013S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1FW03014S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1MS07011S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1MS07047S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1MS07058S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*
K-2884	1MS07060S	MECH. SNUBBER	BASIC ENGRS/ PACIFIC SCI.	PSA 100	H*

H* = ALL HARSH AND MILD ZONES EXCEPT H-28

CERTIFIED LOAD CAPACITY DATA SHEET
FOR NAVCO/BASIC ENGINEERS - CLINTON POWER STATION
PACIFIC SCIENTIFIC SHOCK ARRESTORS
ASME B & PV CODE 1974 ED., SUMMER OF '74 ADDENDA
SECTION III - DIVISION I

COD FILE 00648

1. GENERAL INFORMATION

SUPPORT NAME: MECHANICAL SNUBBER: STRUT KIT

SUPPORT TYPE: LINEAR
DESIGN PROCEDURE: ANALYSIS AND TEST **
DESIGN TEMPERATURE: 300°F
CODE CLASSIFICATION: TYPE 1, 2, 3 & MC
SERVICE LIMITS: LEVELS A, B, C & D

ENGINEERING DATA LIST
DATA REPORT #DR 1391

EDL REV.	DATE	APP'D BY
F	5/26/82	

2. CERTIFICATION

ENGINEER: DATE: 1/11/83

CHECKED: DATE: 1/11/83

ANALYSIS PERFORMED IN COMPLIANCE WITH SUBSECTION NF, ARTICLE 3000.
SUBSTANTIATING DOCUMENTATION ON FILE AT PACIFIC SCIENTIFIC, KIN-TECH DIVISION ANAHEIM, CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER

REGISTERED PROFESSIONAL ENGINEER
LEO E. AY
NO. 13533
MECHANICAL
STATE OF CALIFORNIA

QAC No: LQD 00648/0
Doc: QC Date: 6-18-83
Proj No: 17532-32
Page: 1.3.1 01 P 44

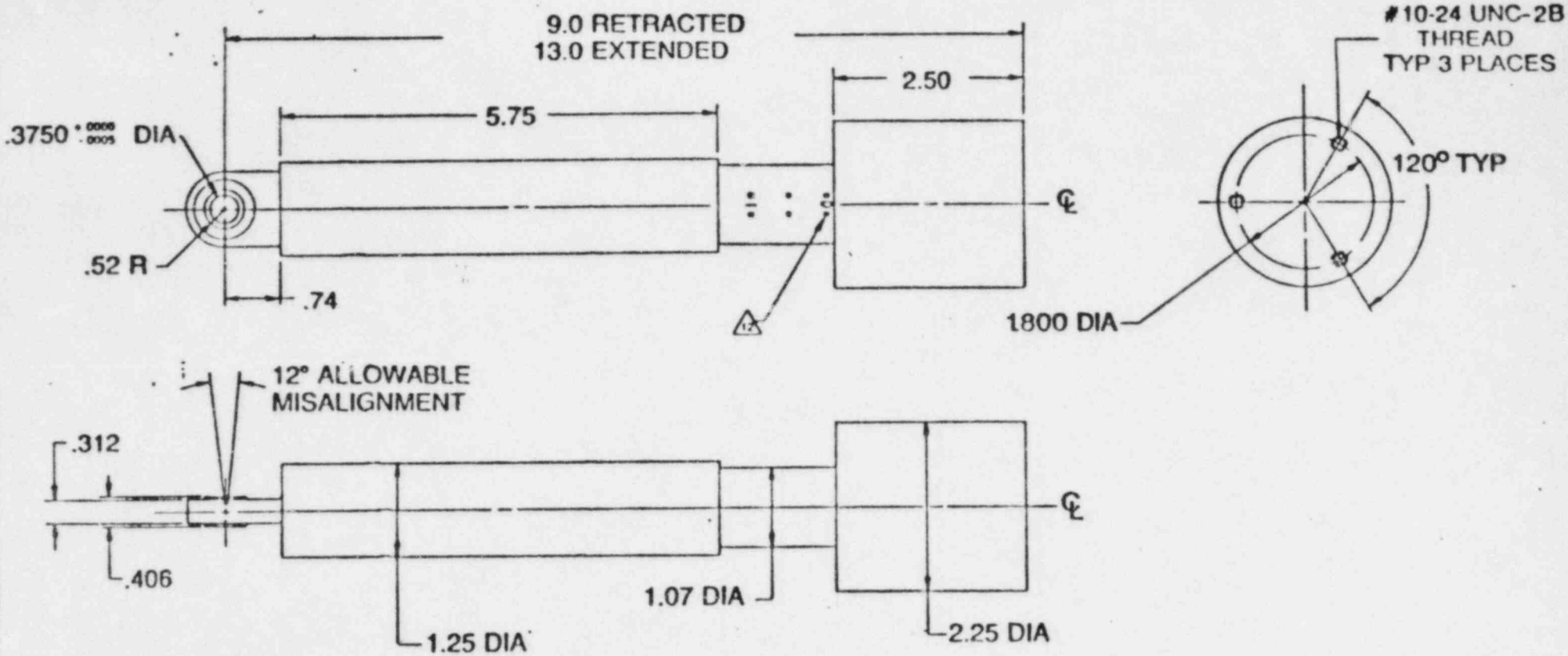
*3. Load rating, lbs., 1 G side load: emergency level operability @ 392°F documented in Addenda "A" to test reports TR 807, 808, 809, 810, 811, 812, & 814

MODEL	STROKE IN.	SHOCK ARRESTOR PART NO.	DESIGN/NORMAL/UPSET	EMERGENCY/FAULTED
SA 1/4	4	1801104-05	350	512
SA 1/2	2.5	1801104-07	650	865
SA 1	4	1801102-05	1500	2100
SA 3	5	1801106-05	6000	10380
SA 10	6	1801103-07	15000	22100
SA 35	6	1801112-09	50000	72450
SA 100	6	1801119-09	120000	160000

REV	DATE	APPVD	REV	DATE	APPVD
	1/11/83				

PACIFIC SCIENTIFIC
KIN-TECH DIVISION
ANAHEIM, CALIFORNIA

DR 1626



NOTES

1. ALL DIMENSIONS ARE NOMINAL EXCEPT WHERE WITH LIMITS INDICATED
2. THIS IS AN ACCELERATION SENSITIVE MECHANICAL SHOCK ABSORBER. IT CONTAINS NO FLUIDS AND HAS NO SEALS
3. TELESCOPING ACCELERATION WILL NOT EXCEED 0.5g WHEN SUBJECTED TO LOADS IN COMPRESSION OR TENSION UP TO RATED CAPACITY
4. ALL PERFORMANCE PARAMETERS ARE MET WHEN SUBJECTED TO CYCLIC LOADING FROM 3 TO 33 HZ
5. TOTAL TELESCOPING MOVEMENT IS LESS THAN .1 Ø0 WHEN SUBJECTED TO CYCLIC LOADING UP TO RATED LOAD
6. WITH SUSTAINED DIRECTIONAL FORCES APPLIED, TELESCOPING MOVEMENT IS LIMITED TO THE ACCELERATION LEVEL OF NOTE 3 AND IS RESTRICTED ONLY BY TOTAL TRAVEL LIMITATIONS
7. REGARDLESS OF LOAD OR ACCELERATION, THIS DEVICE WILL NOT LOCK UP. IT WILL ALWAYS PERMIT MOVEMENT IF THERE IS A SUSTAINED FORCE IN EXCESS OF THE BREAKAWAY FRICTION OF NOTE 10
8. PERFORMANCE IS UNAFFECTED BY PRESSURE OR AMBIENT TEMPERATURES FROM -25° TO +300°F
9. TOTAL TRAVEL IS 4.0 INCHES
10. BREAKAWAY FRICTION IS 5 LBS MAX
11. DESIGN/NORMAL/UPSET LOAD IS 350 LBS
12. NUMBERED SCALE INDICATES EXTENSION IN INCHES
13. FINISHES
    EXTERIOR - ELECTRO PLATED ZINC AND DIFFUSED NICKEL CADMIUM PLATING

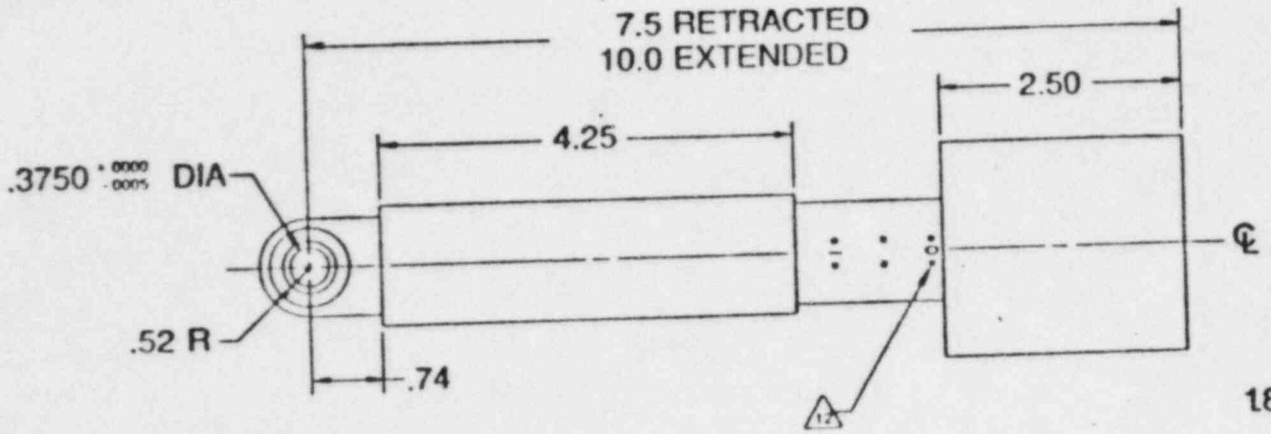
Calc. No: CQD- 006418
Rev: 00 Date: 6-18-83
Proj. No: 4536-32
Page D52 Of D424

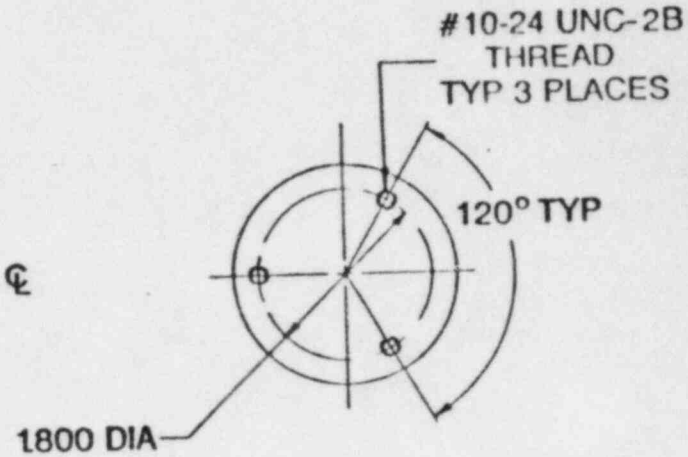
PACIFIC SCIENTIFIC
ANAHEIM, CA 92803

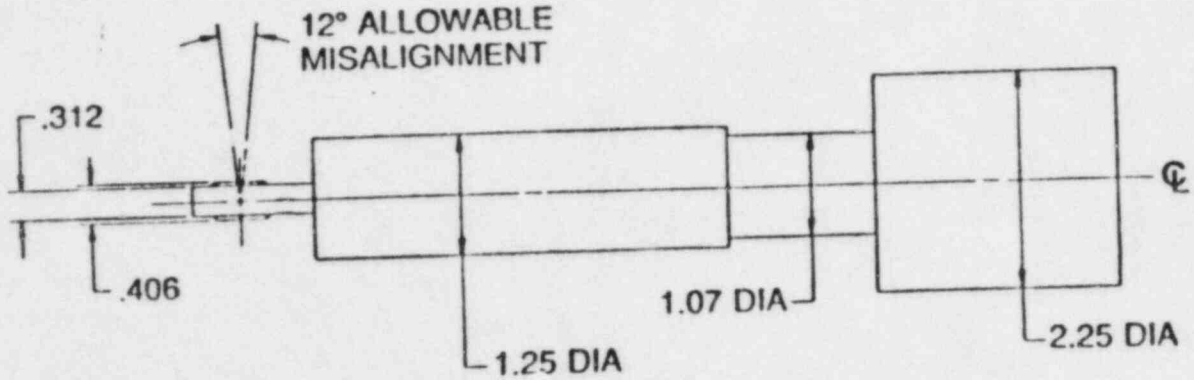
MECHANICAL SNUBBER

MODEL PSA ¼ | 1801104-05

DATE 6/83 | WT .38 LBS







NOTES

6 WITH SUSTAINED DIRECTIONAL FORCES APPLIED, TELESCOPING MOVEMENT IS LIMITED TO THE ACCELERATION LEVEL OF NOTE 3 AND IS RESTRICTED ONLY BY TOTAL TRAVEL LIMITATIONS

5 TOTAL TELESCOPING MOVEMENT IS LESS THAN .9 (60 WHEN SUBJECTED TO CYCLIC LOADING UP TO RATED LOAD

4 ALL PERFORMANCE PARAMETERS ARE MET WHEN SUBJECTED TO CYCLIC LOADING FROM 3 TO 33 HZ

3 TELESCOPING ACCELERATION WILL NOT EXCEED 62g WHEN SUBJECTED TO LOADS IN COMPRESSION OR TENSION UP TO RATED CAPACITY

2 THIS IS AN ACCELERATION SENSITIVE MECHANICAL SHOCK ABSORBER. IT CONTAINS NO FLUIDS AND HAS NO SEALS

1 ALL DIMENSIONS ARE NOMINAL EXCEPT THOSE WITH LIMITS INDICATED

13 FINISHES
EXTERIOR - ELECTRO PLATED ZINC AND DIFFUSED NICKEL CADMIUM PLATING

12 NUMBERED SCALE INDICATES EXTENSION IN INCHES

11 DESIGN/NORMAL/UPSET LOAD IS 650 LBS

10 BREAKAWAY FRICTION IS 6.5 LBS MAX

9 TOTAL TRAVEL IS 2.5 INCHES

8 PERFORMANCE IS UNAFFECTED BY PRESSURE OR AMBIENT TEMPERATURES FROM -20° TO +300°F

7 REGARDLESS OF LOAD OR ACCELERATION THIS DEVICE WILL NOT LOCK UP. IT WILL ALWAYS PERMIT MOVEMENT IF THERE IS A SUSTAINED FORCE IN EXCESS OF THE BREAKAWAY FRICTION OF NOTE 10

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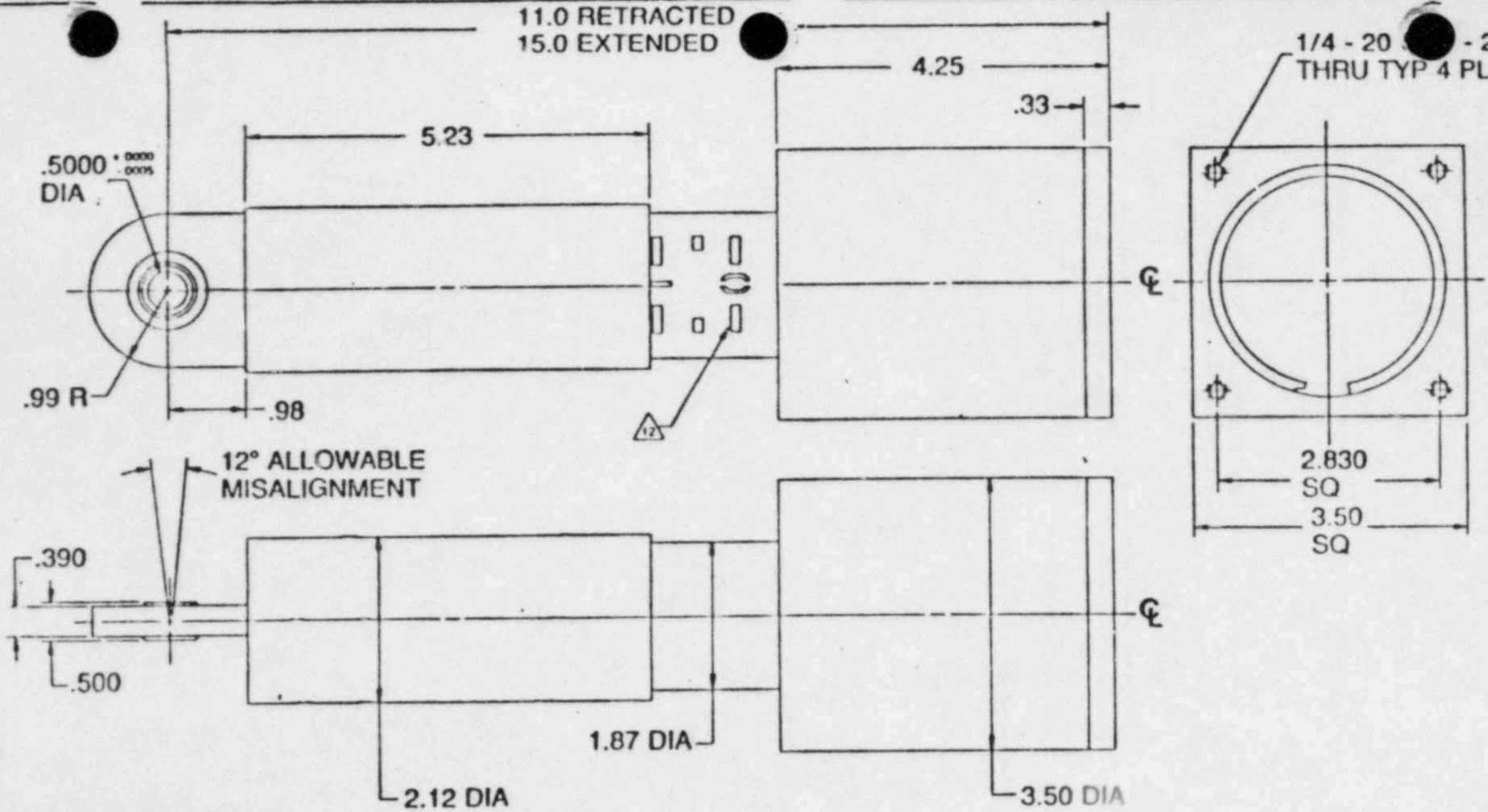
PACIFIC SCIENTIFIC
ANAHEIM, CA 92803

MECHANICAL SNUBBE

MODEL PSA ½ | 1801104-(

DATE 1/81 | WT 33 LBS



6 WITH SUSTAINED DIRECTIONAL FORCES APPLIED, TELESCOPING MOVEMENT IS LIMITED TO THE ACCELERATION LEVEL OF NOTE 3 AND IS RESTRICTED ONLY BY TOTAL TRAVEL LIMITATIONS

5 TOTAL TELESCOPING MOVEMENT IS LESS THAN .060 WHEN SUBJECTED TO CYCLIC LOADING UP TO RATED LOAD

4 ALL PERFORMANCE PARAMETERS ARE MET WHEN SUBJECTED TO CYCLIC LOADING FROM 3 TO 33 HZ

3 TELESCOPING ACCELERATION WILL NOT EXCEED 0.5g WHEN SUBJECTED TO LOADS IN COMPRESSION OR TENSION UP TO RATED CAPACITY

2 THIS IS AN ACCELERATION SENSITIVE MECHANICAL SHOCK ARRESTOR. IT CONTAINS NO FLUIDS AND HAS NO SEALS

1 ALL DIMENSIONS ARE NOMINAL EXCEPT THOSE WITH LIMITS INDICATED

NOTES

13 FINISHES:
EXTERIOR - ELECTRO PLATED ZINC AND DIFFUSED NICKEL-CADMIUM PLATING

12 NUMBERED SCALE INDICATES EXTENSION IN INCHES

11 DESIGN/NORMAL/UPSET LOAD IS 1,500 LBS

10 BREAKAWAY FRICTION IS 15 LBS MAX

9 TOTAL TRAVEL IS 4.0 INCHES

8 PERFORMANCE IS UNAFFECTED BY PRESSURE OR AMBIENT TEMPERATURES FROM -20° TO +160°F

7 REGARDLESS OF LOAD OR ACCELERATION, THIS DEVICE WILL NOT LOCK UP. IT WILL ALWAYS PERMIT MOVEMENT IF THERE IS A SUSTAINED FORCE IN EXCESS OF THE BREAKAWAY FRICTION OF NOTE 10

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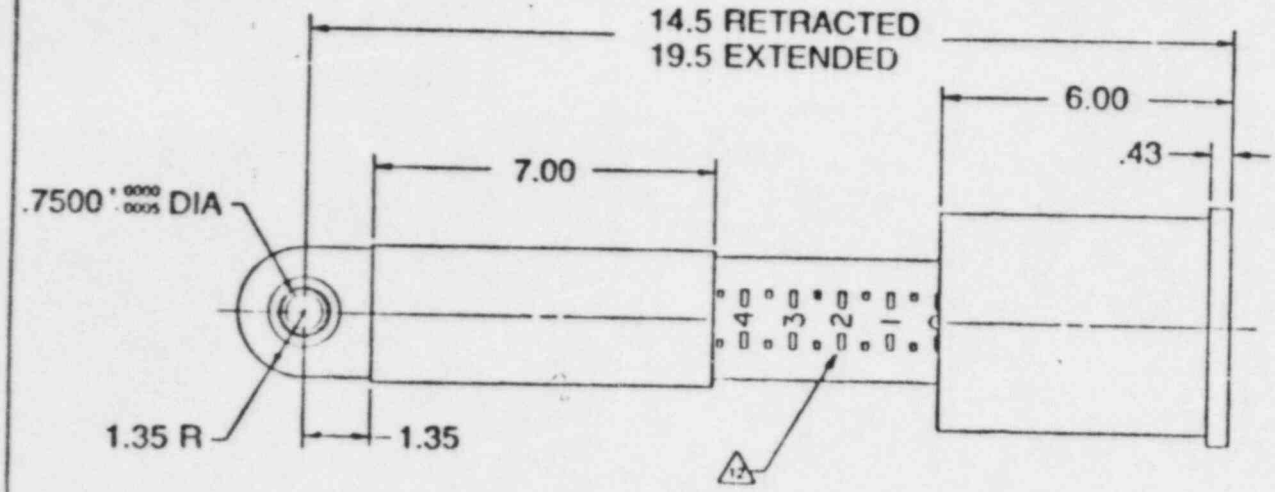
PACIFIC SCIENTIFIC
ANAHEIM, CA 92803

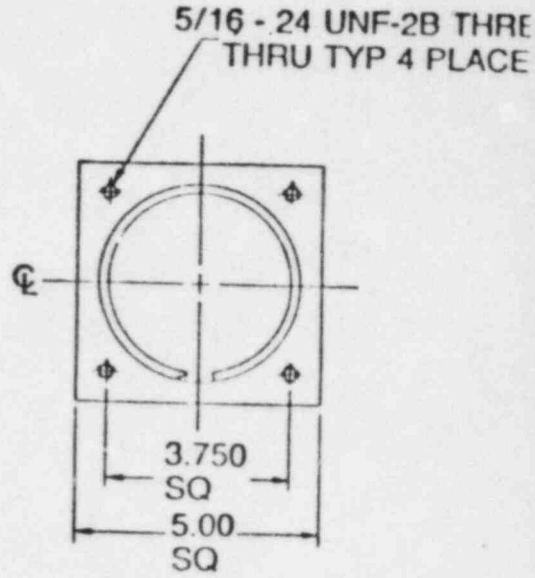
MECHANICAL SNUBBER

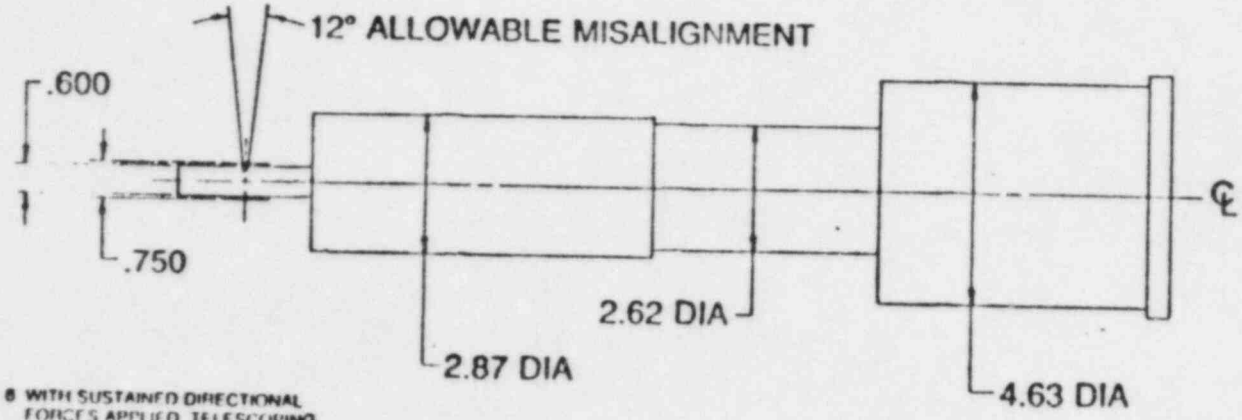
MODEL PSA 1

1801102-05

DATE 10/77 WT 10.2 LBS







8 WITH SUSTAINED DIRECTIONAL FORCES APPLIED TELESCOPING MOVEMENT IS LIMITED TO THE ACCELERATION LEVEL OF NOTE 3 AND IS RESTRICTED ONLY BY TOTAL TRAVEL LIMITATIONS

5 TOTAL TELESCOPING MOVEMENT IS LESS THAN ± 060 WHEN SUBJECTED TO CYCLIC LOADING UP TO RATED LOAD

4 ALL PERFORMANCE PARAMETERS ARE MET WHEN SUBJECTED TO CYCLIC LOADING FROM 1 TO 33 HZ

3 TELESCOPING ACCELERATION WILL NOT EXCEED 0.5g WHEN SUBJECTED TO LOADS IN COMPRESSION OR TENSION UP TO RATED CAPACITY

2 THIS IS AN ACCELERATION SENSITIVE MECHANICAL SHOCK ARRESTOR. IT CONTAINS NO FLUIDS, AND HAS NO SEALS

1 ALL DIMENSIONS ARE NOMINAL EXCEPT WHERE WITH LIMITS INDICATED

NOTES

13 FINISHES
EXTERIOR - ELECTRO PLATED ZINC AND DIFFUSED NICKEL CADMIUM PLATING

12 NUMBERED SCALE INDICATES EXTENSION IN INCHES

11 DESIGN NOMINAL OFFSET LOAD IS 6,000 LBS

10 BREAKAWAY FRICTION IS 60 LBS MAX

9 TOTAL TRAVEL IS 5.0 INCHES

8 PERFORMANCE IS UNAFFECTED BY PRESSURE DIAPHRAGM TEMPERATURES FROM -20 TO +300°F

7 REGARDLESS OF LOAD OR ACCELERATION THIS DEVICE WILL NOT LOCK UP. IT WILL ALWAYS PERMIT MOVEMENT IF THERE IS A SUSTAINED FORCE IN EXCESS OF THE BREAKAWAY FRICTION OF NOTE 10

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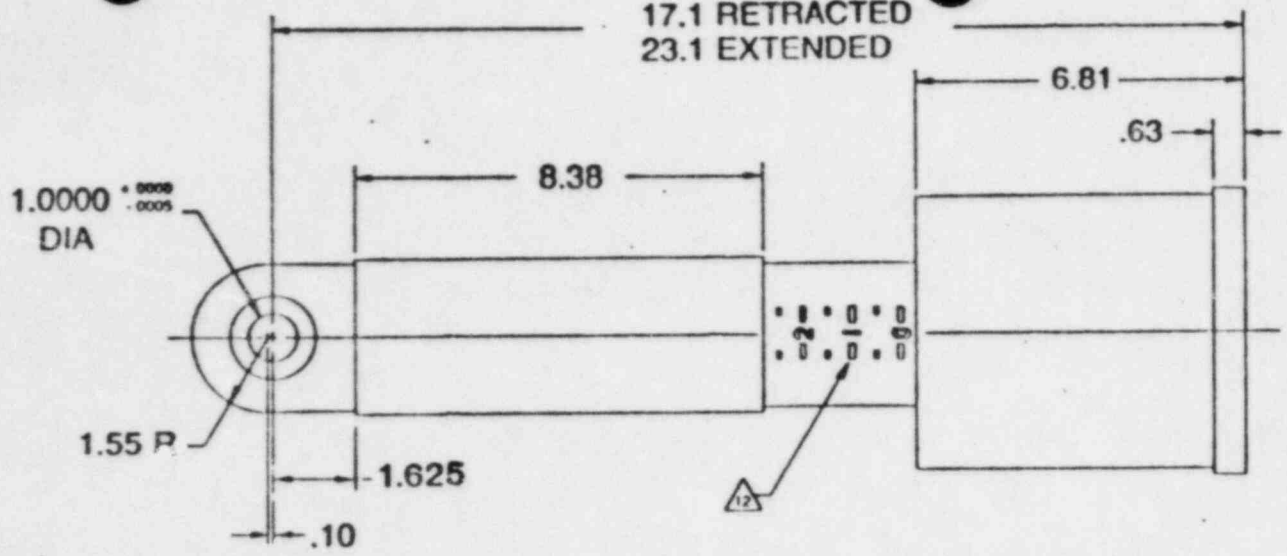
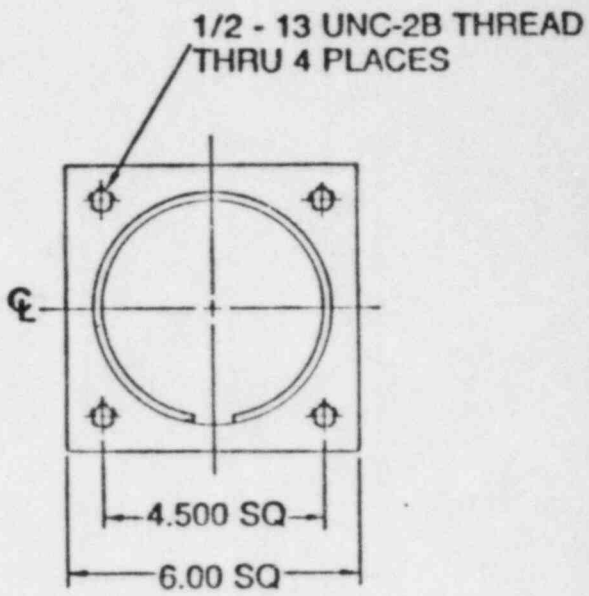
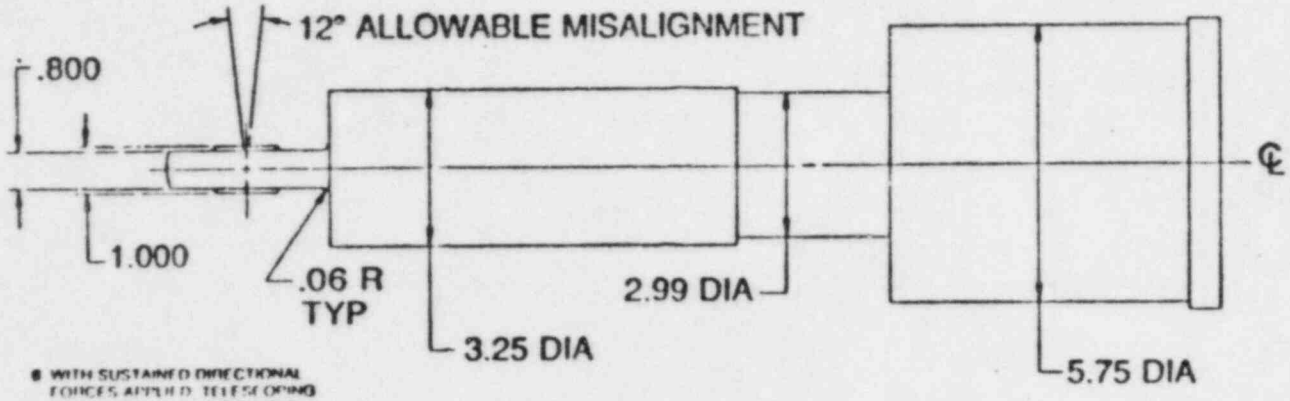
PACIFIC SCIENTIFIC ANAHEIM, CA. 92803	
MECHANICAL SNUBBER	
MODEL PSA 3	1801106-05
DATE 10/7	







8 WITH SUSTAINED DIRECTIONAL FORCES APPLIED TELESCOPING MOVEMENT IS LIMITED TO THE ACCELERATION LEVEL OF NOTE 3 AND IS RESTRICTED ONLY BY TOTAL TRAVEL LIMITATIONS

5 TOTAL TELESCOPING MOVEMENT IS LESS THAN .1 (64) WHEN SUBJECTED TO CYCLIC LOADING UP TO RATED LOAD

4 ALL PERFORMANCE PARAMETERS ARE MET WHEN SUBJECTED TO CYCLIC LOADING FROM 1 TO 33 HZ

3 TELESCOPING ACCELERATION WILL NOT EXCEED 0.3g WHEN SUBJECTED TO LOADS IN COMPRESSION OR TENSION UP TO RATED CAPACITY

2 THIS IS AN ACCELERATION SENSITIVE MECHANICAL SHOCK AND STORE IT CONTAINS NO FLUIDS AND HAS NO SEALS

1 ALL DIMENSIONS ARE NOMINAL EXCEPT THOSE WITH LIMITS INDICATED

NOTES

13 FINISHES
EXTERIOR ELECTRO PLATED ZINC AND FREE USED NICKEL CADMIUM PLATING

12 NUMBERED SCALE INDICATES EXTENSION IN INCHES

11 DESIGN NORMAL/UPSET LOAD IS 15 000 LBS

10 BREAKAWAY FRICTION IS 150 LBS MAX

9 TOTAL TRAVEL IS 6.0 INCHES

8 PERFORMANCE IS UNAFFECTED BY PRESSURE OR AMBIENT TEMPERATURES FROM -20° TO +300°F

7 REGARDLESS OF LOAD OR ACCELERATION THIS DEVICE WILL NOT LOCK UP IT WILL ALWAYS PERMIT MOVEMENT IF THERE IS A SUSTAINED FORCE IN EXCESS OF THE BREAKAWAY FRICTION OF NOTE 10

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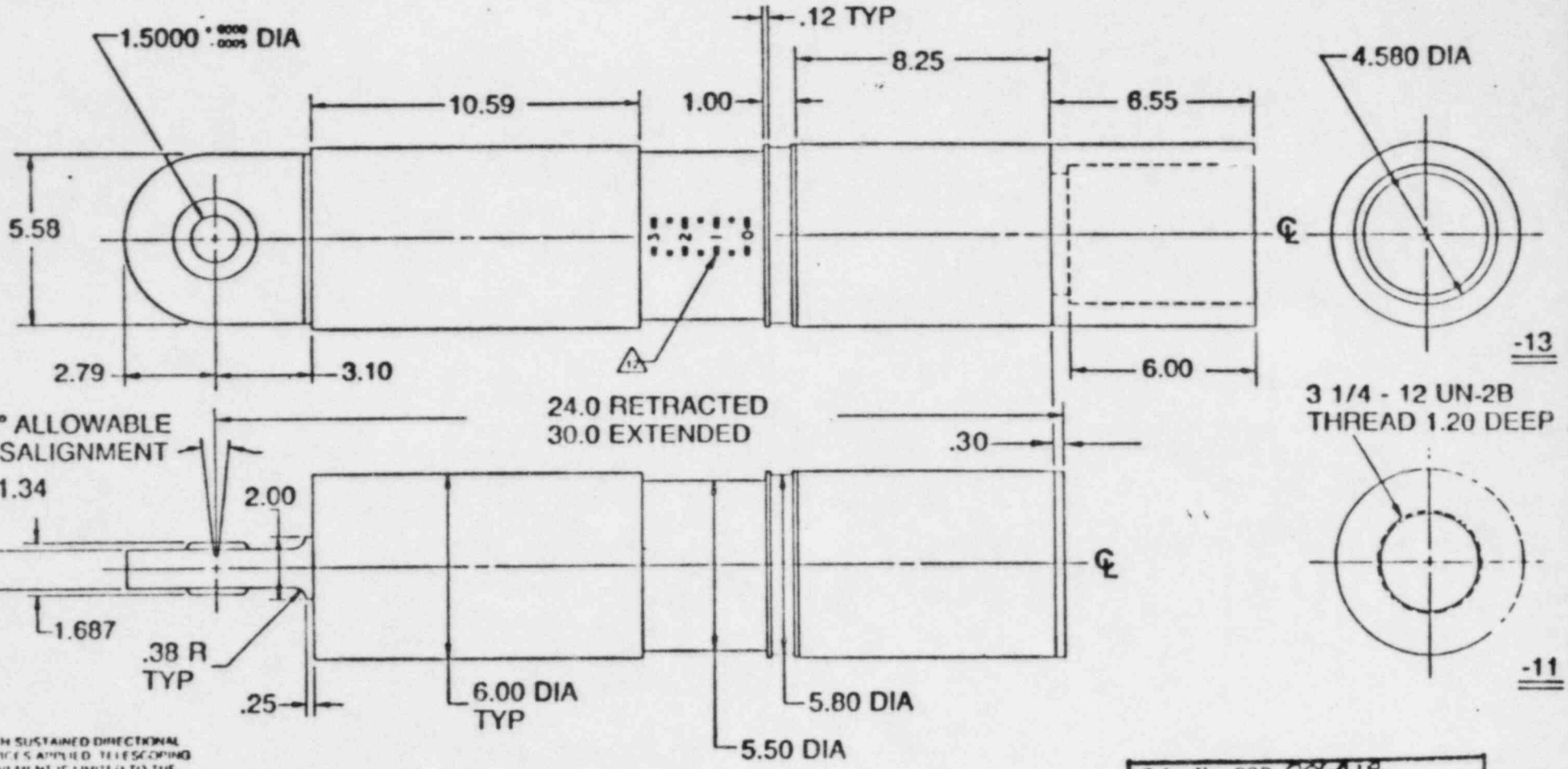
PACIFIC SCIENTIFIC ANAHEIM, CA 92803	
MECHANICAL SNUBBER	
MODEL PSA 10	1801103-07
DATE 1/81 WT 4.7 LBS	



8 WITH SUSTAINED DIRECTIONAL FORCES APPLIED TELESCOPING MOVEMENT IS LIMITED TO THE ACCELERATION LEVEL OF NOTE 3 AND IS RESTRICTED ONLY BY TOTAL TRAVEL LIMITATIONS

5 TOTAL TELESCOPING MOVEMENT IS LESS THAN 1.00 WHEN SUBJECTED TO CYCLIC LOADING UP TO RATED LOAD

4 ALL PERFORMANCE PARAMETERS ARE MET WHEN SUBJECTED TO CYCLIC LOADING FROM 3 TO 33 HZ

3 TELESCOPING ACCELERATION WILL NOT EXCEED 0.5g WHEN SUBJECTED TO LOADS INCLUDING POSITIVE OR TENSION UP TO RATED CAPACITY

2 THIS IS AN ACCELERATION SENSITIVE MECHANICAL SHOCK ABSORBER. IT CONTAINS NO FLUIDS AND HAS NO SEALS

1 ALL DIMENSIONS ARE NOMINAL EXCEPT THOSE WITH LIMITS INDICATED

NOTES

13 FINISHES
EXTERIOR - ELECTRO PLATED ZINC AND DIFFUSED NICKEL CADMIUM PLATING

12 NUMBERED SCALE INDICATES EXTENSION IN INCHES

11 DESIGN/NORMAL/UPSET LOAD IS 50,000 LBS

10 BREAKAWAY FRICTION IS 500 LBS MAX

9 TOTAL TRAVEL IS 6.0 INCHES

8 PERFORMANCE IS UNAFFECTED BY PRESSURE OR AMBIENT TEMPERATURES FROM 20° TO +300°F

7 REGARDLESS OF LOAD OR ACCELERATION THIS DEVICE WILL NOT LOCK UP. IT WILL ALWAYS PERMIT MOVEMENT IF THERE IS A SUSTAINED FORCE IN EXCESS OF THE BREAKAWAY FRICTION OF NOTE 10

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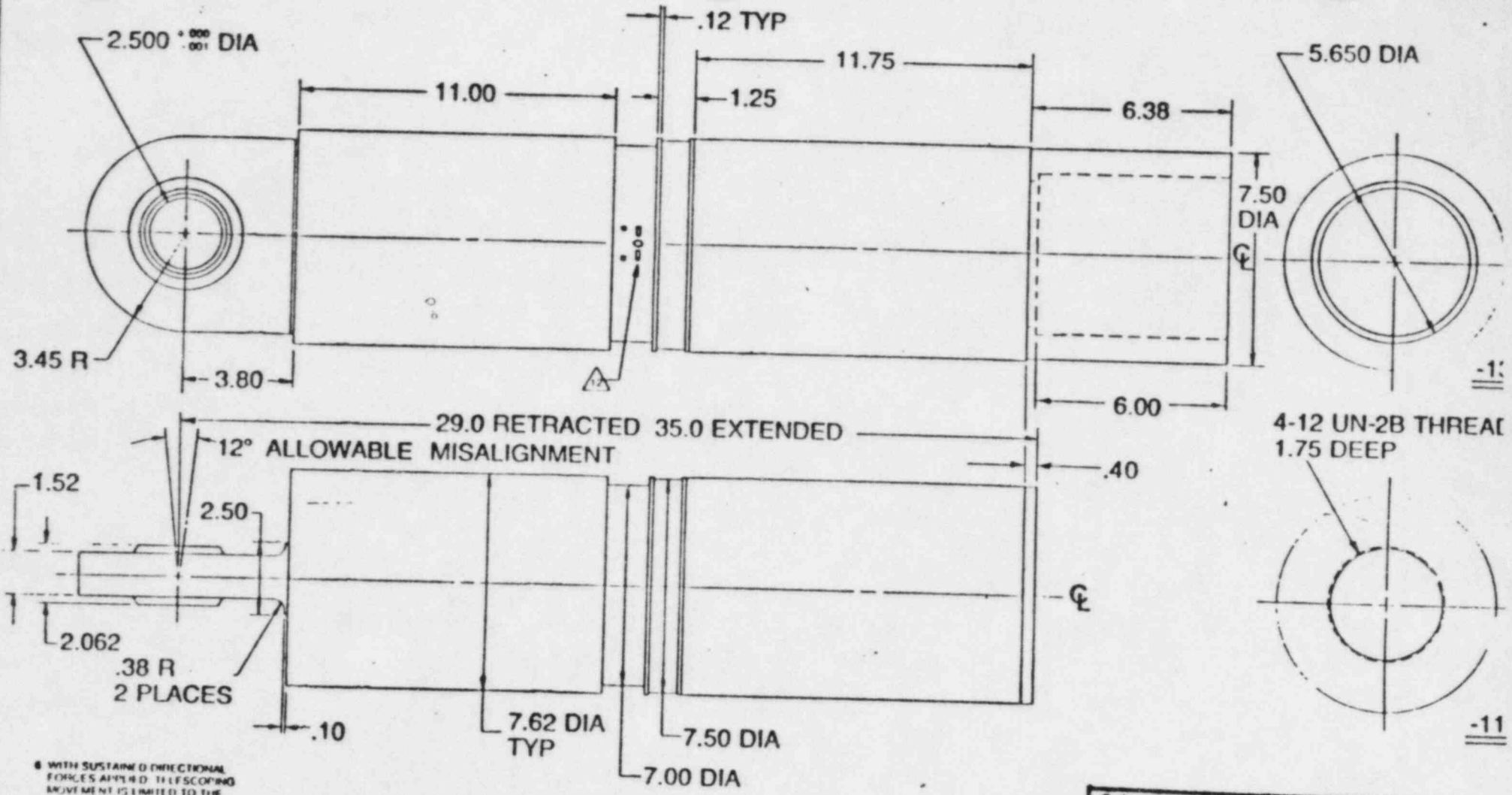
PACIFIC SCIENTIFIC
ANAHEIM, CA 92803

MECHANICAL SNUBBER

MODEL PSA 35

1801112-11
1801112-13

DATE 4/80 | WT. @ 140 LBS. @ 197 LBS.



6 WITH SUSTAINED DIRECTIONAL FORCES APPLIED TELESCOPING MOVEMENT IS LIMITED TO THE ACCELERATION LEVEL OF NOTE 3 AND IS RESTRICTED ONLY BY TOTAL TRAVEL LIMITATIONS

5 TOTAL TELESCOPING MOVEMENT IS LESS THAN 0.060 WHEN SUBJECTED TO CYCLIC LOADING UP TO RATED LOAD

4 ALL PERFORMANCE PARAMETERS ARE MET WHEN SUBJECTED TO CYCLIC LOADING FROM 3 TO 33 HZ

3 TELESCOPING ACCELERATION WILL NOT EXCEED 10g WHEN SUBJECTED TO LOADS RECOMMENDED FOR UP TO RATED CAPACITY

2 THIS IS AN ACCELERATION SENSITIVE MECHANICAL SNUBBER WHICH DOES NOT CONTAIN NO FLUIDS AND HAS NO SEALS

1 ALL DIMENSIONS ARE NOMINAL EXCEPT THOSE WITH LIMITS INDICATED

NOTES

13 FINISHES
EXTERIOR ELECTRO PLATED ZINC AND DIFFUSED NICKEL CADMIUM PLATING

12 MISSING SCALE INDICATES EXTENSION IN INCHES

11 DESIGN NORMAL/OFFSET LOAD IS 120,000 LBS

10 BREAKAWAY FRICTION IS 1,200 LBS MAX

9 TOTAL TRAVEL IS 6.0 INCHES

8 PERFORMANCE IS UNAFFECTED BY PRESSURE OR AMBIENT TEMPERATURES FROM -20° TO +300°F

7 REGARDLESS OF LOAD OR ACCELERATION THIS DEVICE WILL NOT LOCK UP IT WILL ALWAYS PERMIT MOVEMENT IF THERE IS A SUSTAINED FORCE IN EXCESS OF THE BREAKAWAY FRICTION OF NOTE 10

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PACIFIC SCIENTIFIC
ANAHEIM, CA 92803

MECHANICAL SNUBBER

MODEL PSA 100 | 1801119-11

CQD File 006418

MAINTENANCE & SURVEILLANCE SCHEDULE

Project No.: 4536-32

Volume: EQ-CL056

CQD No.: 006418

Rev.00 Date: 6-18-83

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SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For MECHANICAL SNUBBERS PSA-1/4		Calc No.
X Safety-Related	Non-Safety-Related	Rev. / Date
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Client Illinois Power Company		Prepared by B.L. Jensen	Date 3-14-83
Project Clinton - 1		Reviewed by Vasudevan Pillai	Date 3/16/83
Proj. No. 4536-32	Equip No. SEE TAB D	Approved by	Date 6/18/83

MAINTENANCE & SURVEILLANCE SCHEDULE

1. Name: MECHANICAL SNUBBER
2. Model (Catalog Number): PSA-1/4
3. Manufacturer: PACIFIC SCIENTIFIC
4. Function: TO LIMIT PIPING MOVEMENTS DURING SEISMIC DISTURBANCES & LINE BREAKS
5. Weight: 5.6 lbs. 6. Dimensions: 2 1/4" DIA. X 13" long
7. Mounting: VERT. / HORIZ
8. Location: ALL (EXCEPT H-28)
9. Material & construction: Steel with grease applied to internals
10. Safety Design Parameters:

Temperature:	330°F	Pressure:	30 PSIG	Humidity:	ALL STEAM
Process fluid:	N/A	Range:	N/A	Accuracy:	N/A
Frequency:	N/A	Voltage:	N/A	Current:	N/A
Power:	N/A	Rating:	350 lbs; 512 lbs max.	Response time:	N/A
Switching:	N/A	Switch rating:	N/A	Qualified life:	40 YEARS

11. Component's material susceptible to aging conditions:

NONE

12. Component's material susceptible to radiation conditions:

NONE

Calc. No: CQD-006418
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SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For

Calc No

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Client	ILLINOIS POWER COMPANY	Prepared by	Date
Project	CLINTON POWER STATION UNIT 1	Reviewed by	Date
Proj No.	4536-32 Equip No.	Approved by	Date

13. MAINTENANCE & SURVEILLANCE REQUIREMENTS:

THESE MECHANICAL SNUBBERS ARE QUALIFIED FOR THE FORTY (40) YEAR LIFE OF THE PLANT AND DO NOT REQUIRE ANY ADDITIONAL MAINTENANCE AND SURVEILLANCE DUE TO ENVIRONMENTAL QUALIFICATION.

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SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For MECH. SNUBBERS - PSA-1/2 | Calc No.

X Safety-Related | Non-Safety-Related | Rev | Date | Page of

Client Illinois Power Company

Project Clinton - 1

Proj. No. 4536-32 Equip No. SEE TAB D

Prepared by BF Serang Date 3-14-83

Reviewed by Vaidyanathan Pillai Date 3/16/83

Approved by [signature] Date 6/18/83

MAINTENANCE & SURVEILLANCE SCHEDULE

1. Name: MECHANICAL SNUBBER
2. Model (Catalog Number): PSA-1/2
3. Manufacturer: PACIFIC SCIENTIFIC
4. Function: LIMIT PIPING MOVEMENT DURING A SEISMIC DISTURBANCE OR LINE BREAK
5. Weight: 4.7 # 6. Dimensions: 2 1/4" DIA. / 10" long
7. Mounting: HORIZ / VERT
8. Location: ALL BUILDINGS (Except ~~ZONE~~ H-28)
9. Material & construction: Steel with grease applied to internals
10. Safety Design Parameters:

Temperature: 330°F Pressure: 30 psig Humidity: All steam

Process fluid: N/A Range: N/A Accuracy: N/A

Frequency: N/A Voltage: N/A 650 lbs; 865 lbs (max) Current: N/A

Power: N/A Rating: Response time: N/A

Switching: N/A Switch rating: N/A Qualified life: 40 years

11. Component's material susceptible to aging conditions:

NONE

12. Component's material susceptible to radiation conditions:

NONE

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Form GO 308.1 Rev 2

SARGENT & LUNDY ENGINEERS CHICAGO

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Client	ILLINOIS POWER COMPANY	Prepared by	Date
Project	CLINTON POWER STATION UNIT 1	Reviewed by	Date
Proj No.	4536-32 Equip No.	Approved by	Date

13. MAINTENANCE & SURVEILLANCE REQUIREMENTS:

THESE MECHANICAL SNUBBERS ARE QUALIFIED FOR THE FORTY (40) YEARS LIFE OF THE PLANT AND DO NOT REQUIRE ANY ADDITIONAL MAINTENANCE AND SURVEILLANCE DUE TO ENVIRONMENTAL QUALIFICATION.

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SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For: MECH. SNUBBERS PSA-1

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Calc No.

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Client: Illinois Power Company

Project: Clinton - 1

Proj No: 4536-32 Equip No: SEE TAB D

Prepared by: BJ Seward Date: 3-14-83

Reviewed by: Varughese Dillan Date: 3/16/83

Approved by: [signature] Date: 6/18/83

MAINTENANCE & SURVEILLANCE SCHEDULE

1. Name: MECHANICAL SNUBBER
2. Model (Catalog Number): PSA-1
3. Manufacturer: PACIFIC SCIENTIFIC
4. Function: TO LIMIT PIPING MOTION DURING SEISMIC DISTURBANCE & LINE BREAK
5. Weight: 13 lbs. 6. Dimensions: 3.5 SQ. X 15" LONG
7. Mounting: VERT. / HORIZ.
8. Location: ALL BUILDINGS (EXCEPT ZONE H-28)
9. Material & construction: STEEL WITH GREASE APPLIED TO INTERNALS
10. Safety Design Parameters:

Temperature: 330°F Pressure: 30 PSIG Humidity: ALL STEAM

Process fluid: N/A Range: N/A Accuracy: N/A

Frequency: N/A Voltage: N/A Current: N/A

Power: N/A Rating: 2100 lbs (1500 lbs) max Response time: N/A

Switching: N/A Switch rating: N/A Qualified life: 40 years

11. Component's material susceptible to [illegible] conditions:

NONE

12. Component's material susceptible to radiation conditions:

NONE

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SARGENT & LUNDY ENGINEERS CHICAGO

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Client ILLINOIS POWER COMPANY	Prepared by / Date
Project CLINTON POWER STATION UNIT 1	Reviewed by / Date
Proj. No. 4536-32 Equip. No.	Approved by / Date

13. MAINTENANCE & SURVEILLANCE REQUIREMENTS:

THESE MECHANICAL SNUBBERS ARE QUALIFIED FOR THE FORTY (40) YEARS LIFE OF THE PLANT AND DO NOT REQUIRE ANY ADDITIONAL MAINTENANCE AND SURVEILLANCE DUE TO ENVIRONMENTAL QUALIFICATION.

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SARGENT & LUNDY ENGINEERS CHICAGO

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Client: Illinois Power Company	Prepared by: [signature]	Date: 3-14-83
Project: Clinton - 1	Reviewed by: [signature]	Date: 3/16/83
Proj. No.: 4536-32 Equip No: SEE TAB D	Approved by: [signature]	Date: 6/18/83

MAINTENANCE & SURVEILLANCE SCHEDULE

1. Name: MECHANICAL SNUBBER
2. Model (Catalog Number): PSA-3
3. Manufacturer: PACIFIC SCIENTIFIC
4. Function: TO LIMIT PIPING MOTION DURING SEISMIC DISTURBANCE & LINE BREAK
5. Weight: 36.4 LBS 6. Dimensions: 5.0" SQ. X 19.5" LONG
7. Mounting: VERT. / HORIZ.
8. Location: ALL BUILDINGS (EXCEPT ZONE H-28)
9. Material & construction: STEEL WITH GREASE APPLIED TO INTERNALS
10. Safety Design Parameters:

Temperature: 330°F Pressure: 30 PSIG Humidity: ALL STEAM

Process fluid: N/A Range: N/A Accuracy: N/A

Frequency: N/A Voltage: N/A Current: N/A

Power: N/A Rating: 10,380 LBS (6,000 LBS; Response time: N/A

Switching: N/A Switch rating: N/A Qualified life: 40 years

11. Component's material susceptible to aging conditions:

NONE

12. Component's material susceptible to radiation conditions:

NONE

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SARGENT & LUNDY ENGINEERS CHICAGO

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Client ILLINOIS POWER COMPANY

Project CLINTON POWER STATION UNIT 1

Proj. No. 4536-32 Equip No.

Prepared by Date

Reviewed by Date

Approved by Date

13. MAINTENANCE & SURVEILLANCE REQUIREMENTS:

THESE MECHANICAL SNUBBERS ARE QUALIFIED FOR THE FORTY (40) YEARS LIFE OF THE PLANT AND DO NOT REQUIRE ANY ADDITIONAL MAINTENANCE AND SURVEILLANCE DUE TO ENVIRONMENTAL QUALIFICATION.

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SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For: MECH. SNUBBERS PSA-10		Calc No.
X Safety-Related	Non-Safety-Related	Rev. / Date
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Client: Illinois Power Company	Prepared by: BS Sarver	Date: 5-16-83
Project: Clinton - 1	Reviewed by: Vijayakumar D. Vora	Date: 3/16/83
Proj No: 4536-32 Equip No: SEE TAB D	Approved by: [signature]	Date: 6/18/83

MAINTENANCE & SURVEILLANCE SCHEDULE

1. Name: MECHANICAL SNUBBER
2. Model (Catalog Number): PSA-10
3. Manufacturer: PACIFIC SCIENTIFIC
4. Function: TO LIMIT PIPING MOTION DURING SEISMIC DISTURBANCE & LINE BREAK
5. Weight: 65.4 lbs 6. Dimensions: 5.75" SQ. X 23.2" LONG
7. Mounting: VERT. / HORIZ.
8. Location: ALL BUILDINGS (EXCEPT ZONE H-28)
9. Material & construction: STEEL WITH GREASE APPLIED TO INTERNALS
10. Safety Design Parameters:

Temperature: 330°F Pressure: 30 PSIG Humidity: ALL STEAM

Process fluid: N/A Range: N/A Accuracy: N/A

Frequency: N/A Voltage: N/A Current: N/A

Power: N/A Rating: 22,100 lbs (15,000 lbs) Response time: N/A

Switching: N/A Switch rating: N/A Qualified life: 40 years

11. Component's material susceptible to aging conditions:

NONE

12. Component's material susceptible to radiation conditions:

NONE

Calc. No: CQD 006418
Rev: 00 Date: 6-18-83
Proj. No: 4536-32
Page E10 of E15

SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For		Calc No.
		Rev. / Date
X Safety-Related	Non-Safety-Related	Page of

Client	ILLINOIS POWER COMPANY	Prepared by	Date
Project	CLINTON POWER STATION UNIT 1	Reviewed by	Date
Proj No.	4536-32 Equip No.	Approved by	Date

13. MAINTENANCE & SURVEILLANCE REQUIREMENTS:

THESE MECHANICAL SNUBBERS ARE QUALIFIED FOR THE FORTY (40) YEARS LIFE OF THE PLANT AND DO NOT REQUIRE ANY ADDITIONAL MAINTENANCE AND SURVEILLANCE DUE TO ENVIRONMENTAL QUALIFICATION.

Calc. No: CQD-006418
Rev: 00 Date: 6-18-83
Proj. No: 4536-32
Page E11 of E15

Form 00301 Rev. 2

SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For: MECH. SNUBBER PSA-35		Calc No.
X Safety-Related	Non-Safety-Related	Rev. / Date
		Page / of

Client: Illinois Power Company	Prepared by: [signature]	Date: 3-14-83
Project: Clinton - 1	Reviewed by: [signature]	Date: 3/16/83
Proj. No: 4536-32 Equip No: SEE TAB D	Approved by: [signature]	Date: 6/18/83

MAINTENANCE & SURVEILLANCE SCHEDULE

1. Name: MECHANICAL SNUBBER
2. Model (Catalog Number): PSA-35
3. Manufacturer: PACIFIC SCIENTIFIC
4. Function: TO LIMIT PIPING MOTION DURING SEISMIC DISTURBANCE & LINE BREAK
5. Weight: 185 lbs 6. Dimensions: 6" SQ. X 30" LONG
7. Mounting: VERT. / HORIZ.
8. Location: ALL BUILDINGS (EXCEPT H-28)
9. Material & construction: STEEL WITH GREASE APPLIED TO INTERNALS
10. Safety Design Parameters:

Temperature: 330°F Pressure: 30 PSIG Humidity: ALL STEAM

Process fluid: N/A Range: N/A Accuracy: N/A

Frequency: N/A Voltage: N/A Current: N/A

Power: N/A Rating: 72,450 lbs (50,000 lbs. max.) Response time: N/A

Switching: N/A Switch rating: N/A Qualified life: 40 years

11. Component's material susceptible to aging conditions:

NONE

12. Component's material susceptible to radiation conditions:

NONE

Calc. No: CQD-0064-15
Rev: 00 Date: 6-18-83
Proj. No: 4536-32
Page E-12 of E-15

Form GO 308.1 Rev. 2

SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For		Calc No
		Rev / Date
X Safety-Related	Non-Safety-Related	Page of

Client	ILLINOIS POWER COMPANY	Prepared by	Date
Project	CLINTON POWER STATION UNIT 1	Reviewed by	Date
Proj No	4536-32 Equip No.	Approved by	Date

13. MAINTENANCE & SURVEILLANCE REQUIREMENTS:

THESE MECHANICAL SNUBBERS ARE QUALIFIED FOR THE FORTY (40) YEARS LIFE OF THE PLANT AND DO NOT REQUIRE ANY ADDITIONAL MAINTENANCE AND SURVEILLANCE DUE TO ENVIRONMENTAL QUALIFICATION.

Calc. No. CQD 006418
Rev: 00 Date: 6-18-83
Proj. No: 4536-32
Page E13 of E15

Form 00308 Rev. 2

SARGENT & LUNDY ENGINEERS CHICAGO

Calcs For MECH. SNUBBER PSA-100

X Safety-Related | Non-Safety-Related

Calc No.

Rev. | Date

Page of

Client Illinois Power Company

Project Clinton - 1

Proj. No. 4536-32 Equip No SEE TAB D

Prepared by B. Serrano Date 3-16-83

Reviewed by Vasupalavara Pillai Date 3/16/83

Approved by [signature] Date 6/15/83

MAINTENANCE & SURVEILLANCE SCHEDULE

1. Name: MECHANICAL SNUBBER
2. Model (Catalog Number): PSA-100
3. Manufacturer: PACIFIC SCIENTIFIC
4. Function: TO LIMIT PIPING MOTION DURING SEISMIC DISTURBANCE & LINE BREAK
5. Weight: 475 lbs 6. Dimensions: 7.5" SQ. X 35" LONG
7. Mounting: VERT. / HORIZ.
8. Location: ALL BUILDINGS (EXCEPT ZONE H-28)
9. Material & construction: STEEL WITH GREASE APPLIED TO INTERNALS
10. Safety Design Parameters:

Temperature: 330°F Pressure: 30 PSIG Humidity: ALL STEAM

Process fluid: N/A Range: N/A Accuracy: N/A

Frequency: N/A Voltage: N/A Current: N/A

Power: N/A Rating: 160,000 lbs (120,000 lbs max) Response time: N/A

Switching: N/A Switch rating: N/A Qualified life: 40 years

11. Component's material susceptible to aging conditions:

NONE

12. Component's material susceptible to radiation conditions:

NONE

Calc. No: COD. C0614B
Rev: 00 Date: 6-18-83
Proj. No: 4536-32
Page E14 of E15

Form GO 3081 Rev 2

SARGENT & LUNDY ENGINEERS CHICAGO

Calc. For		Calc. No.
		Rev. / Date
X Safety-Related	Non-Safety-Related	Page of

Client	ILLINOIS POWER COMPANY	Prepared by	Date
Project	CLINTON POWER STATION UNIT 1	Reviewed by	Date
Proj. No.	4536-32 Equip. No.	Approved by	Date

13. MAINTENANCE & SURVEILLANCE REQUIREMENTS:

THESE MECHANICAL SNUBBERS ARE QUALIFIED FOR THE FORTY (40) YEARS LIFE OF THE PLANT AND DO NOT REQUIRE ANY ADDITIONAL MAINTENANCE AND SURVEILLANCE DUE TO ENVIRONMENTAL QUALIFICATION.

Calc. No: CQD-006412
Rev: 00 Date: 6-18-83
Proj. No: 4536-32
Page E15 of E15

Form 00300-1 Rev. 2

006418

QUALIFICATION DOCUMENTS

Project No.: 4536-32

Volume: EQ-CL056

CQD No.: 006418

Rev. 04 Date: 9-10-84

JAD

NAVCO BASIC ENGINEERS

NATIONAL VALVE AND MANUFACTURING COMPANY
BASIC ENGINEERS

BOX 100, PITTSBURGH, PA. 15230 • PHONE 412-963-8605 • TWX 710-664-2024
701 ALPHA DRIVE, RIDC INDUSTRIAL PARK, O'HARA TOWNSHIP

March 2, 1982

CQD FILE 006418

Sargent & Lundy Engineers
55 East Monroe Street
Chicago, IL 60603

Attention: Mr. J. A. Dudeck
Senior Quality Control Coordinator

Subject: Clinton Power Station - Unit #1
Component Supports
S & L Spec. No. K-2884

Reference: "Status 4" of Pacific Scientific Documents TR 807 thru 812 & 814 with Addendums A and J. A. Dudeck's Letter of 1-26-82.

Gentlemen:

In response to your comments the following are being submitted for your acceptance;

A. Radiation effects - the only non-metalic item in the Pacific Scientific Snubber is the lubricants. Test Data Tables I, III, II & V are enclosed (2 copies).

B. All models being provided have been tested. i.e. PSA-1/4, 1/2, 1, 3, 10, 35 & 100.

C. K-2884 requires a load test under dynamic cyclic loading in paragraph 302.3C2. The Qualification Test Reports previously submitted include load cycling at 100%, 75% & 50% of rated load at frequencies of 3, 6, 9 & 12 Hz at 30 seconds at each step. Plus, 100% rated load at 15-33 Hz. These test were with all internal parts in tack.

D. Testing of environmental parameters of Table 305-1 - enclosed are 2 copies of the following Qualification Tests:

TR 839	Dated 12 Dec. 1979
TR 840	Dated 12 Dec. 1979
TR 841	Dated 21 Jan. 1980
TR 842	Dated 22 Jan. 1980
TR 843	Dated 25 Jan. 1980
TR 845	Dated 7 Feb. 1980
TR 846	Dated 12 May 1980

SARGENT & LUNDY ENGINEERS
COMPONENT QUALIFICATION DIVISION
FOREIGN DOCUMENT REVIEW STATUS
Spec. No. ... P.O. ...
... NO COMMENTS
... REVIEWED & ACCEPTED
... Date ...
... SHOWN DOES NOT RELIEVE CONTRACTOR ... OBLIGATIONS UNDER THE CONTRACT

TABLE I

Summary of

Nuclear Radiation-Resistant Lubricants

Product	Operating Range,[a] °F.	Radiation Dose Limit, 10^8 Rads	Product Description	Performance Test Data In	Recommended Use
Nuclear Radiation-Resistant Greases					
NRRG-159	-10 to 325	30	Premium synthetic oil, sodium amate gelling agent, selenide oxidation inhibitor.	Tables II, III	Antifriction bearings up to 10,000 rpm, motors, pumps, accessories; has actually withstood more than 30 x 10^8 rads in ball bearings operating inside a nuclear reactor.
NRRG-235	0 to 200	50	Synthetic aromatic oil, silica gelling agent, and selenide oxidation inhibitor. Also contains graphite and molybdenum disulfide as "residual lubricants."	Table IV	Low speed, high load sliding surfaces; screw mechanisms; provides residual lubrication in remote machinery, e.g., remote valves.
NRRG-300	0 to 200	50	Synthetic aromatic oils, silica gelling agent, selenide inhibitor (is base grease for NRRG-235).	Table IV	Antifriction bearings up to 6000 rpm; valve activating and screw mechanisms.
NRRG-335	0 to 250	50	Synthetic aromatic oil, sodium amate gelling agent, and selenide oxidation inhibitor (is base grease for NRRG-116).	Table V	Antifriction bearings up to 10,000 rpm; valve activating and screw mechanisms.
[redacted]					
NRRG-509	0 to 200	50	A soft (ASTM worked penetration 360 to 380) version of NRRG-335 containing molybdenum disulfide.	Table V	Special product for an enclosed gear train; developed for W.K.J. Barnes Co., Rockford, Ill., and used at Hanford.
Chevron Industrial Grease (Heavy)	-10 to 325	10	Paraffinic mineral oil, sodium amate gelling agent, oxidation and rust inhibited.	Table VI	Antifriction bearings up to 10,000 rpm; motors, pumps, accessories; excellent work stability.
Chevron ONT Grease	-10 to 325	5	Paraffinic mineral oil, sodium soap gelling agent, selenide inhibited.	Table VI	Antifriction bearings up to 10,000 rpm; motors, pumps, accessories.
Nuclear Radiation-Resistant Oils					
NRRO-216	+20 to 600	30	Premium synthetic aromatic oil, stable polymer, selenide inhibitor.	Table VII	Hydraulic fluid in high temperature, 2000 psi systems.
NRRO-230	+20 to 500	30	Premium synthetic aromatic oil, selenide inhibitor.	Table VIII	Jet engines and associated gears, bearings, screw-thread activators, and control mechanisms.
NRRO-358	+20 to 225	50	41 SSU at 210	Tables IX, X	Hydraulic pumps and accessory equipment; gear trains; control mechanisms.
NRRO-359	+20 to 225	50	57 SSU at 210		
NRRO-360	+20 to 225	50	86 SSU at 210		
			Low viscosity aromatic oil plus selected polymers (some scission and some crosslink) to provide a "constant viscosity" effect; selenide inhibited.		
Chevron OC Turbine Oil	+20 to 225	0.5	Various viscosity grades, blends of solvent-refined naphthenic mineral oils, oxidation inhibited.	Table XI Figure 1	Industrial steam turbines and related uses; general purpose oil lubrication; MIL-L-17331 qualified.

[a] In air; can be extended in inert atmosphere.

RC 631435

TABLE II

Test Data on NRRG-159 Grease

Radiation Dose, 10^8 Rads	0			7		
ASTM Penetration						
Worked 60 Strokes	261			330		
Worked 100,000 strokes	325			307		
ASTM Drop Point, °F.	500+			500+		
Oxygen Bomb						
Copper Corrosion, 100 Hr. at 212°F.	Slight Stain			Slight Stain		
Oxidation, 100 Hr. at 210°F., psi Drop	9			24		
Water Resistance, % Grease Loss	0			0		
Evaporation, %						
22 Hr. at 300°F.	1.7			3.1		
22 Hr. at 400°F.	21			18.5		
Apparent Viscosity, poises						
0°F. at 12 Sec-1	7000			2600		
0°F. at 20 Sec-1	5000			2000		
Low Temperature Torque						
Temperature, °F.	-65	0	40	-65	0	40
Starting Torque, g-cm	-	2767	554	-	1106	554
Running Torque, g-cm	-	553	185	10,325	369	344
Navy Gear Wear Test, Wt. Loss of Brass Gear						
5 Lb. Load, mg/1000 Cycles	2.0			1.8		
10 Lb. Load, mg/1000 Cycles	5.7			5.0		
Bearing Performance						
10,000 rpm, Hr. at 300°F.	1577	634	-	306	265	-
10,000 rpm, Hr. at 350°F.	279	188	400	195	196	-

TABLE III

In-pile Tests[a] on NRRG-159

Motor No.	Time in Materials Testing Reactor, Hours[b]		Radiation Dose,[b] 10^8 Rads
	Total	Irradiated	
31182[c]	1432	1049	13.7
31183[c]	1432	1049	13.7
31181	3470	2594	34

a. Test conditions: 0.3-horsepower motor in vertical position rotated at 6500 rpm; bearings were about 0.6-inch bore and outside diameter of 1.25 inches; bearing balls and races were M-2 high-speed tool steel with silver-plated separators; bearings were unshielded and were preloaded to 6 pounds; helium atmosphere.

b. 1000 Hours represent incident radiation of 13.5×10^8 rads plus 3.2×10^{18} thermal neutrons/sq. cm, plus 0.64×10^{16} fast neutrons/sq. cm; this roughly corresponds to 12.9×10^8 rads, ignoring thermal neutrons.

c. No failure.

TABLE V

Test Data on NRRG-335[a]

Dose, 10^8 Rads	NRRG-335[a]				
	0	3.8	8.9	26.2	30.0
ASTM Penetration					
Unworked	276	257	238	246	221
Worked 60 Strokes	289	289	308	400	359
ASTM Drop Point, °F.	500+	500+	500+	500+	500+
Bearing Performance in					
Size 204 K Ball Bearings, Hr. to Failure					
10,000 rpm, 250°F.	763, 644				
10,000 rpm, 300°F.	220	154	155	-	39

a) NRRG-336 contains both molybdenum disulfide and graphite; NRRG-335 contains neither additive. NRRG-509 contains only molybdenum disulfide and has an ASTM penetration in the range 360 to 380; the radiation stability of these three products should be similar although their performance characteristics are different.

If you have any questions and or comments, please do not hesitate to contact the writer.

Very truly yours,

Paul G. Scholar

Paul G. Scholar
Assistant Manager of Engineering

PGS/dgl

cc: D. K. Schopfer (1/1)
C. E. Moschella (1/0)
J. Kwasneski (1/0)
Clinton Letter File (1/0)

Kin-Tech Division

PACIFIC SCIENTIFIC

7 January 1983

Sargent & Lundy Engineers
55 E Monroe
Chicago, Ill. 60626

QUALITY 00648

Attention: Mr. Benny Serrano
30th Floor

Subject: Lubrication of Pacific Scientific Shock Arrestors

Gentlemen:

Confirming our discussion of 23 December 1982 our shock arrestors are lubricated with NRRG 159 or NRRG 335. These are radiation resistant greases manufactured by Chevron USA Inc.

When used in our shock arrestors it will not degrade the shock arrestor performance when subjected to 3×10^9 rads neutron accumulation.

Our snubbers containing this lubrication have also been tested at 392°F without signs of degradated performance.

If you require further clarification on this subject, please contact us.

Respectfully yours,

PACIFIC SCIENTIFIC
Kin-Tech Division

Floyd Fredrickson

Floyd Fredrickson
District Application Manager

FF:dnw

cc: J. Dowdy
V. Hammatt
B. Kanetzke

1346 S. State College Boulevard, Anaheim, California 92803, (714) 774-5217, TELEX 65-5421

Kin-Tech Division

PACIFIC SCIENTIFIC

28 January 1983

00648

Sargent & Lundy Engineers
55 E. Monroe
Chicago, Illinois 60626

Attention: Mr. Benny Serrano
30th Floor

Subject: Lubrication of Pacific Scientific Shock Arrestors

Reference: My Letter of 7 January 1983

Gentlemen:

Confirming our conversation of 27 January 1983 and further to the referenced letter, please be advised that our shock arrestors will function without lubrication. This has been confirmed by test. The only negative effect is an increase in the "break away" friction force.

If you have further questions on this matter, please contact us.

Respectfully,

PACIFIC SCIENTIFIC
Kin-Tech Division

F. Fredrickson

Floyd Fredrickson
District Application Engineer

FF:d-w

cc: V. Hammatt
J. Dowdy
B. Kanetkze

1346 S. State College Boulevard, Anaheim, California 92803, (714) 774-5217, TELEX 65-5421

REPORT NO TR 841

DATE 21 January 1980

CQD FILE_ 006418

1801102-05 PSA 1

QUALIFICATION TESTING

BERGEN PATTERSON

C. F. BRAUN SPECIFICATION 400-20

TVA "STRIDE"

FROM

PACIFIC SCIENTIFIC

KIN-TECH DIVISION

SARGENT & LUNDY

COMPONENT QUALIFICATION DIVISION

FOR [illegible] UNIT

R[illegible]

Spec No. K-2884 4536-32

File No. CQD-006418

REVIEWED & ACCEPTED

FOR EQ ONLY

By [signature] for BLSerrano Date 6/18/83

ACTION SHOWN DOES NOT RELIEVE CONTRACTOR FROM HIS OBLIGATIONS UNDER THE CONTRACT.

PREPARED BY

R. F. Whitney

Test Engineer

APPROVED BY

J. E. Glayser

Director of Engineering

W. S. Wright, Jr.

Chief Development Engineer

P. A. Hadnagy

Quality Control Manager

REV	DATE	BY	APPD BY	PAGES AFFECTED	
A	3/18/80	[signature]	WSW	7, Appendix 2	typographical

TABLE OF CONTENTS

ADMINISTRATIVE DATA

PURPOSE OF TEST

To determine the ability of the 1801102-05 Shock Arrestor to meet the Qualification Test requirements.

MANUFACTURER

PACIFIC SCIENTIFIC COMPANY, KIN-TECH DIVISION. 1346 S. State College Boulevard, Anaheim, California.

MANUFACTURER'S TYPE OR MODEL NO.

P/N 1801102-05 MODEL PSA 1

APPLICABLE DOCUMENTS

C. F. Braun Specification 400-20 Rev. 5
PSCo Drawing 1801101-05
PSCo Qualification Test Procedure DR 1506 Rev. 3
PSCo Acceptance Test Procedure I.T. 519 Rev. F

QUANTITY OF ITEMS TESTED

Two (2) P/N 1801102-05 Shock Arrestors S/N 7707 and 7708 were used for the test program. They were selected at random from a production lot. The test units were built in accordance with ASME Boiler and Pressure Vessel Code Section III, Subsection NF. Summer 1977 Agenda and Code Case 1644-5. Each of the test units were subjected to all of the required tests.

TEST COMPLETION DATE

19 November 1979

TEST CONDUCTED BY

PACIFIC SCIENTIFIC COMPANY, KIN-TECH DIVISION, ANAHEIM, CALIFORNIA

SECURITY CLASSIFICATION OF ITEMS

Unclassified

PACIFIC SCIENTIFIC • KIN-TECH DIVISION
1346 S. State College Blvd. Anaheim, Ca. 92803 (714) 774-5217

EQUIPMENT LIST

TEST	EQUIPMENT	TOLERANCE	CALIBRATION DATE	CALIBRATION PERIOD
Dimensional Examination	Standard Micrometers Height Gages, etc.	(Data on file in Quality Control Dept.)		
Breakaway Friction Force & Lost Motion	1801 HF-1 Holding Fixture Spring Scale Dial Indicator - .001/Div.	± 1 lb. ± 1/2 div.	5/21/79 5/21/79	6 months 6 months
Acceleration/Load	1801 - TF-2 Fixture Meylan Digital Timer M/112	± .01 Sec.	6/24/79	3 months
Dynamic Load	M-B Electronic Vibrator Model C10E Ormond Load Cell Model L-25-6K, S/N 1131	± 0.5%	6/19/79	12 months
	Tektronix Oscilloscope	± 1%	--	Daily
	C. L. Collins Linear Motion Transducer Model LMT 12911, S/N 19447	± 1%	--	Daily
	Omega Digital Thermometer Model 2175A With Thermocouple	± 1%	9/5/79	12 mths.
Abnormal Environment	B.T.C. Steam Chamber 0-100 PSI Pressure Gage	± 1%	10/5/79	3 months
	Omega Digital Thermometer Model 2175A With Thermocouple	± 1%	9/5/79	12 months

CERTIFICATION

I, the undersigned, being a registered Professional Engineer in the State of California, competent in the testing and evaluation of Mechanical Shock Arrestors, certify that this report truly and accurately presents results of tests performed in accordance with the approved test procedures.

Certified by R. F. Whitney

Quality Engineer
State of California
Registration No. 1919
Date 1-21-1983

TESTING

1.0 Acceptance Tests

1.1 Requirements

The test units were examined and tested to the requirements of I.T. 519, enclosure 1. Photograph 1 identifies the test units. Photograph 2 shows the breakaway friction test stand. Photograph 3 shows the acceleration test fixture. The breakaway friction must not exceed 15 lbs. and the snubber must limit the acceleration to .02 g maximum (.51 seconds for 1 inch travel). The calculations are as follows:

$$a = \frac{2S}{386t^2} = + \frac{2 \times 1}{386 \times (.51)^2} = .02\ G$$

1.2 Procedure

1.2.1 Breakaway Friction

The breakaway friction was measured with the unit extending and retracting. The measurements were made at mid position and approximately 1/2 inch away from the fully retracted and fully extended position.

1.2.2 Acceleration

A constant load was applied to the snubber and the time required for the unit to travel 1 inch was recorded. The test was made with tension and compression loads.

1.3 Results

Both snubbers met the requirements.

S/N	Friction-Lbs. (15 lbs. max.)	Acceleration (0.51 sec. min.)	
		Ext.	Retr.
7707	5.0 lbs.	0.71 sec.	0.69 sec.
7708	6.5 lbs.	0.62	0.61

Refer to Appendix 1 for actual data sheets I.T. 519, Page 5.

2.0 Dynamic Load Cycling, Room Temperature

2.1 Requirements

Rated load (1500lbs.) shall be applied for ten seconds at each step in both tension and compression between 3 and 33 Hz in 5 Hz steps. The lost motion during dynamic cycling shall not exceed .040 inch. The unit spring rate shall be calculated from the load/deflection photographs between 8 and 18 Hz. The average value shall be equal to (A) or greater than 111×10^3 lbs./inch less 10%.

$$\text{Spring Rate} = \frac{\text{Full Rated Load (peak to peak)}}{\text{Total deflection less lost motion}}$$

2.2 Procedure

The snubber was installed in an MTS load cycling machine and positioned to approximately mid-position of travel. A linear motion transducer was installed to measure unit travel or displacement. A load cell was in line with the unit centerline to measure axial load. Refer to set-up in Photograph 4. The displacement and axial load were monitored on an oscilloscope with the displacement on the vertical axis and the load on the horizontal axis. Refer to the photographs on pages 11 thru 14. The input motion was a displacement that varied as a sine wave which resulted in a load being developed in both tension and compression. Rated load was applied for 10 seconds at each of the seven frequency steps.

2.3 Results

The unit met the requirements, except for Spring Rate which was 99.5 & 98.8 x 10^3 Lbs/Inch (99.9 required). Refer to oscilloscope photos and Appendix 2.

Data Summary

S/N	Lost Motion - Inches (.040 inch max.)	Spring Rate Lbs/Inch (99.9 X 10^3 Lbs/Inch Min.)
7707	.020	99.5 x 10^3
7708	.010	98.8 x 10^3

3.0 Abnormal Ambient Environment

3.1 Requirements

The shock arrestors at room ambient condition shall be placed in a chamber capable of maintaining pressure and temperature. The chamber conditions shall then be adjusted to the Phase I Condition and then allowed to decay gradually through Phase II, III and IV as outlined.

(1) Phase I: 330F, (-)2 to (+)15 psig, all steam for 3 hours
330F, (+)30 psig, all steam for 45 seconds

(2) Phase II: 310F, (-)2 to (+)15 psig, all steam for 6 hours

(3) Phase III: 250F, 0 to 15 psig, 100 percent relative humidity (RH) for 24 hours

(4) Phase IV: 250F to 100F, 0 to 15 psig, 100 percent relative humidity for 1 day (24 hours)

Following the steam test the unit shall be stabilized at 200°F and subjected to the breakaway friction and acceleration test.

3.2 Procedure

The PSA 1 snubbers were placed in the Steam Chamber with units of other sizes. Refer to photograph 5. The chamber was sealed and a quantity of water was introduced into the chamber. Heat was applied to the chamber and the temperature was monitored with a thermocouple. The chamber conditions were adjusted to 330°F and + 15 psig (Phase I). The air was vented from the chamber which resulted in the units being subjected to "all steam". The temperature was maintained at 330°F minimum and the pressure was allowed to vary between 0 and 15 psig. The superheated steam condition was obtained by draining water from the chamber in order to keep the pressure from increasing above 15 psig. A log was maintained of the temperature and pressure. Refer to pages 19 and 20.

After 3 hours the pressure was increased to 30 psig for 45 seconds by adding more water, and then reduced to the condition of Phase II and maintained for 6 hours.

The temperature was then allowed to drop to 250°F and the pressure was maintained between 0 and 15 psig, Phase III. After 24 hours the cham-

ber temperature was adjusted to between 250°F and 100°F while maintaining the pressure between 0 and 15 psig. (Phase IV). These conditions were held for another 24 hour period. The chamber was then opened and the units were visually examined. The snubbers were stabilized at 200°F for 2 hours and then subjected to the breakaway friction and acceleration tests.

3.3 Results

The exterior of the units displayed a darkening in color, but there was no base metal corrosion. The friction and acceleration values were met at 200°F.

S/N	Friction - lbs. (15 lbs. max.)	Acceleration (0.51 sec. min.)	
		Ext.	Retr.
7707	12.0 lbs.	0.83	0.79
7708	11.0 lbs.	0.68	0.67

4.0 Dynamic Load Cycling at 200°F

4.1 Requirements

Same as Paragraph 2.1 except the unit shall be at 200°F. (10 seconds at each step, between 3 and 33 Hz in 5 Hz steps.)

4.2 Procedure

Same as Paragraph 2.2 except the unit shall be stabilized at 200°F for 2 hours before load cycling. A temperature chamber was placed around the snubber which was installed in the load cycling fixture. Refer to Photograph 6.

4.3 Results

The unit met the requirements. Refer to Pages 15 thru 18 for the load cycling photographs. The maximum lost motion during cycling was:

S/N 7707 .020 inch (8 Hz)
S/N 7708 .012 inch (7 Hz)

5.0 Additional Load Cycling, Room Temperature

5.1 Requirements

A total of 5,000 cycles is required for each snubber. All cycles applied during testing of Paragraph 2.0 and 4.0 shall be subtracted from 5,000

and the remaining cycles shall be run at room temperature at rated load and at 3 Hz.

5.2 Procedure

The procedure details were the same as Paragraph 2.2, except all cycles were applied at 3 Hz. The cycles were run as follows:

		Cycles	
Frequency	Temperature	S/N 7707	S/N 7708
3 - 33 Hz	75°F	1960	1705
3 - 33	200	1260	1350
3	75	1780	1945
	TOTAL	5000 Cy	5000 Cy

5.3 Results

There was no failure. Each snubber was in good condition after the test.

6.0 Summary and Conclusion

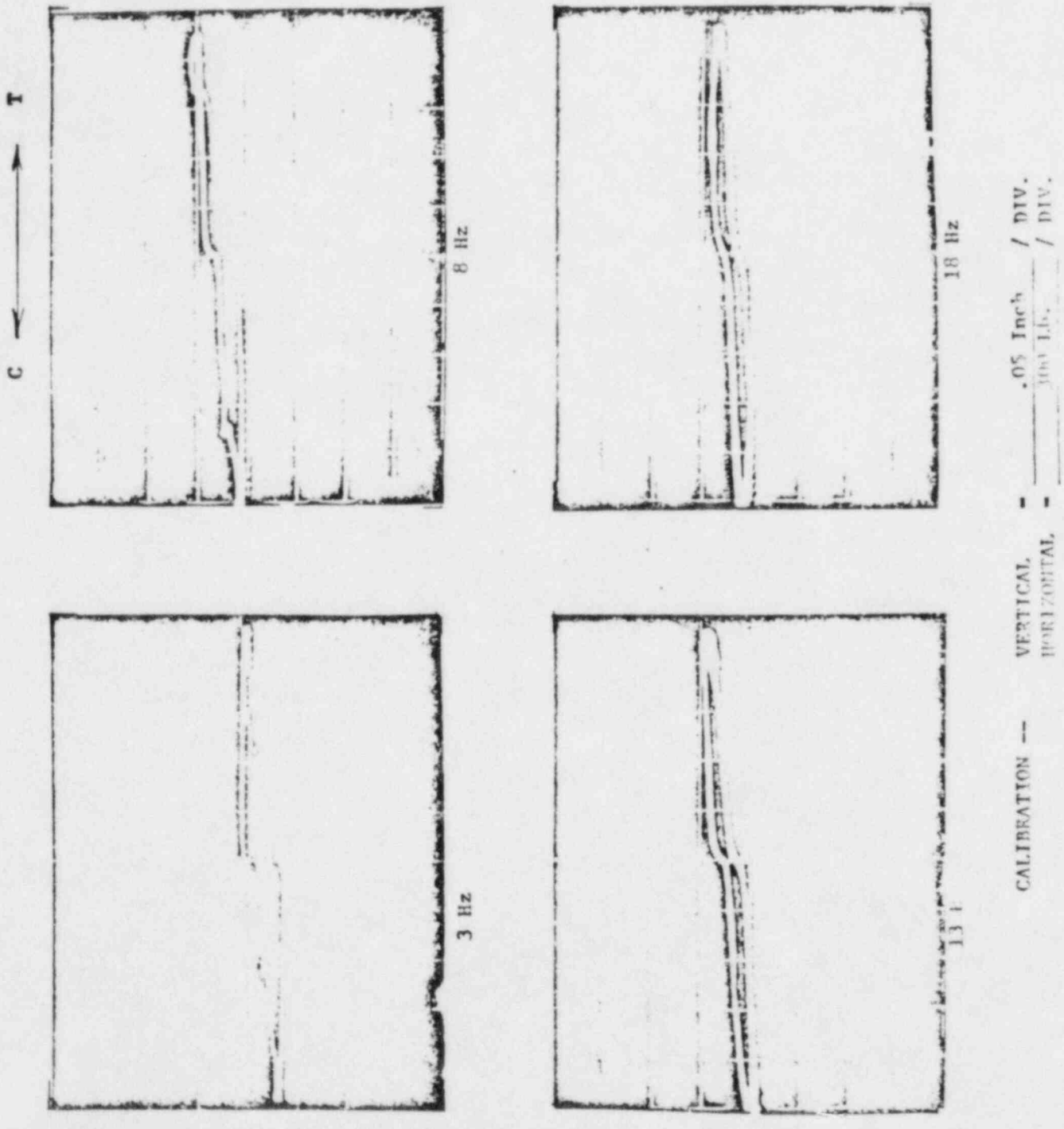
The shock arrestors met all requirements of the test program except for Spring Rate which was 99.5 & 99.8 x 10^3 Lbs/Inch (99.9 Required). There was no failure or damage to the units.

	S/N 7707	S/N 7708
1. Lost Motion .040 inch-max.	.020 Inch	.012 Inch
2. Breakaway Friction (15 lbs. max.)	12.0 lbs.	11.0 lbs.
Acceleration Test 0.51 sec.-min.	0.69 sec.	0.61 sec.
3. Dynamic Test Response	(Refer to load-displacement photographs)	
4. Spring Constants $(111 \times 10^3) - (1.1 \times 10^3)$ = 99.9 x 10^3 lbs/inch	99.5 x 10^3 lbs/in.	98.8 x 10^3 lbs/in.

P/N 1801102-05 S/N 7707 REPORT NO. TR 841

DATE 11-5-79 PSA - 1 PAGE 11 OF 20

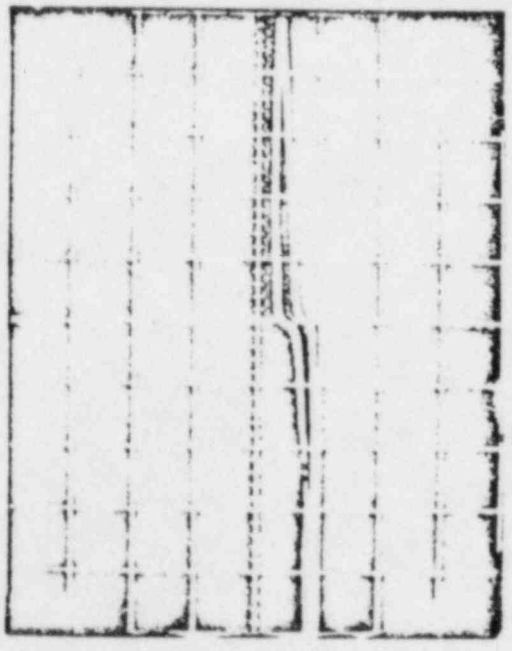
75°F

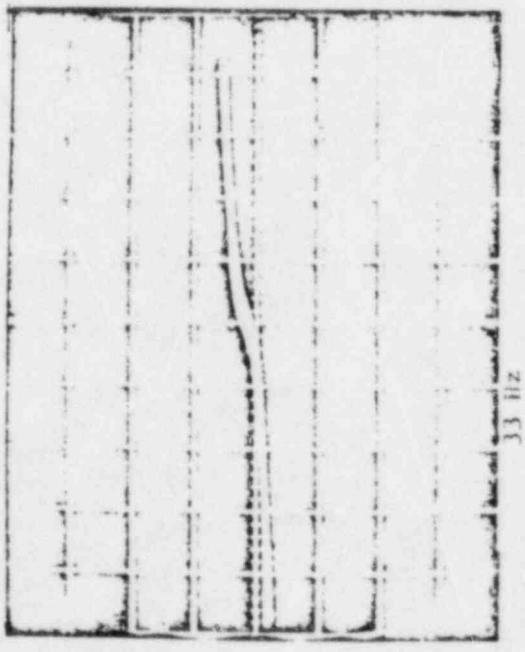


P/N 1801102-05 S/N 7707 REPORT NO. TR 841

DATE 11-5-79 PSA - 1 PAGE 12 OF 20

75°F





CALIBRATION -- VERTICAL = .05 Inch / DIV.

HORIZONTAL = 300 Lb. / DIV.

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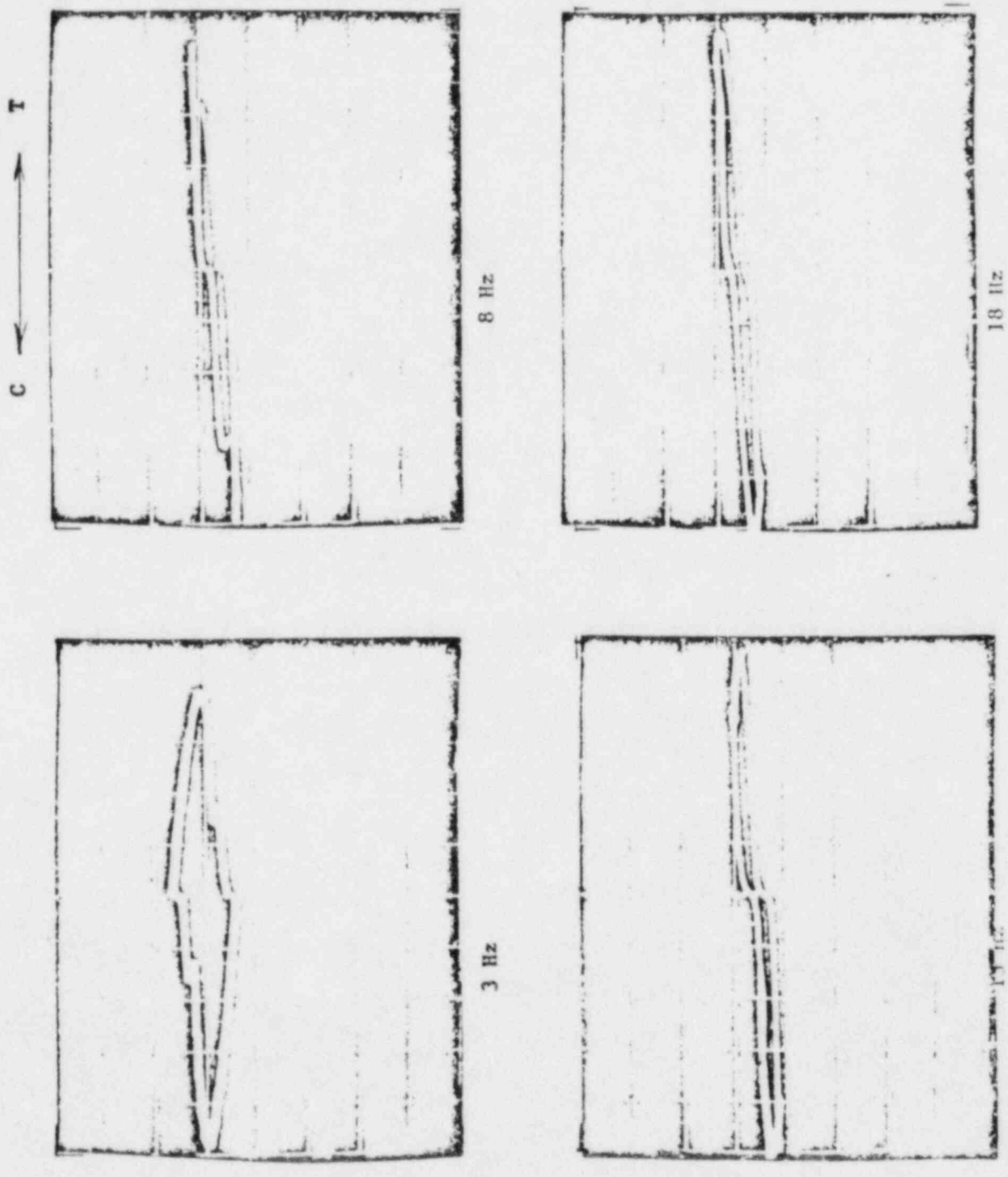
P/N 1801102-05 S/N 7708 REPORT NO TR 841

DATE 11-6-79 PSA - 1 PAGE 13 OF 20

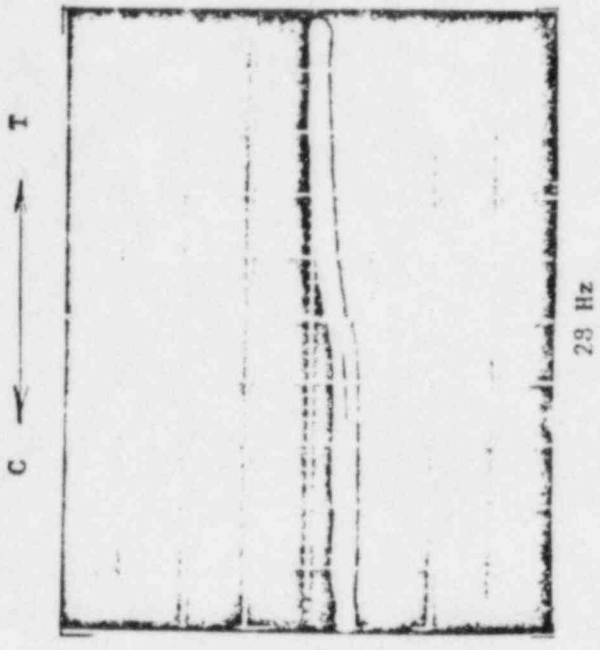
75°F

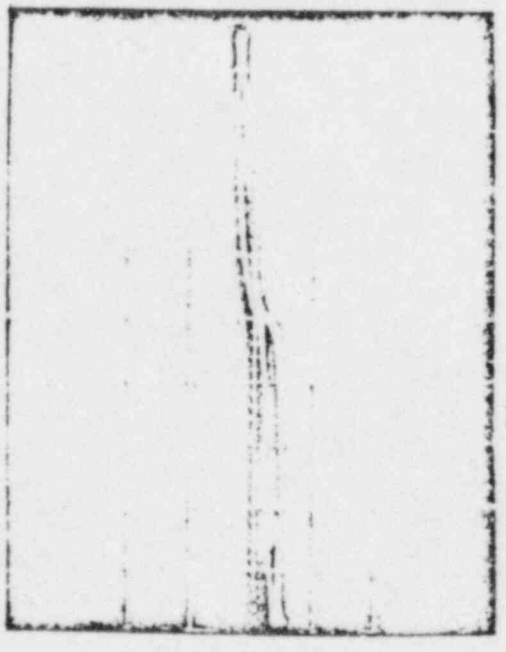


P/N 1801102-05 S/N 7708 REPORT NO. TR 841

DATE 11-6-79 PSA - 1 PAGE 14 OF 20

75°F





CALIBRATION -- VERTICAL = .05 Inch / DIV.

HORIZONTAL = 100 Hz. / DIV.

P/N 1801102-05 S/N 7707

DATE 11-16-79

PSA - 1

200°F

REPORT NO. TR 641

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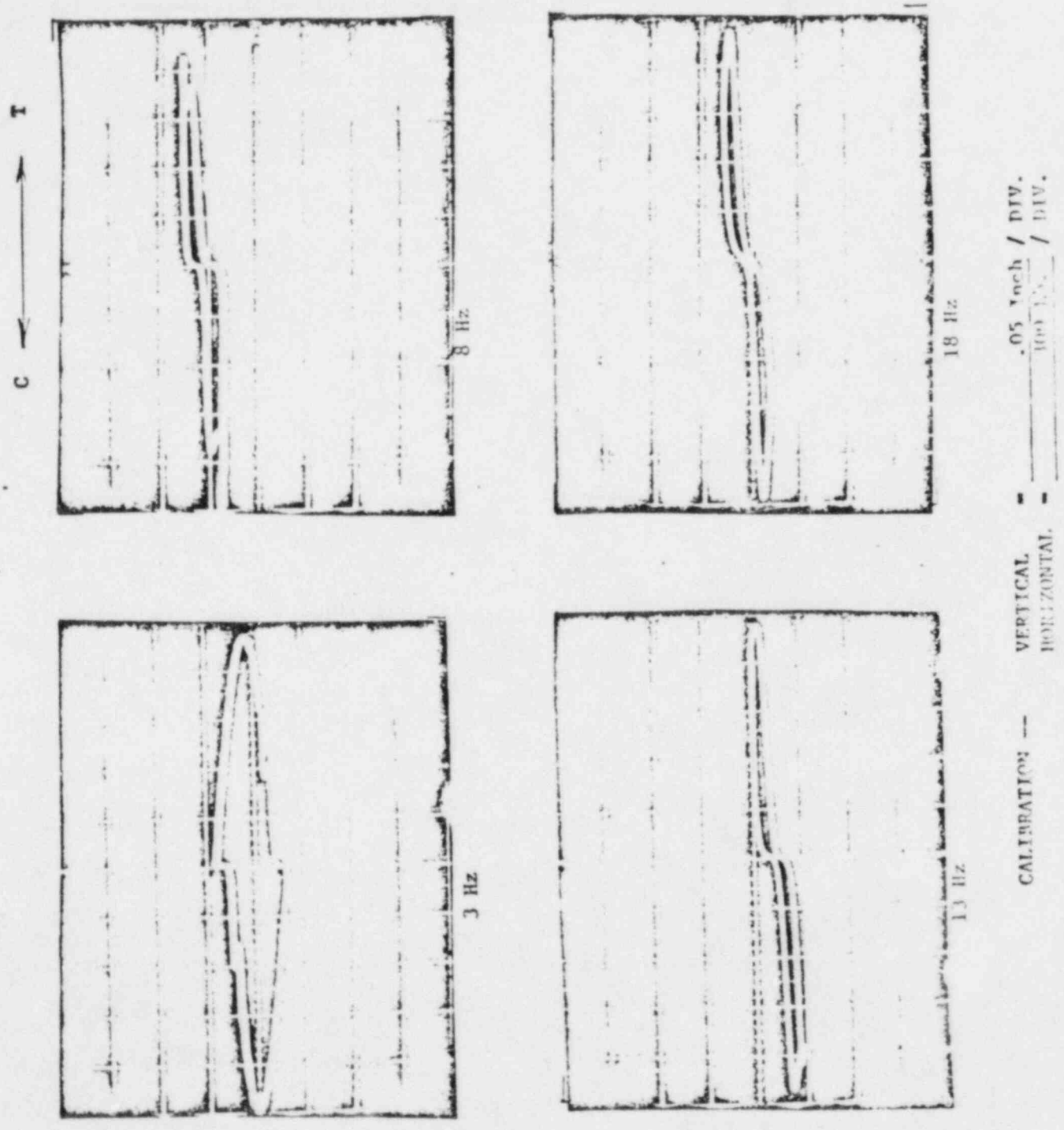
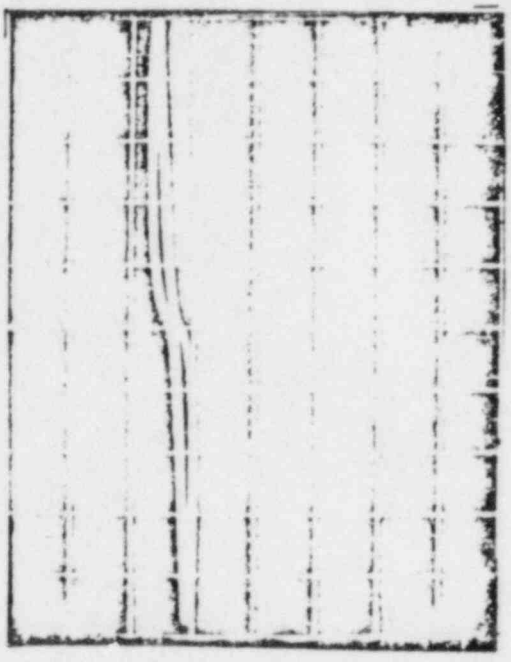


P/N 1801102-05 S/N 7707 REPORT NO. TR 841

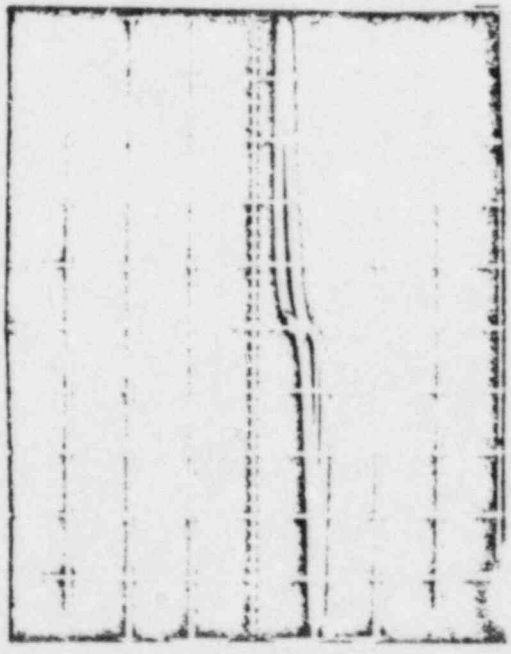
DATE 11-16-79 PSA - 1 PAGE 16 OF 20

200°F

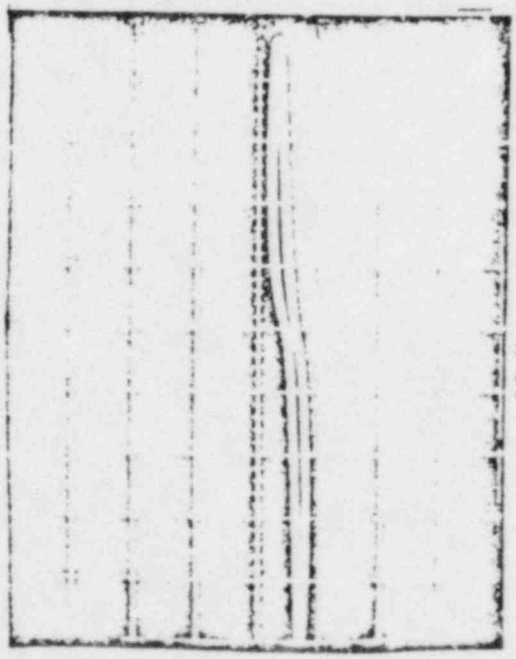
C T



28 Hz



23 Hz



33 Hz

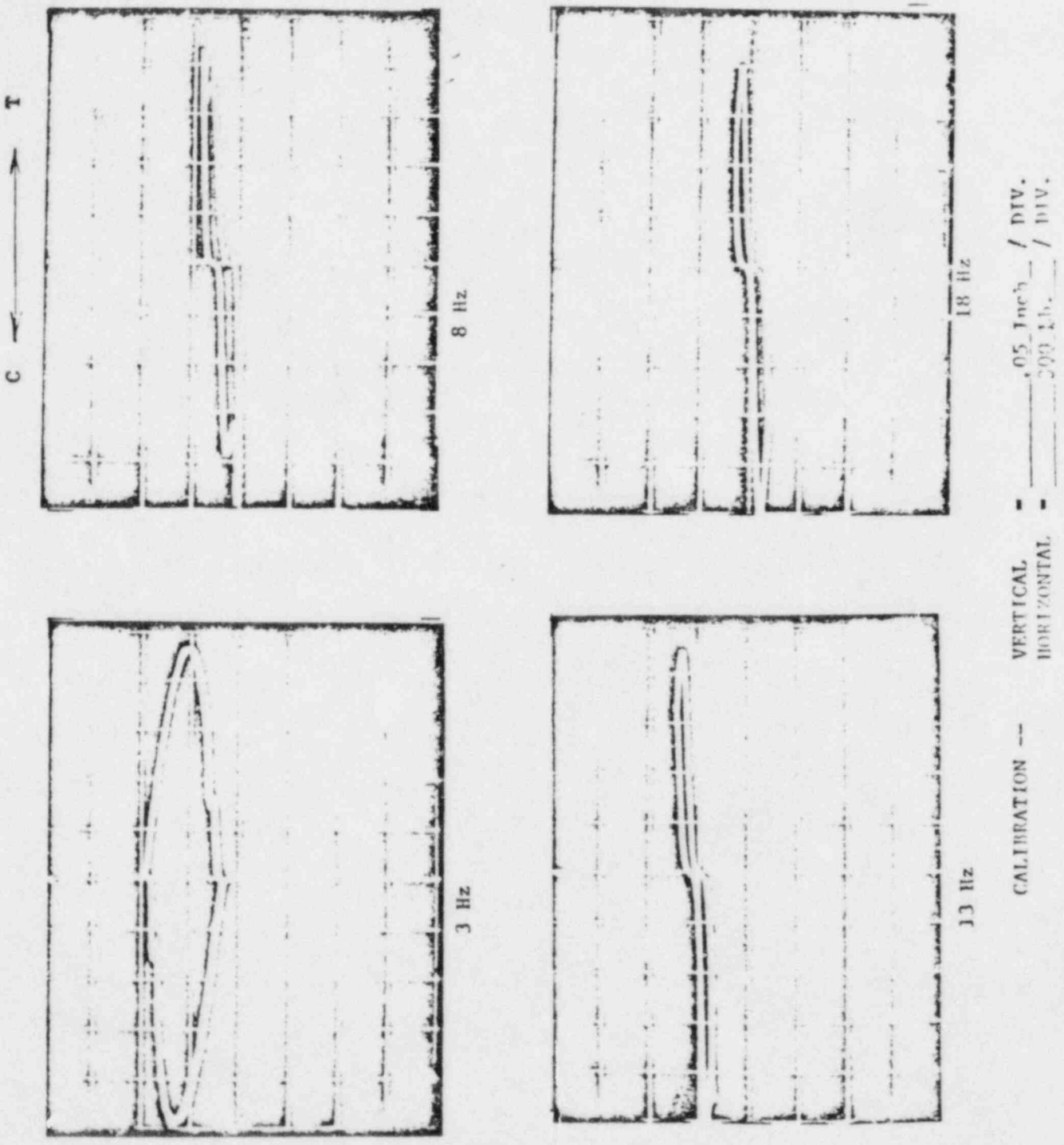
CALIBRATION -- VERTICAL = .05 Inch / DIV.

HORIZONTAL = 100 Hz. / DIV.

P/N 1801102-05 S/N 7708 REPORT NO. TR 841

DATE 11-16-79 PSA - 1 PAGE 17 OF 20

200°F

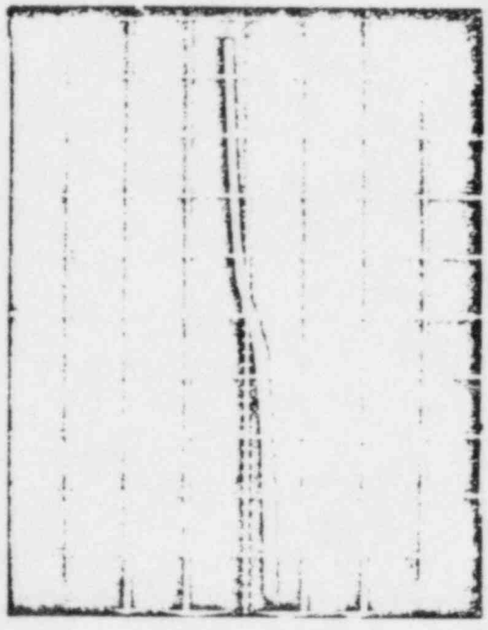


P/N 1801102-05 S/N 7708 REPORT NO TR 841

DATE 11-16-79 PSA - 1 PAGE 18 OF 20

200°F

C ⟶ T



28 Hz

23 Hz

33 Hz

CALIBRATION -- VERTICAL = .05 Inch. / DIV.

HORIZONTAL = [illegible] / DIV.

PACIFIC SCIENTIFIC • KIN-TECH DIVISION

1346 S. State College Blvd. Anaheim, Ca. 92803 (714) 774-5217

REPORT NO. I.T. 519

DATE 2 May 1974

TR 841

ENCLOSURE 1

ACCEPTANCE TEST

FOR

1801102-* Shock Arrestor

FROM

PACIFIC SCIENTIFIC

KIN-TECH DIVISION

PREPARED BY

H.C. Lewis

Q. A. Engineering

APPROVED BY

Q. A. Manager

REV	DATE	BY	APPD BY	PAGES AFFECTED	
Rel	5/ 2/74	HCL	PAH		
A	5/14/74	HCL	PAH	2,3,4	Corrected error.
B	7/25/74	HCL	PAH	3	Torque increased.
C	8/ 6/74	HCL	PAH	2,3,4,5	Revised test procedure.
D	1/16/75	HCL	PAH	All	Revised procedure.

PACIFIC SCIENTIFIC • KIN-TECH DIVISION
1346 S. State College Blvd. Anaheim, Ca. 92803 (714) 774-57

REV	DATE	BY	APPD BY	PAGES AFFECTED	
E	2/26/75	HCL	PAH	3	Corrected load error.
F	4/25/75	HCL	PAH	3,4	Corrected error in time interval.
G	5/ 8/75	HCL	PAH	2,4	Revised method of breakaway torque test.
H	11/12/75	HCL	PAH	5	Added Materials Traceability Tabulation.
J	1/ 9/76	HCL	PAH	3	Deleted Sampling Plan.
K	8/10/76	HCL	PAH	3	Upgraded shock arrestors.
L	10/14/76	HCL	PAH	2,3,4	Increased breakaway force.
M	12/ 9/76	HCL	PAH	5	Added P/Ns to Material Traceability Tabulation.
N	2/23/77	HCL	PAH	4	Removed 1/m sampling.
P	3/16/77	HCL	PAH	2,3,4	Functional test methods revised.
Q	9/12/77	PAH	PAH	3	Revised para. 6.2 to delete gage setting.
R	8/17/78	PAH	PAH	3	Improved test fixture.
S	2/16/79	HCL	PAH	3	Improved test methods.
T	6/13/79	HCL	PAH	2,3,5	Revised test fixture and test methods.

1.0 PURPOSE

1.1 To assure compliance of production units of the Shock Arrestor Assembly with referenced drawings.

2.0 SCOPE

2.1 This test establishes both visual and functional characteristics which could be expected to vary through dimensional variation or improper assembly and adjustment.

3.0 REFERENCE DOCUMENTS

3.1 PSCo Drawing 1801102-*.

4.0 EQUIPMENT

4.1 1801 TF-2 Universal Shock Arrestor Tester

4.2 Holding Fixture 1801 HF-1

4.3 .001 Dial Indicator

(T) (P) 4.4 1801102 TF-1 Test Stand, S/N 2

5.0 INDIVIDUAL TESTS

5.1 Examination of Product

5.1.1 Each unit shall be subjected to a dimensional examination to determine compliance with applicable final assembly drawing.

5.1.2 Each unit shall be visually inspected to assure completeness of assembly, freedom from burrs and sharp edges, alignment of parts, security of fasteners, and dimensional integrity.

5.1.3 Units shall be visually inspected for general appearance of plating, painting, freedom from nicks and damage of finishes.

5.1.4 Units shall be inspected to assure the accuracy and legibility of marking and identification.

(P) 6.0 FUNCTIONAL TESTS

(T) Following tests shall be performed with shock arrestors installed on 1801102 TF-1 Test Stand.

T 6.1 Proof Load (1500 lbs.) Torque Test (2 in./lbs. more)

6.1.1 With arrestor installed on test stand in position 2 and air pressure gage set at approximately 97 P.S.I. on 5" cylinder connection, cage the shaft. Move handle on middle valve to downward position. At same time install torque collet and secure to inertia mass. Actuate right hand lever at 5" cylinder connection, applying 1500 lbs. to unit. Hold pressure for approximately 5 seconds during the 5-second hold, read torque value in one direction and record on check list. Release pressure and apply same load in opposite direction, again noting the torque and record values on checklist. Readings in either direction shall not exceed 2 in./lbs.

6.1.1.1 Failure of arrestor to meet torque requirements shall be subjected to further test on acceleration test fixture 1801 TF-2. If acceleration at this time is less than .51 sec. in 1.00 inch of travel, the arrestor shall be rejected.

6.2 Lost Motion (.040 max.)

6.2.1 With carriage in position 2 of test stand, remove torque meter and lock inertia mass, using torque wrench, with arrestor in mid position of scale. Secure indicator and engage to end cap of arrestor. Transfer pressure to low side by moving center valve handle in upward position. Apply 18 P.S.I. pressure in one direction and zero out the indicator. Apply the load in the opposite direction and record lost motion. Lost motion shall not exceed .040.

6.2.1.1 Failure of arrestor to meet this portion of the test shall be cause for rejection.

6.3 Breakaway Friction Test (15 lbs.)

6.3.1 With arrestor in position 2 on test stand and inertia mass in a free state, secure arrestor with pin to clevis. Remove caging tool from 5" cylinder and transfer pressure to 18 P.S.I. Apply the reduced pressure using left hand valve lever and check breakaway friction at 3 positions of scale, both extending and retracting, 1/2 inch from each end and one place in approximate mid-position of scale.

Failure of arrestor to meet this portion of test shall be retested on 1801 HF-1 holding fixture.

ADDENDUM

Final Inspection Check List

PSCo 1801102-*

Shock Arrestor

Ref. paragraphs refer to paragraphs from this procedure, I.T. 519

Part No._____ Serial No._____

PSCo P.O. No._____ Date_____

Shop Order No._____ Customer_____

I. Visual Examination (para. 5.1)

(a) Dimensional..... ☐

(b) Workmanship..... ☐

Ⓟ II. Final Functional Tests

(a) Proof Load (1500 lbs.)(para. 6.1)..... ☐

Ⓣ (b) Breakaway Friction Force (15 lbs. max.)(para. 6.3).... ☐

Ⓣ (c) Torque Test (2 in./lbs.)(para. 6.1)...Actual Torque

Extending_____

Retracting_____

Ⓣ (If required)
Acceleration/Load Test (.51 sec. min./1.000 travel)
(para. 6.1.1.1)

Actual Time

Extending_____

Retracting_____

Ⓣ (d) Lost Motion (.040 max.)(para. 6.2).....Actual_____

Inspector_____

Stamp_____ Date_____

ASME SECTION III, DIVISION I
SUBSECTION NF

MATERIALS TRACEABILITY TABULATION

PSCO P/N _____

Serial No. _____

Owner/Agent _____

Date _____

	Part No.	Description	Material Code Number	Stamp
	1801218	Drum Torque		
	1801224	Inertia Mass		
	1801226	Cylinder, Support		
	1801227	Cylinder, Telescoping		
	1801229	Plug, End Cylinder		
	1801235	Nut, Bearing Retainer		
	1801281	Housing		
	1801282	Cylinder		
	1801283	Flange		
(M)	1801287	Key Machine		
(M)	1801234	Key, Anti-Rotation		

AE NORMAL ENVIRONMENT LOG

DATE	TIME	TEMP °F	RH %	REMARKS
11-11-79	0700	70°F	0 Rain	START HEAT
	0715	161	0	
	0730	213	1	HEAT A/C
	0746	260	8	
	0800	342	11	330°F min START PANEL - (2 hrs)
	0815	331	13	
	0830	333	7	
	0845	330	5	
	0900	334	12	
	0915	333	9	
	0930	340	14	
	0945	334	14	
	1000	338	15	
	1015	332	13	
	1030	332	12	
	1045	334	8	
	1100	334	6	
	1101	342	32	
	1102	344	33	30 Psi - 4 Cfm max START PANEL - (2 hrs) 330°F min
	1115	318	16	
	1130	325	18	
	1145	322	12	
	1200	320	10	
	1215	317	9	
	1230	315	7	
	1245	320	12	
	1300	321	13	
	1315	320	12	
	1330	320	10	

DATE	TIME	TEMP °F	RH %	REMARKS
		SEE PAGE 1	SEE PAGE 1	
11-12-79	1345	317	9 Psi	
	1400	314	8	
	1415	312	6	
	1430	313	6	
	1445	315	6	
	1500	317	6	
	1515	318	6	
	1530	317	6	
	1545	309	12	
	1600	310	14	Check
	1615	325	4	
	1630	330	2	
	1645	334	1	
	1700	335	2	
	1715	335	2	
	1730	334	1	
	1745	334	1	
	1800	333	1	
	1815	332	1	
	1830	332	1	
	1845	331	1	
	1900	329	4	START PANEL
	1915	315	5	
	1930	302	5	
	1945	292	5	
	2000	283	5	
	2015	275	4	
	2030	271	4	
	2045	264	3	
	2100	261	2	

DATE	TIME	TEMP °F	RH %	REMARKS
		SEE PAGE 1	SEE PAGE 1	
11-13-79	2115	254	1	
	2130	253	1	
	2145	251	2	
	2200	250	2	
	2215	260	4	
	2230	263	12	
	2245	284	10	
	2300	280	8	
	2315	278	6	
	2330	272	5	
	2345	263	4	
	2400	262	3	
11-13-79	0015	259	3	
	0030	256	4	
	0045	260	4	
	0100	261	4	
	0115	260	3	
	0130	259	3	
	0145	257	2	
	0200	255	2	
	0215	254	2	
	0230	252	2	
	0245	253	2	
	0300	256	2	
	0315	255	2	
	0330	252	2	
	0345	247	10	
	0400	249	14	
	0415	254	14	
	0430	257	12	

DATE	TIME	TEMP °F	RH %	REMARKS
		SEE PAGE 1	SEE PAGE 1	
11-13-79	0445	256	11	
	0500	263	10	
	0515	262	8	
	0530	259	9	
	0545	253	14	
	0600	254	14	
	0615	254	14	
	0630	253	13	
	0645	248	13	
	0700	241	12	
	0715	252	14	
	0730	256	14	
	0745	256	13	
	0800	264	12	
	0815	262	11	
	0830	260	10	
	0845	262	10	
	0900	266	10	
	0915	265	10	
	0930	263	10	
	0945	260	8	
	1000	255	6	
	1015	245	4	
	1030	240	3	
	1045	242	4	
	1100	250	10	
	1115	254	15	
	1130	256	14	
	1145	256	13	
	1200	260	11	

REPORT NO TR 841

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ABNORMAL ENVIRONMENT LOG

P/N SEE PAGE 1 S/N SEE PAGE

DATE	TIME	TEMP °F	PRESS PSIG	REMARKS
11/18/79	1215	263	0	
	1230	260	0	
	1245	253	0	
	1300	252	0	
	1315	251	0	
	1330	260	0	
	1345	259	0	
	1400	257	0	
	1415	252	12	
	1430	254	12	
	1445	256	12	
	1500	262	10	
	1515	270	9	
	1530	279	9	
	1545	257	12	
	1600	251	14	
	1615	250	14	
	1630	250	14	
	1645	255	14	
	1700	262	15	
	1715	265	13	
	1730	274	12	
	1745	254	15	
	1800	267	15	
	1815	252	13	
	1830	270	15	
	1845	253	13	
	1900	269	15	START MUSIC III
	1915	267	0	
	1930	253	0	

P/N SEE PAGE 1 S/N SEE PAGE

DATE	TIME	TEMP °F	PRESS PSIG	REMARKS
11/18/79	1945	253	0	
	2000	242	0	
	2015	233	0	
	2030	226	0	
	2045	219	0	
	2100	215	0 PSI	
	2115	213		
	2130	213		
	2145	218		
	2200	216		
	2215	214		
	2230	213		
	2245	213		
	2300	213		
	2315	213		
	2330	213		
11/19/79	2345	210		
	2400	213		
	0015	213		
	0030	213		
	0045	213		
	0100	213		
	0115	214		
	0130	215		
	0145	213		
	0200	213		
	0215	213		
	0230	213		
	0245	214		
	0300	213	0 PSI	

P/N S/N

DATE	TIME	TEMP °F	PRESS PSIG	REMARKS
11/19/79	0315	212	0 PSI	
	0330	212		
	0345	212		
	0400	212		
	0415	212		
	0430	212		
	0445	212		
	0500	211		
	0515	212		
	0530	213		
	0545	212		
	0600	213		
	0615	212		
	0630	212		
	0645	212		
	0700	212		
	0715	212		
	0730	212		FIRE
	0745	212		
	0800	214		
	0815	213		
	0830	213		
	0845	213		
	0900	214		
	0915	212		
	0930	213		
	0945	213		
	1000	213		
	1015	214		
	1030	213	0 PSI	

P/N SEE PAGE S/N SEE PAGE

DATE	TIME	TEMP °F	PRESS PSIG	REMARKS
11/19/79	1045	212	0 PSI	
	1100	215		
	1115	213		
	1130	212		
	1146	212		
	1200			
	1215	212		
	1230	213		
	1245	212		
	1300	212		
	1315	212		
	1330	212		
	1345	212		
	1400	212		
	1415	212		
	1430	212		
	1446	212		
	1500	212		
	1515	212		
	1530	214		
	1545	213		
	1600	213		
	1615	212		
	1630	212		
	1645	213		
	1700	212		
	1730	212		
	1800	212		
	1830	212		
	1900	213		END OF TEST TAPE

APPENDIX 1

INITIAL FUNCTIONAL TEST DATA SHEETS
AND MATERIAL TRACEABILITY RECORD,
I.T. 519 PAGES 5 AND 6
TOTAL OF 3 PAGES

ADDENDUM

Final Inspection Check List

PSCo 1801102-*

Shock Arrestor

Ref. paragraphs refer to paragraphs from this procedure, I.T. 519

Part No. 1801102-05 Serial No. 7707

PSCo P.O. No. 32704 Date 9-17-79

Shop Order No. 1-1910-19382 Customer BERGEN PATERSON

I. Visual Examination (para. 5.1)

(a) Dimensional..... (P) 12

(b) Workmanship..... (P) 12

(P) II. Final Functional Tests

(a) Proof Load (1500 lbs.) (para. 6.1)..... (P) 12

(b) Breakaway Friction Force (15 lbs. max.) 5 LBS (para. 6.2).... (P) 12

(c) Torque Test (2 in./lbs.).....Actual Torque

Extending N/A

Retracting N/A

(If required)
Acceleration/Load Test (.51 sec. min./1.000 travel)
(para. 6.3.1.1)

Actual Time

Extending .71

Retracting .69

(d) Lost Motion (.040 max.) (para. 6.4)..... Actual .011

Inspector G. Taylor

Stamp (P) 12 Date 9.17.79

ADDENDUM

Final Inspection Check List

PSCo 1801102-*

Shock Arrestor

Ref. paragraphs refer to paragraphs from this procedure, I.T. 519

Part No. 1801102-05 Serial No. 7708

PSCo P.O. No. 32704 Date 9-17-79

Shop Order No. 1-1910-19382 Customer BERGEN PATERSON

I. Visual Examination (para. 5.1)

(a) Dimensional..... PSCo

(b) Workmanship..... PSCo

(P) II. Final Functional Tests

(a) Proof Load (1500 lbs.)(para. 6.1)..... PSCo

(b) Breakaway Friction Force (15 lbs. max.)(para. 6.2)....6½ LBS PSCo

(c) Torque Test (2 in./lbs.).....Actual Torque

Extending N/A

Retracting N/A

(If required)
Acceleration/Load Test (.51 sec. min./1.000 travel)
(para. 6.3.1.1)

Actual Time

Extending .62

Retracting .61

(d) Lost Motion (.040 max.)(para. 6.4).....Actual .010

Inspector G. Taylor

Stamp PSCo Date 9-17-79

ASME SECTION III, DIVISION I
SUBSECTION NF

MATERIALS TRACEABILITY TABULATION

PSCO P/N 1801102-05

Serial No. 7707 -7708

Owner/Agent Bergen-Paterson

Date 9-15-79

Part No.	Description	Material Code Number	Stamp
1801218	Drum Torque	N 1262-A	
1801224	Inertia Mass	N 1327	
1801226	Cylinder, Support	N 1134	
1801227	Cylinder, Telescoping	N 1118-C	
1801229	Plug, End Cylinder	N 1249	
1801235	Nut, Bearing Retainer	N 1160-A	
1801281	Housing	N 1169	
1801282	Cylinder	N/A	
1801283	Flange	N/A	
(M) 1801287	Key Machine	N 1035-F	
(M) 1801234	Key, Anti-Rotation	N 1354-H	

SEP 21 1979

APPENDIX 2

SPRING RATE CALCULATIONS

APPENDIX 2

PSA - 1

SPRING RATE CALCULATIONS

AVERAGE ALLOWABLE RATE = 111 - 1.11 = 99.9 x 10^3 Lbs/Inch

S/N	Temp °F	Freq. Hz	Peak-Peak Load Lbs.	Dynamic Displ. Inch	Lost Motion Inch	Spring Rate 1 x 10^3 lbs/Inch
7707	75	8	2865	.048	.020	102.0
		18	2910	.040	.010	97.0
					AVERAGE =	99.5 x 10^3 Lbs/Inch
7708	75	8	2790	.040	.012	99.6
		18	2940	.040	.010	98.0
					AVERAGE =	98.8 x 10^3 Lbs/Inch

SAMPLE CALCULATION

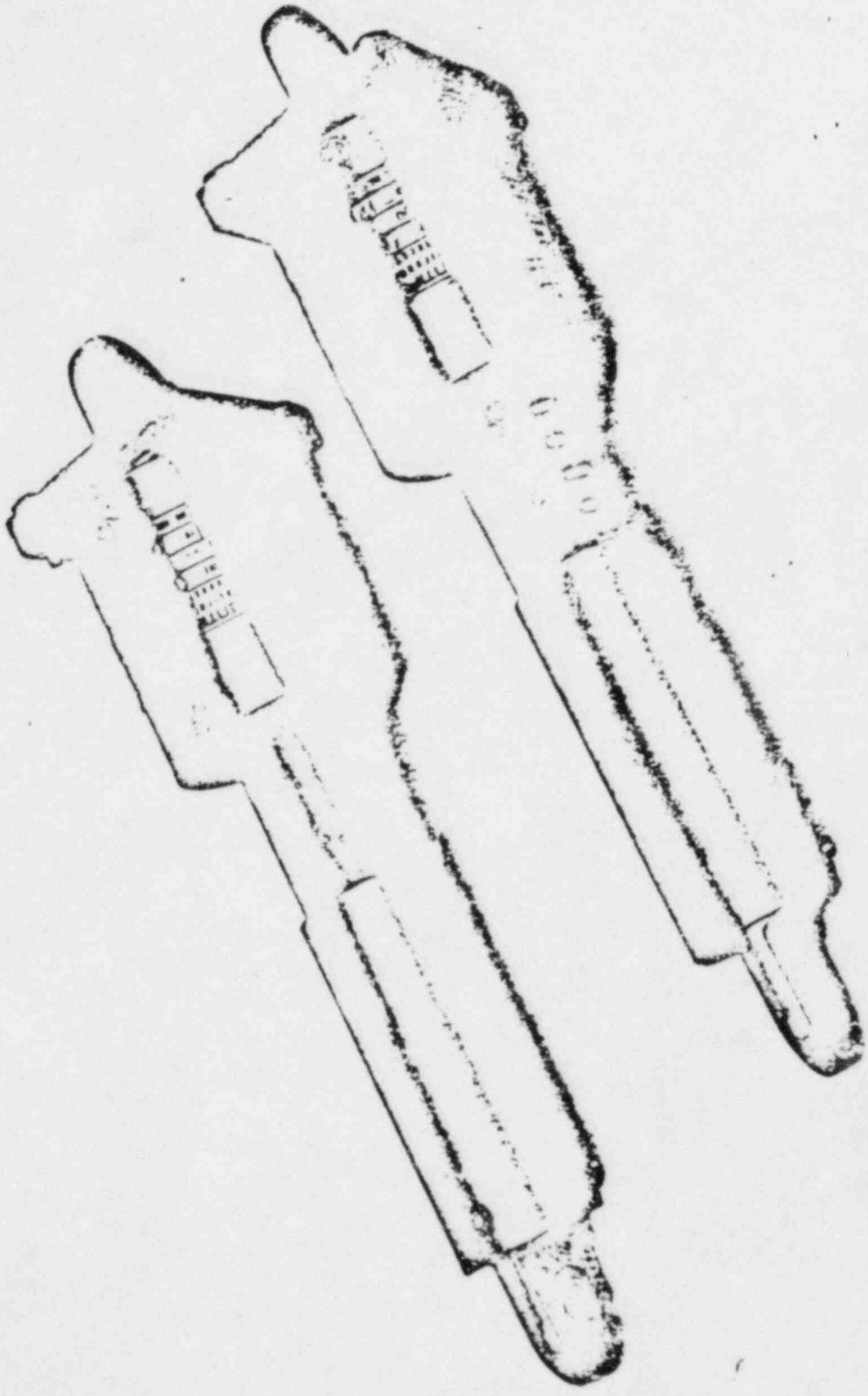
(A) Dynamic Spring Rate = $\frac{2865 \text{ Lbs}}{(.048-.020 \text{ inch})}$ = 102.3 x 10^3 Lbs/Inch

ENCLOSURE 1

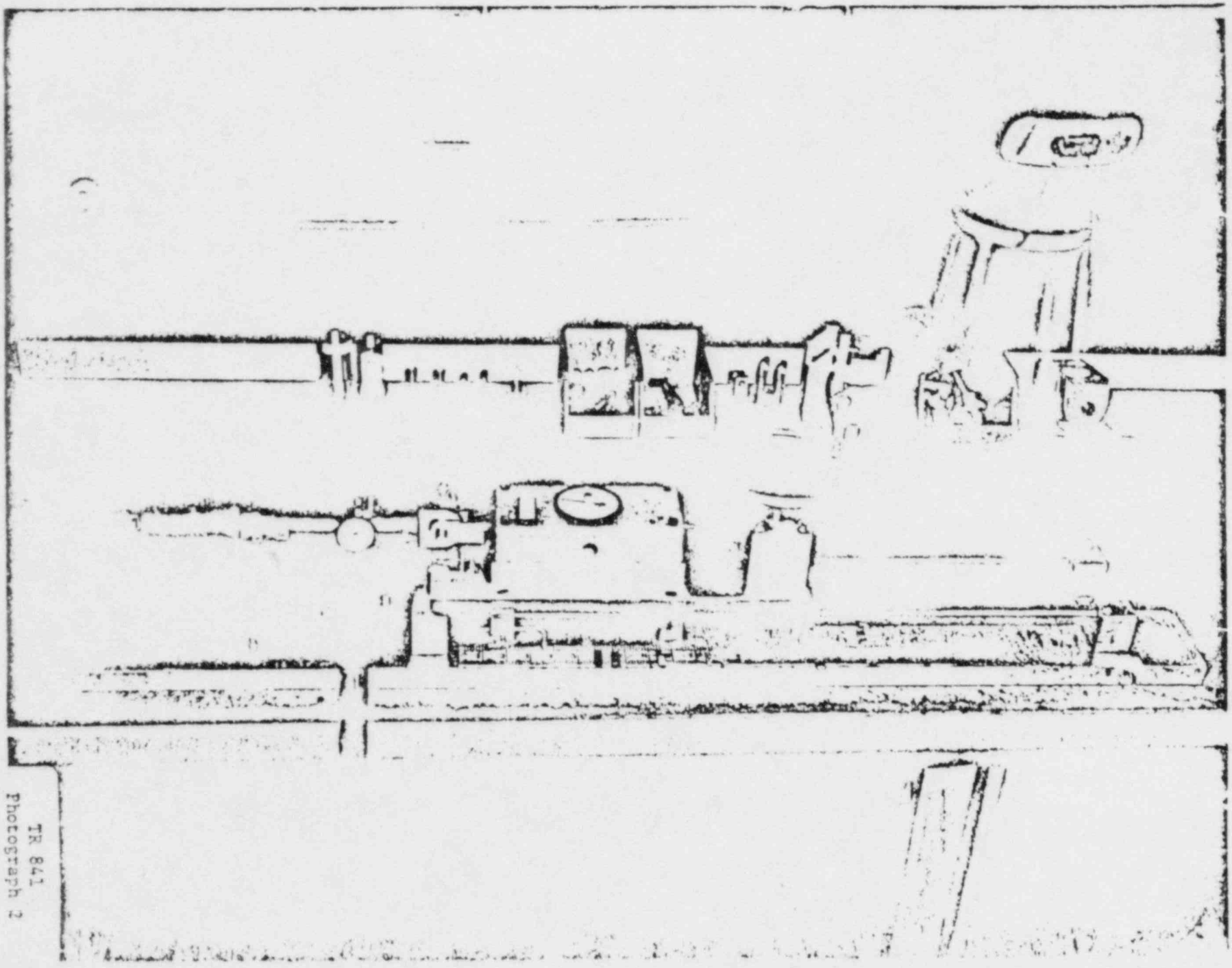
ACCEPTANCE TEST PROCEDURE I.T. 519

P/N 1801102-05

PACIFIC SCIENTIFIC • KIN-TECH DIVISION
1346 S State College Blvd. Anaheim, Ca 92803 (714) 774-5217



TR 841
Photograph 1



TR 841
Photograph 2

IR 841
Photograph 3

TR 841
Photograph 4

TR 841
Photograph 5

REPORT NO. TR 808

DATE 6 January 1977

TEST REPORT 808

CQD - 006418

QUALIFICATION TESTS

MECHANICAL SHOCK ARRESTOR
P/N 1801106-05
Model PSA-3
Rated 6000 lbs

FROM

PACIFIC SCIENTIFIC
KIN-TECH DIVISION

COMPONENT ... DIVISION

FC ... CT

Spec. No. K-2884 4536-32

File No. C ... -006418

REVIEWED & ACCEPTED
FOR EQ ONLY

By ... for DiSciacca Date 6/12/83

ACTION SHOWN DOES NOT RELIEVE CONTRACTOR FROM HIS OBLIGATIONS UNDER THE CONTRACT

PREPARED BY

R. F. Whitney
Test Engineer

APPROVED BY

J. E. Glauser
Director of Engineering

W. S. Wright
Chief Development Engineer

P. A. Hadnagy
Q. C. Manager

REV	DATE	BY	APPD. BY	PAGES AFFECTED	

ADMINISTRATIVE DATA

PURPOSE OF TEST

To determine the ability of the Mechanical Shock Arrestor, P/N 1801106-05 to meet Qualification Test Requirements.

MANUFACTURER

PACIFIC SCIENTIFIC COMPANY, KIN-TECH DIVISION
1346 S. State College Boulevard, Anaheim, California

MANUFACTURER'S TYPE OR MODEL NO.

P/N 1801106-05, Model PSA-3

APPLICABLE DOCUMENTS

PSCo Drawing 1801106, Revision G
PSCo DR 1377 - Qualification Test Procedure
MIL-E-5272 - Environmental Test Methods

QUANTITY OF ITEMS TESTED

One (1) 1801106-05, Mechanical Shock Arrestor, S/N 850.
This device is acceleration sensitive for use in limiting piping movements during seismic disturbances. The unit is commonly known as a "snubber".
This test unit was built in accordance with ASME Boiler and Pressure Vessel Code Section III, Subsection NF, Summer 1976 Addenda and Code Case 1644-4. Certified data is on file at Pacific Scientific.

DATE TEST COMPLETED

16 December 1976

TEST CONDUCTED BY

Pacific Scientific, Anaheim, California

SECURITY CLASSIFICATION OF ITEMS

Unclassified

EQUIPMENT LIST

Test	Equipment	Tolerance	Calibration Date	Calibration Period
Dimensional Examination	Standard Micrometers Height Gages, etc.	(Data on file in Quality Control Dept.)		
Breakaway Friction Force and Lost Motion	1801 HF-1 Holding Fixture; Spring Scale	±1/4 lb	5/21/76	6 months
	.001 dial Indicator	±1/2 div	5/21/76	6 months
Acceleration/Load	1801 TF-2 (Load Indicating Gage and 60 cycle timer)	±1% F.S.	8/25/76	3 months
Dynamic Load	Facilities of Northrop A/C Co. including the following: MTS Load System, Model 440.21, S/N 851, ±82 kips			
	Lebow Load Cell S/N 192	±0.5%	2/19/76	12 months
	PSCo Equipment including the following:			
	Tektronix Oscilloscope	±1%	--	Daily
	C.L. Collins Linear Motion Transducer Model CGLO-LMT-S5301	±1%	--	Daily
Low Temperature and Humidity	Conrad Missimers Model FTH-8, S/N 30C-0243	±5%	9/16/76	6 months

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EQUIPMENT LIST (Continued)

Test	Equipment	Tolerance	Calibration Date	Calibration Period
High Temperature	Despatch Oven	±5°F	11/5/76	6 months
Salt Spray	Bemco Salt Spray Chamber Model S.S. 9	±2°F	8/19/76	6 months
Sand & Dust	PSCo Dust Chamber	±5°F	8/15/76	6 months
Life Test	PSCo Hydraulic Cycler	--	--	--
Faulted Load	Tinius Olsen Tensile Testing Machine 30,000 lb capacity S/N 98375	±0.5%	6/1/76	12 months

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TABLE OF CONTENTS

TESTING

1.0 ACCEPTANCE TESTS

The snubber was examined and tested in accordance with Acceptance Test Procedure IT 524, Enclosure 1. All requirements were met. The results are in Table 1. Photograph 1 identifies the test unit. Photograph 2 shows the unit in the breakaway friction force test fixture. Photograph 3 is the acceleration/load test set up.

2.0 DYNAMIC LOAD CYCLING

2.1 Requirements - The snubber shall be alternately loaded in tension and compression to the rated load of 6000 lbs. The total travel of the unit during cyclic loading including lost motion and deflection shall not exceed ±.060 inch (.120 inch total). The unit shall be subjected to load cycling at 100%, 75% and 50% of rated load at frequencies of 3, 6, 9 and 12 Hz for 30 seconds at each 3 Hz step (6 minutes total). In addition, the unit shall be subjected to 100% rated load between 15 Hz and 33 Hz by applying a single load pulse in both tension and compression at each 3 Hz step. The unit shall then be subjected to the breakaway friction force, lost motion, and acceleration/load test, outlined in IT 524..

2.2 Procedure - The snubber was installed in an MTS load cycling system at Northrop Aircraft Co., Hawthorne, California, reference Letter of Certification, Enclosure 2. With the unit at approximately mid position of travel, the loads were applied as required in paragraph 2.1 above.

2.2 Procedure (Continued)

The load was measured with a Lebow Load Cell. The unit travel was measured with a Collins Linear Motion Transducer attached to the snubber. The test set up is shown in photographs 4 and 5. The data was recorded on an oscilloscope, with travel being recorded on the vertical axis and load on the horizontal axis. Following the load cycling the unit was subjected to the breakaway friction force, lost motion and acceleration/load test.

2.3 Results - The load cycling oscillograms are on pages 9 through 12. The functional test results after load cycling are in Table 1. There was no damage to the unit. All requirements were met.

3.0 LOW TEMPERATURE

3.1 Requirements - The snubber shall be stabilized at -29°C (-20°F) or colder for a minimum of 8 hours. It shall then be removed from the chamber and subjected to the functional tests as rapidly as possible.

3.2 Procedure - The snubber was placed in a chamber at -40°C (-40°F) for 15 hours and then removed and subjected to the functional test. The functional test was completed within 15 minutes after removal from the chamber.

3.3 Results - All functional requirements were met, refer to Table 1.

4.0 HIGH TEMPERATURE

4.1 Requirement - 149°C (300°F) for 8 hrs minimum

4.2 Procedure - The snubber was placed in an oven at 149°C (300°F) for 15 hours. It was then removed from the chamber and subjected to the functional tests within 15 minutes.

4.3 Results - All functional requirements were met. The data is in Table 1.

5.0 HUMIDITY

5.1 Requirements - 95% Relative Humidity for 240 hours in accordance with MIL-E-5272c, Amendment 1, Procedure I.

5.2 Procedure

Step 1 The snubber was placed in the test chamber. Prior to starting the test, the internal chamber temperature was ambient with uncontrolled humidity.

Step 2 The internal chamber temperature was gradually increased to 71°C (160°F) and the relative humidity to 95 percent over a period of 2 hours.

Step 3 The conditions of Step 2 were maintained for 6 hours.

Step 4 While maintaining 95 percent relative humidity, the internal chamber temperature was reduced in 16 hours to 28° ±10°C (82°F).

5.2 Procedure (Continued)

Step 5 Repeat Steps 2, 3 and 4 for 10 cycles (240 hours).

Step 6 The snubber was then removed from the chamber and visually examined.

5.3 Results - There was no base metal corrosion. The normal white powdery appearance of the zinc plating was evident, reference photograph 6. The unit moved freely in both directions.

6.0 SALT SPRAY

6.1 Requirement - 48 hour exposure. MIL-E-5272c, Amendment 1, Procedure I.

6.2 Procedure - The chamber was maintained at 35°C (95°F) by circulating air around an insulated exposure zone. The solution and atomizing air was preheated to 35°C (95°F) prior to atomization. Salt fog collecting receptacles were placed within the exposure zone.

The snubber was placed on a plastic rack and subjected to 48 hours of exposure. The unit was then removed from the chamber and rinsed in tap water at 25°C (75°F) and visually examined.

The test details are as follows:

(a) Solution concentration: 5%

(b) Temperature 35°C (95°F +2, -3): Actual 97°F

6.2 Procedure (Continued)

(c) Collected sample:

(1) Volume of salt solution (0.5 to 3.0 ml/HR/80 cm^2)
Actual ml 1.4

(2) Spec. Gravity (1.0268 to 1.0413)
Actual 1.028 @ 26°C (80°F)

(3) pH 6.5 to 7.2: Actual 6.7

6.3 Results - No discernible difference in appearance than as noted after Humidity, reference photograph 6. The unit moves freely in both directions.

7.0 SAND AND DUST

7.1 Requirements

6 hours at room ambient temperature
6 hours at 71°C (160°F)
MIL-E-5272c, Amendment 1, Procedure I.

7.2 Procedure - The snubber was placed in a test chamber equivalent to MIL-C-9436. Photograph 7 shows three snubbers, PSA-1, PSA-3 and PSA-10, in the dust chamber. The sand and dust density was raised and maintained at 0.1 to 0.5 grams per cubic foot within the test space. The test chamber was vented to the atmosphere. The relative humidity did not exceed 30 percent at any time during the test. Sand and dust used in the test was as specified in MIL-E-5272.

Part I: The internal temperature of the test chamber was maintained at 25°C (77°F) for a period of 6 hours with sand and dust velocity through the test chamber between 100 and 500 feet per minute.

7.2 Procedure (Continued)

Part II: After 6 hours at the above conditions, the temperature was raised to and maintained at 71°C (160°F). These conditions were maintained for 6 hours. At the end of this exposure period, the snubber was removed and allowed to cool to room temperature. Accumulated dust was removed by brushing, care being taken to avoid introduction of additional dust into the unit. The unit was visually examined and then subjected to the break-away friction force, lost motion and acceleration/load tests.

7.3 Results - All requirements were met. The functional data is in Table 1.

8.0 LIFE TEST

8.1 Requirements - The snubber shall be extended and retracted through a minimum of 80% of full travel for 40,000 cycles.

8.2 Procedure - To reduce the time required for completion of 40,000 cycles, the inertia mass, spring and torque carrier were removed from the unit to permit faster cycling time. One end of the unit was then anchored and the opposite end was attached to a hydraulic cycler, reference photo-graph 8 which shows the PSA-10 on the cycler. One cycle consisted of a minimum of 80% of the total stroke or 4.0 inches extension and retraction. A total of 40,000 cycles were completed. The inertia mass, spring and torque carrier were then reinstalled. The snubber was then subjected to the breakaway friction force, lost motion and acceleration/load tests.

8.3 Results - There was no failure or excessive wear. The functional data is in Table 1.

9.0 FAULTED LOAD

9.1 Requirements - A faulted load of 11,700 lbs (stress report value) shall be applied for 1 minute in tension and in compression.

9.2 Procedure - The snubber was placed in the tensile testing machine with the unit at approximately mid-position of travel, reference photograph 9. The inertia mass was restrained and an 11,700 lb load was applied to the unit for one minute in tension and compression. The snubber was then disassembled and examined.

9.3 Results - There was no failure. The snubber was in good condition. All requirements were met.

10.0 SUMMARY OF TEST RESULTS

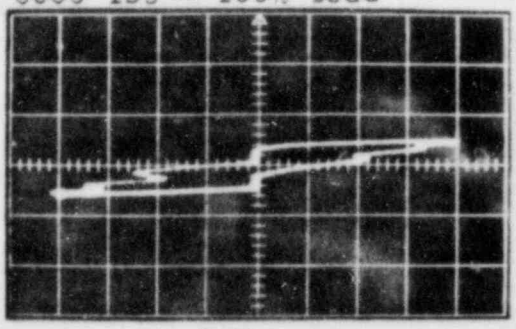
All qualification test requirements were met.

TABLE 1 - FUNCTIONAL TEST DATA

Refer to IT 524

Test Condition	Breakaway Friction Force-lbs 60 lbs-max	Lost Motion inches .040 max	Accel/load Test .51 seconds-min. Ext.	Retr.
Initial Functional	10 lbs	.012	1.00	.98
After Load Cycling	12	.014	1.03	1.02
At -29°C (-20°F)	23	.014	1.03	.94
At 149°C (300°F)	12	.016	.97	1.03
After Sand & Dust	25	.012	1.32	1.32
After 40,000 Cycles	25	.014	1.08	1.11

P/N 1801106-05, S/N 850
6000 lbs = 100% load



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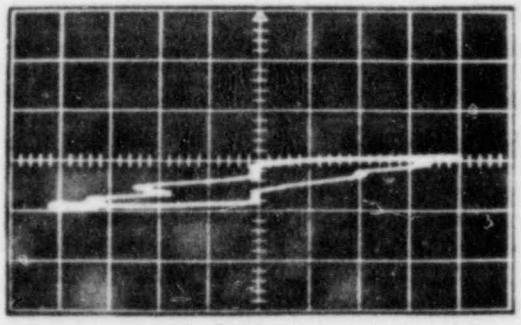

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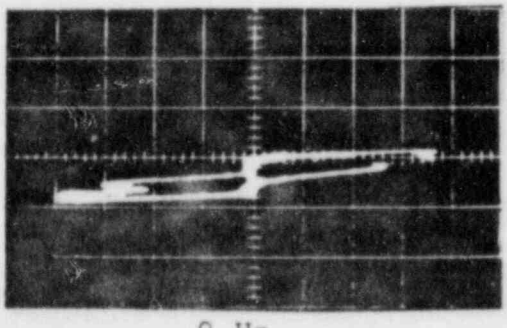

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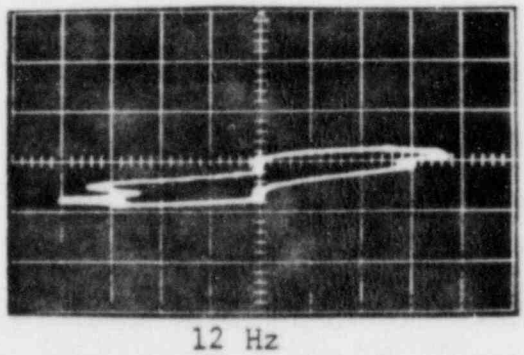

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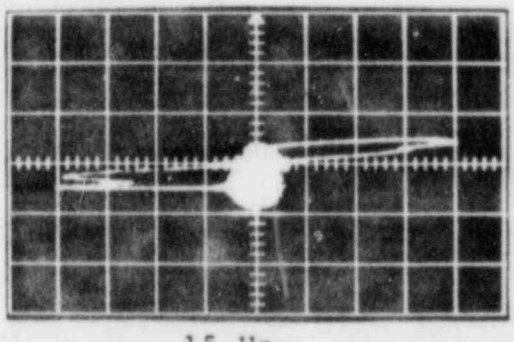

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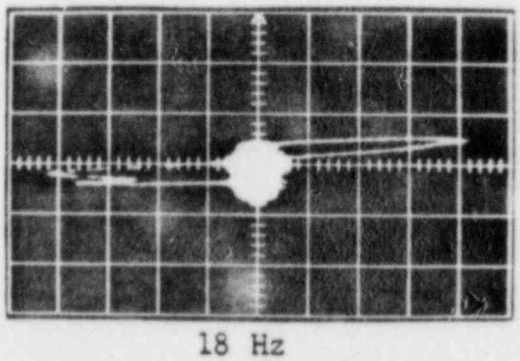

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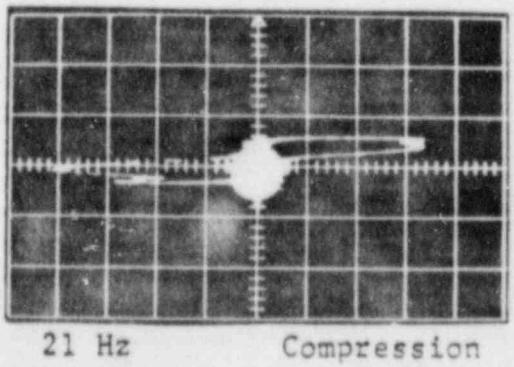

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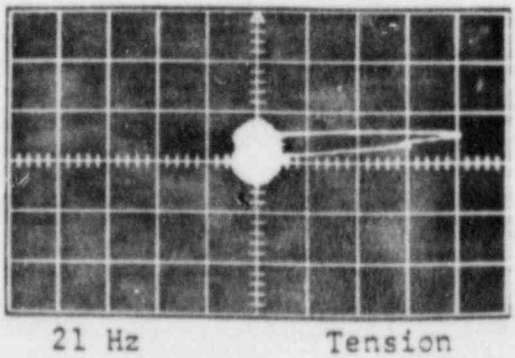

21 Hz Tension

Calibration - Vertical, .100 inch/div
Horizontal, 1500 lbs/div

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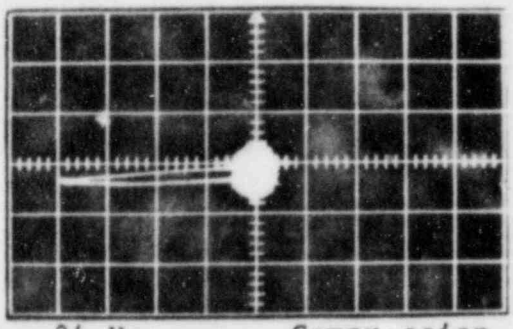
P/N 1801106-05, S/N 850
6000 lbs = 100% Load



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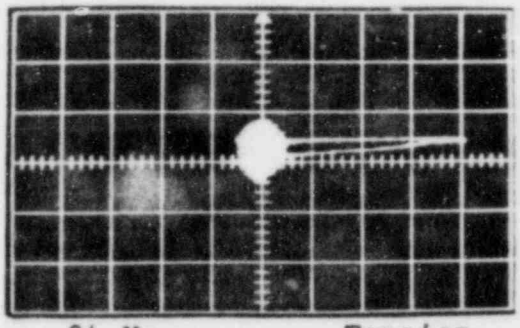
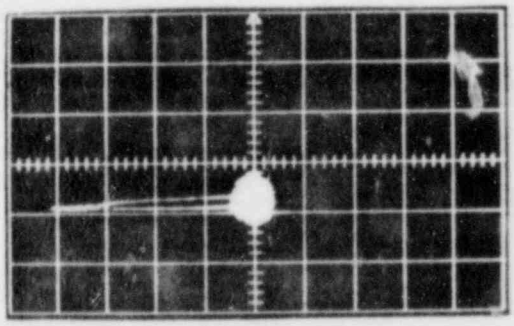


24 Hz Tension



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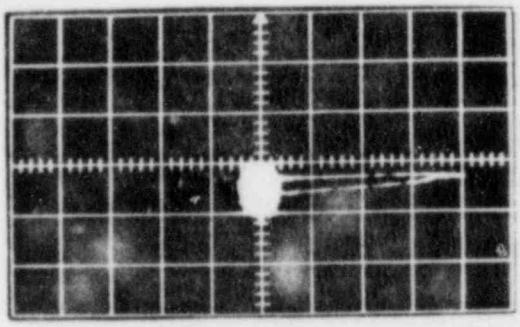

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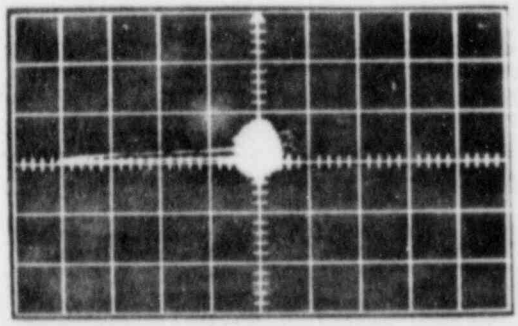

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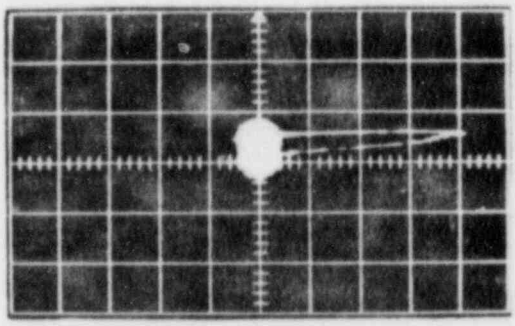
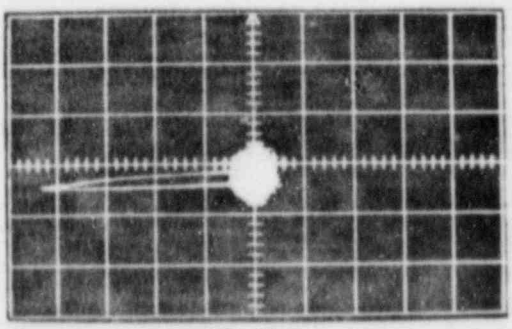


30 Hz



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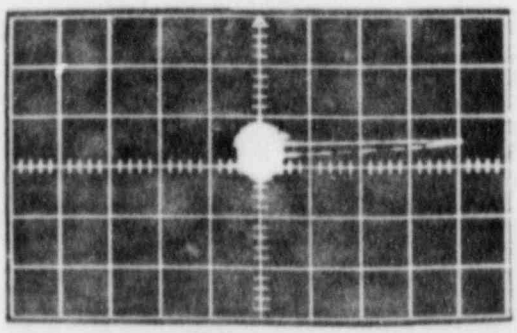
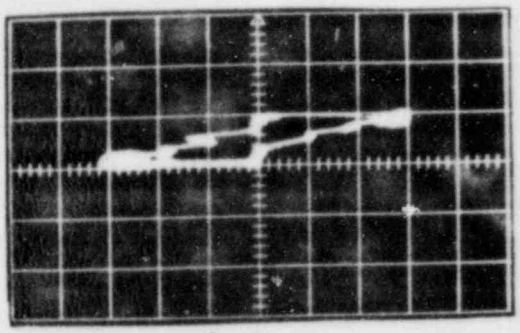


33 Hz

Calibration - Vertical, .100 inch/div
Horizontal, 1500 lbs/div



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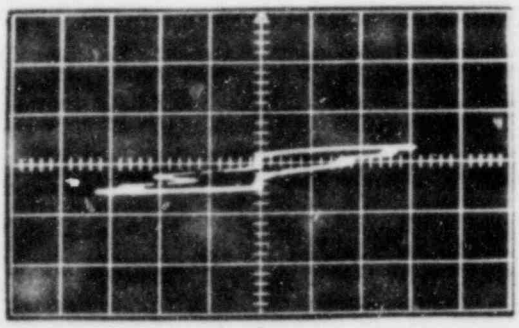
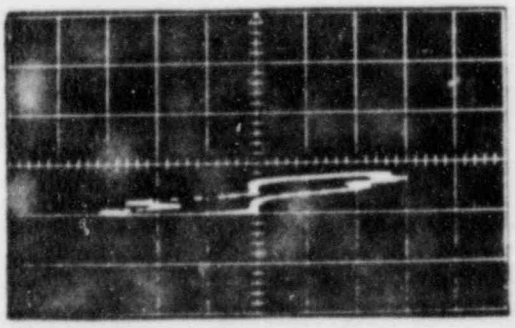


6 Hz

75%



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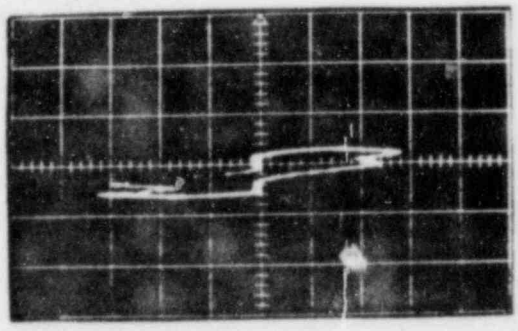

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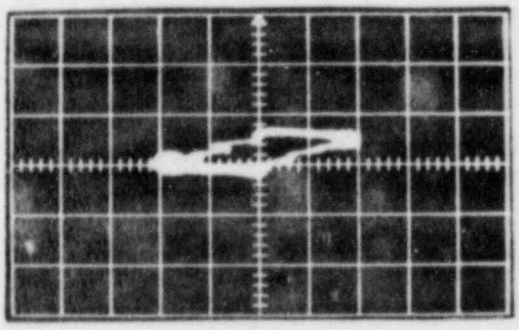

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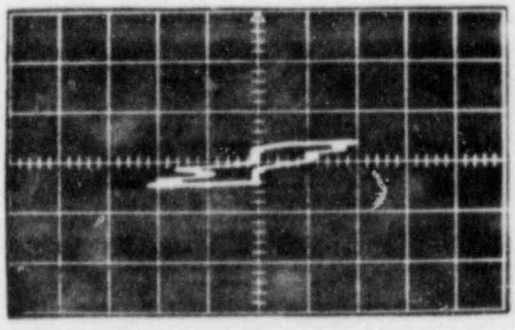
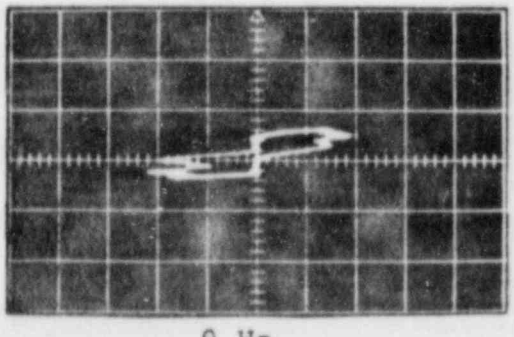


6 Hz

50%



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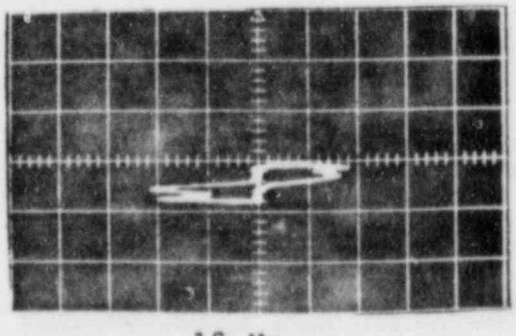


12 Hz

ENCLOSURE 1

ACCEPTANCE TEST PROCEDURE

IT 524

PACIFIC SCIENTIFIC • KIN-TECH DIVISION

1346 S. State College Blvd. Anaheim, Ca. 92803 (714) 774-5217

REPORT NO I.T. 824

DATE 2 May 1974

CQD FILE 006627

006419

ACCEPTANCE TEST

FOR

1801106-* Shock Arrestor

(F) 1801115

FROM

PACIFIC SCIENTIFIC COMPANY

AIRCRAFT PRODUCTS DIVISION

PREPARED BY

N.C. Levan

Q. A. Engineering

APPROVED BY

Q. A. Manager

REV	DATE	BY	APPD BY	PAGES AFFECTED	
Rel	5/ 2/74	HCL	PAH		
A	5/14/74	HCL	PAH	2, 3, 4	Corrected error.
B	7/25/74	HCL	PAH	3	Torque increased.
C	8/ 6/74	HCL	PAH	2, 3, 4	Revised test procedure.
D	1/16/75	HCL	PAH	All	Revised procedure.
E	2/26/75	HCL	PAH	3	Corrected load error.

(Cont'd. on 1a)

REV	DATE	BY	APPD BY	PAGES AFFECTED	
F	4/2/75	HCL	PAH	1,2,4	Added new part number.
G	4/25/75	HCL	PAH	3,4	Corrected error in time interval.
H	5/ 8/75	HCL	PAH	2,4	Revised method of breakaway torque test.
J	12/22/75	HCL	PAH	5	Added Materials Traceability Tabulation
K	1/ 9/76	HCL	PAH	3	Deleted Sampling Plan.
L	8/10/76	HCL	PAH	3	Upgraded shock arrestors.
M	10/15/76	HCL	PAH	2,3,4	Increased breakaway force.
N	12/9/76	HCL	PAH	5	Added P/Ns to Materials Traceability Tabulation

1.0 PURPOSE

1.1 To assure compliance of production units of the Shock Arrestor Assembly with referenced drawings.

2.0 SCOPE

2.1 This test establishes both visual and functional characteristics which could be expected to vary through dimensional variation or improper assembly and adjustment.

3.0 REFERENCE DOCUMENTS

(F) 3.1 PSCo Drawing 1801106-* ; 1801115

4.0 EQUIPMENT

4.1 1801 TF-2 Universal Shock Arrestor Tester

4.2 Holding Fixture 1801 HF-1

4.3 .0001 Dial Indicator

5.0 INDIVIDUAL TESTS

5.1 Examination of Product

5.1.1 Each unit shall be subjected to a dimensional examination to determine compliance with applicable final assembly drawing.

5.1.2 Each unit shall be visually inspected to assure completeness of assembly, freedom from burrs and sharp edges, alignment of parts, security of fasteners, and dimensional integrity.

5.1.3 Units shall be visually inspected for general appearance of plating, painting, freedom from nicks and damage of finishes.

5.1.4 Units shall be inspected to assure the accuracy and legibility of marking and identification.

6.0 FINAL FUNCTIONAL TESTS

(M) 6.1 Breakaway Friction Force (60 lbs. max.)

(H)(M) 6.1.1 The unit shall extend and retract when subjected to a maximum force of 60 pounds. Unit shall be installed in the 1801 HF-1 Holding Fixture and the starting force in both the extension and retraction modes measured at three places with a spring scale. Measurements shall be taken at the approximate mid position and approximately .5 inch from

both extreme positions. Load measured shall not exceed 60 pounds. (M)

6.2 Lost Motion (.040 max.)

6.2.1 Install the snubber on the 1801 HF-1 Fixture and adjust the dial indicator such that it will record movement at the clevis end of the snubber. With the snubber extended at approximately its mid-position, hold the inertia mass stationary using hand pressure and apply a load of 50 lbs. to the (F) snubber, zero out the indicator, and apply a reverse load of 50 lbs. to the snubber while maintaining (E) hand pressure to prevent movement of the inertia mass. Relative movement noted on the dial indicator shall not exceed .040 inch. (K)

6.3 Acceleration/Load Test

6.3.1 The unit shall be installed in the 1801 TF-2 Universal Shock Arrestor Tester with the unit extended approximately midway from full extension. The 1801 TF-2 Tester pressure gage shall be set for 23 P.S.I., which is equal to 2400 lbs. load. With the required pressure (L) applied to the unit, the time as recorded by the timer for the snubber to extend shall be .51 (G) second minimum for 1.000 inch of travel. This test shall be repeated by retracting the unit and (G) again the minimum time recorded shall be .51 sec.

(K)

ADDENDUM

Final Inspection Check List

PSCo 1801106-*
1801115

(F)

Shock Arrestor

Ref. paragraphs refer to paragraphs from this procedure, I.T. 524

Part No._____ Serial No._____

PSCo P.O. No._____ Date_____

Shop Order No._____ Customer_____

I. Visual Examination (para. 5.1)

(a) Dimensional..... ☐

(b) Workmanship..... ☐

II. Final Functional Tests

(H)(M) (a) Breakaway Friction Force (60 lbs. max.) (para. 6.2).....Actual_____

(b) Lost Motion (.040 max.)(para. 6.2)..... Sample Actual_____

Lot Accept ☐

(G) (c) Acceleration/Load Test (.51 sec. min./1.000 travel) (para. 6.3)

Actual Time

Extending_____

Retracting_____

Inspector_____

Stamp_____ Date_____

ASME SECTION III, DIVISION I
SUBSECTION NF

MATERIALS TRACEABILITY TABULATION

PSCO P/N _____

Serial No. _____

Owner/Agent _____

Date _____

Part No.	Description	Material Code Number	Stamp
1801262	Nut, Bearing Retainer		
1801268	Plug, Cylinder End		
1801270	Cylinder, Telescoping		
1801274	Housing		
1801254	Flange		
1801317	Cylinder		
1801275	Drum, Torque		
1801276	Inertia, Mass		
1801277	Cylinder, Support		
1801280	Key Machine		
1801265	Key Anti Rotation		

ENCLOSURE 2

Letter of Certification
of Dynamic Load Cycling Accomplished
at Northrop Aircraft Co.
Letter dated 19 November 1976

In reply refer to: 3874-76-175
WMW:MAB:pf

NORTHROP

19 November 1976

Pacific Scientific Company
Kin-Tech Division
1346 S. State College Boulevard
Anaheim, California 92803

Attn: Mr. Bob Whitney

Subject: Shock Arrestor Tests

This communication is intended to certify that the following shock arrestor hardware was tested as detailed in the following:

P/N's	1801102-05, S/N 702
	1801106-05, S/N 850
	1801103-07, S/N 550
	1801112-11, S/N 202

Tests of these units were conducted during the period of October 5 and November 8, 9, and 10, 1976 in the Materials Research Department of the Aircraft Division of the Northrop Corporation at the letterhead address by members of Organization 3874 of the Support Services Group.

Testing was performed in an MTS Series 810 Materials Test System, serial #851. The calibration cycle is 12 month with the last calibration performed on 19 February 1976 by:

MTS Systems Corporation
P. O. Box 24012
Minneapolis, Minnesota

The calibration performed on the above dates validates the referenced electro servohydraulic system closed-loop over the range of -82,000 lbf to +82,000 lbf. The referenced load cell calibration is valid over the range of -100,000 lbf to +100,000 lbf.

All tests were witnessed by one or more members of the staff of the Pacific Scientific Company of Anaheim, California. These tests were conducted by Northrop Corporation under a time and materials basis with the Pacific Scientific Company. Neil Babcock of Organization 8543

is in charge of all customer contact as pertains to the areas of customer liaison, costing, etc. Questions of a non-technical nature pertaining to this activity should be addressed to:

Mr. Neil Babcock
M/S 8543/63
Telephone: (213) 970-4433

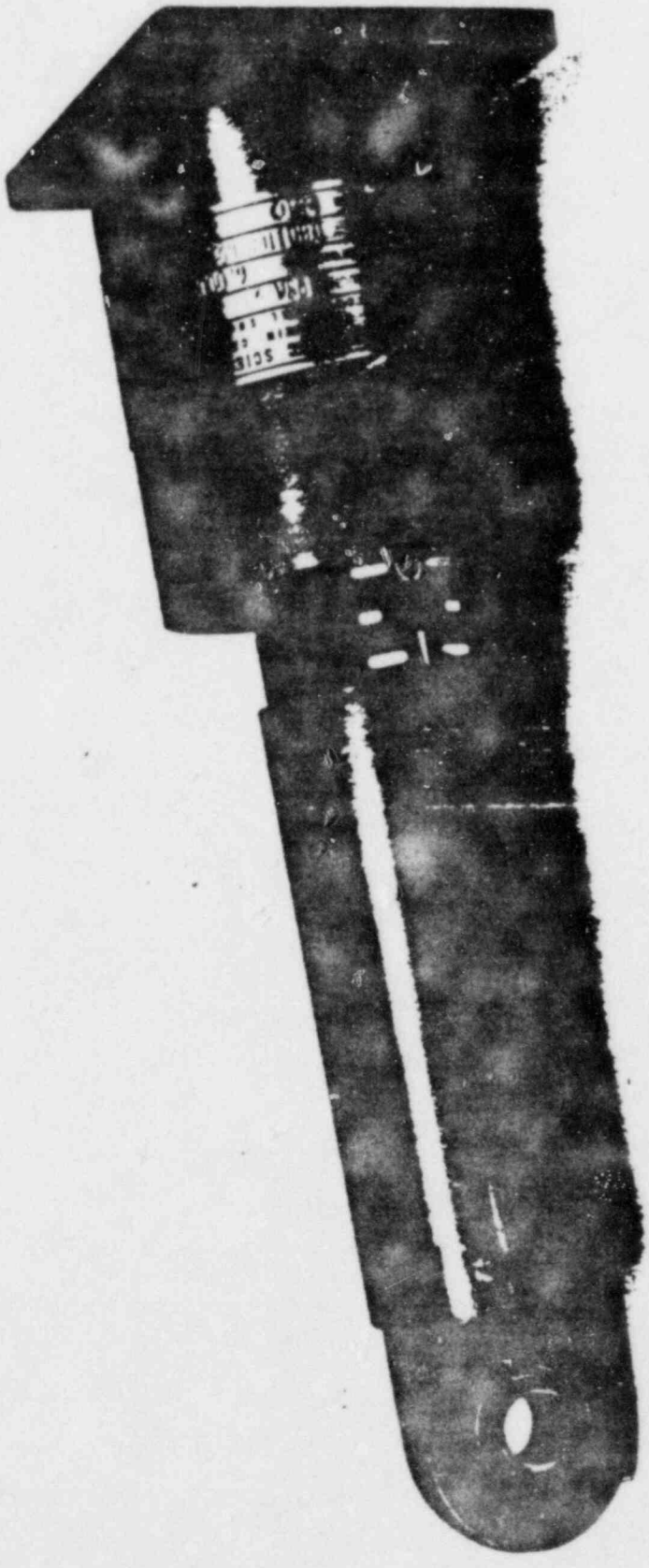
Questions of a technical nature should be addressed to the undersigned.

W M Wochos

W. M. Wochos, Engineering Specialist
Support Services Department
3874/62, Ext. 4957

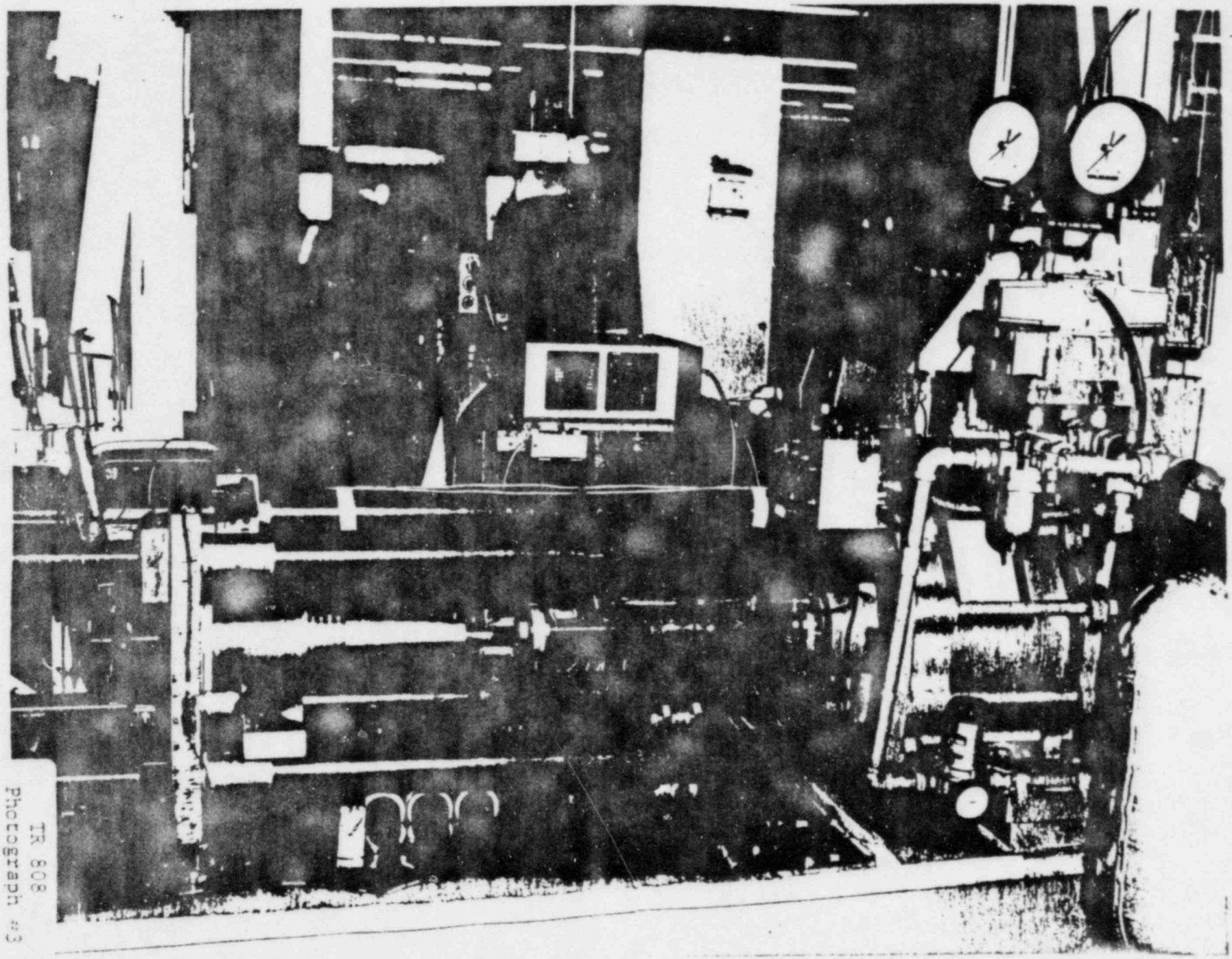
Concurrence:

M. A. Bandic, Acting Manager
Support Services Department
3874/62, Ext. 4957

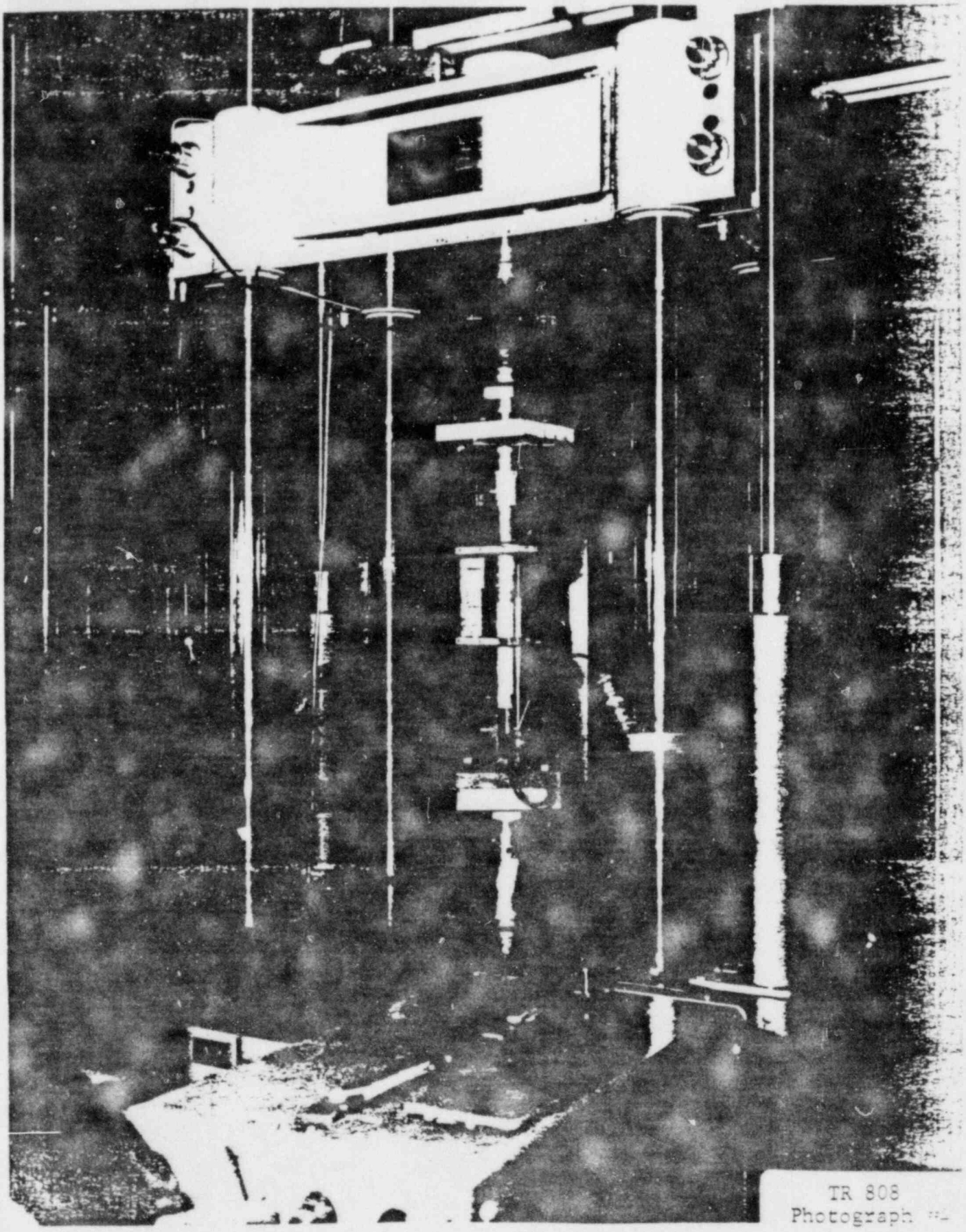


TR 808
Photograph #1

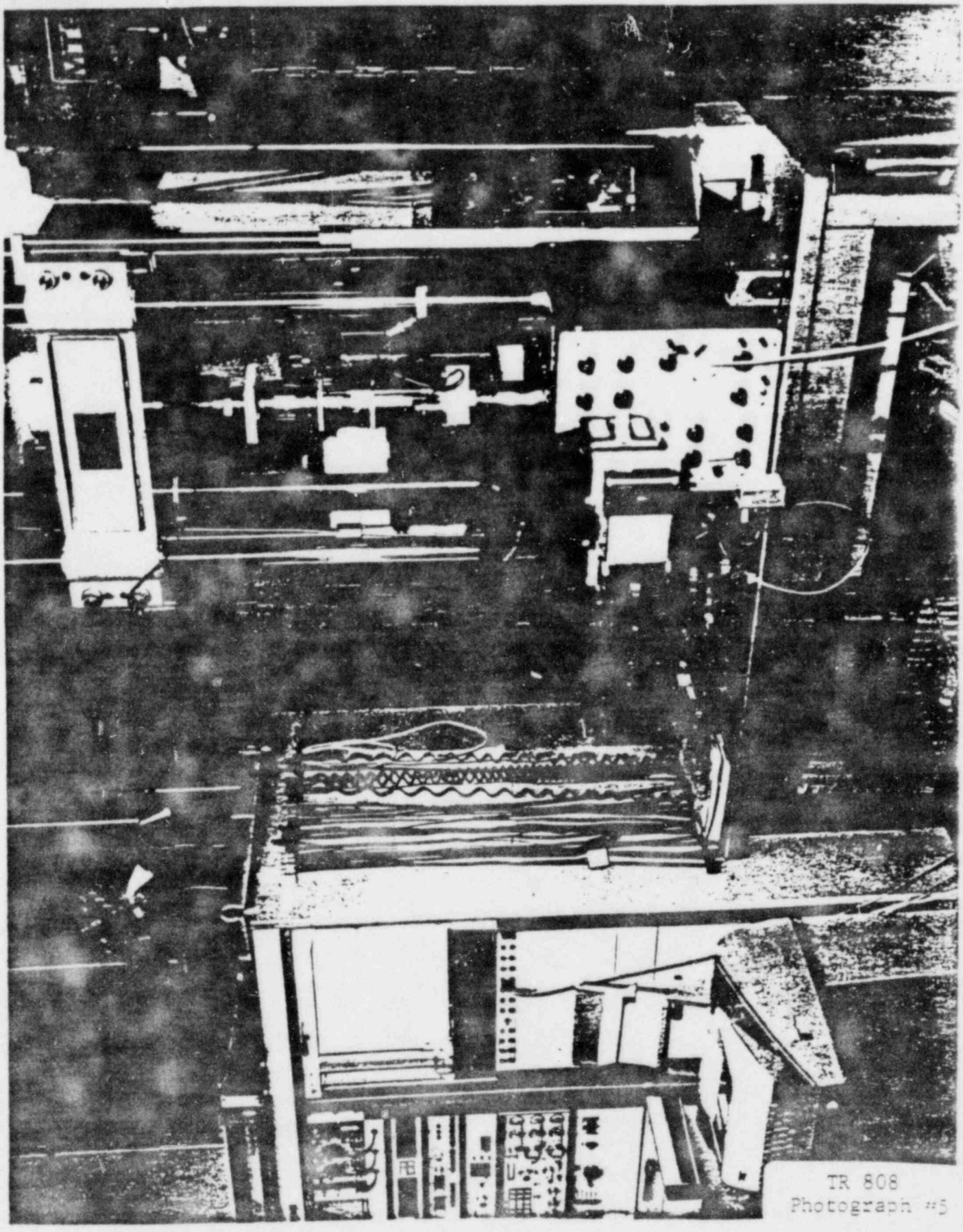
TR 808
Photograph #2



TR 608
Photograph #3



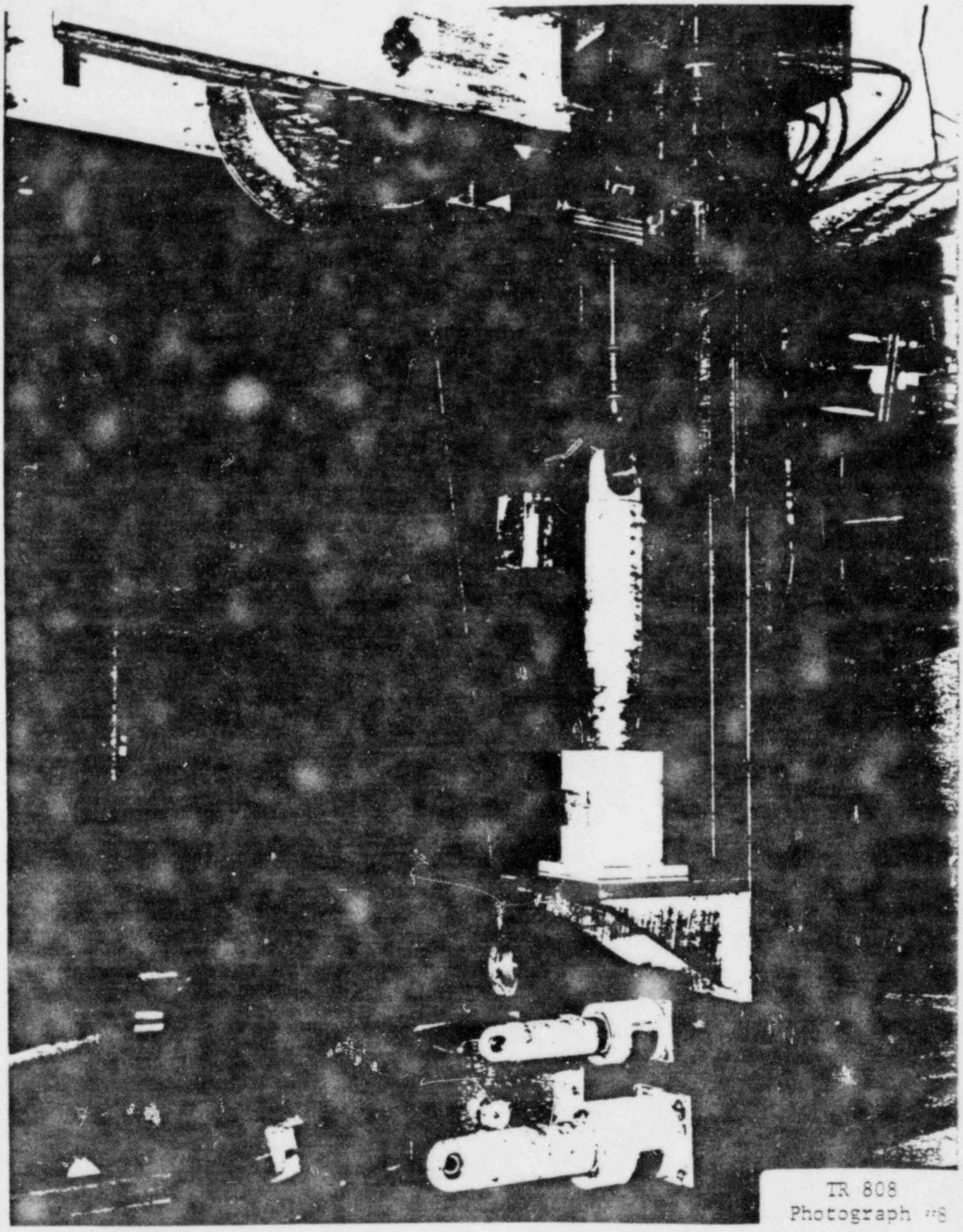
TR 808
Photograph #1



TR 808
Photograph #5

TR 808
Photograph #6

TR 808
Photograph #7



TR 808
Photograph #8

TR 808
Photograph #9

REPORT NO. TR 808

DATE 16 December 1977

ADDENDUM "A"

TEST REPORT 808

QUALIFICATION TESTS

MECHANICAL SHOCK ARRESTOR

P/N 1801106-05
Model PSA 3
Rated 6000 lbs
Functional Testing at 200°C

FROM

PACIFIC SCIENTIFIC

KIN-TECH DIVISION

PREPARED BY

R. F. Whitney
Test Engineer

APPROVED BY

J. E. Glauser
Director of Engineering

Leo E. Ay
Chief Design Engineer

P. A. Hadnagy
Q. C. Manager

REV	DATE	BY	APPD BY	PAGES AFFECTED	
0	12/16/77				

1.0 DISCUSSION

The purpose of the additional testing was to provide assurance that the 1801106-05 Mechanical Shock Arrestor will sustain the "Emergency" load at 200°C (392°F) and subsequently be capable of providing thermal cycling and seismic protection while at or below that temperature. Refer to DR 1425, Test Procedure for Functional Testing at 200°C (392°F).

2.0 FUNCTIONAL TEST AT AMBIENT TEMPERATURE

2.1 Requirement - The unit shall meet the functional tests of IT 524, Rev Q.

2.1.1 Procedure

2.1.2 S/N 850 was disassembled, examined thd then rebuilt using any necessary parts to assure reliable operation. The unit was then subjected to the functional tests outlined in IT 524, Rev Q.

2.1.3 Results - The functional requirements were met and the data is enclosed on page 3 (IT 524, page 5).

3.0 HIGH TEMPERATURE

Each unit shall be stabilized at 200°C (392°F) for a minimum of 8 hours. It shall then be removed from the oven and subjected to the following tests as rapidly as possible.

3.1 Load Test - 200°C

3.1.1 Requirements - The unit was positioned at mid-travel, with the inertia mass restrained. The "Emergency" load of 10,380 lbs shall be applied for 1 minute in tension, then 1 minute in compression.

3.1.2 Procedure - The unit was placed in a 200°C oven for 15 hours. It was removed from the oven and installed in the tensile test machine with the unit at mid-travel and loaded to 10,380 lbs in tension and held for 1 minute. The unit was then loaded in compression to 10,380 lbs and held for 1 minute. The load was removed and the unit examined and was in good condition. Approximately 10 minutes elapsed from removal from the oven until tests were completed.

3.1.3 Results - There was no failure.

3.2 Functional Test at 200°C (392°F)

3.2.1 Requirement - Immediately after load test, the functional tests defined in paragraph 2.0 shall be repeated, and the data again recorded. The temperature of the unit shall be monitored. It may drop to 172°C (340°F) during testing, but not below. If necessary, the unit shall be reheated between the load test and the subsequent functional tests.

3.2.2 Procedure - The unit was placed in the 200°C oven again immediately following the load test for 3 hours to stabilize the unit temperature. The unit was then removed and a thermocouple was installed with a band clamp. An insulated blanket was used on the unit during the functional tests.
The unit was subjected to the functional tests outlined in IT 524, Rev Q. The unit temperature was approximately 350°F after the tests were completed.

3.2.3 Results - All requirements were met. The data is recorded on IT 524, page 5. Refer to page 4.

REPORT NO IT-524
PAGE 5 OF 6
Rev. 0

ADDENDUM

Final Inspection Check List

PSCo 1801106-*

Shock Arrestor

Ref. paragraphs refer to paragraphs from this procedure, I.T. 524

Part No. 1801106-05 Serial No. 850

PSCo P.O. No. N/A Date 12-7-77

Shop Order No. 4-1900-19-08 Customer

I. Visual Examination (para. 5.1)

(a) Dimensional..... PSCo 20P

(b) Workmanship..... PSCo 20P

(P) II. Final Functional Tests

(a) Proof Load (6000 lbs.)(Para. 6.1)..... PSCo PT

(b) Breakaway Friction Force (60 lbs. max.)(para. 6.2)... PSCo P2C

(c) Torque Test (5 in./lbs.).....Actual Torque

Extending 1.4

Retracting 1.5

(if required)
Acceleration/Load Test (.51 sec. min./1.000 travel)
(para. 6.3.1.1)

Actual Time

Extending N/A

Retracting N/A

(d) Lost Motion (.040 max.)(para. 6.4).....Actual .013

Inspector R. Burton

Stamp PSCo 20P Date 12-7-77

REPORT NO IT-524

PAGE 5 OF 6

Rev. Q

ADDENDUM

Final Inspection Check List

PSCo 1801106-* AT 393°F

Shock Arrestor

Ref. paragraphs refer to paragraphs from this procedure, I.T. 524

Part No. 1801106-05 Serial No. 850

PSCo P.O. No. _____ Date 12-8-77

Shop Order No. _____ Customer _____

I. Visual Examination (para. 5.1)

(a) Dimensional..... —

(b) Workmanship..... —

(P) II. Final Functional Tests

(a) Proof Load (6000 lbs.)(Para. 6.1)..... O.K

(b) Breakaway Friction Force (60 lbs. max.)(para. 6.2)... O.K

(c) Torque Test (5 in./lbs.).MAX.....Actual Torque

Extending 1.9

Retracting 1.6

(if required)
Acceleration/Load Test (.51 sec. min./1.000 travel)
(para. 6.3.1.1)

Actual Time

Extending N/A

Retracting N/A

(d) Lost Motion (.040 max.)(para. 6.4).....Actual .017

Inspector C P Hartley S.E.N.

Stamp — Date 12/8/77

REFERENCES & MISC. DATA

(NOT APPLICABLE)

Project No.: 4536-32

Volume: EQ-CL056

CQD No.: 00418

Rev.00 Date: 6-18-83

SYSTEM COMPONENT
EVALUATION WORKSHEETS
(Arranged by Equipment No.)

Calc. No: COD	006418
Rev:	04
Date:	9-10-84
Proj. No:	4536-32
Page	H1 Of H2

Project No.: 4536-32

Volume: EQ-CL056

CQD No.: 006418

Rev. 04 Date: 9-10-84

EQUIPMENT DESCRIPTION		PARAMETER	ENVIRONMENT: SPECIFIED REQUIREMENTS	ENVIRONMENT: QUALIFICATION DEMONSTRATED	DOCUMENTATION REF.*: SPECIFIED REQUIREMENTS	DOCUMENTATION REF.*: QUALIFICATION DEMONSTRATED	QUALIFICATION METHOD	OUTSTANDING ITEMS
SYSTEM:	GENERIC	OPERATING TIME	100 DAYS	100 DAYS	1,2	3,4	ANALYSIS	NONE
PLANT ID NO.:	SEE NOTE 2	TEMPERATURE (DEG. F)	330 DEG. F SEE NOTE 1	330 DEG. F	1,2	3,4	ANALYSIS	NONE
COMPONENT:	SNUBBERS	PRESSURE (PSIG)	30	30	1,2	3,4	ANALYSIS	NONE
MANUFACTURER:	BASIC ENGRS./ PACIFIC SCIEN.	RELATIVE HUMIDITY(%)	ALL STEAM 100%	ALL STEAM 100%	1,2	3,4	ANALYSIS	NONE
MODEL NO.:	SEE NOTE 3	DEMIN. WTR. SPRAY	2×10^{8} 15 GPM/FT	SEE REF. DOC. 3	1,2	3,4	ANALYSIS	NONE
FUNCTION/ SERVICE:	RESTRICT PIPE MOVEMENT	RADIATION (RADS) TID	2×10^{8}	2×10^{8}	1,2	3,4	ANALYSIS	NONE
ACCURACY:	NOT APPLICABLE	AGING	40 YRS.	40 YRS.	1,2	3,4	ANALYSIS	NONE
LOCATION:	SEE NOTE 1	SUBMERGENCE	SEE NOTE 4	SEE NOTE 4	1,2	3,4	ANALYSIS	NONE
FLOOD LEVEL ELEV.: SEE NOTE 4 ABOVE FLOOD LEVEL:								

*DOCUMENTATION REFERENCES:

1) CPS-FSAR SECTION 3.11

2) S&L SPEC. K-2884

3) CQD-006418 (ANALYSIS FOR MECH. SNUBBER QUALIFICATION) Rev. 04

NOTES:

1) THE SYSTEM COMPONENT EVALUATION WORKSHEET IS TYPICAL FOR SNUBBERS IN ALL ENVIRONMENTAL ZONES EXCEPT H-28. THEREFORE, THE WORST CASE TEMP. IS EXPERIENCED IN ZONE H-54; ALL OTHER WORST CASE PARAMETERS ARE EXPERIENCED IN ZONE H-2.

2) THIS SHEET IS TYPICAL FOR ALL ID NUMBERS AND SYSTEMS.

3) THIS SHEET IS TYPICAL FOR MODELS PSA 1/4, 1/2, 1, 3, 10, 35, & 100.

4) SUBMERGENCE REQUIREMENTS HAVE BEEN JUSTIFIED IN MEQ-CL056, TAB C.

3306

Calc. No: CQD 006418
Rev: 04 Date: 9-10-84
Proj. No: 4536-32
Page 42 Of 42

SARGENT & LUNDY ENGINEERS