

10-MWe Solar-Thermal
Central-Receiver Pilot Plant

MASTER

SOLAR-FACILITIES DESIGN INTEGRATION

**PLANT-SUPPORT SUBSYSTEM
PROCUREMENT DOCUMENTATION
(RADL ITEM 7-44C)**

September 1980

WORK PERFORMED UNDER CONTRACT
DE-AC03-79SF10499

STEARNS-ROGER ENGINEERING CORP
4500 CHERRY CREEK DRIVE
P.O. BOX 5888
DENVER, CO 80217



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U.S. Department of Energy



Stearns-Roger



Solar Energy

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Central-Receiver Pilot Plant
Solar-Facilities Design Integration**

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PROCUREMENT DOCUMENTATION
(RADL ITEM 7-44C)**

September 1980

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**PREPARED FOR THE
U.S. DEPARTMENT OF ENERGY
SOLAR ENERGY
UNDER CONTRACT DE-AC-03-79SF10499**

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PREFACE

This document is provided by McDonnell Douglas Astronautics Company (MDAC) in accordance with Department of Energy Contract Number DE-AC03-79SF10499, Reports and Deliverables List (RADL), Item 7-44C. The information contained was provided by Stearns-Roger Engineering Corporation under MDAC Subcontract Number 78012035.

The procurement documentation contained herein (purchase specification and purchase orders) are for specific long lead materials provided as GFE for the Piping and Mechanical Equipment Construction Package 9. It includes the primary prefabricated pipe and the long lead pipe supports and seismic snubbers.

This document is a partial submittal of all PSS long lead hardware procurement documentation. This document along with RADL 7-44B, which includes the diesel and motor driven fire pumps, and various pressure seal and special control valves comprise the total PSS long lead hardware for Construction Package 9.

Questions concerning this report should be directed to R. J. Perkins at (714) 896-3073.

CONTENTS

I SCOPE

II PURCHASE SPECIFICATIONS

III PURCHASE ORDERS

IV HARDWARE DELIVERY SCHEDULE

V REFERENCES

APPENDIX I PURCHASE SPECIFICATION FOR PIPING AND MECHANICAL
EQUIPMENT CONSTRUCTION PACKAGE 9 - LONG LEAD MATERIAL

APPENDIX II PURCHASE ORDERS FOR PIPING AND MECHANICAL EQUIPMENT
CONSTRUCTION PACKAGE 9 - LONG LEAD MATERIAL



I SCOPE

This document contains the procurement documentation prepared by the SFDI (Stearns-Roger) for the long lead material required to be procured in support of the Piping and Mechanical Equipment Construction Package 9 for the 10 MWe Solar Pilot Plant being constructed at Daggett, CA.

II PURCHASE SPECIFICATIONS

The purchase specifications included herein define the technical requirements for the specific long lead items to be procured. They represent the final specification as conformed for purchase. The hardware was grouped into three (3) categories for this procurement effort as follows:

- A. Primary Prefabricated Pipe (heavy wall and alloy); identified as Specification No. Stearns-Roger E6, DOE 40P700-17S, dated 28 March 1980 (for Stearns-Roger Piping Purchase), Revision 1 dated September 1980 (for Rocketdyne Piping Purchase).

- (1) Isometrics of Stearns-Roger Piping (21 sheets)
- (2) Isometrics of Rocketdyne Piping (26 sheets)

- B. Primary Pipe Supports, identified as Specification No. Stearns-Roger E2, DOE 40P700-20S, dated 2 July 1980 (For Purchase).

- (1) Primary Pipe Supports, PSS Area, Hanger Volume P60-1 (DOE 40P700-16I, Revision 5, dated 2 September 1980.

- C. Pipe Support Snubbers, identified as Specification No. Stearns-Roger E8, DOE 40P700-32S, dated September 1980 (For Purchase).

- (1) Primary Pipe Supports Snubbers, Hanger Volume P60-2 (DOE 40P700-17I), dated 26 September 1980 (For Purchase).

The detail technical specification for each of these procurement packages are included in Appendix I.

III PURCHASE ORDERS

The purchase orders issued by Stearns-Roger for each of the procurement packages noted in Section II are included herein to provide a detailed listing of each procurement. As noted in each purchase order, the material is planned for direct delivery to the jobsite, i.e., 10 MWe Solar Pilot Plant, Daggett, California. A copy of the purchase order for each package is included in Appendix II.

IV HARDWARE DELIVERY SCHEDULE

The need dates established for each of the various items of hardware is identified in the purchase specification and on the purchase orders. The SFDI has prepared and maintains a hardware delivery status log to track the subject hardware. This information is provided to STMPD and Townsend & Bottum, Inc., on a regular basis in order to maintain a current status with respect to projected on-site deliveries.

V REFERENCES

The material identified herein was referenced in the Technical Specifications as prepared by the SFDI for the Piping and Mechanical Equipment Construction Package 9, which is identified as follows:

- Technical Specification DOE 40M700-6S, under cover of SAN/0499-39, MDC G8177 (RADL Item 7-33), dated June 1980.

The above specification was included in the invitation for bid prepared by Townsend & Bottum, Inc., as follows:

- 10 MWe Solar Pilot Plant, Invitation for Bids, TB-FB-96-80-JC50007, Piping and Mechanical Equipment, distributed on July 1980.

APPENDIX I

PURCHASE SPECIFICATIONS
FOR
PIPING AND MECHANICAL EQUIPMENT
CONSTRUCTION PACKAGE 9

LONG LEAD MATERIAL



SPECIFICATION

S-R E6

March 28, 1980
For S-R Piping Purchase
Rev. 1 September 12, 1980

D. O. E. NO. 40 P 700 - 17S

for

PRIMARY FABRICATED PIPE
(HEAVY WALL AND ALLOY)

for

10 MW_e SOLAR PILOT PLANT
SOLAR-ONE
DAGGETT, CA.

Prepared by:

Stearns-Roger
ENGINEERING CORP.

PROJECT NO. C-21700

September 12, 1980

REVISION NO. 1
TO
S-R E6

SPECIFICATION D.O.E. NO. 40P700-17S
FOR
PRIMARY FABRICATED PIPE
(HEAVY WALL AND ALLOY)
FOR
PURCHASE

1. Revision No. 1 is issued for:
 - A. Completion of design temperatures, design pressures, hydrotest pressures, and pipe sizes.
 - B. Completion of Rocketdyne reference drawings.
 - C. Substitution of ANSI B31.1 butt weld transitions for Engineering Standard DE21.9.
 - D. Clarification of material note on DN00.5.
 - E. Updating of Engineering Standards SE00.1 and SE00.MBX.
 - F. Clarification on use of Fabricator's drawings.
 - G. Addition of Primary Pipe Support Volumes P60-1 and P60-2.
 - H. Clarification of Rocketdyne piping field hydrotests.
 - I. Clarification on mailing reproducible drawings.
2. Remove the following pages and replace with the corresponding pages attached hereto:

Pages 2, 3, 4, 5, 110, 12, A-1, A-2, C-1, C-2, Engineering Standard DN00.5 Sheet 3 of 5, SE00.1 Sheet 1 of 2, and SE00.MBX Sheets 1 and 2 of 2.
3. Delete Engineering Standard DE21.9.
4. Add page C-3 and Primary Pipe Support Volumes P60-1 and P60-2.
5. Remove cover and replace with cover marked Revision No. 1 attached hereto.

TABLE OF CONTENTS

	<u>Page</u>
<u>SPECIFICATION FOR HEAVY WALL FABRICATED PIPE</u>	
1. Scope	1
2. Supplements	1
3. Codes and Standards	1
4. Operating Conditions	2
5. Materials Furnished by Fabricator	2
6. Material Furnished by Others	4
7. Material Not Included Under this Specification	4
8. Interpreting Drawings Furnished to Fabricator	4
9. Shop Fabrication	5
10. Testing Requirements	9
11. Documentation	11
12. Preparation For Shipment	15
13. Shipping Schedule	17
14. Guarantees	17
15. Final Acceptance	17
 Appendix A - Pipe Materials	 A-1
Appendix B - Fittings	B-1
Appendix C - Supplements	C-1

SPECIFICATION
FOR
PRIMARY FABRICATED PIPE (HEAVY WALL AND ALLOY)

1. SCOPE

- A. The work to be performed hereunder by the Fabricator shall include the furnishing, fabrication, inspection, testing, preparation for shipment and delivery of all primary (heavy wall and alloy) piping, complete as shown on the supplements and as specified herein.
- B. Unloading and storage at the plant site, installation, field inspection and field testing after installation will be performed by others.

2. SUPPLEMENTS

The following Stearns-Roger appendices are included with and form a part of this Specification

- A. Appendix A, Pipe Materials, dated 10/30/79, 2 pages.
- B. Appendix B, Material Take-Off, dated 3/27/80.
- C. Appendix C, Supplements, dated 10/30/79, 2 pages.

3. CODES AND STANDARDS

- A. All materials, design, fabrication, inspection and testing for all primary piping furnished under this Specification shall be in accordance with American National Standard Code for Pressure Piping, ANSI B31.1-1977, Power Piping with Addenda through Winter 1978, and the additional Standards specifically referenced in this Specification. The ASME Boiler and Pressure Vessel Code, Section I, 1977 Edition with Addenda through Summer 1979, shall also govern the materials, design, fabrication, inspection, testing and stamping of the boiler external piping.
- B. The Engineer shall be apprised in writing of the discrepancies between this Specification and the drawings or between this Specification and the referenced Standards and Codes. The Engineer's subsequent resolution shall be final.

SPECIFICATION (CONTD)

4. OPERATING CONDITIONS

A. Environmental

- a. Altitude of plant above mean sea level: 1950 feet
- b. Barometric pressure: 13.72 psia
- c. Operational ambient temperature range: 16 F to 113 F
- d. Survival temperature range: 9 F to 117 F
- e. The plant is located in a Uniform Building Code Seismic Zone 3.

B. Design Conditions

The design pressure-temperature conditions for each system are specified in Section 5 "Materials Furnished by Fabricator."

5. MATERIALS FURNISHED BY FABRICATOR

- A. The materials as shown on Stearns-Roger Drawings and furnished by the Fabricator shall include the primary piping, fittings, flanges, caps and sample nozzles shown on the Engineer's drawings, and the additional items listed below for this primary piping. The piping is further specified in Appendices A and B, attached hereto. Exceptions are the furnishing of those materials listed under Paragraph MATERIAL NOT INCLUDED UNDER THIS SPECIFICATION.

- a. MS-2, -3, -6, and -10; Main Steam Header and Branches in accordance with Piping Engineering Standard SE00.QEB. Design Temperature 1010 F Design Pressure 1775 psig.
- b. MS-5 and -7; Receiver Steam Dump and Branch in accordance with Piping Engineering Standard SE00.FEA. Design Temperature 950 F Design Pressure 305 psig.
- c. MS-9 and ST-9; Admission Steam to Main Steam to Desuperheater in accordance with Piping Engineering Standard SE00.FEA. Design Temperature 950 F Design Pressure 305 psig.
- d. AS-7; Auxiliary Steam from Desuperheater to Auxiliary Steam Header Limit in accordance with Piping Engineering Standard SE00.FEA. Design Temperature 950 F Design Pressure 305 psig.
- e. ST-13; Atomizing Steam to Desuperheater in accordance with Piping Engineering Standard SE00.FEA. Design temperature 950 F; Design Pressure 154 psig.

SPECIFICATION (CONTD)

- f. FW-2 and -9; Feedwater to TSS Desuperheater in accordance with Piping Engineering Standard SE00.MBA. Design Temperature 440 F; Design Pressure 2500 psig.
- g. VT-1 and VT-12; Receiver Flash Tank Vent in accordance with Piping Engineering Standard SE00.KEB. Design Temperature 960 F; Design Pressure 585 psig.
- h. VT-11, Receiver Flash Tank Vent in accordance with Piping Engineering Standard SE00.FEA. Design Temperature 960 F; Design Pressure 305 psig.
- i. ST-17 Admission Steam in accordance with Piping Engineering Standard SE00.HEA Design temperature 902°F; Design Pressure 1448 psig. 1
- j. ST-18 and -19; Admission Steam and Branches in accordance with Piping Engineering Standard SE00.HEA. Design temperature 902°F; Design Pressure 450 psig. 1
- k. Thermowells as shown on S-R Engineering Standard DN 00.5, 5 pages and as follows: 1
 - (1) Four (4) thermowells for the main steam (QEB) piping.
 - (2) One (1) thermowell for the receiver steam dump (FEA) piping.
 - (3) One (1) thermowell for the Auxiliary Steam (FEA) Piping.
- l. One (1) sample nozzle for main steam (QEB) piping - See S-R Engineering Standard DN 00.5, Sheet 5 of 5. 1
- m. Weldolets as shown on the Drawings.
- n. Sockolets for FT, FX, PI, PS and PT instrument connections as shown on the Drawings.
- o. All bolts, studs, nuts, washers, gaskets, etc., required for the makeup of flanged joints.
- p. All branch connections on the piping.
- q. Nuts required for supporting vertical pipe insulation in accordance with DP30.1.
- r. Integral pipe attachments, i.e., welded-on hanger lugs, etc. as shown in Primary Pipe Supports Vol P60-1 and Primary Pipe Supports Snubber Vol. P60-2. 1

SPECIFICATION (CONTD)

- s. Plugs for all shop and field radiographic access holes.
- t. Weld rings as required by the Piping Engineering Standards for both shop and field butt welded joints.
- u. Bootlegs as shown on the drawings.
- B. The materials as shown on Rocketdyne Drawings and furnished by the Fabricator shall include carbon steel and alloy piping materials as defined on Appendix B, Part II, Rocketdyne material take-off.
- C. Butt welded joints as specified herein shall include pipe-to-pipe, pipe-to-valve, pipe-to-fitting, pipe-to-equipment, valve-to-valve, valve-to-fitting, valve-to-equipment, fitting-to-equipment, and fitting-to-fitting joints.
- D. All material shall be marked in accordance with Paragraph PREPARATION FOR SHIPMENT of this Specification.

6. MATERIALS FURNISHED BY OTHERS (ROCKETDYNE)

Incoloy piping, noted by material specification RNX, will be furnished by Rocketdyne for fabrication as shown on the applicable Rocketdyne Drawings:

3"-CO-222-QEX

6"-MS-201-QEX Sheets 2 & 3

1

1

1

7. MATERIAL NOT INCLUDED UNDER THIS SPECIFICATION

- A. All valves and accessories.
- B. All piping 2-inches and smaller.
- C. All piping supplied "By Others" as shown on the drawings.
- D. All hangers and supports.
- E. Thermal insulation materials.
- F. Thermometers, thermocouples and instrument welds.

8. INTERPRETING DRAWINGS FURNISHED TO FABRICATOR

- A. Each pipeline covered by this Specification has a three-letter designation as indicated on the drawings (An example defining the pipeline designation is shown on Drawing XL-22934, Sheet P1-1, Symbols & Nomenclature). The Piping Engineering Standard corresponding to the three-letter designation establishes the requirements for pipe, valves, fittings and accessories.

SPECIFICATION (CONTD)

- B. Any deviations between this Specification and the supplements shall be brought to the attention of the Engineer for resolution of the conflict.

9. SHOP FABRICATION

A. General

- a. Piping shall be fabricated as required by the applicable Piping Engineering Standard for each pipeline, and as shown on the drawings. All piping and fittings shall be shop fabricated to the greatest extent practicable while still maintaining units of shippable size. The use of short pieces (less than random lengths) of pipe in making up long runs will not be allowed unless otherwise approved by the Engineer.
- b. Prefabricated assembly linear dimensional tolerances shall be in accordance with PFI Standard ES-3-1974 or $\pm 1/8$ inch end-to-end, center-to-center, center-to-end, face-to-center, etc.
- c. All connections for vents, drains, instruments and small connecting piping shall incorporate the branch connections as specified on the applicable Piping Engineering Standard or as called out on the drawings. Connections for venting and draining of all piping systems shall be included as part of this Specification.
- d. All instrumentation connections shall be tagged with the appropriate tag number and installed in the pipe by the Fabricator.
- e. Nuts required for supporting vertical pipe insulation shall be attached to the pipe in accordance with Engineering Standard DP30.1.
- f. The Fabricator shall at all times make available and provide access to all portions of the work and all inspection reports for inspection by the Engineer. Fabricator shall be required to furnish the necessary tools, equipment and general assistance.

B. Welded Construction

- a. All welders shall be qualified in accordance with the requirements of the Code(s) governing the class of work to be done.
- b. Piping butt weld transitions shall conform to ANSI B31.1. The minimum wall thickness for pipe and fittings after counterboring shall not be less than the specified minimum code calculated pipe wall thickness.

SPECIFICATION (CONTD)

- c. Welding processes and butt weld end preparation requirements are specified in Engineering Standard No. SE00.1, GENERAL NOTES. Pipe ends for socket weld joints shall be machine cut and reamed.
- d. Weld rings may be used only when allowed by the applicable Engineering Standard.
- e. All welded attachments to piping specified to be postheat treated shall be attached prior to such postheat treatment.
- f. Access holes and plugs shall be provided by the Fabricator for field welded joints above 6 inch nominal pipe size that require field radiographic inspection. Access holes and plugs shall be designed and fabricated in accordance with PFI Standard ES-16, 1979.
- g. Visual inspection of welding operations shall be performed by the Fabricator's inspectors and shall include examination of bevel details prior to welding, examination of surface holes, cracks and other defects during welding and examination for undercuts or other surface defects and reinforcement dimensions after welding. Documentation shall be furnished by the fabricator indicating at least 20% of all welding operations have been inspected. Visual examination of all completed welds shall be performed and necessary repairs made prior to any postheat treatment.
- h. Imperfect welds as defined by ANSI B31.1 and ASME Codes are unacceptable and shall be repaired. Repaired welds shall then be reexamined by the original inspection method.

C. Heat Treatment

In addition to the requirements for bending and forming operations stated herein the Fabricator shall perform the heat treatment requirements as specified in ANSI B31.1 and the applicable qualified welding procedure.

D. Threaded Construction

All pipe threads on pipe and fittings shall conform to ANSI B2.1 for pipe threads.

E. Flanged Construction

- a. All contact surfaces of pipe flanges shall be concentric with the axis of the piping. All flanges and flanged fittings shall be accurately machined, shall be drilled true to template and shall conform to ANSI B16.5. Flanges shall be installed so that all bolt holes straddle the centerlines of the pipe and/or equipment.

SPECIFICATION (CONTD)

- b. Flanged joints shall not be made up in the shop; however, all flanges, bolts, studs, nuts, washers, gaskets, etc., required for makeup of flanged joints shall be provided.
- c. PFI Standard ES-3-1974 shall be used for control of flange face angularity and rotation tolerances.
- d. Alloy bolt studs shall be properly marked and have finished ends for micrometer length measurements in accordance with the requirements specified in Engineering Standard No. SE00.1, GENERAL NOTES.
- e. Tensile loading will be done in the field by others in accordance with Crane Company procedures for "Assembly and Maintenance of Flanged Joints" as specified in Crane Catalog No. VC-1900.

F. Branch Connections

- a. Branch connections shall be as specified on the applicable Piping Engineering Standard and shall comply with the ANSI B31.1 Code.
- b. Openings in the pipe 1-1/2 inch and smaller shall be drilled. Openings larger than 1-1/2 inch shall be made by milling air arc gouging or flame cutting. If air arc gouging or flame cutting is used the parent metal shall be preheated in accordance with the applicable welding procedure and the hole shall be finished by grinding or other suitable means to assure a smooth radius finish.
- c. All threaded attachment shall be cleaned and trued by use of a thread tap or die after welding of the attachment to the parent pipe and any required postheat treatment has been completed.
- d. All connections for pressure instruments shall be fabricated in accordance with the drawings and shall be finished on the internal edges in accordance with Figure No. II-II-5 of the ASME Performance Test Code Supplement PTC 19.5; 4-1972.

G. Bends (For Rocketdyne Piping)

- a. All bends shall be fabricated (including heat treatment) in accordance with ANSI B31.1 and the procedures which have been submitted by the Fabricator and approved by Rocketdyne Engineering. In addition, all bending shall be in accordance with the requirements specified herein.

SPECIFICATION (CONTD)

- b. All straight pipe sections shall have end preparations 90 degrees to the longitudinal centerline, and any angular corrections to pipe bends shall be made on the bend ends only.
- c. Pipe bending tolerances shall be in accordance with PFI Standard ES-24-1975 and shall be true within 1-1/2 degrees. The minimum wall thickness after bending shall not be less than the specified minimum code calculated pipe wall thickness. All bends shall be made with the thick wall on the outside of the radius.
- d. All bends shall maintain a nearly true circular cross-section of pipe without buckling or undue stretching of pipe wall. In no case shall ovality be greater than 8 percent in accordance with ANSI B31.1, Paragraph 104.2.1.
- e. The pipe bend shall not come in contact with nonferrous metals while hot, and galvanized steel chains or straps shall not be used in the hot bending operation.
- f. If pull-legs of a material foreign to the parent pipe are used for bending, the pull-legs shall be removed by cutting the bent pipe back 3 inches from the edge of the weld.
- g. Except for carbon steel piping, water and similar cooling medium(s) shall not be allowed to contact the pipe material during the heating period, bending operation or subsequent cooling.
- h. Bends shall be ultrasonically tested in accordance with PFI ES-20-1980 (revised draft) to ensure that over-thinning of pipe on the outside axis of pipe has not occurred during the bending process.
- j. All Incoloy 800 pipe bends shall be liquid penetrant inspected for surface cracks in accordance with ANSI B31.1.
- k. All pipe incorporated bends shall be thoroughly cleaned by steel shot or grit blast and subsequently purged with an air blast to remove all sand and other impurities from the inner surface of the pipe. The inside and outside of all such pipe shall be free from scale, sand, abrasive cleaning materials and other foreign matter.

H. Cleaning and Finishing

- a. All primary piping shall be internally blast cleaned in accordance with PFI ES-29 (tentatively dated July 1979) "Abrasive Cleaning of Ferritic Piping Materials" to remove all mill scale, welding icicles, cuttings, beads, burrs and rust and subsequently cleaned inside before shipment. Grit materials shall not contain silica.

SPECIFICATION (CONTD)

- b. All pipe and fittings shall have all paint removed from the interior surfaces.

10. TESTING REQUIREMENTS

A. General

- a. All pipe and fittings to be furnished by the Fabricator shall be tested by the manufacturer in accordance with the supplementary requirements of the applicable Piping Engineering Standard, the applicable ASTM or ASME material specification and as further specified herein.
- b. The Fabricator shall inspect his shop welded joints to the extent and in accordance with the techniques and acceptance standards specified in ANSI B31.1 and as further specified herein.
- c. The pipe and fitting manufacturer and Fabricator shall notify the Engineer no less than two (2) weeks prior to the time that the pipe and fittings will be ready for testing in order that the Engineer may schedule such representation as they may desire to witness the testing.
- d. Should the Engineer elect not to have a representative present during shop tests, such decision shall in no way relieve the manufacturer or Fabricator from full responsibility for the quality and correctness of the work, nor shall anything contained in the above Paragraphs in any way void, restrict, or limit the right of the Engineer to later conduct such performance tests as it may desire, or its rights under any warranty or guarantee.

B. Manufacturer's Hydrostatic Tests

a. General

- (1) The hydrostatic test pressures specified herein for pipe and fittings are equivalent to the field hydrostatic test pressures that will be performed.
- (2) If the specified hydrostatic test pressures exceed the manufacturer's test pressure capabilities, the fabricated piping shall be capable of withstanding the specified field hydrostatic pressure.

SPECIFICATION (CONTD)

b. Piping Systems

- (1) Each piping system on Main Steam MS-2, -3, -6 and -10 pipe shall be hydrostatically tested to 2663 psig.
- (2) Each piping system on Main Steam MS-5 and -7 pipe shall be hydrostatically tested to 458 psig.
- (3) Each piping system on Main Steam and Auxiliary Steam MS-9 and ST-9 shall be hydrostatically tested to 458 psig.
- (4) Each piping system on Auxiliary Steam AS-7 shall be hydrostatically tested to 458 psig.
- (5) Each piping system on Atomizing Steam ST-13 shall be hydrostatically tested to 235 psig. 1
- (6) Each piping system on boiler feedwater discharge pipe FW-2 and -9 shall be hydrostatically tested to 3750 psig.
- (7) Each piping system on receiver flash tank vent VT-1 and VT-12 shall be hydrostatically tested to 878 psig.
- (8) Each piping system on receiver flash tank vent VT-11 shall be hydrostatically tested to 458 psig.
- (9) Each piping system on Admission Steam ST-17, shall be hydrostatically tested to 2172 psig. 1
- (10) Each piping system on Admission Steam ST-18 and -19 shall be hydrostatically tested to 675 psig. 1
- (11) Each piping system fabricated per Rocketdyne drawings shall be field hydrostatically tested per applicable code. 1

c. Weld Examination Requirements

- a. In addition to the requirements of the ANSI B31.1 Code shop and field welded joints, which are not included in the field hydrostatic test of the piping, shall be 100 percent radiographed.
- b. All dissimilar and all Incolloy welds shall have liquid penetrant checks.
- c. Radiographic, magnetic particle and liquid penetrant inspection methods and acceptance standards for welds and weld repairs shall be in accordance with the applicable ASME or ANSI Code.

D. Incolloy Pipe

One length per heat of all incolloy piping shall be liquid penetrant inspected.

SPECIFICATION (CONTD)

11. DOCUMENTATION

A. General

Documentation shall be furnished in accordance with Specification No. FJ50.50, Engineering Standard No. FJ60.60, and the following:

B. Exceptions or Modifications to Specification No. FJ50.50

- a. Paragraphs 3.A.b., c., and g. are deleted in their entirety.
- b. Paragraph 3.D is deleted in its entirety.
- c. Paragraph 3.E. is deleted in its entirety; however, a bill of material shall be added to each spool sheet (shop fabrication) drawing.

C. Exceptions or Modifications to Engineering Standard No. FJ60.60

- a. The column titled "WEEKS AFTER AWARD" on Engineering Standard No. FJ60.60 is deleted in its entirety; however, documentation shall be furnished in accordance with the time requirements specified herein.

b. Pipe and Fitting Manufacturer's Drawings and Reports

The fabricator shall retain at his facilities one (1) certified report of each of the following for inspection by the Engineer:

- (1) Tests required by ASME SA-335, ASTM A335, ASTM A106, ASME SA-182, ASTM A182 and/or ASTM A234.
- (2) Additional product analysis, flattening and macro etch tests as specified herein.
- (3) Additional photomicrographs as specified herein.
- (4) Ultrasonic, radiographic, magnetic particle and liquid penetrant inspections complete with evaluations.
- (5) Weld repairs complete with evaluations.
- (6) Welder qualifications.
- (7) Welding procedures.

c. Fabricator's Drawings

- (1) Item 2A of Standard No. FJ60.60 shall include spool sheet (shop fabrication) drawings as specified herein.

SPECIFICATION (CONTD)

- (2) Item 2B of Standard No. FJ60.60 shall include field erection drawings as specified herein. 1
- (3) The Fabricator shall not prepare field erection or spool sheet drawings until he receives the Engineer's drawings designated "APPROVED FOR CONSTRUCTION."
- (4) The Fabricator is not authorized to begin fabrication until his field erection and spool sheet drawings have been returned and marked "APPROVED" or "APPROVED EXCEPT AS NOTED."
- (5) The Fabricator shall submit two (2) sepias and one (1) print of each field erection and spool sheet drawing to the Engineer for approval. Spool sheet drawing and erection drawings shall as a minimum indicate the following as applicable:
 - (a) Locations and identification numbers of all field welds. (Erection drawings only)
 - (b) Locations of all shop welds. (Spool drawings only)
 - (c) Locations and identification numbers of all welds to be radiographed.
 - (d) Piece numbers, line numbers, and arrow indicating direction of flow.
 - (e) A reference to weld end preparation details.
 - (f) Valve tag numbers which shall also be marked on each package of special bolting for valves having wafer or monoflange joints.
 - (g) Location of hanger lugs.
 - (h) Location of insulation nuts.
 - (i) All related details.
 - (j) Bills of material.
- (6) One (1) copy of each field erection and spool sheet drawing will be returned to the Fabricator with the Engineer's comments.

SPECIFICATION (CONTD)

- (7) The Fabricator shall then revise the field erection and spool sheet drawings in accordance with the Engineer's comments and reissue (1) sepia and (1) print.
- (8) After all fabrication has been completed, the Fabricator shall show all piping spools on the latest revised drawings.
- (9) The Fabricator will be held responsible for all details shown on his drawings. The Engineer's review and comments do not relieve the Fabricator of this responsibility.

d. Fabrication Procedures

- (1) Item 3E of Standard No. FJ60.60 shall include the fabrication procedures as specified herein.
- (2) The Fabricator shall submit, within two (2) weeks after being notified to proceed, copies of each of the following procedures and reports for the Engineer's review and/or comments. The number of copies that are required is specified on Standard No. FJ60.60.
 - (a) Complete and detailed description of the welding procedures.
 - (b) Qualification test report(s) for each welding operator.
 - (c) Preheat and postheat treatment procedures.
 - (d) Radiography, liquid penetrant, and magnetic particle examination procedures.
 - (e) Detailed description of quality control procedures including extent of inspection.
- (3) The Engineer's review and/or comments of the Fabricator's procedures and reports shall in no way relieve the Fabricator of the full responsibility for satisfactory welding, heat treating, radiographing, examining by liquid penetrant or magnetic particle inspection or the proper correction of any defects, or otherwise fulfilling all other requirements of this Specification.

SPECIFICATION (CONTD)

e. Shop Fabrication Reports

Item 3F of Standard No. FJ60.60 shall include certified reports of the following:

- (1) Postheat treatment for welds and hot formed sections/bends including temperature charts.
- (2) Weld repairs complete with evaluations.
- (3) Evaluations of radiographic films and liquid penetrant and magnetic particle inspections. Radiographic evaluations shall show date, location, area, film number, serial number, film combinations, and other pertinent information for each weld radiographed. A summary of this record and an expert interpretation shall be submitted in report form for each weld to the Engineer for analysis and approval.
- (4) All other inspections performed by the Fabricator.
- (5) Reports required by the applicable ASME and ANSI Code.

D. Shipping Information

At least thirty (30) days prior to initial shipment of equipment specified herein, the Fabricator shall submit the following information to the Engineer for approval:

- a. A description of Fabricator's method of preparing the equipment for shipment in accordance with Paragraph PREPARATION FOR SHIPMENT.
- b. Specific shipping data, as follows:
 - (1) Name of carrier.
 - (2) Proposed routing.
 - (3) Actual breakdown by carload and/or truckload to include all applicable tag numbers (at time of shipment).
 - (4) Packing and classification description (at time of shipment).

SPECIFICATION (CONTD)

12. PREPARATION FOR SHIPMENT

A. Pipe and Fittings - Protection for Shipment

- a. For shipment, all pipe materials and fabricated piping assemblies shall be adequately blocked and secured to ensure against all possible loss or damage such as the following:
 - (1) Load shifting or humping.
 - (2) Damage to machined surfaces and weld end preparations during shipping and field handling.
 - (3) Entrance of foreign matter during shipment and while in storage at the site.
 - (4) Climatic conditions encountered enroute as well as the hazards of transportation and handling.
- b. All materials and equipment shall be protected in accordance with the following additional requirements:
 - (1) Weld end preparations shall be coated with Deoxaluminat (Special Chemicals Corporation or an Engineer-approved equal) in accordance with the manufacturer's recommendations and fitted with plywood inserts held in place with metal end closures tack welded to the pipe in such a manner to prevent any damage to the weld end preparation.
 - (2) Flanges shall be protected with plywood or masonite covers sealed and bolted to the flange with not less than four bolts.
 - (3) Threaded connections shall be furnished with thread protectors.
 - (4) Small connections shall be protected with plastic inserts pressed into the connection.
 - (5) All end connections shall be subsequently sealed with at least three wraps of waterproof tape.

B. Pipe and Fittings - Marking

- a. Each pipe and fitting shall bear the manufacturer's stamp or mark indicating the ASTM or ASME Specification under which the pipe or fitting was manufactured.

SPECIFICATION (CONTD)

- b. To facilitate identification and assembly in the field, each pipe spool shall be conspicuously marked with clear and legible identifying markings showing the following:
 - (1) Spool piece number and line number.
 - (2) Weight.
 - (3) Shop radiography identification numbers.
 - (4) Arrows indicating direction of flow.
- c. All other bolts, studs, gaskets, etc., required for flanged joints shall be assembled, packaged and identified by line pipe size, material and pressure class. Spare gaskets shall be separately packaged and tagged as spare parts.
- d. The markings shall be done with paint or ink that will not smear, fade, peel or otherwise become illegible during transportation, handling or storage. Stamping shall be performed with low stress round nose steel stamps or other methods approved by the Engineer.

C. Shipping Information

Fabricator shall submit to the Engineer for approval all shipping information specified in Paragraph DOCUMENTATION.

D. Tagging Instructions

- a. All crates, boxes, bags or items shipped loose or skidded shall contain the following information:
 - (1) DOE No. 40P700-17S
 - (2) Purchase order item number
 - (3) Mark or tag number as applicable.
 - (4) Ship to address: Townsend & Bottum, Inc.
C/O D.M. Abrams, Construction Manager
Solar One Pilot Plant
Daggett, California 92327
- b. Items not crated or boxed shall be tagged with metal tags securely attached and containing the information set forth in Subparagraph a. above.
- c. Fabricator shall require subsuppliers to follow these tagging instructions.

SPECIFICATION (CONTD)

13. SHIPPING SCHEDULE

The Fabricator shall schedule engineering, fabrication, preparation for shipment and delivery to a carrier in such a manner that all S-R piping items covered by this Specification shall be delivered to the power plant site prior to December 1, 1980.

Rocketdyne piping shall be delivered in accordance with the project schedule.

14. GUARANTEES

- A. The Fabricator shall guarantee that the material/equipment furnished conforms to the requirements specified herein and to the specified Codes, Standards and Regulations, and that all specified tests have been satisfactorily completed and all corrections have been made if such tests indicated deficiencies.
- B. The foregoing shall not be construed in any way to limit or negate any other standard guarantee or portion thereof which may provide a more comprehensive guarantee than those required by this Specification.

15. FINAL ACCEPTANCE

Final acceptance of the materials and shop fabricated work will be contingent upon completion of a successful field hydrostatic test at the pressures specified herein.

APPENDIX A
PIPE MATERIALS
S-R PIPING

<u>Line No.</u>	<u>Size</u>	<u>Spec.</u>	<u>Sch.</u>	<u>"C" Bore</u>	<u>* Quantity Linear Ft.</u>
AS-7	6"	FEA	40	6.094	
CO-6	3"	BBA**	160	2.692	1
CO-12	4"	FEA	40	4.044	1
FW-2	4"	MBA	160	3.530	
FW-9	2-1/2"	MBA	160	2.178	
MS-2	6"	QEB	XXS	5.072	
MS-3	6"	QEB	XXS	5.072	
MS-5	10"	FEA	40	10.070	
MS-6	6"	QEB	XXS	5.072	
MS-7	10"	FEA	40	10.070	
MS-8	4"	QEB	160	3.530	1
MS-8	6"	QEB	XXS	5.072	1
MS-9	6"	FEA	40	6.094	
MS-10	4"	QEB	160	3.530	1
ST-9	4"	FEA	40	4.044	
ST-13	3"	FEA	40	3.081	
ST-17	4"	QEB	160	3.530	
ST-18	8"	HEA	40	8.021	
ST-19	8"	HEA	40	8.021	
VT-1	4"	KEB	40	4.044	
VT-11	10"	FEA	40	10.070	
VT-12	2-1/2"	KEB	40	2.479	

* Approximate footage is listed based on the Piping Material Take-Off.

** Special 3'0" long section.

1

APPENDIX A (CONTD)

Rocketdyne Piping (ASME B&PV Code)

3"-CO-222-QEX	1
4"-FW-200-MBX	1
2-1/2"-FW-201-MBX	
2-1/2"-FW-202-MBX	
2-1/2"-FW-203-MBX	
3",4"-FW-228-MBX	
2-1/2"-FW-231-MBX	
2-1/2"-FW-232-MBX	
2-1/2"-FW-233-MBX	
2-1/2"-FW-234-MBX	
2-1/2"-FW-235-MBX	
2-1/2"-FW-236-MBX	
6"-MS-201-QEX	1
4"-ST-202-QEX	

Rocketdyne Piping (ANSI B31.1 Piping Code)

3",4"-CO-201-QEX	1
3"-CO-203-MBX	
4"-FW-200-MBX (Interface RIC to Receiver Panel Water Inlet Valve Only.)	
4"-ST-203-KEX (On drawing 4"-ST-202-QEX)	1
4"-VT-201-KEX	
3"-VT-208-QEX	

This piping is under the jurisdiction of Section I of the ASME Boiler and Pressure Vessel Code.

C-21700
S-R E6
10/30/79

APPENDIX B - PART I
PRIMARY FABRICATED PIPE
S-R MATERIAL TAKE-OFF

C-21700
S-R E6
10/30/79

PIPING MATERIALS QUANTITIES FOR
S-R PIPING TO BE ESTABLISHED
BY S-R PIPE SHOP

B-I-1

C-21700
S-R E6
10/30/79

APPENDIX B - PART II
PRIMARY FABRICATED PIPE
ROCKETDYNE MATERIAL TAKE-OFF

Revised 3/27/80

CORE PIPING MATERIAL

Feedwater Sys. 3-17-80

DESCRIPTION	MATERIAL SPEC.	QTY
4 NPS Sch 160 CS Pipe	ASTM A-106 Grade B	100 ft.
3 NPS Sch 160 CS Pipe	↑	60 ft.
2 1/2 NPS Sch 80 CS Pipe	↑	220 ft.
6 NPS Sch 80 CS Pipe	↓	40 ft.
1 NPS Sch 80 CS Pipe	↓	180 ft.
1/2 NPS Sch 80 CS Pipe	ASTM A-106 Grade B	60 ft.
3/4 NPS Sch 80 CS Pipe	ASTM A-106 Grade B	600 ft.
1 1/2 NPS Sch 80 CS Pipe	ASTM A-106 Grade B	100 ft.
4 NPS Sch 160 90° LR Elbow	ASTM A-234 Grade WPB	11
3 NPS Sch 160 90° LR Elbow	↑	4
2 1/2 NPS Sch 80 90° LR Elbow	↑	37
1 1/2 NPS Sch 80 45° LR Elbow	↓	7
1 NPS Sch 80 90° LR Elbow	↓	30
2 1/2 NPS Sch 80 45° LR Elbow	↓	7
1 NPS Sch 80 45° LR Elbow	↓	4
2 1/2 NPS Sch 80 ST Tee	↓	3
4 x 4 x 2 1/2 NPS Sch 160 R Tee	↓	5
4 NPS Sch 160 St Tee	↓	1
3 NPS Sch 160 St Tee	↓	1
1 1/2 x 1 1/2 x 3/4 NPS Sch 80 Tee	↓	22
1/2 NPS Sch 80 Tee	↓	6
3/4 NPS Sch 80 90° LR Elbow	↓	98
1/2 NPS Sch 80 90° LR Elbow	↓	4
1/2 NPS Sch 80 45° LR Elbow	ASTM A-234 Grade WPB	3

30
B-II-1

CORE PIPING MATERIAL

Feedwater Sys. 3-17-80

[illegible]

31

B-11-2

3/R Form

02-240 Rev 3/76

PIPE	SIZE	SEQ	QTY
1	12"	1	1
2	12"	2	1
3	12"	3	1
4	12"	4	1
5	12"	5	1
6	12"	6	1
7	12"	7	1
8	12"	8	1
9	12"	9	1
10	12"	10	1
11	12"	11	1
12	12"	12	1
13	12"	13	1
14	12"	14	1
15	12"	15	1
16	12"	16	1
17	12"	17	1
18	12"	18	1
19	12"	19	1
20	12"	20	1
21	12"	21	1
22	12"	22	1
23	12"	23	1
24	12"	24	1
25	12"	25	1
26	12"	26	1
27	12"	27	1
28	12"	28	1
29	12"	29	1
30	12"	30	1
31	12"	31	1
32	12"	32	1
33	12"	33	1
34	12"	34	1
35	12"	35	1
36	12"	36	1
37	12"	37	1
38	12"	38	1
39	12"	39	1
40	12"	40	1
41	12"	41	1
42	12"	42	1
43	12"	43	1
44	12"	44	1
45	12"	45	1
46	12"	46	1
47	12"	47	1
48	12"	48	1
49	12"	49	1
50	12"	50	1
51	12"	51	1
52	12"	52	1
53	12"	53	1
54	12"	54	1
55	12"	55	1
56	12"	56	1
57	12"	57	1
58	12"	58	1
59	12"	59	1
60	12"	60	1
61	12"	61	1
62	12"	62	1
63	12"	63	1
64	12"	64	1
65	12"	65	1
66	12"	66	1
67	12"	67	1
68	12"	68	1
69	12"	69	1
70	12"	70	1
71	12"	71	1
72	12"	72	1
73	12"	73	1
74	12"	74	1
75	12"	75	1
76	12"	76	1
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78	12"	78	1
79	12"	79	1
80	12"	80	1
81	12"	81	1
82	12"	82	1
83	12"	83	1
84	12"	84	1
85	12"	85	1
86	12"	86	1
87	12"	87	1
88	12"	88	1
89	12"	89	1
90	12"	90	1
91	12"	91	1
92	12"	92	1
93	12"	93	1
94	12"	94	1
95	12"	95	1
96	12"	96	1
97	12"	97	1
98	12"	98	1
99	12"	99	1
100	12"	100	1

CORE PIPING MATERIAL

Steam & Start Sys. 3-17-80

DESCRIPTION	MATERIAL SPEC.		QTY
6 Sch XX Weld Cap	ASTM A335 Grade P22		1
3 Sch XX Weld Cap	A335	P22	4
3 x 1/2 Sch 160 Swage	A182	F22	1
3 x 1 Sch XX Swage	A182	F22	2
6 x 3/4 x 4 1/2 Sch XX - Sch 80 Nipolet	A182	F22	4
4 x 3/4 x 4 1/2 Sch XX - Sch 80 Nipolet	A182	F22	1
4 x 3/4 x 4 1/2 Sch 80 Nipolet	A182	F22	2
3 x 3/4 x 4 1/2 Sch XX - Sch 80 Nipolet	A182	F22	2
6 x 300# R.F.W.N. Flange	A182	F22	1
3 x 2500# R.F.W.N. Flange	A182	F22	2
1 x 2500# R.F.W.N. Flange	A182	F22	2
1 x 1500# R.F.W.N. Flange	A182	F22	2
6 x 4 Sch XX Reducer	A335	P22	2
4 x 3 Sch XX Reducer	A335	P22	1
3 x 2 Sch XX Reducer	A335	P22	2
2 x 1 Sch 80 Reducer	A335	P22	2
3/4 x 1/2 Sch 160 Reducer	A335	P22	7
3/4 x 1/2 Sch 80 Reducer	A335	P22	2
6 x 90° Sch XX LR Elbow	A335	P22	4
4 x 90° Sch XX LR Elbow	A335	P22	15
3 x 90° Sch XX LR Elbow	A335	P22	20
3 x 90° Sch 160 LR Elbow	A335	P22	6
2 x 90° Sch 80 LR Elbow	A335	P22	8
1 x 90° Sch 160 LR Elbow	A335	P22	2
1 x 90° Sch 80 LR Elbow	ASTM A335 Grade P22		2

32

B-11-3

CORE PIPING MATERIAL

Steam & Start Sys. 3-17-80

[illegible]

33

B-II-4

APPENDIX C
SUPPLEMENTS

The following supplements are included with and form a part of Specification No. 40P70017S for Primary Fabricated Pipe.

A. Engineering Standards attached hereto as follows:

<u>Standard Number</u>	<u>Date</u>	<u>Number of Pages</u>	1
DN00.2	7/30/76	3	
DN00.5	7/30/76	5	
DP30.1	Pg 2, 6/22/77; Pg 3, 5/7/75	2	
FJ50.50T	11/14/79	7	
FJ60.60T	10/22/79	1	
SE00.1	Pg 1, 2/4/80; Pg 2, 8/1/79	2	1
SE00.FEA	Pg 1, 2/4/80; Pg 2, 12/14/79	2	
SE00.KEB	Pg 1, 2/4/80; Pg 2 & 3, 9/6/79	3	
SE00.KEX	Pg 1-3, 2/4/80	3	1
SE00.MBA	Pg 1, 2/4/80; Pg 2, 8/1/79	2	
SE00.MBX	Pg 1, 2/4/80, Pg 2, 8/1/79	2	1
SE00.QEB	Pg 1, 2/4/80; Pg 2, 12/14/79	2	1
SE00.QEX	Pg 1-2, 2/4/80	2	1
SE00.RNX	Pg 1, 2/4/80	1	1

B. Drawings attached separately as follows:

a. S-R Drawings

<u>S-R Drawing Number</u>	<u>S-R Sheet Number</u>	<u>Rev.</u>	<u>Title</u>	
XL-22934	P1-1	0	Symbols	1
9033/4	P1-2	1	Line List	1
XL-22934	P3-1	1	P&ID	1
XL-22934	P3-2	1	P&ID	1
XL-22934	P9-2	1	Piping Drawing -Receiver	1
XL-22934	P9-3	1	Piping Drawing -Receiver	1
XL-22934	P9-4	1	Piping Drawing -Receiver	1
XL-22934	P9-8	1	Piping Drawing -Pipe Rack	1
XL-22934	P9-10	1	Piping Drawing -Pipe Rack	1
XL-22934	P9-13	1	Piping Drawing -Sections	1

APPENDIX C (CONTD)

<u>S-R Drawing Number</u>	<u>S-R Sheet Number</u>	<u>Rev.</u>	<u>Title</u>	
XL-22934	P9-14	1	Piping Drawing-Sections	1
XL-22934	P9-15	1	Piping Drawing-EPGS Area	1
XL-22934	P9-18	1	Piping Drawing-Details	1
XL-22934	P9-19	1	Piping Drawing - Details	1
XL-22934	P9-20	1	Piping Drawing - Details	1
XL-22934 (For Ref.)	P13-2		Isometric-Main Steam, PSS, TSS & EPGs	
XL-22934 (For Ref.)	P13-3		Isometric-TSS Admission Steam	
XL-22934 (For Ref.)	P13-4		Isometric-R.S. Feedwater	
XL-22934 (For Ref.)	P13-6		Isometric-R.S. Flash Tank Vent to EPGs	

b. Rocketyne Drawings

<u>DOE DRAWING NUMBER</u>	<u>TITLE</u>	
40P2005 13 1763	P & ID - Preheaters	
40P2005 13 1764	P & ID - Receiver	
40P2005 13 1765	P & ID - Receiver	
40P2005 13 1766	P & ID - Receiver	
40P2005 13 1767	Main Steam Manifold	
40P2005 13 1925	Core Piping Plan	1
40P2005 13 1926	Core Piping Plan	1
40P2005 13 1927	Core Piping Plan	1
40P2005 13 1928	Core Piping Plan	1
40P2005 13 1929	Core Piping Plan	1
40P2005 13 1930	Core Piping Plan	1
40P2005 13 1931	Core Piping Plan	1
40P2005 13 1932	Core Piping Plan	1
40P2005 13 1933	Core Piping Plan	1
40P2005 13 1934	Core Piping Plan	1
40P2005 13 1935	Core Piping Plan	1
40P2005 13 1937	Core Piping Elevation	1
40P2005 13 1938	Core Piping Elevation	1
40P2005 13 1939	Core Piping Elevation	1
40P2005 13 1940	Core Piping Elevation	1
40P2005 13 1941	Core Piping Elevation	1
40P2005 13 1942	Core Piping Elevation	1
40P2005 13 1943	Core Piping Elevation	1

C-21700
S-R E6
10/30/79
Revision No. 1

DOE DRAWING
NUMBER

TITLE

40P2005 13 1944	Feed Water Elevation	1
40P2005 13 1945	Feed Water Elevation	1
40P2005 13 1946	Boiler Drain Elevation	1
40P2005 13 1948	GN ₂ Panel	1
40P2005 13 1949	GN ₂ Panel	1
40P2005 13 1950	GN ₂ Panel	1
40P2005 13 1952	Instrument Air	1
40P2005 13 1953	Instrument Air	1
40P2005 13 1954	Instrument Air	1
40P2005 13 1955	Instrument Air	1
40M2005 13 1962	Pipe Supports	1
40M2005 13 1963	Pipe Supports	1
40M2005 13 1964	Pipe Supports	1
40M2005 13 1965	Module Installation	1
40M2005 13 1966	Module Installation	1
40M2005 13 1967	Module Installation	1
40M2005 13 1968	Heat Shield	1
40M2005 13 1969	Heat Shield	1
40M2005 13 1970	Pipe Supports	1
40M2005 13 1658	Module Assy.	1
40M2005 13 1659	Module Assy.	1
40M2005 13 1660	Module Assy.	1
40M2005 13 1661	Preheater Instrumentation	1
40M2005 13 1662	Preheater Instrumentation	1
40M2005 13 1665	Boiler Bracket	1
40M2005 13 1666	Boiler Instrumentation	1
40M2005 13 1667	Boiler Restraints	1
40M2005 13 1668	Boiler Supports	1
40M2005 13 1669	Boiler Springhanger	1
40M2005 13 1670	Boiler Thermowell Detail	1
40M2005 13 1671	Boiler Separator Pipe Detail	1
40M2005 13 1672	Boiler Instrumentation	1
40M2005 13 1673	Boiler Instrumentation	1

c. S-R Pipe Support Details

<u>Volume</u>	<u>Rev.</u>	<u>Title</u>	
P60-1	5	Primary Pipe Supports	1
P60-2	0	Primary Pipe Supports Snubbers	1

DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP		DN 00.2
APPROVALS As. Sect. <i>[Signature]</i> Ct. Supv. <i>[Signature]</i> Div. <i>[Signature]</i>						TYPICAL INSTRUMENTATION PRESSURE AND FLOW CONNECTIONS	PAGE <u>1</u> OF <u>3</u>
							ISSUED 2/6/70 REVISED 7/30/76

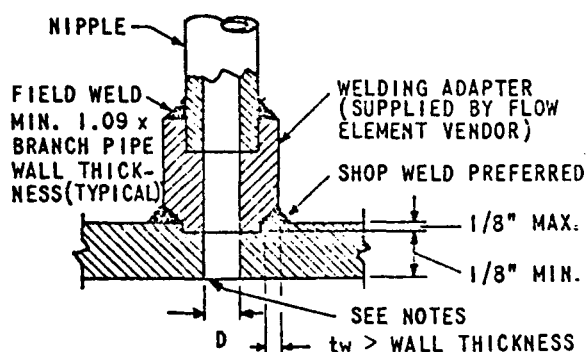


FIGURE 1
FOR TEMPERATURES UP TO 750°F.

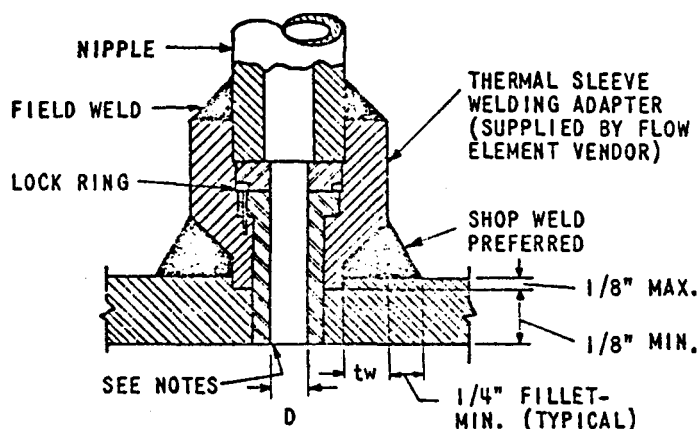


FIGURE 2
FOR TEMPERATURES ABOVE 750°F. AND A SECONDARY ELEMENT
WITH APPRECIABLE DISPLACEMENT.

INSTALLATION PROCEDURE:

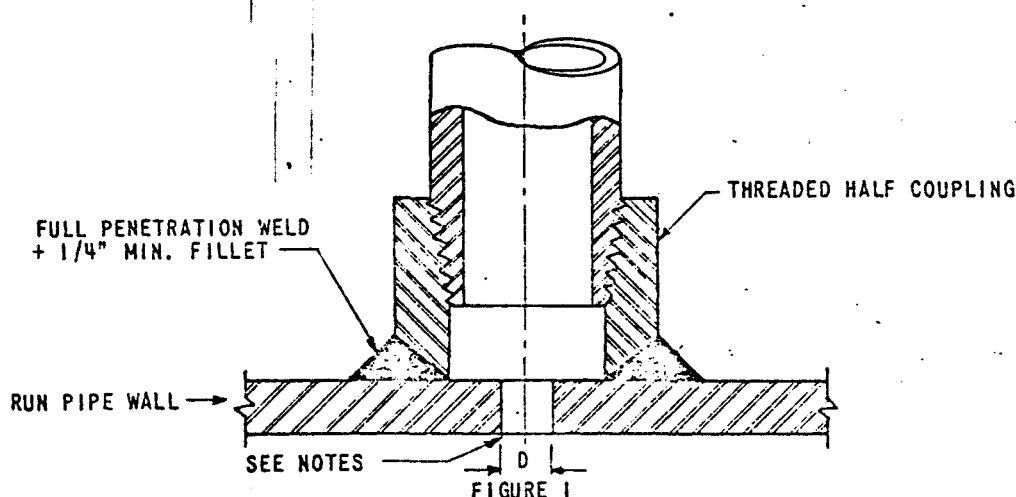
1. LOCATE PRESSURE CONNECTION. PARTIALLY DRILL PIPE, COUNTERBORE FOR ADAPTER, AND WELD ADAPTER IN PLACE.
2. STRESS RELIEVE.
3. BORE PIPE TO REQUIRED I.D.
4. DRILL AND REAM PRESSURE CONNECTION HOLE IN PIPE IN ALIGNMENT WITH HOLE IN ADAPTER.
5. INSERT ADAPTER SLEEVE AND LOCK RING.
6. CUT INLET END OF SLEEVE SO THAT IT IS FLUSH WITH AND ROUNDED TO CONTOUR OF PIPE.
7. SCREW LOCK RING UP TIGHT AGAINST SLEEVE. AND WITH A CENTERPUNCH OR OTHER BLUNT TOOL, STAKE LOCK RING THREADS SO THAT RING CANNOT TURN.

NOTES:

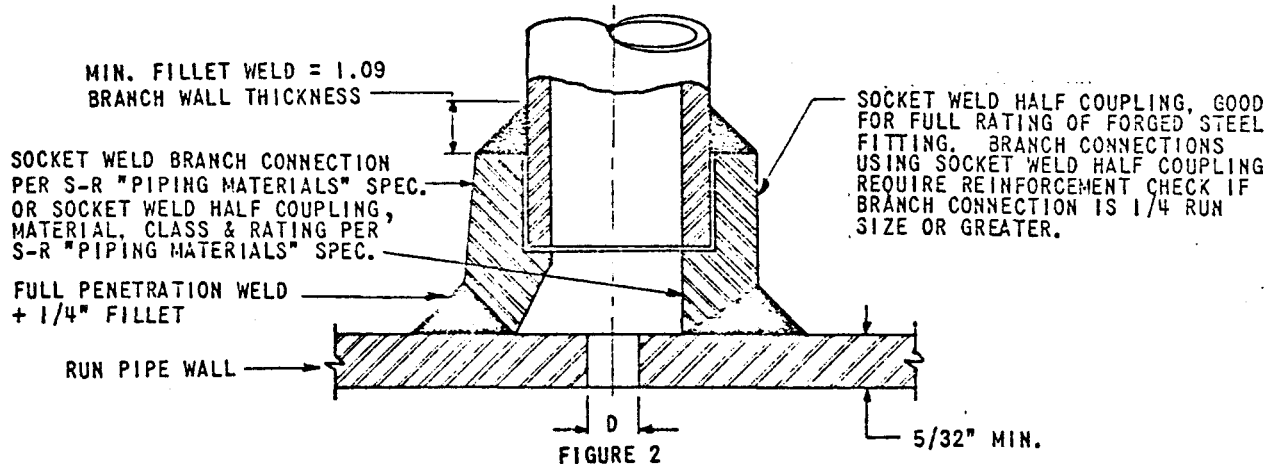
1. EDGE OF HOLE MUST BE CLEAN AND SQUARE OR ROUNDED SLIGHTLY, FREE FROM BURRS, WIRE EDGES, OR OTHER IRREGULARITIES.
2. HOLE THRU PIPE WALL TO BE DRILLED AFTER NIPPLE OR ADAPTER IS WELDED TO PIPE, USING THE NIPPLE OR ADAPTER FOR DRILL GUIDE.
3. "D" - 1/4" DIA. MAX. FOR 1 1/2" AND SMALLER PIPE
 "D" - 3/8" DIA. MAX. FOR 2" AND 3" PIPE
 "D" - 1/2" DIA. MAX. FOR 4" THRU 8" PIPE
 "D" - 3/4" DIA. MAX. FOR 10" AND LARGER PIPE
4. MATERIAL, CLASS AND RATING OF ADAPTERS TO CONFORM TO STEARNS-ROGER SPECIFICATIONS "PIPING MATERIALS".
5. tw = DIMENSION OF PARTIAL PENETRATION WELD.

DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP		DN 00.2
APPROVALS .Sect. <i>[Signature]</i> t. Supv. <i>[Signature]</i> Div. <i>[Signature]</i>						TYPICAL INSTRUMENTATION PRESSURE AND FLOW CONNECTIONS	PAGE <u>2</u> OF <u>3</u>
							ISSUED 7/30/76
							REVISED

TO BE USED WHERE FULL PENETRATION WELDS ARE DESIRED



TO BE USED ONLY WHEN SPECIFIED ON PIPING DRAWINGS



NOTES:

- EDGE OF HOLE MUST BE CLEAN AND SQUARE OR ROUNDED SLIGHTLY, FREE FROM BURRS, WIRE EDGES, OR OTHER IRREGULARITIES.
- HOLE THRU PIPE WALL TO BE DRILLED AFTER FITTING IS WELDED TO PIPE, USING THE FITTING FOR GUIDE.
- "D" - 1/4" DIA. MAX. FOR 1 1/2" AND SMALLER PIPE
 "D" - 3/8" DIA. MAX. FOR 2" AND 3" PIPE
 "D" - 1/2" DIA. MAX. FOR 4" THRU 3" PIPE
 "D" - 3/4" DIA. MAX. FOR 10" AND LARGER PIPE
- MATERIAL, CLASS, AND RATING OF FITTINGS SHALL CONFORM TO STEARNS-ROGER SPECIFICATION "PIPING MATERIALS".
- ALL FE, PC, PI, PS, PT AND PX CONNECTIONS SHALL BE "BRANCH CONNECTIONS" PER STEARNS-ROGER SPECIFICATION "PIPING MATERIALS" SIZE AS FOLLOWS: 1/2" FOR SERVICE CONDITIONS NOT IN EXCESS OF EITHER 900 PSI OR 800°F, 3/4" FOR SERVICE CONDITIONS WHICH EXCEED EITHER 900 PSI OR 800°F.

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP	DN 00.2		
APPROVALS Des. Sect. <i>[Signature]</i> Inst. Supv. <i>[Signature]</i> Div. <i>[Signature]</i>							TYPICAL INSTRUMENTATION PRESSURE AND FLOW CONNECTIONS FOR ASME TEST CONNS. ONLY	PAGE <u>3</u> OF <u>3</u>
								ISSUED 7/30/76 REVISED

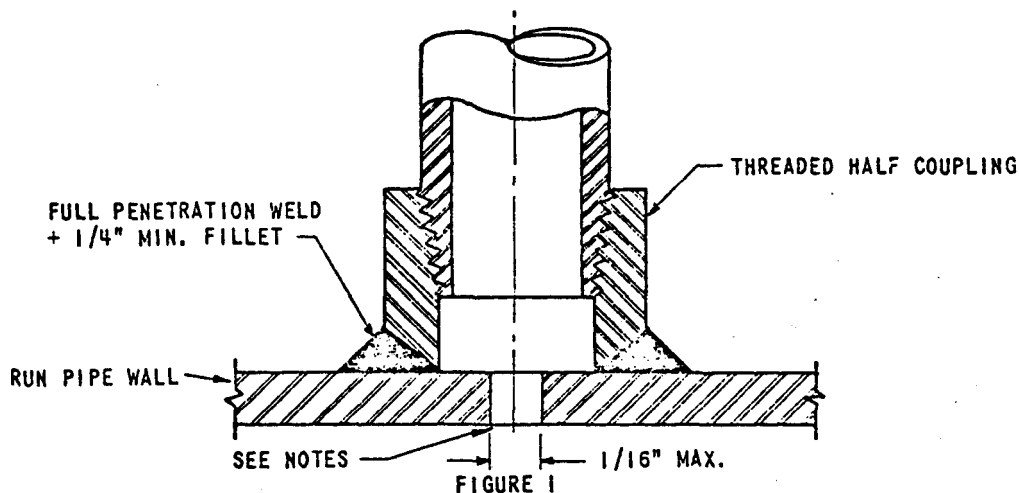
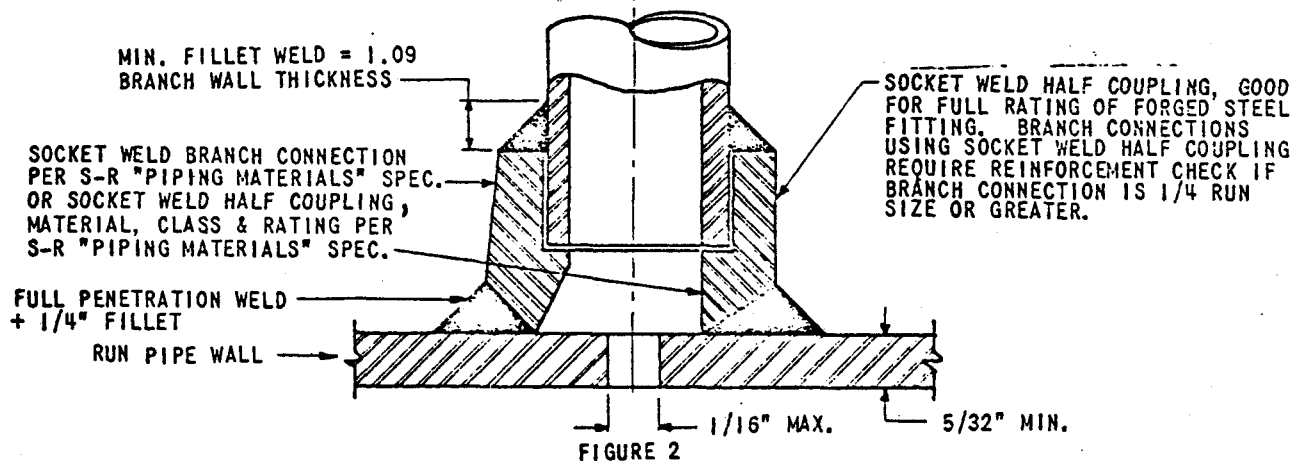


FIGURE 1
TO BE USED ONLY WHEN SPECIFIED ON PIPING DRAWINGS

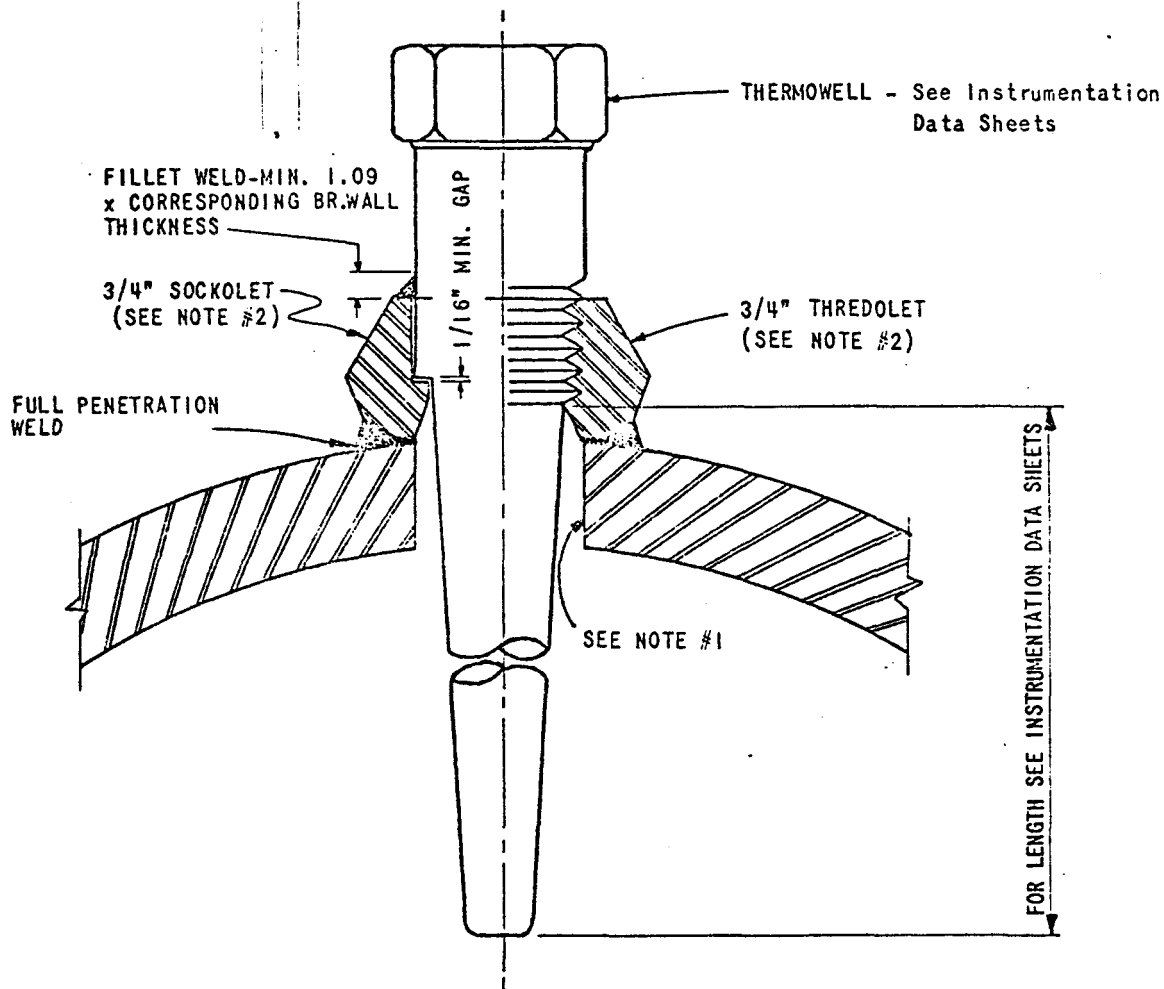


NOTES:

1. EDGE OF HOLE MUST BE CLEAN AND SQUARE OR ROUNDED SLIGHTLY, FREE FROM BURRS, WIRE EDGES, OR OTHER IRREGULARITIES.
2. HOLE THRU PIPE WALL TO BE DRILLED AFTER FITTING IS WELDED TO PIPE, USING THE FITTING FOR GUIDE.
3. MATERIAL, CLASS, AND RATING OF FITTINGS SHALL CONFORM TO STEARNS-ROGER SPECIFICATION "PIPING MATERIALS".
4. ALL FE, PC, PI, PS, PT AND PX CONNECTIONS SHALL BE "BRANCH CONNECTIONS" PER STEARNS-ROGER SPECIFICATION "PIPING MATERIALS" SIZE AS FOLLOWS: 1/2" FOR SERVICE CONDITIONS NOT IN EXCESS OF EITHER 900 PSI OR 800°F, 3/4" FOR SERVICE CONDITIONS WHICH EXCEED EITHER 900 PSI OR 800°F.

DIVISION USAGE							Stearns-Roger INCORPORATED ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP	ON 00.5		
APPROVALS Des. Sect. <i>[Signature]</i> Sect. Sup. <i>[Signature]</i> Div. <i>[Signature]</i>							THERMOWELL INSTALLATION STANDARD DETAIL	PAGE <u>1</u> OF <u>5</u>
								ISSUED 2/27/70 REVISED 7/30/76

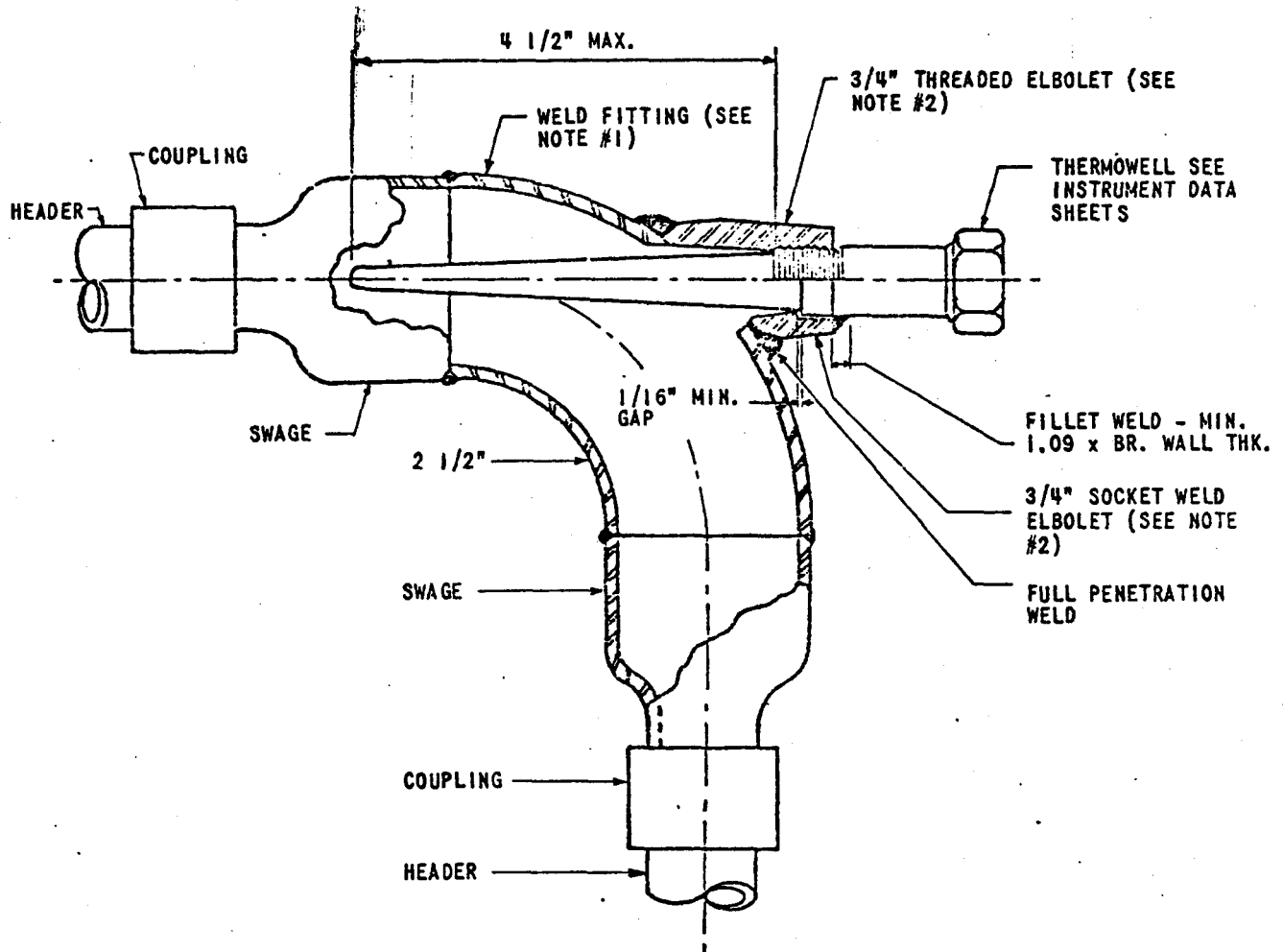
DO NOT USE FOR MAIN STEAM, HOT REHEAT OR COLD REHEAT



NOTES:

1. DRILL PIPE WALL TO MATCH I.D. OF WELDOLET.
2. USE 3/4" FITTINGS WHICH CONFORM TO STEARNS-ROGER SPECIFICATION, "PIPING MATERIALS".
3. SEE STANDARD DN00.5, PAGE 2, FOR INSTALLATION IN 2-1/2" AND SMALLER PIPES.
4. SEE STANDARD DN00.5, PAGES 3 AND 4 OF 5 FOR THERMOWELL INSTALLATION IN MAIN STEAM, HOT REHEAT AND COLD REHEAT.
5. DO NOT USE THREADED FITTING FOR SERVICE CONDITIONS WHICH EXCEED EITHER 900 PSI OR 800°F.

DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP		DN 00.5
APPROVALS s. Sect. <i>[Signature]</i> Act. Supv. <i>[Signature]</i> Div. <i>[Signature]</i>						THERMOWELL INSTALLATION FOR 2-1/2" & SMALLER PIPES	PAGE <u>2</u> OF <u>5</u>
							ISSUED 2/27/70 REVISED 7/30/76



NOTE:

1. DRILL ELBOW WALL TO MATCH I.D. CONFIGURATION OF ELBOLET.
2. USE 3/4" FITTING WHICH CONFORM TO STEARNS-ROGER SPECIFICATION, "PIPING MATERIALS".
3. FOR ADDITIONAL NOTES, SEE STD. DN00.5 PAGE 1 OF 5.
4. DO NOT USE THREADED FITTING FOR SERVICE CONDITIONS WHICH EXCEED EITHER 900 PSI OR 800°F.

DIVISION USAGE						Stearns-Roger INCORPORATED ENGINEERING STANDARD		STANDARD NUMBER	
MM	P	PP	SH	FI	SP			DN 00.5	
APPROVALS						THERMOWELL INSTALLATION STANDARD DETAIL		PAGE <u>3</u> OF <u>5</u>	
Des. Sect. <i>[Signature]</i>								ISSUED 2/27/70 REVISED 4/11/74	
Sect. Supv. <i>[Signature]</i>									
Div. <i>[Signature]</i>									

MINIMUM PIPE WALL THICKNESS Tm	TOT. LGTH. "A"	STRENGTH W. "B"	INSERT LGTH. "C"	LAG EXT. "D"
1. SMALLER THAN 0.625	7.000	0.406	2.719	3.875
2. FROM 0.626 to 0.750	7.000	0.487	2.773	3.750
3. FROM 0.751 to 0.875	7.000	0.568	2.807	3.625
4. FROM 0.876 to 1.000	7.000	0.650	2.850	3.500
5. FROM 1.001 to 1.125	7.000	0.731	2.894	3.375
6. FROM 1.126 to 1.312	8.000	0.825	2.960	4.188
7. FROM 1.313 to 1.437	8.000	0.934	3.003	4.063
8. FROM 1.438 to 1.562	8.000	1.015	3.047	3.938
9. FROM 1.563 to 1.750	8.000	1.133	3.112	3.750
10. FROM 1.751 to 2.000	8.000	1.300	3.200	3.500
11. FROM 2.001 to 2.250	9.000	1.462	3.288	4.250
12. FROM 2.251 to 2.500	9.000	1.750	3.250	4.000
13. FROM 2.501 to 2.750	9.000	1.930	3.320	3.750
14. FROM 2.751 to 3.000	9.000	2.100	3.400	3.500
15. FROM 3.001 to 3.250	10.000	2.275	3.475	4.250
16. FROM 3.251 to 3.500	10.000	2.450	3.550	4.000
17. FROM 3.501 to 3.750	10.000	2.625	3.625	3.750
18. FROM 3.751 to 4.000	11.000	2.800	3.700	4.500
19. FROM 4.001 to 4.250	11.000	2.975	3.775	4.250

NOTES:

1. Thermowell material shall be 2-1/4% chrome moly, ASTM 182 F22.
2. All welding and stress relieving shall be done in accordance with Section I of the ASME Power Boiler Code, and the ANSI 31.1 Power Piping Code.
3. The tag number of each thermowell shall be inscribed at the top end of the thermowell above the weld area.
4. Each thermowell shall be cleaned, and all dirt, metal chips, or other foreign material shall be removed; and a 1/2"-square head carbon steel plug shall be installed to protect the thermowell until the thermocouple element is installed.

DIVISION USAGE					
MM	P	PP	SH	FI	SP

Stearns-Roger INCORPORATED ENGINEERING STANDARD

STANDARD NUMBER
DN 00.5

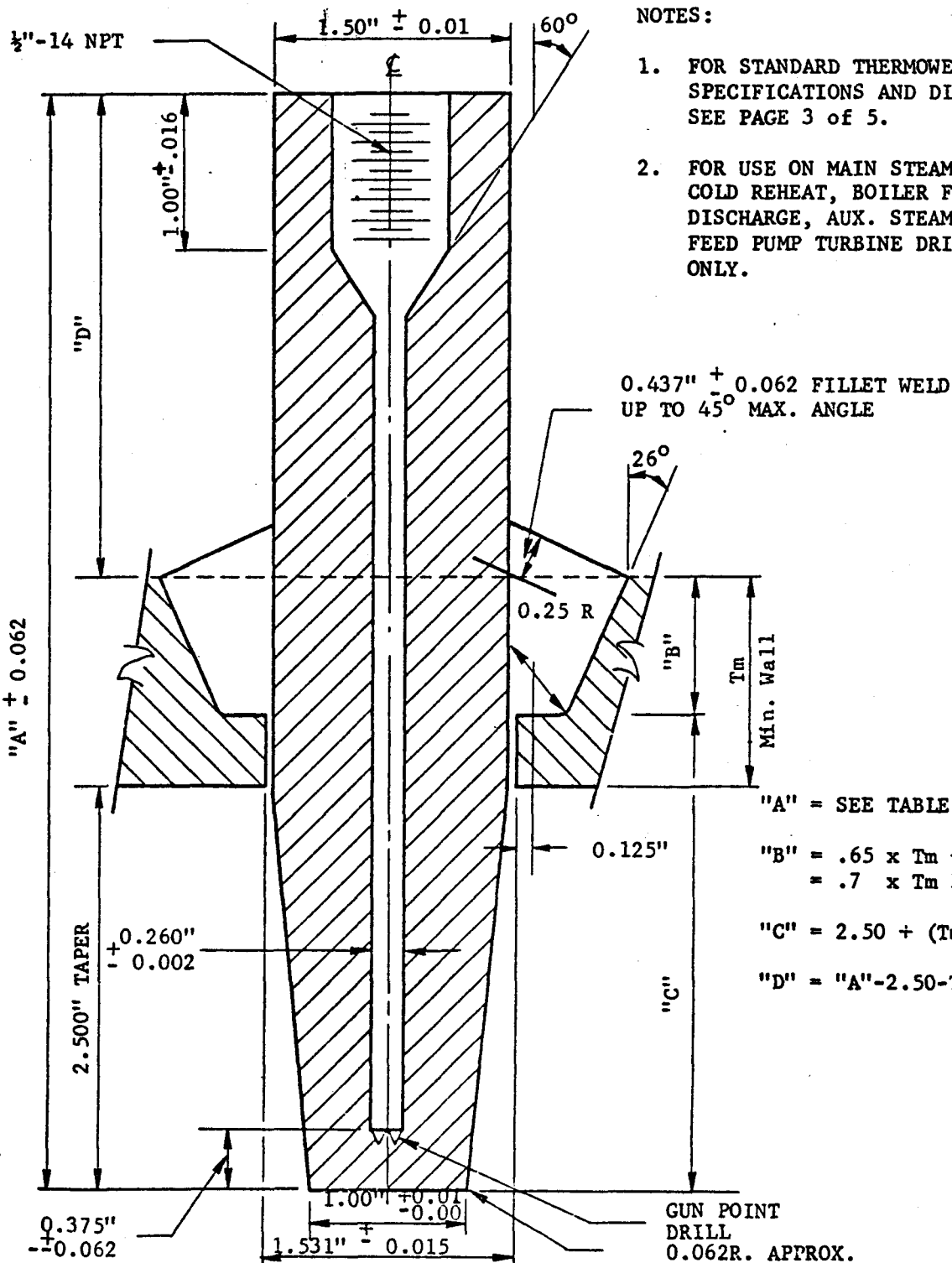
APPROVALS

Des. Sect. *[Signature]*
Sect. Supv. *[Signature]*
Div. *[Signature]*

THERMOWELL INSTALLATION STANDARD DETAIL

PAGE 4 OF 5

ISSUED 2/27/70
REVISED 4/11/74



NOTES:

1. FOR STANDARD THERMOWELL SPECIFICATIONS AND DIMENSIONS SEE PAGE 3 of 5.
2. FOR USE ON MAIN STEAM HOT REHEAT, COLD REHEAT, BOILER FEED PUMP DISCHARGE, AUX. STEAM & BOILER FEED PUMP TURBINE DRIVE SYSTEMS ONLY.

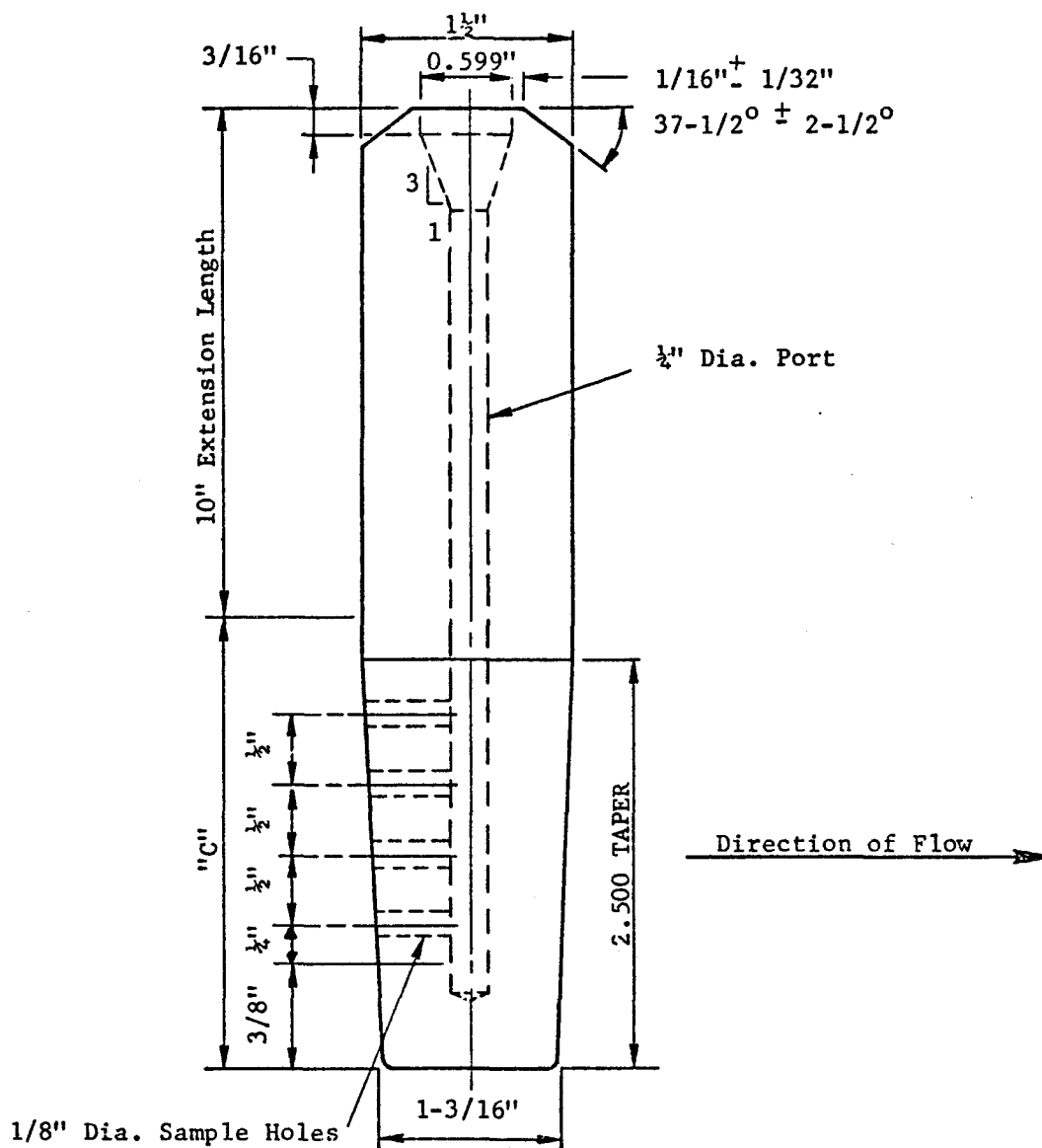
"A" = SEE TABLE

"B" = .65 x Tm < 2.25"
= .7 x Tm > 2.25"

"C" = 2.50 + (Tm - "B")

"D" = "A" - 2.50 - Tm

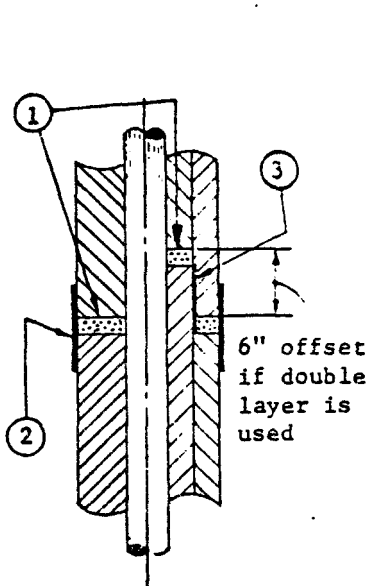
DIVISION USAGE							Stearns-Roger INCORPORATED ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP	DN 00.5		
APPROVALS							SAMPLE NOZZLE MAIN STEAM LINE	PAGE <u>5</u> OF <u>5</u>
Des. Sect. <i>[Signature]</i>								ISSUED 5/18/73 REVISED 9/26/74
Sect. Supv. <i>[Signature]</i>								
Div. <i>[Signature]</i>								



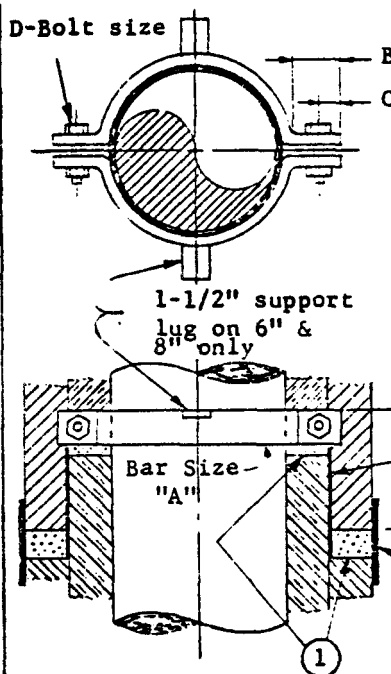
1. For details of nozzle installation see Sheets 3 and 4.
2. Surface finish to be 16 RMS.
3. Mark permanently to indicate direction of flow.
4. Nozzle to be fabricated of same material as pipe.
5. Maximum operating conditions 3000 PSIG @ 1015° F.
6. For "C" Dim. See Sheet 3.
7. For butt weld transition see Std. DE 21.9.

DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD				STANDARD NUMBER		
M	P	PP	SH	PI	SP					DP30.1		
	X					PIPE INSULATION THICKNESS SCHEDULE				PAGE <u>2</u> OF <u>3</u>		
APPROVALS Des. Sect. <u>C.P. [Signature]</u> Sect. Supy. <u>[Signature]</u> Div. <u>WR [Signature]</u>										ISSUED 2-20-70		
										REVISED 6/22/77		
INSULATION SCHEDULE NO.		PP	1	2	3	4	5	6	7	8	9	10
TEMP. OF PIPE SIZE		PERSONNEL PROTECTION SAME AS PIPE TEMPERATURE	<u>150</u> 199	<u>200</u> 299	<u>300</u> 399	<u>400</u> 499	<u>500</u> 599	<u>600</u> 699	<u>700</u> 799	<u>800</u> 899	<u>900</u> 999	<u>1000</u> 1099
1 1/2" & Smaller			1 1/2"	1 1/2"	1 1/2"	1 1/2"	2"	2"	2 1/2"	3"	3 1/2"	3 1/2"
2"			1 1/2"	1 1/2"	1 1/2"	1 1/2"	2"	3"	3"	3"	3 1/2"	4"
2 1/2"			1 1/2"	1 1/2"	1 1/2"	2"	2"	3"	3"	3"	3 1/2"	4"
3"			1 1/2"	1 1/2"	1 1/2"	2"	2 1/2"	3"	3"	3 1/2"	3 1/2"	4"
4"			1 1/2"	1 1/2"	2"	2 1/2"	2 1/2"	3"	3 1/2"	3 1/2"	4"	4 1/2"
6"			1 1/2"	2"	2"	2 1/2"	3"	3 1/2"	4"	4"	4 1/2"	5"
8"			1 1/2"	2"	2 1/2"	3"	3 1/2"	3 1/2"	4"	4 1/2"	5"	5 1/2"
10"			1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	4 1/2"	5"	5 1/2"
12"			1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5"	5 1/2"
14" O.D.			1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5"	5 1/2"
16" O.D.			1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5"	5 1/2"
18" O.D.			1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5"	5 1/2"
20" O.D.			1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5"	5 1/2"
24" O.D. & LARGER			1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	4 1/2"	5"	5"	5 1/2"
			NO EXPANSION JOINTS REQUIRED				EXPANSION JOINTS REQUIRED SEE STD DP30.1 PAGE 3					
			SINGLE LAYER INSULATION				DOUBLE LAYER INSULATION REQ'D EXCEPT ON LINES 1 1/2" & SMALLER					
NOTES: 1. INSULATION THICKNESSES SHOWN ARE ECONOMIC THICKNESS FOR FUEL COSTS OF \$2.00 PER B.T.U. OR LESS. 2. INSULATION THICKNESSES SHOWN ARE FOR CALCIUM SILICATE [OR MINERAL FIBER] HAVING SIMILAR "K" FACTOR WITH ALUMINUM LAGGING, HAVING A SURFACE RESISTANCE OF 0.68°F - Hr. PER B.T.U. 3. INSULATION THICKNESSES SHOWN ARE BASED ON 95°F AMBIENT TEMPERATURE, 150°F HOT COLD FACE TEMPERATURE, AND 70" M.P.H. AIR VELOCITY. 4. ASSUMES 1 1/2" MINIMUM INSULATION AVAILABLE.												

DIVISION USAGE						Stearns-Roger INCORPORATED Engineering Standard		STANDARD NUMBER DP30.1	
MM	P	PP	SH	FI	SP				
X									
APPROVALS Des. Sect. <i>[Signature]</i> Sect. Supv. <i>[Signature]</i> Div. <i>[Signature]</i>						PIPE INSULATION EXPANSION JOINTS FOR VERTICAL LINES		PAGE <u>3</u> OF <u>3</u> ISSUED 2/20/70 REVISED 5/7/75	

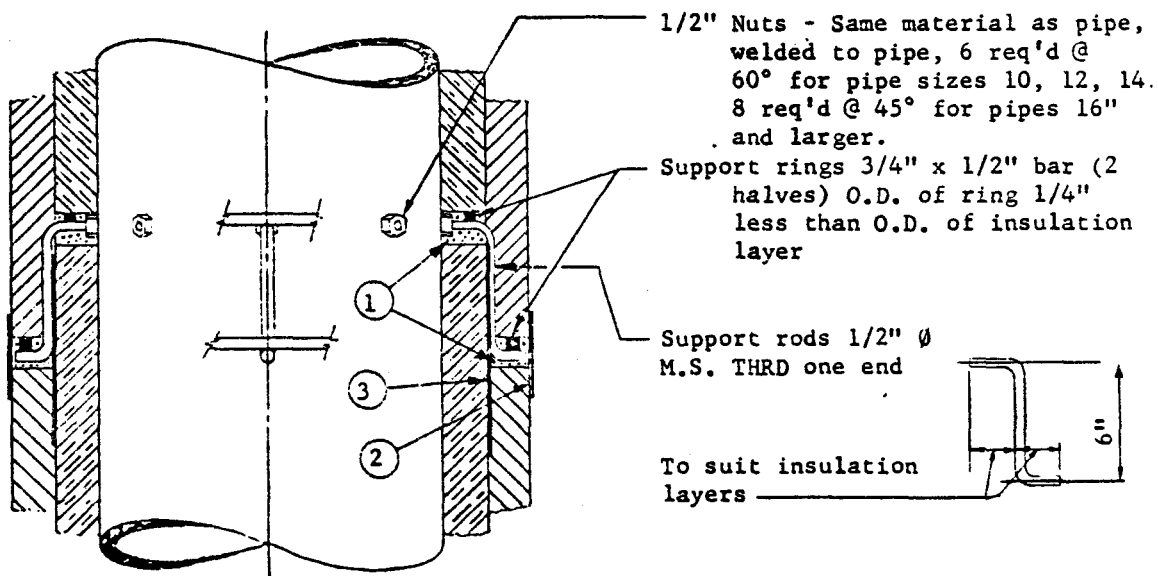


EXPANSION JOINT FOR PIPE
SIZES 2" & UNDER



INSULATION SUPPORT CLAMP				
Pipe Size	A	B	C	D
3"	1/4"x 1"	2"	3/4"	1/2"
4"	1/4"x 1"	2"	3/4"	1/2"
6"	3/8"x 1-1/2"	2-1/4"	1"	5/8"
8"	3/8"x 1-1/2"	2-1/4"	1"	5/8"

Grinnell type 212 clamp may be substituted with support lug added



EXPANSION JOINT FOR PIPE
SIZES 10" & LARGER

NOTES

- All expansion joints shall be spaced on 12'-1" centers
- ① 1" to 1-1/2" space packed with mineral wool suitable for temp.
- ② 8" sheet metal band over joint if jacket is not req'd.
- ③ 6" sheet metal band to permit slippage between layers.

November 14, 1979

SPECIFICATION

NO. FJ50.50T

MODIFIED FOR PRIMARY FABRICATED PIPE

DOCUMENTATION

FOR

10 MWe Solar Pilot Plant
Solar One
Daggett, California

TABLE OF CONTENTS

	<u>Page</u>
1. Scope	1
2. Type, Quantities and Quality of Copies	1
A. Reproducible Drawings	1
B. Prints	1
C. Other Documentation	2
3. Documentation by Fabricator	2
A. General	2
B. Progress Reports	3
C. Review and Comment	3
D. Operation and Maintenance Manuals	5
E. Bills of Material	6
4. Drawings by Engineer	6
5. Transmittals	7
6. Special Considerations	7

STEARNS-ROGER ENGINEERING CORP.
DENVER, COLORADO

PROJECT NO. C-21700

DOCUMENTATION

1. SCOPE

- A. This Specification outlines the requirements for, and the procedures associated with, the preparation and exchange of documentation for the work, equipment and/or materials specified in the Specification to which this Specification is a supplement.
- B. This Specification supplements requirements in Engineering Standard No. FJ60.60T.
- C. This Specification also supplements requirements, where specified, in Paragraph DOCUMENTATION of the Specification to which this Specification is a supplement.
- D. This Specification and supplementary references specified in the foregoing paragraphs cover minimum requirements for documentation and are not intended to limit the amount of additional documentation which may be required for the engineering coordination, use or maintenance of the work, equipment and/or materials being furnished. Such additional documentation shall be provided by the Fabricator.
- E. All references to "Fabricator" herein shall apply to Stearns-Roger Pipe Shop. All references to "Engineer" herein shall apply to Stearns-Roger Engineering Corporation.

2. TYPE, QUANTITIES AND QUALITY OF COPIES

The type and quantities of copies for required documentation are specified on Engineering Standard No. FJ60.60T. Quality requirements shall be as follows:

A. Reproducible Drawings

All reproducible drawings submitted to Engineer shall be furnished on ozalid vellum, auto-positive vellum or Mylar, black line on vellum, or other Engineer-approved medium, each to be suitable for legible reproduction by the diazo copy process. Reproducible drawings shall be rolled, not folded, and enclosed in mailing tubes when mailed.

1

B. Prints

Where designated by the word "Prints" on Engineering Standard No. FJ60.60T, it shall be understood to mean suitable "blueprint print/copy," "blueprint," or other Engineer-accepted reproduction of an original Fabricator-prepared tracing or sepia.

C. Other Documentation

Where designated by the word "Copies" on Engineering Standard No. FJ60.60T, applicable documentation shall be submitted on legible, black on white, 8-1/2 inch by 11-inch pages.

3. DOCUMENTATION BY FABRICATOR

A. General

- a. Required types of documentation are specified on Engineering Standard No. FJ60.60T. Where this Standard does not fully describe individual categories of documentation that are required, such detailed categories are specified in Paragraph DOCUMENTATION of the Specification to which this Specification is a supplement.
- b. (DELETED)
- c. (DELETED)
- d. The following information shall be included in each drawing:
 - (1) Engineer's Name, Stearns-Roger Engineering Corporation or Rocketdyne Division, Rockwell International
 - (2) Engineer's Project Number, C-21700
 - (3) Plant or station name, 10 MWe Solar Pilot Plant
 - (4) Unit number (if applicable).
 - (5) (DELETED)

Other documentation submitted by Fabricator shall carry similar identification.

- e. Unless specifically approved by the Engineer, "typical" or "similar" documentation is not acceptable for review.

f. "Standard Hardware Items" are defined as standard commercial items, such as air and hydraulic cylinders and operating valves, gear reducers, small motors, instruments, etc. For such items, review drawings are not required. Certified sheets showing exact mounting dimensions, overall dimensions, cross-sectional arrangement, parts nomenclature and material designation shall be submitted. Details of parts shall be furnished when requested by Engineer.

g. (DELETED)

B. Progress Reports

Fabricator shall furnish Engineer monthly progress reports and schedule status reports. These reports and schedules shall cover the complete status and shipment.

C. Review and Comment

a. (DELETED)

b. All documentation to be certified and submitted by Fabricator for interface coordination shall show sufficient details of design so that the Engineer may proceed with his overall project design where interrelated with Fabricator's design.

c. All documentation submitted in the correct and complete form to Engineer for his review and comment will be processed and a copy sent to Fabricator within 5 weeks after receipt of Fabricator's submittal. If more than 5 weeks review time is necessary, Engineer will advise Fabricator in writing as to his review schedule for such data. Fabricator shall then advise Engineer in writing what effect the extended review schedule has on the scheduled delivery of Fabricator's materials and equipment.

d. Drawings and data will be returned to Fabricator marked either "REVIEWED/NO COMMENTS," "REVIEWED/SEE COMMENTS" or "REVISE PER COMMENTS AND RESUBMIT FOR REVIEW."

- e. When the documentation is returned marked "REVIEWED/NO COMMENTS" or "REVIEWED/SEE COMMENTS," final certified submittals incorporating the noted changes shall be furnished, unless otherwise authorized by Engineer in writing, within 3 weeks from the time of receipt of copy by Fabricator or at least 3 weeks before the scheduled delivery of Fabricator's work, whichever is earlier. Where Engineering Standard No. FJ60.60T stipulates that drawing review is required before release for fabrication, "REVIEWED/SEE COMMENTS" shall constitute such release.
- f. When the documentation is returned marked "REVISE PER COMMENTS AND RESUBMIT FOR REVIEW," the documentation with the noted revisions incorporated shall be resubmitted for review and comment within one week from the time of receipt of copy by Fabricator. The review and comment and final submittal schedule shall be as specified in Subparagraphs 3.C.c. and 3.C.e. above.
- g. The documentation submittal schedules shall be adhered to by Fabricator, unless otherwise authorized by Engineer in writing. In any case, final submittals shall be furnished at least 3 weeks before the scheduled delivery of Fabricator's work.
- h. When reviewed information is subsequently revised by Fabricator, or is subsequently found to be deficient because of Fabricator's error or omission, additional Fabricator submittals shall be made to Engineer as developed. Any Engineer's design changes and any changes in equipment or construction by others which are required to make such subsequent revisions an integral part of the overall project shall be made at Fabricator expense.
- i. (DELETED)
- j. Fabricator will be notified of review by a stamped copy of Stearns-Roger Form 02.145 or TRMSR05A stating "Supplier: As to all Drawings/Data listed on this transmittal: PROCEED TO FABRICATE." All Fabricator drawings which are submitted as final shall be stamped "Final." Where specified on Engineering Standard No. FJ60.60T, final drawings shall be certified for construction.
- k. Neither review of, nor comment or revision on drawings by Engineer relieves Fabricator from compliance with Specifications, nor shall the procedures outlined herein be cause for delay of equipment deliveries, except as otherwise specified herein.

1. (DELETED)

D. (DELETED)

(DELETED)

E. Bills of Material

Detailed Bills of Material are required to facilitate identification by constructors of the items received. Shipment, therefore, shall be preceded by submittal of Bills of Material in accordance with Engineering Standard No. FJ60.60T, Item 4.C.

4. DRAWINGS BY ENGINEER

- A. For applicable equipment, prints of drawings prepared by Engineer for use by others in constructing foundations, building components and major piping and wiring requiring coordination with the work

associated herewith will be furnished to Fabricator for review as soon as possible after Engineer's receipt from Fabricator of the certified equipment drawings and design information necessary for their preparation.

- B. Where material, locations, etc., are marked HOLD on Engineer's Drawings, that material, location, etc., shall not be detailed or fabricated by Fabricator until the HOLD is removed by Engineer.
- C. Within 30 calendar days after the date of transmittal to Fabricator, Fabricator shall return to Engineer two (2) copies of each of these drawings marked to indicate Fabricator's review thereof either without change, or with any corrections or necessary changes clearly marked thereon in red or other contrasting color.
- D. After making such corrections or changes as shown on the review copies returned by Fabricator, Engineer will release these drawings for construction. Subsequent changes or corrections to foundations, building components, wiring or piping fabricated or installed in accordance with drawings corresponding to the review copies approved by the Fabricator, such changes having been necessitated by Fabricator-initiated modifications, shall be done in a manner satisfactory to Engineer.

5. TRANSMITTALS

When transmitting documentation, Fabricator shall:

- A. Prepare original and four (4) copies of transmittal letters to accompany each submittal of documentation. Drawing transmittal letters shall identify the purpose of the transmittal (drawings for review, revised drawings, final drawings), the piece of equipment or material involved, and shall list the drawing numbers with applicable revision numbers or dates.
- B. Identify each letter and parcel with the information listed under Paragraph 3.A.d. and Fabricator's Shop Order Number, and transmit it by air mail or first class mail. Each parcel shall contain an enclosed copy of the transmittal letter.
- C. Stamp each document to be submitted with reproduction date and purpose of the transmittal, e.g., "For Review," "Revised," "Final," etc.

6. SPECIAL CONSIDERATIONS

- A. (DELETED)

DIVISION USAGE							Stearns-Roger INCORPORATED ENGINEERING STANDARD				STANDARD NUMBER FJ 60.60T		
MM	P	PP	SH	FI	SP		DOCUMENTATION REQUIREMENTS				C-21700		
APPROVALS: Des. Sec. <i>[Signature]</i> Sect. Supv. <i>[Signature]</i> Div. <i>[Signature]</i>							PROJECT: SOLAR ONE CONTRACT/REQUISITION NUMBER: S-R E6 TITLE: PRIMARY FABRICATED PIPE (HEAVY WALL AND ALLOY)				ISSUED 10/22/79 REVISED		
TYPE OF DOCUMENTATION							TYPE OF COPIES	FOR REVIEW		FINAL		REVIEW	CTFY.
							NO. OF COPIES	WEEKS AFTER AWARD	NO. OF COPIES	"X" IF REQ'D	REQ'D BEFORE FAB. **	FINAL ISSUE ***	
1-ENGINEERING DRAWINGS							Repro-ducibles						
A-Outline, General Arrangement and Principal Dimensions							Prints						
B-Cross Sections													
C-Foundation Requirements, including Loadings & Anchoring Locations													
D-Physical Locations of Piping and/or Wiring Terminals													
E-Control Diagrams													
F-Electrical Schematic Diagrams													
G-Wiring Diagrams, Including Internal External and Interconnecting													
H-Standard Hardware Items													
2-ERECTION OR INSTALLATION INFO.							Repro-ducibles						
A-Shop Fabrication Drawings							Prints	2					
B-Erection or Installation Drawings									8	X	X	X	
C-Erection or Install. Instructions							Copies			X	X	X	
3-SPECIAL DOCUMENTATION													
A-Performance Data, including Curves							Copies						
B-Design Calculations							Copies						
C-Test Reports							Copies						
D-Code Papers and Certificates ##							Copies		8	X		X	
E-Shop Fab. and/or Welding Proced.							Copies	8	8	X			
F-Shop Fabrication Reports							Copies		8	X		X	
G-Welder's Qualification Reports							Copies						
H-Operating Certificates							Copies						
4-MISCELLANEOUS													
A-Operation and Maintenance Manuals							Manuals						
B-Recommended Spare Parts List for 1 Year's Operation, with Unit Prices							Copies						
C-Bills of Material							Copies			X#			
D-Definitive Drawing List							Copies						
- "X" in this column means drawing review req'd. before fabric. release. *- "X" in this column means final issue must be certified for construction. #- At least 2 weeks before each shipment, detailed Bills of Material shall be sent to the plant site. This form supplements requirements, where specified, in Article 4. in the Specification. ## - For Rocketdyne Piping Only													

DIVISION USAGE							Stearns-Roger ENGINEERING CORPORATION	STANDARD NUMBER
MM	P	PP	SH	FI	SP	SE00.1		
	X							
APPROVALS							PIPING MATERIAL SPECIFICATIONS GENERAL NOTES	PAGE 1 of 2
Des. Sect. _____								ISSUED 8/1/79
Sect. Supv. _____								REVISED 2/4/80
Div. _____								

1. These Specifications are for work performed under the jurisdiction of the ANSI B31.1 Power Piping Code where applicable.
2. These Piping Material and Valve Specifications specify the exact materials and type of pipe, valves and fittings required for the individual piping systems. Manufacturers listed are intended to establish a minimum level of quality and the intent is not to restrict other products which comply with the applicable specifications. The contracting officer shall be the sole judge as to whether or not proposed products meet these specifications.
3. Alloy bolt studs for Piping Material Specifications "FEA", "HEA", "KBA", "KEB", "KEX", "LBA", "QEB" and "MBA" shall be properly marked and have finished ends for micrometer length measurements (for tensile loading in the field).
4. Cathodic protection requirements, if required for piping, will be shown on the drawings.
5. No allowance has been made for exterior corrosion.
6. Tungsten inert gas arc welding shall be used for the first root pass on all butt welds in Piping Material Specifications "FEA", "HEA", "KBA", "KEB", "HEA", "LBA", "MBA", "MBX", "QEB", "QEX" and "RNX", except that butt welds on pipe having a wall thickness of 1 inch or greater shall be welded with two (2) tungsten inert gas arc weld root passes. The remaining passes shall be completed by the shielded metal-arc or submerged arc process.
7. Welded joints in stainless steel pipelines shall be completely welded by the tungsten inert gas arc method.
8. MIG welding is permitted for the initial root pass. Shielded metal-arc or submerged arc welding shall be used for all remaining passes on all other butt welds in Class 600 and lower carbon steel pipelines.
9. Butt weld ends to have tungsten inert gas arc weld root passes shall be prepared in accordance with PFI Standard ES-21. When inerting the inside of carbon steel or low alloy pipe for TIG welding, the dams used to contain the inert gas shall be made of water soluble paper.
10. Butt weld ends to be welded completely by the shielded metal-arc or submerged arc process shall be prepared in accordance with the applicable Figure No. 2 or Figure No. 3 of ANSI B16.25.
11. Each butt weld end transition profile shall in no case exceed the limits of ANSI B31.1.

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD	SE00.1
MM	P	PP	SH	FI	SP			
	X							
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____							PIPING MATERIAL SPECIFICATIONS GENERAL NOTES	PAGE 2 of 2 ISSUED 8/1/79 REVISED 2/4/80

12. When ordering concrete and FRP (Fiberglass Reinforced Plastic), the Purchaser shall specify the maximum design pressure (and/or vacuum), temperature, pH and the concentration of service to which the pipe will be subjected. The depth of cover and live loads shall also be specified when ordering concrete and FRP pipe. When pipe, valves and fittings will be used for abrasive service, the Purchaser shall inform the manufacturer of the size, hardness and velocity of the abrasive particles. Each manufacturer shall be required to verify and guarantee that the pipe supplied will meet the specified conditions when the pipe is installed and tested in accordance with the manufacturer's recommendations and instructions.

DIVISION USAGE							Siearns-Roger ENGINEERING STANDARD		STANDARD NUMBER													
MM	P	PP	SH	FI	SP	SE00.FEA																
	X							PAGE <u>1</u> OF <u>2</u>														
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____							PIPING MATERIAL SPECIFICATION "FEA" CLASS 300 - ALLOY STEEL		ISSUED 12/1/76 REVISED 2/4/80													
MAXIMUM ALLOWABLE PRESSURE AND TEMPERATURE FOR SPECIFICATION: TEMPERATURE, °F: Up to 800° 850° 900° 950° Do not use over 950°F PRESSURE, PSIG: 415 398 362 305																						
PIPE MATERIAL		Seamless 1-1/4% Chrome - 1/2% Moly Steel, ASTM A335 Grade P11 Supplementary Requirements: See Sheet 2.																				
PIPE SCHEDULE		1/2" thru 2": Schedule 80 2-1/2" thru 10": Schedule 40 12" thru 24": Standard (0.375" W.T.)																				
VALVES		<table border="0"> <tr> <td>2" & Smaller</td> <td>2-1/2" & Larger</td> </tr> <tr> <td>Class 600 Alloy Steel</td> <td>Standard Class 300 Alloy Steel</td> </tr> <tr> <td>Socket Weld</td> <td>Butt Weld</td> </tr> <tr> <td>Check V3228</td> <td>Check V3240</td> </tr> <tr> <td>Gate V6524</td> <td>Gate V6479</td> </tr> <tr> <td>Globe V7970</td> <td>Globe V7953</td> </tr> </table>									2" & Smaller	2-1/2" & Larger	Class 600 Alloy Steel	Standard Class 300 Alloy Steel	Socket Weld	Butt Weld	Check V3228	Check V3240	Gate V6524	Gate V6479	Globe V7970	Globe V7953
2" & Smaller	2-1/2" & Larger																					
Class 600 Alloy Steel	Standard Class 300 Alloy Steel																					
Socket Weld	Butt Weld																					
Check V3228	Check V3240																					
Gate V6524	Gate V6479																					
Globe V7970	Globe V7953																					
PIPE SIZE		2" & Smaller				2-1/2" & Larger																
FITTINGS		ANSI B16.11 Class 3000 Forged Alloy Steel, ASTM A182 Grade F11, Socket Weld.				ANSI B16.9 Seamless Alloy Steel ASTM A234 Grade WP11, Butt Weld, Same Schedule as Pipe.																
FLANGES*		ANSI B16.5 Class 300 Forged Alloy Steel ASTM A182 Grade F11, RF, Socket Weld, Same Sch. as Pipe.				ANSI B16.5 Class 300 Forged Alloy Steel, ASTM A182 Grade F11, RF, Weld Neck, Same Sch. as Pipe.																
UNIONS		Flanges as specified above where necessary.																				
BACKING RINGS		Not Applicable				None Allowed																
CONSUMABLE INSERT RINGS		Not Applicable				None Allowed																
BRANCH CONNS.		Socket Weld Tee. (Use insert for reducing)				Full Size Branch: Tee 2-1/2" & Larger: ** Branch 2" & Smaller: **																
BOLTS		Alloy Bolt Studs ASTM A193 Grade B16, Hex: Nuts ASTM A194 Grade 7 Heavy Weight. See General Notes (Finished Ends).																				
GASKETS		ANSI B16.5, Class 300 spiral wound gaskets with 347 stainless steel and asbestos filler and 1/8" carbon steel compression gage ring.																				
NOTES: *Slip-on flanges shall be used for vena contracta type orifices and flanged flow nozzle assemblies. **If butt weld branch connections (ASTM A182 Grade F11) are not available for branch sizes 2 1/2" and larger, then reducing tees (ASTM A234 Grade WP11) may be used for up to and including two size reductions. If socket weld branch connections (ASTM A182 Grade F11) are not available for branch sizes 2" and smaller, then Class 3000 half couplings (ASTM A182 Grade F11) may be used. All branch connections shall be designed and integrally reinforced in accordance with ANSI B31.1																						

FORM 02 224 REV 11-76

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP	SE00.FEA		
	X							
APPROVALS							PIPING MATERIAL SPECIFICATION "FEA" CLASS 300 - ALLOY STEEL	PAGE <u>2</u> OF <u>2</u>
Des. Sect. _____								ISSUED 12/1/76 REVISED 12/14/79
Sect. Supv. _____								
Div. _____								

SUPPLEMENTARY TEST REQUIREMENTS FOR PIPE AND FITTINGS

A. SUPPLEMENTARY TEST REQUIREMENTS FOR ASTM A335 PIPE

a. For 4-Inch Nominal Pipe Size and Less

No special tests are required.

b. For Nominal Pipe Sizes over 4 Inches

In addition to the standard tests specified in ASTM Specification A335, the following tests shall be required for pipe over 4-inch nominal pipe size.

1. Product analysis on each length in accordance with Supplementary Requirement "S1" of ASTM A335.
2. Flattening test from one end of each length in accordance with Supplementary Requirement "S3" of ASTM A335.
3. Macro Etch test from one end of each length in accordance with Supplementary Requirement "S4" of ASTM A335.
4. Photomicrograph (one per heat on one length in the as-finished condition) in accordance with Supplementary Requirement "S5" of ASTM A335.
5. Ultrasonic examination of each length. The procedure and acceptance standard shall be in accordance with Pipe Fabrication Institute Standard PFI ES-18.

B. SUPPLEMENTARY TEST REQUIREMENTS FOR FITTINGS

a. Forged Fittings for Nominal Pipe Size over 4 Inches (ASTM A234 and A182)

In addition to the standard tests specified in ASTM Specifications A234 and A182, each fitting over 4-inch nominal pipe size shall be ultrasonically examined in accordance with ASTM A388. The maximum acceptable defect shall not exceed 5 percent of the nominal wall thickness.

b. Welded Fittings For Pipe Sizes Over 4" Made From Plate (ASTM A234)

Ultrasonic examination of each plate. The procedure and acceptance standard shall be in accordance with Supplementary Requirement "S8" of ASTM A387.

DIVISION USAGE							Stearns-Roger		STANDARD NUMBER																		
MM	P	PP	SH	FI	SP	ENGINEERING STANDARD		SEOO.KEB																			
	X							PAGE 1 OF 3																			
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____						PIPING MATERIAL SPECIFICATION "KEB" CLASS 900 - ALLOY STEEL		ISSUED 12/1/76 REVISED 2/4/80																			
MAXIMUM ALLOWABLE PRESSURE AND TEMPERATURE FOR SPECIFICATION: TEMPERATURE, °F: 100° 1000° 1015° PRESSURE, PSIG: 1143 608 562																											
PIPE MATERIAL		Seamless 2-1/4% Chrome - 1% Moly steel ASTM A335 Grade P22 Supplementary Requirements: See Sheet 2.																									
PIPE SCHEDULE		1/2" - 2": Schedule 80 2 1/2" - 6": Schedule 40																									
VALVES		<table border="0"> <tr> <td>2" & Smaller</td> <td>2-1/2" & Larger</td> </tr> <tr> <td>Class 1500 Alloy Steel</td> <td>Standard Class 900 Alloy</td> </tr> <tr> <td>Socket Weld</td> <td>Butt Weld</td> </tr> <tr> <td>Check V3243</td> <td>Check V201</td> </tr> <tr> <td>Globe V7972</td> <td>Gate V405</td> </tr> <tr> <td></td> <td>Globe V501 (T-Pattern)</td> </tr> <tr> <td></td> <td>Globe V506 (T-Patt., Spec. Throt.)</td> </tr> <tr> <td></td> <td>Globe V510 (Y-Patt., Spec. Throt.)</td> </tr> <tr> <td></td> <td>Globe V549 (Y-Pattern)</td> </tr> </table>								2" & Smaller	2-1/2" & Larger	Class 1500 Alloy Steel	Standard Class 900 Alloy	Socket Weld	Butt Weld	Check V3243	Check V201	Globe V7972	Gate V405		Globe V501 (T-Pattern)		Globe V506 (T-Patt., Spec. Throt.)		Globe V510 (Y-Patt., Spec. Throt.)		Globe V549 (Y-Pattern)
2" & Smaller	2-1/2" & Larger																										
Class 1500 Alloy Steel	Standard Class 900 Alloy																										
Socket Weld	Butt Weld																										
Check V3243	Check V201																										
Globe V7972	Gate V405																										
	Globe V501 (T-Pattern)																										
	Globe V506 (T-Patt., Spec. Throt.)																										
	Globe V510 (Y-Patt., Spec. Throt.)																										
	Globe V549 (Y-Pattern)																										
PIPE SIZE		2" & Smaller				2-1/2" & Larger																					
FITTINGS		ANSI B16.11 Class 3000 Forged Alloy Steel ASTM A182 Grade F22, Socket Weld. **				ANSI B16.9 Seamless ASTM A234 Gr.WP22, Butt weld, Same Schedule as Pipe																					
FLANGES		Flanges to be eliminated from this Spec. wherever possible. ANSI B16.5 Class 900 Forged Alloy Steel, ASTM A182 Grade F22, RF, Socket Weld for 2" & Smaller and Weld Neck for 2-1/2" & Larger, Same Sch. as Pipe.																									
UNIONS		Flanges as specified above where necessary.																									
BACKING RINGS		Not Applicable				None Allowed																					
CONSUMABLE INSERT RINGS		Not Applicable				None Allowed																					
BRANCH CONNS.		Socket Weld Tee. (Use insert for reducing.)				Full Size Branch: Tee Branch 2-1/2" & Larger: * Branch 2" & Smaller: *																					
BOLTS		Alloy Bolt Studs ASTM A193 Grade B16, Hex Nuts ASTM A194 Grade 7 Heavy Weight. See General Notes (Finished Ends)..																									
GASKETS		1/8" Class 900 Flexitallic Type CG with 347 Stainless Steel and asbestos filler and carbon steel compression gage ring, or equal.																									
NOTES: * If butt weld branch connections (ASTM A182 Grade F22) are not available for branch sizes 2-1/2" and larger, then reducing tees (ASTM A234 Grade WP22) may be used for up to and including two size reductions. If socket weld branch connections (ASTM A182 Grade F22) are not available for branch sizes 2" and smaller, then Class 3000 half couplings (ASTM A182 Grade F22) may be used. All branch connections shall be designed and integrally reinforced in accordance with ANSI B31.1. ** 1/2" thru 2" Rocketdyne fittings in the receiver shall be ANSI B16.9 seamless ASTM A234, Grade WP22, butt weld, same as pipe schedule. FPK																											

FORM 02 2 EV 11-76

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP	SE00.KEB		
	X							
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____							PIPING MATERIAL SPECIFICATION "KEB" CLASS 900 - ALLOY STEEL	PAGE <u>2</u> OF <u>3</u> ISSUED 12/1/76 REVISED 9/6/79

SUPPLEMENTARY TEST REQUIREMENTS FOR PIPE AND FITTINGS

A. SUPPLEMENTARY TEST REQUIREMENTS FOR ASTM A155 PIPE

In addition to the standard tests specified in ASTM Specification A155, the following tests shall be required:

- a. Product analysis on each length in accordance with Supplementary Requirement "S1" of ASTM A155.
- b. Ultrasonic examination of each plate. The procedure and acceptance standard shall be in accordance with Supplementary Requirement "S8" of ASTM A387.

B. SUPPLEMENTARY TEST REQUIREMENTS FOR ASTM A335 PIPE

a. For 4-Inch Nominal Pipe Size and Less

No special tests are required.

b. For Nominal Pipe Sizes over 4 Inches

In addition to the standard tests specified in ASTM Specification A335, the following tests shall be required for pipe over 4-inch nominal pipe size.

1. Product analysis on each length in accordance with Supplementary Requirement "S1" of ASTM A335.
2. Flattening test from one end of each length in accordance with Supplementary Requirement "S3" of ASTM A335.
3. Macro Etch test from one end of each length in accordance with Supplementary Requirement "S4" of ASTM A335.
4. Photomicrograph (one per heat on one length in the as finished condition) in accordance with Supplementary Requirement "S5" of ASTM A335.
5. Ultrasonic examination of each length. The procedure and acceptance standard shall be in accordance with Pipe Fabrication Institute Standard PFI ES-18.

C. SUPPLEMENTARY TEST REQUIREMENTS FOR FITTINGS

a. General

Fittings shall be furnished with no abrupt changes in section, and finished shape shall be streamlined with excess metal and sharp edges removed. "Block type" finished construction is not acceptable. Transitions in thickness shall be gradual with the required radii to minimize stress intensification and discontinuities in thinner sections.

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP	SE00.KEB		
	X							
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____							PIPING MATERIAL SPECIFICATION "KEB" CLASS 900 - ALLOY STEEL	PAGE <u>3</u> OF <u>3</u> ISSUED 12/1/76 REVISED 9/6/79

SUPPLEMENTARY TEST REQUIREMENTS FOR PIPE AND FITTINGS (CONTD)

C. SUPPLEMENTARY TEST REQUIREMENTS FOR FITTINGS (CONTD)

b. Forged Fittings For Nominal Pipe Size Over 4 Inches (ASTM A234 and A182)

In addition to the standard tests specified in ASTM Specifications A234 and A182, each fitting over 4-inch nominal pipe size shall be ultrasonically examined in accordance with ASTM A388. The maximum acceptable defect shall not exceed 5 percent of the nominal wall thickness.

c. Welded Fittings Made From Plate (ASTM A234)

Ultrasonic examination of each plate. The procedure and acceptance standard shall be in accordance with Supplementary Requirement "S8" of ASTM A387.

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD		STANDARD NUMBER																						
MM	P	PP	SH	FI	SP	SEOO.MBA																									
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____							PIPING MATERIAL SPECIFICATION "MBA" CLASS 1500 - CARBON STEEL		PAGE 1 OF 2 ISSUED 8/1/79 REVISED 2/4/80																						
MAXIMUM ALLOWABLE PRESSURE AND TEMPERATURE FOR SPECIFICATION: TEMPERATURE, °F: 400 500 600 650 700 750 Do not use PRESSURE, PSIG: 3170 2995 2735 2685 2665 2520 over 750 F																															
PIPE MATERIAL		Seamless Carbon Steel ASTM A106, Grades B and C Supplementary Requirements: See Sheet 2.																													
PIPE SCHEDULE		1/2" thru 1-1/4": Schedule 80 Grade B 1-1/2" thru 4": Schedule 160 Grade B 6": XXS Grade B 8" thru 16": Schedule 160 Grade C																													
VALVES		<table border="0"> <tr> <td>2" & Smaller</td> <td>2-1/2" & Larger</td> <td></td> </tr> <tr> <td>Class 1500</td> <td>Standard Class 1500</td> <td>For Rocketdyne Valve</td> </tr> <tr> <td>Carbon Steel</td> <td>Carbon Steel-Butt Weld</td> <td>See R Valve List</td> </tr> <tr> <td>Socket Weld</td> <td>Check V209</td> <td>Globe V558 (T-Pattern)</td> </tr> <tr> <td>Check V3159</td> <td>Gate V413</td> <td>Globe V559 (Y Pattern, Spec. Throt.)</td> </tr> <tr> <td>Globe V7950</td> <td>Globe V557</td> <td>Globe V560 (T Pattern, Spec. Throt.)</td> </tr> <tr> <td></td> <td>(Y-Pattern)</td> <td>Globe V575 (3-Way)</td> </tr> </table>									2" & Smaller	2-1/2" & Larger		Class 1500	Standard Class 1500	For Rocketdyne Valve	Carbon Steel	Carbon Steel-Butt Weld	See R Valve List	Socket Weld	Check V209	Globe V558 (T-Pattern)	Check V3159	Gate V413	Globe V559 (Y Pattern, Spec. Throt.)	Globe V7950	Globe V557	Globe V560 (T Pattern, Spec. Throt.)		(Y-Pattern)	Globe V575 (3-Way)
2" & Smaller	2-1/2" & Larger																														
Class 1500	Standard Class 1500	For Rocketdyne Valve																													
Carbon Steel	Carbon Steel-Butt Weld	See R Valve List																													
Socket Weld	Check V209	Globe V558 (T-Pattern)																													
Check V3159	Gate V413	Globe V559 (Y Pattern, Spec. Throt.)																													
Globe V7950	Globe V557	Globe V560 (T Pattern, Spec. Throt.)																													
	(Y-Pattern)	Globe V575 (3-Way)																													
PIPE SIZE		2" & Smaller			2-1/2" & Larger																										
FITTINGS		ANSI B16.11 Class 3000 for 1/2" - 1-1/4" and Class 6000 for 1-1/2" - 2" Forged Carbon Steel, ASTM A105, Socket Weld.**			See Sheet 2																										
FLANGES		ANSI B16.5 Class 1500 Forged Carbon Steel, ASTM A105, RF, Socket Weld, Same Sch. as Pipe			ANSI B16.5 Class 1500 Forged Carbon Steel, ASTM A105, RF, Weld Neck, Same Sch. as Pipe																										
UNIONS		Flanges as specified above where necessary.																													
BACKING RINGS		Not Applicable			None Allowed																										
CONSUMABLE INSERT RINGS		Not Applicable			None Allowed																										
BRANCH CONNS.		Socket Weld Tee. (Use insert for reducing.)			Full Size Branch: Tee Branch 2-1/2" & Larger: * Branch 2" & Smaller: *																										
BOLTS		Alloy Bolt Studs ASTM A193 Grade B7, Hex Nuts ASTM A194 Grade 2H Heavy Weight. See General Notes (Finished Ends).																													
GASKETS		ANSI B16.5, Class 1500 spiral wound gaskets with 304 Stainless Steel and asbestos filler and 1/8" carbon steel compression gage rings.																													
NOTES: * If butt weld branch connections (ASTM A105) for branch sizes 2-1/2" and larger are not available then reducing tees (ASTM A234, Grade WPB) may be used for up to and including two size reductions. If socket weld branch connections (ASTM A105) for branch sizes 2" and smaller are not available then the applicable Class 3000 or 6000 half couplings (ASTM 105) may be used. All branch connections shall be designed and integrally reinforced in accordance with ANSI B31.1.																															
**1/2" thru 2" Rocketdyne fittings in the receiver shall be ANSI B16.9 seamless carbon steel ASTM A234, Grade WPB, butt weld same schedule pipe.																															

2,3

2

1

1

3

2,3

DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP		SE00.MBA
	X						
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____						PIPING MATERIAL SPECIFICATION "MBA" CLASS 1500 - CARBON STEEL	PAGE 2 OF 2 ISSUED 8/1/79 REVISED

SUPPLEMENTARY TEST REQUIREMENTS FOR PIPE AND FITTINGS

A. FOR 4-INCH NOMINAL PIPE SIZE AND LESS

No special tests are required.

B. FOR NOMINAL PIPE SIZES OVER 4 INCHES

a. Pipe

In addition to the standard tests specified in ASTM Specification A106, the following tests shall be required on pipe over 4-inch nominal pipe size:

1. Product analysis on each length in accordance with Supplementary Requirement "S1" of ASTM A106.
2. Ultrasonic examination of each length. The procedure and acceptance standard shall be in accordance with Pipe Fabrication Institute Standard PFI ES-18.

b. Fittings

1. In addition to the standard tests specified in ASTM Specification A234, each fitting over 4-inch nominal pipe size shall be ultrasonically examined in accordance with ASTM A388. The maximum acceptable defect shall not exceed 5 percent of the nominal wall thickness.
2. 2-1/2" thru 6": ANSI B16.9 seamless carbon steel, ASTM A234 Grade WPB, butt weld, same schedule as pipe.
3. 8" thru 16": ANSI B16.9 seamless carbon steel, ASTM A234 Grade WPC, butt weld, same schedule as pipe.

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD		STANDARD NUMBER																			
MM	P	PP	SH	FI	SP	SEOO.QEB																						
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____							PIPING MATERIAL SPECIFICATION "QEB" CLASS 2500 - ALLOY STEEL		PAGE 1 OF 2 ISSUED 8/1/79 REVISED 2/4/80																			
MAXIMUM ALLOWABLE PRESSURE AND TEMPERATURE FOR SPECIFICATION: TEMPERATURE, °F: 100 975 1000 1010 PRESSURE, PSIG: 3376 2208 1883 1786																												
PIPE MATERIAL		Seamless 2-1/4% Chrome - 1% Moly Steel ASTM A335 Grade P22 Supplementary Requirements: See Sheet 2																										
PIPE SCHEDULE		1/2" thru 1" : Schedule 80 1-1/4" thru 4" : Schedule 160 6":XXS																										
VALVES		<table border="0"> <tr> <td>2" & Smaller</td> <td>2-1/2" & Larger</td> </tr> <tr> <td>Class 2500 Alloy Steel</td> <td>Standard Class 2500 Alloy Steel</td> </tr> <tr> <td>Socket Weld</td> <td>Butt Weld</td> </tr> <tr> <td>Check V3244</td> <td>Check V214</td> </tr> <tr> <td>Globe V7974</td> <td>Gate V403</td> </tr> <tr> <td></td> <td>Globe V504 (T-Pattern)</td> </tr> <tr> <td></td> <td>Globe V509 (T-Pattern, Spec. Throt.)</td> </tr> <tr> <td></td> <td>Globe V513 (Y-Pattern, Spec. Throt.)</td> </tr> <tr> <td></td> <td>Globe V572 (Y-Pattern)</td> </tr> </table>									2" & Smaller	2-1/2" & Larger	Class 2500 Alloy Steel	Standard Class 2500 Alloy Steel	Socket Weld	Butt Weld	Check V3244	Check V214	Globe V7974	Gate V403		Globe V504 (T-Pattern)		Globe V509 (T-Pattern, Spec. Throt.)		Globe V513 (Y-Pattern, Spec. Throt.)		Globe V572 (Y-Pattern)
2" & Smaller	2-1/2" & Larger																											
Class 2500 Alloy Steel	Standard Class 2500 Alloy Steel																											
Socket Weld	Butt Weld																											
Check V3244	Check V214																											
Globe V7974	Gate V403																											
	Globe V504 (T-Pattern)																											
	Globe V509 (T-Pattern, Spec. Throt.)																											
	Globe V513 (Y-Pattern, Spec. Throt.)																											
	Globe V572 (Y-Pattern)																											
PIPE SIZE		2" & Smaller				2-1/2" & Larger																						
FITTINGS		ANSI B16.11 Class 3000 for 1/2" - 1" and Class 6000 for 1-1/4" - 2" Forged Alloy Steel, ASTM A182 Grade F22, Socket Weld				ANSI B16.9 Seamless Alloy Steel, ASTM A234 Grade WP22, Butt Welded same schedule as pipe.																						
FLANGES		None Allowed				None Allowed																						
UNIONS		None Allowed				None Allowed																						
BACKING RINGS		Not Applicable				None Allowed																						
CONSUMABLE INSERT RINGS		Not Applicable				None Allowed																						
BRANCH CONNS.		Socket Weld Tee. (Use insert for reducing.)				Branch 2-1/2" & Larger: * Branch 2" & Smaller: *																						
BOLTS		Not Applicable																										
GASKETS		Not Applicable																										
NOTES: * If butt weld branch connections (ASTM A182, Grade F22) for branch sizes 2-1/2" and larger are not available then reducing tees (ASTM A182, Grade F22) may be used for up to and including two size reductions. If socket weld branch connections (ASTM A182, Grade F22) for branch sizes 2" and smaller are not available then the applicable Class 3000 or 6000 half couplings (ASTM A182, Grade F22) may be used. All branch connections shall be designed and integrally reinforced in accordance with ANSI B31.1. ** 1/2" thru 2" Rocketdyne fittings in the receiver shall be ANSI B16.9, seamless ASTM A234, butt weld Grade WP22, same schedule as pipe.																												

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP	SEOO.QEB		
	X						PAGE <u>2</u> OF <u>2</u>	
APPROVALS Des. Sect. _____ Tech. Supv. _____ Div. _____							PIPING MATERIAL SPECIFICATION "QEB" CLASS 2500 - ALLOY STEEL	ISSUED 8/1/79 REVISED 12/14/79

SUPPLEMENTARY TEST REQUIREMENTS FOR PIPE AND FITTINGS

A. SUPPLEMENTARY TEST REQUIREMENTS FOR ASTM A335 PIPE

a. For 4-Inch Nominal Pipe Size and Less

No special tests are required.

b. For Nominal Pipe Sizes over 4 Inches

In addition to the standard tests specified in ASTM Specification A335, the following tests shall be required for pipe over 4-inch nominal pipe size.

1. Product analysis on each length in accordance with Supplementary Requirement "S1" of ASTM A335.
2. Flattening test from one end of each length in accordance with Supplementary Requirement "S3" of ASTM A335.
3. Macro Etch test from one end of each length in accordance with Supplementary Requirement "S4" of ASTM A335.
4. Photomicrograph (one per heat on one length in the as-finished condition) in accordance with Supplementary Requirement "S5" of ASTM A335.
5. Ultrasonic examination of each length. The procedure and acceptance standard shall be in accordance with Pipe Fabrication Institute Standard PFI ES-18.

B. SUPPLEMENTARY TEST REQUIREMENTS FOR FITTINGS
FOR NOMINAL PIPE SIZE OVER 4 INCHES

In addition to the standard tests specified in ASTM Specification A182, each fitting over 4-inch nominal pipe size shall be ultrasonically examined in accordance with ASTM A388. The maximum acceptable defect shall not exceed 5 percent of the nominal wall thickness.

DIVISION USAGE <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">MM</td> <td style="width: 10%;">P</td> <td style="width: 10%;">PP</td> <td style="width: 10%;">SH</td> <td style="width: 10%;">FI</td> <td style="width: 10%;">SP</td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> Stearns-Roger ENGINEERING STANDARD STANDARD NUMBER SE00.MBX							MM	P	PP	SH	FI	SP		X				
MM	P	PP	SH	FI	SP													
	X																	
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____ PIPING MATERIAL SPECIFICATION CLASS 1500 - CARBON STEEL (BY ROCKETDYNE)** PAGE 1 OF 2 ISSUED 2/4/80 REVISED																		
MAXIMUM ALLOWABLE PRESSURE AND TEMPERATURE FOR SPECIFICATION: TEMPERATURE, °F: Up to 650° 700° 750° Do not use over 750°F PRESSURE, PSIG: 2340 2230 2010																		
PIPE MATERIAL	Seamless Carbon Steel ASTM A106 Grade B																	
PIPE SCHEDULE	1½" thru 1½": Schedule 80 Grade B 2½": Schedule 80 Grade B 3" thru 6": Schedule 160 Grade B																	
PIPE SIZE	½" thru 1½", 2½" thru 6"																	
FITTINGS	ANSI B16.9 Seamless Carbon Steel, ASTM A234 Grade WPB, Butt Weld, Same Schedule as Pipe																	
FLANGES	None Allowed																	
UNIONS	None allowed																	
BACKING RINGS	None allowed																	
CONSUMABLE INSERT RINGS	None allowed																	
BRANCH CONNS.	Full Size or Reducing Branch: Tee ANSI B16.9 Pipe Branch 3/4" & Larger*																	
NOTES: *All branch connections shall be designed and integrally reinforced in accordance with ANSI B31.1. **All piping materials and components specified in this standard are the design responsibility of Rockwell International, Rocketdyne Division, Canoga Park, California.																		

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP	SEOO.MBX		
	X							
APPROVALS							PIPING MATERIAL SPECIFICATION "MBX" CLASS 1500 - CARBON STEEL	PAGE 2 OF 2
Des. Sect. _____								ISSUED 8/1/79
Sect. Supv. _____								REVISED 2/4/80
Div. _____								

SUPPLEMENTARY TEST REQUIREMENTS FOR PIPE AND FITTINGS

A. FOR 4-INCH NOMINAL PIPE SIZE AND LESS

No special tests are required.

B. FOR NOMINAL PIPE SIZES OVER 4 INCHES

a. Pipe

In addition to the standard tests specified in ASTM Specification A106, the following tests shall be required on pipe over 4-inch nominal pipe size:

1. Product analysis on each length in accordance with Supplementary Requirement "S1" of ASTM A106.
2. Ultrasonic examination of each length. The procedure and acceptance standard shall be in accordance with Pipe Fabrication Institute Standard PFI ES-18.

b. Fittings

1. In addition to the standard tests specified in ASTM Specification A234, each fitting over 4-inch nominal pipe size shall be ultrasonically examined in accordance with ASTM A388. The maximum acceptable defect shall not exceed 5 percent of the nominal wall thickness.
2. 2-1/2" thru 6": ANSI B16.9 seamless carbon steel, ASTM A234 Grade WPB, butt weld, same schedule as pipe.
3. 8" thru 16": ANSI B16.9 seamless carbon steel, ASTM A234 Grade WPC, butt weld, same schedule as pipe.

ISOMETRIC DRAWINGS
FOR
STEARNS-ROGER DESIGNED
PRIMARY PREFABRICATED PIPE
FOR
LINE NO.'S

AS-7

FW-2 & 9

MS-2, 3, 5, 6, 7, 8, 9 & 10

ST-9, 13, 17, 18, 19

VT-1, 11 & 12

CO-6 & 12

70

LINE NO. **G-MS-2** REF. PD-3A
DWG.

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L	REQ'N.
------	-------------	-------	--------

LOOSE MAT'L.
-NONE-

REVIEWED/NO COMMENTS
REVISE P.R. COMMENTS FOR SUBMIT FOR REVIEW
SEE LIST OF TRANSMITTAL
DATE 01 1980
INC. DEPT. B.
RETURN TO

Stearns-Roger
INCORPORATED
ON OR BEFORE

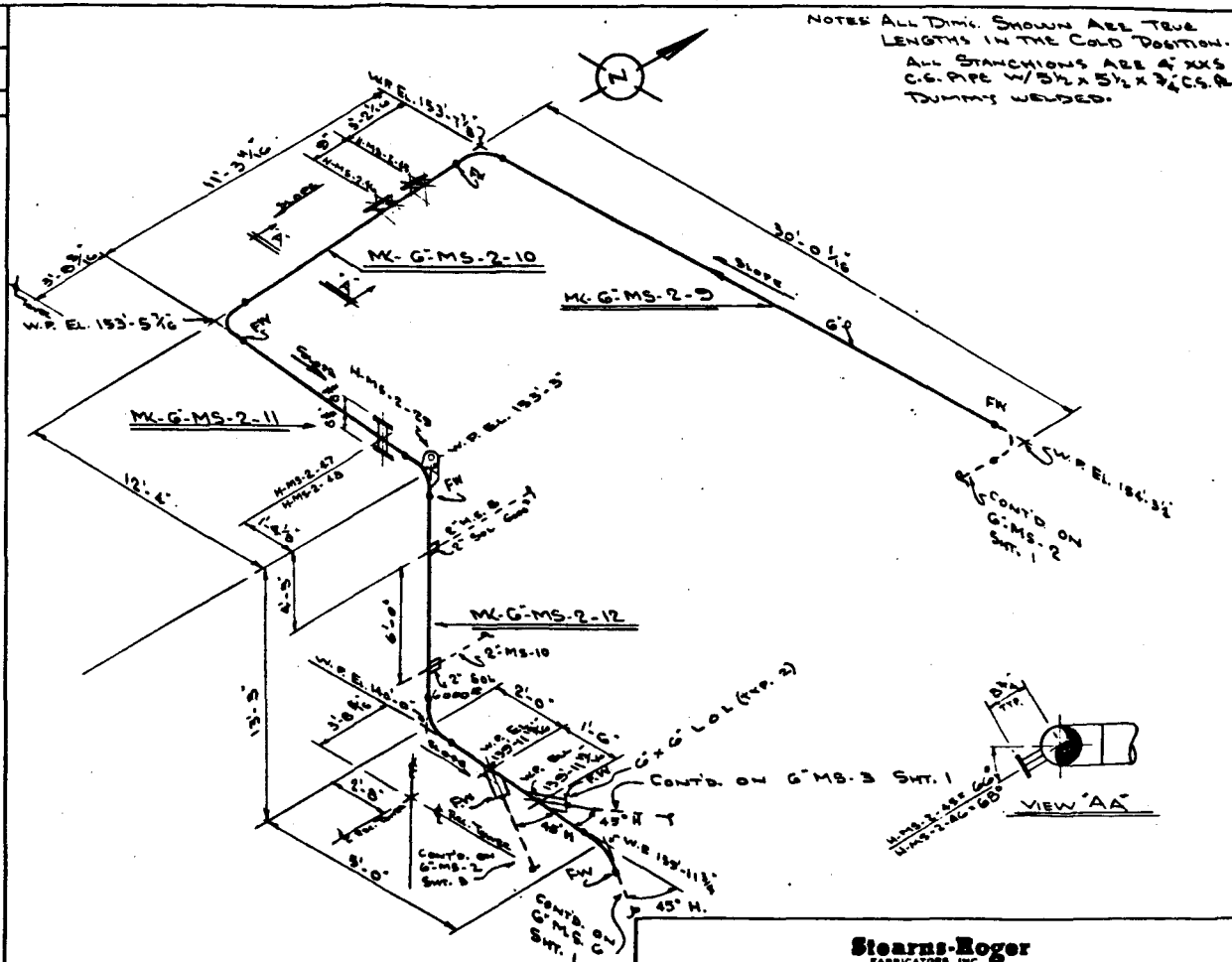
FINAL AUG 01 1980

C. E. FIVE

Stearns-Roger

C21700 AUG 01 '80

SR No. E6 File No. 002



Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS

SHOP WELDING

JM
TIG ALL

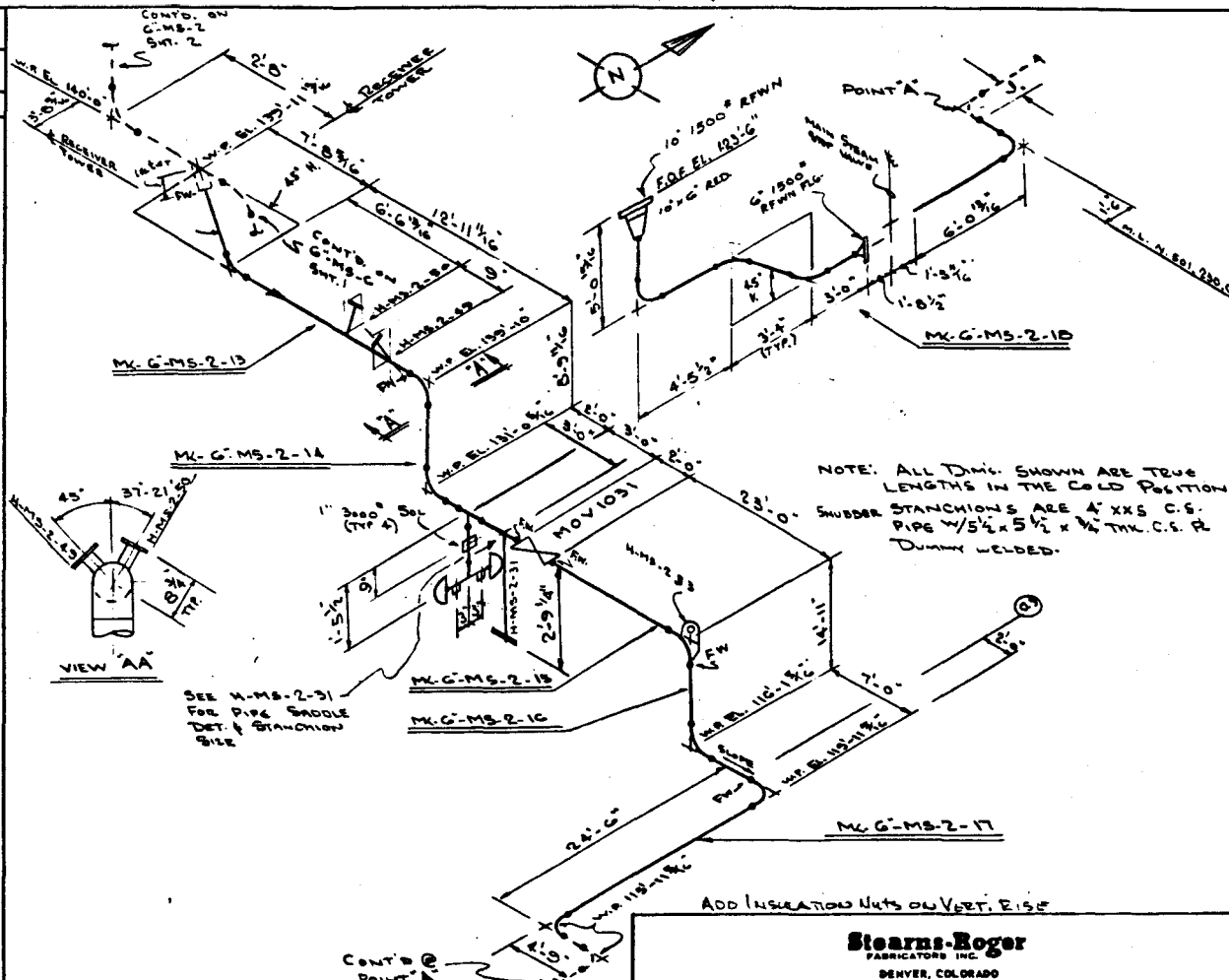
DESIGN	1775 PW @ 1010 SF	DRAWN	PK 5-14-80
SPEC. / MAT'L	QES A335-P22 XKS	CHECKED	26 5-15-80
N.D.E. 10070	BW-MT OR PT FILLET WELDS	APPR.	DEC 7-73-80
O.D. PREP. FFI-E55	P.W.H.T. YES	LINE NO.	G-M.S.-2
I.D. PREP. FFI-E425		REV.	
		SHEET	2 OF 3

CUSTOMER **MD/SR/R**

PROJECT **10 MW & SOLAR PLANT**

JOB No. **D-82583**

LINE NO. G-MS-2		REF. PDS 1A DWG. PS-10 A	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L.		
1	10' 1500* FLEXITALLIC GWT. TYP. C8 W/347 5/8" F ASBESTOS FILLER & C. STL COMP. GAGE RING.		
1	6' 1500* — D —		
12	1 1/8" x 1 1/4" LG ALUM STUDS A193 GR B1G W/2 WHT. HEX NUTS Ea. A194 GR 7		
12	1 1/8" x 10 1/4" LG ALUM. STUDS A193- GR B1G W/2 WHT. HEX NUTS Ea. A194 GR 7		
REVIEWED/NO COMMENTS REV. W. DISC. COMMENTS REVISE P.R. COMMENTS FOR SUBMIT FOR REVIEW SEE LISTING TRANSMITTAL ENG. DESIGNED BY: <i>[Signature]</i> DATE: AUG 01 1980 RETURN TO: Stearns-Roger INCORPORATED ON OR BEFORE FINAL AUG 01 1980 C. E. FILE Stearns-Roger C21700 AUG 01 '80 SR No. <u>E6</u> File No. <u>002</u>			
REVISIONS SHOP WELDING JM TIG ALL DESIGN 1775 PH & 1010 PF SPEC. / MAT'L. QES A335-P22 XXS N.D.E. 100' X 24' B.W. LATOR PT FULLY WELDED O.D. PREP. PF-ESS I.D. PREP. PF-ESS2D DRAWN PL 5-14-80 CHECKED 5-15-80 APPR. DEC 7-31-80 LINE NO. G-MS-2 REV. SHEET 5 OF 5			
CUSTOMER MD/SR/R		PROJECT 10 MW ₂ SOLAR PILOT PLANT	



LINE No. G-MS-3		REF. P9-3 DWG.			
MATERIAL LIST					
ITEM	DESCRIPTION	MAT'L	REQ'N.		
	Loose Mat'l. — NONE —				

☒ REVIEWED/NO COMMENTS ☐ REVIEW/DISE COMMENTS ☐ REVISE PER COMMENTS & RETURN FOR REVIEW ☐ SEE COMMENTS FOR MATERIAL ENG. DEPT. BY <i>[Signature]</i> DATE 01 000 RETURN TO Stearns-Roger INCORPORATED ON OR BEFORE	VIEW "AA" SEE HMS-3-2 FOR PIPE SIZES DETAIL & STRUCTURAL SIZE
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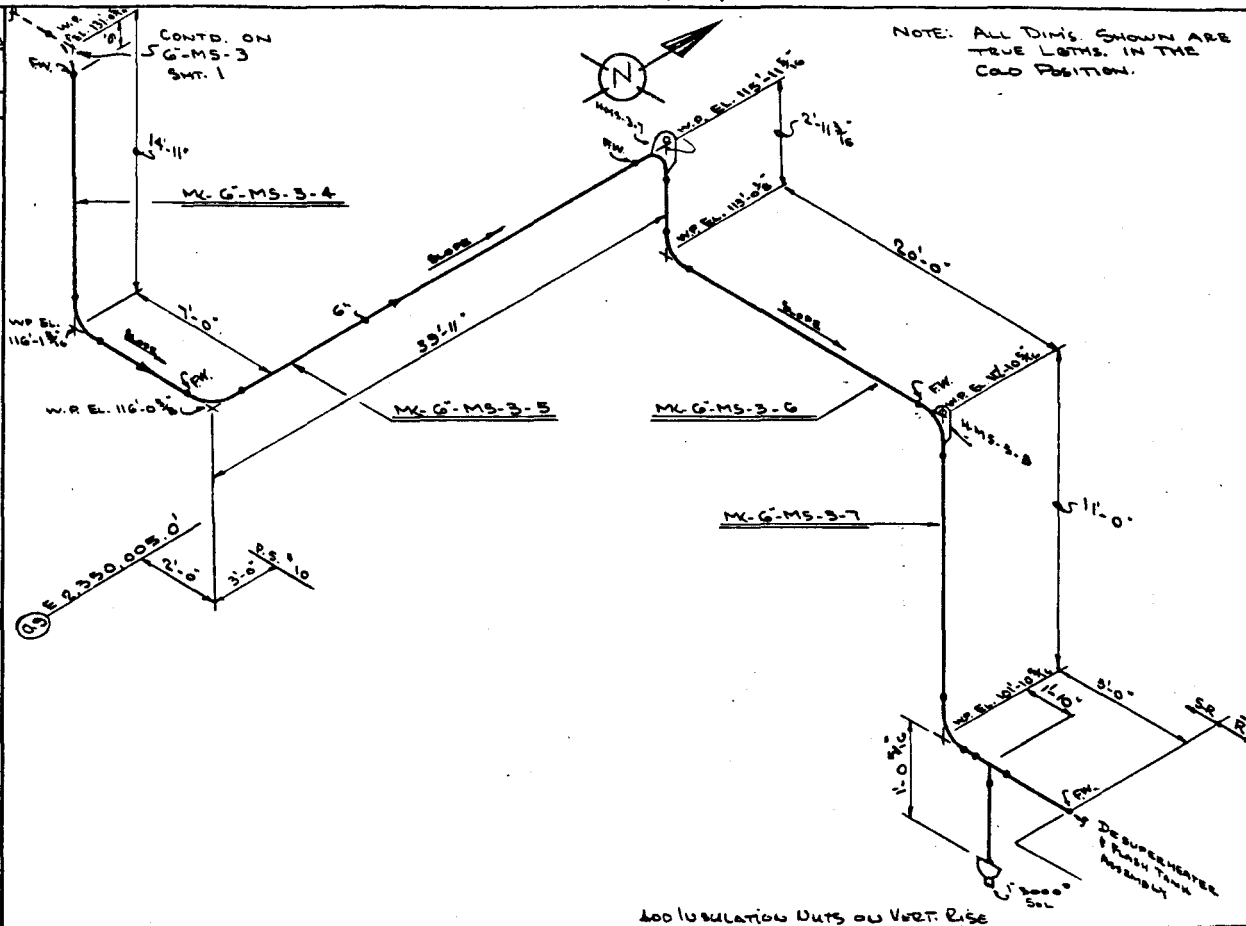
FINAL AUG 01 1980 Stearns-Roger C21700 AUG 01 '80 SR No. <u>E-6</u> File No. <u>004</u>		C.E. FILE	
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REVISIONS		SHOP WELDING JM TIO ALL		Stearns-Roger FABRICATORS, INC. DENVER, COLORADO	
				DESIGN 1715 PM 1010 of SPEC. / MAT'L QED A335-P22 KXS N.D.E. 100% X-RAY PW-MTOL PT FILLET WELD O.D. PREP. PFI-ESS P.W.T. YES I.D. PREP. PFI-ESS	
				DRAWN BY 3-15-80 CHECKED BY 5-19-80 APPROVED BY 7-10-80 LINE No. G-MS-3 SHEET 1 OF 2	

LINE No. **G'-MS-3** REF. **D9-3**
 DWG. **P9-4** **P9-10A**

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L	REQ'N.
	LOOSE MAT'L. — NONE —		
☐ REVIEWED/NO COMMENTS ☐ REV. W. DISSEE COMMENTS ☐ REVISE P.R. COMMENTS & R'SUBMIT FOR REVIEW ☐ SEE <u>W. 116-0%</u> OF TRANSMITTER ENG. DEPT. E <u>116-0%</u> DATE <u>AUG 01 1980</u> RETURN TO Stearns-Roger INCORPORATED ON OR BEFORE FINAL AUG 01 1980 Stearns-Roger C. E. FILE M: 021700 AUG 01 '80 SR No. <u>EG</u> File No. <u>005</u>			



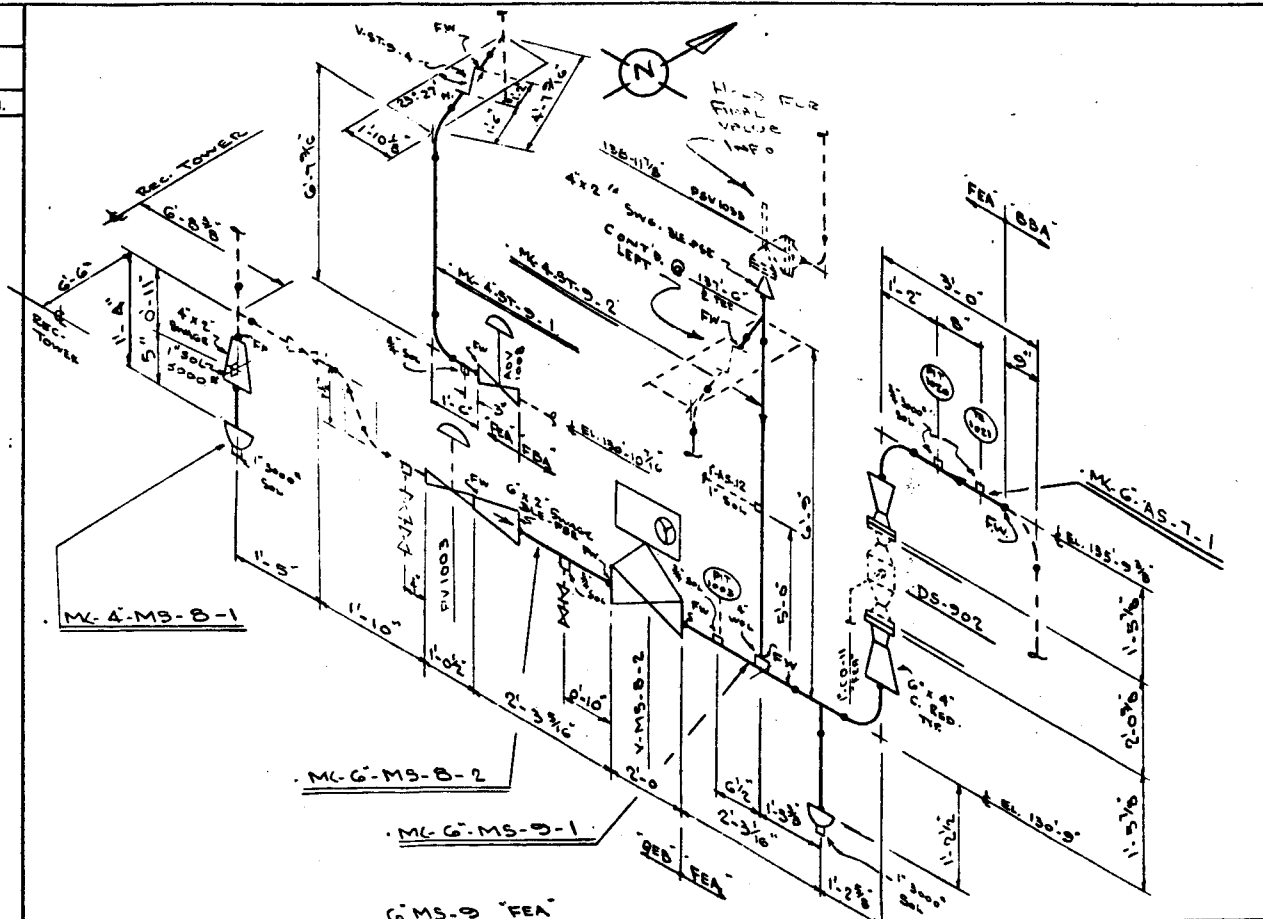
Stearns-Roger
 FABRICATORS, INC.
 DENVER, COLORADO

REVISIONS	SHOP WELDING JM TIG ALL	DESIGN 1773 PSI @ 1010 OF	DRAWN <u>DL 5-15-80</u>
		SPEC. / MAT'L QED A335-P22 XKS	CHECKED <u>5-19-80</u>
		N.D.E. 100% XRAY DW-MTDEPT FULT WELDS	APPR. <u>230-80</u>
		O.D. PREP. PFLESS	LINE NO. G'-MS-3
		I.D. PREP. PFI-ES23	REV. 2
CUSTOMER MD/S-R/R	PROJECT 10MW SOLAR PLOT PLANT	JOB No. D-82503	SHEET 2 OF 2

LINE No. G-MS-B REF. P9-4
DWG.

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L	REQ'N.
	LOOSE MAT'L		
24	3/4" x 4 1/2" LG A193-B16 STUDS W/2 A194 GR7 HEX NUTS		
3	4" 300" STYLE CG 347 SS FLEXITALK GASKET		
☒ REVIEWED/NO COMMENTS ☐ REVIEW/REVISION COMMENTS ☐ REVIEW FOR COMMENTS & REQUEST FOR REVIEW ☐ SEE LIST OF TRANSMITTALS ENG. DEPT. BY <u> </u> DATE <u>AUG 01 1980</u> ALL REVISED WORK IS TO BE REWORKED AND RE-INSPECTED OF CONTRACTOR'S WORK TO BE REWORKED AND RE-INSPECTED IN FIELD OF WORK. CONTRACTOR'S RESPONSIBILITY. RETURN TO Stearns-Roger INCORPORATED ON OR BEFORE			
FINAL <u>AUG 01 1980</u> C. E. FILE Stearns-Roger 021700 <u>AUG 01 '80</u> SR No. <u>E-6</u> File No. <u>031</u>			



THIS ISO. INCLUDES LINES

G-MS-B "FEA"
 4-MS-B "QEB"
 G-AS-7 "FEA"
 4-ST-3 "FEA"

REVISIONS

SHOP WELDING

JM

TIG ROOT ALL

CUSTOMER MD/SR/R

PROJECT 10MW₂ SOLAR PLOT PLANT JOB No. B-82583

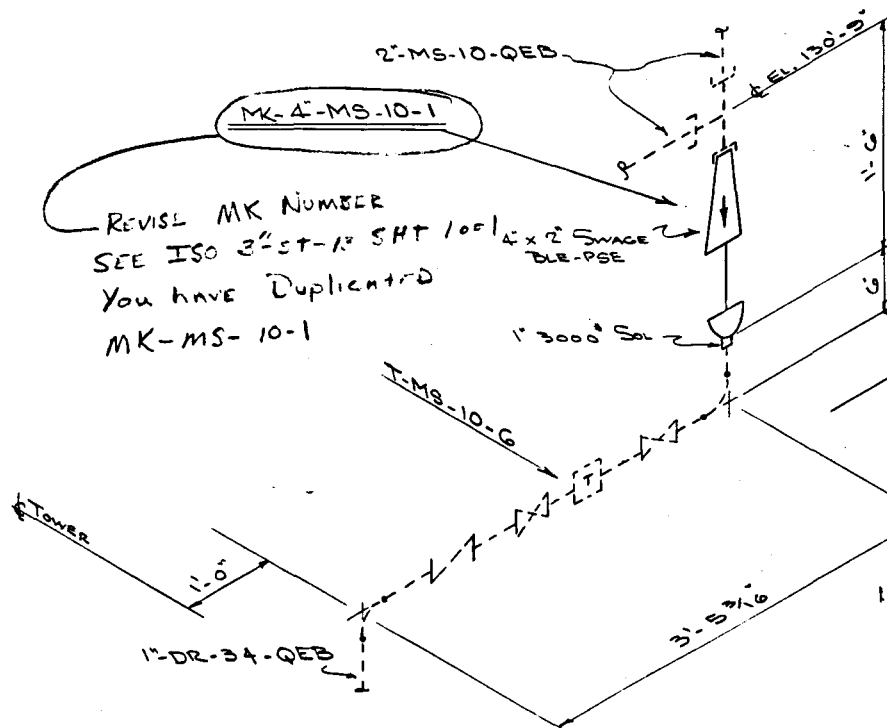
Stearns-Roger
 FABRICATORS, INC.
 DENVER, COLORADO

DESIGN <u>QEB</u> <u>1775</u> <u>FEA</u> <u>1010</u> <u>OF</u>	DRAWN <u>PK 5-14-80</u>
SPEC. / MAT'L <u>QEB</u> <u>A335-B71</u> <u>XXS</u>	CHECKED <u>PK 5-24-80</u>
N.D.E. 100% PW X-RAY MT/OT BRANCH COMM.	APPR. <u>PK 7-31-80</u>
O.D. PREP. PFI-ESS	P.W.M.T. YES <u>NOTED</u>
I.D. PREP. PFI-ESS	LINE No. <u>GMS-B</u> REV. <u>0</u>
	SHEET 1 OF 1

REF. DWG. P9-18 A & P9-3 A

MATERIAL LIST

ITEM	QTY.	DESCRIPTION	MAT'L.
		Loose Mat'l.	
		NONE	



REVISE MK NUMBER
SEE ISO 3"-ST-1" SHT 1001 4" x 2" SWAGE
BLE-PSE
You have Duplicated
MK-MS-10-1

☐ REVIEWED/NO COMMENTS
☒ REVIEWED/SEE COMMENTS
☐ REVISE PER COMMENTS & RESUBMIT FOR REVIEW

ENG. DESIGNED BY: SEE 111 OF TRANSMITTAL
 DATE: SEP 15 1980

OR CONSULTATION FROM THE POSSIBILITY TO CO-EXIST WITH SPEC.
 REVISIONS TO THE OTHER CONTRACT DOCUMENTS.

RETURN TO
Stearns-Roger
 INCORPORATED
 ON OR BEFORE

C. E. FILE
Stearns-Roger
 11-021700 SEP 10 '80
 SR No. E-6 File No. 122

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

CUSTOMER MD/SR

PROJECT 10MWE SOLAR Pilot Plant JOB No. B-825B3

DESIGN	1775 PSI @ 1010 OF
SPEC./MAT'L.	QEB SCH 160 A335-P22
N.D.E.	100% BW-MT PT Sol
O.D. PREP.	PFI-ES 5 P.W.H.T. YES
I.D. PREP.	PFI-ES 29

DRAWN	PK B-14-80
CHECKED	2-5-80
APPR.	
LINE No.	4'-MS-10
REV.	
SHEET	1 OF 1



LINE No. 4-ST-17 REF. DWG. PS-15 A

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L	REQ'D.
	LOOSE MAT'L. — NONE —		

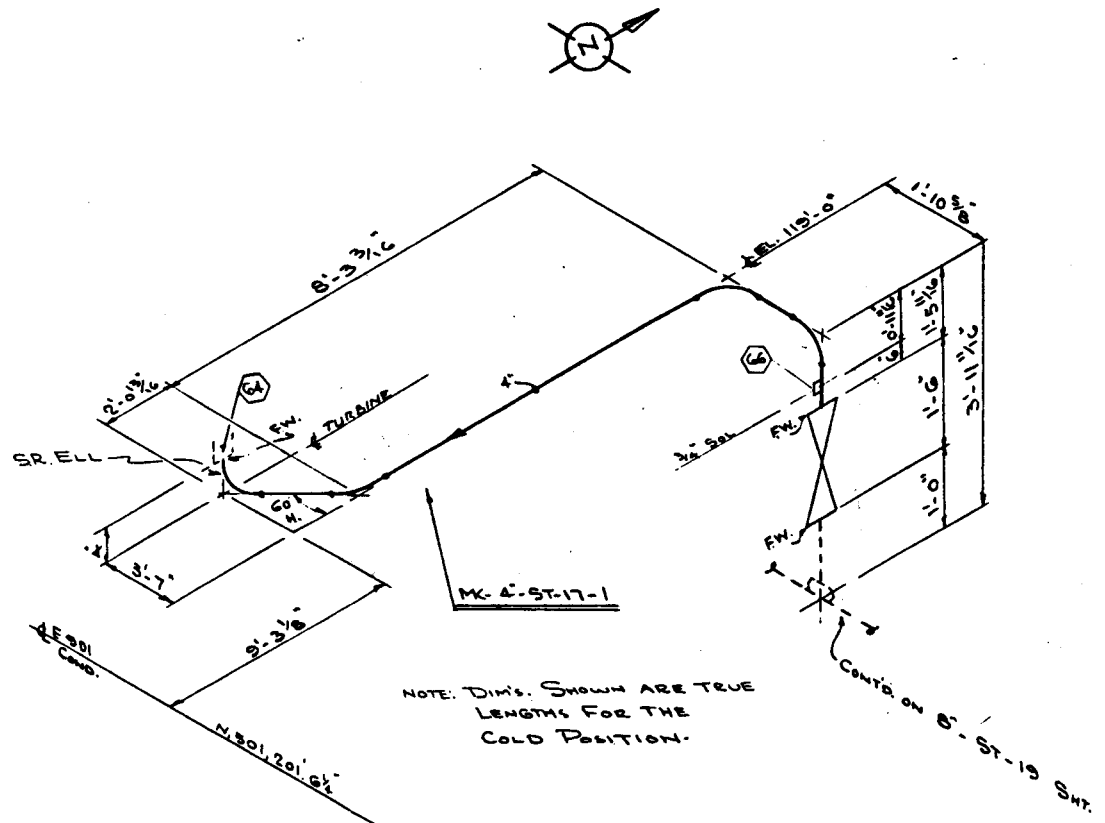
☒ REVIEWED/NO COMMENTS
☐ REVIEWED/SEE COMMENTS
☐ REVISE P.R. COMMENTS & RETURN FOR REVIEW
☐ SEE LIST FOR REVISIONS
 ENG. DESIGNED BY: DATE: AUG 01 1980
 CHECKED BY: DATE: AUG 01 1980
 RETURN TO: LOCATION: 1001
 ON OR BEFORE

FINAL AUG 01 1980 C.E. FILE

Stearns-Roger

C21700 AUG 01 '80

SR No. E-6 File No. C42



NOTE: DIMS. SHOWN ARE TRUE LENGTHS FOR THE COLD POSITION.

REVISIONS

SHOP WELDING
JM
TIG ALL

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

DESIGN 144B	PM # 902 OF	DRAWN PL 7-15-80
SPEC. / MAT'L QED A335-P22 GEN 160		CHECKED 7-21-80
M.D.E. 100% Y.R. DW MT PT NO. WELD:		APPR. 7-21-80
O.D. PREP. PF-ES-5	P.W.H.T. YES	LINE NO. 4-ST-17
I.D. PREP. PF-ES-23		SHEET 1 OF 1

CUSTOMER MD/SR/R

PROJECT 10MW SOLAR PLOT PLANT

JOB No. B-B2583



LINE No. B-ST-19 REF. DWG. P9-15 A

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L	REQ'N.
1	Loose Mat'l.		
2	4" 600# FLEXITALLIC CASKET TYPE CG 7327 5/16" x 1/2" ASB- ESTOS FILLER PC-STL COMPR. RING.		

16 7/8 x 5 3/4" L.C. ALLOY
STUDS A193 GR. B16
HTWD. HWY. HEX NUTS
FR. A194 GR. 7

REVIEWED NO COMMENTS
REVIEWED NO COMMENTS
REVISE FOR COMMENTS OR SUBMIT FOR REVIEW
S. LITTE
AUG 01 1980
RETURN TO

ON OR BEFORE

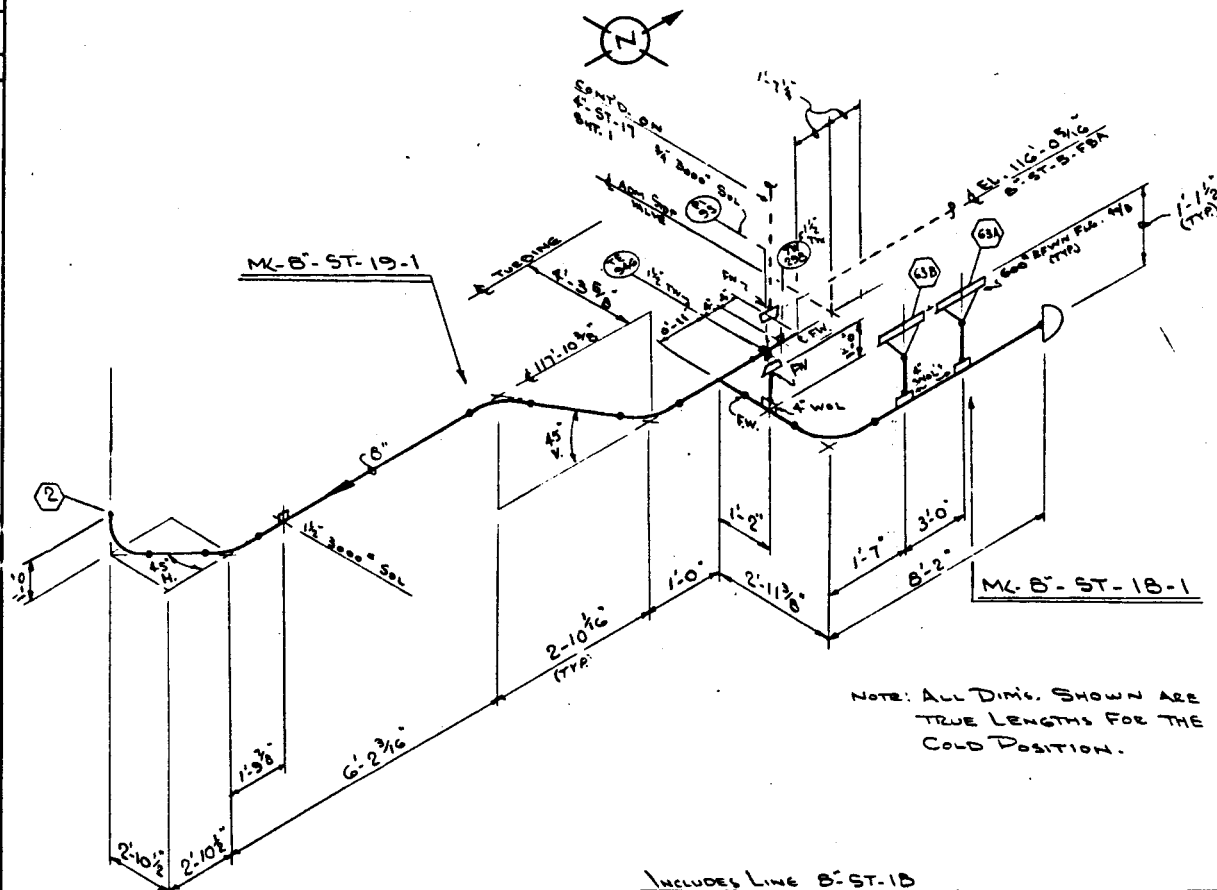
FINAL AUG 01 1980

Stearns-Roger

C21700 AUG 01 '80

SA No. E-6 File No. 043

C. E. FILE



NOTE: ALL DIMS. SHOWN ARE TRUE LENGTHS FOR THE COLD POSITION.

Includes Line B-ST-18

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS

SHOP WELDING

JM
TIG ALL

DESIGN 489 PSI @ 502 OF
SPEC. / MAT'L. WEN A335-P11 SH 40
N.D.E. 100% X 2 BN MT & PT NOZZLE WELDS
O.D. PREP. PF. ES-5 P.W.M.T. YES
I.D. PREP. PF. ES-5

DRAWN DIC 7-15-80
CHECKED 7-21-80
APPR. 7-31-80
LINE NO. B-ST-19
REV. 1
SHEET 1 OF 1

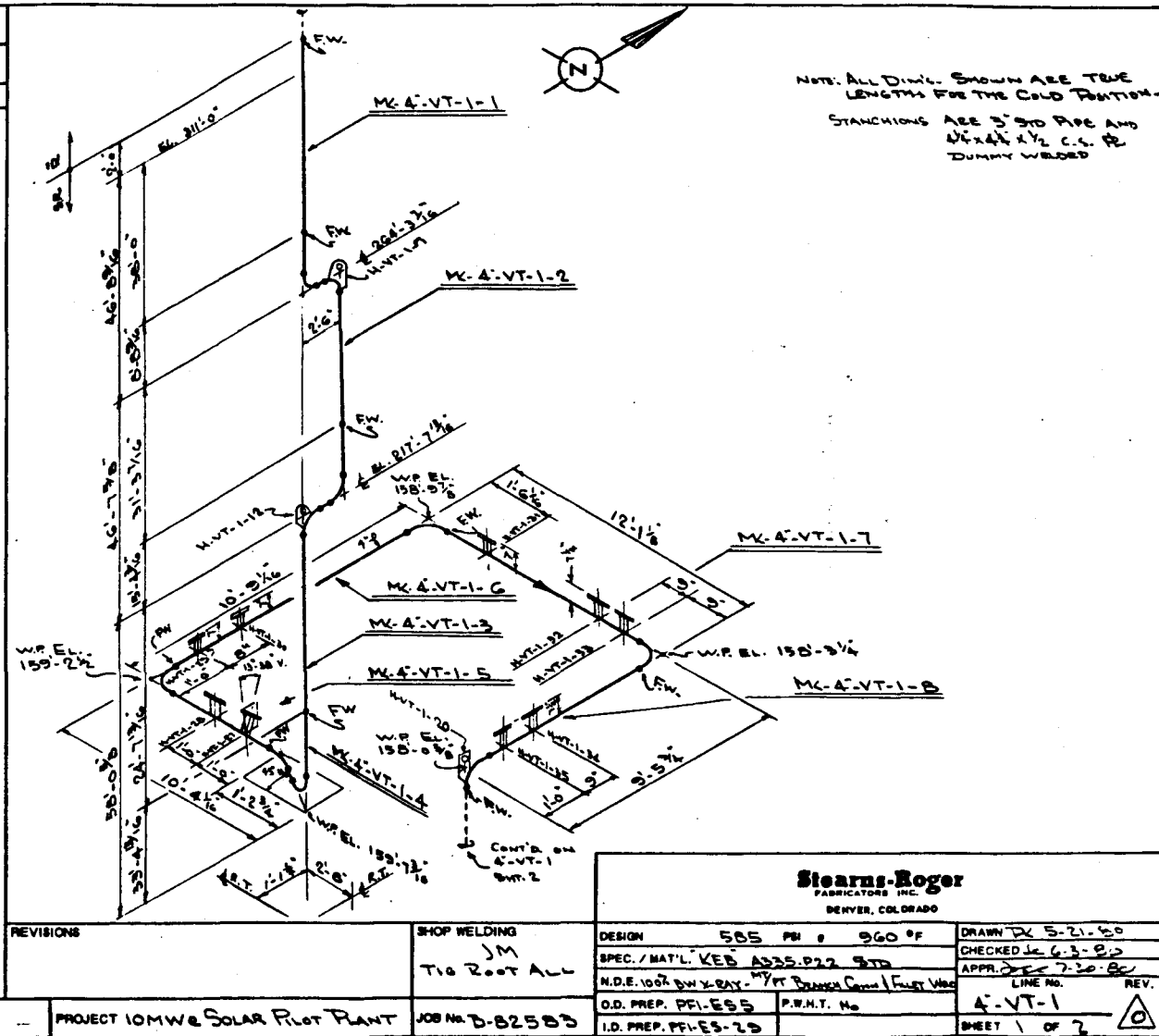
CUSTOMER M.D./SR/R

PROJECT 10 MW SOLAR PILOT PLANT

JOB No. B-82583

LINE NO. 4-VT-1	REF. PD-3 
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MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L. - NONE -		
☒ REVIEWED/NO COMMENTS ☐ REVIEWED/SEE COMMENTS ☐ REVIEW FOR COMMENTS & RECOMMENDATION FOR REVIEW ☐ SEE COMMENTS FOR MATERIAL EGG DATE BY: <u> </u> DATE <u>AUG 01 1980</u> MATERIAL LISTED ON THIS FORM IS FOR INFORMATION ONLY. IT IS NOT A CONTRACT. THE CONTRACT IS THE ONLY SOURCE OF THE TRUE AND CORRECT DESCRIPTION OF THE CONTRACT REQUIREMENTS. RETURN TO: <u> </u> <u> </u> INSTRUCTIONS ON OR BEFORE			
FINAL AUG 01 1980 C. E. FILL Stearns-Roger C21700 AUG 01 '80 SR No. <u>E6</u> File No. <u>Q39</u>			



REF. P9-18 A & P9-3 A
DWG.

MATERIAL LIST

ITEM	QTY.	DESCRIPTION	MAT'L.
		Loose Mat'l.	
		NONE	

☒ REVIEW/DISC COMMENTS
☐ R.V.W./DISC COMMENTS
☐ REVISE PER COMMENTS & RETURN IT FOR REVIEW
☐ SIGN LETTER OF TRANSMITTAL
 INC. DEPT. BY SR DATE SEP 15 1980
 PREP. BY SR DATE SEP 15 1980
 OR CONTRACTOR FROM RESPONSIBILITY FOR COORDINATE WITH SPEC
 INDICATION OF WITH ALL OTHER CONTRACT REQUIREMENTS.
 RETURN TO

Stearns-Roger
 INCORPORATED
 ON OR BEFORE

C. E. FILE

Stearns-Roger

C21700 SEP 12 '80

SR No. E-6 File No. 131

CUSTOMER MD/SR

PROJECT 10MWE SOLAR PLANT

JOB No. B-82583

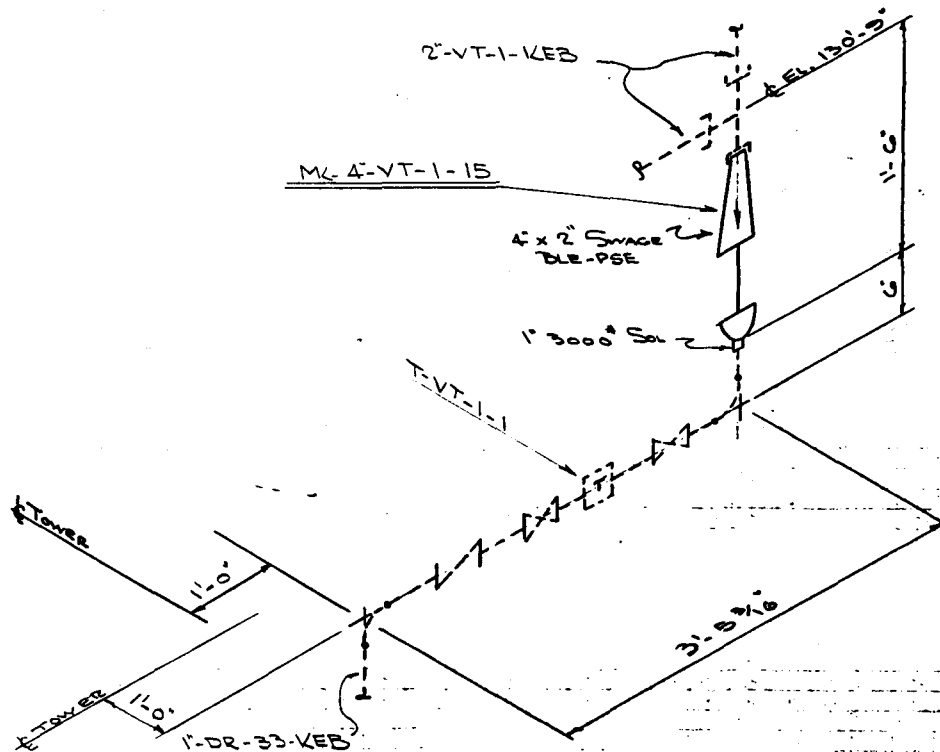
NO.	REVISION	BY	DATE

SHOP
 WELDING
 TIG

DESIGN 585 PS @ 960 °F
 SPEC./MAT'L KEB STD A335-P22
 N.D.E 100% PW-MT & PT SOL
 O.D. PREP. PFI-ES 3 P.W.M.T.
 I.D. PREP. PFI-ES 29

Stearns-Roger
 FABRICATORS, INC.
 DENVER, COLORADO

DRAWN PK B-14-80
 CHECKED 9-2-80
 APPR.
 LINE No. REV.
 4-VT-1
 SHEET 1A OF 1



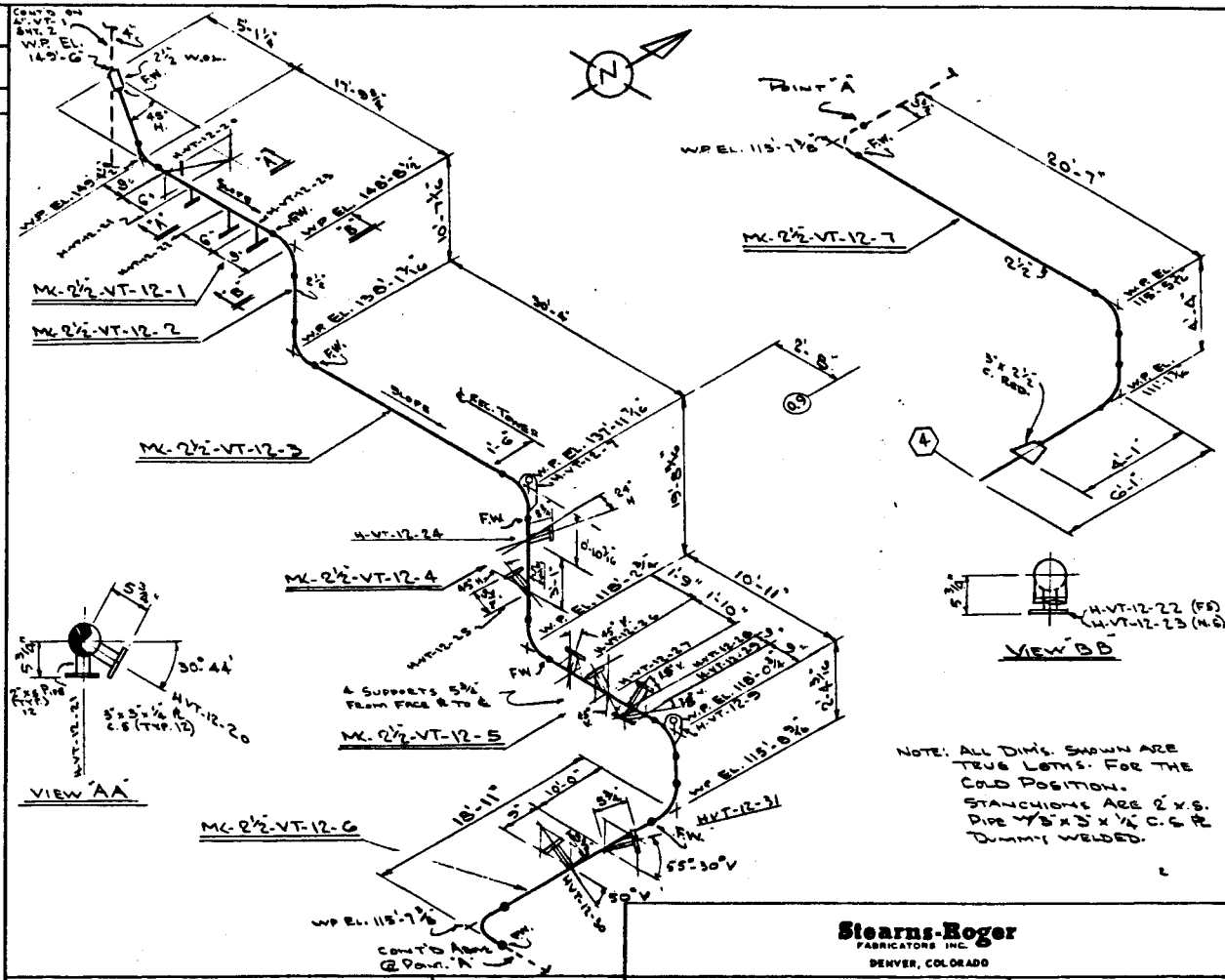
LINE No. 2 1/2-VT-12 REF. DS-5 DWG. DS-10

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L. - NONE -		

REVIEWED NO COMMENTS
 REVIEW DISC COMMENTS
 REVISE FOR COMMENTS & RETURN FOR REVIEW
 [] SEE L. [] SEE L. [] SEE L.
 EMP. DEPT. BY [Signature] AUG 01 1980
 RETURN TO [Signature]
 ON OR BEFORE

FINAL AUG 01 1980 C. E. FILE
 Stearns-Roger
 021700 AUG 01 '80
 SR No. E-6 File No. 041



NOTE: ALL DIMS. SHOWN ARE TRUE LTHS. FOR THE COLD POSITION. STANCHIONS ARE 2" X 8. PIPE 1/2" X 3/4" C.G. R. DUMMY WELDED.

REVISIONS	SHOP WELDING JM TIG ROOT ALL	DESIGN 505 PH 0 960 OF	DRAWN PK 5-10-80
		SPEC. / MAT'L. KEB A335-P22 STD	CHECKED 6-4-80
		N.D.E. 100% BY XRAY - 1/2" BENCH CORR & FLUET WELD	APPR. DEC 7-31-80
		O.D. PREP. PELESS P.W.M.T. NO	REV. 2 1/2-VT-12
		I.D. PREP. PFI-F523	SHEET 1 OF 1

CUSTOMER MD/S-R/R

PROJECT 10MW SOLAR PILOT PLANT

JOB No. B-82583

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
------	-------------	--------	--------

Loose Mat'l.
- None -

☒ REVIEWED/NO COMMENTS
☐ REVIEWED/SEE COMMENTS
☐ REVISE P/R COMMENTS & RESUBMIT FOR REVIEW
☐ SEE LIAISON FOR INFORMATIONAL
 ENC. DEST. BY 112 DATE AUG 01 1980
 NO. OF COPIES OF THIS DOCUMENT TO BE DESTROYED 1
 ON 01/01/81 DATE FOR COMPLETION OF THIS ACTION 01/01/81
 BY 112 OF 112 CONTACT NAME 112
 RETURN TO 112

NOTIFIED
ON OR BEFORE

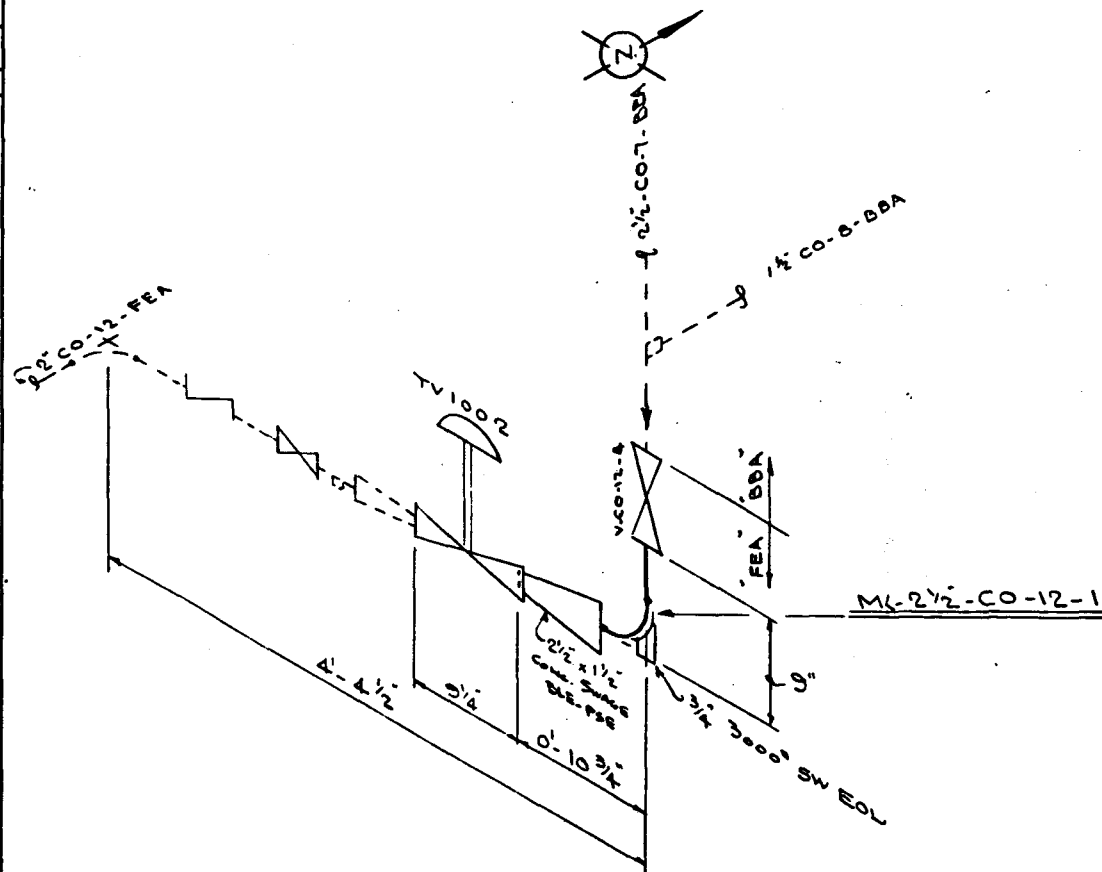
FINAL AUG 01 1980

C. E. FILE

Stearns-Roger

C21700 AUG 01 '80

EC No E-6 File No 051



Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

		REVISIONS		SHOP WELDING		DESIGN 102 PSI @ 665 °F		DRAWN J2L 7-25-80	
				TIG ALL		SPEC. / MAT'L FEA A335-P11 STD		CHECKED L 7-25-80	
						N.D.E. 100% X-RAY BW-MT & PT B. Comp.		APPR. JSC 7-31-80	
								LINE No. REV	
CUSTOMER MD/SR/R		PROJECT 10 MW SOLAR PILOT PLANT		JOB No. B-02583		O.D. PREP. PFLESS P.W.M.T. —		2 1/2 - CO-12	
						I.D. PREP. PFLESS		SHEET 1 OF 1	



ISOMETRIC DRAWINGS

FOR

ROCKETDYNE DESIGNED

FOR

LINE NO.'S

FW-200, 201, 202, 203, 228, 231, 232,
233, 234, 235 & 236

ST-202 & 203

CO-201, 203 & 222

VT-1, 201 & 208

MS-2 (partial), 201, 205, 208, 211, 214
217 & 220



LINE No. 4"-FW-200-MBX REF. 40M2005131932
DWG. 40M2005131945

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L	REQ'N.
	LOOSE MAT'L		
48	1 1/8" ϕ x 8 1/2" LG STUDS		
96	1 1/8" HEX NUTS		
6	FLEXITALLIC GASKET CG-25H		
6	2 1/2"-2500* RFWN FLG		

Stearns-Roger

D21700 JUN 1 '80

SR No. E-6.1 File No. 023

CUSTOMER MD/SR/R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.

REVISIONS CADD. REV. 1.0 11/1/80 E.D.S. 11/1/80

SHOP WELDING

DESIGN E.D.S. 2000 PSI @ 440 °F

DRAWN GUTEN 5/3/80

SPEC./MAT'L MBX/CL1500 CARBON ST

CHECKED 11/1/80 11/1/80

N.D.E.

APPR. 11/1/80 11/1/80

O.D. PREP.

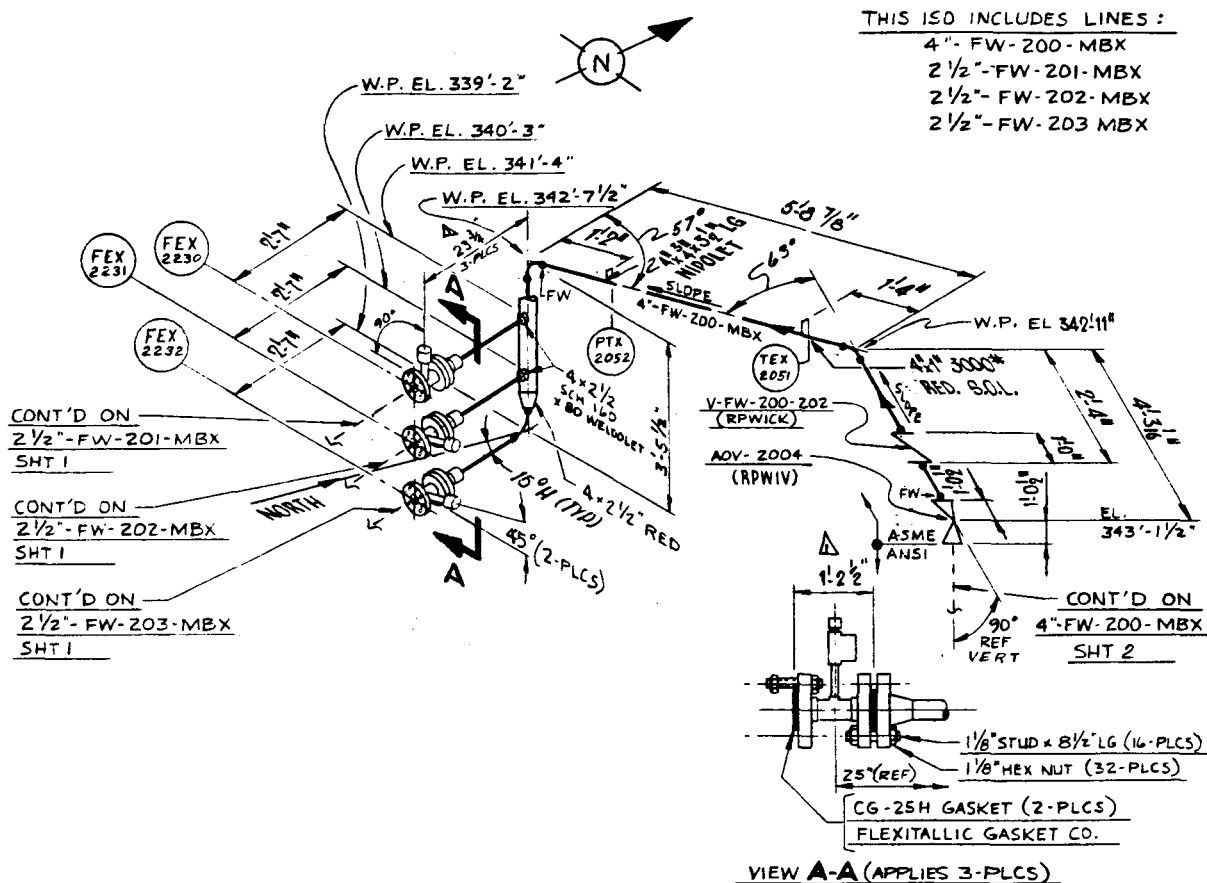
P.W.H.T.

LINE No. REV.

I.D. PREP.

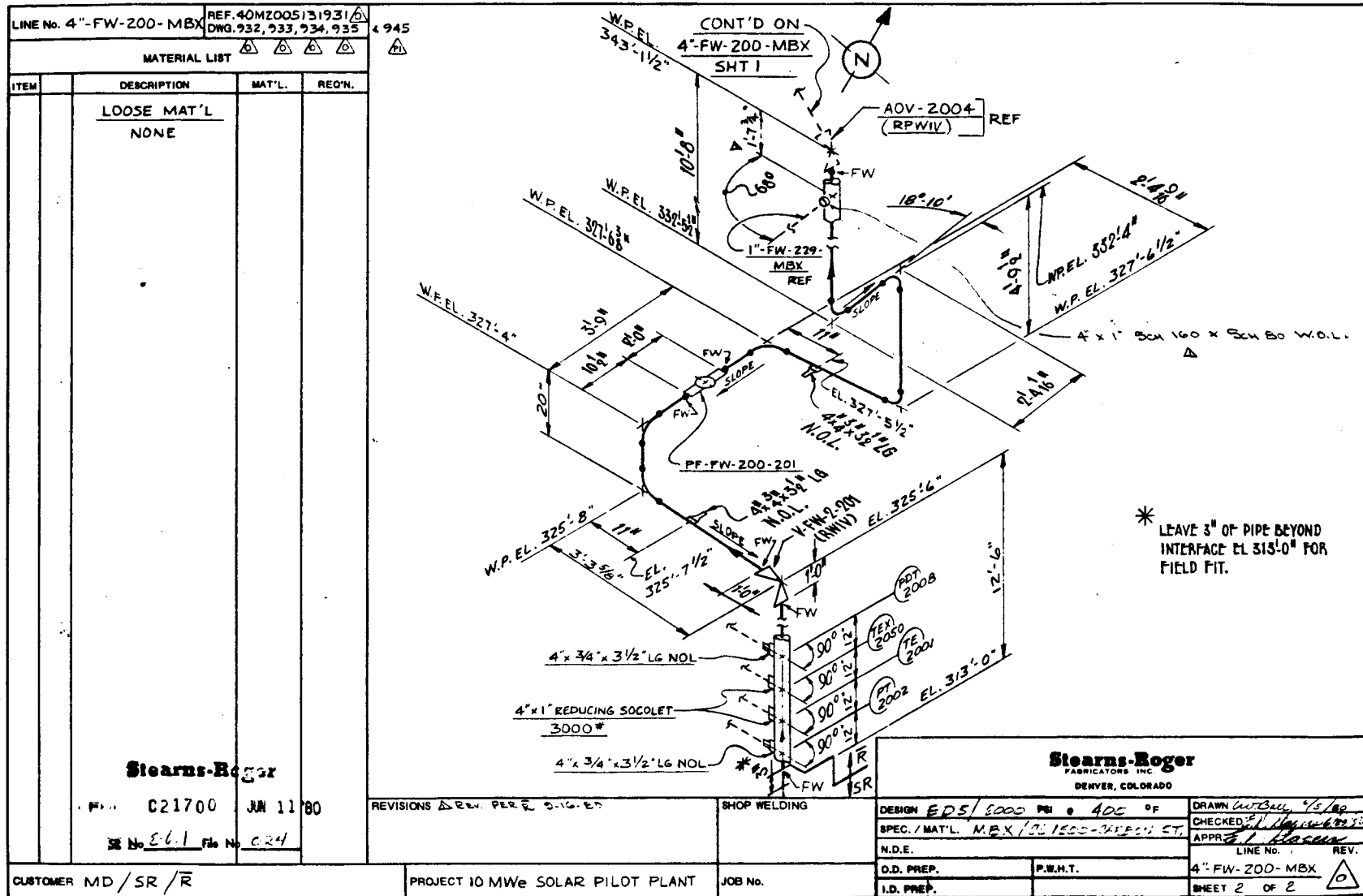
4"-FW-200-MBX

SHEET 1 OF 2



VIEW A-A (APPLIES 3-PLCS)

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO



4945

LINE No. 2 1/2"-FW-201-MBX		REF. 40M2005131932 DWG. 40M2005131945	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L NONE		
Stearns-Roger No. C21700 JUN 16 '80 Rev No. 26.1 File No. 035		* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT	
REVISIONS		SHOP WELDING	
DESIGN EDS/0000 P. 440 OF SPEC. / MAT'L. MEX/011500-01500-01 N.D.E. O.D. PREP. I.D. PREP.		Stearns-Roger FABRICATORS, INC. DENVER, COLORADO DRAWN G. H. HARRIS 9/1/80 CHECKED E. L. HARRIS APPR. E. L. HARRIS LINE No. 2 1/2"-FW-201-MBX REV. SHEET 1 OF 1	
CUSTOMER MD/SR/R		PROJECT 10 MW _e SOLAR PILOT PLANT	

LINE No. $2\frac{1}{2}$ "-FW-202-MBX REF. 40M2005131732
DWG. 40M2005131745

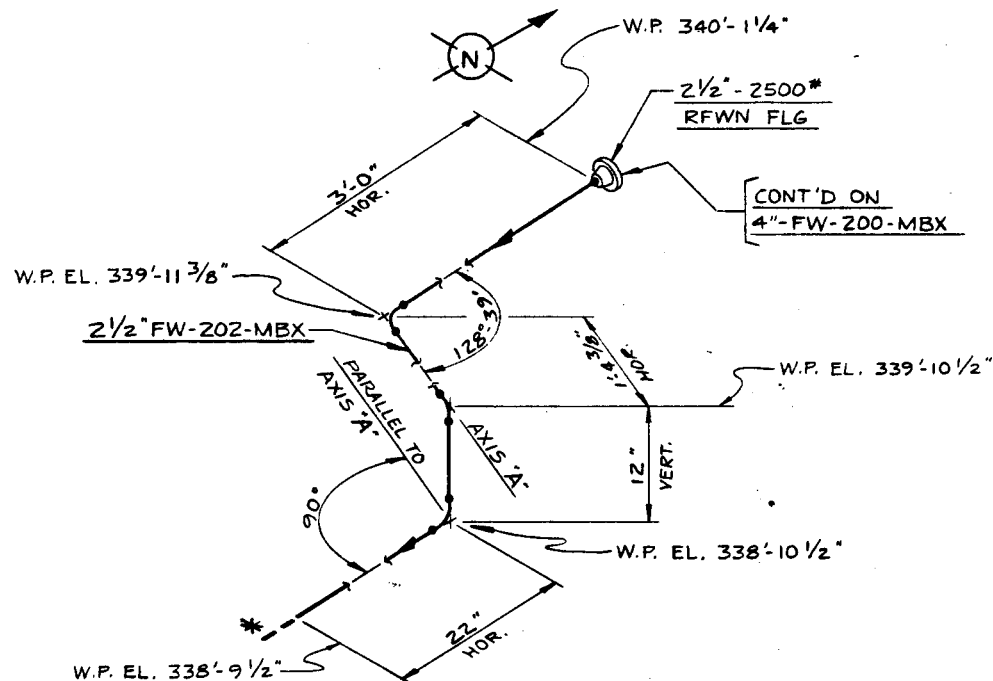
MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L NONE		

Stearns-Roger

C21700 JAN 16 '80

SR No. EL-1 P/W No. 033



* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS

SHOP WELDING

DESIGN <u>EDS/2000 PSI @ 442 OF</u>	DRAWN <u>(Signature)</u>
SPEC. / MAT'L. <u>MBX/CL 1500 STEEL ST</u>	CHECKED <u>(Signature)</u>
N.D.E.	APPR. <u>(Signature)</u>
O.D. PREP.	P.W.M.T.
I.D. PREP.	SHEET 1 OF 1

CUSTOMER MD/SR/R

PROJECT 10 MWe SOLAR PILOT PLANT

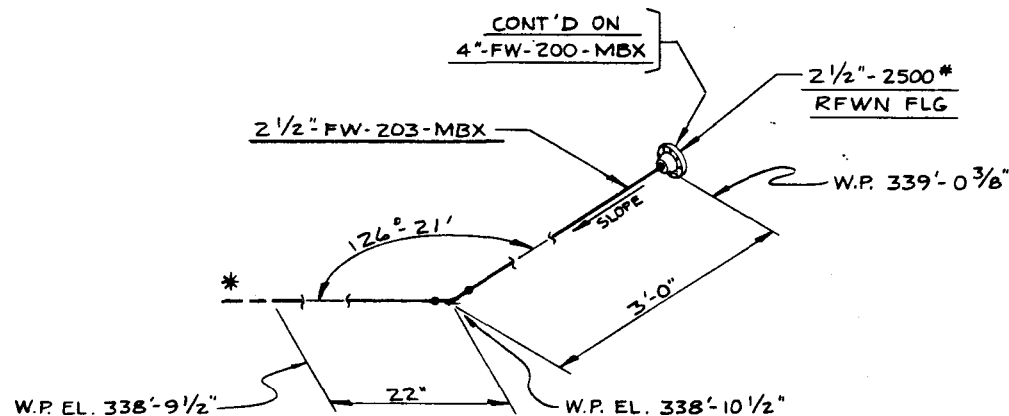
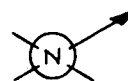
JOB No.

REV.

LINE No. 2 1/2"-FW-203-MBX REF. 40M2005131932
DWG. 40M2005131945

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L NONE		
Stearns-Roger 10111 C21700 JUN 16 '80 REV. 14.1 FILE NO. 034			



* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS

SHOP WELDING

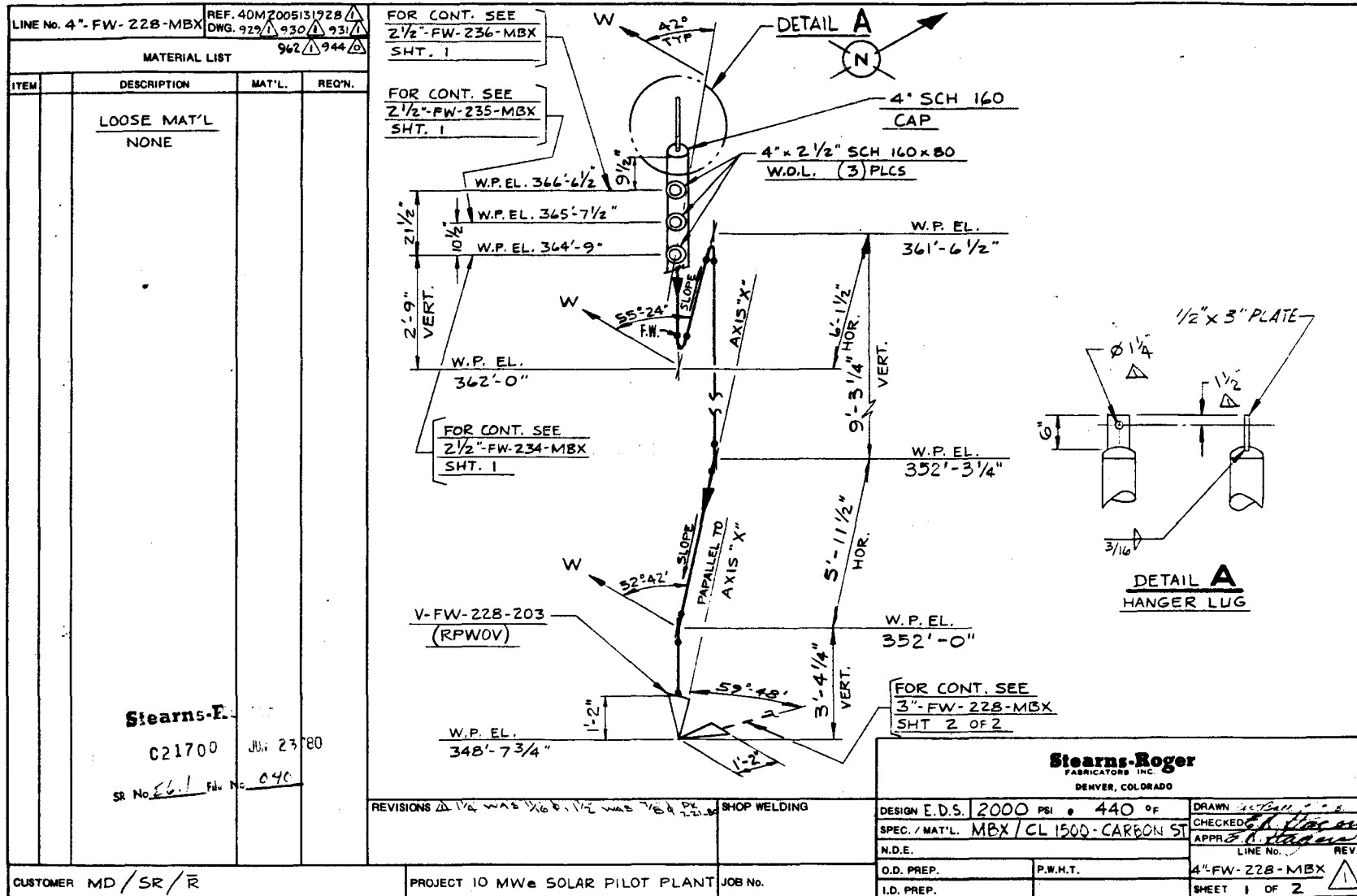
DESIGN EDS/2000 PSI @ 440 °F
SPEC./MAT'L. MEX /CL1500-CAESAR ST
N.D.E.
O.D. PREP. P.W.H.T.
I.D. PREP.

DRAWN GSK/CL 4/11/80
CHECKED E. P. HARRIS
APPROVED E. P. HARRIS
LINE No. REV.
2 1/2"-FW-203-MBX
SHEET 1 OF 1

CUSTOMER MD/SR/R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.



Stearns-R.

021700

JUN 23 '80

SR No. 66.1 File No. 040

REVISIONS 1/4 WAS 1/8, 1/2 WAS 1/4, 2 WAS 1/2

SHOP WELDING

Stearns-Roger
FABRICATORS, INC.
DENVER, COLORADO

DESIGN E.D.S. 2000 PSI • 440 OF	DRAWN <i>Stearns-Roger</i>
SPEC. / MAT'L. MBX / CL 1500-CARBON ST	CHECKED <i>Stearns-Roger</i>
N.D.E.	APPR <i>Stearns-Roger</i>
O.D. PREP.	P.W.H.T.
I.D. PREP.	LINE No. REV.
4"-FW-228-MBX	
SHEET 1 OF 2	

CUSTOMER MD/SR/R

PROJECT 10 MWE SOLAR PILOT PLANT

JOB No.

LINE No. 3 4'-FW-228-MBX		REF. 40M2005131931 DWG. -9446	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L	REQ'N.

CONT. ON DWG 4" FW-228-MBX
SHT 1 OF 2

V-FW-228-203
(RPW0V)

WP EL. 348'-7 3/4"

1'-2" 3 1/2" 3 1/2"

4" x 3/4" x 3 1/2" LG. N.O.L.

PT 2006

TYP 18 PLACES

3'-1" SCH 160 x 80 W.O.L.
TYP 18 PLACES

EL. 348'-7 3/4"

3'-6" DIA

3" x 1 1/2" SCH 80 WOL

4" x 3" RED
TYP 2 PLACES

N
22 1/2° E
5°

THIS ISO. INCLUDES LINES
3" FW-228-MBX ; 4" FW-228-MBX

Stearns-Roger

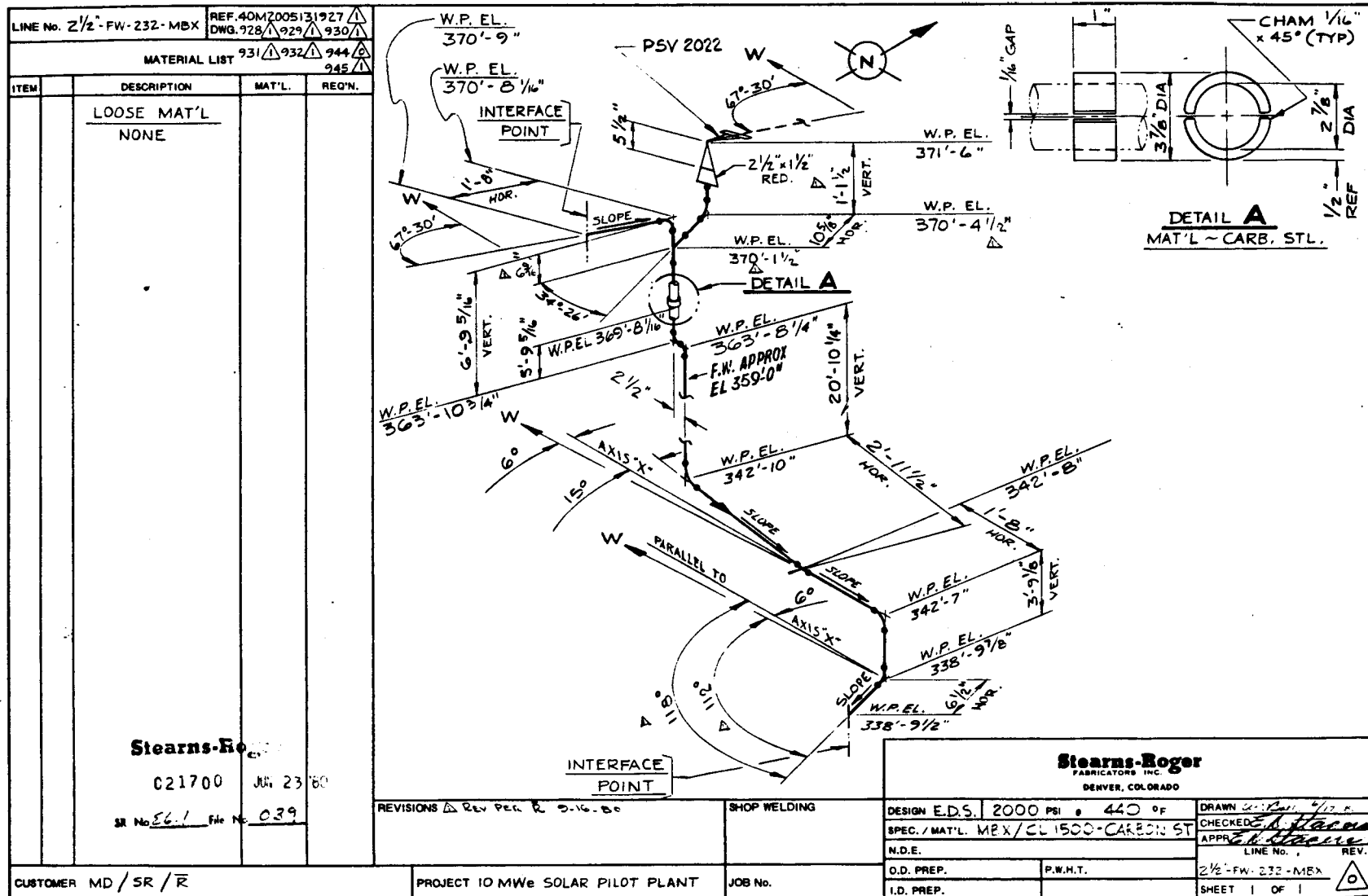
021700 JUN 23 '80

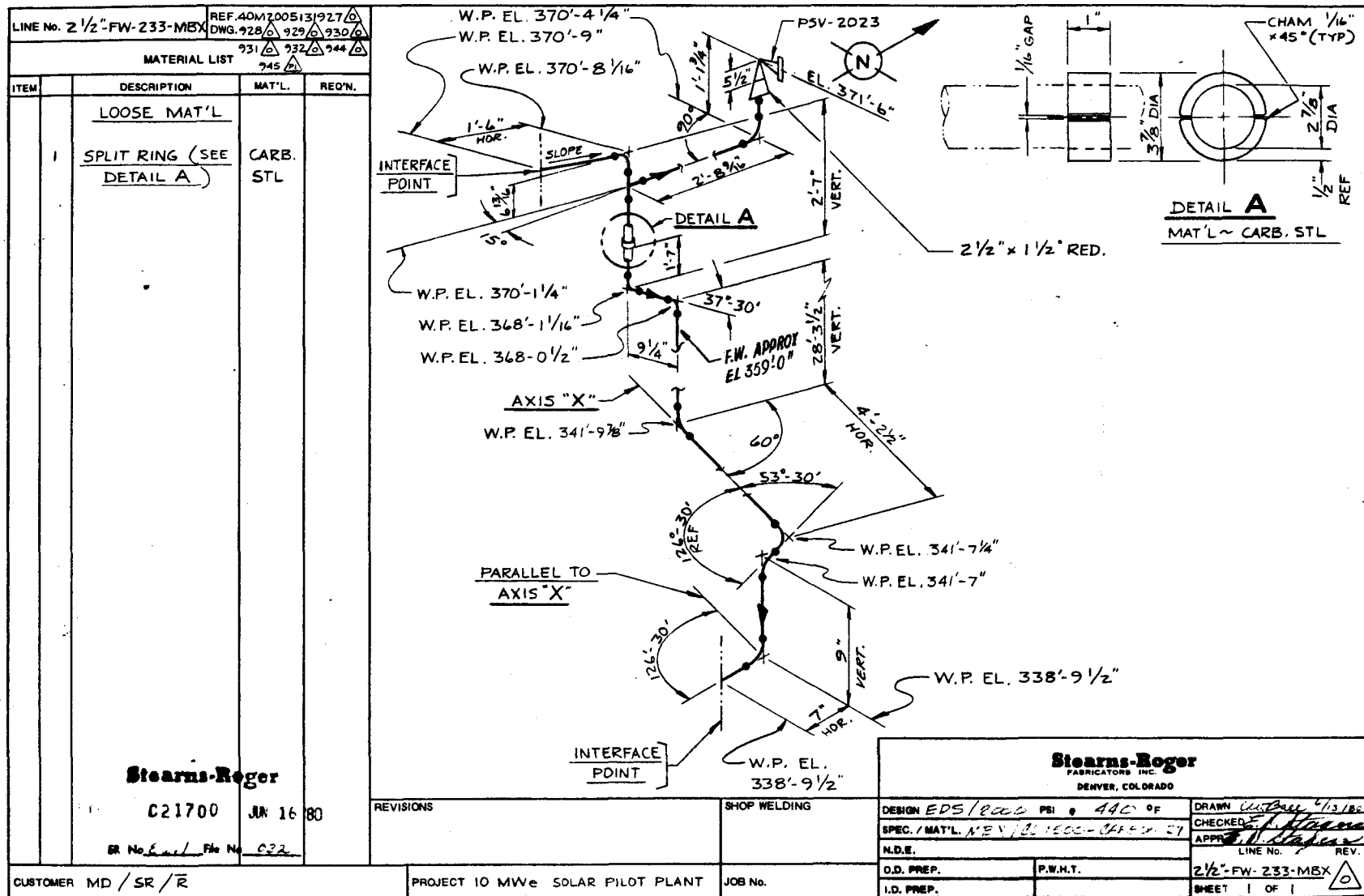
SR No. 56-1 File No. 141

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

DESIGN E.D.S.	2000 PSI @ 440 °F	DRAWN <u>2/11/80</u>
SPEC. / MAT'L	MBX/CL 1500-CARBON ST	CHECKED <u>[Signature]</u>
N.D.E.		APPR <u>[Signature]</u>
O.D. PREP.	P.W.M.T.	LINE No. REV.
I.D. PREP.		3' 4'-FW-228-MBX
		SHEET 2 OF 2

CUSTOMER MD / SR / R	PROJECT 10 MWe SOLAR PILOT PLANT	JOB No.
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Stearns-Roger

C21700 JUN 16 80

SR No. Encl. File No. C22

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

DESIGN EDS/2000 PSI @ 440' OF	DRAWN CUT/2000 6/13/80
SPEC. / MAT'L N.E.V. / 01 1900- (SEE P. 57)	CHECKED [Signature]
N.D.E.	APPR [Signature]
O.D. PREP.	P.W.H.T.
I.D. PREP.	2 1/2"-FW-233-MBX SHEET 1 OF 1

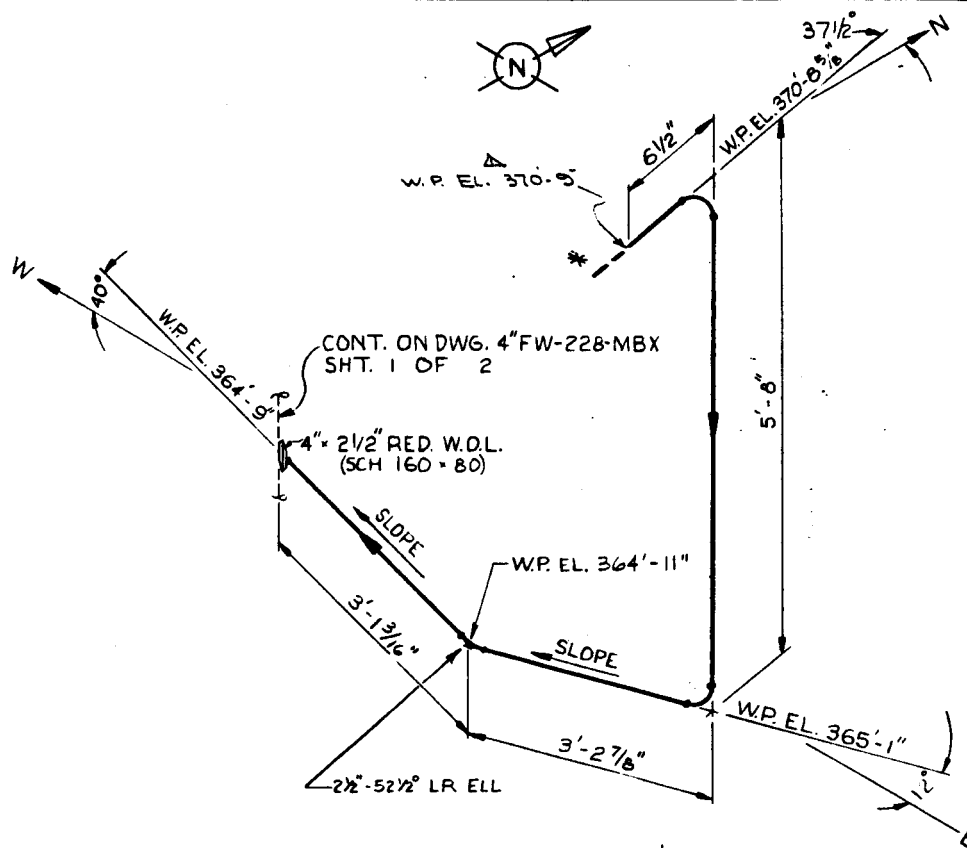
LINE No. 2V2 "FW-234-MBX	REF. 40M2005131927 ▲ DWG. -928 ▲, -944 ▲
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[illegible]

Stearns-Roger

C21700 JUN 25 '83

SR No EG.1 File No 044



* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

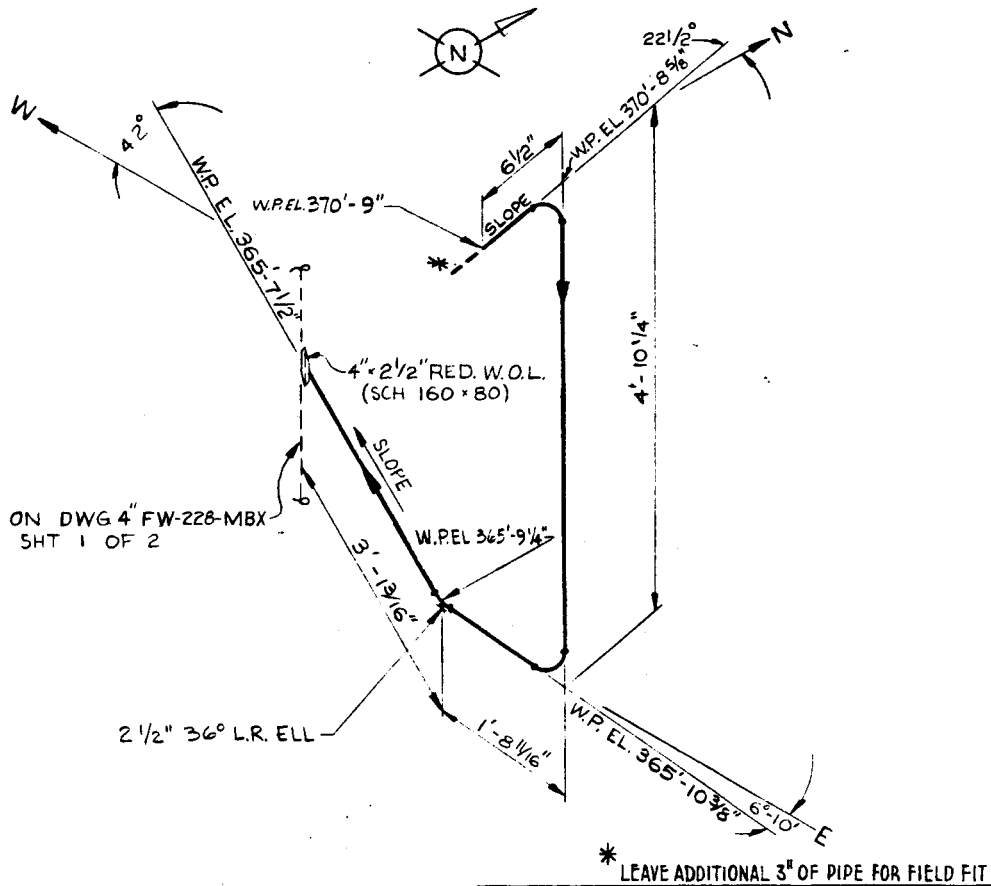
REVISIONS Δ REV. PER Δ 2-16-80		SHOP WELDING		DESIGN E.D.S. 2000PSI • 440 °F		DRAWN BY G19150	
				SPEC. / MAT'L MBX / C1 1500 CARBON STEEL		CHECKED E.H. Hearn	
				N.D.E.		APPROVED E.H. Hearn	
						LINE NO. REV	
PROJECT 10 MWe SOLAR PILOT PLANT		JOB No.		O.D. PREP.		242 FW-234-MBX	
				I.D. PREP.		P.W.M.T.	
						SHEET 1 OF 1	

LINE No. 2 1/2" FW-235-MBX REF. 40M2005131927
DWG.-928 944

MATERIAL LIST

[illegible]

CONT. ON DWG 4" FW-228-MBX
SHT 1 OF 2



* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

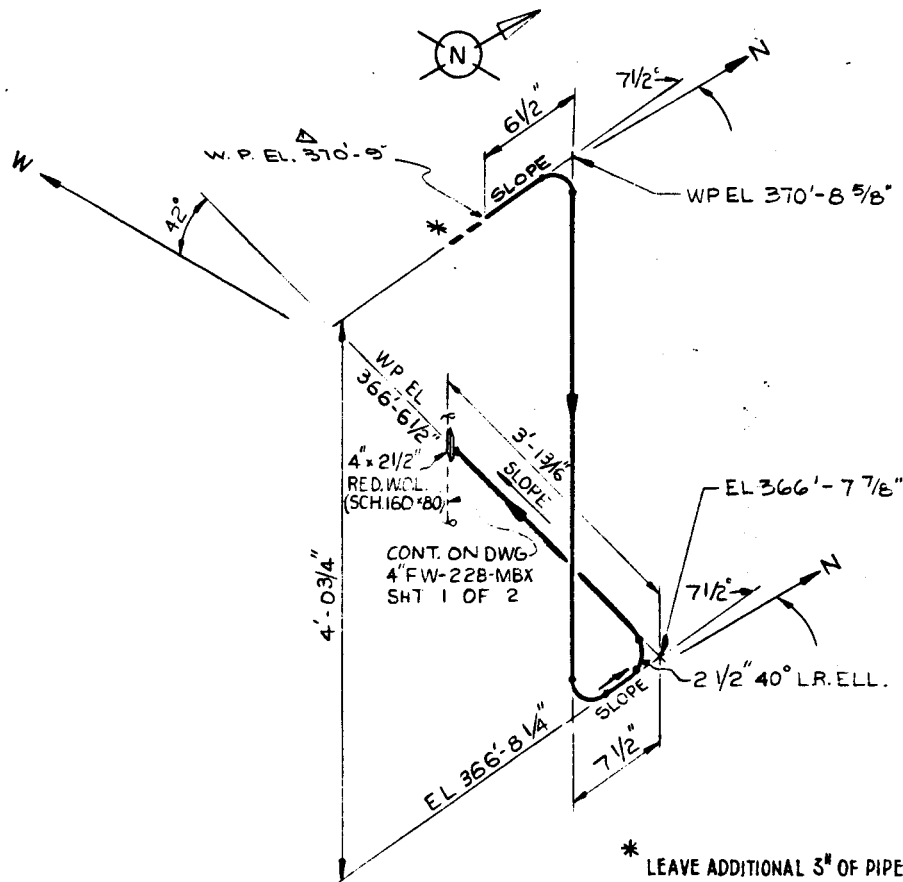
SR No. <u>86-1</u> File No. <u>643</u>		REVISIONS		SHOP WELDING		DESIGN <u>E.D.S.</u> <u>2000</u> PSI • <u>440</u> °F		DRAWN <u>W. H. C. 250</u>	
						SPEC. / MAT'L. <u>MEX / CL1500-CARBON STL</u>		CHECKED <u>W. H. C. 250</u>	
						N.D.E.		APPR <u>W. H. C. 250</u>	
								LINE No. <u>21/2" FW 225-MBX</u>	
CUSTOMER <u>MD / SR / R</u>		PROJECT <u>10 MWe SOLAR PILOT PLANT</u>		JOB No.		O.D. PREP.		P.W.H.T.	
						I.D. PREP.		SHEET <u>1</u> OF <u>1</u>	

[illegible]

Stearns-Roger

C21700 JUN 23 '80

SR No. 561 File No. 542



* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

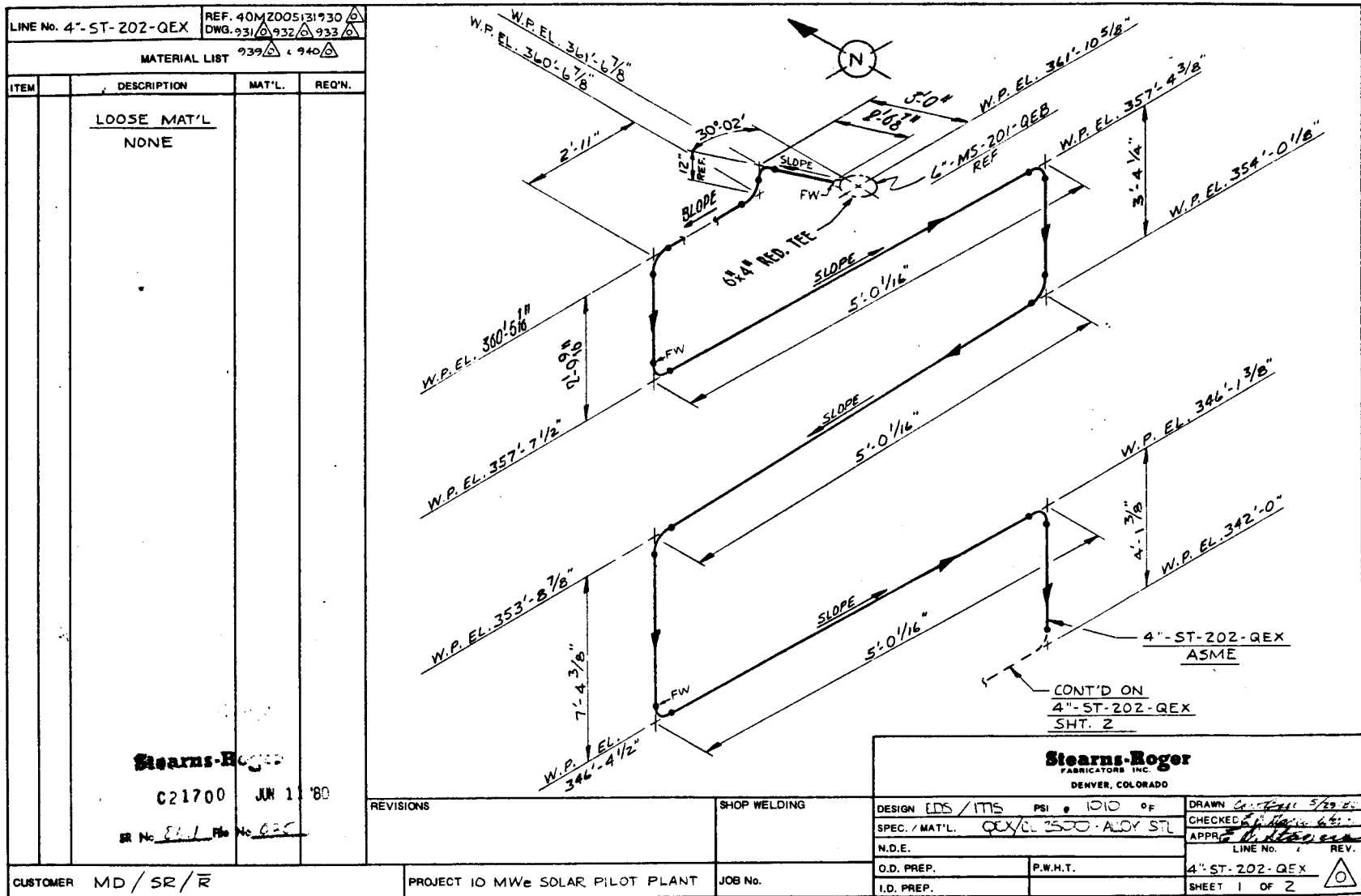
Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

DESIGN E.D.S. 2000 PSI @ 440 °F		DRAWN <i>ED</i>	
SPEC. / MAT'L M.B.A. / CL 1500-CAREPA ST		CHECKED <i>H. Hagan</i>	
N.D.E.		APPR <i>ED Hagan</i>	
O.D. PREP.		LINE No. 2 1/2" FW-226-MBA	
I.D. PREP.		P.W.H.T.	
		SHEET 1 OF 1	
		REV. 	

CUSTOMER MD/SR/R

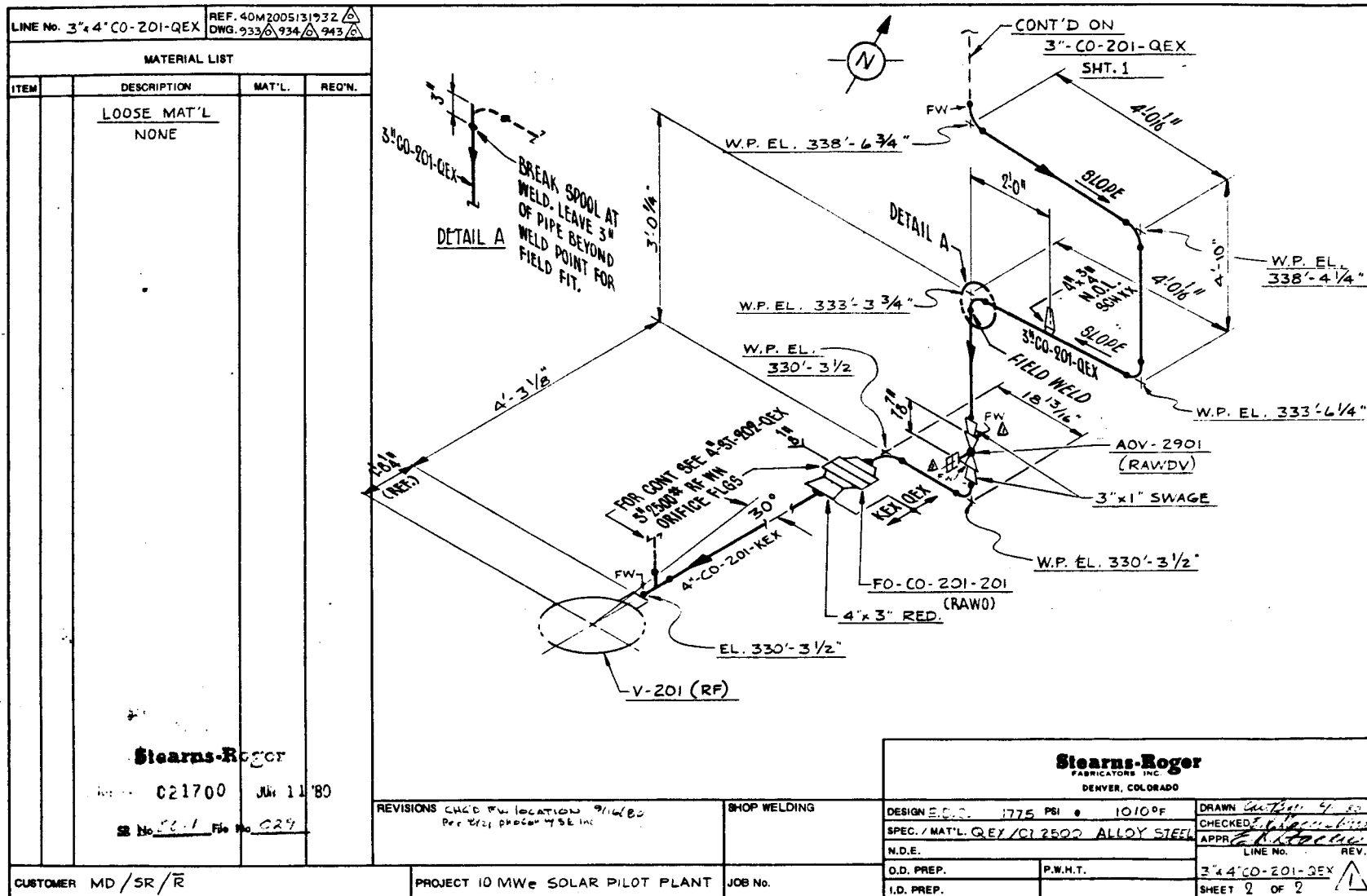
PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.



LINE No. 4"-ST-202-QEX		REF. 40M2005131930 40M2005131932 40M2005131933	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L	REQ'N.
	LOOSE MAT'L NONE		
Stearns-Roger C21700 JUN 1 '80 SR No. <u>EL-1</u> File No. <u>026</u>		REVISIONS SHOP WELDING DESIGN EDS / I/T/S PSI @ 1010 OF SPEC. / MAT'L. QEX / CL 2500-ALLOY STL N.D.E. O.D. PREP. P.W.M.T. I.D. PREP.	
CUSTOMER MD / SR / R		PROJECT 10 MWe SOLAR PILOT PLANT JOB No.	
		Stearns-Roger FABRICATORS, INC. DENVER, COLORADO DRAWN <u>5/30/80</u> CHECKED <u>5/30/80</u> APPROVED <u>5/30/80</u> LINE No. REV. 4"-ST-202-QEX SHEET 2 OF 2	

LINE No. 3"-CO-201-QEX		REF. 40M2005131930 DWG. 932/3, 942/3, 943/3	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L	REQ'N.
	LOOSE MAT'L NONE		
Stearns-Roger 021700 JUN 11 '80 SP 11 EL 1 File No. 025		Stearns-Roger FABRICATORS INC. DENVER, COLORADO	
REVISIONS		SHOP WELDING	
CONT'D ON 3"-CO-201-QEX SHT 2		DESIGN E.D.S. 1775 PSI • 1010°F SPEC. / MAT'L QEX / C12500 ALLOY STEEL N.D.E. O.D. PREP. P.W.M.T. I.D. PREP.	
CUSTOMER MD / SR / R		PROJECT 10 MWe SOLAR PILOT PLANT	
JOB No.		DESIGN E.D.S. 1775 PSI • 1010°F CHECKED <i>[Signature]</i> APPROVED <i>[Signature]</i> LINE No. 1 REV. 3"-CO-201-QEX SHEET 1 OF 2	



LINE No. 3"-CO-203-MBX		REF. DWG. 40M2005131935 A	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L		
	NONE		

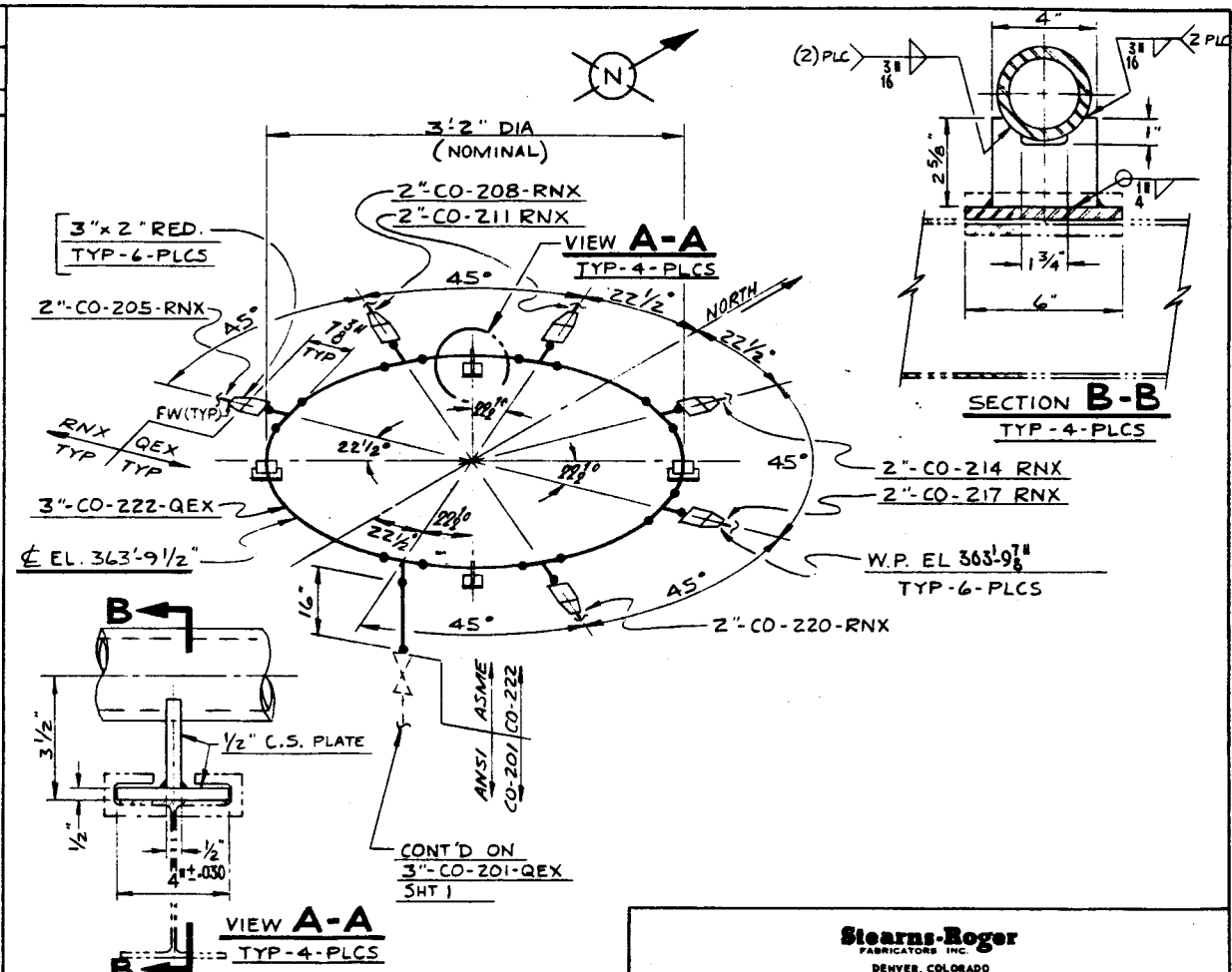
Stearns-Roger
 021700 JUN 18 '80
 SR No. 061 P. No. 020

* LEAVE 3" OF PIPE BEYOND INTER-FACE EL 313'-0" FOR FIELD FIT.

Stearns-Roger FABRICATORS INC. DENVER, COLORADO		DESIGN E.D.S. 200 PSI @ 400°F	DRAWN <i>Car. R. J. J.</i>
		SPEC. / MAT'L. MBX / C1500 CARBON STEEL	CHECKED <i>E. J. J.</i>
REVISIONS		W.D.E.	APPROVED <i>E. J. J.</i>
SHOP WELDING		O.D. PREP.	P.W.H.T.
PROJECT 10 MWe SOLAR PILOT PLANT		JOB No.	
CUSTOMER MD / SR / R		SHEET 1 OF 1	

LINE No. 3"-CO-222-QEX	REF. 40M2005131929 DWG. 40M2005131942	① ②
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MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L	REQ'N.
	<u>LOOSE MAT'L</u> NONE		
Stearns-Roger Lab No. <u>C21700</u> Jul 1, '80 Inv No. <u>8-6.1</u> Mo No <u>027</u>			



REVISIONS		SHOP WELDING	DESIGN E.D.S. 1775 PSI @ 1010 °F	DRAWN <i>W. Page 4/6/60</i>
			SPEC. / MAT'L QEX/C12500 ALLOY STEEL	CHECKED <i>E.D.S. 4/6/60</i>
			N.D.E.	APPR. <i>E.D.S. 4/6/60</i>
				LINE No. REV.
PROJECT 10MWe SOLAR PILOT PLANT	JOB No.	I.D. PREP.	P.W.M.T.	3-CD-222-QEX
		O.D. PREP.		SHEET OF 1

LINE No. 4 ¹¹ VT-201-KEX	REF. 40M2005131934 Δ , DWG. 935 Δ , 943 Δ
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MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.

Stearns-Roger

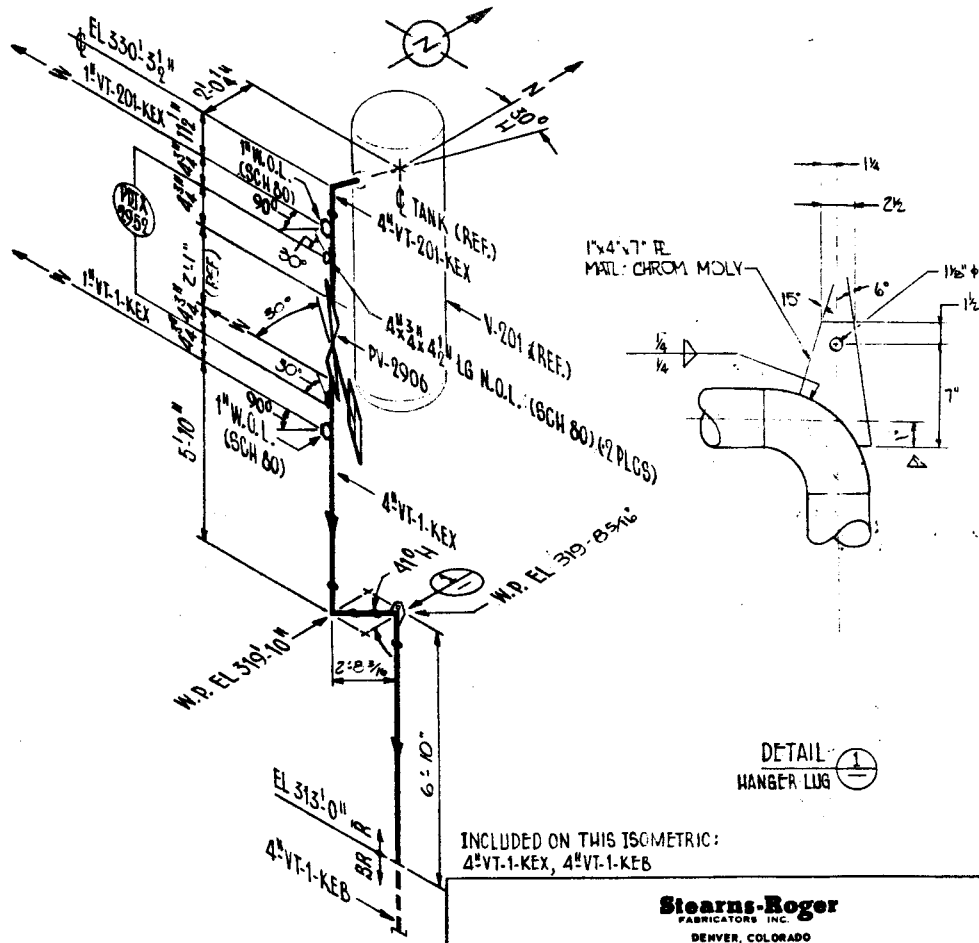
Inventory C21700 JUN 30 '80

SR No. 261 File No. 665

Stearns-Roger

021700 JUN 30 '80

SR No. 511 File No. 645



DETAIL 1
HANGER LUG

INCLUDED ON THIS ISOMETRIC:
4th VT-1-KEA, 4th VT-1-KEB

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS Δ REV. PER $\bar{R}$ 2-16-80

SHOP WELDING

DESIGN	EPS / 600	PSI	1010	°F
SPEC. / MAT'L.	KEX / CL 900 - ALUX ST			
N.D.E.				
O.D. PREP.	P.W.M.T.			
I.D. PREP.				

DRAWN TDM	
CHECKED <i>E.K. Hager</i>	
APPROVED <i>E.K. Hager</i>	
LINE No.	REV
4 th VT-201-KEX	
SHEET 1 OF 1	

CUSTOMER MD, SR, R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.

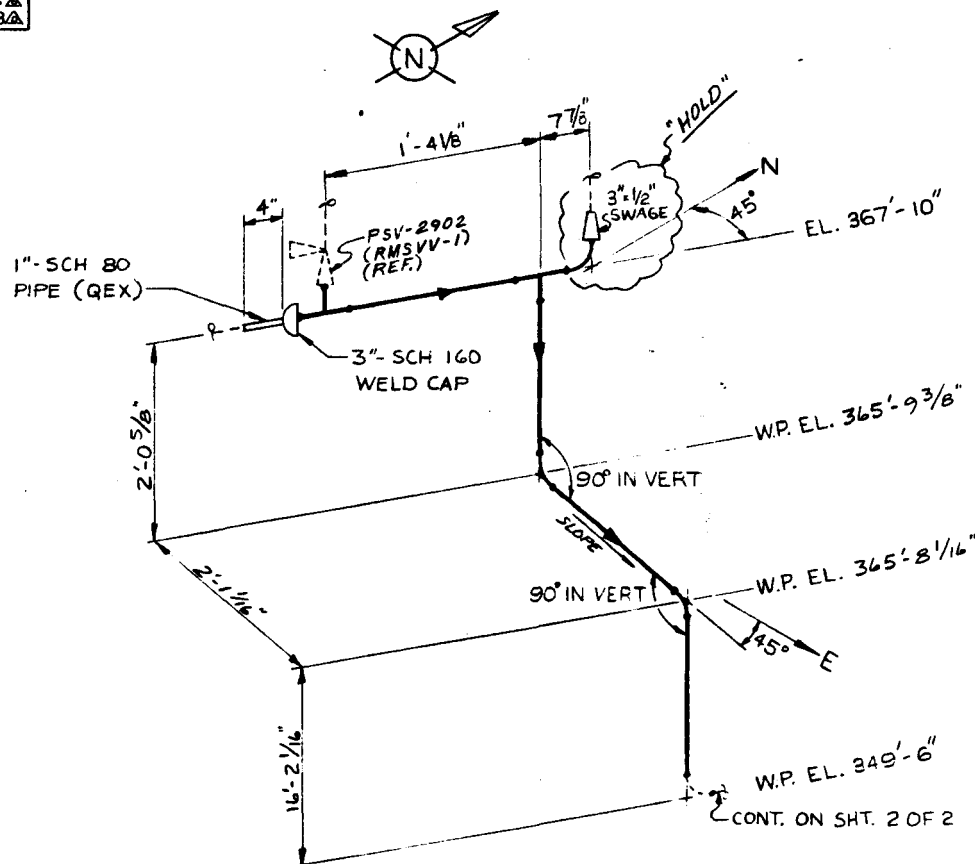
SHEET 1 OF 1

MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	QTY.
	Stearns-Roger		
	C21700	JUN 16 1980	
	SR No. <u>56-1</u> File No. <u>C-36</u>		

Stearns-Roger

C21700 JUN 16 '81

SR No 26.1 File No C-36



2 CONT. ON SHT. 2 OF 2

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS		SHOP WELDING		DESIGN E.D.S. 600PSI @ 1010 °F SPEC. / MAT'L QEX/C12500 ALLOY STEEL N.D.E.		DRAWN <i>E.R. Hagan</i> CHECKED <i>E.R. Hagan</i> APPR <i>E.R. Hagan</i> LINE No. REV	
PROJECT 10 MWe SOLAR PILOT PLANT		JOB No.		O.D. PREP. P.W.H.T. I.D. PREP.		3"V-208-QEX SHEET 1 OF 2	

MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L	REQ'N.
	Stearns-Dugger		
	021700	Jun 16	80
	SR No. <u>86-1</u> File No. <u>037</u>		

Stearns-Roger

C21700	JUN 16 1980
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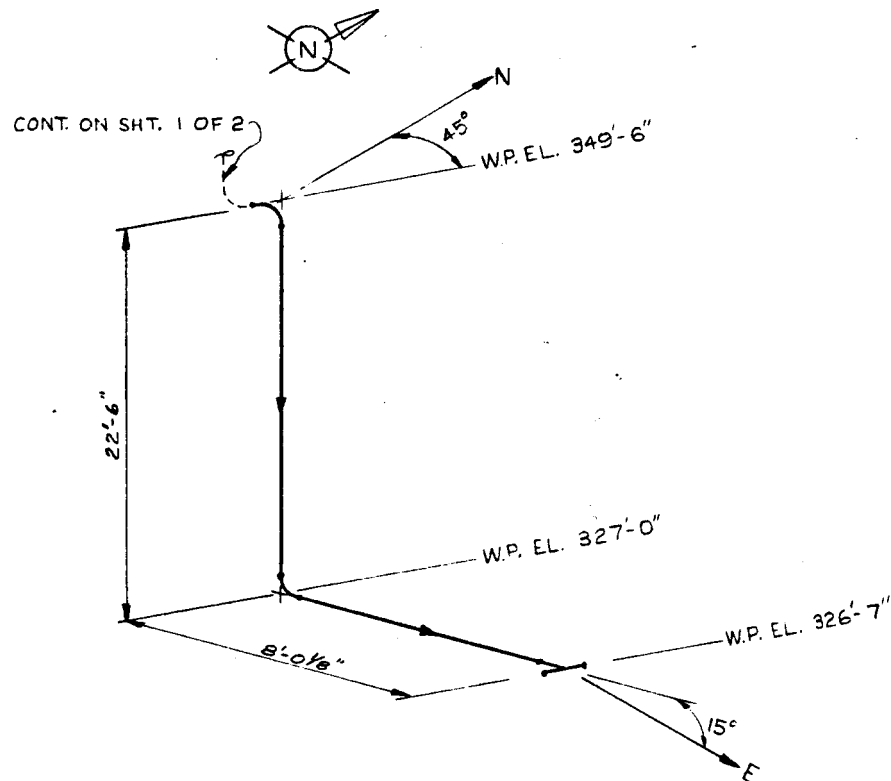
SR No. EL-1 File No. 037

REVISIONS

SHOP WELDING

Stearns-Roger
FABRICATORS INC
DENVER, COLORADO

DESIGN <i>EEC/22 PBI 1512 OF</i>		DRAWN <i>227</i>	
SPEC. / MAT'L <i>WEX / CL 2500-LWC ST</i>		CHECKED <i>227</i>	
N.D.E.		APPR <i>227</i>	
		LINE No.	
O.D. PREP.		3"VT-205 QEX	
I.D. PREP.		SHEET 2 OF 2	
P.W.H.T.		REV 	



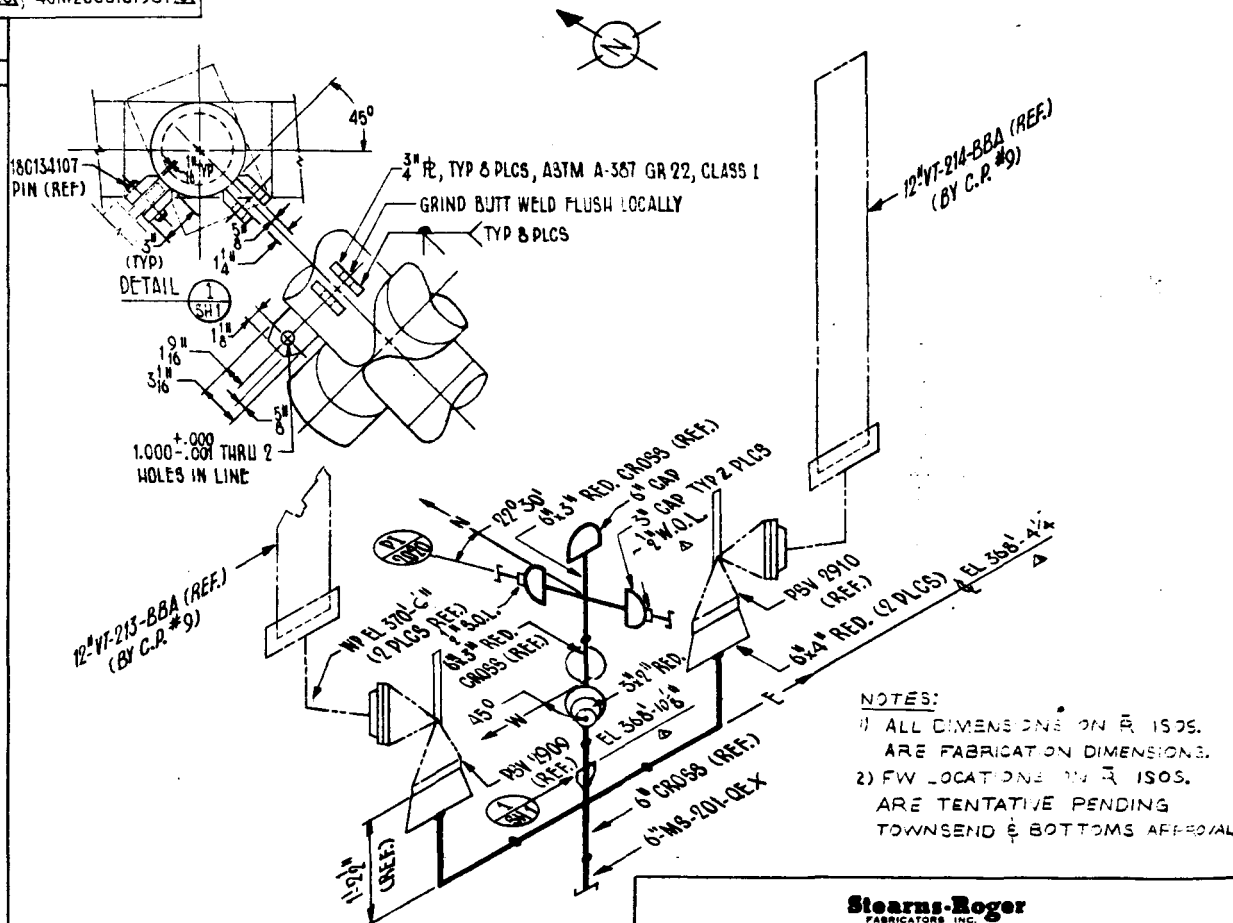
LINE No. 6 ¹¹ MS-201-QE-X	REF. DWG. 4CM2005131927 Δ , 4CM2005131937 Δ
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[illegible]

Stearns-Roger

021700 JUN 30 '80

SR No 51 | 1 | No 51



NOTES:

- 1) ALL DIMENSIONS ON $\bar{R}$ ISOS.
ARE FABRICATION DIMENSIONS.
- 2) FW LOCATIONS ON $\bar{R}$ ISOS.
ARE TENTATIVE PENDING
TOWNSEND & BOTTOMS APPROVAL

REVISIONS 1 Rev. to Change EL. 2-16-80
 2400. 300 to 200
 2400 300 EL.

SHOP WELDING

DESIGN F.O.B. 1775 PSI 1010 PSI = F

SPEC. / MAT'L. QEX / CL 2500-ALLOY STL

N.D.E

O.D. PREP.

I.D. PREP.

P.W.H.T.

--	--

DRAWN TDM

CHECKED

APPR *[Signature]*
LINE

6-MS-

SHEET 1

REV

^

7

LINE No. 6"MS-201-QEX		REF. DWG. 40M2005131928 Δ, 40M2005131937 Δ	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.

Stearns-Roger

SR No. 21700 File No. 102

INCLUDED ON THIS ISOMETRIC:
 4"MS-205-RNX, 6"MS-205-QEX, 4"MS-208-RNX, 6"MS-208-QEX,
 4"MS-217-RNX, 6"MS-217-QEX, 4"MS-220-RNX, 6"MS-220-QEX

Stearns-Roger FABRICATORS INC. DENVER, COLORADO		DESIGN E.D.S. 1775 PSI 1010 OF E3 SPEC. / MAT'L. QEX / CL2500-ALLOY STL N.D.E. O.D. PREP. P.W.H.T. I.D. PREP.	DRAWN TDM CHECKED <i>[Signature]</i> APPR. <i>[Signature]</i> LINE No. 6"MS-201-QEX REV.
REVISIONS Δ CHAS. CROSS EV. 5-16-80 CUCO WP WL. 5-16-80		SHOP WELDING PROJECT 10MWe SOLAR PILOT PLANT JOB No.	

CUSTOMER MD, SR, R

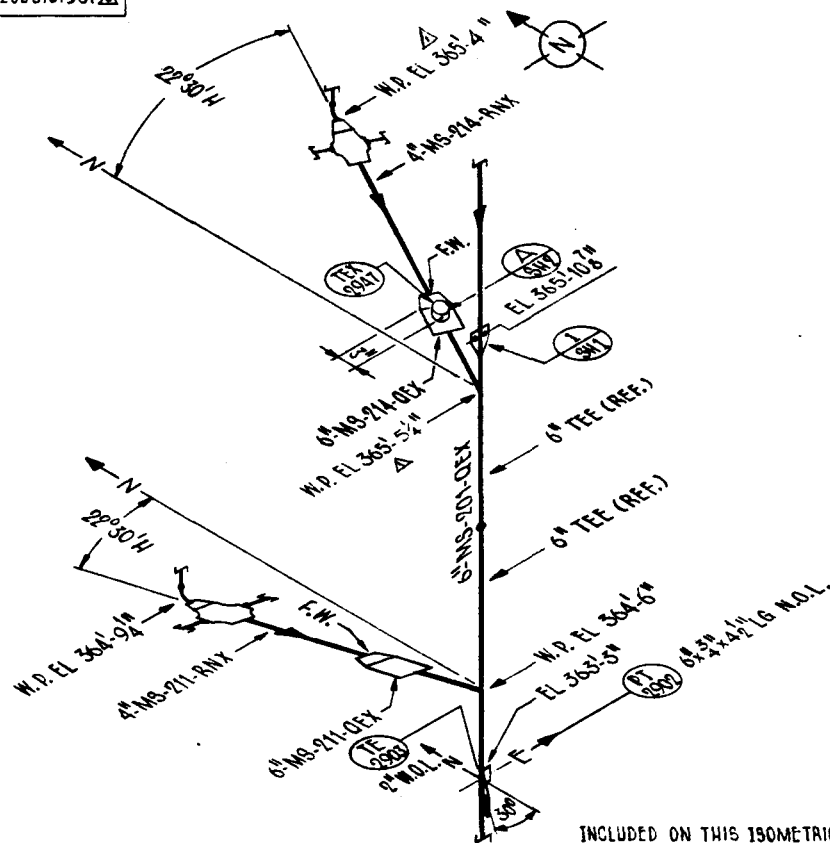
PROJECT 10MWe SOLAR PILOT PLANT

JOB No.

SHEET 2 OF 4

MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.
	Sterns-Roger		
	C21700 JUN 80 '80		
	SR No. <u>E-1</u> File No. <u>103</u>		

SR No 51 File No 103



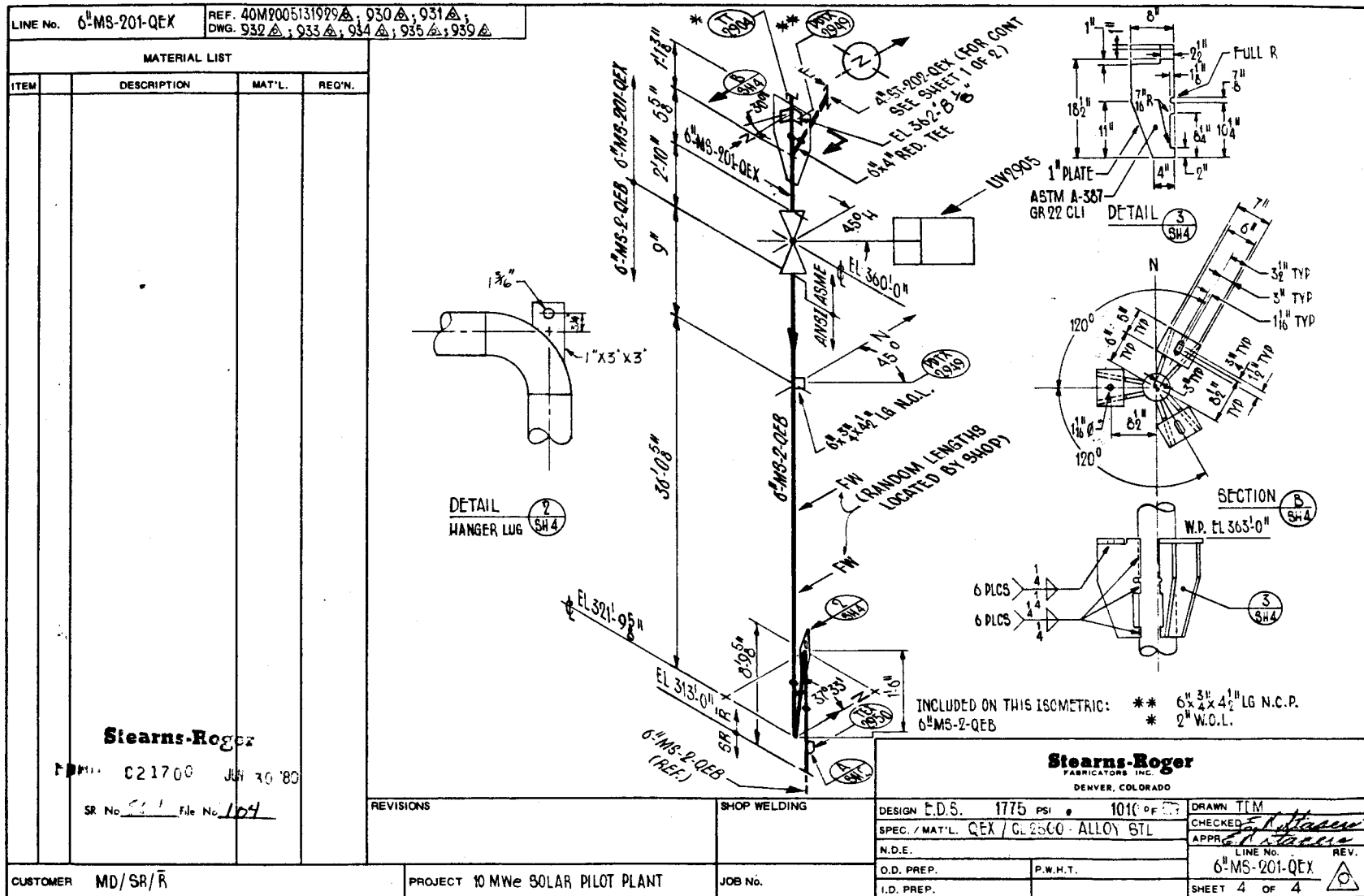
INCLUDED ON THIS ISOMETRIC:
4"MS-211-RNX, 6"MS-211-QEX, 4"MS-214-RNX, 6"MS-214-QEX

Stearns-Roger FABRICATORS, INC. DENVER, COLORADO			
DESIGN E.D.S. - 1775 PSI		1010 OF 10	
SPEC. / MAT'L QEX / CL250C ALLOY STL		DRAWN TCM	
N.D.E.		CHECKED <i>[Signature]</i>	
O.D. PREP.		APPR. <i>[Signature]</i>	
I.D. PREP.		LINE NO. 64MS-ECI-QEX	
P.W.H.T.		REV 	
		SHEET 3 OF 4	

CUSTOMER MD,SR,R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.



July 2, 1960
(For Purchase)

SPECIFICATION

S-R E2

D. O. E. NO. 40 P 700 - 205

for

PRIMARY PIPE SUPPORTS

for

10 MW_e SOLAR PILOT PLANT

SOLAR ONE

DAGGETT, CA.

Prepared by:

Stearns-Roger
ENGINEERING CORP.

PROJECT NO. C-21700



TABLE OF CONTENTS

	<u>Page</u>
<u>SPECIAL INSTRUCTIONS</u>	
Conformance of "For Bid" Specification to "For Purchase" Notes	1
<u>SPECIFICATION FOR PRIMARY PIPE SUPPORTS</u>	
1. Scope	DS-1
2. Supplements	DS-1
3. Codes, Standards and Regulations	DS-1
4. Environmental Conditions	DS-2
5. Work to be Performed and Items to be Furnished by Seller	DS-2
6. Work or Items to be Furnished by Others	DS-3
7. Engineer's Drawings	DS-3
8. Definitions	DS-3
9. Design and Construction	DS-4
10. Nameplates	DS-7
11. Shop Painting and Protection	DS-7
12. Preparation for Shipment	DS-8
13. Guarantees	DS-8
14. Documentation	DS-9
15. Engineering Schedule	DS-10
16. Shipping Schedule	DS-11
<u>BID DATA</u>	
1. Drawing Approval	DS-12
2. Subcontractors	DS-12



SPECIAL INSTRUCTIONS

An asterisk has been placed in the right hand margins to denote changes to this "For Bid" Specification. The subject changes were made to conform this document to awardee's proposal and subsequent updating and/or negotiations.

All further changes to this "For Purchase" document shall be made by the issuance of a numbered revised copy.



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SPECIFICATION
FOR
PRIMARY PIPE SUPPORTS

1. SCOPE

- A. The scope of the work hereunder shall consist of furnishing, preassembling and delivering Primary Pipe Supports for the piping systems as specified herein.
- B. The data as specified herein and as specified on the supplements is descriptive of the Engineer's design intent but does not enumerate all details of accessories and appurtenances. Such details and descriptive data shall be provided by the Seller for approval by the Engineer.
- C. The Engineer is furnishing Pipe Hanger Schedules and Pipe Support Design Drawings to the Seller in this Specification.
- D. Unloading, storage, installation, field inspection and field testing will be performed by others.

2. SUPPLEMENTS

The following Stearns-Roger Incorporated supplements are included with and form a part of this Specification:

- A. Volume I, P60-1, Primary Pipe Support Design Drawings 138 pages, and Pipe Hanger Schedules 10 pages, Rev. 3, dated July 2, 1980. *
- B. Specification No. FJ50.50, Documentation, dated 11/3/76, 7 pages. *
- C. Engineering Standard No. FJ60.60, Documentation Requirements, dated 10/22/79, 1 page.
- D. Engineering Standard No. EJ14.37.1, Welding Symbols, dated 5/5/78, 1 page.

3. CODES, STANDARDS AND REGULATIONS

Pipe supports shall be in accordance with the following Codes, Standards and Regulations:

- A. Pipe supports and accessories specified herein shall, as a minimum, meet the requirements of Paragraphs 120 and 121 of ANSI Standard Code for Pressure Piping, ANSI B31.1-1977 Edition with Addenda through Winter 1978, hereinafter referred to as the "Code."
- B. The material, design and fabrication criteria to be used in the manufacture of the pipe support assemblies and components shall be in accordance with MSS-SP-58-1975 Edition, "Pipe Hangers and Supports."

- C. Welding symbols shall be in accordance with Stearns-Roger Engineering Standard EJ14.37.1.
- D. Dimensions shall be English units of pounds, degrees, inches, or feet and inches.
- E. In addition to the Codes, Standards and Regulations specified above and elsewhere in this Specification, work shall comply with Federal, State and Municipal Laws in effect at the time the Purchase Order is signed. If there is a conflict between any of the requirements of this Specification and the requirements of the Williams-Steiger Occupational Safety and Health Act of 1970, Part 1910, "Occupational Safety and Health Standards," as amended and/or any other applicable statute, ordinance or code, then the requirement which is the most stringent or has governing jurisdiction shall apply. Seller will not be liable for factors over which he has no control, e.g., installation, operation and maintenance.

4. ENVIRONMENTAL CONDITIONS

The design of the Primary Pipe Supports shall incorporate all features necessary for satisfactory operation under the following environmental conditions:

- A. Altitude of plant above sea level: 1950 feet.
- B. Barometric pressure: 13.72 psia.
- C. Operational ambient temperature range: 16 F to 113 F.
- D. Survival temperature range: 9 F to 117 F.
- E. Shelter type: The pipe supports will be used outdoors unless otherwise specified on the drawings.
- F. Seismic Loads: The piping to be supported by assemblies furnished in accordance with this Specification shall be subjected to loads resulting from response to a horizontal ground acceleration of .25 g simultaneously with normal operating loads.

5. WORK TO BE PERFORMED AND ITEMS TO BE FURNISHED BY SELLER

- A. The Seller shall furnish and deliver to the jobsite complete pipe support and restraint assemblies including guides, anchors, and vibration control assemblies.
- B. The Seller shall furnish the supplemental structural steel as required in accordance with the design details bundled and tagged for easy identification and installation.

- C. The work shall include the furnishing of all documentation requirements as detailed in Paragraph DOCUMENTATION.
- D. Shop prime painting of all pipe support assemblies as specified herein.

6. WORK OR ITEMS TO BE FURNISHED BY OTHERS

- A. Unloading, installation, field inspection and field testing.
- B. Design and furnish shop welded attachments for piping.
- C. Field painting.
- D. Piping analysis.
- E. Pipe Support Design Drawings.
- F. Hanger assemblies as noted "by others" in the Pipe Hanger Schedules.

7. ENGINEER'S DRAWINGS

- A. The hanger schedules show the hanger size, movement and loads for all hangers that are not shown on a detail drawing. These were for bid purposes only. Detail drawings supplied after award of contract, supersede all hanger schedules. *
- B. The Engineer's drawings show the structural steel available for supporting the hangers, and the support arrangement and size.
- C. ITT Grinnell figure numbers have been used on all detail drawings and hanger details. This is for identification only and is not intended to exclude acceptable equivalent components of the vendor. After award the Seller is responsible for revising to his nomenclature. *

8. DEFINITIONS

- A. Pipe Supports. as used herein shall mean all types of hangers, supports, guides, anchors, or restraints including seismic restraints or vibration control devices.
- B. Assembly. as used herein shall mean the entire supporting or restraining device including all the pipe support, bolting, supplemental structural steel, clip angles, slide or stationary bases, etc., necessary to attach the piping to the structure. The definition is independent of the contract scope.

- C. Hangers. as used herein generally refers to suspension devices capable of resisting downward acting forces only. Hangers are included in the more general definition of Pipe Supports.
- D. Structure. as used herein shall mean the system of primary members of the building or other supporting structure.
- E. Supplemental Structural Steel . . . as used herein shall mean those necessary additional structural members which are components of a pipe support assembly as defined above.

9. DESIGN AND CONSTRUCTION

A. Pipe Supports

a. General

- (1) Each Primary Pipe Support and its accessories shall be furnished in accordance with this Specification and all other supplements attached hereto.
- (2) It is the intent of this Specification to establish the engineering design criteria for complete workable assemblies capable of performing as specified herein.
- (3) The equipment to be furnished hereunder shall meet or exceed the requirements of this Specification. Materials shall be new and of first-line quality, and shall be free of all defects which would affect performance or service life of the equipment, or which would cause unsightly or unworkmanlike appearance.
- (4) The hot load for each spring as it appears on the Pipe Support Design Drawings and Pipe Hanger Schedules does not include the weights of the lower components. The Seller shall add the weight of the lower components to the operational (hot) and cold loads shown on the Pipe Support Design Drawings. All components shall be adequate to support the hydrostatic load specified on the Pipe Support Design Drawings. The Seller shall convert the bill of material on the Pipe Support Design Drawings to his own ordering terminology.

- (5) Component materials shall meet the requirements of ANSI B31.1, Paragraph 121.1.2.
- (6) The hangers and support assemblies shall, where practical, incorporate commercially available, load rated and tested component parts.
- (7) Variable springs and constant support devices weighing in excess of 90 pounds shall be furnished with lifting lugs.
- (8) Supports furnished for outdoor service or to be located in a corrosive environment shall be constructed or protected such that the elements will not corrode or otherwise interfere with their intended function.

b. Flexible Pipe Supports

- (1) Flexible pipe supports shall allow thermal expansion of the piping in a normal manner and in no way restrict pipe movement. Variable type spring support units used as part of the hanger assemblies shall be of the enclosed and guided type and shall conform to MSS-SP-58. In no case shall eccentric loading of the spring be permitted.
- (2) Variable springs shall be provided with a means of adjusting the support through the full load range.
- (3) Variable springs shall have at least one (1) position indicator on the side of the spring can for ease in observation and adjustment after installation. Each spring assembly shall have hot and cold position indicators installed to ensure proper support loading.
- (4) Travel stops shall be provided on variable springs for hydrostatic testing purposes and shall be installed in the cold position. Variable spring travel stops shall be suitably affixed to the assembly by cable or chain to prevent loss after removal so that they may be reengaged in the event future hydrostatic testing or maintenance is required.
- (5) Constant support devices shall have a minimum of plus or minus 10 percent calibrated load adjustment feature.
- (6) The supporting force of any constant support shall not deviate more than 6 percent of the calibrated load throughout its full working range.

- (7) Unless specified otherwise, travel stops shall be provided on all constant support devices for hydrostatic test purposes, and shall be installed with the device set in the cold position. Travel stops shall be of the type that can be engaged at any point through the full working range of the support, minimizing field readjustment of supports during future hydrostatic test and maintenance procedures.

d. Hanger Rods

- (1) Hanger rods shall be of solid round section and of material suitable for the maximum operating temperature that will be encountered. Rods shall have sufficient thread length for full adjustment of springs and turnbuckles.
- (2) The use of wire, chain, cable, strap iron or rectangular bar in substitution for solid round steel rods will not be permitted.
- (3) Rods less than 1/2-inch diameter will not be permitted.
- (4) Continuous threaded rods up thru 7/8-inch diameter may be used.
- (5) Welded eyerods or weldless eyenuts shall be used for all Rod Hangers.

e. Pipe Clamps

- (1) Pipe clamps shall be made of a sufficiently heavy material and/or stiffened to hold the loads, plus an allowance for hydrostatic test loads where steam piping is concerned.
- (2) Rigid riser clamps shall be designed to carry the total operating load on either arm in the event of load shift due to pipe and/or hanger movement.
- (3) Pipe clamp material shall, as a minimum, be equivalent to the piping material. For stainless steel piping, the clamps shall be of the same stainless material grade as the pipe, or, as an alternate, may be lined or coated with a material suitable for the loading service. The use of such alternates shall be subject to the approval of the Engineer.
- (4) When the operating temperature of the supported pipe exceeds 750 F, all pipe clamps and welded attachments shall be of suitable alloy steel, and heavy-duty construction. For insulated piping, pipe clamps and welded attachments

shall be constructed such that support rod attachment bolt(s) will be external to the insulation, and the pipe clamps will be rigid relative to the pipe and insulation.

f. Bolts and Threaded Connections

(1) Threaded connections shall be designed to avoid having loads bear against threads. Where this is not completely avoidable, a maximum limit of 33-1/3 percent of the load bearing support length may bear against the threads.

(2) All threaded connections except on hanger rods shall be provided with lock nuts. *

B. Supplementary Structural Steel and Attachments

Hangers and supports will normally be attached to adequately sized steel channels, beams and columns which are primary members in the building or other supporting structure. When this is not possible, the Engineer has designed such additional structural steel as necessary for the safe and proper attachment of the pipe hangers and supports. Supplemental steel shall be in accordance with AISC and ASTM A36.

10. NAMEPLATES

Each spring shall have a durable metal nameplate with the model number, serial number, tag number and other pertinent information clearly inscribed thereon. Each nameplate shall be permanently attached in a conspicuous place on its piece of equipment.

11. SHOP PAINTING AND PROTECTION

A. Preparation for Painting

After fabrication, all exposed surfaces shall have oil and grease removed by solvent cleaning; loose mill scale and powdered rust removed by mechanical cleaning; and shall have all burrs removed and sharp edges eased. Solvent cleaning shall precede mechanical cleaning.

B. Painting

Spring supports and pipe support hardware shall be painted with one coat of the manufacturer's standard rust-inhibitive primer suitable for the maximum temperature at which the component will operate. In addition, each pipe support assembly shall be coated for a corrosive environment when the drawings designate that the pipe support assembly will be installed in a corrosive environment.

C. Surfaces Not To Be Painted

Shop paint shall not be applied to surfaces of stainless steel, threads, name and data plates, and indicator scales and pointers. Shop paint shall be omitted for a distance of approximately 3 inches back from each connection to be field welded. Threads shall be protected with heavy coating of grease or antirust compound.

12. PREPARATION FOR SHIPMENT

- A. To the greatest extent possible, the components comprising each support assembly shall be grouped, bundled, crated, or otherwise shipped as a unit. Loose components shall be strung on wire and securely attached to a bundle or to a major component to prevent their loss.
- B. Tagging Instructions
- a. All items packaged in crates, boxes, or bags as well as items shipped loose or skidded shall be identified with the following information on metal tags securely fastened to the items with wire:
 - (1) Purchase Order number.
 - (2) Mark or tag number as shown on the applicable drawings.
 - b. Additionally, crates, boxes, or bags shall be externally identified with the information in Paragraph a. above.
 - c. Identification tags shall be of durable metal, such as brass, aluminum, or stainless steel, indelibly marked, and attached with wire.
 - d. Seller shall require subsuppliers to follow these tagging instructions.
- C. Shipments shall not be made by the Seller until bills of material have been provided in accordance with Paragraph DOCUMENTATION.

13. GUARANTEES

- A. The Seller shall guarantee that the equipment furnished conforms to the requirements set forth herein and to the specified Codes, Standards and Regulations and that all specified tests have been satisfactorily completed.

- B. The foregoing shall not be construed in any way to limit or negate any other standard guarantee or portion thereof which may provide a more comprehensive guarantee than those required by this Specification.
- C. If goods are defective, the amount of damage is the price of the defective goods only and no allowance will be made for labor or expense of repairing defective goods or damage resulting from the same. *

14. DOCUMENTATION

A. General

Documentation shall be furnished in accordance with Specification No. FJ50.50, Engineering Standard No. FJ60.60, and the requirements specified herein.

B. Exceptions or Modifications to Specification No. FJ50.50

- a. Paragraph 3.A.b.c.g. is deleted in its entirety.
- b. Paragraphs 3.D.b.(1) thru (4) are deleted in their entirety.
- c. Paragraphs 3.D.c.(1), (3) and (4) are deleted in their entirety.
- d. Paragraphs 3.D.d.(1) and (2) are deleted in their entirety.
- e. Paragraph 3.E. is deleted in its entirety; however, a bill of material shall be added to each Pipe Support Design Drawing or shop detail sheet.

C. Exceptions or Modifications to Engineering Standard No. FJ60.60

a. Pipe Support Design Drawings

- (1) Item 2A of Standard FJ60.60 shall include detailed shop drawings for each hanger for the Engineer's approval and/or comment. *
- (2) The Seller has the option of adding the necessary shop detail information to the Engineer's Pipe Support Design Drawings or furnish his own shop detail drawings.
- (3) The shop detail drawings shall, in addition to the information required in Paragraph 3.A.d. of Specification FJ50.50, show the following information for each hanger:
 - (a) Manufacturer's figure number, type, size, arrangement and weight.

- (b) Details of integral pipe attachments required for field welding to piping.
- (c) Dimensions needed for installation.
- (d) Dimensioned location plan and elevation.
- (e) Design loads and movements plus hot and cold load settings.
- (f) Complete list of parts referenced on the drawings.
- (g) Description of each piece of material including cut lengths.
- (h) Weld size, type, and location for field welds.
- (i) Bolt type, size, location, and size of all bolt holes.
- (j) Seller's drawing revision letters.

b. Operation and Maintenance Manuals

Item 4A of Standard JF60.60 shall include catalogs of all standard hanger components.

D. Shipping Information

The Seller shall submit the following specific shipping data prior to shipment:

- a. Name of carrier.
- b. Proposed routing.
- c. Proposed breakdown by carload and/or truckload.
- d. Packing and classification description.

15. ENGINEERING SCHEDULE

Engineering schedule shall be as follows:

Date or Sequence
Required

A. Erection and operating information

- a. Maintenance and operating instructions At time of shipment

Date or Sequence
Required

b. Erection instructions

At time of shipment

B. Shipping papers

At time of shipment

16. SHIPPING SCHEDULE

Seller shall schedule engineering, fabrication, preparation for shipment and delivery to a carrier in such a manner that all items covered by this Specification shall be delivered to the power plant site by October 1, 1980.

BID DATA

NAME OF BIDDER

F & S Central

*

In addition to all other data and descriptive material furnished with the Bidder's Proposal, Bidder shall fill in all blank spaces of the following Bid Data Section:

1. DRAWING APPROVAL

Pipe Line
Numbers

Date

*

All numbers

Aug. 1, 1980

Note: effort should be made to have drawings at F & S Central previous to the above date

2. SUBCONTRACTORS

Vendor who shall supply any major components:

Power Piping, Constant Supports or F & S Central Equal. Basic Engineers,
Constant Supports or F & S Central Equal. Green Point Pipe Co.

Stearns-Roger INCORPORATED

Page

i

Project No. C-21700
Spec. No. FJ50.50

November 3, 1976

SPECIFICATION

NO. FJ50.50

FOR

DOCUMENTATION

TABLE OF CONTENTS

	<u>Page</u>
1. Scope	1
2. Type, Quantities and Quality of Copies	1
A. Reproducible Drawings	1
B. Prints	1
C. Other Documentation	2
3. Documentation by Seller	2
A. General	2
B. Progress Reports	3
C. Review and Comment	3
D. Operation and Maintenance Manuals	5
E. Bills of Material	6
4. Drawings by Engineer	6
5. Transmittals	7
6. Special Considerations	7

STEARNS-ROGER ENGINEERING CORP.
DENVER, COLORADO

PROJECT NO. C-21700

Stearns-Roger INCORPORATED

Page
1

Project No. C-21700

Spec. No. FJ50.50

DOCUMENTATION

1. SCOPE

- A. This Specification outlines the requirements for, and the procedures associated with, the preparation and exchange of documentation for the work, equipment and/or materials specified in the Contract or Specification to which this Specification is a supplement.
- B. This Specification supplements requirements in Engineering Standard No. FJ60.60.
- C. This Specification also supplements requirements, where specified, in Paragraph DOCUMENTATION of the Contract or Specification to which this Specification is a supplement.
- D. This Specification and supplementary references specified in the foregoing paragraphs cover minimum requirements for documentation and are not intended to limit the amount of additional documentation which may be required for the engineering coordination, use or maintenance of the work, equipment and/or materials being furnished. Such additional documentation shall be provided by Seller or Contractor.
- E. All references to "Seller" herein shall apply to Seller or Contractor. All references to "Buyer" herein shall apply to the Buyer or the Owner. All references to "Engineer" herein shall apply to Stearns-Roger Incorporated.

2. TYPE, QUANTITIES AND QUALITY OF COPIES

The type and quantities of copies for required documentation are specified on Engineering Standard No. FJ60.60. Quality requirements shall be as follows:

A. Reproducible Drawings

All reproducible drawings submitted to Engineer shall be furnished on ozalid vellum, auto-positive vellum or Mylar, black line on vellum, or other Engineer-approved medium, each to be suitable for legible reproduction by the diazo copy process. Reproducible drawings shall be rolled, not folded, and enclosed in mailing tubes when mailed to Engineer or otherwise handled.

B. Prints

Where designated by the word "Prints" on Engineering Standard No. FJ60.60, it shall be understood to mean suitable "blue-line print/copy," "blueprint," or other Engineer-accepted reproduction of an original Seller-prepared tracing or sepia.

Stearns-Roger

INCORPORATED

Page

2

Project No. C-21700

Spec. No. FJ50.50

2. TYPE, QUANTITIES AND QUALITY OF COPIES (CONTD)

C. Other Documentation

Where designated by the word "Copies" on Engineering Standard No. FJ60.60, applicable documentation shall be submitted on legible, black on white, 8-1/2-inch by 11-inch pages.

3. DOCUMENTATION BY SELLER

A. General

a. Required types of documentation are specified on Engineering Standard No. FJ60.60. Where this Standard does not fully describe individual categories of documentation that are required, such detailed categories are specified in Paragraph DOCUMENTATION of the Contract or Specification to which this Specification is a supplement.

b. Where equipment for Units 1 and 2 is identical, or where equipment is common to Units 1 and 2, one (1) set of documentation shall be furnished. If equipment is identical, Seller shall certify, on each document, that it is applicable to both Units 1 and 2. Where equipment is neither identical for nor common to Units 1 and 2, two (2) complete, individual sets of documentation shall be furnished, appropriately identified.

c. The title block of each drawing shall denote the applicability of the drawing either to "Unit 1," "Unit 2" or "Units 1 and 2." Other documentation submitted by Seller shall carry similar identification.

d. The following information shall be included in each drawing:

- (1) Buyer's Name.
- (2) Engineer's Project Number.
- (3) Plant or station name.
- (4) Unit number (if applicable).
- (5) Buyer's Purchase Order Number.

Other documentation submitted by Seller shall carry similar identification.

e. Unless specifically approved by the Engineer, "typical" or "similar" documentation is not acceptable for review.

Project No. C-21700Spec. No. FJ50.50**3. DOCUMENTATION BY SELLER (CONTD)****A. General (Contd)**

- f. "Standard Hardware Items" are defined as standard commercial items, such as air and hydraulic cylinders and operating valves, gear reducers, small motors, instruments, etc. For such items, review drawings are not required. Certified sheets showing exact mounting dimensions, overall dimensions, cross-sectional arrangement, parts nomenclature and material designation shall be submitted. Details of parts shall be furnished when requested by Buyer.
- g. Within 30 days after written notice of award, Seller shall submit a complete Definitive Drawing List, by drawing and title, of all drawings that will be submitted to Engineer. On this list, each drawing shall be identified by its appropriate category as defined in Items 1 or 2 on Engineering Standard No. FJ60.60, and as supplemented in Paragraph DOCUMENTATION of the Contract or Specification. Any drawing that does not fall under these predefined categories shall be identified on the list as "Miscellaneous." This list shall include proposed submittal dates for each drawing. This drawing list and schedule, together with any subsequent modifications, shall be subject to Engineer's review and comments.

B. Progress Reports

Seller shall furnish Engineer monthly progress reports and schedule status reports. These reports and schedules shall cover the complete status and progress of engineering, documentation, fabrication, materials, labor and shipment.

C. Review and Comment

- a. Entries in the column "WEEKS AFTER AWARD" on Engineering Standard No. FJ60.60 designate maximum time spans for Seller's submittal of documentation for review after the date of Buyer's written notification of award, whether such notification be in the form of a Purchase Order, a Letter of Intent or similar written authorization.
- b. All documentation to be certified and submitted by Seller for interface coordination shall show sufficient details of design so that the Engineer may proceed with his overall project design where interrelated with Seller's design.
- c. All documentation submitted in the correct and complete form to Engineer for his review and comment will be processed and a copy sent to Seller within 2 weeks after receipt of Seller's submittal. If more than 2 weeks review time is necessary, Engineer will advise Seller in writing as to his review schedule for such data. Seller shall then advise Engineer in writing what effect the extended review schedule has on the scheduled delivery of Seller's materials and equipment.

Project No. C-21700
Spec. No. FJ50.50DOCUMENTATION BY SELLER (CONTD)C. Review and Comment (Contd)

- d. Drawings and data will be returned to Seller marked either "REVIEWED/NO COMMENTS," "REVIEWED/SEE COMMENTS" or "REVISE PER COMMENTS AND RESUBMIT FOR REVIEW."
- e. When the documentation is returned marked "REVIEWED/NO COMMENTS" or "REVIEWED/SEE COMMENTS," final certified submittals incorporating the noted changes shall be furnished, unless otherwise authorized by Engineer in writing, within 3 weeks from the time of receipt of copy by Seller or at least 16 weeks before the scheduled delivery of Seller's work, whichever is earlier. Where Engineering Standard No. FJ60.60 stipulates that drawing review is required before release for fabrication, "REVIEW/SEE COMMENTS" shall constitute such release.
- f. When the documentation is returned marked "REVISE PER COMMENTS AND RESUBMIT FOR REVIEW," the documentation with the noted revisions incorporated shall be resubmitted for review and comment within 3 weeks from the time of receipt of copy by Seller. The review and comment and final submittal schedule shall be as specified in Sub-paragraphs 3.C.c. and 3.C.e. above.
- g. The documentation submittal schedules shall be adhered to by Seller, unless otherwise authorized by Engineer in writing. In any case, final submittals shall be furnished at least 16 weeks before the scheduled delivery of Seller's work.
- h. When reviewed information is subsequently revised by Seller, or is subsequently found to be deficient because of Seller's error or omission, additional Seller submittals shall be made to Engineer as developed. Any Engineer's design changes and any changes in equipment or construction by others which are required to make such subsequent revisions an integral part of the overall project shall be made at Seller's expense.
- i. Fabrication or shipment shall be at Seller's risk, whether or not Engineer has reviewed Seller's drawings as specified on Engineering Standard No. FJ60.60.
- j. Seller will be notified of review by a stamped copy of Stearns-Roger Form 02.145 or TRMSR05A stating "Supplier: As to all Drawings/Data listed on this transmittal: PROCEED TO FABRICATE." All Seller drawings which are submitted as final shall be stamped "Final." Where specified on Engineering Standard No. FJ60.60, final drawings shall be certified for construction.
- k. Neither review of, nor comment or revision on drawings by Engineer relieves Seller or Contractor from compliance with Specifications or with all other requirements of Purchase Order or Contract, nor shall the procedures outlined herein be cause for delay of equipment deliveries, except as otherwise specified herein.

Project No. C-21700Spec. No. FJ50.503. DOCUMENTATION BY SELLER (CONTD)C. Review and Comment (Contd)

1. Notations made during the review of drawings shall not be construed to authorize contractual changes in price or delivery of equipment or materials furnished by Seller. If the scope of work has been changed as a result of such notations, Seller shall request a change in Purchase Order price and/or delivery date(s). Seller shall make the request in writing to Engineer before proceeding with the work.

D. Operation and Maintenance Manualsa. General

- (1) Seller shall furnish Operation and Maintenance Manuals which shall be complete for all equipment and systems furnished by Seller and by Seller's suppliers. Any differences between equipment supplied for Unit 1 and Unit 2 with regard to operation and maintenance shall be clearly defined in these Manuals.
- (2) Manuals shall be forwarded four (4) weeks prior to complete delivery of equipment in accordance with Engineering Standard No. FJ60.60.
- (3) If the publication of a subassembly manufacturer does not contain a complete operation, maintenance and parts breakdown meeting the intent of this Specification, then it shall be the responsibility of Seller to include such information in the Operation and Maintenance Manual.
- (4) All necessary precautions and warnings relative to the safety of life and equipment shall be included.

b. Operation

As a minimum, the Operation Section of the Manual shall contain the following:

- (1) Starting instructions, including, as applicable, instructions for initial startup, normal starting, starting after overhaul and startup after emergency trip.
- (2) Operating instructions, including trouble-shooting procedures.
- (3) Shutdown instructions, for both normal and emergency shutdown.
- (4) Design data for all equipment and systems, specifying horsepower, kilowatts, voltage, amperage, pressure, temperature, revolutions per minute, flow, etc.

Project No. C-21700Spec. No. FJ50.50**3. DOCUMENTATION BY SELLER (CONTD)****D. Operation and Maintenance Manuals (Contd)****c. Maintenance**

As a minimum, the Maintenance Section of the Manual shall contain the following:

- (1) Disassembling and reassembling instructions.
- (2) Preventive maintenance and lubrication information.
- (3) Description and identification of special maintenance tools.
- (4) Settings, clearance and adjustment data.

d. Parts Breakdown

The Parts Breakdown Section of the Manual shall contain:

- (1) A list of replacement parts, including drawings and data for all equipment assemblies and subassemblies. The material shall cover all information required for ordering replacement parts such as part name, part number, equipment serial number, supplier, address and normal delivery time.
- (2) Complete instructions for procuring replacement parts. Recommended forms for tabulating replacement part information and instructions for returning material to the factory shall also be included. Special storage, handling or packaging procedures required for any particular parts shall be noted.

E. Bills of Material

Detailed Bills of Material are required to facilitate identification by constructors of the items received. Shipment, therefore, shall be preceded by submittal of Bills of Material in accordance with Engineering Standard No. FJ60.60, Item 4 C.

4. DRAWINGS BY ENGINEER

- A. For applicable equipment, prints of drawings prepared by Engineer for use by others in constructing foundations, building components and major piping and wiring requiring coordination with the work associated herewith will be furnished to Seller for review as soon as possible after Engineer's receipt from Seller of the certified equipment drawings and design information necessary for their preparation.
- B. Where material, locations, etc., are marked HOLD on Engineer's Drawings, that material, location, etc., shall not be detailed or fabricated by Seller until the HOLD is removed by Engineer.

4. DRAWINGS BY ENGINEER (CONTO)

- C. Within 30 calendar days after the date of transmittal to Seller, Seller shall return to Engineer two (2) copies of each of these drawings marked to indicate Seller's review thereof either without change, or with any corrections or necessary changes clearly marked thereon in red or other contrasting color.
- D. After making such corrections or changes as shown on the review copies returned by Seller, Engineer will release these drawings for construction. Subsequent changes or corrections to foundations, building components, wiring or piping fabricated or installed in accordance with drawings corresponding to the review copies approved by the Seller, such changes having been necessitated by Seller-initiated modifications, shall be done in a manner satisfactory to Buyer and at Seller's expense.

5. TRANSMITTALS

When transmitting documentation, Seller shall:

- A. Prepare original and four (4) copies of transmittal letters to accompany each submittal of documentation. Drawing transmittal letters shall identify the purpose of the transmittal (drawings for review, revised drawings, final drawings), the piece of equipment or material involved, and shall list the drawing numbers with applicable revision numbers or dates.
- B. Identify each letter and parcel with Buyer's Project Name, Engineer's Project Number, Purchase Order Number and Seller's Shop Order Number, and transmit it by air mail or first class mail. Each parcel shall contain an enclosed copy of the transmittal letter.
- C. Stamp each document to be submitted with reproduction date and purpose of the transmittal, e.g., "For Review," "Revised," "Final," etc.

6. SPECIAL CONSIDERATIONS

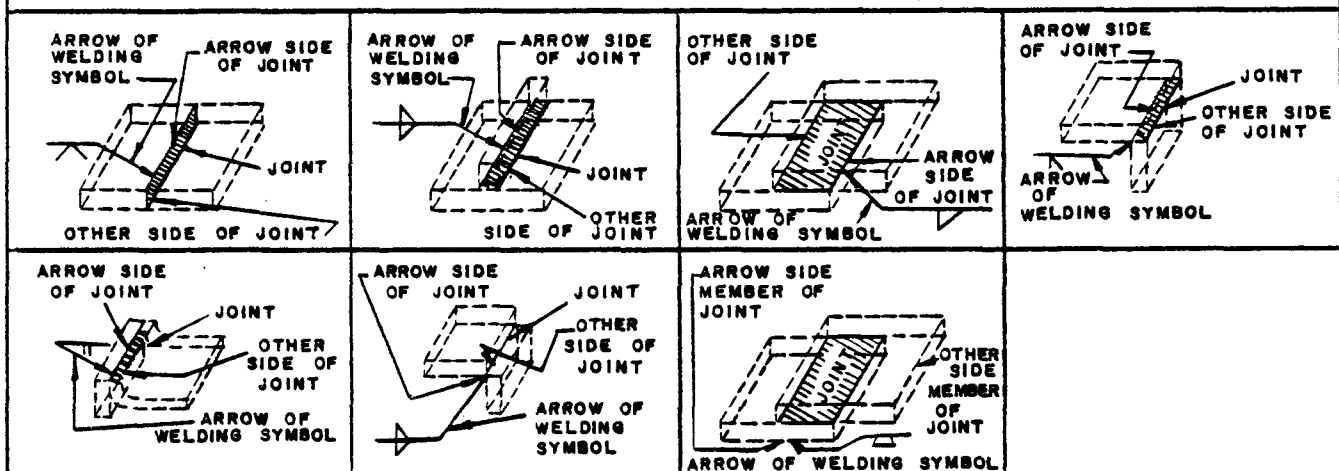
- A. It is understood that upon delivery of Seller's documentation without any restrictive notations concerning such work, they shall become Buyer's property and may be used in any manner desired for obtaining replacements, repairs and spare parts.
- B. Seller's final invoice will not be paid by Buyer until all materials and/or equipment governed hereunder have been received complete at the delivery point, and final certified submittals of all specified documentation have been received by Engineer.

DIVISION USAGE							Stearns-Roger INCORPORATED ENGINEERING STANDARD				STANDARD NUMBER		
MM	P	PP	SH	FI	SP						FJ 60.60		
APPROVALS: Des. Sec. <i>[Signature]</i> Sect. Sup. <i>[Signature]</i> Div. <i>[Signature]</i> DOCUMENTATION REQUIREMENTS PROJECT: SOLAR ONE CONTRACT/REQUISITION NUMBER: S-R E2 TITLE: PRIMARY PIPE SUPPORTS C-21700 ISSUED 10/22/79 REVISED													
TYPE OF DOCUMENTATION							TYPE OF COPIES	FOR REVIEW		FINAL		REVIEW REQ'D BEFORE FAB.**	CTFY. FINAL ISSUE ***
							NO. OF COPIES	WEEKS AFTER AWARD*	NO. OF COPIES	"X" IF REQ'D			
1-ENGINEERING DRAWINGS							Repro- ducibles						
A-Outline, General Arrangement and Principal Dimensions							Prints						
B-Cross Sections													
C-Foundation Requirements, including Loadings & Anchoring Locations													
D-Physical Locations of Piping and/or Wiring Terminals													
E-Control Diagrams													
F-Electrical Schematic Diagrams													
G-Wiring Diagrams, Including Internal External and Interconnecting													
H-Standard Hardware Items													
2-ERECTION OR INSTALLATION INFO.							Repro- ducibles						
A-Shop Fabrication Drawings							Prints	4	6	4	X	X	X
B-Erection or Installation Drawings													
C-Erection or Install. Instructions							Copies						
3-SPECIAL DOCUMENTATION													
A-Performance Data, including Curves							Copies						
B-Design Calculations							Copies						
C-Test Reports							Copies						
D-Code Papers and Certificates							Copies						
E-Shop Fab. and/or Welding Proced.							Copies						
F-Shop Fabrication Reports							Copies						
G-Welder's Qualification Reports							Copies						
H-Operating Certificates							Copies						
4-MISCELLANEOUS													
A-Operation and Maintenance Manuals							Manuals	4	4				
B-Recommended Spare Parts List for 1 Year's Operation, with Unit Prices							Copies						
C-Bills of Material							Copies						
D-Definitive Drawing List							Copies						
*-Entries in the column "WEEKS AFTER AWARD" designate which types of review documentation are required. Blank spaces in this column denote that review documentation is not required. **-"X" in this column means drawing review req'd. before fabric. release. ***-"X" in this column means final issue must be certified for construction. #-At least 2 weeks before each shipment, detailed Bills of Material shall be sent to the plant site. This form supplements requirements, where specified, in Article 4. in the Specification.											Except where otherwise specified, send all documentation to: Stearns-Roger Engineering Corp. P.O. Box 5888 Denver, CO 80217 Attn: R.K. Brushel		

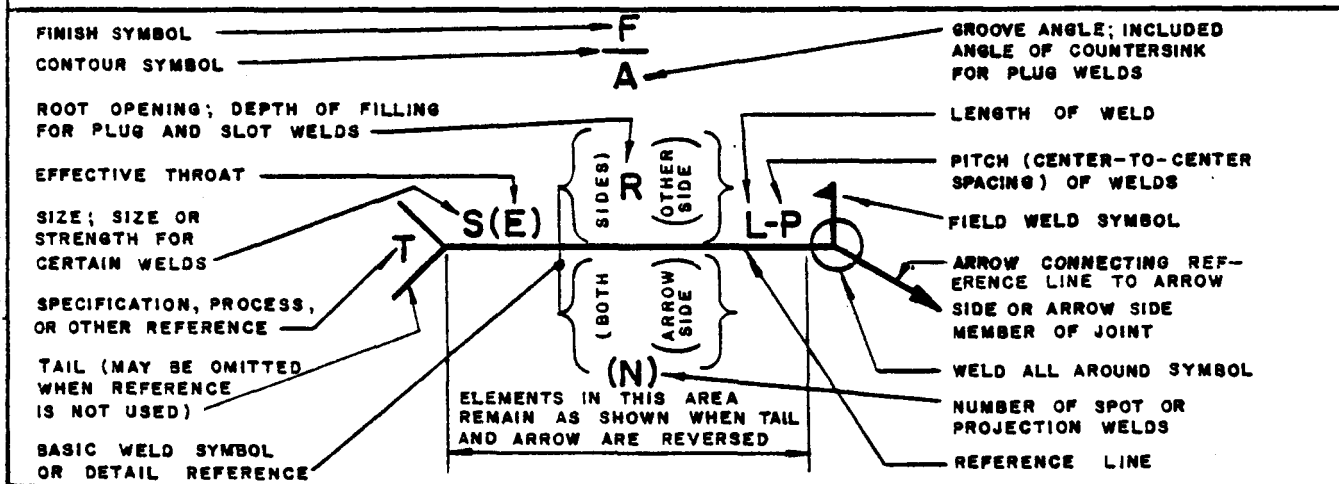
DIVISION USAGE						Stearns-Roger INCORPORATED ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP		EJ 14.37.1
APPROVALS						WELDING SYMBOLS	PAGE <u>1</u> OF <u>1</u>
Des. Sect. _____							ISSUED 5/5/78 REVISED
Sect. Supv. _____							
Div. <u>WEL</u>							

LOCATION SIGNIFICANCE	ARC AND GAS WELDING SYMBOLS							
	BEAD	FILLET	PLUG OR SLOT	GROOVE				
				SQUARE	V	BEVEL	U	J
ARROW SIDE	GROOVE WELD SYMBOL							
OTHER SIDE	GROOVE WELD SYMBOL							
BOTH SIDES	NOT USED		NOT USED					
NO ARROW SIDE OR OTHER SIDE SIGNIFICANCE		NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

IDENTIFICATION OF ARROW SIDE AND OTHER SIDE OF JOINT
AND ARROW-SIDE AND OTHER-SIDE MEMBER OF JOINT



LOCATION OF ELEMENTS OF A WELDING SYMBOL



ENGINEERING VOLUME

September 2, 1960

Rev. No. 5

PCO-1

D.O.E. NO. 40 P 700 - 161

PRIMARY PIPE SUPPORTS PSS AREA

Prepared by:

Stearns-Roger
ENGINEERING CORP.

PROJECT NO. C-21700



PRIMARY PIPE SUPPORTS

PSS AREA

P60-1

REVISION NO. 5

SEPTEMBER 2, 1980

Revision No. 5 issued to incorporate revisions to Pipe Supports on the primary piping.

Remove the drawings listed below in Item 3 and replace with corresponding drawings attached hereto.

This revision 5 includes:

1. Cover Sheet
2. Pipe Hanger Index, Rev. 5
3. Drawings:

<u>Drawing</u>	<u>Rev.</u>
H-MS-7-4	2
H-MS-7-5	2
H-MS-7-6	3
H-MS-7-7	3
H-MS-7-8	2



PRIMARY PIPE SUPPORTS
PSS AREA
P60-1
REVISION NO. 4
AUGUST 18, 1980

Revision No. 4 issued to incorporate revisions to pipe supports on the primary piping.

Remove the drawings listed below in item 3 and replace with corresponding drawings attached hereto.

Drawing H-ST-8-1 replaces HT-6-1 which has been deleted.

This revision 4 includes:

1. Cover Sheet
2. Pipe Hanger Index, Rev. 4
3. Drawings

<u>Drawing</u>	<u>Rev.</u>	<u>Drawing</u>	<u>Rev.</u>	<u>Drawing</u>	<u>Rev.</u>
H-FW-2-1	1	H-MS-6-1	3	H-VT-12-1	3
H-FW-2-13	3	H-MS-6-2	4	H-VT-12-2	3
H-FW-2-21	3	H-MS-8-2	2	H-VT-12-3	3
H-MS-2-6	1	H-MS-8-3	3	H-VT-12-7	2
H-MS-2-11	2	H-MS-10-3	2	H-VT-12-9	2
H-MS-2-12	1	H-MS-10-4	2	H-VT-12-10	2
H-MS-2-20	1	H-ST-9-1	3	H-VT-12-11	2
H-MS-2-25	2	H-ST-13-2	2	H-VT-12-12	1
H-MS-2-27	2	H-VT-1-20	2	H-VT-12-13	2
H-MS-2-28	2	H-VT-1-25	3	H-VT-12-14	2
H-MS-2-29	2	H-VT-11-1	3		
H-MS-2-30	2	H-VT-11-2	2		
H-MS-2-35	2				

DIVISION USAGE						Stearns-Roger INCORPORATED ENGINEERING STANDARD		STANDARD NUMBER	
MM	P	PP	SH	FI	SP			FE03.0	
APPROVALS Des. Sect. <i>[Signature]</i> Supv. <i>[Signature]</i> Div. <i>[Signature]</i>						PIPE HANGER INDEX VOL. P60-1		PAGE <u>1</u> OF <u> </u>	
								ISSUED 2-14-75	
								REVISED	
HANGER NO.		REV	HANGER NO.		REV	HANGER NO.		REV	
H-FW-2-1		1	H-MS-2-17		0	H-ST-13-1		2	
H-FW-2-2		0	H-MS-2-18		0	H-ST-13-2		2	
H-FW-2-3		0	H-MS-2-19		0				
H-FW-2-4		0	H-MS-2-20		1	H-ST-14-1		1	
H-FW-2-5		0	H-MS-2-21		1				
H-FW-2-6		1	H-MS-2-22		1	H-VT-1-2		0	
H-FW-2-7		0	H-MS-2-23		1	H-VT-1-3		0	
H-FW-2-8		0	H-MS-2-24		1	H-VT-1-4		0	
H-FW-2-9		0	H-MS-2-25		2	H-VT-1-5		0	
H-FW-2-10		0	H-MS-2-26		1	H-VT-1-6		0	
H-FW-2-11		1	H-MS-2-27		2	H-VT-1-7		1	
H-FW-2-12		1	H-MS-2-28		2	H-VT-1-8		0	
H-FW-2-13		3	H-MS-2-29		2	H-VT-1-9		0	
H-FW-2-14		1	H-MS-2-30		2	H-VT-1-10		0	
H-FW-2-15		0	H-MS-2-31		0	H-VT-1-11		0	
H-FW-2-16		0	H-MS-2-32		3	H-VT-1-12		2	
H-FW-2-17		0	H-MS-2-33		2	H-VT-1-13		0	
H-FW-2-18		0	H-MS-2-34		1	H-VT-1-14		0	
H-FW-2-19		2	H-MS-2-35		2	H-VT-1-15		0	
H-FW-2-20		2				H-VT-1-16		0	
H-FW-2-21		3	H-MS-3-1		1	H-VT-1-17		2	
H-FW-2-22		0	H-MS-3-2		0	H-VT-1-18		2	
H-FW-2-23		2	H-MS-3-3		3	H-VT-1-19		2	
H-FW-2-24		1	H-MS-3-4		2	H-VT-1-20		2	
H-FW-2-25		2	H-MS-3-5		1	H-VT-1-21		2	
H-FW-2-26		2	H-MS-3-6		1	H-VT-1-22		2	
H-FW-2-27		1	H-MS-3-7		1	H-VT-1-23		2	
H-FW-2-28		2	H-MS-3-8		1	H-VT-1-24		1	
H-FW-2-29		1				H-VT-1-25		3	
H-FW-2-30		1	H-MS-6-1		3	H-VT-1-26		2	
			H-MS-6-2		4				
H-FW-9-1		2				H-VT-11-1		3	
H-FW-9-2		1	H-MS-7-1		0	H-VT-11-2		2	
H-FW-9-3		2	H-MS-7-2		3				
H-FW-9-4		2	H-MS-7-3		3	H-VT-12-1		3	
H-FW-9-5		1	H-MS-7-4		2*	H-VT-12-2		3	
H-FW-9-6		1	H-MS-7-5		2*	H-VT-12-3		3	
			H-MS-7-6		3*	H-VT-12-4		2	
H-MS-2-6		1	H-MS-7-7		3*	H-VT-12-5		2	
H-MS-2-7		0	H-MS-7-8		2*	H-VT-12-6		2	
H-MS-2-8		0				H-VT-12-7		2	
H-MS-2-9		0	H-MS-8-1		2	H-VT-12-8		1	
H-MS-2-10		0	H-MS-8-2		2	H-VT-12-9		2	
H-MS-2-11		2	H-MS-8-3		3	H-VT-12-10		2	
H-MS-2-12		1				H-VT-12-11		2	
H-MS-2-13		0	H-MS-9-1		0				
H-MS-2-14		0							
H-MS-2-15		0							
H-MS-2-16		1							
154						PROJECT NO. C-21700			
						DATE September 2, 1980 SHEET NO. 1 OF 1 REV. 5			

*Indicates Drawing is Revised this Issue.

FUNCTIONAL REQUIREMENTS														PIPE SUPPORT DESIGN DATA											
MARK N°	HOT TEMP (°F)	OPERATIONAL (HOT) LOAD (LBS)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS)	LOC N°	ANALYST T.W. DATE 2-12-80			MIN. REQ. VERT. DIST (FT./IN)	BASIC SUPPORT TYPE	PIPE SUPPORT SELECTION				K. (LBS./ IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)	STR. DESIGN LOAD (KIPS)	REMARKS				
							DISPLACEMENT COLD-HOT	X	VERT. Y			Z	STYLE	FIG. N° TYPE	SIZE							TT (IN)			
N-FW-2-1	440	SEE S.D.L.	4.50	2 1/2"	N.A.	5	0	0	0	-	ANC	-	-	-	-	-	-	-	LATEE	BY OTHERS. (PIPE FABRICATOR)					
-2						10	0	3/8 DN	0	-	GDE	-	-	-	-	-	-	-	FA = .3K FB = .2K	BY SPEC. E-2 SEE DETAIL					
-3						15	0	3/8 DN	0	-	GDE	-	-	-	-	-	-	-	FA = .2K FB = .2K						
-4						20	0	3/8 DN	0	-	GDE	-	-	-	-	-	-	-	FA = .4K FB = .4K						
-5						25	0	1 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	FA = 1.4K FB = .3K						
-6		2242				35N	0	1 1/4 DN	0	-	VSH	S	9B	12	-	225	1	1928	-	2.5					
-7		SEE S.D.L.				40	0	1 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	FA = 1.1K FB = .6K						
-8						45	0	1 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	FA = .6K FB = 1.0K						
-9						50	0	2 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	FA = 1.1K FB = 1.4K						
-10						55	0	2 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	FA = 1.4K FB = 1.5K						
-11		288				65	-7/8	2 3/4 DN	1/16	-	CSH	S	80-V	11	4	-	1/2	-	-	.4					
-12		293				85	-3/4	1 1/2 DN	3/16	-	CSH	S	81-H	7	3	-	1/2	-	-	.4					
-13		222				92	-1/2	1 DN	-3/8	-	VSH	S	9B	4	-	23	1/2	199	-	.3					
-14		1917				100N	-1/4	3/4 DN	3/16	-	VSH	S	B-268	11	-	340	7/8	1726	-	2.3					
-15		SEE S.D.L.				105	0	3/8 DN	0	-	GDE	-	-	-	-	-	-	-	FA = 2.5K FB = 3.0K						
-16						110	0	1 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	FA = 2.7K FB = 2.8K						
-17						115	0	1 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	FA = 2.5K FB = 2.5K						
-18						120	0	2 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	FA = 1.9K FB = 2.3K						
-19		951				130N	-1/8	2 1/4 DN	5/8	-	CSH	S	80-V	18	3 1/2	-	3/8	-	-	1.1					
-20		599				150	-3/4	3/4 DN	5/8	-	VSH	F	82	7	-	224	-	529	-	.7					
-21		479				165	-1/8	0	1/4	-	R	F	-	-	-	-	-	-	-	.6					
-22		SEE S.D.L.				170	0	0	0	-	ANC	F	-	-	-	-	-	-	LATEE	BY OTHERS. (PIPE FABRICATOR)					

NOTES ① MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 4° SWING ANGLE FROM VERTICAL. ② VSH VARIABLE SPRING HANGER, CSH CONSTANT SUPPORT HANGER, R RIGID, HYD HYDRAULIC SHOCKER, ANC ANCHOR, GDE GUIDE. ③ K SPRING SCALE LBS./IN. (FOR VARIABLE SPRING HANGER). ④ STYLE: S SINGLE ROD ASSY, T TRAPEZE ASSY, F FLOOR SUPPORT, D DUAL ROD ASSY. ⑤ OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS.	ANALYSIS I.D. CODE T/W-FW-01-A-2/2	PIPE MATERIAL: ASTM A106 GR.B	PIPE HANGER SCHEDULE RECEIVER FEEDWATER Stearns-Roger TO MME SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	REFERENCES P/B-4 A	② ALL DETAILS COMPLY WITH 10% GMMY ① FOR BID	② ALL DETAILS COMPLY WITH 10% GMMY ① FOR BID	CHECKED BY: NLM DATE: 4-1-80 JOB N° C-21700
	REVISIONS	DATE BY SCH DWG ISO LS	SCHEDULE N° FW 1	SHEET N° 1 OF 1

Form 100774 Rev. 1

FUNCTIONAL REQUIREMENTS										PIPE SUPPORT DESIGN DATA											
ANALYST <i>J.F.M.</i> DATE <i>2-14-80</i>										DESIGNED BY <i>G.P.</i> DATE <i>2-14-80</i>											
MARK Nº	HOT TEMP (ºF)	OPERATIONAL (HOT) LOAD (LBS.)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS.)	LOC Nº	DISPLACEMENT COLD-HOT			MIN. REGD. VERT. DIST (FT./IN)	BASIC SUPPORT TYPE	PIPE SUPPORT SELECTION				K ⁽³⁾ (LBS./ IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)	STR. DESIGN LOAD (KIPS)	REMARKS
							X	Y	Z			STYLE (4)	FIG. Nº- TYPE	SIZE	T T (IN)						
H-FW-2-23	440	475	4.50	2 1/2	N.A.	175	-1/8	0	-1/4	-	R	F	-	-	-	-	-	-	1.6	BY SPEC. E2 SEE DETAIL	
-24		1083				190F	-1/4	1/4 UP	-1/8	-	VSH	S	82	10	-	520	3/4	1213	1.3		
-25		639				205F	-1 5/16	0	-1 3/8	-	R	S	-	-	-	5/8	-	-	1.2		
-26		726				225	-1/2	0	-7/8	-	R	F	-	-	-	-	-	-	.9		
-27		489				235	-1/8	0	-3/4	-	R	S	-	-	-	1/2	-	-	.7		
-28		456				240	-1/2	0	-1 1/4	-	R	F	-	-	-	-	-	-	.7		
-29		532				245	-1	0	-1 1/2	-	R	S	-	-	-	1/2	-	-	.9		
-30		597				260	-1 5/8	0	-1 5/8	-	R	S	-	-	-	1/2	-	-	1.1		
-31		327				265	-1 1/8	0	-1 3/8	-	R	F	-	-	-	-	-	-	1.1	BY SPEC. E2 DETAIL LATER BID PER H-FW-2-23 ADJUST	
-32		414				270	-3/8	1/8 DN	-5/8	-	VSH	S	82	6	-	168	3/8	393	45	.5	
-33		887				285	-1/8	1/8 UP	-3/4	-	VSH	S	82	9	-	400	3/4	912	163	1.0	
H-FW-9-1	440	226	2.875	2	N.A.	405	-1 1/8	0	-1 1/4	-	R	F	-	-	-	-	-	-	.7	BY SPEC. E2 SEE DETAIL	
-2		170				410	-1 3/8	0	-1 5/8	-	R	S	-	-	-	1/2	-	-	.3		
-3		122				415	-1 5/8	0	-5 1/8	-	R	F	-	-	-	-	-	-	.2		
-4		252				420	-1 3/8	0	3/4	-	R	S	-	-	-	1/2	-	-	.4		
-5		271				430N	-2 5/8	0	1 1/16	-	R	S	-	-	-	1/2	-	-	.5		
-6		389				445F	-1 3/8	3/8 UP	1/8	-	VSH	S	82	6	-	168	3/8	452	-	.5	

FUNCTIONAL REQUIREMENTS														PIPE SUPPORT DESIGN DATA										REMARKS
MARK Nº	HOT TEMP (°F)	OPERATIONAL (HOT) LOAD (LBS)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS.)	LOG Nº	DISPLACEMENT COLD → HOT			MIN. REQ. VERT. DIST (FT./IN.)	BASIC SUPPORT TYPE	PIPE SUPPORT SELECTION				K (LBS./ IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)	STR. DESIGN LOAD (KIPS)				
							X	VERT. Y	Z			STYLE	FIG. Nº- TYPE	SIZE	T T (IN.)									
H-MS-2-1	960	SEE S.D.L.	6.625	4 1/2	-	20	0	1 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = .2 F _y = .2	BY OTHERS (ROCKETDYNE)				
-2					-	25	0	2 3/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = .5 F _y = .5					
-3					-	30	0	2 3/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.0 F _y = .9					
-4					-	32	0	3 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.6 F _y = 1.3					
-5		9902			5.0	35F	-1/16	3 3/4 DN	1/16	4-0	CSH	S		45	5	-	1 1/8	-	5.5					
-6		SEE S.D.L.			-	45	0	4 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.1 F _y = 1.1	3Y SPEC. E-2 SEE DETAIL				
-7					-	50	0	5 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = .6 F _y = .6					
-8					-	55	0	6 1/8 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = .3 F _y = .3					
-9					-	60	0	7 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.1 F _y = .7					
-10					-	65	0	7 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 2.2 F _y = 1.1					
-11		3147			3.5	75N	0	8 3/4 DN	0	-	CSH	S	81H-A	51	10 1/2	-	1	-	4.0					
-12		SEE S.D.L.			-	80	0	8 3/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.8 F _y = .4					
-13					-	85	0	9 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = .3 F _y = .4					
-14					-	90	0	10 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.0 F _y = .7					
-15					-	95	0	11 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 2.0 F _y = 1.0					
-16		6303			7.1	105N	1/16	12 3/8 DN	0	-	CSH	S	80V-C	67	14 1/2	-	1 1/2	-	8.0					
-17		SEE S.D.L.			-	110	0	13 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 2.2 F _y = 1.3					
-18					-	115	0	14 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.8 F _y = 1.4					
-19					-	120	0	15 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.3 F _y = 1.3					
-20					-	125	0	16 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	F _x = 1.3 F _y = 1.3					
-21		1083			1.2	137	1/2	17 3/8 DN	1 1/4	-	CSH	S	80V-B	44	20	-	5/8	-	1.4					
-22		1066			1.2	141	1	17 1/2 DN	1/2	-	CSH	S	80V-B	44	19 1/2	-	5/8	-	1.4					
-23		1208			1.4	143	-1/4	13 3/4 DN	-1	-	CSH	S	80V-B	43	16	-	3/8	-	1.6					
-24		1049			1.2	147	-1 3/16	9 3/8 DN	-1 1/16	-	CSH	S	80V-B	37	12	-	5/8	-	1.4					
-25		893			1.0	149	-2 3/8	4 1/2 DN	1	-	CSH	S	80V-B	23	6	-	3/8	-	1.2					
-26		1252			1.4	152	-1 3/8	1 1/2 DN	2 1/4	-	VSH	S	98	17	-	130	3/4	1057	1.6					
-27		979			1.1	158	-3/8	1 3/4 UP	3 3/8	-	VSH	S	98	9	-	100	3/4	1154	1.3					

NOTES		ANALYSIS I.D. CODE		PIPE MATERIAL:		PIPE HANGER SCHEDULE	
①	MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 4° SWING ANGLE FROM VERTICAL.	T/W-MS-01-A-12/5		ASTM A335 P22		MAIN STEAM	
②	VSH VARIABLE SPRING HANGER, CSH CONSTANT SUPPORT HANGER, R RIGID, HYD HYDRAULIC SHROUDER, ANC ANCHOR, GDE GUIDE.					Stearns-Roger	
③	K SPRING SCALE LBS./IN. (FOR VARIABLE SPRING HANGER).					10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
④	STYLE: S SINGLE ROD ASSY, T TRAPEZE ASSY, F FLOOR SUPPORT, D DUAL ROD ASSY.					CHECKED BY: M/M	DATE: 4-1-80
⑤	OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS.					APPROVED BY: fco	DATE: 4/1/80
REFERENCES		P13-142 A		REVISIONS		SHEET Nº 1 OF 2	

[illegible]

FUNCTIONAL REQUIREMENTS													PIPE SUPPORT DESIGN DATA									
ANALYST <i>JRM</i> DATE <i>3-26-80</i>													DESIGNED BY <i>JRM</i> DATE <i>3-26-80</i>									
MARK Nº	HOT TEMP (ºF)	OPERATIONAL (HOT) LOAD (LBS.)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS.)	LOC Nº	DISPLACEMENT COLD → HOT			MIN. REQ. VERT. DIST (FT./IN.)	BASIC SUPPORT TYPE	PIPE SUPPORT SELECTION				K. (LBS./ IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)	STR. DESIGN LOAD (KIPS)	REMARKS	
							X	VERT. Y	Z			STYLE ④	FIG. Nº- TYPE	SIZE	T T (IN.)							
H-MS-6-1	960	1424	6.625	4 1/2	1.6	227	1/16	9/16 UP	1 1/4	-	VSH	S	B-268	11	-	340	7/8	1615	-	1.8	BY SPEC. E-2, SEE DETAIL	
↓ -2	↓	4486	6.625	4 1/2	5.0	245N	1/16	0	3/4	-	R	F	-	-	-	-	-	-	5.5	↓		
H-MS-8-1	960	172	2.375	3 1/2	0.2	335N	-7/16	7/8 UP	2 7/16	-	VSH	S	B-268	3	-	35	1/2	203	-	0.3	BY SPEC. E-2, SEE DETAIL	
↓ -2	↓	329	2.375	3 1/2	0.4	345N	-5/16	1 1/8 UP	1 7/16	-	VSH	S	98	6	-	42	5/8	376	-	0.5	↓	
↓ -3	↓	1367	6.625	4 1/2	1.5	360	0	0	1/2	-	R	F	-	-	-	-	-	-	2.2	↓		
H-MS-10-1	960	85	2.375	3 1/2	N.A.	900	-1 1/16	1/2 UP	2 3/8	-	VSH	S	B-268	1	-	21	1/2	96	-	0.2	BY SPEC. E-2, SEE DETAIL	
↓ -2	↓	76				915	-1 1/16	1/2 UP	2 13/16	-	VSH	S	B-268	1	-	21	1/2	87	-	0.2	↓	
↓ -3	↓	150				927	-7/16	0	2 3/4	-	R	S	-	-	-	1/2	-	-	0.2	↓		
↓ -4	↓	612				935N	-1	0	1 1/4	-	R	F	-	-	-	-	-	-	0.7	↓		

NOTES

- MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 4º SWING ANGLE FROM VERTICAL.
- VSH VARIABLE SPRING HANGER, CSH CONSTANT SUPPORT HANGER, R RIGID, HYD HYDRAULIC SHOCKER, ANC ANCHOR, GDE GUIDE.
- K SPRING SCALE LBS./IN. (FOR VARIABLE SPRING HANGER).
- STYLE: S SINGLE ROD ASSY, T TRAPEZE ASSY, F FLOOR SUPPORT, D DUAL ROD ASSY.
- OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS.

ANALYSIS I.D. CODE

T/W-MS-1-A-12/5 (MS-6, MS-8)

T/W-ST-13-A-1/1 (MS-10)

PIPE MATERIAL:

ASTM A335 P22

REFERENCES

P13-1 (MS-6, MS-8) A

P13-8 (MS-10) A

PIPE HANGER SCHEDULE

MAIN STEAM

Stearns-Roger

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

CHECKED BY: *AKM* DATE: *4-1-80* JOB Nº: *C-21700*

APPROVED BY: */s/* DATE: *4/1/80*

SCHEDULE Nº: *MS-6* SHEET Nº: *1* OF *1*

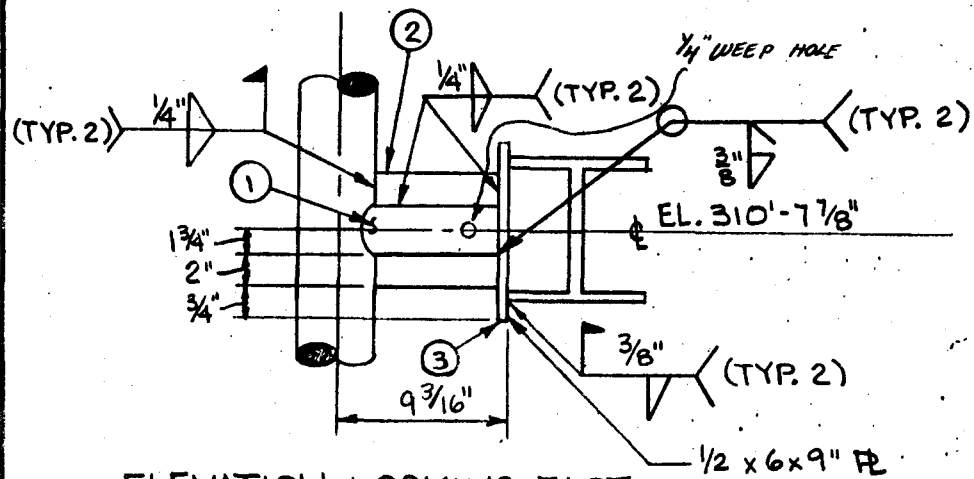
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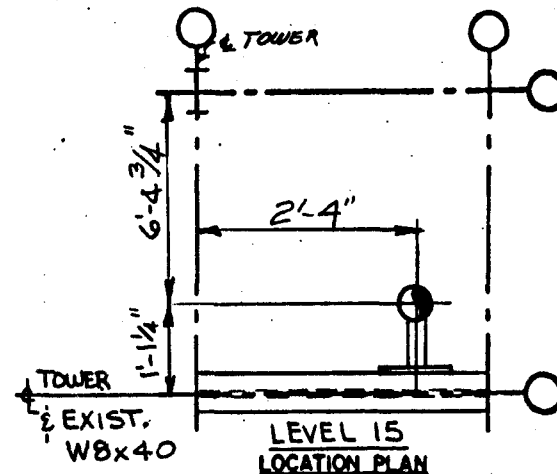
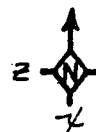
FUNCTIONAL REQUIREMENTS											PIPE SUPPORT DESIGN DATA										
ANALYST <i>J.H. May</i> DATE <i>2-19-80</i>											DESIGNED BY <i>J.H. May</i> DATE <i>2-20-80</i>										
MARK N°	HOT TEMP (°F)	OPERATIONAL (HOT) LOAD (LBS)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS.)	LOC N°	DISPLACEMENT COLD → HOT			MIN. REQ'D VERT. DIST (FT./IN.)	BASIC SUPPORT TYPE	PIPE SUPPORT SELECTION				K. (LBS./ IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)	STR. DESIGN LOAD (KIPS)	REMARKS
							X	Y	Z			STYLE (S)	FIG. N° -TYPE	SIZE	T (IN)						
H-VT-1-1	960	1250	4.50	4	1.7	19N	1/16	3/8 DN	1/16	4'-0"	VSH	S	B2	10	-	520	3/4	1078	80	1.9	BY OTHERS (ROCKETDYNE)
-2		SEE S.D.L.				20	0	3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.6	BY SPEC. E-2 SEE DETAIL
-3						22	0	1 1/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.3	
-4						24	0	2 3/4 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.2	
-5						26	0	3 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.3	
-6						28	0	4 1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.6	
-7		981			1.3	35F	-1/16	5 1/2 DN	0	-	CSH	S	80-V	26	6 1/2	-	5/8	-	-	1.5	
-8		SEE S.D.L.				37	0	5 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.8	
-9						39	0	6 3/4 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.9	
-10						41	0	7 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.7	
-11						43	0	8 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.9	
-12		1152			1.5	50F	1/8	9 1/2 DN	-1/16	-	CSH	S	81-H	33	11	-	5/8	-	-	1.7	
-13		SEE S.D.L.				52	0	9 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.0	
-14						54	0	10 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.0	
-15						56	0	12 1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.0	
-16						58	0	13 1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	1.0	
-17		297			.4	67	1/16	13 DN	1/16	-	CSH	S	80V-C	21	15	-	1/2	-	-	.5	BY SPEC E-2 SEE DETAIL N/A/INTENDED FOR 2500 PSI
-18		206			.3	72	13/16	10 3/8 DN	3/16	-	CSH	S	80V-C	16	12 1/2	-	1/2	-	-	.4	
-19		238			.3	77	-7/16	8 DN	3/16	-	CSH	S	80V-C	16	10	-	1/2	-	-	.4	
-20		436			.6	85F	-5/16	6 3/4 DN	2 1/2	-	CSH	S	81H-C	18	8 1/2	-	1/2	-	-	.7	
-21		296			.4	92	-7/16	8 1/2 DN	2 1/2	-	CSH	S	80V-C	17	10	-	1/2	-	-	.5	
-22		193			.3	102	-1 1/16	5 1/2 DN	3 3/8	-	CSH	S	80V-C	12	7 1/2	-	1/2	-	-	.4	BY SPEC E-2 SEE DETAIL
-23		313			.4	104	-3/8	5 1/2 DN	4 1/8	-	CSH	S	80V-C	14	6 1/2	-	1/2	-	-	.5	
-24		623			.8	112	-3/8	5 1/2 DN	2 3/16	-	VSH	S	B2	7	-	224	5/8	553	-	.9	
-25		101			.2	126	-1/4	7/16 DN	3/4	-	VSH	S	B-268	1	-	21	1/2	92	-	.2	BY SPEC E-2 SEE DETAIL MUST ALSO ACCOMMODATE 7/16" DN
-26		572	2.375	3 1/2	.7	832	-1/2	0	2 3/16	-	R	S	-	-	-	1/2	-	-	-	.7	BY SPEC E-2 SEE DETAIL
H-VT-11-1		1338	10.75	5	2.1	134	-1/4	1/4 DN	7/16	-	VSH	S	B2	10	-	520	3/4	1208	-	2.3	
NOTES											PIPE HANGER SCHEDULE										
① MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 40° SWING ANGLE FROM VERTICAL.											RECEIVER FLASH TANK VENT										
② VSH VARIABLE SPRING HANGER, CSH CONSTANT SUPPORT HANGER, R RIGID, HYD HYDRAULIC SHOCKER, ANC ANCHOR, GDE GUIDE.											Stearns-Roger										
③ K SPRING SCALE LBS./IN. (FOR VARIABLE SPRING HANGER).											10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA										
④ STYLE: S SINGLE ROD ASSY, T TRAPEZE ASSY, F FLOOR SUPPORT, B DUAL ROD ASSY.											CHECKED BY: <i>WLM</i> DATE: <i>4-1-80</i> JOB N°										
⑤ OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS.											APPROVED BY: <i>fg</i> DATE: <i>4-1-80</i> C-21700										
ANALYSIS I.D. CODE											PIPE MATERIAL:										
T-VT-1-A-4/B-2											ASTM A335 P22 EXCEPT PT. 134 ASTM A335 PH										
W-VT-1-A-5																					
T/W-ST-13-A-1/1 (H-VT-1-26)																					
											3 ALL DETAILS CONFORM TO <i>ASME B31.1</i>										
											2 FOR <i>ASME B31.1</i>										
REFERENCES											FOR <i>BID</i>										
P13-6											N° REVISIONS DATE BY SCH DWG ISO. LS.										
											SCHEDULE N° VT-1 SHEET N° 1 OF 2										

FUNCTIONAL REQUIREMENTS														PIPE SUPPORT DESIGN DATA										REMARKS
MARK Nº	HOT TEMP (°F)	OPERATIONAL (HOT) LOAD (LBS)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS.)	LOC Nº	DISPLACEMENT COLD-HOT			MIN. REQ. VERT. DIST. (FT./IN.)	BASIC SUPPORT TYPE	PIPE SUPPORT SELECTION				K. (LBS./ IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)	STR. DESIGN LOAD (KIPS.)				
							X	VERT. Y	Z			STYLE (4)	FIG. Nº- TYPE	SIZE	T T (IN.)									
H-VT-11-2	960	1823	10.75	5	2.9	145F	-1/4	3/16 UP	3/8	-	VSH	S	B-268	12	-	450	1	2076	-	3.2	BY SPEC. E2 SEE DETAIL			
H-VT-12-1		110	2.875	3 1/2	.2	202	5/8	6 1/2 DN	2	-	CSH	S	B1H	9	7 1/2	-	1/2	-	-	.2				
-2		127			.2	204	1/16	1 1/2 DN	1	-	VSH	F	98	2	-	13	-	108	-	.2				
-3		322			.3	212	1/16	0	-1 1/4	-	R	F	-	-	-	-	-	-	-	.5				
-4		SEE S.D.L.			.2	215	0	0	-1 1/4	-	R+GDE	F	-	-	-	-	-	-	-	F _x = 1.0 F _y = .5				
-5		124			.2	217	0	0	-2 1/2	-	R	F	-	-	-	-	-	-	-	.3				
-6		71			.2	220	0	0	-2 1/2	-	R+GDE	F	-	-	-	-	-	-	-	F _x = 1.0 F _y = .5				
-7		99			.1	225M	1/16	0	-2 3/4	-	R	S	-	-	-	-	1/2	-	-	.3				
-8		271			.4	232	-2 1/2	1 DN	-1 1/2	-	VSH	S	98	5	-	31	1/2	240	-	.5	BY SPEC. E2 SEE DETAIL MUST ALSO ACCOMMODATE 1 1/2" DN			
-9		110			.2	235F	-1 1/4	0	-2 1/4	-	R	S	-	-	-	-	1/2	-	-	.2	BY SPEC. E2 SEE DETAIL			
-10		172			.3	242	-1 1/2	0	-1	-	R	F	-	-	-	-	-	-	-	.3				
-11		88			.2	244	-1/2	0	1/4	-	R	S	-	-	-	-	1/2	-	-	.2				
-12		SEE S.D.L.			-	247	0	0	0	-	ANC	-	-	-	-	-	-	-	-	LATER	BY OTHERS (PIPE FABRICATOR)			
-13		137			.2	249	-3/16	0	-3/16	-	R	S	-	-	-	-	1/2	-	-	.2	BY SPEC. E2 SEE DETAIL			
-14		138			.2	255M	-3/16	0	-1 3/16	-	R	S	-	-	-	-	1/2	-	-	.2				
-15		104			.2	262	-5/8	1/2 DN	-1 1/4	4-0	VSH	S	B-268	1	-	21	1/2	94	30	.3	BY OTHERS (SCE) MUST ALSO ACCOMMODATE 3/4" DN			
-16		94			.2	265	-3/16	5/8 DN	-3/4		VSH	S	B-268	1	-	21	1/2	81	30	.3	BY OTHERS (SCE) MUST ALSO ACCOMMODATE 3/4" DN			
-17		188			.3	277	-1/16	1/16 DN	-1/16		VSH	S	82	3	-	70	1/2	183	30	.4	BY OTHERS (SCE)			
-18	660	1144	6.625		1.6	286	-5/16	1/16 DN	3/16		VSH	S	82	10	-	520	3/4	1111	70	1.8				
-19		219			.3	290M	-3/8	1/8 DN	-1/16		VSH	F	82	4	-	94	-	207	30	.4				

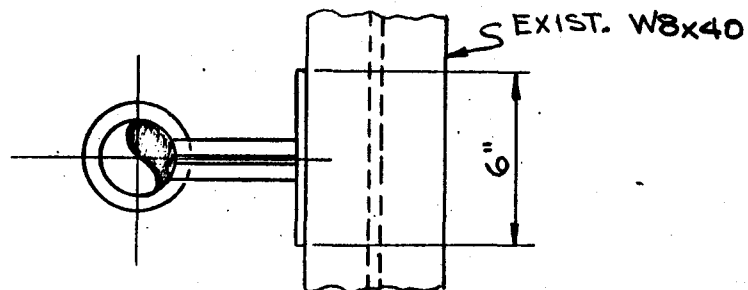
NOTES		ANALYSIS I.D. CODE		PIPE MATERIAL:		PIPE HANGER SCHEDULE	
①	MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 40° SWING ANGLE FROM VERTICAL.	T-VT-1-A-4/B-2		ASTM A335 P22 EXCEPT PT. 145F	ASTM A335 P11	RECEIVER FLASH TANK VENT	
②	VSH VARIABLE SPRING HANGER, CSH CONSTANT SUPPORT HANGER, R RIGID, HYD HYDRAULIC SHOCKER, ANC ANCHOR, GDE GUIDE.	W-VT-1-A-5				Stearns-Roger	
③	K SPRING SCALE LBS./IN. (FOR VARIABLE SPRING HANGER).					10 Mde SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
④	STYLE: S SINGLE ROD ASSY, T TRAPEZE ASSY, F FLOOR SUPPORT, D DUAL ROD ASSY.					CHECKED BY: <i>Ally</i>	DATE: 9-1-80
⑤	OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS.					APPROVED BY: <i>160</i>	DATE: 9-1-80
		REFERENCES				SCHEDULE Nº: VT-1	JOB Nº: C-21700
		P13-6		FOR BID			SHEET Nº 2 OF 2
				REVISIONS	DATE BY SCH DWG ISO. LS.		



ELEVATION LOOKING EAST



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X: 0"
- Δ Z: 0"



PLAN VIEW

Δ REVISED N-S PIPE LOCATION

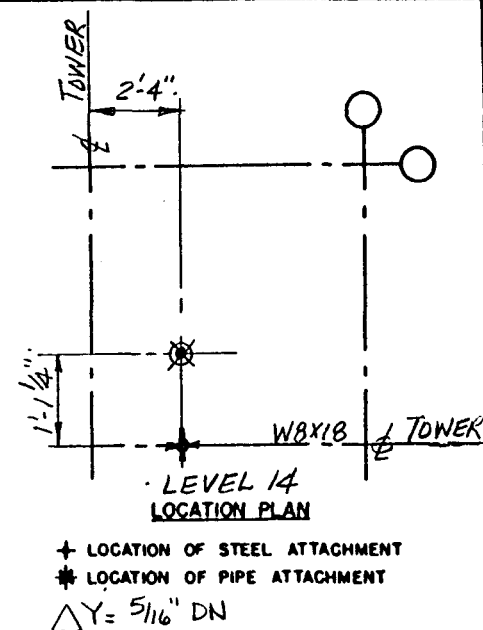
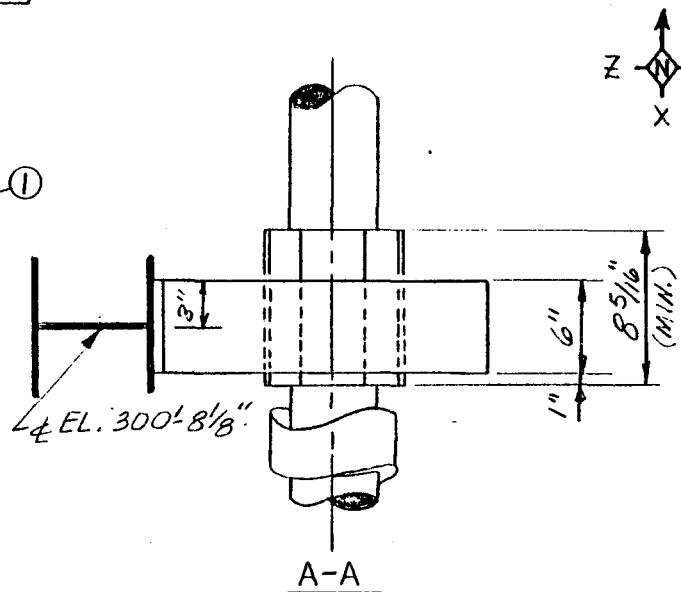
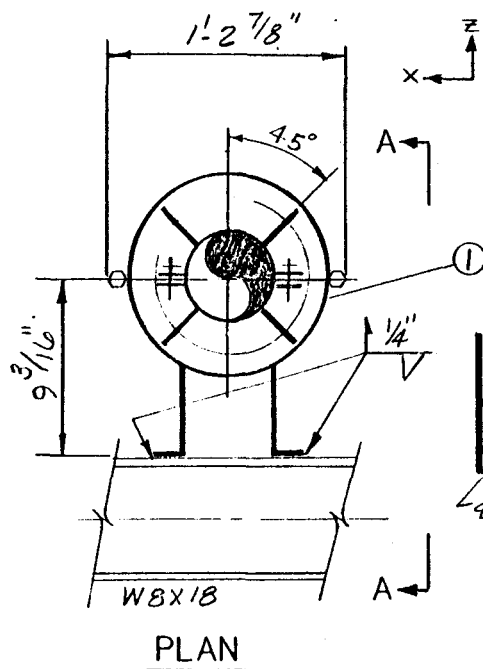
NOTES:

PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.1K$, $F_y = 6.5K$
 PIPE SIZE: 4.5" O.D. $F_z = 0.1K$, $M_x = .1'K$
 PIPE INSULATION: 2 1/2" $M_y = .4'K$, $M_z = .2'K$
 PIPE MATERIAL: ASTM A106 GR. B

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-2	P.1
D		STRUCTURAL	S32-5	3
C		ELECTRICAL		
B				
A				

ENGINEERING RECORD				5		1	1	3"X5S PIPE (BY FAB.)	
DESIGNED	7/1/80	CHECKED	7/1/80	4		ITEM REQD	COMPONENT DESCRIPTION		REMARKS
DATE	5/9/80	DATE	7/1/80	3		SCALE:	Stearns-Roger		
REVIEWED	7/1/80	APPROVED		2		NONE			11165/8
DATE	5-19-80	DATE							
PROJECT									
DATE									
ANALYSIS ID. CODE	T-11165/8					10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700				LINE NO. H-FW-2-11165/8		MARK NO H-FW-2-1			

VOL. P60-1



VOL. PGD-1

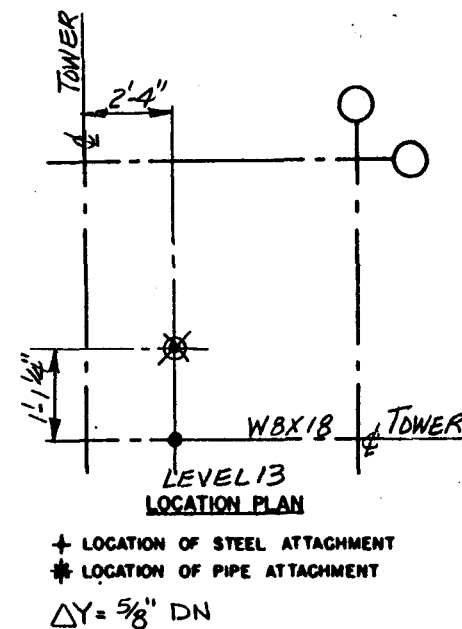
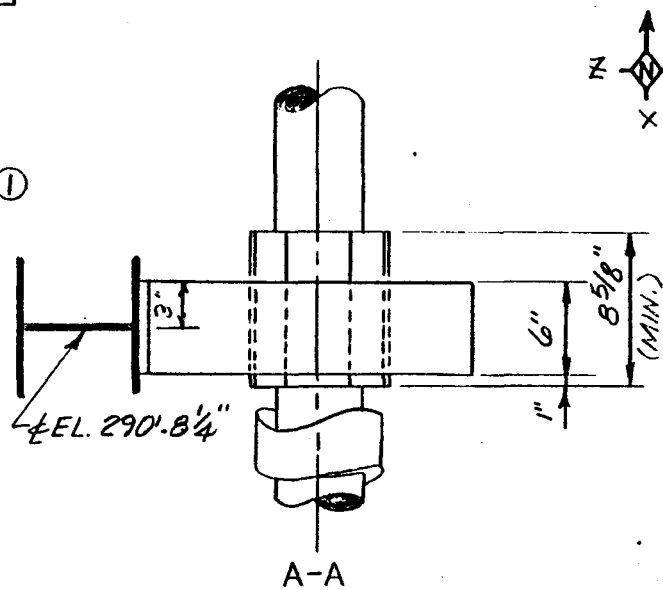
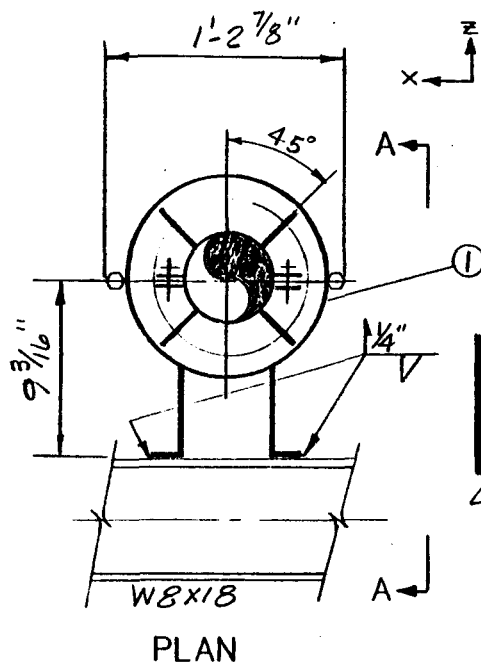
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-2
D	STRUCTURAL	S32-5
C	ELECTRICAL	0
B		
A		

NOTES:

PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = .3K$ $F_z = .2K$
 PIPE SIZE: 1.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR B

ENGINEERING RECORD				5
DESIGNED	ALAT	CHECKED	J.B.	4
DATE	4-21-80	DATE	5-12-80	3
REVIEWED	J.B.	APPROVED		2
DATE	5-29-80	DATE		1
PROJECT	BDR			
DATE	6-12-80			
ANALYSIS ID. CODE	T/W-FW-01-A-2/E			

14			
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5			
4			
3			
1	/	PIPE ALIGNMENT GUIDE SIM. FIG. 256	
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE: NONE	Stearns-Roger INCORPORATED		11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE N° 4"FW-2-116A	MARK N° H-FW-2-2	



VOL. P60-1

14			
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3			
1	/	PIPE ALIGNMENT GUIDE SIM-FIG. 256	

VENDOR ENG. REV.		REFERENCE DRAWINGS		RE
E		PIPING	P9-2	P4
D		STRUCTURAL	S32-5	C
C		ELECTRICAL		
B				
A				

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: $F_v = 1.2K$ $F_h = 2K$

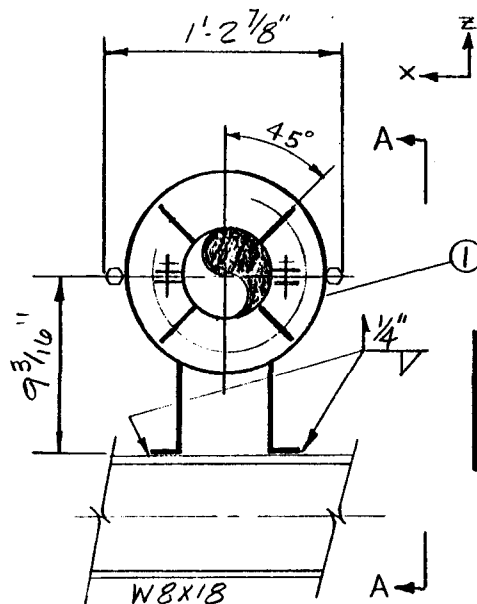
PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 2 1/2"

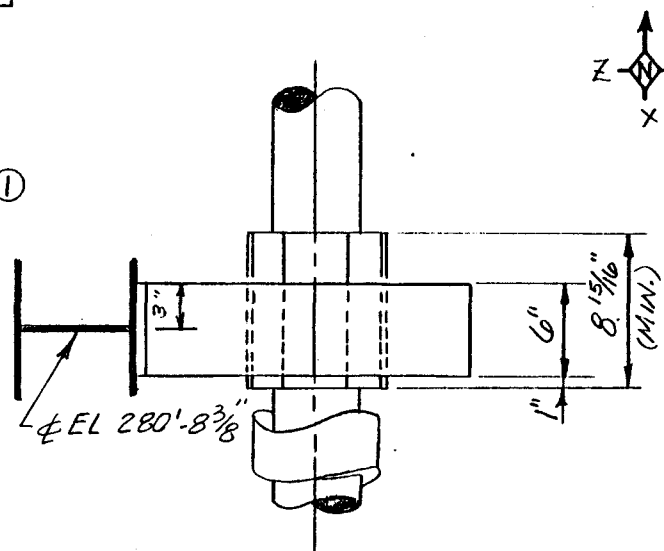
PIPE MATERIAL: ²⁷² A57M A106 GR. B

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-21-80	DATE	
REVIEWED	JYH	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS	ID. CODE	T/W-FW-DI-A-2/2	

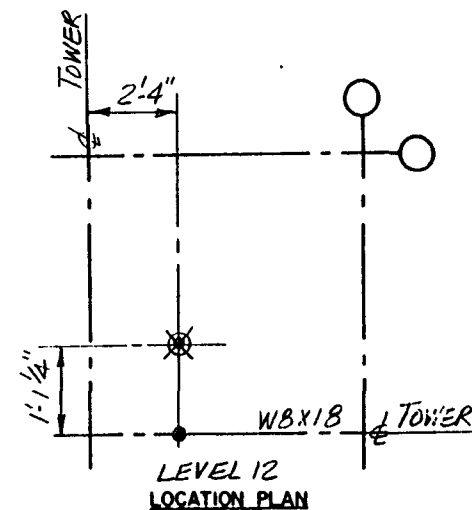
5					
4		ITEM REQD	COMPONENT DESCRIPTION		REMARKS
3		SCALE:	Stearns-Roger INCORPORATED		11165/8
2		NONE			
1					
REVISIONS		10 MwE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT N° C-21700			LINE N° 4"FW-2-MBA	MARK N° 4-FW-2-3	



PLAN



A-A



LEVEL 12
LOCATION PLAN
+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 1 \frac{5}{16} \text{ DN}$

VOL. P60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-2	P4
D		STRUCTURAL	S32-5	O
C		ELECTRICAL		
B				
A				

14		
13		
12		
11		
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8		
7		
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5		
4		
3		
2		
1		
PIPE ALIGNMENT GUIDE SIM. FIG. 256		

NOTES.

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: $F_x = .4k, F_z = .4k$

PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 2 1/2"

PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	
DATE	4-21-80	DATE	
REVIEWED	R.P.Y.	APPROVED	
DATE	4-24-80	DATE	
PROJECT	BDR		J.P.Y.
DATE	6-12-80		6-12-80

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1

REVISIONS

ITEM REQD

SCALE:

NONE

COMPONENT DESCRIPTION

Stearns-Roger

11165/8

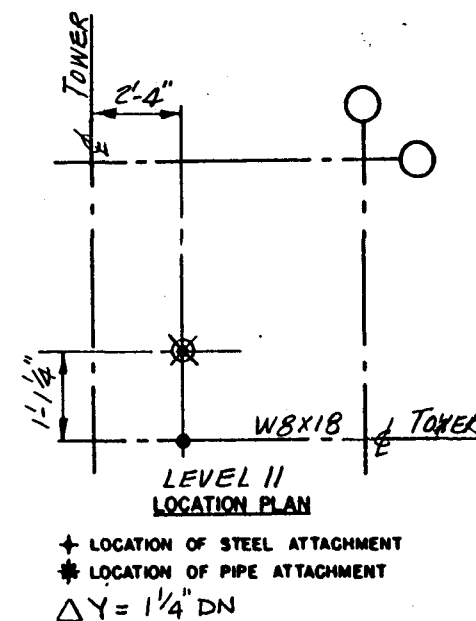
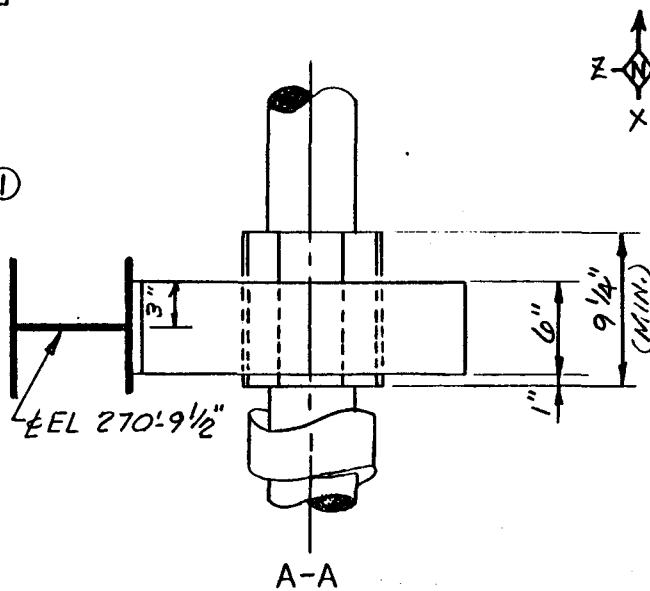
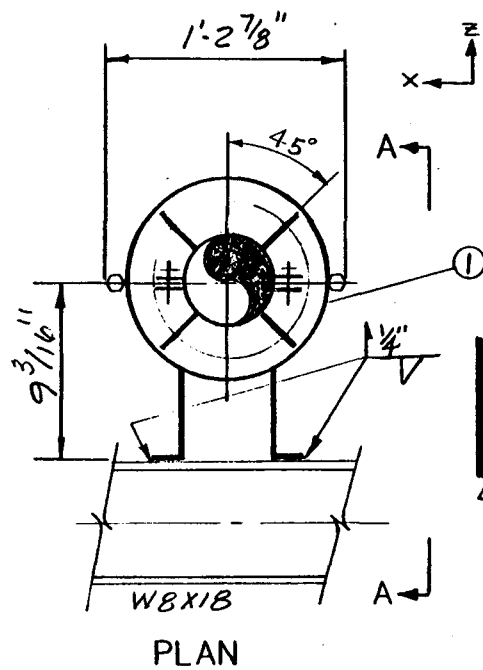
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE T/W-FW-01-A-2/2

PROJECT NO C-21700

LINE NO 4"FW-2-11BA

MARK NO H-FW-2-4



VOL. PG0-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-2	P4
D	STRUCTURAL S32-4	O
C	ELECTRICAL	
B		
A		

14		
13		
12		
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10		
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8		
7		
6		
5		
4		
3		
2		
1		

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: $F_x = 1.4k$ $F_z = .8k$

PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 2 1/2"

PIPE MATERIAL: ASTM A106 GR B

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	JHY
DATE	4-21-80	DATE	5-2-80
REVIEWED	JBY	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		
DATE	6-12-80		

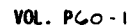
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4
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REVISIONS

ITEM REQD	
SCALE:	NONE

PIPE ALIGNMENT GUIDE SIM.FIG. 256

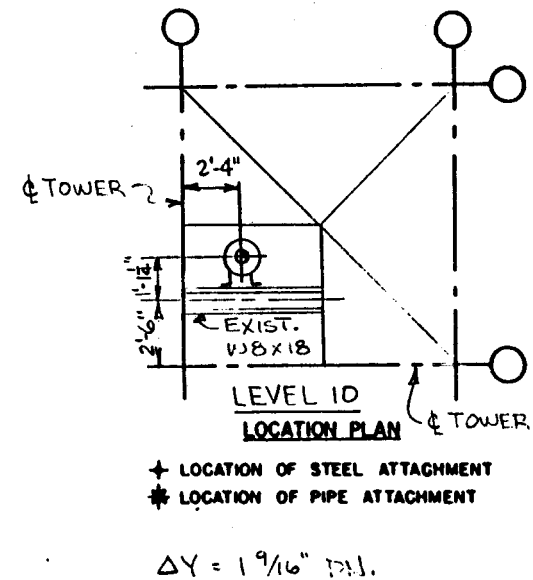
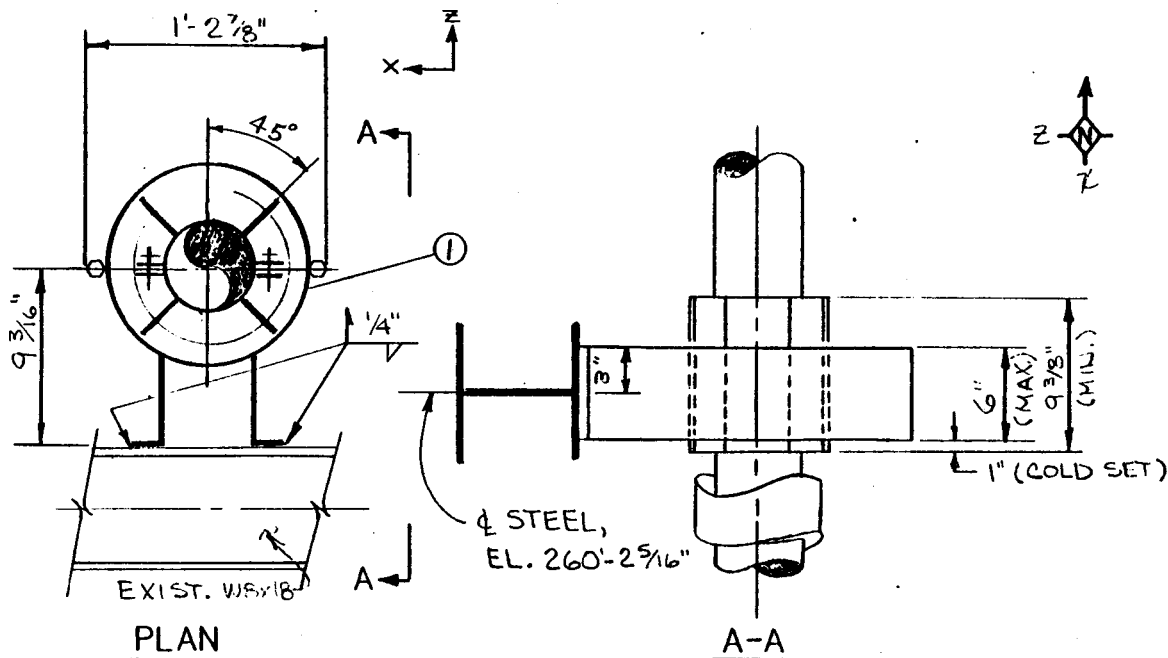
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 4"FW-2-NBA
MARK NO	H-FW-2-5	



VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.	7	2	1" DIA. F. S. CLEVIS W/PIN FIG. 299	
E		PIPING	19-1	15	6	1	1" DIA. WELDING LUG C=7 1/2" H. S. 53	BY FAB.
D		STRUCTURAL	S32-1	0	5	1	1" DIA. R. H. THD. ROD FIG. 140	
C		ELECTRICAL			4	1	SPRING	SEE DATA
B					3	1	1" DIA. R. H. THD. ROD FIG. 140	
A					2	4	1" DIA. R. H. HEX NUT	

NOTES:
PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: 25 K.
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 2 1/2"
PIPE MATERIAL: 304L STAINLESS STEEL

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA



VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P13-4	A
D		STRUCTURAL	S32-4	O
C		ELECTRICAL		
B				
A				

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12		
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PIPE ALIGNMENT GUIDE SIM. FIG. 256		
ITEM NO.	COMPONENT DESCRIPTION	REMARKS
1	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO
MARK NO	H-FW-2-7	

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: 1.0 K, F.O.S.K

PIPE SIZE: 1.0 O.D.

PIPE INSULATION: 2 1/2"

PIPE MATERIAL: ASTM A106 GR. B.

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
DATE	11/21/80	DATE	2/19/80
REVIEWED	DATE	APPROVED	DATE
DATE	4/30/80	DATE	
PROJECT	DATE		
BDR	6-12-80		
ANALYSIS ID. CODE			
T	A-012		

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REVISIONS

ITEM RECD

SCALE:

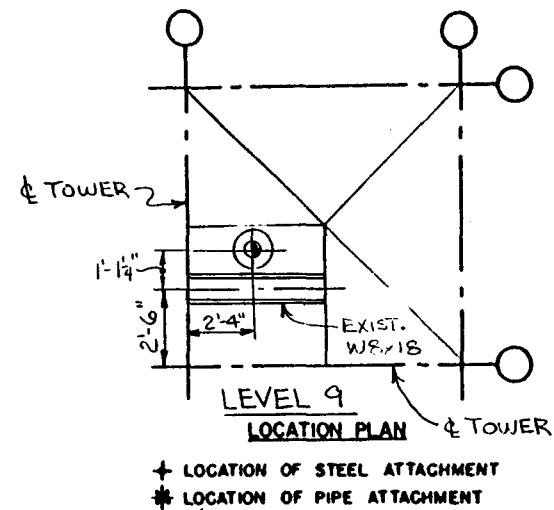
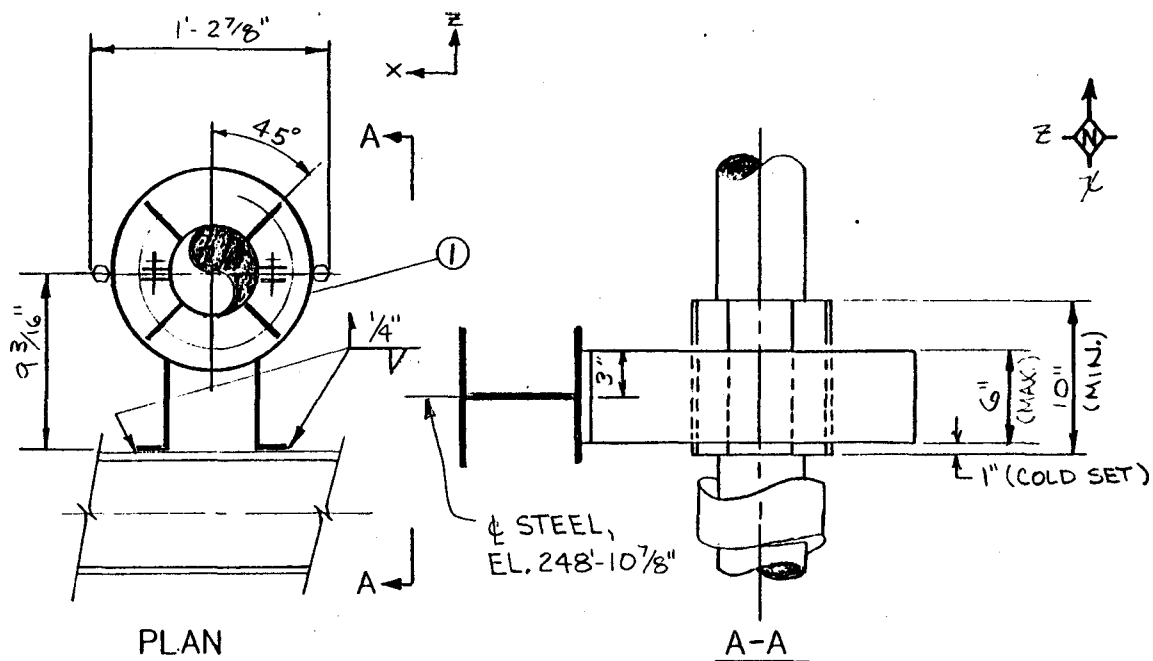
NONE

COMPONENT DESCRIPTION

Stearns-Roger

REMARKS

11165/8



$$\Delta Y = 1 \frac{15}{16}'' \text{ DN.}$$

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P13-4	A
D		STRUCTURAL	S32-4	C
C		ELECTRICAL		
B				
A				

14		
13		
12		
11		
10		
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8		
7		
6		
5		
4		
3		
1	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: $F_x = 0,6 \text{ K}$, $F_y = 0,6 \text{ K}$

PIPE SIZE: 4.5" O.D.

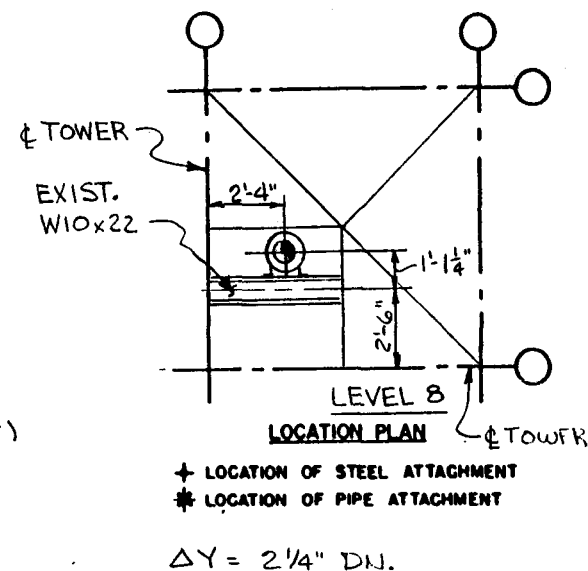
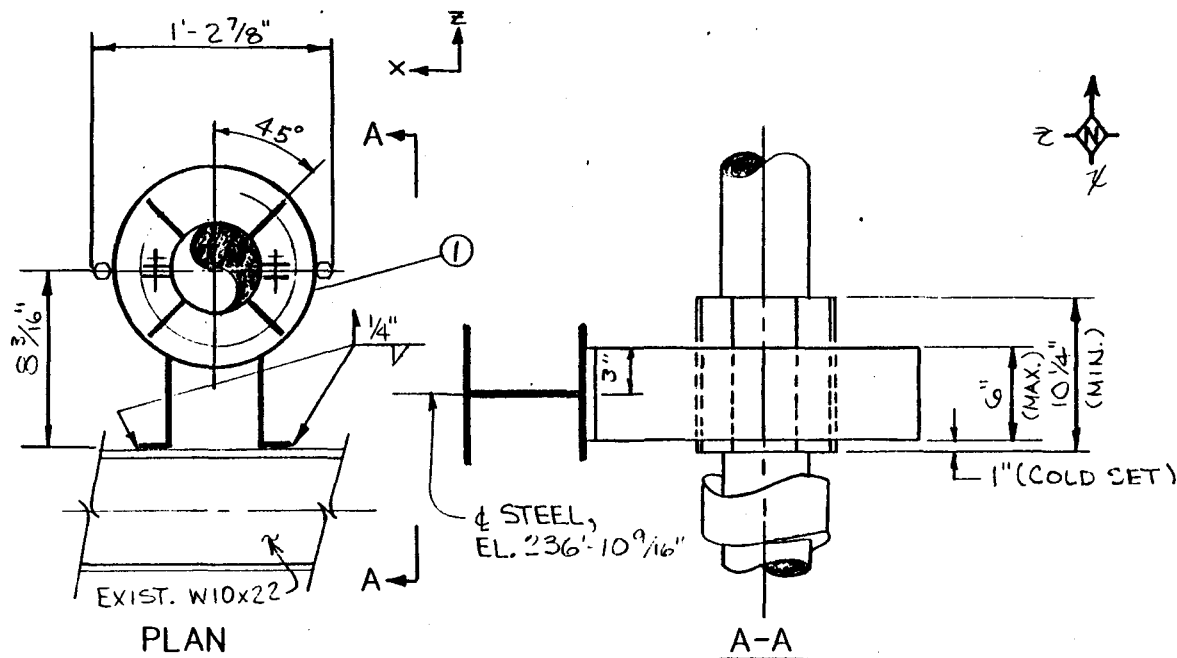
PIPE INSULATION: 2 1/2"

PIPE MATERIAL: ASTM A106 GR.B

ENGINEERING RECORD

DESIGNED	7/27	CHECKED	7/27
DATE	4/21/80	DATE	7/27/80
REVIEWED	7/27	APPROVED	
DATE	4-30-80	DATE	
PROJECT	BDR		100% Y.
DATE	6-12-80		6-12-80
ANALYSIS	ID. CODE	T/W-EW-01-A-2/2	

5				
4	ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
3	SCALE:		Stearns-Roger REGISTRATION	11165/8
2	NONE			
1				
REVISIONS		10 MwE SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT N° C-21700		LINE N° 4 th FW-?-MFA		MARK N° H-FW-?-8



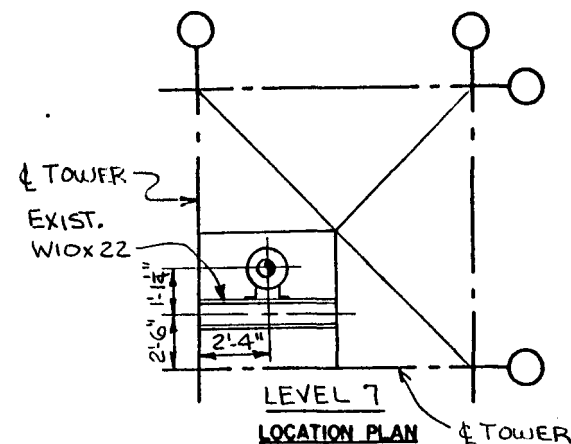
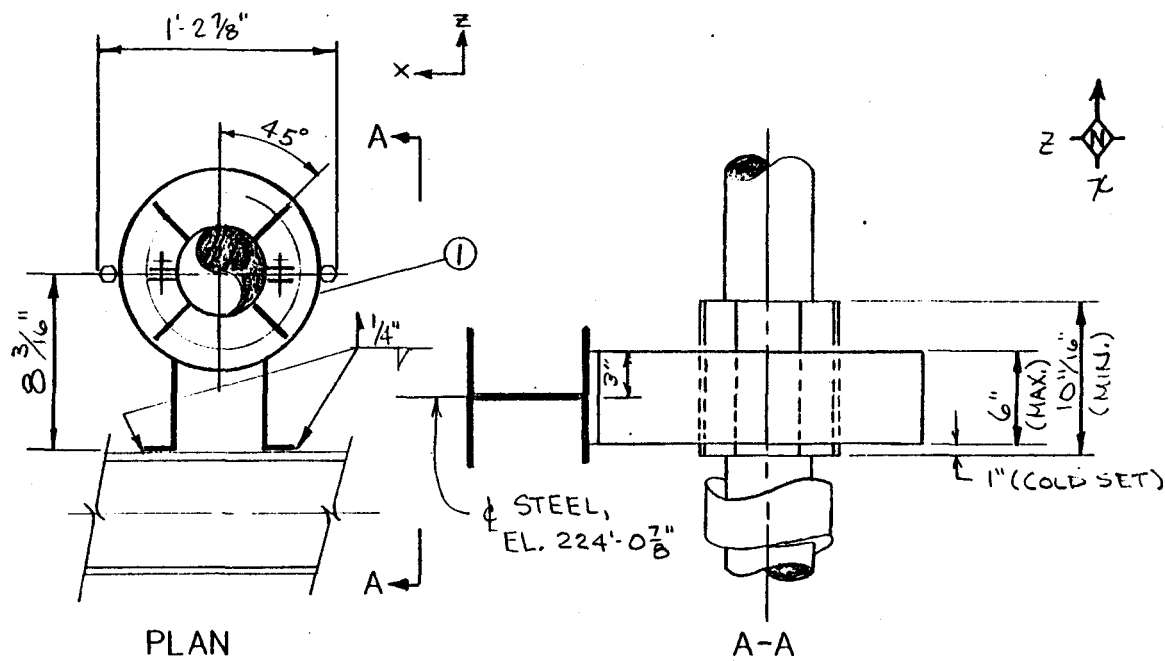
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P13-4	A
D		STRUCTURAL	S32-4	O
C		ELECTRICAL		
B				
A				

14			
13			
12			
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7			
6			
5			
4			
3			
1			

NOTES:

PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: $F_x = 1.0\text{K}, F_z = 1.1\text{K}$
PIPE SIZE: $4.5" \text{ O.D.}$
PIPE INSULATION: $2\frac{1}{2}"$
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD				5				
DESIGNED	J. P. J.	CHECKED	J. P. J.	4	ITEM REQD	COMPONENT DESCRIPTION		REMARKS
DATE	2/12/80	DATE	2/12/80	3	SCALE:	Stearns-Roger		
REVIEWED	J. P. J.	APPROVED		2	NONE	INCORPORATED		11165/B
DATE		DATE		1				
PROJECT	BDR		J. P. J.	REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
DATE	6-12-80		6-12-80					
ANALYSIS ID. CODE		T/W-EW-01-A-2/2		PROJECT NO C-21700		LINE NO	4"-EW-2-MFA	MARK NO H-FW-2-9



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT

$$\Delta Y = 2 \frac{11}{16} \text{ DN}$$

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	PI3-4
D	STRUCTURAL	S32-4
C	ELECTRICAL	
B		
A		

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2		
1	PIPE ALIGNMENT GUIDE SIM. FIG. 256	

NOTES.

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: $F_x = 1.4K$, $F_z = 1.5K$

PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 2 1/2"

PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD

DESIGNED	9/12/80	CHECKED	9/12/80
DATE	4/12/80	DATE	4/12/80
REVIEWED	8/3/80	APPROVED	
DATE	8/3/80	DATE	
PROJECT	BDR	PROJECT	H. P. Y.
DATE	6-12-80	DATE	6-12-80

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REVISIONS

ITEM REQD

SCALE:

NONE

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700

LINE NO 4-FW-2-MPA

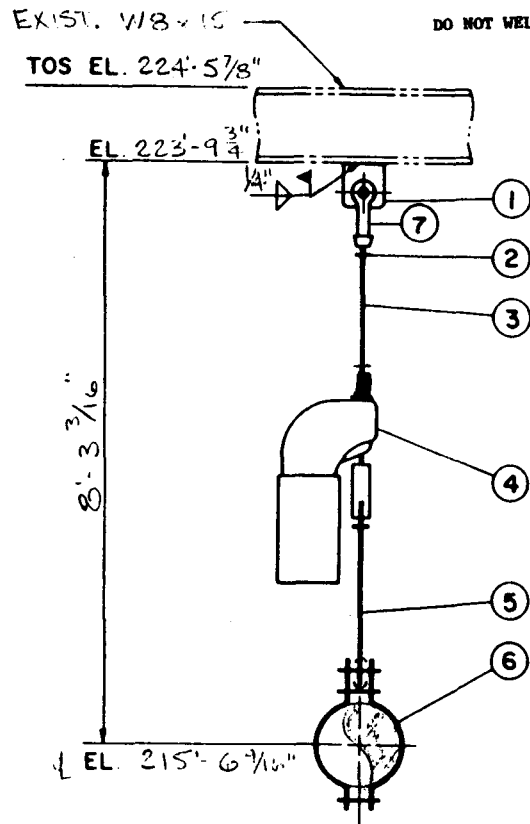
MARK NO H-FW-2-10

COMPONENT DESCRIPTION

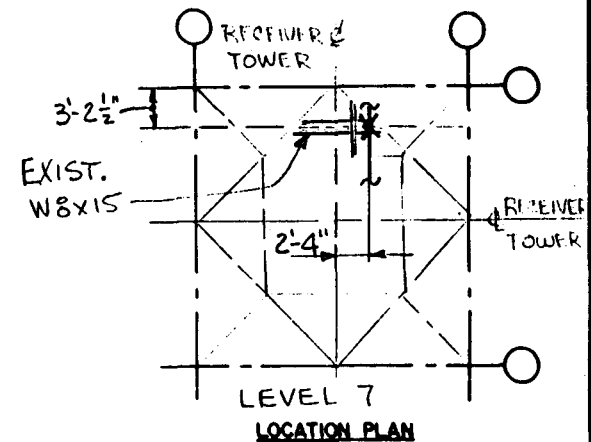
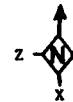
Stearns-Roger

11165/8

REMARKS



ELEV. LOOKING NORTH



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = -\frac{7}{16}$ "
 $\Delta z = \frac{1}{16}$ "

VOL. P 60-1

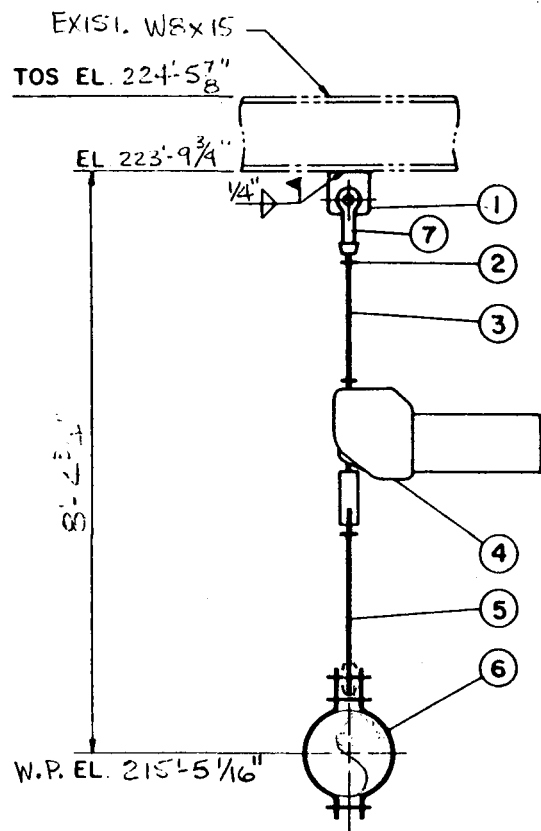
OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. NO.	TYPE	SIZE	13			
80V	B	11	12			
HOT LOAD	288 lb.	11				
COLD LOAD	N.A.	10				
VERT. TRAVEL C. TO H.	-34" (14)	9				
T.T. CONST. SUPPORT	4"	8				
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7	2	1/2" DIA. F.S. CLEVIS W/PIN FIG. 299	
E	PIPING	FW-2	6	1	1/2" PIPE CLAMP FIG. 295	
D	STRUCTURAL	S32-4	5	1	1/2" DIA. R. H. THD. W. E. ROD FIG. 278	
C	ELECTRICAL		4	1	SPRING SEE DATA	
B			3	1	1/2" DIA. R. H. THD. ROD FIG. 140	
A			2	3	1/2" DIA. R. H. HEX NUT	
			1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ENGINEERING RECORD			5			
DESIGNED	DATE	CHECKED	DATE	ITEM	RECD	COMPONENT DESCRIPTION
	3-25-80	FW-2	3-27-80	3		SCALE: NONE
REVIEWED	DATE	APPROVED	DATE	2		Stearns-Roger
	3-9-80		3-28-80	1		11165/8
PROJECT	DATE			REVISIONS		
ANALYSIS ID. CODE	T/W-FW-01-F-2/1			PROJECT NO	C-21700	LINE NO 4-FW-2-HBA
						MARK NO H-FW-2-11

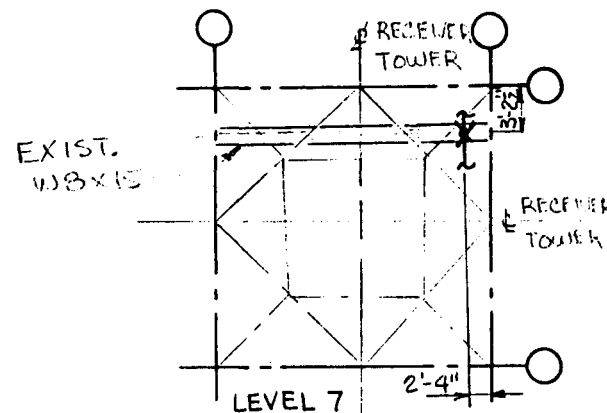
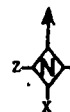
NOTES

PIPE TEMPERATURE: 410°F
STRUCTURAL DESIGN LOAD: 2.41
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 2 1/2"
PIPE MATERIAL: 304L STAINLESS STEEL

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta x = -3/4"$ $\Delta z = -3/16"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA				14		
FIG. NO.	TYPE	SIZE		13		
81H	A	7		12		
HOT LOAD		292 lb.		11		
COLD LOAD		N.A.		10		
VERT. TRAVEL C. TO H.		15 1/2" (A)		9		
T.T. CONST. SUPPORT		2 in.		8		
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.				
E	PIPING	P9-2	P3	6	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
D	STRUCTURAL	S32-4	O	5	1	1/2" PIPE CLAMP FIG. 295
C	ELECTRICAL			4	1	1/2" DIA. R. H. THD. W. E. ROD FIG. 278
B				3	1	SPRING SEE DATA
A				2	3	1/2" DIA. R. H. THD. ROD FIG. 140
				1	1	1/2" DIA. R. H. HEX NUT
				1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55
ENGINEERING RECORD				5		
DESIGNED		CHECKED	HER	4		ITEM REQD
DATE	2/24/80	DATE	3/27/80	3		COMPONENT DESCRIPTION
REVIEWED	ATW	APPROVED	ATW	2		REMARKS
DATE	3-9-80	DATE	3-27-80	1		
PROJECT				1		
DATE						
ANALYSIS ID. CODE				REVISIONS		
1/WI-1000-A-2/2				10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700				LINE NO. 1" DIA. 1000 LPA		
				MARK NO. H-FW-2-12		

NOTES

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: 0.4

PIPE SIZE: 4.5" DIA.

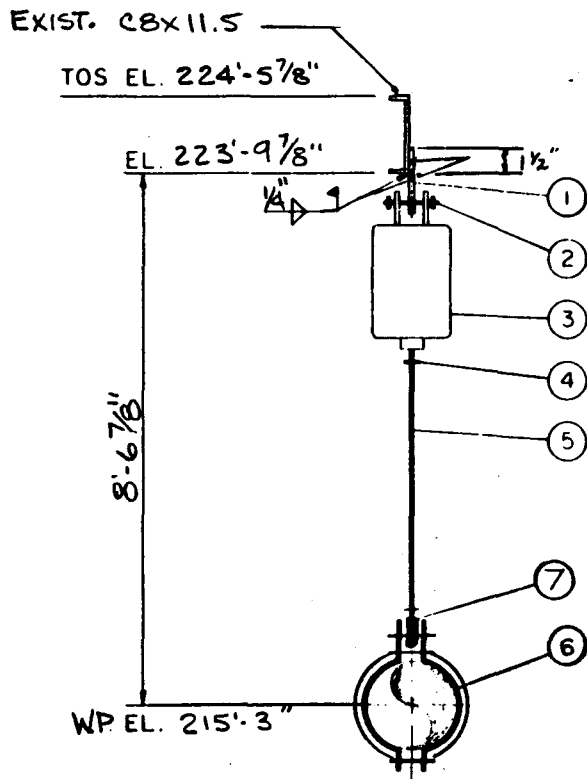
PIPE INSULATION: 1"

PIPE MATERIAL: A312 304 SS

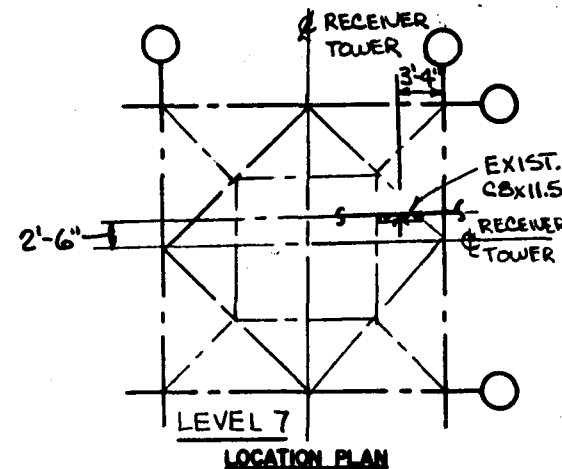
Stearns-Roger

11165/8

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -1/2"$
 $\Delta z = -3/8"$

VOL. PG0-1

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
98	C	4	12		
HOT LOAD		222 lb.	11		
COLD LOAD		197 lb.	10		
VERT. TRAVEL C. TO H.		1" T. I.	9		
T. Y. CONST. SUPPORT		N.A.	8		
REFERENCE DRAWINGS		REV.	7	1	1/2" DIA. WELDLESS EYENUT FIG. 290
PIPING		P ₂	6	1	1/2" PIPE CLAMP FIG. 295
STRUCTURAL	32-4	0	5	1	1/2" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	2	1/2" DIA. R. H. HEX NUT
			3	1	SPRING
			2	1	1/2" DIA. PIN W/COTTER PIN FIG. 291
			1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55
RD	5		1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55

VENDOR ENG. REV.

REFERENCE DRAWINGS

REV.

ITEM NO.	COMPONENT DESCRIPTION	REMARKS
1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	221/5
2	1/2" DIA. PIN W/ COTTER PIN FIG. 291	
3	SPRING	SEE DATA
4	1/2" DIA. R. H. HEX NUT	
5	1/2" DIA. R. H. THD. ROD FIG. 140	
6	1/2" PIPE CLAMP FIG. 295	
7	1/2" DIA. WELDLESS EYENUT FIG. 290	

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE	APPROVED	DATE
REVIEWED	DATE	APPROVED	DATE	PROJECT	DATE
ANALYSIS ID. CODE	PROJECT NO. C-21700				

ITEM NO.	COMPONENT DESCRIPTION	REMARKS
1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	221/5
2	1/2" DIA. PIN W/ COTTER PIN FIG. 291	
3	SPRING	SEE DATA
4	1/2" DIA. R. H. HEX NUT	
5	1/2" DIA. R. H. THD. ROD FIG. 140	
6	1/2" PIPE CLAMP FIG. 295	
7	1/2" DIA. WELDLESS EYENUT FIG. 290	

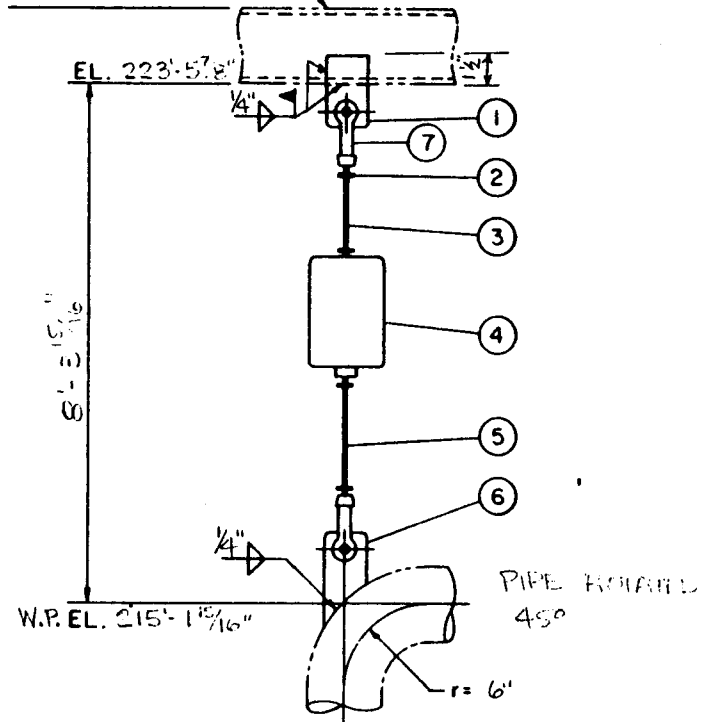
NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 0.3K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

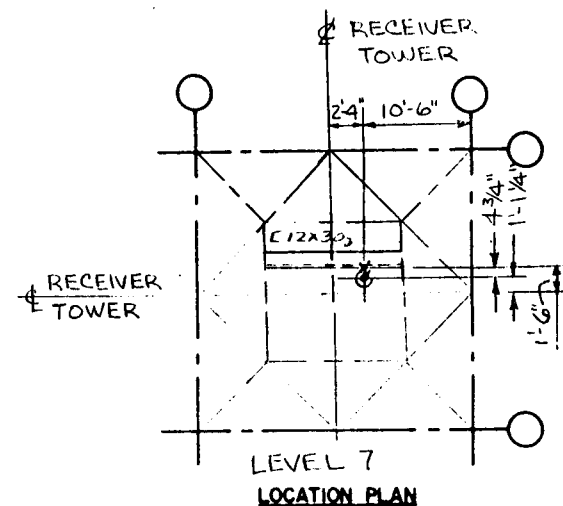
PROJECT NO. C-21700 LINE NO. 4-FW-2-MVA MARK NO. H-FW-2-13

EXIST. 212×20

DO NOT WELD ACROSS WIDTH OF FLANGE

TOS EL. $224'-5\frac{7}{8}"$ 

ELEV. LOOKING NORTH



+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta x = -\frac{1}{4}"$ $\Delta z = -\frac{3}{16}"$

VOL. P-60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			REV.		
FIG. NO.	TYPE	SIZE			
B-268	A	11	12		
HOT LOAD		1917 lb.	11		
COLD LOAD		1726 lb.	10		
VERT. TRAVEL C. TO H.		$\frac{3}{16}"$ (T.D.)	9		
T.T. CONST. SUPPORT		N.A.	8		
VENDOR ENG. REV.	REFERENCE DRAWINGS		REV.		
E	PIPING	11	6	1	$\frac{7}{8}"$ DIA. F. S. CLEVIS W/PIN FIG. 299
D	STRUCTURAL	22-1	5	1	$\frac{7}{8}"$ DIA. WELDING LUG C-7 $\frac{1}{2}"$ H. S. 53 (BY FAB)
C	ELECTRICAL		4	1	SPRING SEE DATA
B			3	1	$\frac{7}{8}"$ DIA. R. H. THD. ROD FIG. 140
A			2	4	$\frac{7}{8}"$ DIA. R. H. HEX NUT
			1	1	$\frac{7}{8}"$ DIA. STRUCT. WELDING LUG FIG. 55

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: 2.3K

PIPE SIZE: 4.5" O.D.

PIPE INSULATION: $2\frac{1}{2}"$

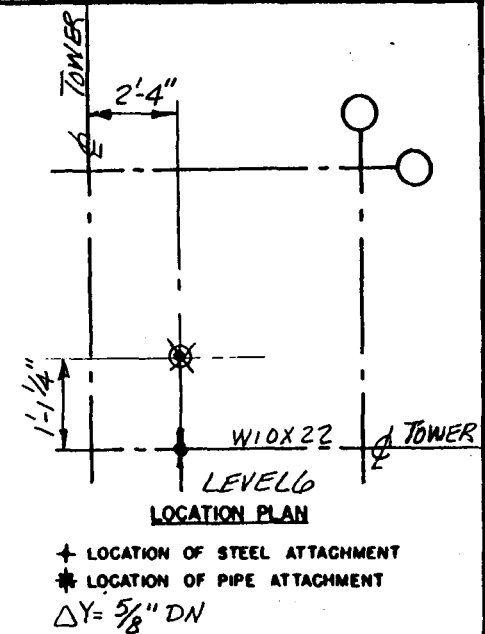
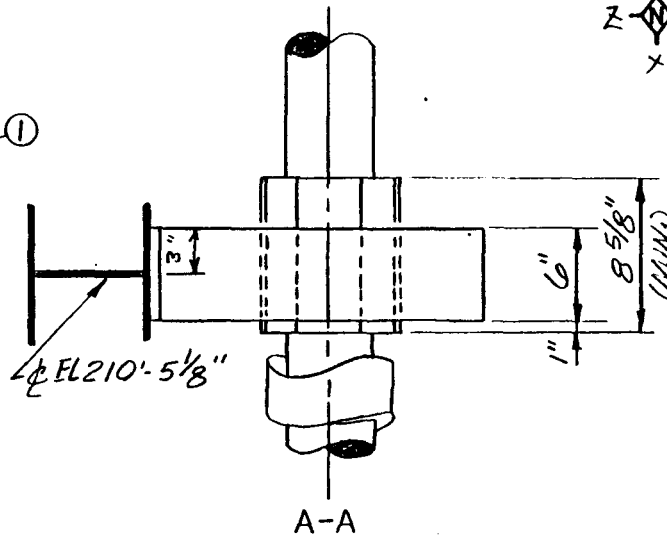
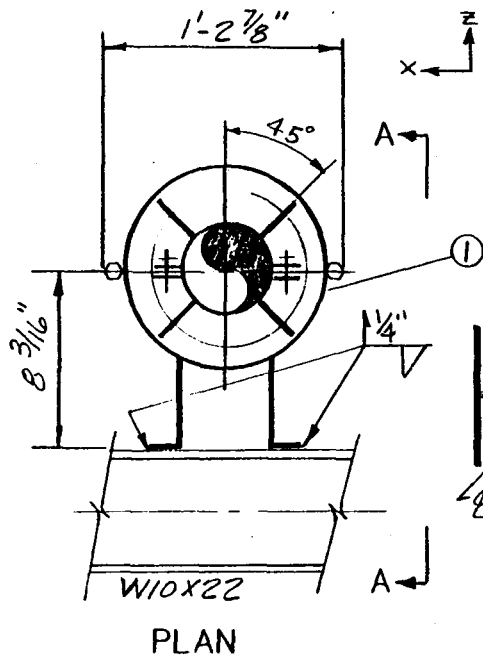
PIPE MATERIAL: ASTM A191-CL.1

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE	APPROVED	DATE
11/23/80	2/19/81	REK	2/25/81	FULL	3/27/80
REVIEWED	DATE	APPROVED	DATE		
2/18/81	3-9-80	1/2/81	2-27-80		
PROJECT	DATE				

ANALYSIS ID. CODE T/W-FW-01-A-2/2

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	SCALE: NONE	11165/8
Stearns-Roger 10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 4-FW-2-HPA
MARK NO	H-FW-2-14	



VOL. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	R4
D	STRUCTURAL 932-3	0
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
1	1	PIPE ALIGNMENT GUIDE SIM.FIG. 256

NOTES:

PIPE TEMPERATURE: 140°F STRUCTURAL DESIGN LOAD: $F_x = 2.5\text{K}$ $F_z = 3.0\text{K}$

PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 2 1/2"

PIPE MATERIAL: A37M A106 GR.B

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	V...
DATE	4-22-80	DATE	...
REVIEWED	...	APPROVED	...
DATE	4-29-80	DATE	...
PROJECT	HDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-FW-01-A-2/2		

5

4

3

2

1

REVISIONS

ITEM REQD

SCALE:

NONE

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700

LINE NO 4"FW-2-MEA

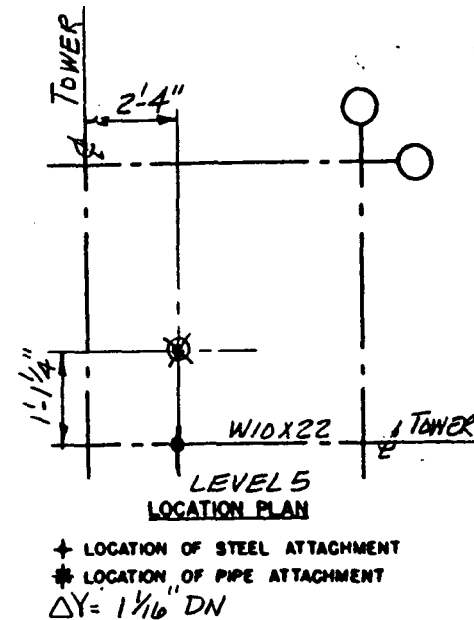
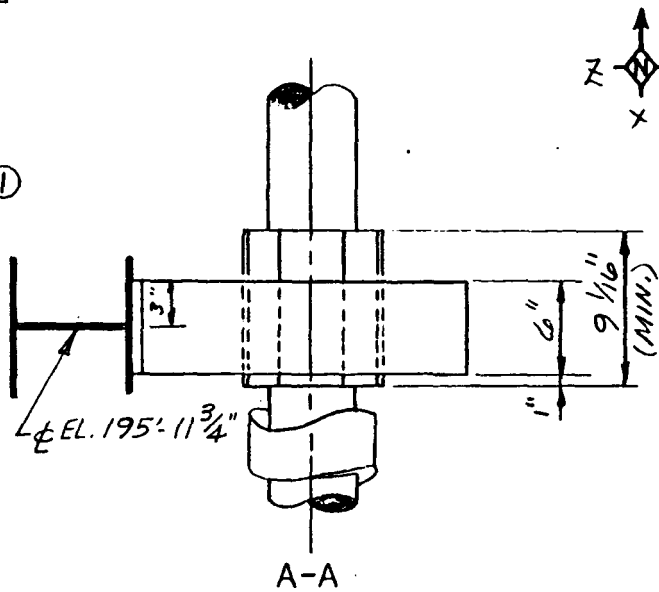
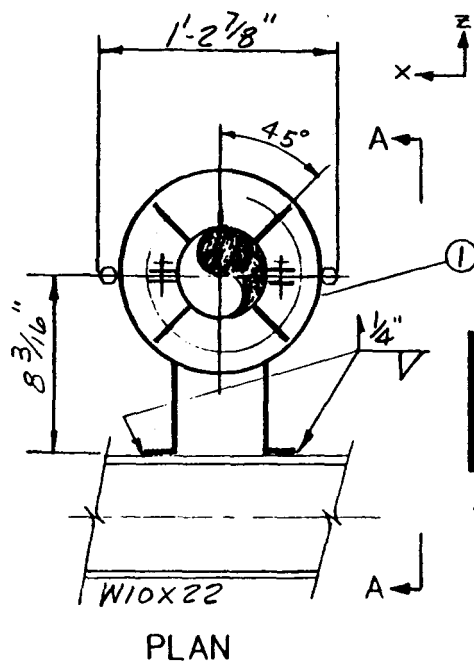
MARK NO H-FW-2-15

COMPONENT DESCRIPTION

Stearns-Roger

11165/8

REMARKS



VOL. P60-1

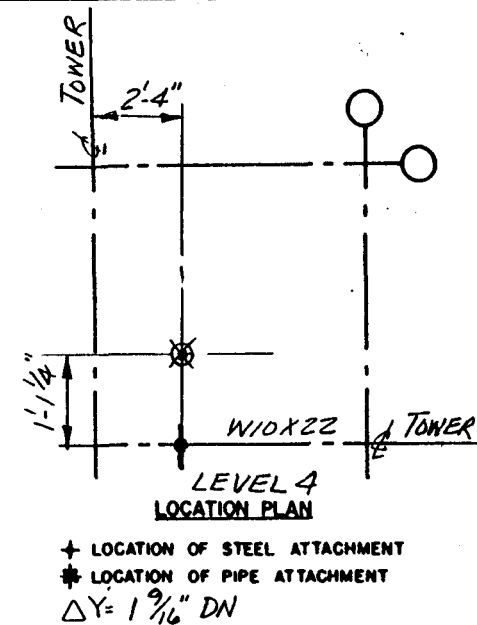
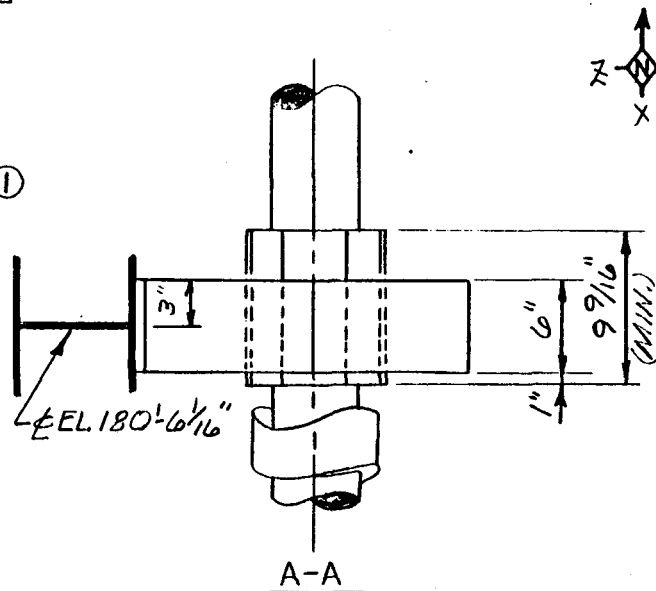
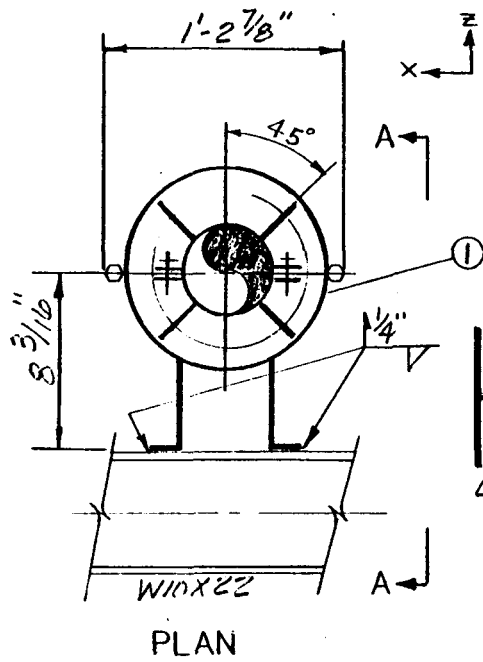
VENDOR	ENG.	REV.	REFERENCE DRAWINGS	REV.
E			PIPING P9-3	P4
D			STRUCTURAL S32-3	O
C			ELECTRICAL	
B				
A				

14		
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5		
4		
3		
2		
1	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 2.7k$ $F_z = 2.8k$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GRB

ENGINEERING RECORD				5					
DESIGNED	ALM	CHECKED	ALM	4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS		
DATE	7-22-80	DATE	7-22-80	3					
REVIEWED	TH	APPROVED		2					
DATE	7-22-80	DATE		1					
PROJECT	RDP		ALM						
DATE	6-12-80		6-12-80	REVISIONS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
ANALYSIS ID. CODE	T/W-FW-01-A-212			PROJECT N°	C-21700	LINE N°	4"FW-2-MBA	MARK N°	H-FW-2-16



VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-3
D	STRUCTURAL	S32-3
C	ELECTRICAL	
B		
A		

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: $F_x = 2.3K$ $F_z = 23K$

PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 2 1/2"

PIPE MATERIAL: ASTM A106 GR B

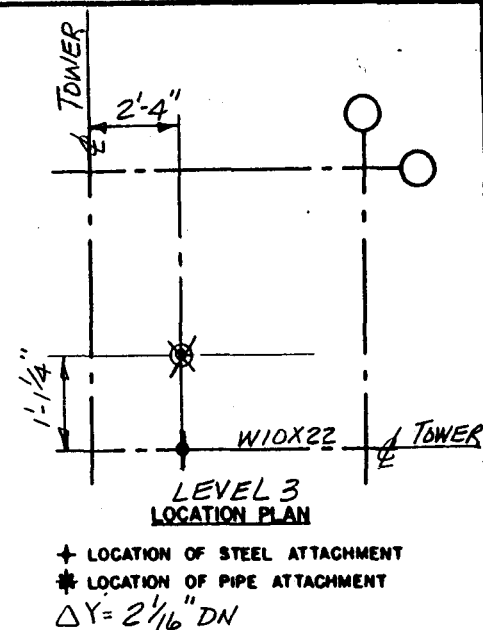
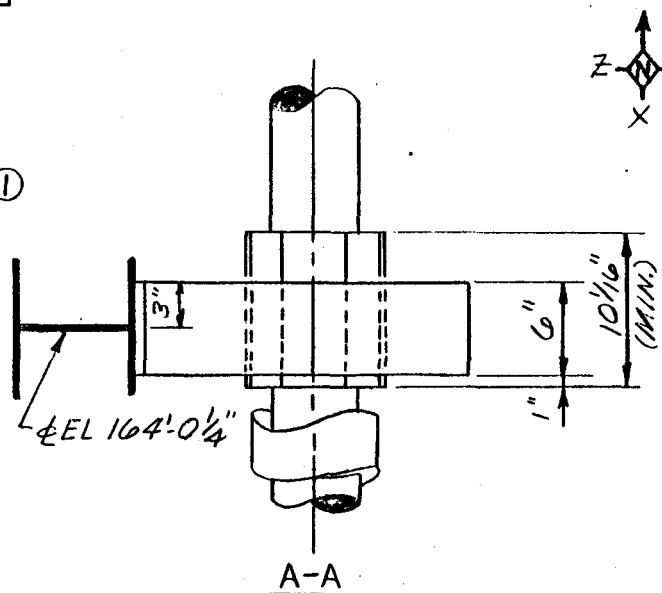
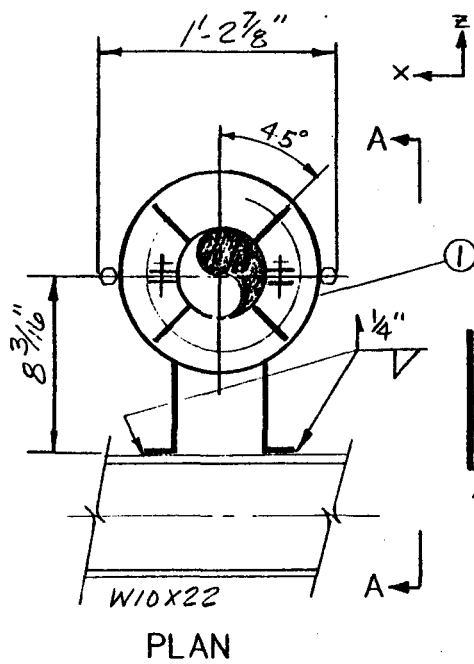
ENGINEERING RECORD

DESIGNED	MLM	CHECKED	
DATE	4-22-80	DATE	5-15-80
REVIEWED	ALM	APPROVED	
DATE	11-30-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-FW-01-A-2/2		

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4			
3			
2			
1			
ITEM REQD	COMPONENT DESCRIPTION	REMARKS	
SCALE: NONE	Stearns-Roger	11165/8	
REVISIONS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 4"FW-2-MBA	MARK NO H-FW-2-17	

VOL. P60-1

PIPE ALIGNMENT GUIDE SIM.FIG. 256



VOL. P60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	0
C		ELECTRICAL		
B				
A				

14	
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12	
11	
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8	
7	
6	
5	
4	
3	
2	
1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.7\text{k}$ $F_z = 2.3\text{k}$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: $2 \frac{1}{2}$ "
 PIPE MATERIAL: ASTM A106 GR. B

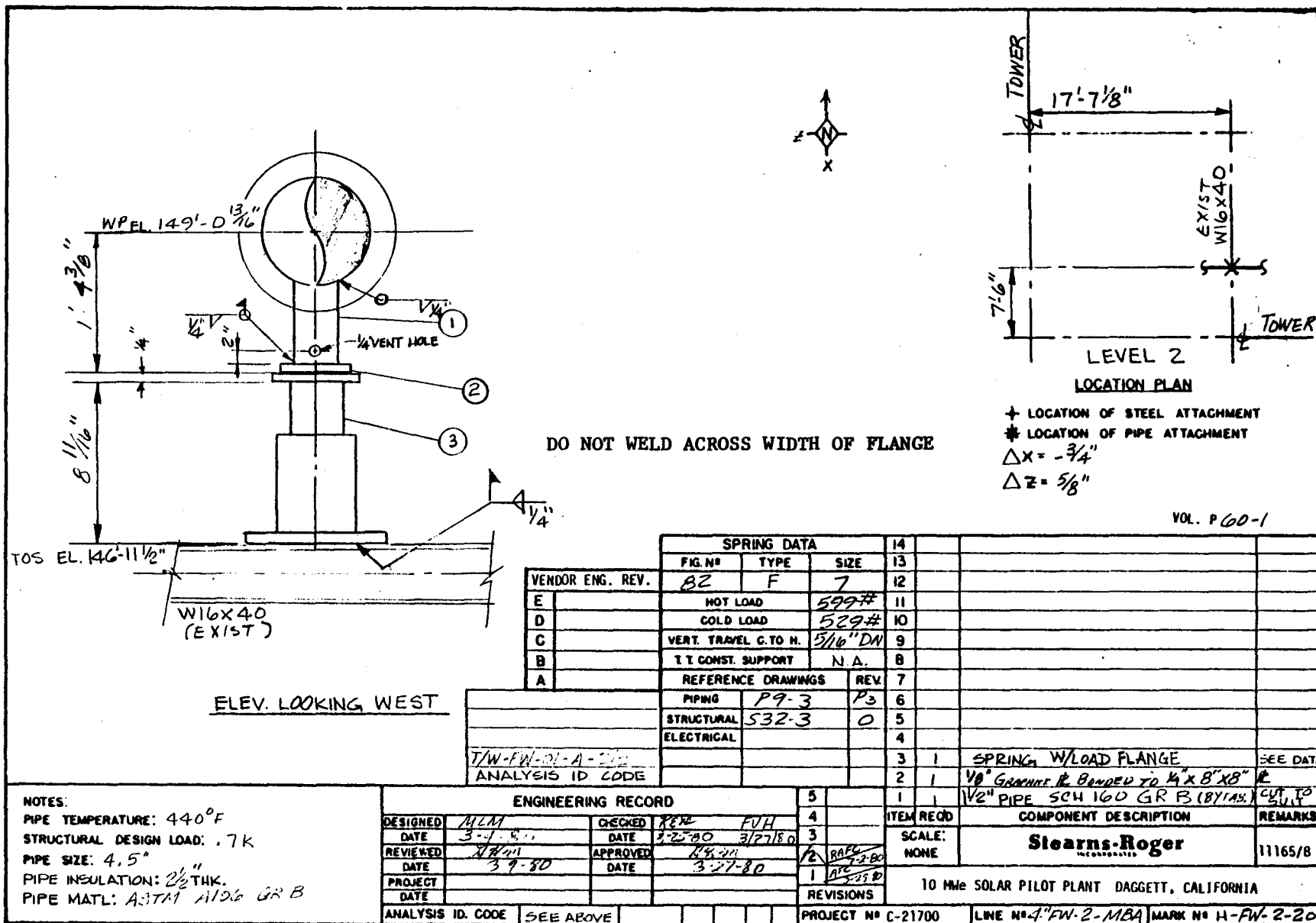
ENGINEERING RECORD

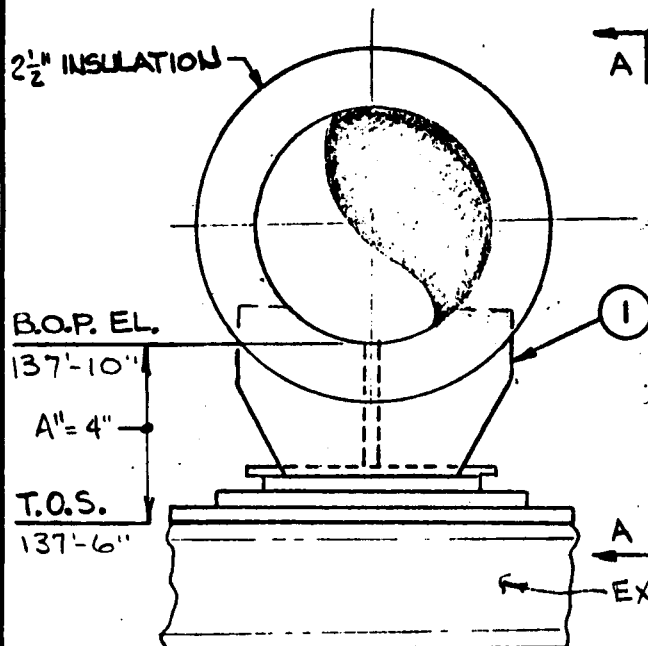
DESIGNED	MLM	CHECKED	MLM
DATE	7-22-80	DATE	
REVIEWED	MLM	APPROVED	
DATE	7-30-80	DATE	
PROJECT	BDR		
DATE	6-12-80		

5		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4		SCALE:	Stearns-Roger	11165/8
3		NONE		
2				
1				
TO MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
REVISIONS				
PROJECT NO C-21700				
LINE NO 4"FW-2-MBA				
MARK NO H-FW-2-15				

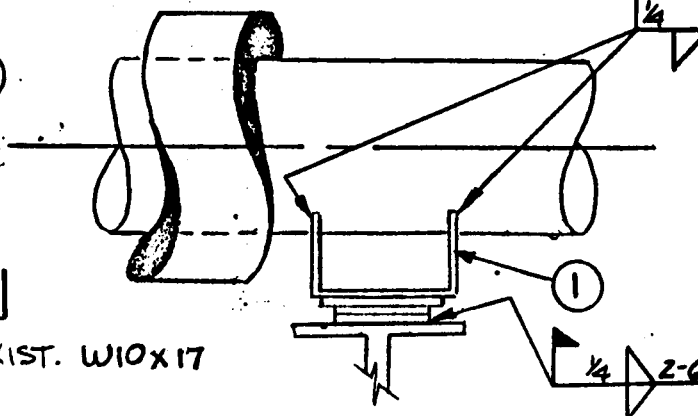
ANALYSIS ID. CODE T/W-FW-01-A-2/2

PROJECT NO C-21700	LINE NO 4"FW-2-MBA	MARK NO HFW-2-19
--------------------	--------------------	------------------



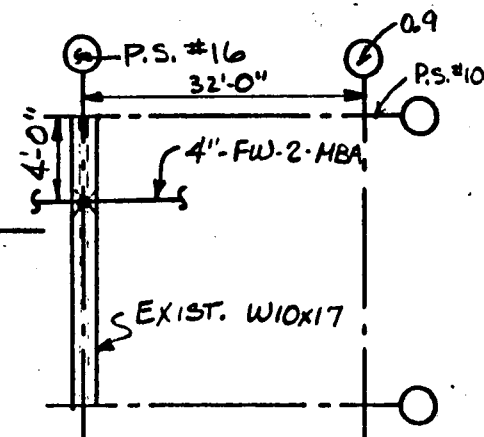


ELEVATION LOOKING WEST



SECTION A-A

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/8"$
 $\Delta Z = 1/4"$

VOL. P 60-1

- 3 REVISBD S.D. LOAD
- 2 REVISD WELD SYMBOLS

NOTES
PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: 2.5 K
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 2 1/2"
PIPE MATERIAL: ASTM A106 GR. B

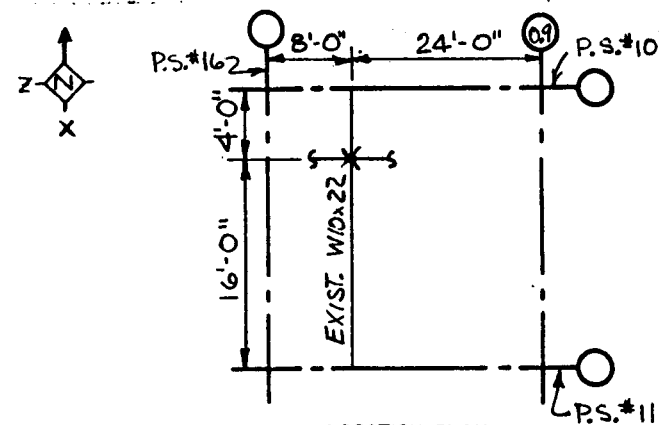
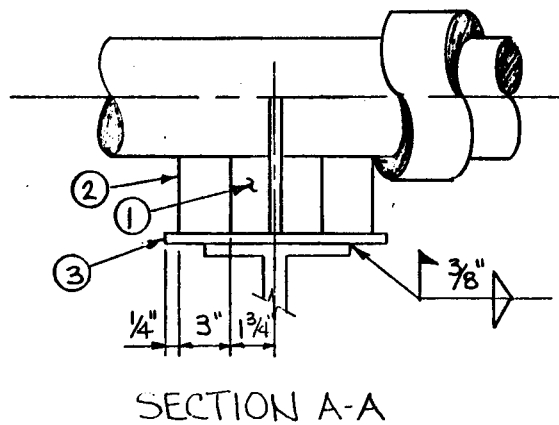
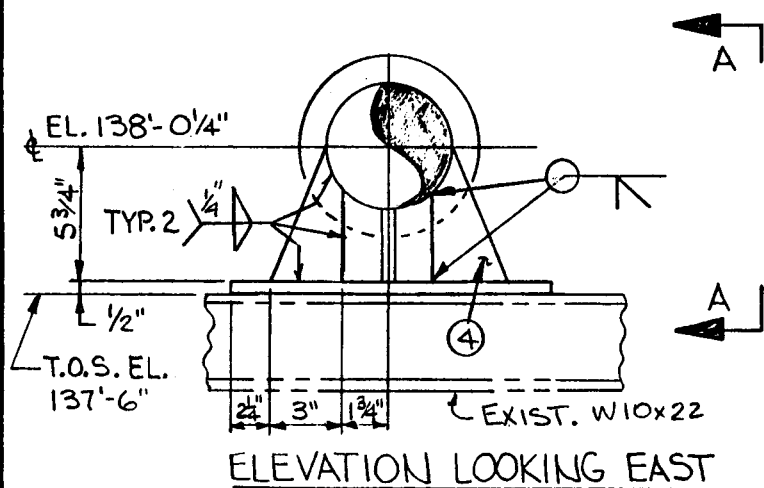
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	19-3	P3
D		STRUCTURAL	S33-4	
C		ELECTRICAL		
B				
A				

ENGINEERING RECORD				5
DESIGNED	DATE	CHECKED	DATE	4
REVIEWED	DATE	APPROVED	DATE	3
PROJECT	DATE			2
				1

REVISIONS	
1	REVISED
2	REVISED
3	REVISED
4	REVISED
5	REVISED

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4			
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2			
1			
ITEM	RECD	COMPONENT DESCRIPTION	REMARKS
1	1	4" O.D. PIPE WELD, FIG. 612	11165/8
SCALE: NONE			
Stearns-Roger			
10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
ANALYSIS ID. CODE	T-21700	PROJECT NO	C-21700
LINE NO	11	MARK NO	11-FW-2-21

188



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
 ✦ LOCATION OF PIPE ATTACHMENT
 △ X = 0"
 △ Z = 0"

• VOL. P60-1.

14			
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5			
4	2	1/2" x 3" x 5 3/8" C.S. P. (BY FAB.)	
3	1	1/2" x 10" x 14" C.S. P. (BY FAB.)	
2	2	1/2" x 3" x 3 1/2" C.S. P. (BY FAB.)	
1	1	3" XXS PIPE (BY FAB.)	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger INCORPORATED	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
= C-21700		LINE N° 4"-FW-2-MRA	MARK N° H- FW-2-22

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: $F_v = 1.8 \text{ K}$, $F_r = 1.2 \text{ K}$,

PIPE SIZE: 4.5" O.D. $F_y = 0.9K$ $M_x = 2.6'K$

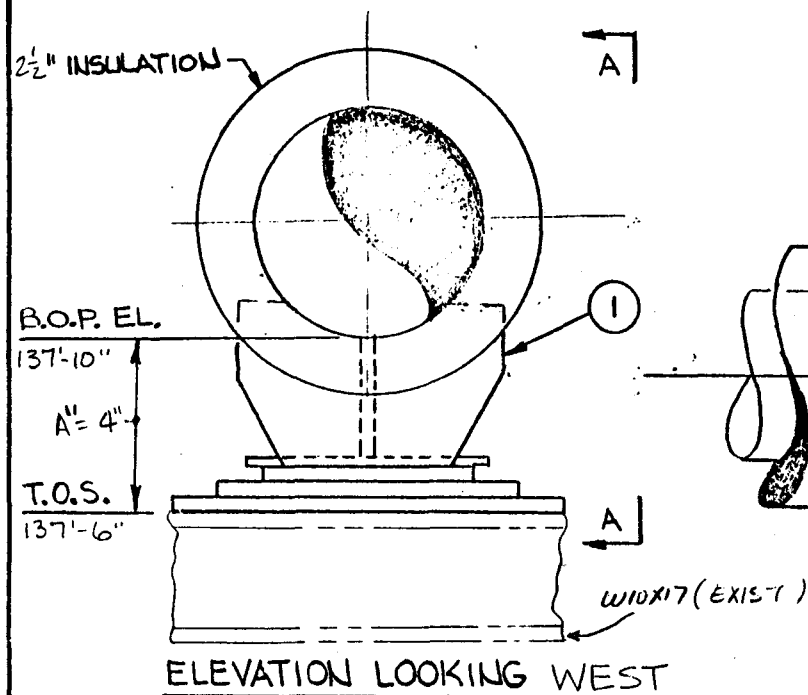
PIPE INSULATION: $2\frac{1}{2}"$ $M_y = 10.3'K, M_z = 3.3'K$

PIPE MATERIAL: ASTM A106 GR.B

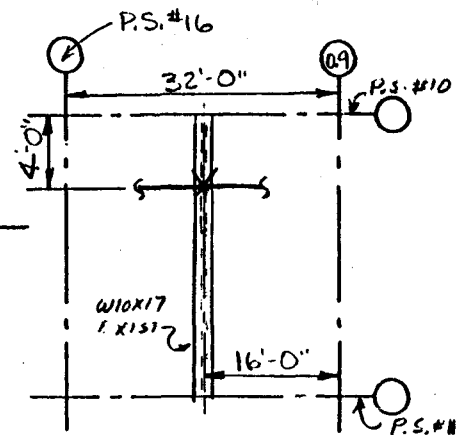
ENGINEERING RECORD

DESIGNED	JML	CHECKED	JML
DATE	5/8/80	DATE	5/11/80
REVIEWED	JML	APPROVED	
DATE	5-19-80	DATE	
PROJECT			
DATE			

ANALYSIS ID. CODE	T/W-FW-1-A-2/2, X-FW-1-A-6	PROJECT N° C-21700	LINE N° 4"-FW-2-MBA	MARK N° H-FW-2-22
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SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/16"$
 $\Delta Z = -1/4"$

VOL. P 60-1

DO NOT WELD ACROSS WIDTH OF FLANGE

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P3
D		STRUCTURAL	S33-4	
C		ELECTRICAL		
B				
A				

NOTES

PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 1.6 KIPS
 PIPE SIZE: 4" Ø
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: A312 TP304

ENGINEERING RECORD

DESIGNED	MRJ	CHECKED	REJ	FVH
DATE	2/26/80	DATE	3-25-80	3-27-80
REVIEWED	MRJ	APPROVED	REJ	
DATE	3/10/80	DATE	3-27-80	
PROJECT				
DATE				

5	
4	
3	
2	SCALE: 1/2" = 1'-0"
1	APPROVED
REVISIONS	

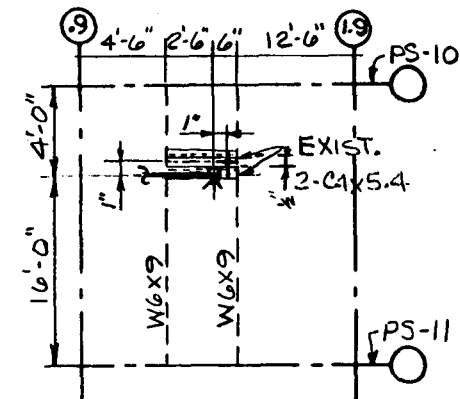
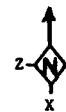
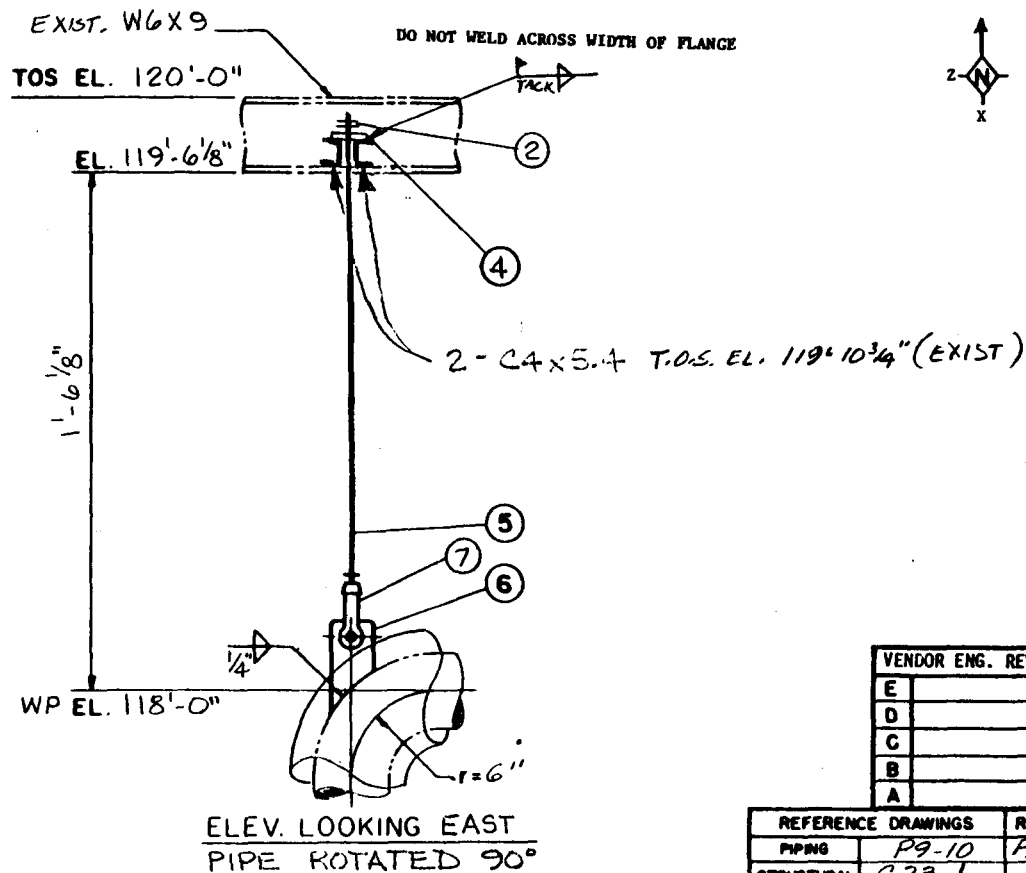
14			
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2			
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1	4" Ø PIPE SADDLE, FIG. 6012	1/2" TRAP	
ITEM REQD	COMPONENT DESCRIPTION	REMARKS	
SCALE: NONE	Stearns-Roger	11165/8	

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE T/W-FW-01-A-4/3

PROJECT NO C-21700 LINE NO 4" FW-2-MBA MARK NO H-FW-2-23

Stearns-Roger



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = -15/16"$
 $\Delta z = -13/16"$

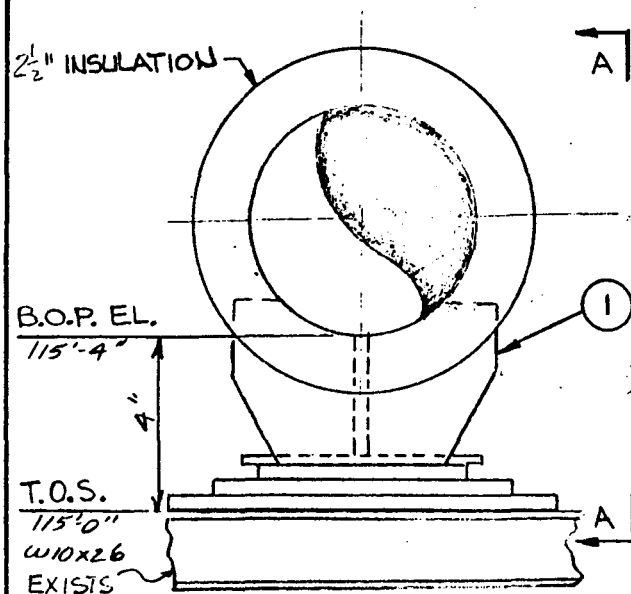
VOL. P 60-1

VENDOR	ENG.	REV.	14		
E			13		
D			12		
C			11		
B			10		
A			9		
			8		

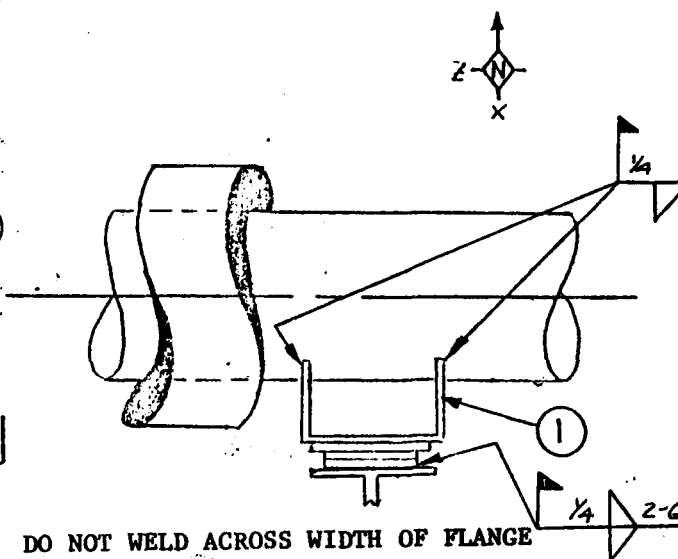
REFERENCE DRAWINGS	REV.	7	1	5/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
PIPING	P9-10	P3	6	1	4" DIA. WELDING LUG C-7 1/2 H.S. 53 BY FAC
STRUCTURAL	S33-1	-	5	1	5/8" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	1	5/8" DIA WASHER PLATE FIG 60
			3	-	
			2	3	5/8" DIA. R. H. HEX NUT
			1	-	

NOTES:
PIPE TEMPERATURE: 440°F.
STRUCTURAL DESIGN LOAD: 1.2 K.
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 2 1/2"
PIPE MATERIAL: ASTM A106 GR.B

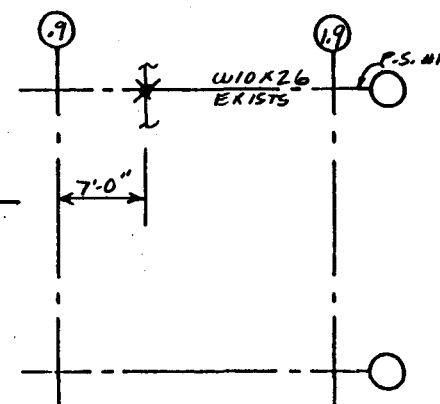
ENGINEERING RECORD				5			
DESIGNED	MLM	CHECKED	KEW	4		ITEM REQD	COMPONENT DESCRIPTION
DATE	3-12-80	DATE	3-25-80	3		SCALE:	REMARKS
REVIEWED	MLM	APPROVED	MLM	1		NONE	
DATE	3-12-80	DATE	3-27-80	1			
PROJECT				1			
DATE				1			
ANALYSIS ID. CODE	1-FW-C?-A--1/3			REVISIONS		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
						PROJECT NO C-21700	LINE NO 4"FW-2-MBA
							MARK NO HFW-2-25



ELEVATION LOOKING NORTH



SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta X = -\frac{1}{2}"$ $\Delta Z = -\frac{7}{8}"$

VOL. P 60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-10	P3
D		STRUCTURAL	S33-3	
C		ELECTRICAL		
B				
A				

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: .9K

PIPE SIZE: 4.50" O.D.

PIPE INSULATION: 2 1/2" THICK

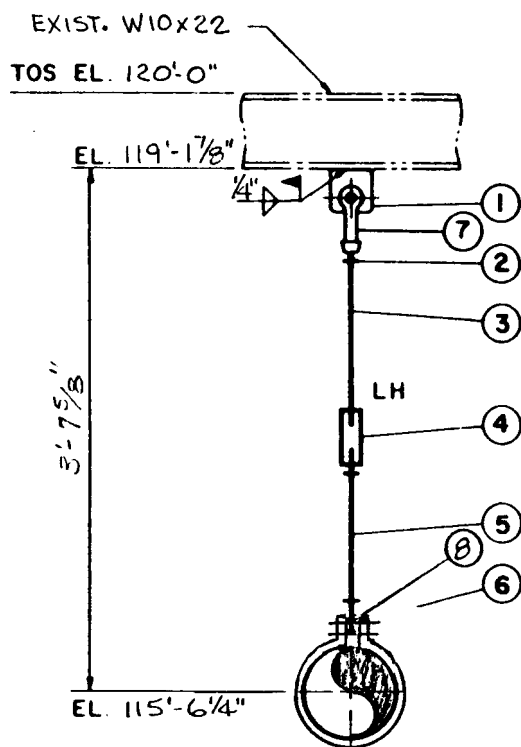
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD

DESIGNED	2/27	CHECKED	ROB	PUH
DATE	2/22/80	DATE	2-25-80	3-27-80
REVIEWED	GAC	APPROVED	H. B. H.	
DATE	3/10/80	DATE	3-27-80	
PROJECT				
DATE				

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REVISIONS

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3			
2			
1	1	4" PIPE SADDLE FIG. 612 W/ STRAP	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
		SCALE: NONE	11165/8
		10 MMg SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
		LINE N° 4" FW-2-MBA	MARK N° H-FW-2-26



Hand-drawn site plan showing the layout of a building addition. The plan includes a vertical "EXIST. WID x 22" wall and a horizontal "3'-10"" wall. Two circular structures are labeled "P.S. #11" and "P.S. #12". Dimensions include "10'-0"" and "3'-10"". A north arrow is present in the top right corner.

LOCATION PLAN

* LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

$$\Delta x = -1/8''$$
$$\Delta z = -3/4''$$

VOL. P60-1

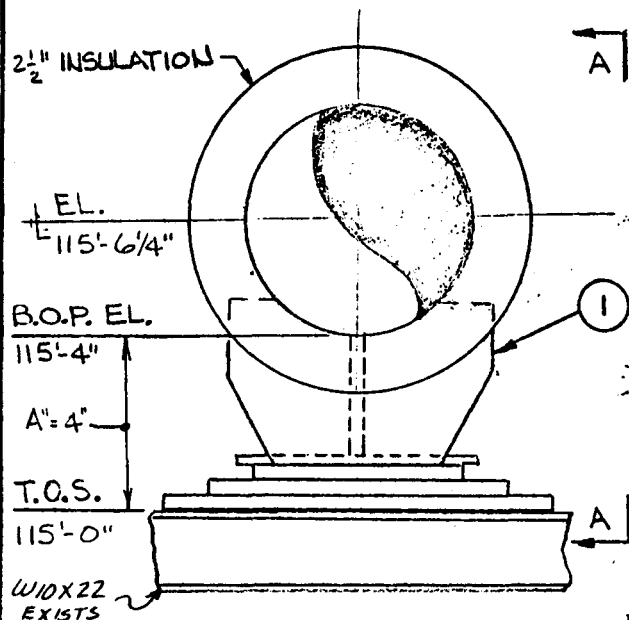
14			
13			
12			
11			
10			
9			
8	1	1/2" DIA. WELDLESS EYENUT	FIG. 290
7	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
6	1	1/2" DIA. ADJUSTABLE CLEVIS FIG. 300	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. -L. H. THD. ROD FIG. 253	
2	3	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger INCORPORATED	11165/8
10 MME SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE N° 4"-FW-2-MBA	MARK N° H-FW-2-27

NOTES

PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: .7K
PIPE SIZE 4.5" O.D.
PIPE INSULATION: 2½"
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	<i>JMS</i>	CHECKED	<i>REAL</i>
DATE	<i>3/22/80</i>	DATE	<i>3-25-80</i>
REVIEWED	<i>JMS</i>	APPROVED	<i>JMS</i>
DATE	<i>3-10-80</i>	DATE	<i>3-27-80</i>
PROJECT			
DATE			
ANALYSIS ID. CODE	<i>T/W-FW-02 A-4/3</i>		

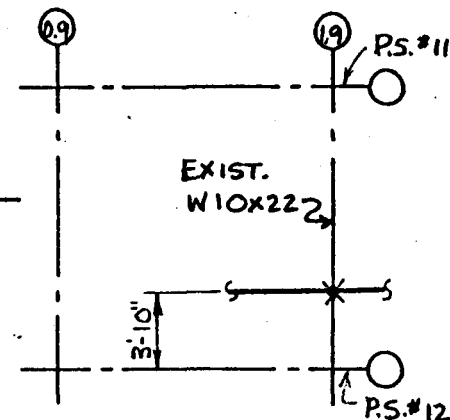
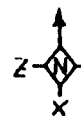
PROJECT N° C-21700	LINE N° 4"-FW-2-MBA	MARK N° H-FW-2-27
--------------------	---------------------	-------------------



ELEVATION LOOKING EAST

DO NOT WELD ACROSS WIDTH OF FLANGE

SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta X = -1/2"$ $\Delta Z = -1 1/16"$

VOL. P 60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9.10	P3
D		STRUCTURAL	S33-1	
C		ELECTRICAL		
B				
A				

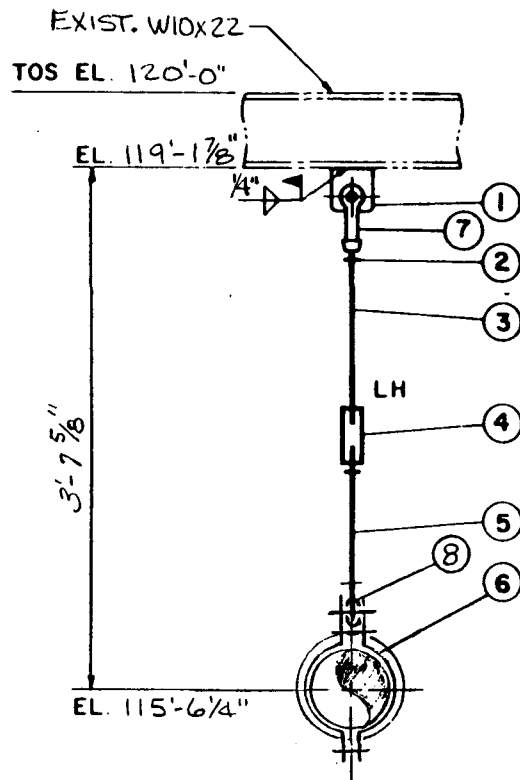
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1	1	4" ϕ PIPE SADDLE, FIG. 612	1/2" STRAP
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
ANALYSIS ID. CODE		PROJECT NO	LINE NO
T/M-FW-011-1-4-1		C-21700	4"-FW-2-NBA
		MARK NO	H-FW-2-2B

NOTES

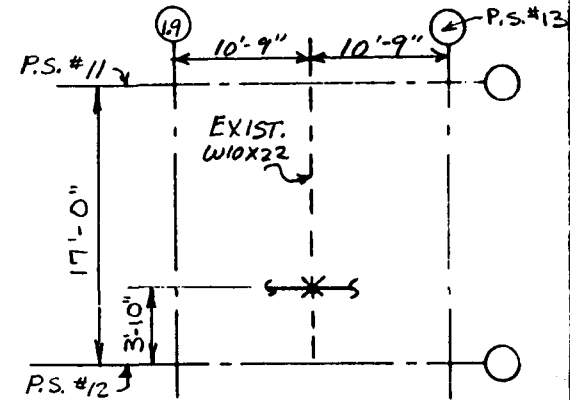
PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 0.11k
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
	3/20/80		3-27-80
REVIEWED	DATE	APPROVED	DATE
	3/23/80		3-27-80
PROJECT	DATE		
REVISIONS			
1. R/FW-2-2B			
1. R/FW-2-2B			

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x = -1"
- △ z = -1 1/2"

VOL. P60-1

14			
13			
12			
11			
10			
9			
8	1	1/2" DM. WELDLESS EYE NUT FIG. 290	
7	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
6	1	4" PIPE CLAMP, FIG. 295	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. -L. H. THD. ROD FIG. 253	
2	3	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ITEM	RECD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger INCORPORATED	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 4-FW-2-MEA	MARK NO H-FW-2-29

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING	P9-10
D		STRUCTURAL	S33-1
C		ELECTRICAL	
B			
A			

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
MDJ	2/22/80	REV FVH	3-25-80
REVIEWED	DATE	APPROVED	DATE
MDJ	3/11/80	MDJ	3-27-80
PROJECT	DATE		

NOTES.

PIPE TEMPERATURE: +40 °F
 STRUCTURAL DESIGN LOAD: 1.1K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

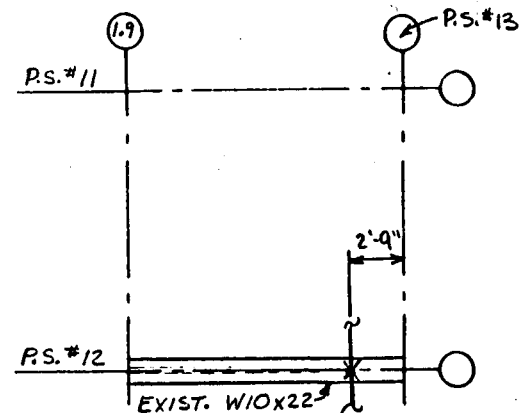
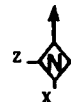
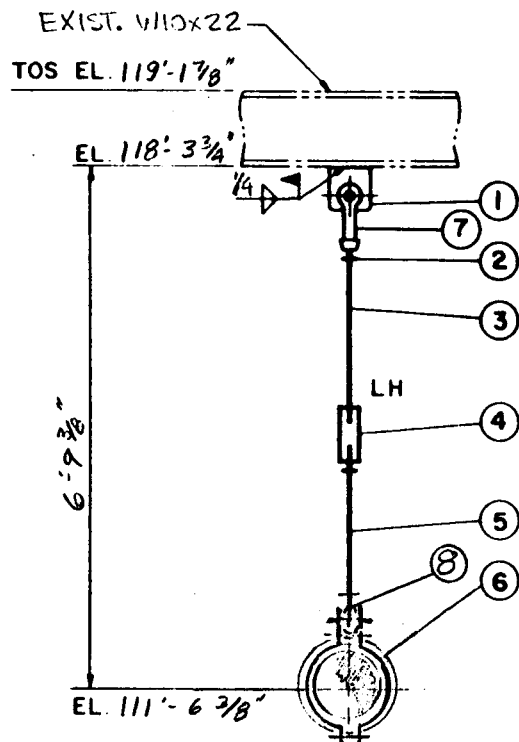
ANALYSIS ID. CODE T/W-FW-02-A-4/3

PROJECT NO C-21700

LINE NO 4-FW-2-MEA

MARK NO H-FW-2-29

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta x = -15/16"$
- $\Delta z = -15/8"$

VOL. P60-1

ELEV. LOOKING SOUTH

HOLD
7-2-80 G.H. MAY

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-10
D	STRUCTURAL	S33-1
C	ELECTRICAL	
B		
A		

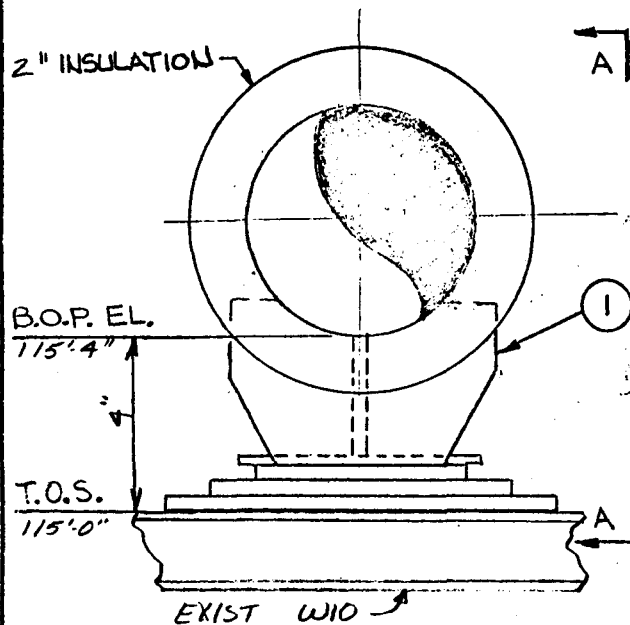
14			
13			
12			
11			
10			
9			
8	1	1/2" DIA. WELDLESS EYENUT	FIG. 290
7	1	1/2" DIA. P. S. CLEVIS W/PIN FIG. 299	
6	1	4" PIPE CLAMP FIG. 295	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	1/2" DIA. P. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. -L. H. THD. ROD FIG. 253	
2	3	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger INCORPORATED	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE N° 4"-FW-2-HBA	MARK N° H-FW-2-30

NOTES.

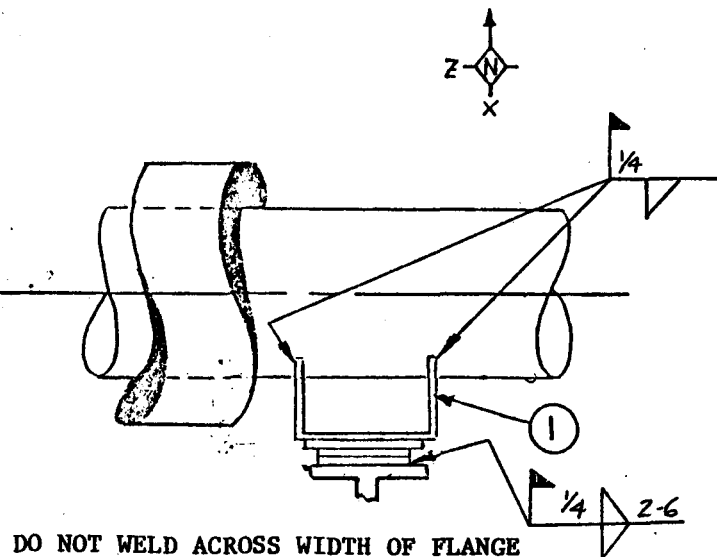
PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: .9K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: ASTM A36

ENGINEERING RECORD			
DESIGNED	7/1/80	CHECKED	REL
DATE	2/21/80	DATE	3-24-80
REVIEWED	4/8/80	APPROVED	8/8/80
DATE	3-11-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-FW-02-A-4/3		

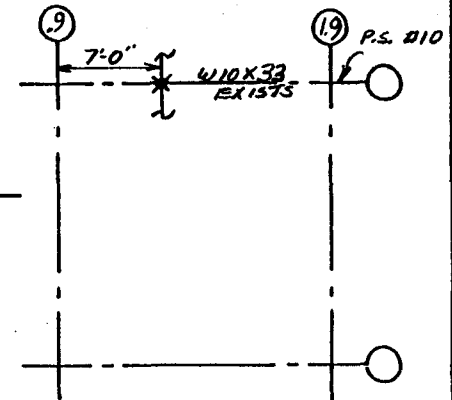
5
4
3
2
1
REVISED



ELEVATION LOOKING NORTH



SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1\frac{1}{16}"$
 $\Delta Z = -1\frac{1}{4}"$

VOL. P 60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P 9-10	P 3
D		STRUCTURAL	533-3	
C		ELECTRICAL		
B				
A				

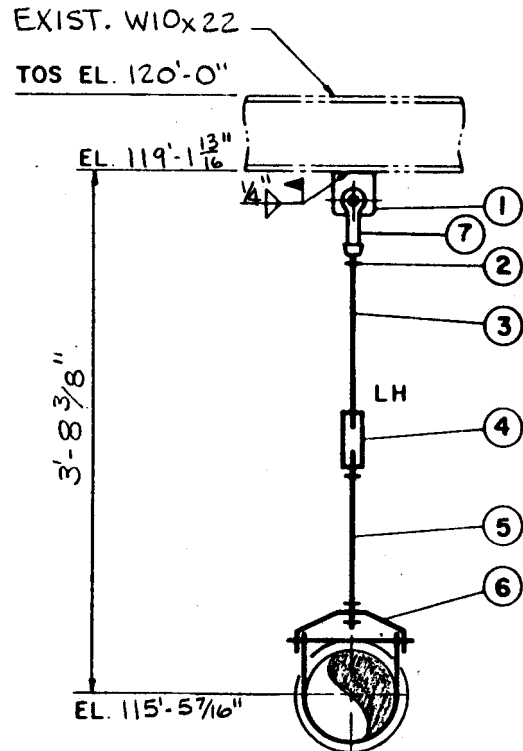
14	
13	
12	
11	
10	
9	
8	
7	
6	
5	
4	
3	
2	

NOTES
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: .7K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 2"
 PIPE MATERIAL: ASTM A106 GR. B

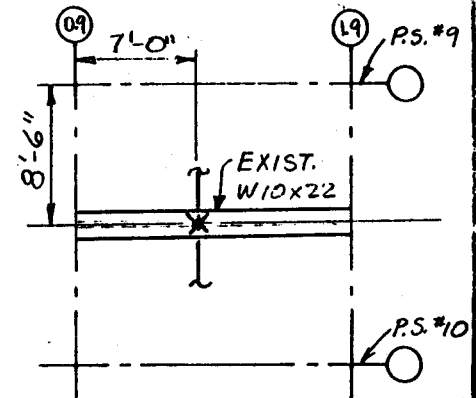
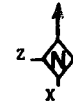
ENGINEERING RECORD			
DESIGNED	11/1/77	CHECKED	1/2/80 FVA
DATE	3/21/78	DATE	3-27-80
REVIEWED	1/2/80	APPROVED	1/2/80
DATE	3-11-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-FW-02-A 4/13		

5		1	1	2 1/2" PIPE SADDLE & SLIDE FIG. 612	ASTM
4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS
3		SCALE:	NONE	Stearns-Roger	11165/8
2		10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
1		REVISIONS		LINE NO 2 1/2"-FW-9-HBA	MARK NO 11-FW-9-1
		PROJECT NO	C-21700		

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x = -1 3/8"
- △ z = -15/16"

VOL. P 60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	Pg-10 P3
D	STRUCTURAL	533-1
C	ELECTRICAL	
B		
A		

14			
13			
12			
11			
10			
9			
8			
7	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
6	1	2 1/2" DIA. ADJUSTABLE CLEVIS FIG. 300	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. -L. H. THD. ROD FIG. 253	
2	4	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	

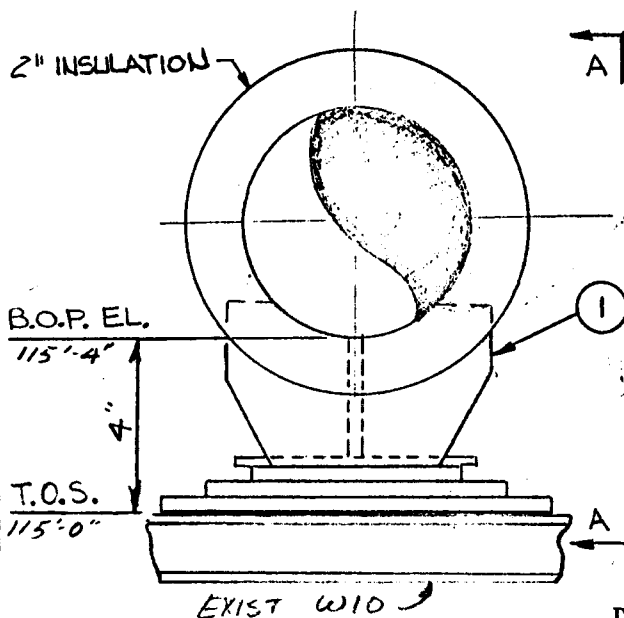
NOTES:

PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 0.3 KIPS
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 2"
 PIPE MATERIAL: ASTM A106 GR.B

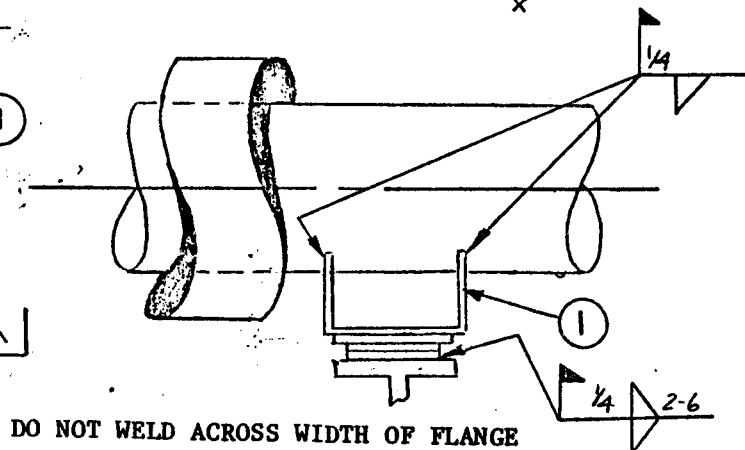
ENGINEERING RECORD			
DESIGNED	7/27	CHECKED	8/20 FVH
DATE	2/21/80	DATE	3-8-80 3-27-80
REVIEWED	11/9/80	APPROVED	8/20
DATE	3-10-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-FW-02-A-4/3		

5	1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
4	ITEM REQD	COMPONENT DESCRIPTION		REMARKS
3	SCALE:	Stearns-Roger		
2	NONE	11165/8		
1	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
REVISIONS				
PROJECT N° C-21700		LINE N° 2 1/2"-FW-9-MBA		MARK N° H-FW-9-2

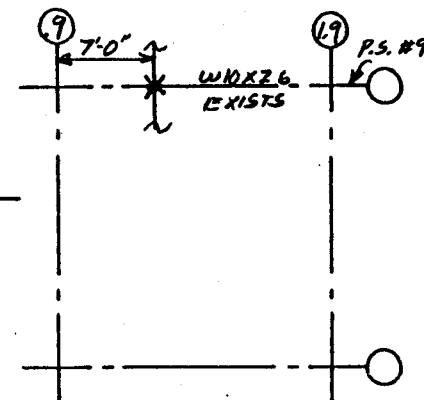
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA



ELEVATION LOOKING NORTH



SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -15/8'$
 $\Delta Z = -51/8''$

VOL. P 60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P7-10	P3
D		STRUCTURAL	S33-3	
C		ELECTRICAL		
B				
A				

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		

NOTES:
 PIPE TEMPERATURE: 440 °F
 STRUCTURAL DESIGN LOAD: .2K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 2" THICK
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	2/7/80	CHECKED	2/27/80
DATE	2/21/80	DATE	3-27-80
REVIEWED	2/9/80	APPROVED	2/27/80
DATE	3-11-80	DATE	3-17-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-910-12 A-1/3		

5		1	2 1/2" PRE-SADDLES & SLIDE FIG. 612	4/11/80
4		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3		SCALE:	Stearns-Roger	11165/8
2		NONE		
1				
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO C-21700		LINE NO 2 1/4" FW-9-MBA		MARK NO H-FW-9-3

EXIST. W10x22

TOS EL. 120'-0"

EL. 119'-1 ¹³/₁₆"

3'-8 ³/₈"

1/4"

LH

EL. 115'-5 ⁷/₁₆"

1

7

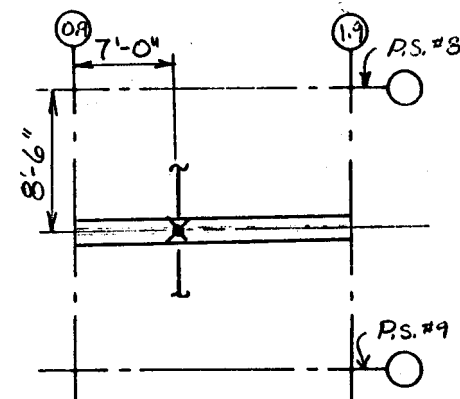
2

3

4

5

6



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
 ✦ LOCATION OF PIPE ATTACHMENT
 $\Delta x = -17/8"$
 $\Delta z = 5/16"$

VOL. P 60-1

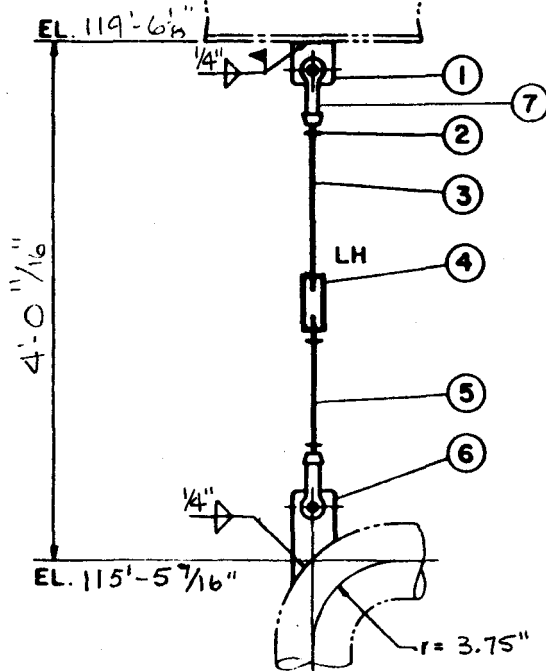
14			
13			
12			
11			
10			
9			
8			
7	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
6	1	2 1/2" DIA. ADJUSTABLE CLEVIS FIG. 300	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. -L. H. THD. ROD FIG. 253	
2	4	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger INCORPORATED	11165/8
10 MME SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 2 1/2" FW-9-11BA	MARK NO H-FW-9-4

NOTES.

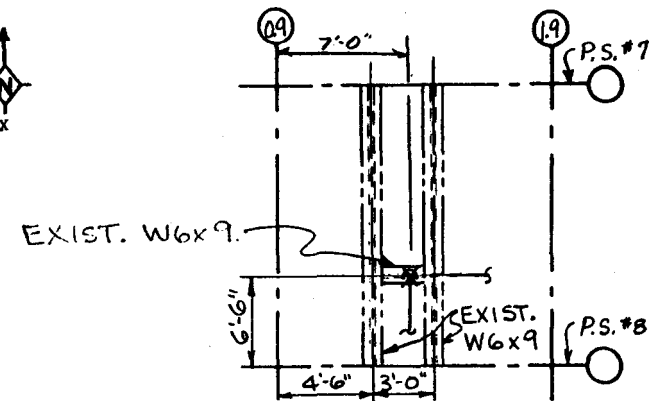
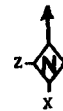
NOTES:
PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: 0.4 K
PIPE SIZE: 2.875" O.D.
PIPE INSULATION: 2"
PIPE MATERIAL: ASTM A106 GR. B

EXIST. W6x9
TOS EL. 120'-0"

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = -2\frac{5}{16}"$
 $\Delta z = 1\frac{1}{16}"$

VOL. P 60-1

VENDOR ENG. REV.		14			
E		13			
D		12			
C		11			
B		10			
A		9			
		8			
REFERENCE DRAWINGS	REV.	7	2	1/2"	DIA. F. S. CLEVIS W/PIN FIG. 299
P9-10	P3	6	1	1/2"	DIA. WELDING LUG C-75 1/4" H.S. 53 (FY FABR.)
S33-1		5	1	1/2"	DIA. R. H. THD. ROD FIG. 140
		4	1	1/2"	DIA. F. S. TURNBUCKLE FIG. 230
		3	1	1/2"	DIA. R. H. - L. H. THD. ROD FIG. 253
		2	3	1/2"	DIA. R. H. HEX NUT
		1	1	1/2"	DIA. STRUCT. WELDING LUG SHORT FIG. 55
EVH		5			
3-27-80		4	ITEM REQD		COMPONENT DESCRIPTION
7		3	SCALE:		REMARKS
2-80		2	NONE		
1	1/25/80	1			
REVISIONS		10 McE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT N° C-21700		LINE N° 2 1/2"-FW-9-11FA		MARK N° H-FW-9-5	

NOTES:

PIPE TEMPERATURE: 440°F

STRUCTURAL DESIGN LOAD: 0.5 K

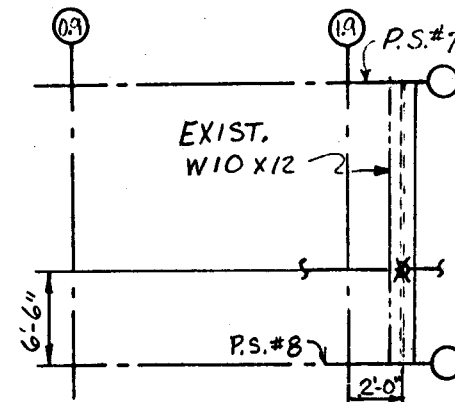
PIPE SIZE: 2.875" O.D.

PIPE INSULATION: 2"

PIPE MATERIAL: ASTM A106 GR. B

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

Stearns-Roger
INCORPORATED



✦ LOCATION OF STEEL ATTACHMENT
✦ LOCATION OF PIPE ATTACHMENT

Δ x = $-13/16"$
 Δ z = $1/8"$

VOL. P 60-1

**OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS**

SPRING DATA			14			
FIG. NO	TYPE	SIZE	13			
82	A	6	12			
HOT LOAD		389 lb.	11			
COLD LOAD		452 lb.	10			
VERT. TRAVEL C. TO H.		3/8" UP	9			
T. T. CONST. SUPPORT		N. A.	8			
REFERENCE DRAWINGS			REV.	7	2	5/8" DIA. F. S. CLEVIS W/PIN FIG. 299
PINING	P9-B	P3	6	1	5/8" DIA. WELDING LUG C=7 3/16" H. S. 53	BY FAB
STRUCTURAL	S33-1		5	1	5/8" DIA. R. H. THD. ROD FIG. 140	
ELECTRICAL			4	1	SPRING	SEE DATA
			3	1	5/8" DIA. R. H. THD. ROD FIG. 140	
			2	4	5/8" DIA. R. H. HEX NUT	

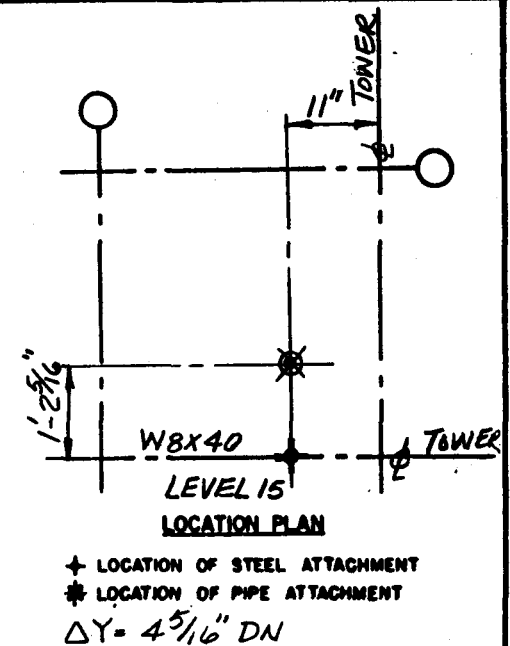
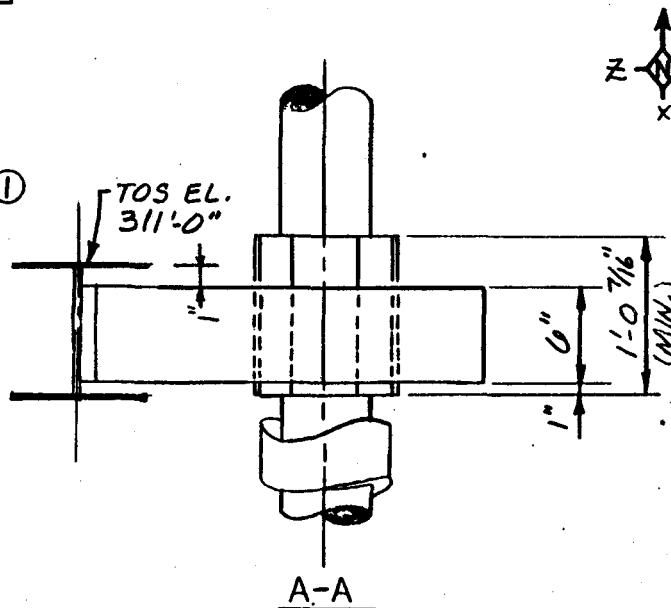
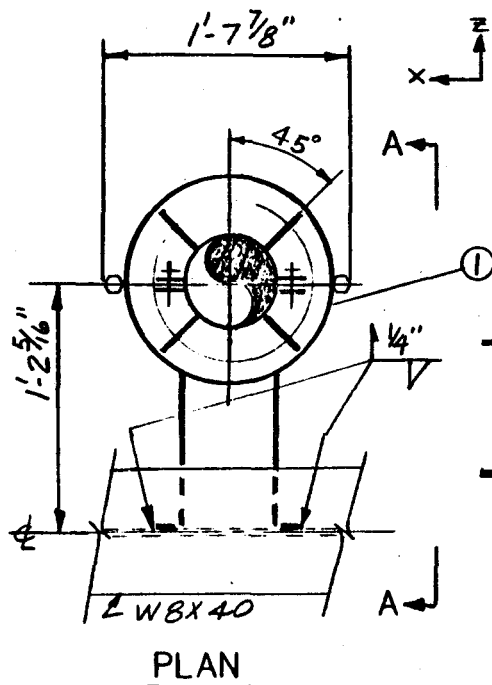
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.	7	2	5/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
E		PIPING	PQ-B	P3	6	1	5/8" DIA. WELDING LUG C-75/16" H. S. 53	BY FAG
D		STRUCTURAL	S33-1		5	1	5/8" DIA. R. H. THD. ROD FIG. 140	
C		ELECTRICAL			4	1	SPRING	SEE DATA
B					3	1	5/8" DIA. R. H. THD. ROD FIG. 140	
A					2	4	5/8" DIA. R. H. HEX NUT	

PIPE TEMPERATURE: 580°F
STRUCTURAL DESIGN LOAD: .5K
PIPE SIZE: 2.875" O.D.
PIPE INSULATION: 2"
PIPE MATERIAL: 1.5% Ni ALLOY 6061

ENGINEERING RECORD

DESIGNED	<i>PHH</i>	CHECKED	<i>REAL</i>	<i>FVH</i>	4	ITEM REQD	COMPONENT DESCRIPTION		REMARKS
DATE	<i>2-12-80</i>	DATE	<i>2-25-80</i>	<i>2-27-80</i>	3	SCALE:	Stearns-Roger		
REVIEWED	<i>PHH</i>	APPROVED	<i>PHH</i>		2	NONE	-CORPORATED		11165/8
DATE	<i>2-10-80</i>	DATE	<i>2-27-80</i>		1	<i>APC</i>	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT									
DATE					REVISIONS				
ANALYSIS ID. CODE					PROJECT NO		LINE NO		MARK NO
<i>T/W-FW-024-A-1/3</i>					<i>C-21700</i>		<i>212-FW-9-HRC</i>		<i>FW-9-6</i>

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA



VOL. P60-1

VENDOR	ENG.	REV.	REFERENCE DRAWINGS	REV.
E			PIPING	P9-2 P4
D			STRUCTURAL	S32-5 0
C			ELECTRICAL	
B				
A				

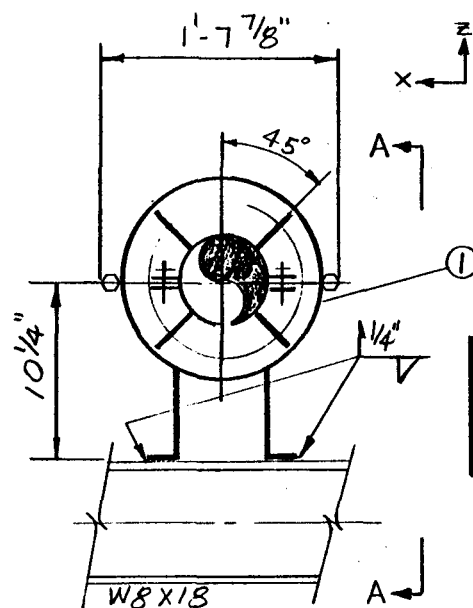
Δ REVISED PIPE MONT. & S.D. LOAD

NOTES:

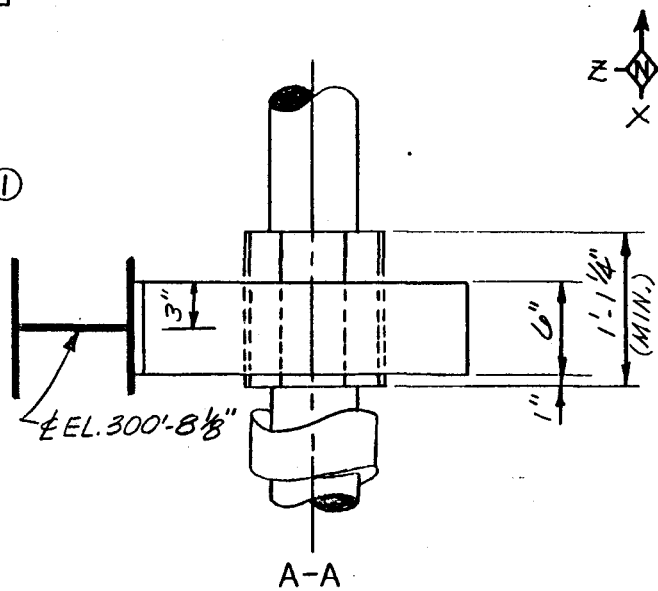
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.3\text{K}$ $F_z = 1.3\text{K}$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: $4 \frac{1}{2}$ "
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	MLM	CHECKED	hjs	4
DATE	4-21-80	DATE		3
REVIEWED	MLM	APPROVED		2
DATE	4-21-80	DATE		1
PROJECT	BDR			
DATE	6-12-80			
ANALYSIS ID. CODE	T/W-11-01-13/6			

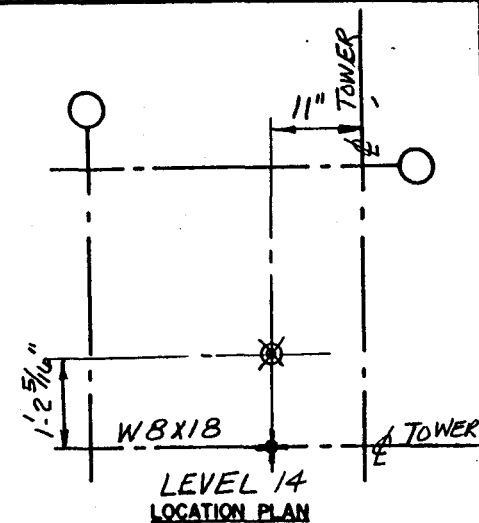
14		
13		
12		
11		
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7		
6		
5		
4		
3		
2		
1	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256
ITEM REQD		COMPONENT DESCRIPTION
SCALE:	NONE	Stearns-Roger
		11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT N°	C-21700	LINE N° 6/MS-2-91/1
MARK N°	11-MS-2-6	



PLAN



A-A



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 5 \frac{1}{4}$ DN

VOL. P60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-2	P4
D		STRUCTURAL	S32-5	0
C		ELECTRICAL		
B				
A				

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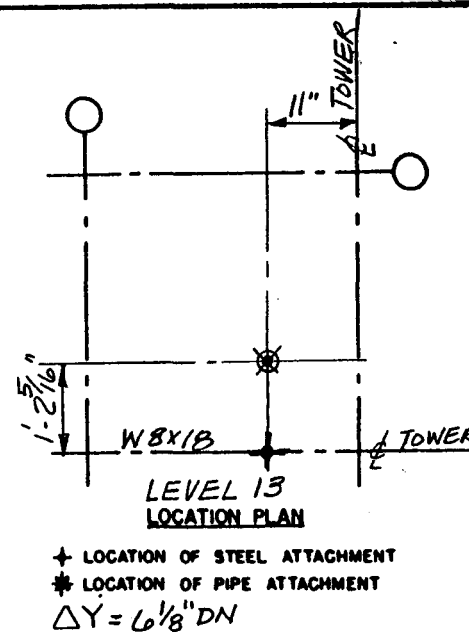
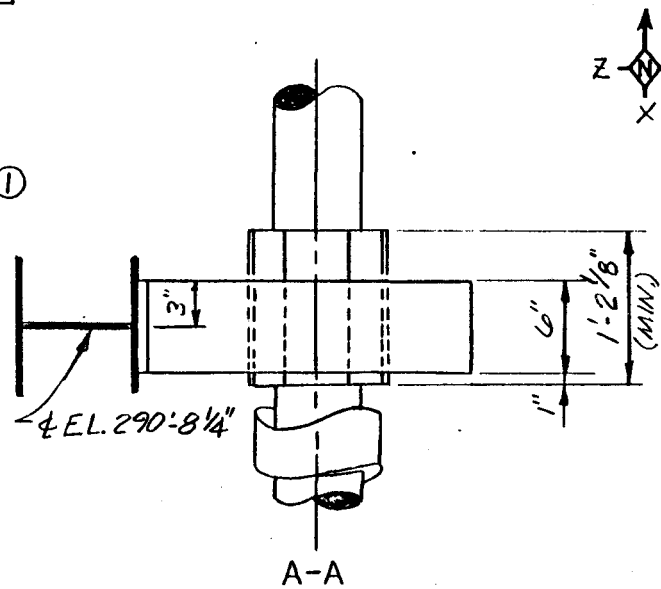
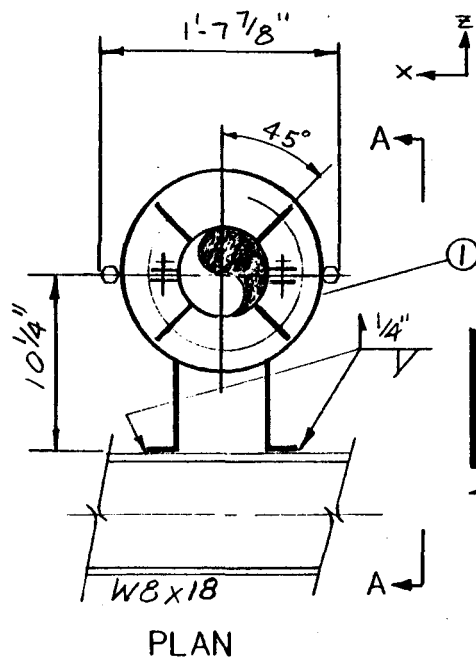
PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .6k$ $F_z = .6k$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	2/1/80
DATE	4-21-80	DATE	5/13/80
REVIEWED	7/1/80	APPROVED	
DATE	4/29/80	DATE	
PROJECT	BDR		J.P. Y.
DATE	6-12-80		6-12-80
ANALYSIS ID. CODE	T/W-MS-01-A-12/5		

5		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4		SCALE:	Stearns-Roger	
3		NONE		11165/8
2				
1				
REVISIONS				
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO C-21700 LINE NO 6"MS-2-QEB MARK NO H-MS-2-7				



VOL. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-2	P4
D	STRUCTURAL S32-5	O
C	ELECTRICAL	
B		
A		

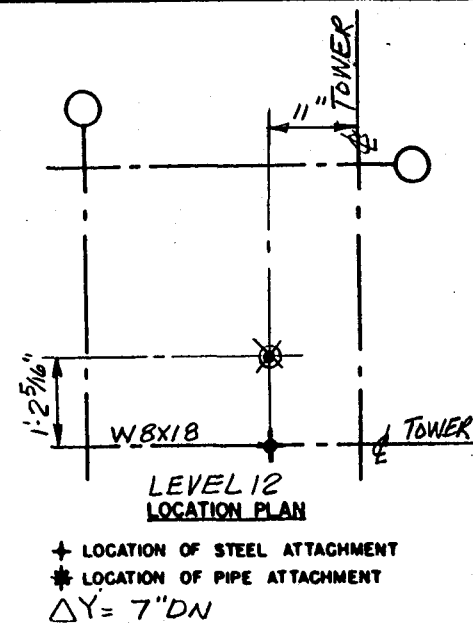
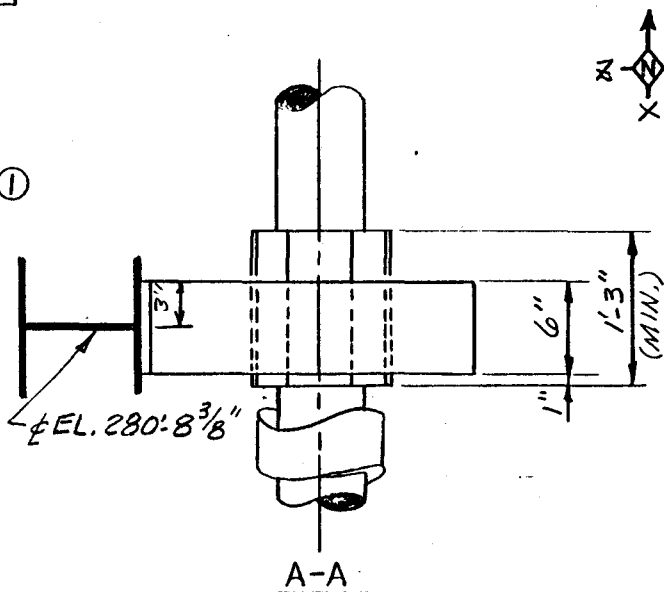
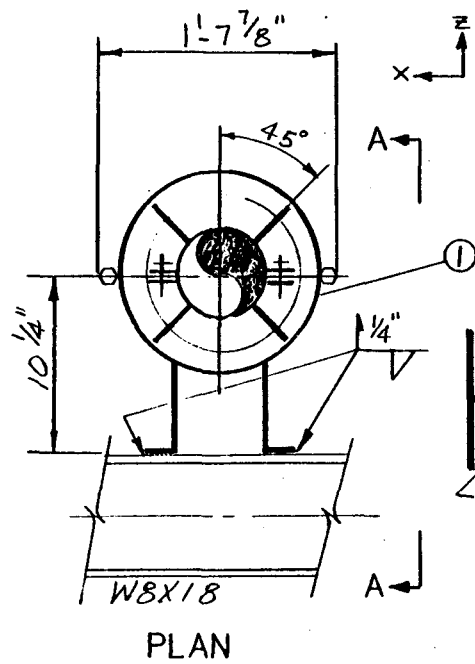
14		
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2		
1		

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .3k$ $F_z = .3k$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MIM	CHECKED	T.W.
DATE	4-21-80	DATE	7-27-80
REVIEWED	MIM	APPROVED	
DATE	7-27-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-MS-01-A-12/5		

5		
4		
3		
2		
1		
REVISIONS		
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	
	Stearns-Roger	11165/8
	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700	LINE NO
	6"MS-2-DEB	MARK NO
	H-MS-2-8	



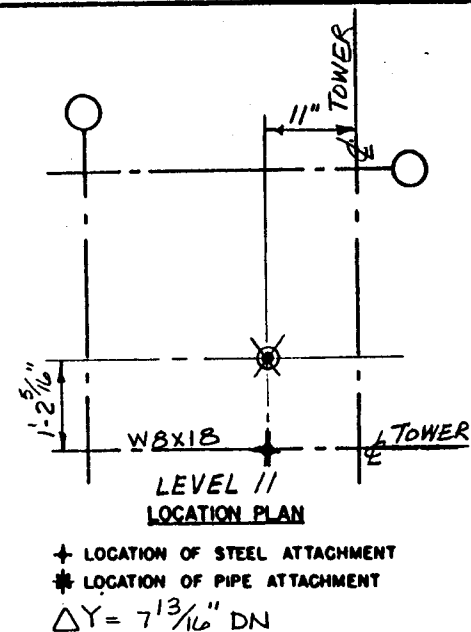
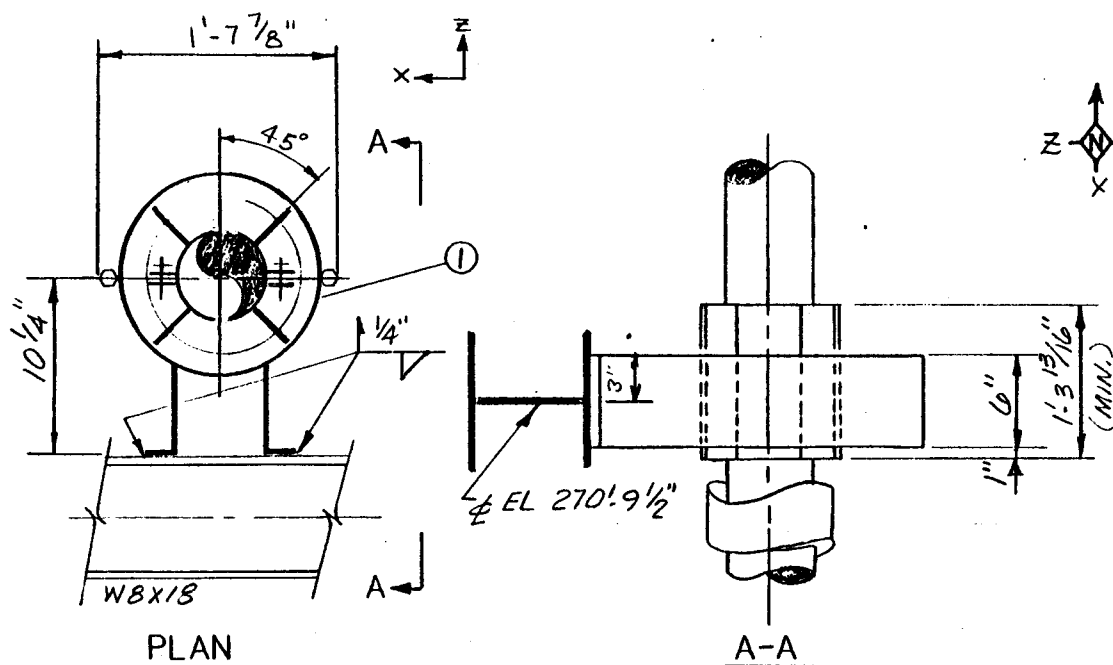
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-2	P4
D		STRUCTURAL	S32-5	0
C		ELECTRICAL		
B				
A				

14			
13			
12			
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9			
8			
7			
6			
5			
4			
3			
1	/	PIPE ALIGNMENT GUIDE SIM. FIG. 256	

NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = 1.1\text{k}$ $F_z = .7\text{k}$
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: $4\frac{1}{2}"$
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5				
DESIGNED	MLM	CHECKED	MLM	4	ITEM REQD	COMPONENT DESCRIPTION		
DATE	4-21-80	DATE	4-21-80	3	SCALE:	Stearns-Roger		
REVIEWED	MLM	APPROVED		2	NONE	11165/8		
DATE	4-29-80	DATE		1				
PROJECT	BDR		MLM	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
DATE	6-12-80		6-12-80	REVISIONS				
ANALYSIS ID. CODE	T/W-MS-01-A-12-5			PROJECT NO		C-21700	LINE NO	6/MS-2-QEB
							MARK NO	H-MS-2-9



Vol. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-2 P4
D	STRUCTURAL	S32-4 0
C	ELECTRICAL	
B		
A		

14		
13		
12		
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9		
8		
7		
6		
5		
4		
3		
2		
1		

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 2.2k$ $F_z = 1.1k$

PIPE SIZE: 6.625" O.D.

PIPE INSULATION: 4 1/2"

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	JH/M
DATE	4-21-80	DATE	2/13/80
REVIEWED	JH/M	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		JP, JP, Y
DATE	6-12-80		6-13-80
ANALYSIS ID. CODE	T/W-MS-01-A-12-5		

5
4
3
2
1
REVISIONS

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 6"MS-2-QEB
MARK NO	H-MS-2-10	

DO NOT WELD ACROSS WIDTH OF FLANGE

EXIST. W8x24

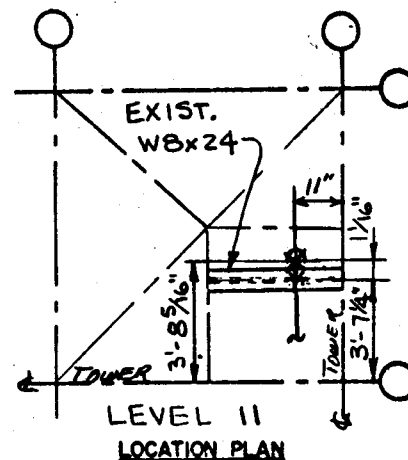
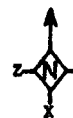
TOS EL. 271'-1 1/2"

EL. 270'-5 5/8"

6'-2 3/16"

EL. 264'-3 7/16"

ELEV. LOOKING SOUTH

PIPE ROTATED
90° SOUTHSUPPORT ROTATED
90° NORTH

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

Δ x= 0"

Δ z= 0"

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. NO.	TYPE	SIZE	13			
81H	A	62	12			
HOT LOAD		3174#	11			
COLD LOAD		N.A.	10			
VERT. TRAVEL C.T.O.H.		8 3/16" D.I.	9			
T.T. CONST. SUPPORT		10 1/2"	8			
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7	2	1" DIA. F. S. CLEVIS W/PIN FIG. 299	
E	PIPING	P9-2	P2	6	1" DIA. WELDING LUG, C=7 1/2" H.S. 53	ALLOY (BY FAB)
D	STRUCTURAL	332-4	Q	5	1" DIA. R. H. THD. W. E. ROD FIG. 278	
C	ELECTRICAL			4	1" SPRING	SEE DATA FOR 5MMH RRD
B				3	1" DIA. R. H. THD. ROD FIG. 140	
A				2	1" DIA. R. H. HEX NUT	
				1	1" DIA. STRUCT. WELDING LUG SHORT FIG. 55	

Δ REUSED MOUNT, LOAD & CAN SIZE

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: 4.0 KIPS

PIPE SIZE: 6.625"

PIPE INSULATION: 4 1/2"

PIPE MATERIAL: ASTM A335 P22

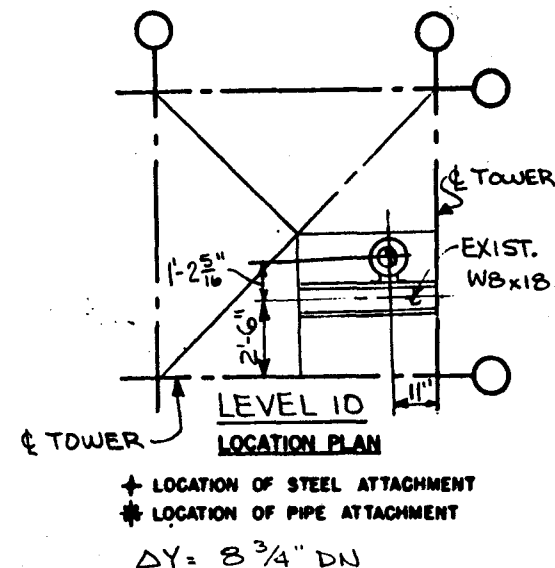
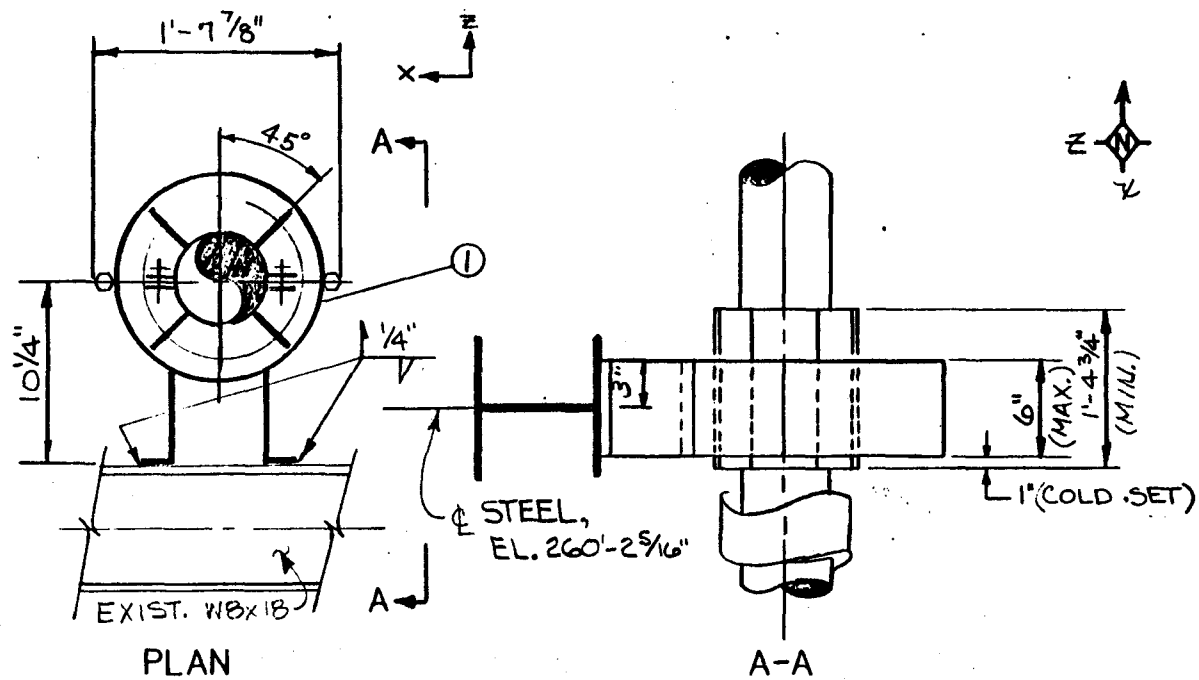
ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
DATE	DATE	APPROVED	DATE
REVIEWED	DATE	DATE	DATE
PROJECT	DATE		
DATE			

5	1	1	1" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
4		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3		SCALE:	Stearns-Roger	11165/8
		NONE		
		REVISIONS		
		PROJECT NO C-21700	LIVE NO 6'-MS-2-QTR	MARK NO H-MS-2-11

ANALYSIS ID. CODE T/W-112-01-A-13/6

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA



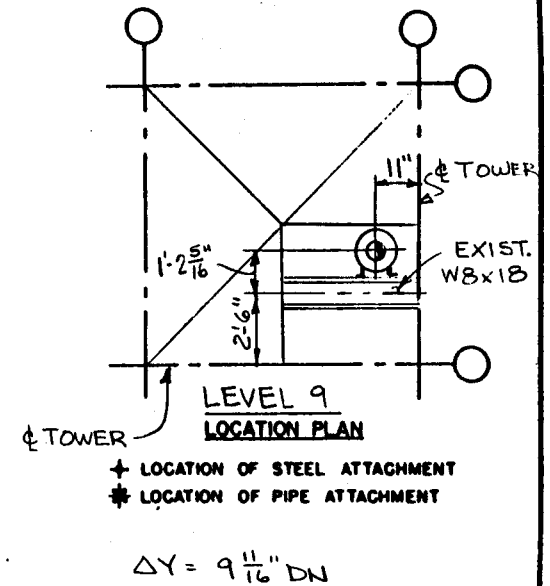
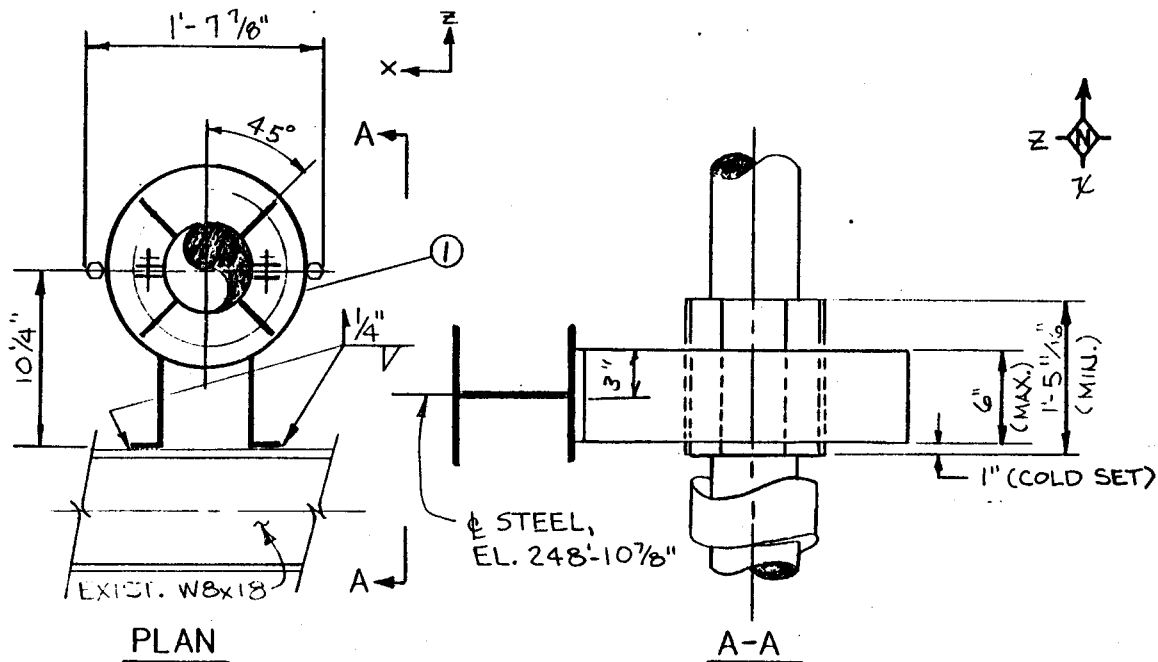
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P13-1	A
D		STRUCTURAL	S32-4	O
C		ELECTRICAL		
B				
A				

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1	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256,	
ITEM REQ'D	COMPONENT DESCRIPTION		REMARKS
SCALE: NONE	Stearns-Roger INCORPORATED		11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE N° 6-HS-2-00H	MARK N° 11-HS-2-12	

△ REVISED S.D. LOAD & ANALYSIS NO.

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = 2.1 \text{ K}$, $F_z = 0.4 \text{ K}$
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5					
DESIGNED	JMS	CHECKED		4	ITEM REQD	COMPONENT DESCRIPTION		REMARKS	
DATE	2/21	DATE		3	SCALE:	Stearns-Roger INCORPORATED		11165/8	
REVIEWED	JMS	APPROVED		2	NONE				
DATE	2/21	DATE		REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT	BDR		K. J. J.						
DATE	6-12-80		6-12-80						
ANALYSIS ID. CODE		TW-115-01-1-13/6		PROJECT NO C-21700		LINE NO	C-115-2-001	MARK NO	H-115-2-1



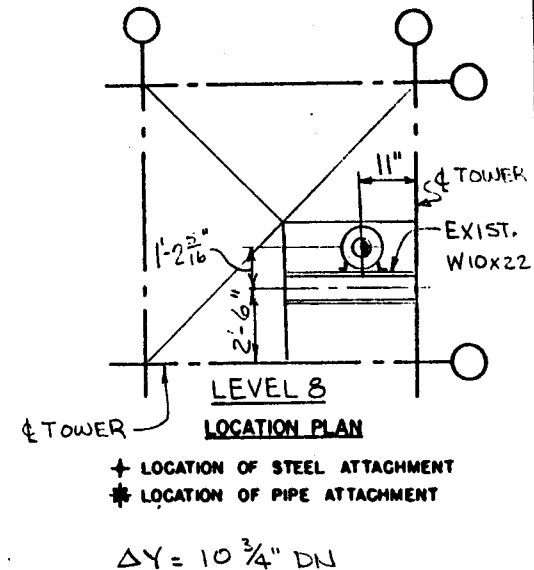
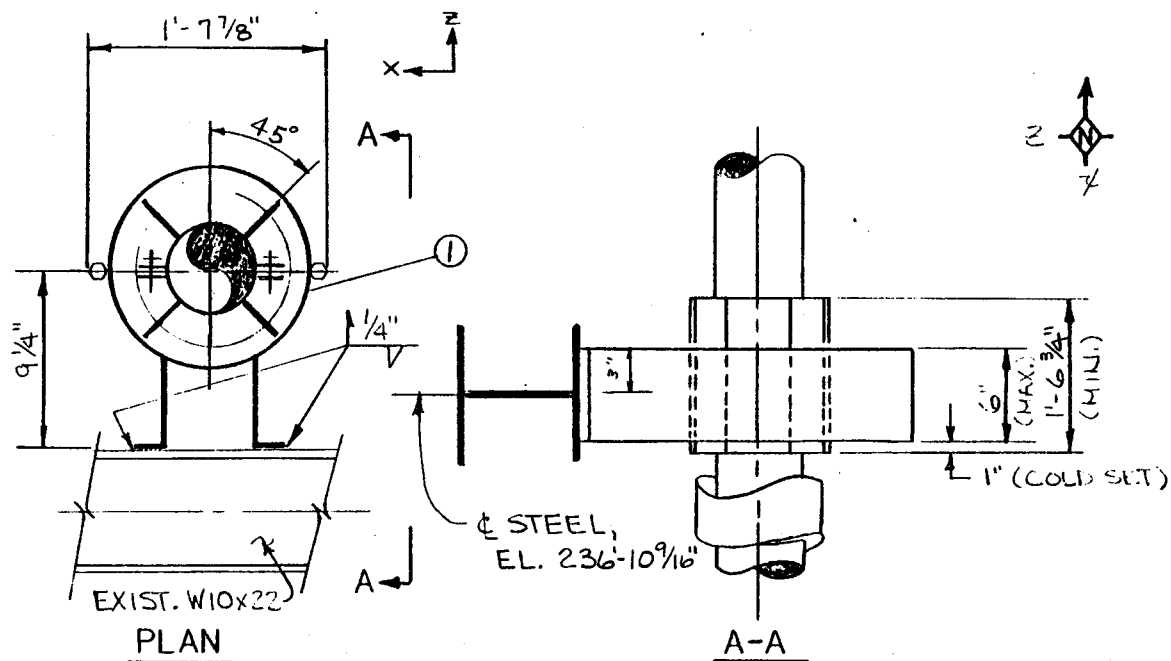
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	PI3-1	A
D		STRUCTURAL	S32-4	O
C		ELECTRICAL		
B				
A				

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.1K$, $F_z = 0.4K$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5			
DESIGNED	DATE	CHECKED	DATE	4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
REVIEWED	DATE	APPROVED	DATE	3	SCALE:	Stearns-Roger	11165/8
DATE	DATE	DATE	DATE	2	NONE		
PROJECT	DATE	DATE	DATE	1	REVISIONS	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
ANALYSIS ID. CODE	DATE	DATE	DATE				

PROJECT NO C-21700 LINE NO 6"-MS-2-01 MARK NO H-MS-2-13



VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	PI-1	A
D		STRUCTURAL	SR-1	C
C		ELECTRICAL		
B				
A				

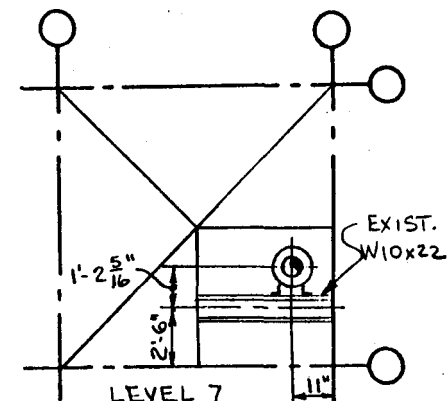
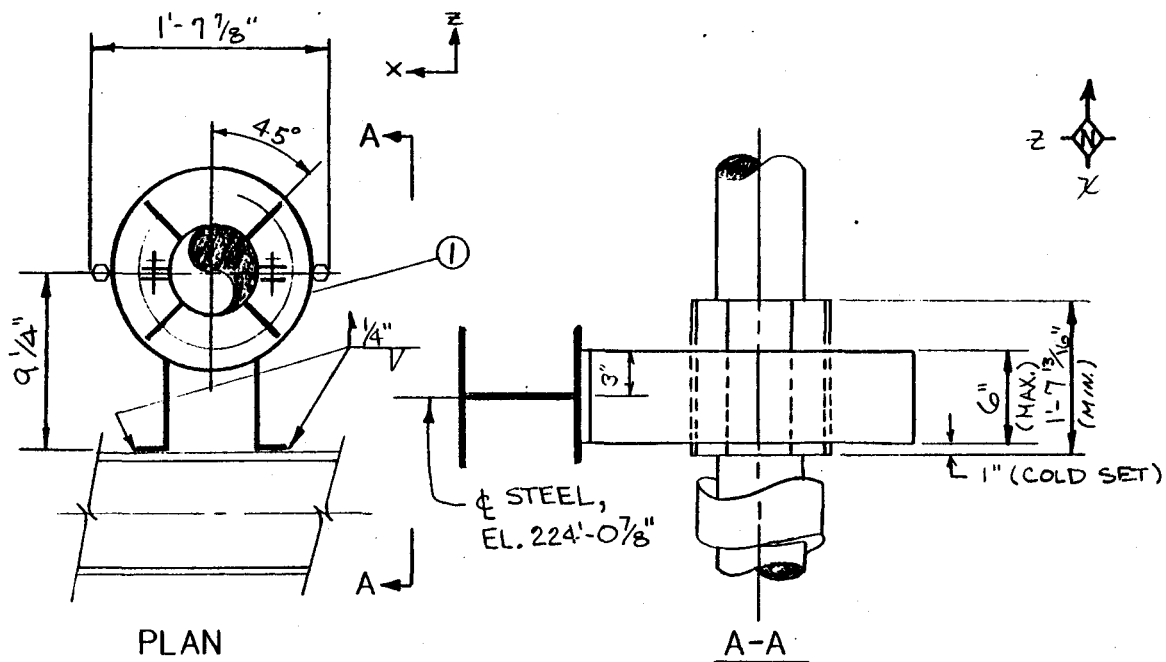
14	
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1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.0K$, $F_z = 0.1K$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	4/22/80	CHECKED	7/14/80	4
DATE	4/22/80	DATE	6/14/80	3
REVIEWED	4/24/80	APPROVED		2
DATE	4-30-80	DATE		1
PROJECT	BDR	DATE	6-12-80	REVISIONS
DATE	6-12-80			
ANALYSIS ID. CODE	T/W-11-01-A-1215			

ITEM REQ'D	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 64145-2-01E	MARK NO H-HS-2-14



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT

$$\Delta Y = 11 \frac{13}{16} \text{ IN}$$

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P13-1
D	STRUCTURAL	S32-4
C	ELECTRICAL	
B		
A		

14	
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4	
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1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 2.0K$, $F_z = 1.0K$

PIPE SIZE: 6.625" O.D.

PIPE INSULATION: 4 1/2"

PIPE MATERIAL: ASTM A335 12L

ENGINEERING RECORD

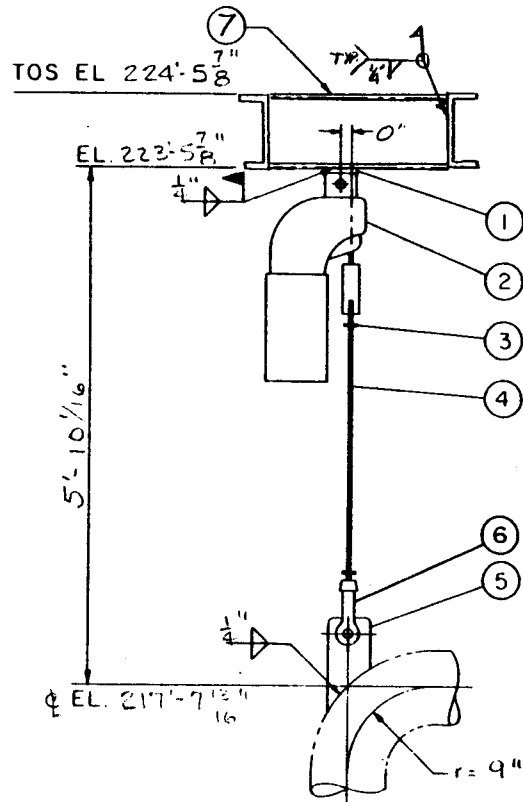
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DATE	7/12/80	DATE	7/12/80
REVIEWED	7/12/80	APPROVED	
DATE	7/30/80	DATE	
PROJECT	BDR		P. H. Y.
DATE	6-12-80		6-12-80
ANALYSIS ID. CODE	T/W-HS-01-A-12/5		

5
4
3
2
1

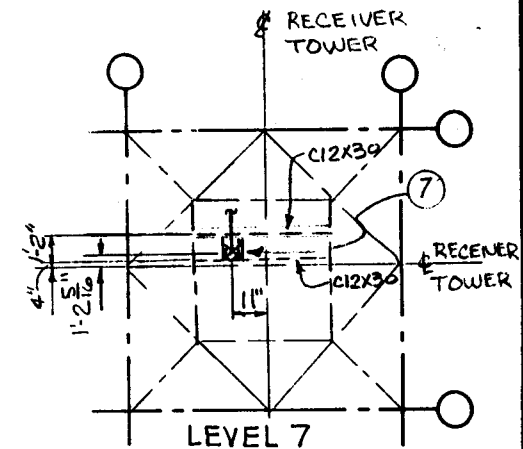
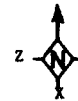
REVISIONS

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 6"-HS-2-01Y	MARK NO H-HS-2-15

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x = 0"
- △ z = 0"

VOL. PG. 0-1

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

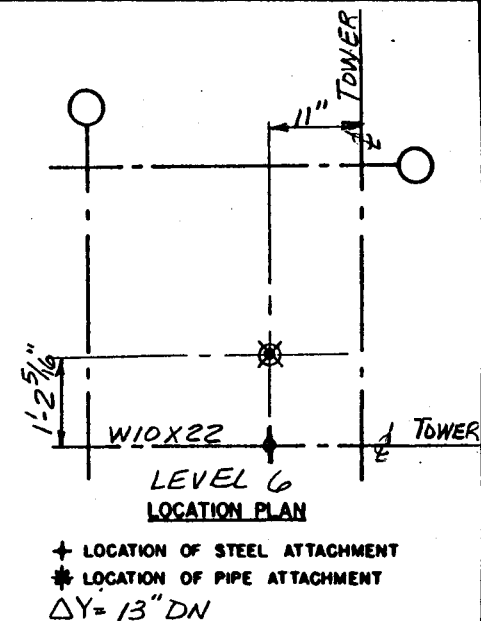
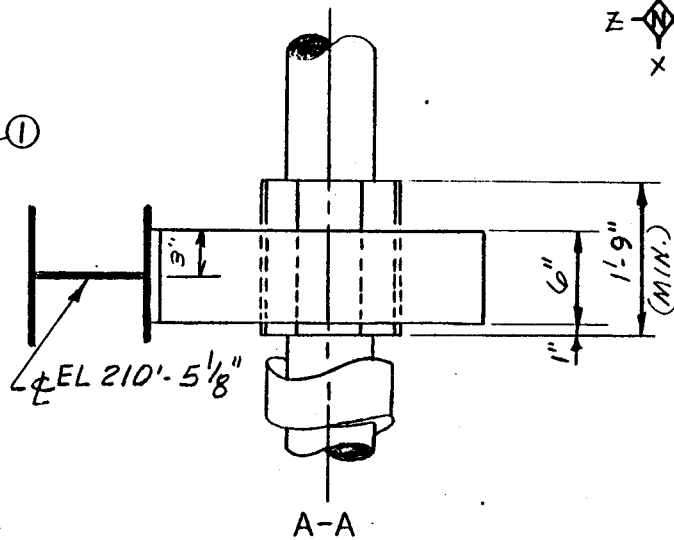
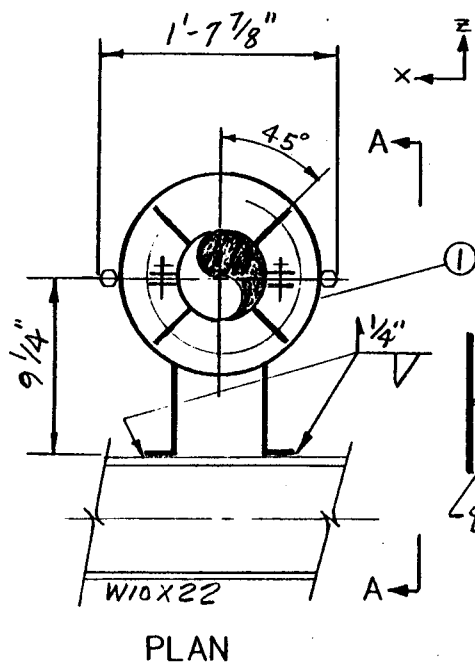
SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
80V	C	6"7	12		
HOT LOAD			11		
COLD LOAD			10		
VERT. TRAVEL C. TO H.			9		
T.T. CONST. SUPPORT			8		

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV	7	1	C 12X30 1'2" LG	
E		PIPING	P9-2	P3	6	1	1 1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
D		STRUCTURAL	S32-A	O	5	1	1 1/2" DIA. WELDING LUG C-7 1/2" H. S. 53 BY FAB.	
C		ELECTRICAL			4	1	1 1/2" DIA. R. H. THD. ROD FIG. 140	
B					3	2	1 1/2" DIA. R. H. HEX NUT	
A					2	1	SPRING	
								SEE DATA
								LONG

NOTES:
 PIPE TEMPERATURE: 1100 F
 STRUCTURAL DESIGN LOAD: 8.0 K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 GR. 12

ENGINEERING RECORD					
DESIGNED	DATE		CHECKED	DATE	
	3-12-80		PAV	3-27-80	
REVIEWED	DATE		APPROVED	DATE	
	3-12-80		PAV	3-27-80	
PROJECT	DATE				
ANALYSIS ID. CODE	T/W-MS-01-1-12/5				

Stearns-Roger
 11165/8
 MARK NO H-MS-2-16



VOL. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

14		
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1	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 2.2K$ $F_z = 1.3K$

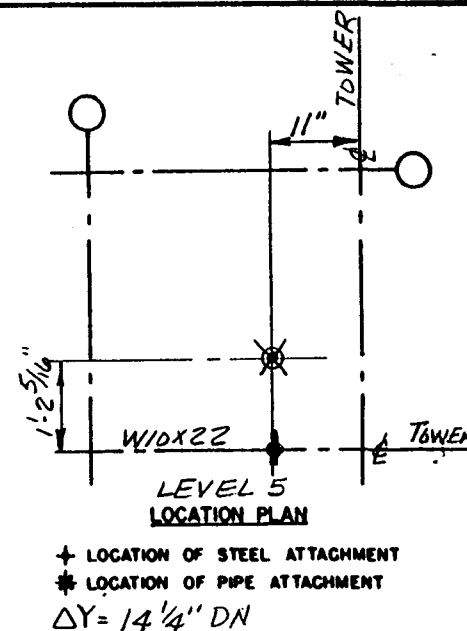
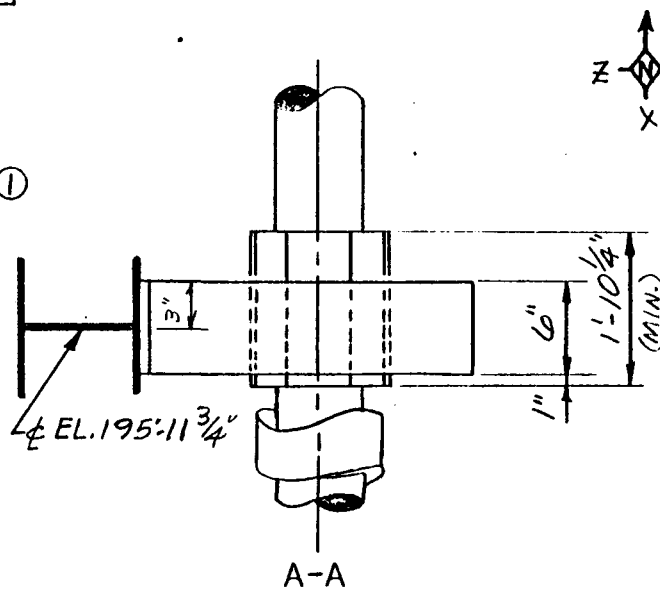
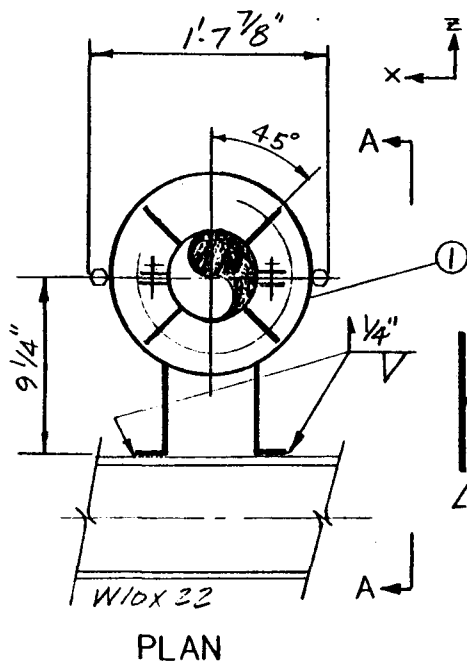
PIPE SIZE: 6.625" O.D.

PIPE INSULATION: 4 1/2"

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	MLM	CHECKED	J. P. M.	4
DATE	4-22-80	DATE	11-12-80	3
REVIEWED	J. P. M.	APPROVED		2
DATE	4-29-80	DATE		1
PROJECT	BDR		X. X. Y.	
DATE	6-12-80		6-12-80	
ANALYSIS ID. CODE	T/W-M3-C-A-12/5			

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 6"MS-2-QEB	MARK NO H-MS-2-17



VOL. P60-1

14			
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1			
PIPE ALIGNMENT GUIDE SIM. FIG. 256			
ITEM REQD COMPONENT DESCRIPTION REMARKS			
SCALE: NONE			
Stearns-Roger			
11165/8			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700 LINE NO 6' MS-2-QEB MARK NO H-MS-2-1B			

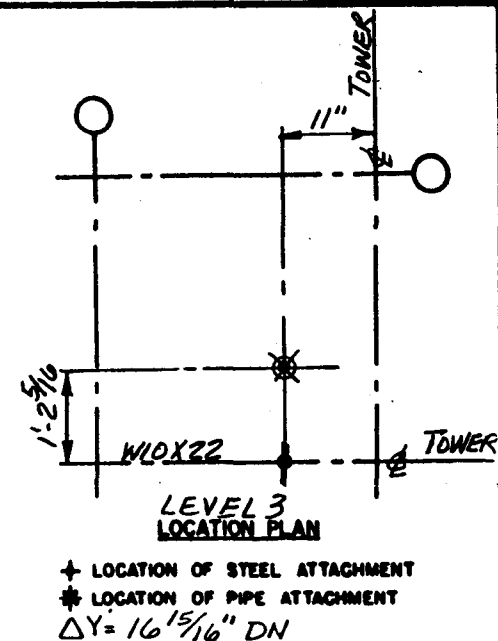
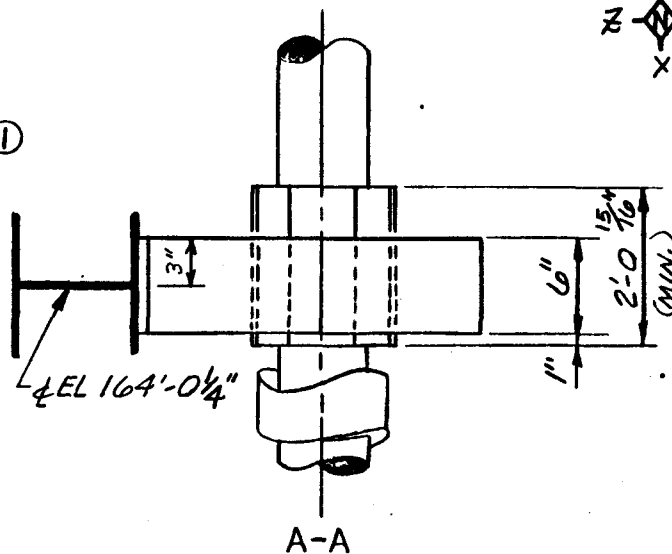
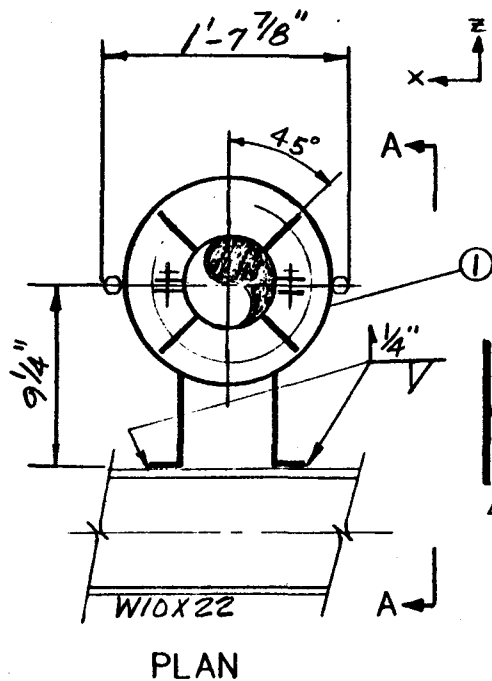
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	O
C		ELECTRICAL		
B				
A				

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.8k$ $F_z = 1.4k$
 PIPE SIZE: $6.625'' \text{ O.D.}$
 PIPE INSULATION: $4 \frac{1}{2}''$
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	J.P.Y.
DATE	4-22-80	DATE	4-22-80
REVIEWED	R.B.M.	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-111-1-A-12/5		

5			
4			
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1			
REVISIONS			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700 LINE NO 6' MS-2-QEB MARK NO H-MS-2-1B			



VOL. P60-1

Δ REVISED S.D. LOAD & ANALYSIS NO.

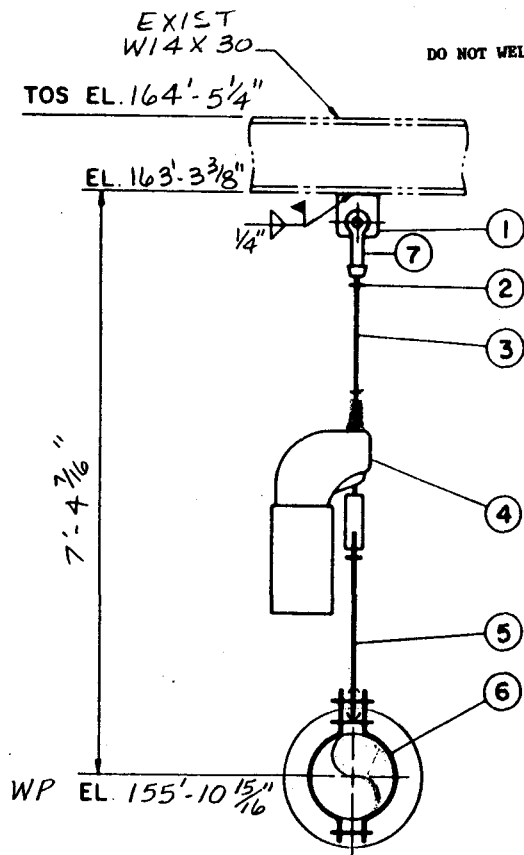
NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = 1.5k$ $F_z = 3.5k$
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P22

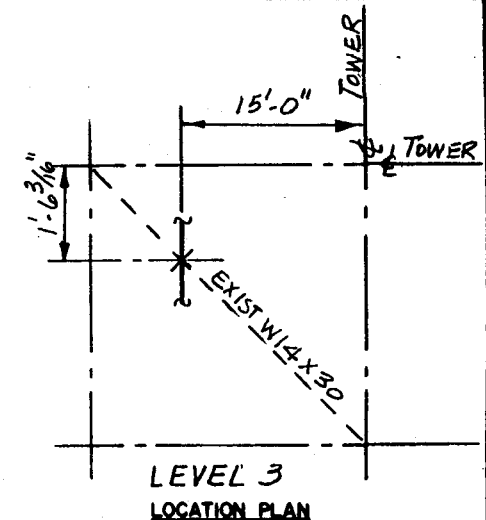
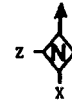
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	
C		ELECTRICAL		
B				
A				

ENGINEERING RECORD				5			
DESIGNED	MJM	CHECKED		4		ITEM REQD	COMPONENT DESCRIPTION
DATE	4-22-80	DATE	7-1-80	3		SCALE:	REMARKS
REVIEWED	HJM	APPROVED		2		NONE	
DATE	4-29-80	DATE					
PROJECT	BDR						
DATE	6-12-80						
ANALYSIS ID. CODE	TTH-115-CI-1-13/6			REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	X-115-1-A-4					PROJECT NO C-21700	LINE NO 6 "MS-2-9-EE MARK NO H-MS-2-30

14			
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7			
6			
5			
4			
3			
2			
1			
	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256	



ELEV. LOOKING SOUTHWEST
PIPE ROTATED 45°



★ LOCATION OF STEEL ATTACHMENT
✱ LOCATION OF PIPE ATTACHMENT

Δx = 1/2"
Δz = 1 1/4"

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. N°	TYPE	SIZE	13			
80V	B	44	12			
HOT LOAD		1083#	11			
COLD LOAD		N.A.	10			
VERT. TRAVEL C. TO H.		17 ³ / ₁₆ "DN	9			
T T CONST. SUPPORT		20"	8			
VENDOR ENG. REV.			7	2	5/8" DIA. F.S. CLEVIS FIG. 299	W/PIN
E	REFERENCE DRAWINGS		6	1	6" PIPE CLAMP FIG. 295A	
D	PIPING	P9-3	5	1	5/8" DIA. R. H. THD. W. E. ROD FIG. 278	
C	STRUCTURAL	S32-3	4	1	SPRING W/ EXTENDED LOW ARM	SEE DATA
B	ELECTRICAL		3	1	5/8" DIA. R. H. THD. ROD FIG 140	
A			2	3	5/8" DIA. R. H. HEX NUT	

NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.4 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P22

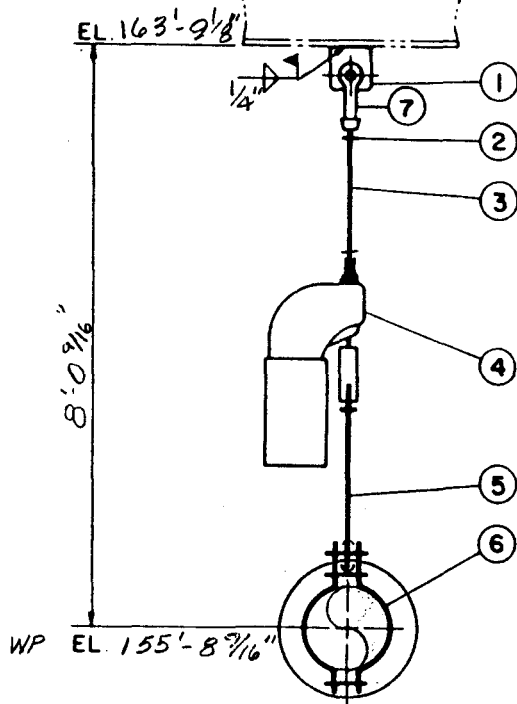
ENGINEERING RECORD

DESIGNED	MLM	CHECKED	RLH	FVH
DATE	3-4-80	DATE	3-24-80	3-27-80
REVIEWED	MLM	APPROVED	RLH	3-27-80
DATE	3-9-80	DATE	3-27-80	
PROJECT				
DATE				
ANALYSIS ID. CODE T/W-A15-01-A-12F				

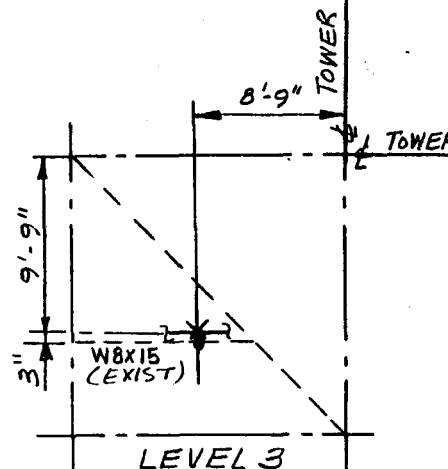
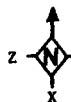
5		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4		SCALE:	Stearns-Roger	11165/8
3		NONE		
2				
1	REC-28A			
REVISIONS				
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO	C-21700	LINE NO	6"MS-2-QEB	MARK NO H-MS-2-21

EXIST W8X15
TOS EL. 164'-5 1/4"

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH
PIPE ROTATED 90°



LOCATION PLAN

✦ LOCATION OF STEEL ATTACHMENT
✦ LOCATION OF PIPE ATTACHMENT

$\Delta x = 1"$
 $\Delta z = 1/2"$

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			
FIG. NO	TYPE	SIZE	
80V	B	44	12
HOT LOAD		1066#	11
COLD LOAD		N.A.	10
VERT. TRAVEL C. TO H.		17 1/4" DN	9
T.T. CONST. SUPPORT		19 1/2"	8

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.			
E	PIPING	P9-3	P3	6	1
D	STRUCTURAL	S32-3	0	5	1
C	ELECTRICAL			4	1
B				3	1
A				2	3
				1	1

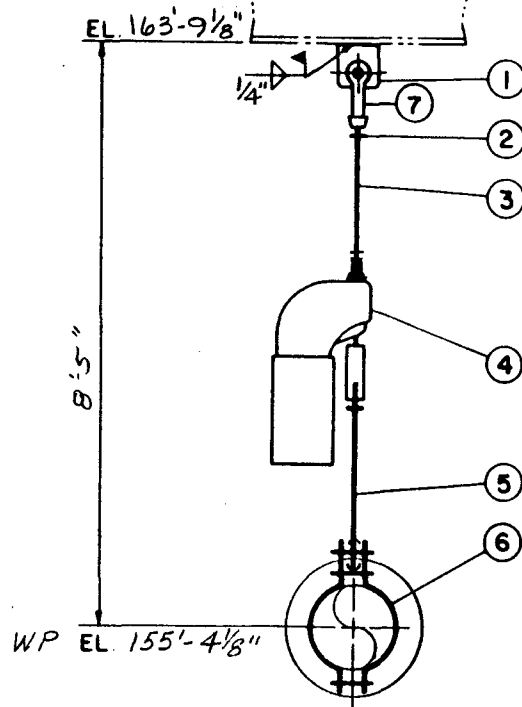
NOTES:
PIPE TEMPERATURE: 960°F.
STRUCTURAL DESIGN LOAD: 1.4K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 F12

ENGINEERING RECORD			
DESIGNED	AMM	CHECKED	APR FVH
DATE	3-4-80	DATE	3-27-80
REVIEWED	AMM	APPROVED	AMM
DATE	3-10-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	TW-115-01-A-12/5		

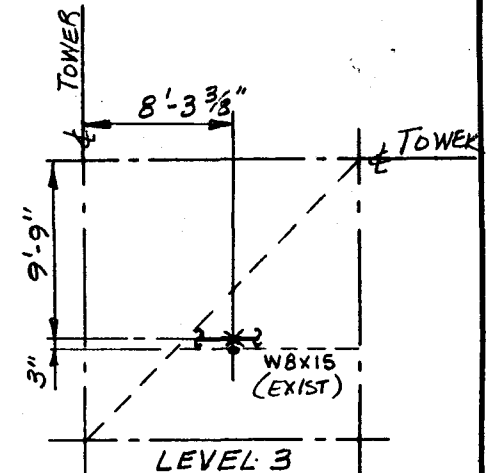
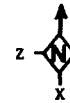
5		1	1	5/8" DIA. STRUCT. WELDING LUG SHORT FIG.	55
4		ITEM REQD	COMPONENT DESCRIPTION		REMARKS
3		SCALE:	Stearns-Roger INCORPORATED		
2		NONE			
1		MS-2-9EB 10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
REVISIONS					
PROJECT NO		C-21700	LINE NO	MS-2-9EB	MARK NO
				H-MS-2-22	

EXIST W8X15
TOS EL. 164'-5 1/4"

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH
PIPE ROTATED 90°



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT

Δx = -1/4"
Δz = -1"

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
80V	B	43	12		
HOT LOAD		1208.4	11		
COLD LOAD		N.A.	10		
VERT. TRAVEL C. TO H.		133/4" DN	9		
T.T. CONST. SUPPORT		16"	8		
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7	2	5/8" DIA. F.S. CLEVIS W/ PIN FIG. 299
E	PIPING	P9-3	P3	6	1 6" PIPE CLAMP FIG. 295A
D	STRUCTURAL	532-3	0	5	1 5/8" DIA. R. H. THD. W. E. ROD FIG. 278
C	ELECTRICAL			4	1 SPRING W/ EXTENDED LOAD ARM SEE DATA
B				3	1 5/8" DIA. R. H. THD. ROD FIG. 140
A				2	3 5/8" DIA. R. H. HEX NUT
				1	1 5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55

NOTES:

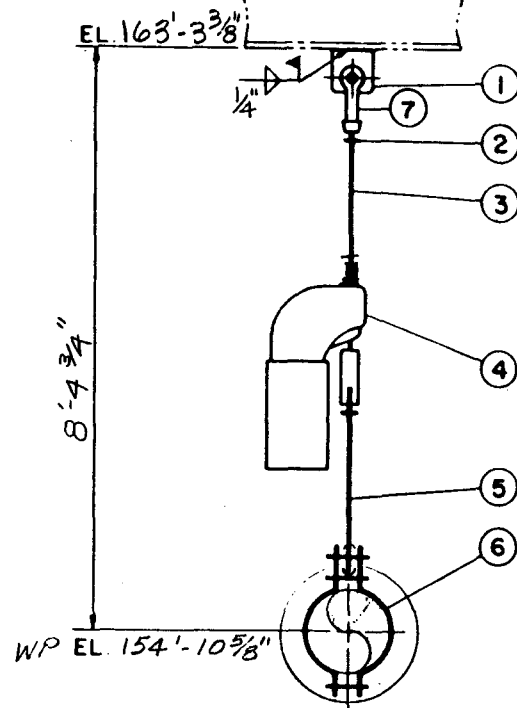
PIPE TEMPERATURE: 960°F.
STRUCTURAL DESIGN LOAD: 1.6 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5	
DESIGNED	MM	CHECKED	REU	4	
DATE	3-4-80	DATE	3-24-80	3	
REVIEWED	MM	APPROVED	MM	2	
DATE	3-10-80	DATE	3-27-80	1	
PROJECT				REVISIONS	
DATE					
ANALYSIS	ID. CODE	T/W-MS-00-A-1215		PROJECT NO	C-21700

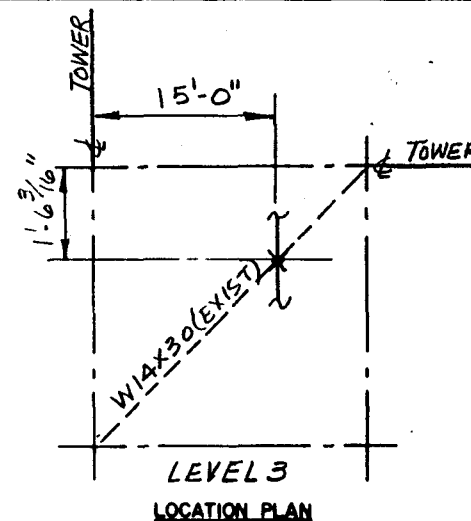
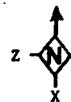
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
LINE NO	6MS-2-QER	MARK NO H-MS-2-23

EXIST W14X30
TOS EL. 164'-5 1/4"

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTHWEST
PIPE ROTATED 45°



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = -1 \frac{3}{16}$ "
 $\Delta z = -1 \frac{1}{16}$ "

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. NO.	TYPE	SIZE	13			
80V	B	37	12			
HOT LOAD		1049#	11			
COLD LOAD		N.A.	10			
VERT. TRAVEL C. TO H.		9 13/16" DN	9			
T.T. CONST. SUPPORT		12"	8			
VENDOR ENG. REV.			7	2	5/8" DIA. F.S. CLEVIS W/ PIN FIG. 297	
REFERENCE DRAWINGS			6	1	6" PIPE CLAMP FIG. 295A	
E	PIPING	P9-3	P3	5	1	5/8" DIA. R. H. THD. W. E. ROD FIG. 278
D	STRUCTURAL	S32-3	O	4	1	SPRING
C	ELECTRICAL			3	1	5/8" DIA. R. H. THD. ROD FIG. 140
B				2	3	5/8" DIA. R. H. HEX NUT
A				1	1	5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55

SEE DATA

NOTES

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.4k
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	ALM	CHECKED	RFW	FVH
DATE	3-7-80	DATE	3-27-80	
REVIEWED	RFW	APPROVED	RFW	
DATE	3-9-80	DATE	3-27-80	
PROJECT				
DATE				

5			
4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3	SCALE:		
2	NONE		
1	APC		
	REVISIONS		

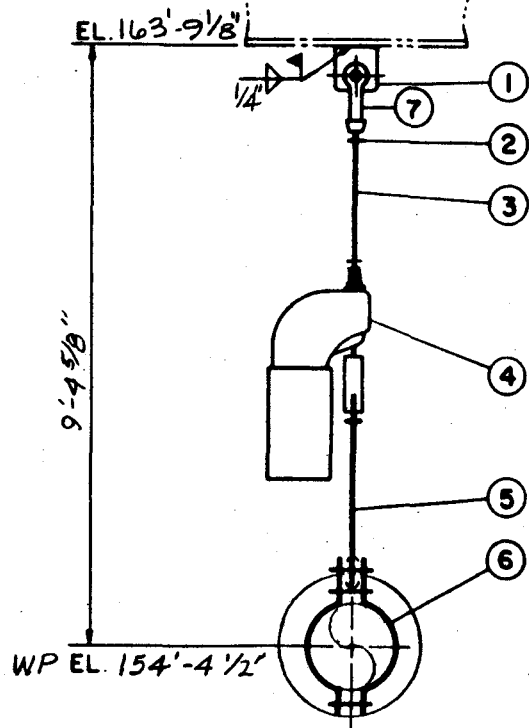
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ANALYSIS ID. CODE T/W-MS-2-4-12/5

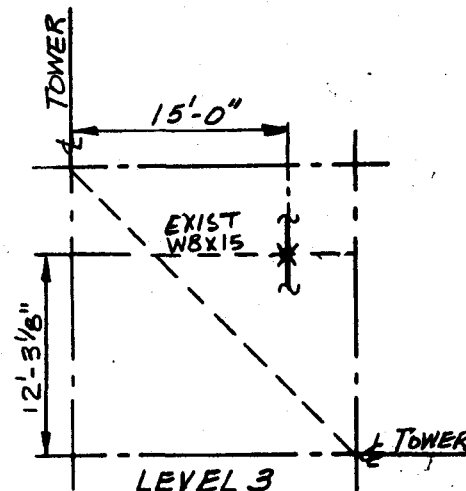
PROJECT NO C-21700 LINE NO 6"MS-2-QEB MARK NO H-MS-2-24

EXIST W8x15
TOS EL. 164'-5 1/4"

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = 2' 13/16"$
 $\Delta z = 1"$

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. NO.	TYPE	SIZE	13			
80V	B	23	12			
HOT LOAD		893#	11			
COLD LOAD		N.A.	10			
VERT. TRAVEL C. TO H.		4 1/2" DN	9			
T.T. CONST. SUPPORT		6"	8			
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7	2	5/8" DIA. F.S. CLAMP W/PM FR. 299	
E	PIPING	P 2-3	6	1	6" PIPE CLAMP FIG. 295 A	
D	STRUCTURAL	1-2-3	5	1	5/8" DIA. R. H. THD. W. E. ROD FIG. 278	
C	ELECTRICAL		4	1	SPRING SEE DATA	
B			3	1	5/8" DIA. R. H. THD. ROD FIG 140	
A			2	3	5/8" DIA. R. H. HEX NUT	
			1	1	5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55	

REVISOR PIPE ELEV.

NOTES:

PIPE TEMPERATURE: 760°F
STRUCTURAL DESIGN LOAD: 1.2K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MCM	CHECKED	PVH
DATE	3-7-80	DATE	3-27-80
REVIEWED	BH	APPROVED	PVH
DATE	3-7-80	DATE	3-27-80
PROJECT			
DATE			

5			
4			
3			
2			
1			
REVISIONS	ITEM	RECD	COMPONENT DESCRIPTION
			REMARKS

SCALE:
NONE

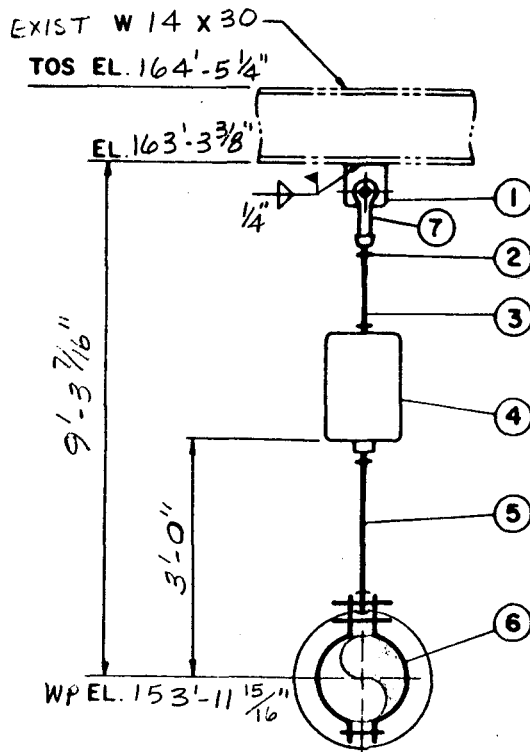
Stearns-Roger

11165/8

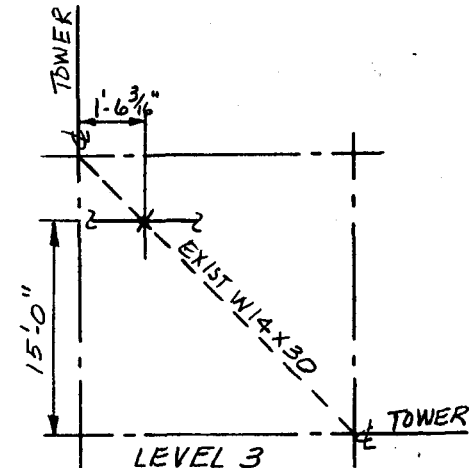
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE	TW-AIS-0-4-1515	PROJECT NO	C-21700	LINE NO	6-AIS-2-25B	MARK NO	H-AIS-2-25
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DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTHEAST
PIPE ROTATED 45°



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta X = 1' \frac{3}{16}"$
 $\Delta Z = 2' \frac{1}{4}"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO	TYPE	SIZE	13		
9B	A	10	12		
HOT LOAD			11		
COLD LOAD			10		
VERT. TRAVEL C. TO H.			9		
1 1/2" DN					
T.T. CONST. SUPPORT			8		
N/A					
REFERENCE DRAWINGS			7	1	3/4" DIA. F.S. CLEVIS FIG. 299
REV.			6	1	PIPE CLAMP FIG. 295A
PIPING			5	1	3/4" DIA. R.H. WE. ROD FIG. 278
STRUCTURAL			4	1	SPRING
ELECTRICAL			3	1	3/4" DIA. R.H. THD ROD FIG. 140
			2	3	3/4" DIA. HEX. NUT R.H.
			1	1	3/4" DIA. WELD LUG SHRT FIG. 55

7/W-MS-01-A-125

ANALYSIS ID. CODE

NOTES:

PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: 1.0 K.
PIPE SIZE: 4" O.D.
PIPE INSULATION: 1/2" THK.
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MAI	CHECKED	MAI	DATE	3-24-80
DATE	3-24-80	DATE	3-27-80	DATE	3-27-80
REVIEWED	MAI	APPROVED	MAI	DATE	3-27-80
DATE	3-27-80	DATE	3-27-80	DATE	3-27-80
PROJECT		PROJECT		PROJECT	
DATE		DATE		DATE	

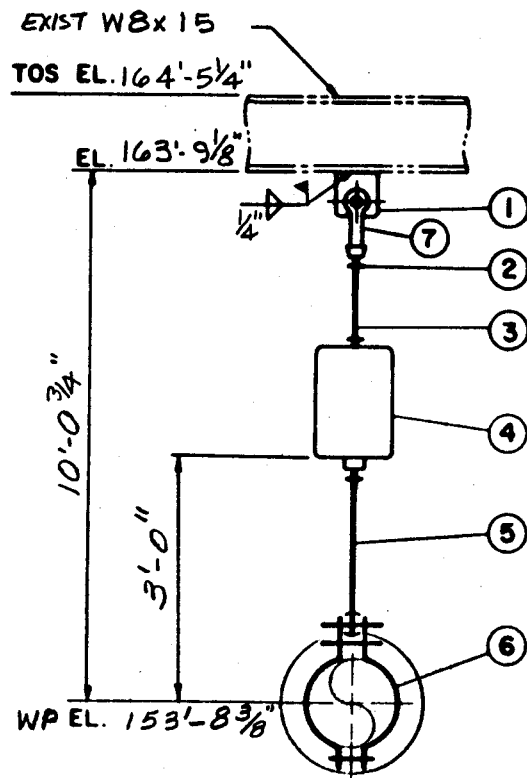
5			
4			
3			
2			
1			
REVISIONS			
PROJECT NO	C-21700	LINE NO	6"MS-2-REB
MARK NO	H-MS-2-26		

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

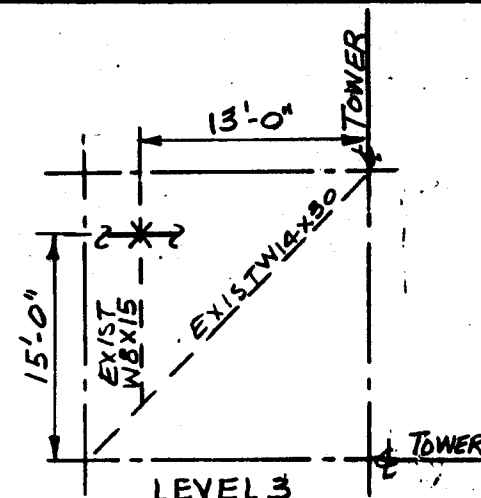
Stearns-Roger

11165/8

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST



LEVEL 3
LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
Δ X = -7/8"
Δ Z = 3 5/8"

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
98	A	9	12		
HOT LOAD		979 #	11		
COLD LOAD		1154 #	10		
VENDOR ENG. REV.		VERT. TRAVEL C. TO H. 13 1/4" UP	9		
E	T. T. CONST. SUPPORT		N/A.	8	
D	REFERENCE DRAWINGS		REV	7	1
C	PIPING	P 9-3	13	6	1
B	STRUCTURAL	332-3	0	5	1
A	ELECTRICAL			4	1
				3	1
				2	1
				1	1

ANALYSIS ID. CODE

Δ REVISED PIPE ELEV.

NOTES:
PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: 1.3 K.
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2" THK.
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5		
DESIGNED	MLM	CHECKED	REV	4		
DATE	3-4-80	DATE	3-27-80	3		
REVIEWED	JW	APPROVED	JW	2		
DATE	3-9-80	DATE	3-27-80	1		
PROJECT				REVISIONS		
DATE						
				PROJECT NO	C-21700	LINE NO
						4-ALD-2-QEB
						MARK NO
						H MS-2-27

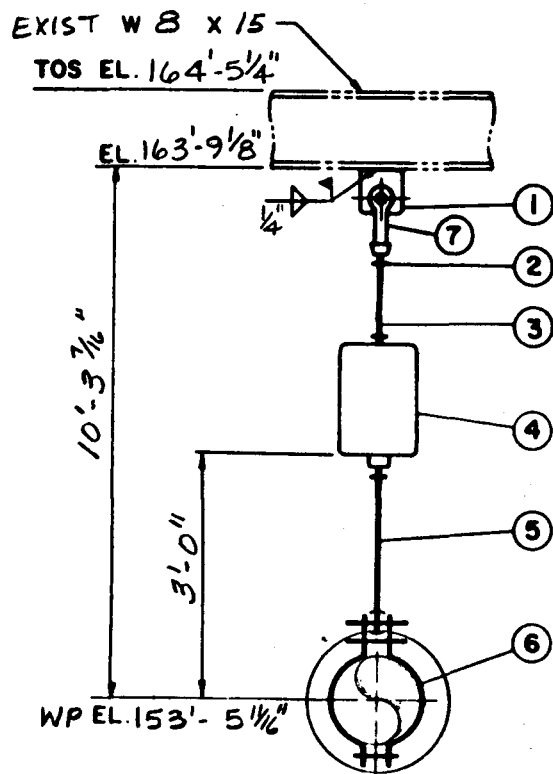
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

SCALE: NONE

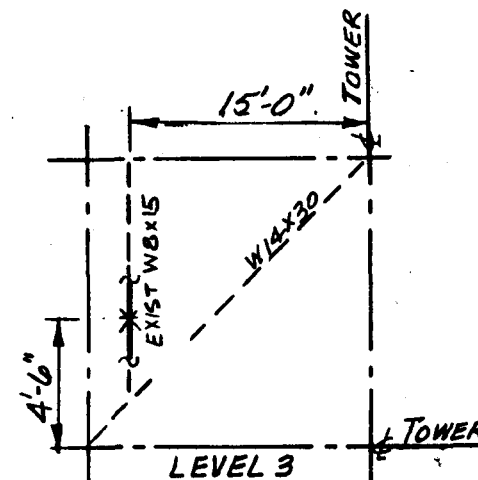
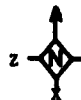
COMPONENT DESCRIPTION

REMARKS

11165/8



ELEV. LOOKING NORTH
PIPE ROTATED 90°



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δ X = -1/16"
 Δ Z = 3 1/4"

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS				$\Delta Z = 3\frac{1}{4}"$		VOL. P60-1	
SPRING DATA				14			
FIG. N°	TYPE	SIZE	13				
98	A	8	12				
HOT LOAD		615 #	11				
COLD LOAD		713 #	10				
VERT. TRAVEL C. TO H.			1 15/16" UP	9			
T T CONST. SUPPORT			N/A.	8			
REFERENCE DRAWINGS			REV.	7	1	5/8" DIA. F.S. CLEVIS FIG. 299	W/PIN
PIPING		P9-3	P3	6	1	6" PIPE CLAMP FIG. 295A	
STRUCTURAL		S33-3	0	5	1	5/8" DIA. R.H. WE. ROD FIG 278	
ELECTRICAL				4	1	SPRING	SEE DATA
-1-A-1215				3	1	5/8" DIA. R.H. THD ROD FIG. 140	
SIS ID. CODE				2		5/8" DIA. HEX. NUT R.H.	
ENGINEERING RECORD				5	1	5/8" DIA. WELD LUG SHORT FIG. 55	

△ REVISED DIM. IN LOC. PLAN & PIPE ELEV.

NOTES:
PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: .8 K.
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2" THK.
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5	1	1	5/8" DIA. WELD LUG SKRT FIG. 55	
DESIGNED	ALAN	CHECKED	ALAN	4	ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
DATE	3-1-60	DATE	3-27-60	3	SCALE:		Stearns-Roger INCORPORATED	11165/8
REVIEWED	ALAN	APPROVED	ALAN	2	NONE			
DATE	3-27-60	DATE	3-27-60	1				
PROJECT				REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
DATE				PROJECT NO C-21700		LINE NO 6 MS-2 QEA MARK NO 11 MS-2-28		



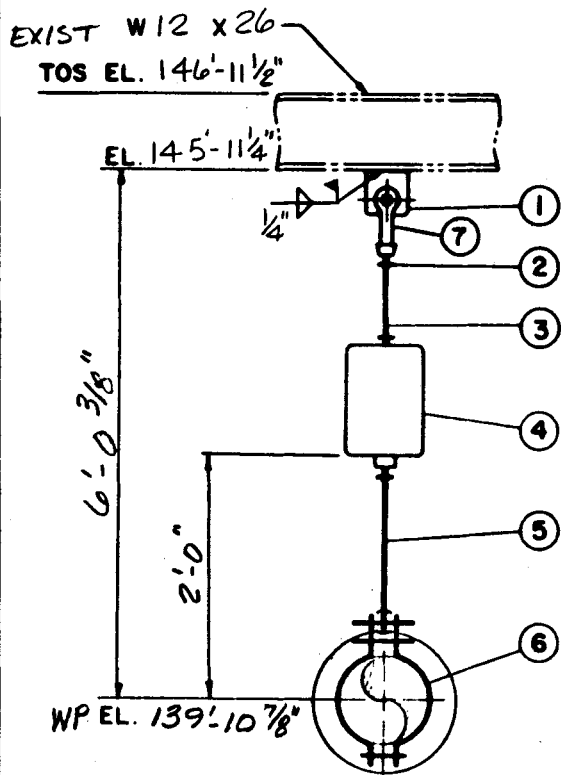
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 2.6 K
PIPE SIZE: 6.625 "O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P22

DESIGNED	MLM	CHECKED	REN
DATE	3-4-80	DATE	3-6-80
REVIEWED	MLM	APPROVED	2700
DATE	3-9-80	DATE	3-11-80
PROJECT			
DATE			

SPRING DATA			14		
FIG. NO	TYPE	SIZE	13		
98	A	12	12		
HOT LOAD		2095#	11		
COLD LOAD		2366#	10		
VERT. TRAVEL C. TO H.		1/4" UP	9		
T. T. CONST. SUPPORT		N.A.	8		
REFERENCE DRAWINGS		REV.	7	2	1" DIA. F. S. CLEVIS W/PIN FIG. 299
PIPING	P9-3	P3	6	1	6" DIA. WELDING LUG C-7 3/16" H. S. 53
STRUCTURAL	32-3	O	5	1	1" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	1	SPRING
			3	1	1" DIA. R. H. THD. ROD FIG. 140
			2	4	1" DIA. R. H. HEX NUT
			1	1	1" DIA. STRUCT. WELDING LUG FIG. 55

ENGINEERING RECORD				4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
DESIGNED	MLM	CHECKED	REN	3	SCALE: NONE	Stearns-Roger INCORPORATED	11165/8
DATE	3-4-80	DATE	3-6-80				
REVIEWED	MLM	APPROVED	VJH				
DATE	3-9-80	DATE	3-11-80	1	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT				REVISIONS			
DATE							
ANALYSIS ID. CODE		T/W-MS-1-1316		PROJECT NO C-21700		LINE NO 6745-2-508	MARK NO H-MS-2-29

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST

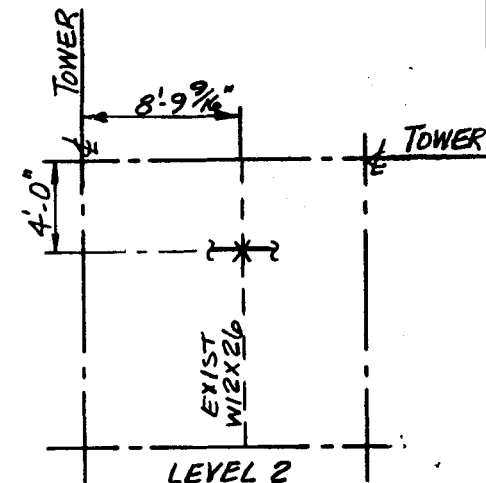
REVISED HOT & COLD LOAD & ANALYSIS N/A

NOTES:
PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: 1.3 K.
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2" THK.
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	300 FUL
DATE	3-5-80	DATE	3-7-80
REVIEWED	N/A	APPROVED	N/A
DATE	3-9-80	DATE	3-27-80
PROJECT			
DATE			

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. NO.	TYPE	SIZE	13			
B-268	A	9	12			
HOT LOAD			11			
COLD LOAD			10			
VERT. TRAVEL C. TO H.			9			
T.T. CONST. SUPPORT			8			
REFERENCE DRAWINGS			7	1	3/4" DIA. F.S. CLEVIS FIG. 299	W/PIN
PIPING			6	1	6" PIPE CLAMP FIG. 295 A	
STRUCTURAL			5	1	3/4" DIA. R.H. WE. ROD FIG. 278	
ELECTRICAL			4	1	SPRING	SEE DATA
			3	1	3/4" DIA. R.H. THD ROD FIG. 140	
			2		3/4" DIA. HEX. NUT R.H.	
			1	1	3/4" DIA. WELD LUG SIKRT FIG. 55	



LOCATION PLAN

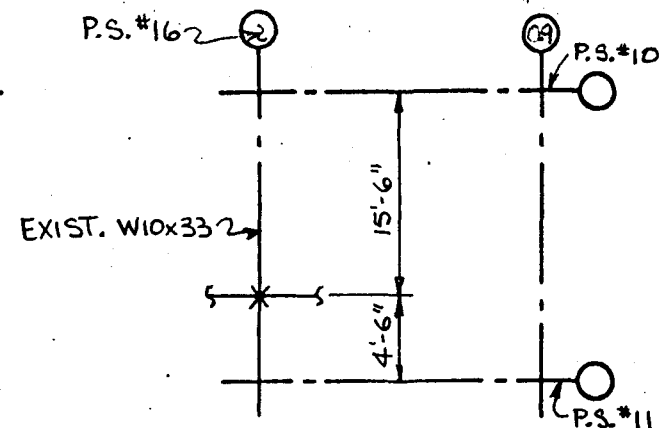
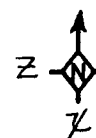
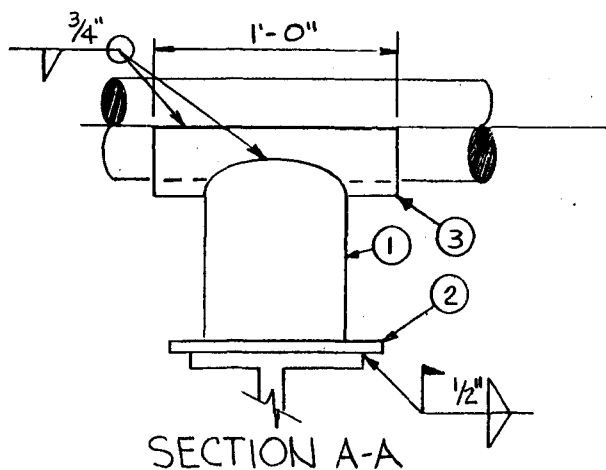
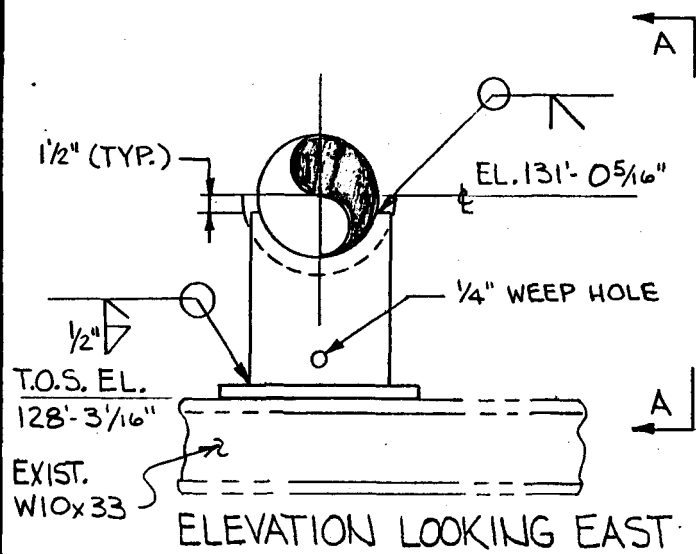
+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
Δ X = 5/16"
Δ Z = 1 3/16"

VOL. P 60-1

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 6"MS-2-GFB MARK NO 11 MS-2-30

**LOCATION PLAN**

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta X = 0"$ $\Delta Z = 0"$

* ALL ITEMS BY PIPE FABRICATOR

Vol. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P4
D	STRUCTURAL S33-4	1
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
3		SHAPED TO FORM PIPE SADDLE
3	1	3/4" x 10 1/2" x 1'-0" TP, ASTM A-87 GR.D*
2	1	1" x 9" x 9" TP *
1	1	6" XXS PIPE STALKHON 1335 122"

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 7.65K$, $F_y = 4.45K$ PIPE SIZE: 6.625" O.D. $F = 1.42K$, $M_x = 9.25K$ PIPE INSULATION: 4 1/2" $M_y = 4.4K$, $M_z = 2.16K$

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	7/12/7	CHECKED	7/12/7
DATE	5/15/80	DATE	5/15/80
REVIEWED	8/7/7	APPROVED	8/7/7
DATE	5-17-80	DATE	
PROJECT			
DATE			

5
4
3
2
1

ITEM REQD

SCALE:

NONE

Stearns-Roger

11165/8

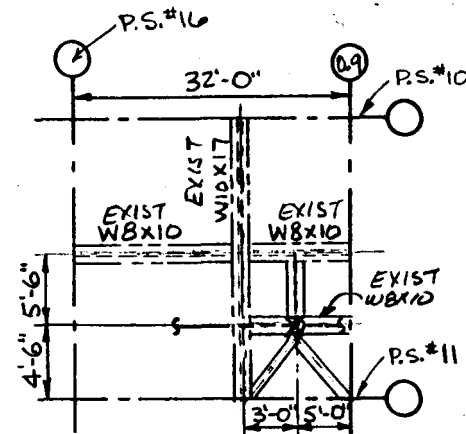
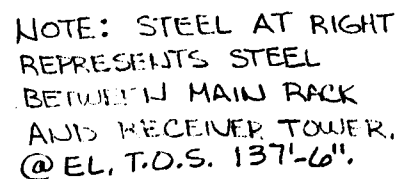
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE

PROJECT NO C-21700

LINE NO 6-HS-2-QER

MARK NO H-HS-2-B1



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -2\frac{5}{16}$
 $\Delta z = -2\frac{1}{4}"$

VOL. P 60-1

VENDOR ENG. REV.		14		
E		13		
D		12		
C		11		
B		10		
A		9		
		8		
CE DRAWINGS	REV.	7	2	5/8" DIA. F. S. CLEVIS W/PIN FIG. 299
P9-3	P.	6	1	5/8" DIA. WELDING LUG C-7 1/8" H.S. 53 (BY FAB)
523-4	A	5	1	5/8" DIA. R. H. THD. ROD FIG. 140
		4	1	5/8" DIA. F. S. TURNBUCKLE FIG. 230
		3	1	5/8" DIA. R. H. - L. H. THD. ROD FIG. 253
		2	3	5/8" DIA. R. H. HEX NUT
5	1	1	1	5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55

REFERENCE DRAWINGS		REV.	7	2	5/8"	DIA. F. S. CLEVIS W/PIN FIG. 299
PIPING	P9-3	P.	6	1	7/8"	DIA. WELDING LUG C-7 1/8" H. S. 53 (BY FAB.)
STRUCTURAL	503-4	A	5	1	5/8"	DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	1	5/8"	DIA. F. S. TURNBUCKLE FIG. 230
			3	1	5/8"	DIA. R. H. - L. H. THD. ROD FIG. 253
			2	3	5/8"	DIA. R. H. HEX NUT

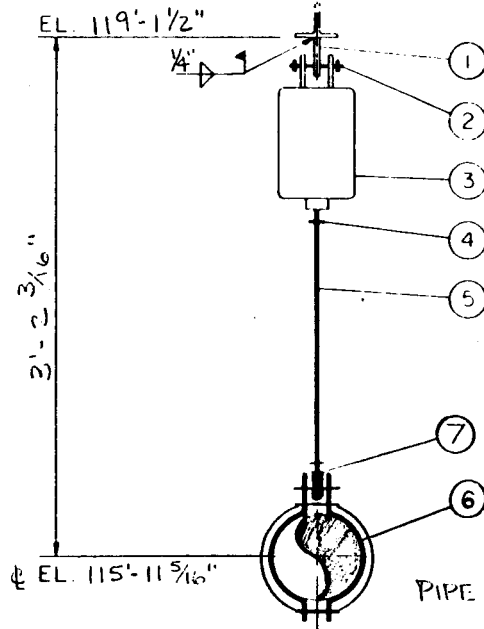
NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 2.7 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: A515 A235

ENGINEERING RECORD				5		1	1	72" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
DESIGNED	W/L	CHECKED	RCK FUL	4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS
DATE	2-16-80	DATE	2-27-80 3-27-80	3		SCALE:		Stearns-Roger INCORPORATED	11165/8
REVIEWED	W/L	APPROVED	W/L	2	SAE 9-31-80	NONE			
DATE	2-16-80	DATE	2-27-80	1	AF 9-30-80				
PROJECT						10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
DATE					REVISIONS				
ANALYSIS ID. CODE	W/L-MS-1	A-12/5		PROJECT NO	C-21700	LINE NO	6: MS-2-OEP	MARK NO	H-MS-2-33

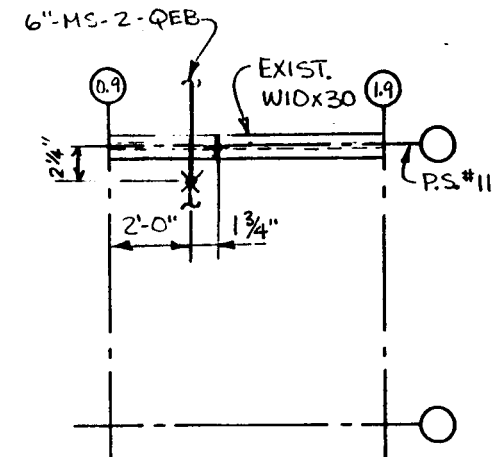
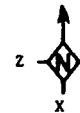
DO NOT WELD ACROSS WIDTH OF FLANGE

EXIST. W10x30
TOS EL. 120'-0"



ELEV. LOOKING EAST

PIPE ROTATED 90°



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

$\Delta x = -4 \frac{5}{8}"$

$\Delta z = -1 \frac{5}{16}"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
98	C	10	12		
HOT LOAD			11		
COLD LOAD			10		
VERT. TRAVEL C. TO H.			9		
T.T. CONST. SUPPORT			8		
REFERENCE DRAWINGS			7	1	3/4" DIA. WELDLESS EYENUT FIG. 290
PIPING			6	1	6" PIPE CLAMP FIG. 295 A
STRUCTURAL			5	1	3/4" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	2	3/4" DIA. R. H. HEX NUT
			3	1	3/4" SPRING
			2	1	3/4" DIA. PIN W/COTTER PIN FIG. 291
			1	1	3/4" DIA. STRUCT. WELDING LUG FIG. 55
ITEM REQD			COMPONENT DESCRIPTION		
SCALE:			NONE		
REVISIONS			10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700			LINE NO 6" MS-2-QEB		
MARK NO H MS-2-34			REMARKS		
			11165/8		

NOTES:

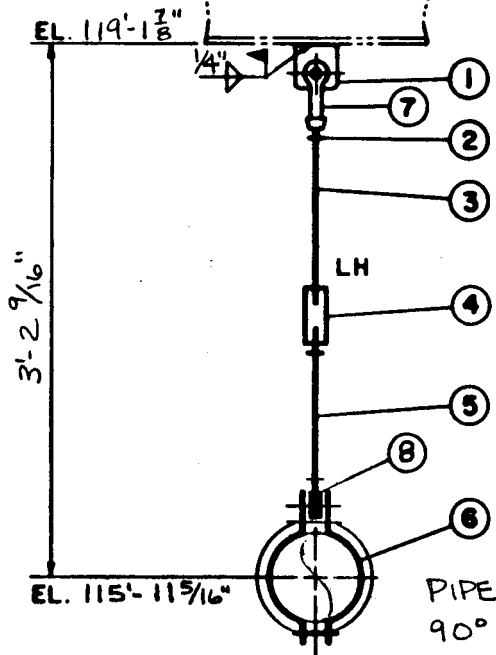
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.6 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: A335 P22

ENGINEERING RECORD

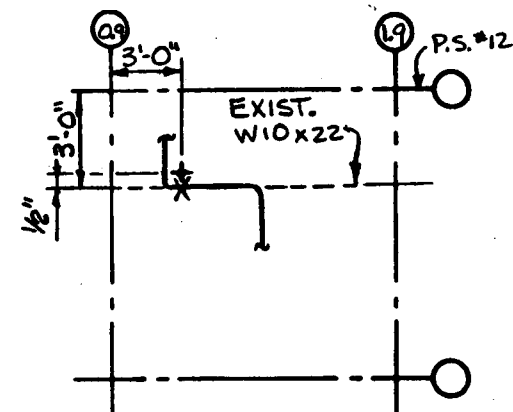
DESIGNED	DATE	CHECKED	DATE
DATE	3/10/80	DATE	3-27-80
REVIEWED	DATE	APPROVED	DATE
DATE	3/10/80	DATE	3-27-80
PROJECT	DATE		
DATE			
ANALYSIS ID. CODE	T/W/V-115-2-A-4/5/3		

DO NOT WELD ACROSS WIDTH OF FLANGE

EXIST. W10X22
TOS EL. 120'-0"



ELEV. LOOKING SOUTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = -2\frac{1}{2}"$
 $\Delta z = \frac{1}{8}"$

VOL. P60-1

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING	P1-10 P3
D		STRUCTURAL	533-1 A
C		ELECTRICAL	
B			
A			

14			
13			
12			
11			
10			
9			
8	1	7/8" DIA. WELDLESS EYENUT FIG. 290	
7	1	7/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
6	1	6" PIPE CLAMP FIG. 295H Alloy	
5	1	7/8" DIA. R. H. THD. ROD FIG. 140	
4	1	7/8" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	7/8" DIA. R. H. - L. H. THD. ROD FIG. 253	
2	3	7/8" DIA. R. H. HEX NUT	
1	1	7/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ITEM	RECD	COMPONENT DESCRIPTION	REMARKS
	SCALE: NONE	Stearns-Roger INCORPORATED	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 6-11-2-011	MARK NO H-MS-2-35

REVISOR MONT, S.D. LOAD & ANALYSIS NO.

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 4.0 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: A335 P22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	T/N/S-MS-P-A-717/5		



Hand-drawn diagram of Level 2 showing a proposed tower and existing structure. The diagram includes dimensions: 9'-1 1/8" for the horizontal distance from the tower to the existing structure, and 8'-6" for the vertical distance from the level to the existing structure. A dashed line labeled "EXISTING WIGXAO" connects the tower to the existing structure. The tower is labeled "TOWER" and the level is labeled "LEVEL 2".

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δ X = -9/16"
 Δ Z = 1 1/4"

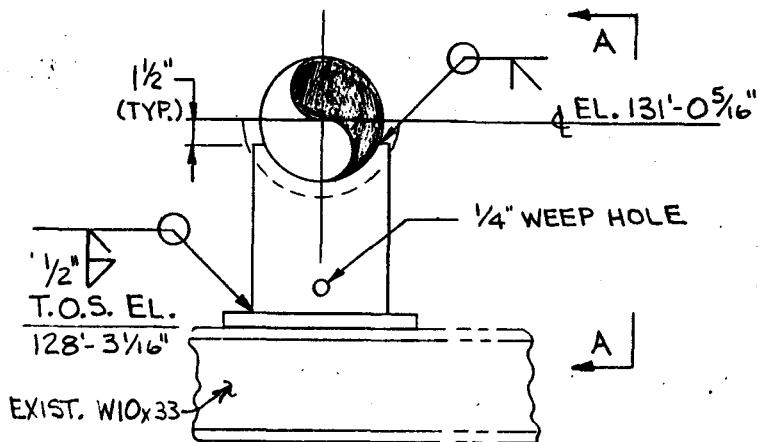
OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

VENDOR ENG. REV.	
E	
D	
C	
B	
A	

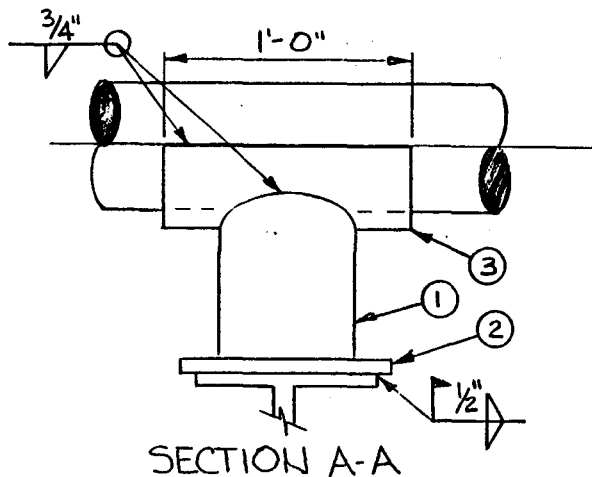
ANALYSIS ID. CODE

PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: 1.5 K.
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2" THK.
PIPE MATERIAL: ASTM A335 P22

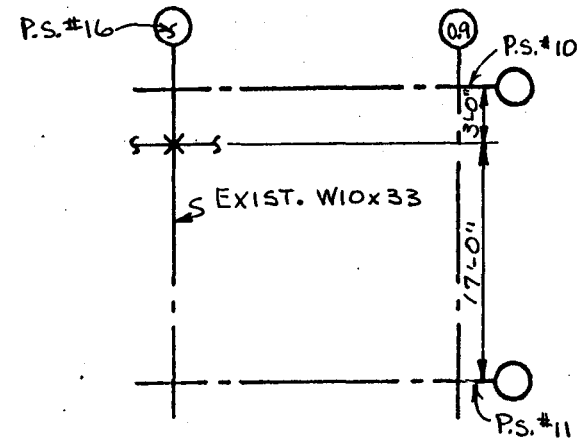
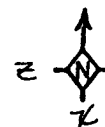
ENGINEERING RECORD				5		1	1	3/4" DIA. WELD LUG SHORT FIG. 55	
DESIGNED	MLM	CHECKED	RLA FVH	4		ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
DATE	3-15-80	DATE	3-24-80 3-27-80	3		SCALE:		Stearns-Roger INCORPORATED	11165/8
REVIEWED	HTM	APPROVED	HTM	2		NONE			
DATE	3-9-80	DATE	3-22-80	1					
PROJECT						10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
DATE				REVISED					
				PROJECT NO C-21700		LINE NO 6 MS-3-QEB		MARK NO H-MS-3-1	



ELEVATION LOOKING EAST



SECTION A-A



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = 0"
- Δ Z = 0"

Vol. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL S33-4	1
C	ELECTRICAL	
B		
A		

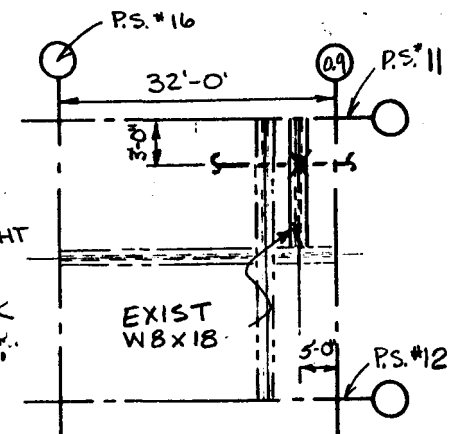
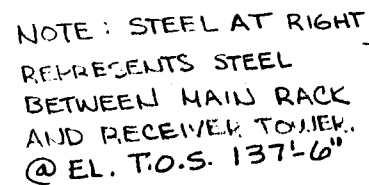
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1			
1	1	6" X XS PIPE STANCHION A335 P22	P22
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger	11165/8

NOTES:
 PIPE TEMPERATURE: 960 °F
 STRUCTURAL DESIGN LOAD: $F_x = 6.1 \text{ K}$, $F_y = 3.85 \text{ K}$
 PIPE SIZE: 6.625" O.D. $F_z = 1.43 \text{ K}$, $M_x = 4.7 \text{ K}$
 PIPE INSULATION: 4 1/2" $M_y = 8.2 \text{ K}$, $M_z = 20.0 \text{ K}$
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MPJ	CHECKED	
DATE	5/15/80	DATE	
REVIEWED	MPJ	APPROVED	
DATE	5-19-80	DATE	
PROJECT			
DATE			
ANALYSIS ID. CODE			

5			
4			
3			
2			
1			
REVISIONS		10 MHe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO C-21700		LINE NO 6"-HS-3-QEB MARK NO H-MS-3-2	

NOTES:
PIPE TEMPERATURE: 1100°F
STRUCTURAL DESIGN LOAD: $F_x = 6.0 \text{ K}$
 $F_y = 4.0 \text{ K}$
PIPE SIZE: 6.625" DIA.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P91



LOCATION PLAN

✦ LOCATION OF STEEL ATTACHMENT
✧ LOCATION OF PIPE ATTACHMENT

$$\Delta x = 1''$$
$$\Delta z = -2\frac{1}{4}''$$

VOL. P60-1

VENDOR ENG. REV.		14			
E		13			
D		12			
C		11			
B		10			
A		9			
		8			
CE DRAWINGS	REV.	7	2	3/4"	DIA. F. S. CLEVIS W/PIN FIG. 299
P9-3	P3	6	1	3/4"	DIA. WELDING LUG C-7 H.S. 53 (BY FALTR
S33-4	A	5	1	3/4"	DIA. R. H. THD. ROD FIG. 140
		4	1	3/4"	DIA. F. S. TURNBUCKLE FIG. 230
		3	1	3/4"	DIA. R. H. - L. H. THD. ROD FIG. 253
		2	3	3/4"	DIA. R. H. HEX NUT
		1	1	3/4"	DIA. STRUCT. WELDING LUG SHORT FIG. 55
5		ITEM REQD	COMPONENT DESCRIPTION		REMARKS
4		SCALE:	Stearns-Roger		11165/8
3		NONE	INCORPORATED		
2	2-11-53 HCU				
1	APC				
REVISIONS		10 MwE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 6"-MS-3-QEP		MARK NO H-MS-3-4	

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: 3.3 K

PIPE SIZE: 6.625" O.D.

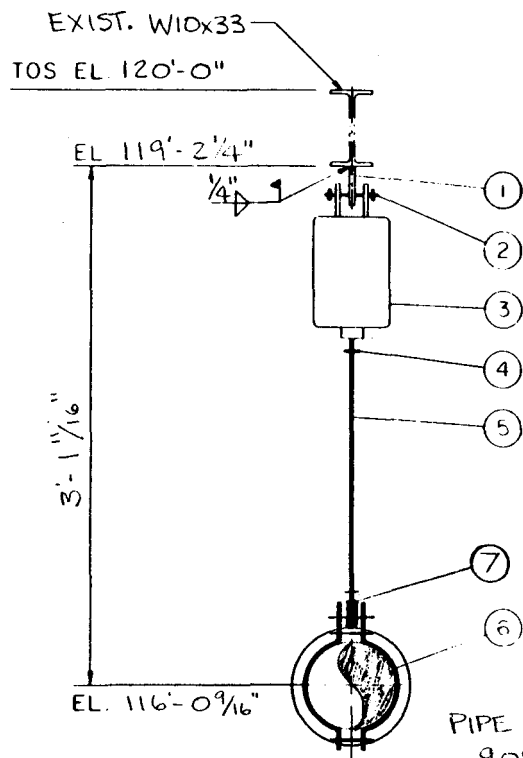
PIPE INSULATION: 4 1/2"

PIPE MATERIAL: ASTM A335 P22

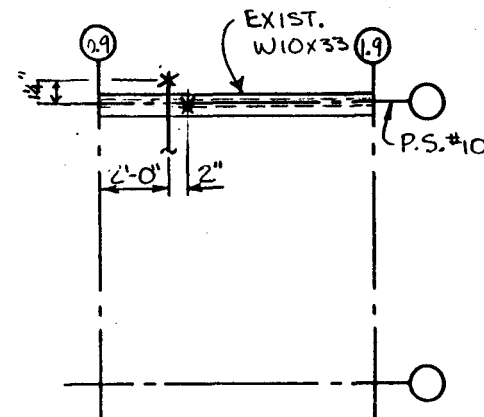
ENGINEERING RECORD

DESIGNED	<i>2/15/80</i>	CHECKED	<i>AKW</i>	<i>PH</i>
DATE	<i>2/15/80</i>	DATE	<i>2-24-80</i>	<i>3-27-80</i>
REVIEWED	<i>2/15/80</i>	APPROVED	<i>AKW</i>	
DATE	<i>2/16/80</i>	DATE		<i>2-27-80</i>
PROJECT				
DATE				
ANALYSIS ID. CODE	<i>T/W/X-MS-3-A-3/3/1</i>			

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta X = 1 \frac{7}{16}''$
 $\Delta Z = -2 \frac{1}{2}''$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

SPRING DATA			14
FIG. NO.	TYPE	SIZE	13
B-268	C	9	12
HOT LOAD		923 lb.	11
COLD LOAD		755 lb.	10
VERT. TRAVEL C. TO H.		15/16" (1.875)	9
T.T. CONST. SUPPORT		N.A.	8

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-10
D	STRUCTURAL	S22-1
C	ELECTRICAL	
B		
A		

7	1	3/4" DIA. WELDLESS EYENUT FIG. 290	
6	1	6" PIPE CLAMP FIG. 295 A	
5	1	3/4" DIA. R. H. THD. ROD FIG. 140	
4	2	3/4" DIA. R. H. HEX NUT	
3	1	3/4" SPRING	SEE DATA
2	1	3/4" DIA. PIN W/COTTER PIN FIG. 291	
1	1	3/4" DIA. STRUCT. WELDING LUG FIG. 55	

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.2 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 1 1/2"
PIPE MATERIAL: A387-91

ENGINEERING RECORD				5
DESIGNED	3/3/80	CHECKED	REX FVH	4
DATE	3/3/80	DATE	3-27-80	3
REVIEWED	HFM	APPROVED	HFM	2
DATE	3/9/80	DATE	3-27-80	1
PROJECT				REVISIONS
DATE				

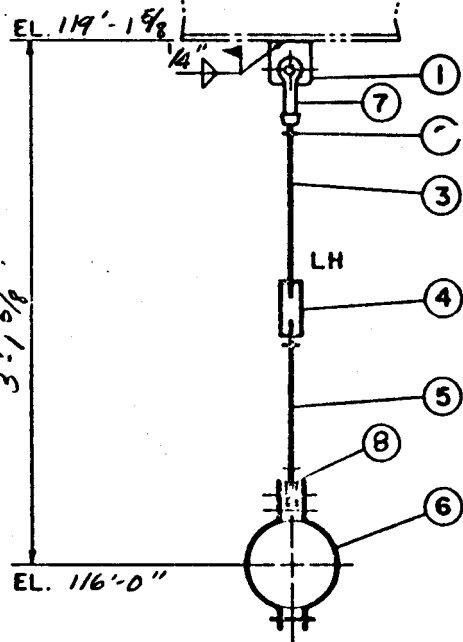
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger INCORPORATED	11165/8

ANALYSIS ID. CODE	T/W/X-HS-H-A-3/3/1	PROJECT NO	C-21700	LINE NO	6-HS-3-QEE	MARK NO	H-HS-3-S
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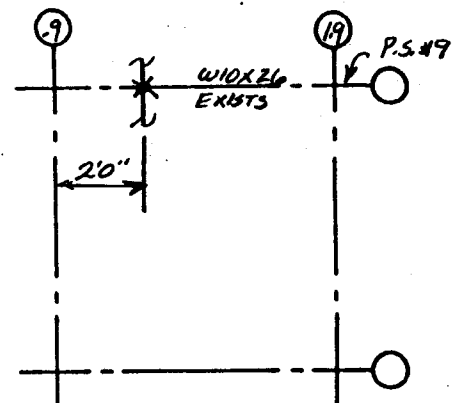
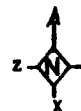
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

DO NOT WELD ACROSS WIDTH OF FLANGE

EXIST W10X26
TOS EL. 120'-0"



ELEV. LOOKING NORTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta x = 0"$
 $\Delta z = -1/16"$

VOL. P60-1

14			
13			
12			
11			
10			
9			
8	1	3/8" DIA. WELDLESS EYENUT FIG. 290	
7	1	3/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
6	1	6" PIPE CLAMP FIG. 295 H 440X	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	3/8" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. - L. H. THD. ROD FIG. 253	
2	3	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger	11165/8
NONE			
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT N° C-21700		LINE N° 6"MS-3-OEB	MARK N° H-MS-3-6

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P 9-10	P 3
D		STRUCTURAL 533-1	
C		ELECTRICAL	
B			
A			

ENGINEERING RECORD

DESIGNED	W. A. E.	CHECKED	J. E. D.
DATE	3/15/80	DATE	3-27-80
REVIEWED	J. E. D.	APPROVED	J. E. D.
DATE	3/10/80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	TWIX-A15-3-A-3/3/1		

NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 3.4K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2" THICK
PIPE MATERIAL: ASTM A335 P22

EXIST W6X9

TOS EL. 120'-0"

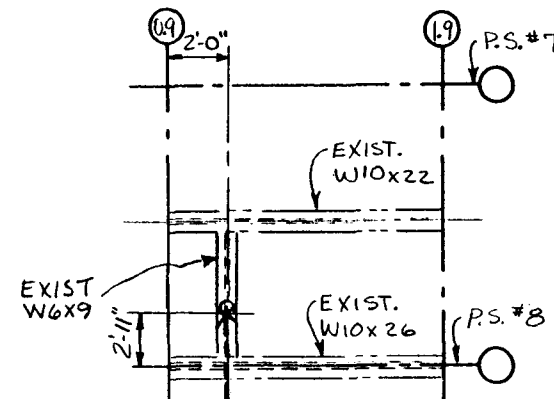
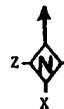
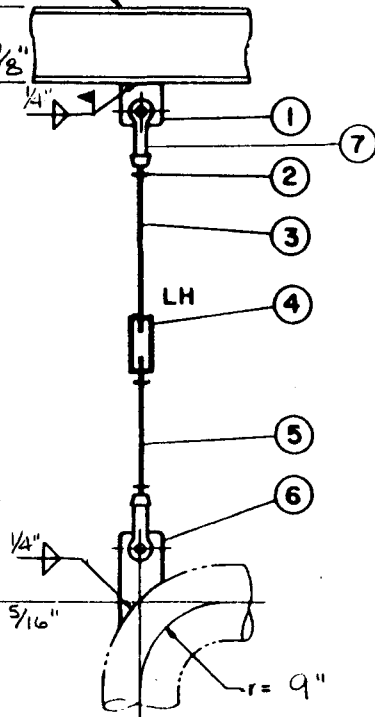
DO NOT WELD ACROSS WIDTH OF FLANGE

EL. 119'-6 1/8"

3'-6 13/16"

EL. 115'-11 5/16"

ELEV. LOOKING EAST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta x = -1 \frac{5}{8}"$ $\Delta z = 2 \frac{5}{16}"$

VOL. P60-1

VENDOR ENG. REV.	14		
E	13		
D	12		
C	11		
B	10		
A	9		
	8		

REFERENCE DRAWINGS	REV.	7	2	5/8"	DIA. F. S. CLEVIS W/PIN FIG. 299	
PIPING	P-1-10	P.	6	1	5/8" <th>DIA. WELDING LUG C=7 7/8" H.S. 53 (BY FHB JR)</th>	DIA. WELDING LUG C=7 7/8" H.S. 53 (BY FHB JR)
STRUCTURAL	S33-1	A	5	1	5/8" <th>DIA. R. H. THD. ROD FIG. 140</th>	DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	1	5/8" <th>DIA. F. S. TURNBUCKLE FIG. 230</th>	DIA. F. S. TURNBUCKLE FIG. 230
			3	1	5/8" <th>DIA. R. H. - L. H. THD. ROD FIG. 253</th>	DIA. R. H. - L. H. THD. ROD FIG. 253
			2	3	5/8" <th>DIA. R. H. HEX NUT</th>	DIA. R. H. HEX NUT
			1	1	5/8" <th>DIA. STRUCT. WELDING LUG SHORT FIG. 55</th>	DIA. STRUCT. WELDING LUG SHORT FIG. 55

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 2.1 K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4" 5"
 PIPE MATERIAL: A335 P22

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
DATE	3-10-80	DATE	3-27-80
REVIEWED	DATE	APPROVED	DATE
DATE	3-10-80	DATE	3-27-80
PROJECT			
DATE			

5

4

3

2

1

REVIEWS

ITEM REQD

SCALE:

NONE

COMPONENT DESCRIPTION

Stearns-Roger

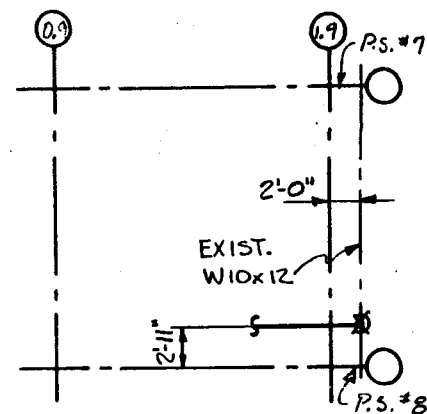
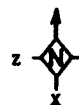
11165/8

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700

LINE NO 6" MS-3-06B

MARK NO H-MS-3-7



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δ x = -11/16"
 Δ z = 1/2"

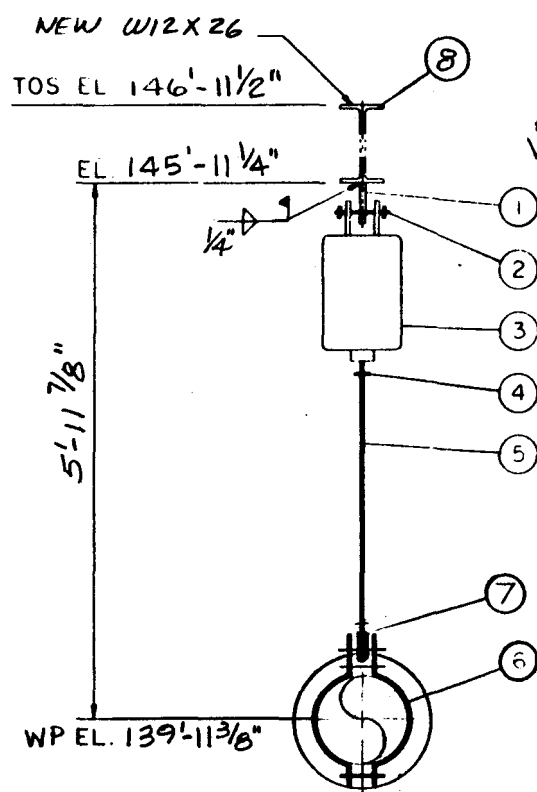
**OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS**

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.				
E		PIPING	P9-8	B	6	1	1" DIA. F. S. CLEVIS W/PIN FIG. 299	
D		STRUCTURAL	S33-1	A	5	1	1" DIA. WELDING LUG C-7 7/8" H. S. 53	(BY FPL TR)
C		ELECTRICAL			4	1	1" DIA. R. H. THD. ROD FIG. 140	
B					3	1	SPRING	SEE DATA
A					2	4	1" DIA. R. H. THD. ROD FIG. 140	
					2	4	1" DIA. R. H. HEX NUT	

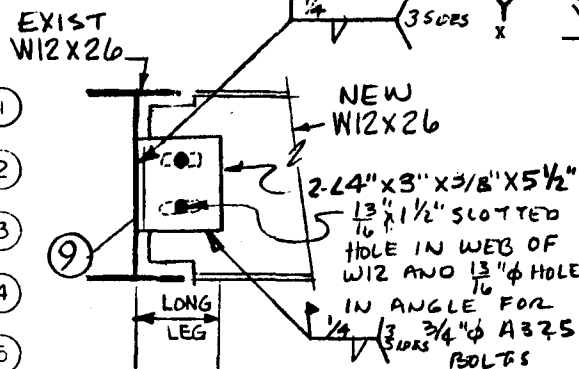
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 2.8 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 1-1/2"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5	1	1	1" DIA. STRUCT. WELDING LUG FIG. 55	SHORT
DESIGNED	DATE	CHECKED	DATE	4	ITEM	RECORD		REMARKS
3/11/80	3/11/80	3/27/80	3/27/80	3	SCALE:		COMPONENT DESCRIPTION	
REVIEWED	DATE	APPROVED	DATE	2	NONE		Stearns-Roger INCORPORATED	11165/8
3/11/80	3/11/80	3/27/80	3/27/80	1	REVIEWS			
PROJECT	DATE			10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
ANALYSIS	ID. CODE	T/WIX-MS-3-A-3/31		PROJECT NO		C-21700	LINE NO	G-MS-3-DEFB
				MARK NO		H-MS-3-8		

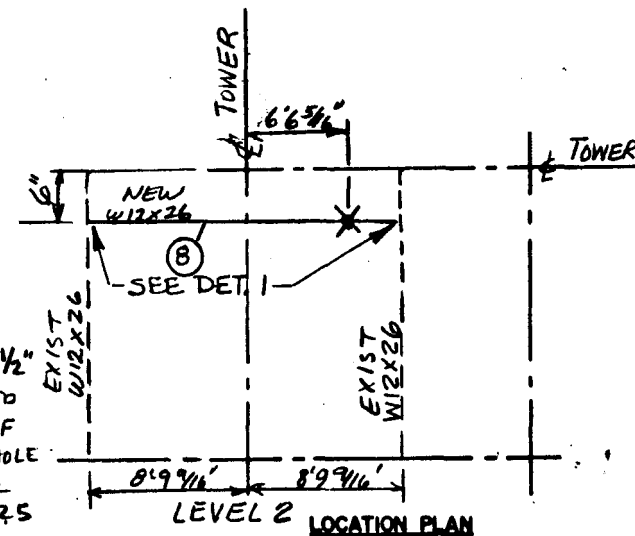
DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST
PIPE ROTATED 45°



DET. 1 (TYP. 4 TIMES)



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta x = 1/16"$
 $\Delta z = 1/4"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
B-268	C	11	12		
HOT LOAD			11		
COLD LOAD			10	4	3/4" X 3" A 325 BOLTS
VERT. TRAVEL C.T.O.H.			9	4	4" X 3" X 3/8" X 5 1/2" LG.
T.T. CONST. SUPPORT			8	1	W12X26 17'-6" LG.
N.A.			7	1	7/8" DIA. WELDLESS EYENUT FIG. 290
P. 2-3			6	1	6" PIPE CLAMP FIG. 295A
P. 3-3			5	1	7/8" DIA. R. H. THD. ROD FIG. 140
			4	2	7/8" DIA. R. H. HEX NUT
			3	1	SPRING
			2	1	1" DIA. PIN W/COTTER PIN FIG. 291
			1	1	7/8" DIA. STRUCT. WELDING LUG FIG. 55

VENDOR ENG. REV.

REFERENCE DRAWINGS	REV.
PIPING	P. 2-3
STRUCTURAL	P. 3-3
ELECTRICAL	

ENGINEERING RECORD

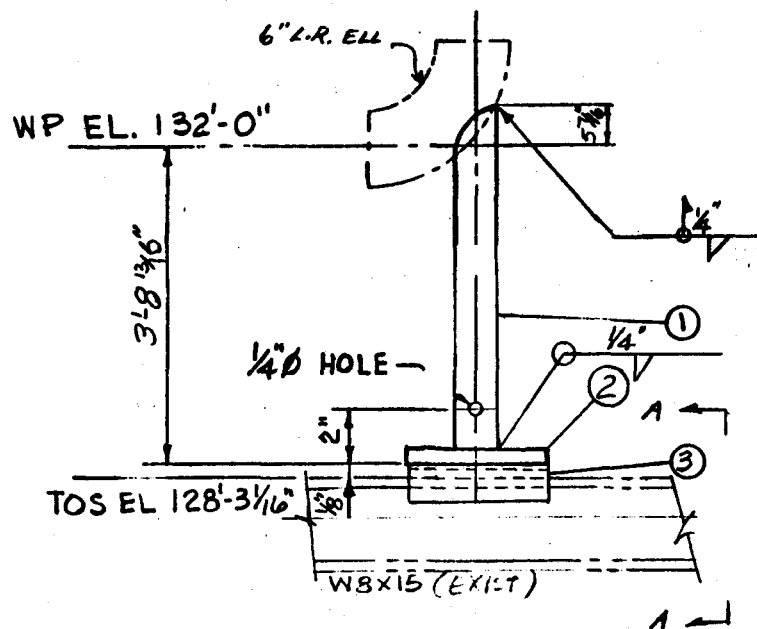
DESIGNED	MLM	CHECKED	KEB
DATE	3-10-80	DATE	3-10-80
REVIEWED	3/12/80	APPROVED	3/12/80
DATE	3/12/80	DATE	3/12/80
PROJECT			
DATE			
ANALYSIS ID. CODE	11W A12-1A213/6	PROJECT NO	C-21700

5	
4	
3	
2	
1	
REVISIONS	

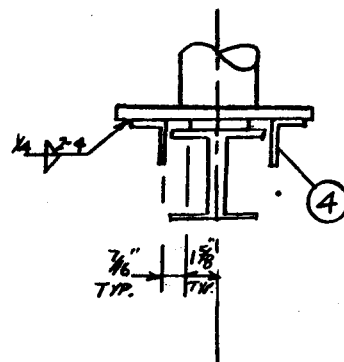
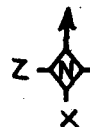
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
LINE NO 6"MS-6-QEB MARK NO H-MS-6-1		

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.8K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P22

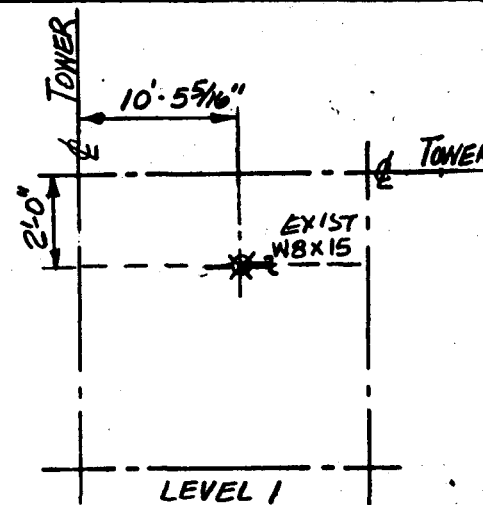
REVISD HOT & COLD LOADS & ANALYSIS AD
REVISD WELD SYMBOLS



ELEVATION LOOKING SOUTH



SECTION A-A



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
✦ LOCATION OF PIPE ATTACHMENT

$$\Delta X = 0''$$

$$\Delta Z = 1/16''$$

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	2	1 1/2" X 1 1/2" X 1/4" 8" LG.	
3	1	1/8" THK. 8" X 3 1/4" GRAYHIRE L BENDER TO (2)	
2	1	8" X 8" X 3/8" C.S. PLATE	
1	1	5" SCH. 80 PIPE A335P22 CUT TO SIZE	
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE:	Stearns-Roger INCORPORATED		11165/8
NONE			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE N° 6"MS-6-QEB	MARK N° H-MS-6-2	

△ ADDED GUIDE, REVISED ITEMS 143, S.D. LAND, MONT., SECTION.

3 REVISED WELD SYMBOLS

△ REVISED ITEM 1

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 20K$, $F_y = 5.5K$

PIPE SIZE: 6.625" O.D.

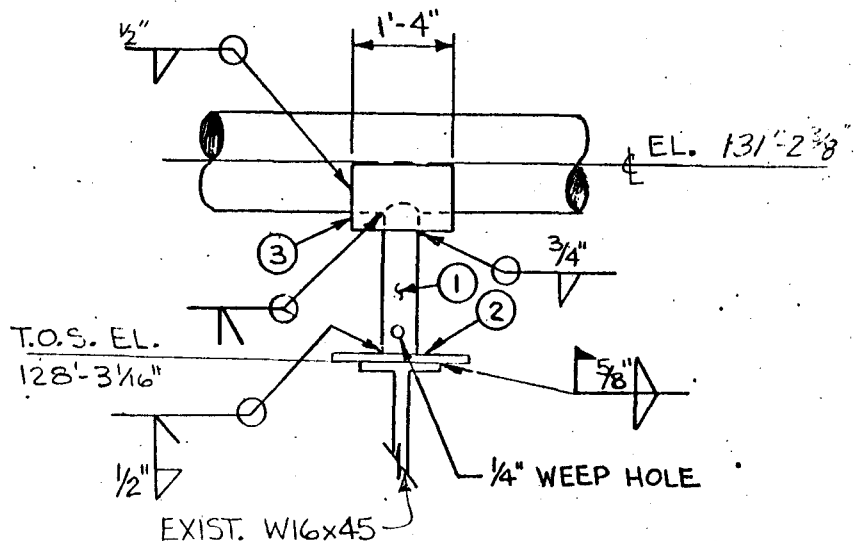
PIPE INSULATION: 4 1/2"

PIPE MATERIAL: ASTM A335 P22

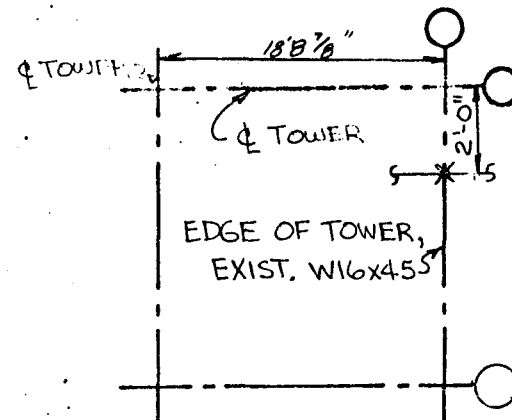
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	RKL
DATE	3-10-81	DATE	24-81
REVIEWED	MLM	APPROVED	MLM
DATE	3-12-81	DATE	2-27-81
PROJECT			
DATE			
ANALYSIS ID. CODE		T/W-MS-1-A 13/6	

X-MS-1-A-5

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEVATION LOOKING NORTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta X = 0"$
 $\Delta Z = 0"$

VOL. F60-1

* ALL ITEMS BY
PIPE FABRICATOR

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-2	1
C		ELECTRICAL		
B				
A				

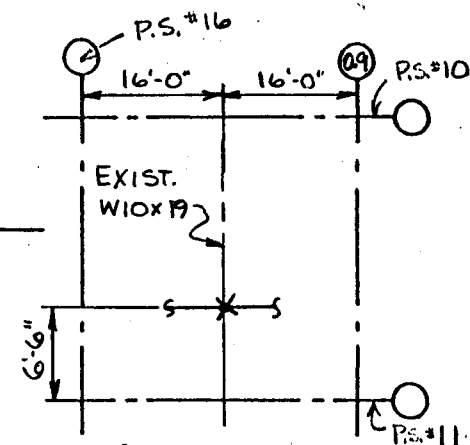
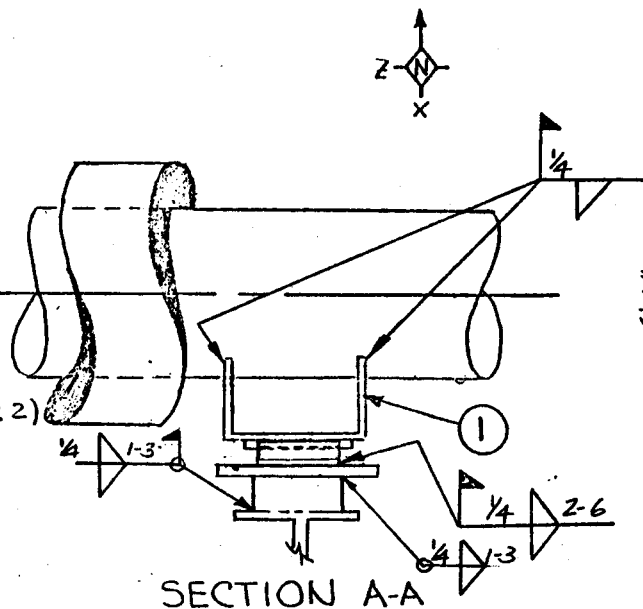
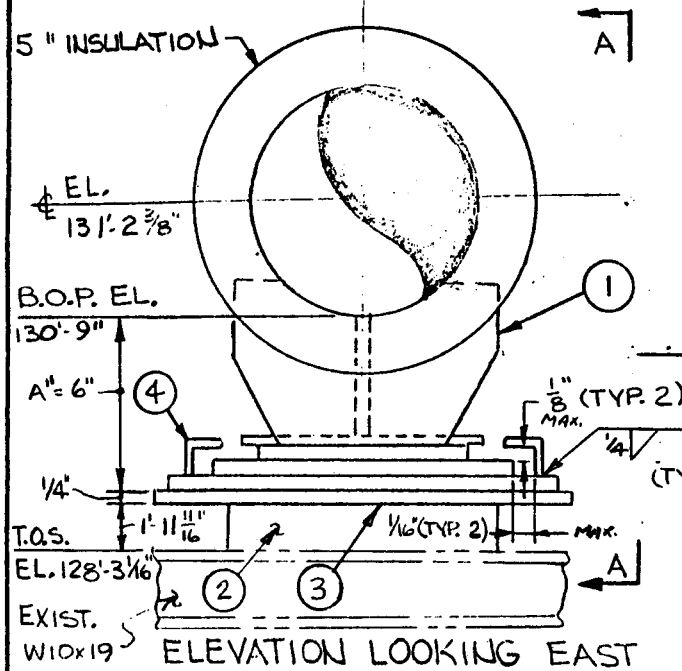
NOTES.

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = 29K$, $F_y = 36K$,
PIPE SIZE: 10" 15" O.D. $F_2 = 6.5K$, $F_1 = 21.0K$
PIPE INSULATION: $M_y = 13.4K$, $M_z = 26.5K$
PIPE MATERIAL: ASTM A333 P11

ENGINEERING RECORD				5	
DESIGNED	DATE	CHECKED	DATE	4	
REVIEWED	DATE	APPROVED	DATE	3	
PROJECT	DATE			2	
				1	
ANALYSIS ID. CODE				REVISIONS	
T/W/MS-1-A-12/55				PROJECT NO C-21700	
				LINE NO 10-HS-7-FFA	
				MARK NO H-MS-7-1	

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
3			
3	1	FE, SHAPED TO FORM PIPE SADDLE	
2	1	1/2" X 1'-4" X 1'-5" ASTM A337 6A. D *	
1	1	1" X 10" X 10" ASTM *	
1	1	8" XXS PIPE STANCHION A333 P11 *	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:			
NONE			
		Stearns-Roger	11165/8

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$$\Delta X = 0$$

$$\Delta Z = -1 9/16"$$

VOL. PG0-1

DO NOT WELD ACROSS WIDTH OF FLANGE

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING Pq-3	P ₃
D	STRUCTURAL S33-4	A
C	ELECTRICAL	
B		
A		

14			
13			
12			
11			
10			
9			
8			
7			
6			
4	2	1/2" x 1/4" x 1/4", 5" LONG (TRIM AS REQ'D)	
3	1	1'-2" x 6" x 1/4" C.S. PL	
2	1	7x5 STRUCT. TUBING, 1'-11 1/16" LG. x 1/4" THK A" = 6" (SPECIAL, OF A335 P11 ALLOY)	
1	1	10" Ø DIA. PIPE SADDLE, FIG. 612	W/O STAMP
ITEM REQ'D	COMPONENT DESCRIPTION		REMARKS
SCALE: NONE	Stearns-Roger *****		11165/8
10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 10-MS-7-FFA	MARK NO H-MS-7-2

NOTES:

PIPE TEMPERATURE: 885°F
STRUCTURAL DESIGN LOAD: F_x = 2.5K
PIPE SIZE: 10.75" O.D. F_y = 2.2K
PIPE INSULATION: 5"
PIPE MATERIAL: A335 P11

ENGINEERING RECORD

DESIGNED	7/1/80	CHECKED	REV
DATE	3/10/80	DATE	3-27-80
REVIEWED	H 7/1/81	APPROVED	P 7/1/81
DATE	3/11/80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W/X-MS-1-A-5/3/1		

5	
4	
3	RAPE 7-30
2	RAPE 7-30
1	RAPE 7-30
REVISIONS	



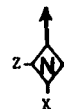
EL. 136'-10¹/₈"

5'-7 3/4"

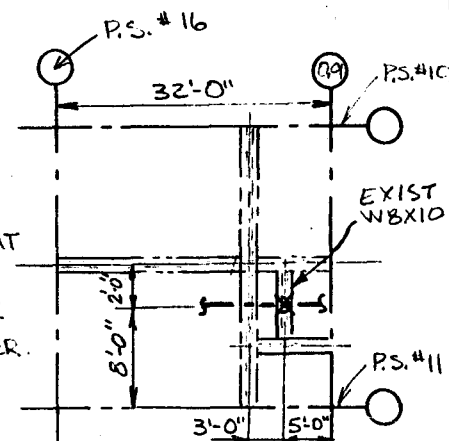
EL. 131'-2³/₈"

ELEV. LOOKING EAST

PIPE ROTATED
90°



NOTE: STEEL AT RIGHT
REPRESENTS STEEL
BETWEEN MAIN RACK
AND RECEIVER TOWER.



LOCATION PLAN

* LOCATION OF STEEL ATTACHMENT

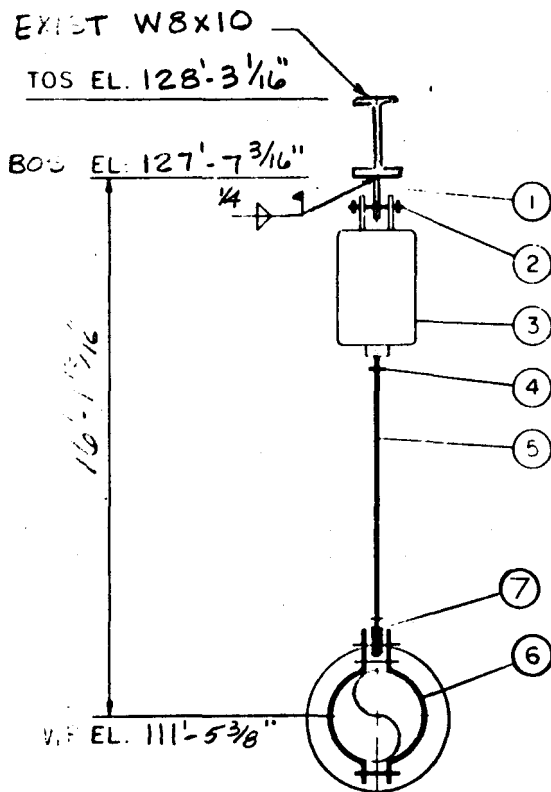
LOCATION OF PIPE ATTACHMENT

$$\Delta x = -1/8''$$
$$\Delta z = -2^{5/16}''$$

VOL. P60-1

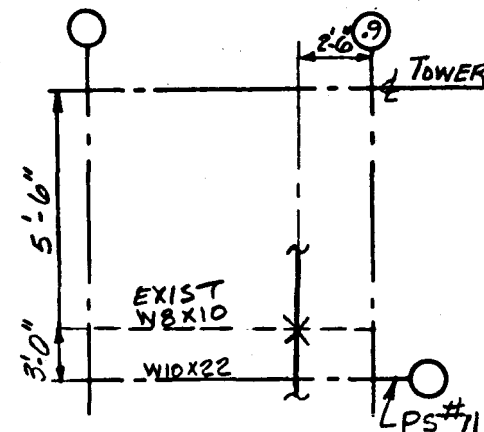
VENDOR ENG. REV.		14				
E		12				
D		11				
C		10				
B		9				
A		8				
CE DRAWINGS	REV.	7	2	3/4"	DIA. F. S. CLEVIS W/PIN FIG. 299	
P9-3	P3	6	1	3/4"	DIA. WELDING LUG C= 9 5/16" H.S. 53 (HY TAB TR.)	
S33-4	A	5	1	3/4"	DIA. R. H. THD. ROD FIG. 140	
		4	1	3/4"	DIA. F. S. TURNBUCKLE FIG. 230	
		3	1	3/4"	DIA. R. H. - L. H. THD. ROD FIG. 253	
		2	3	3/4"	DIA. R. H. HEX NUT	
		1	1	3/4"	DIA. STRUCT. WELDING LUG SHORT FIG. 55	
EVH -27-SC -80	5 4 3 2 1			ITEM REQD	COMPONENT DESCRIPTION	REMARKS
				SCALE:	Stearns-Roger INCORPORATED	11165/8
				NONE		
	REVISIONS	10 MwE SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT N° C-21700		LINE N° 10" MS-7-FFA		MARK N° H-MS-7-3		

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST
PIPE ROTATED 90°

Δ REVISE H. & C. HOT & COLD LOAD, PIPE EL. & ANALYSIS AND.
Δ REVISE ST. L.



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
Δ X = -1 7/8"
Δ Z = -1 7/8"

VOL. P60-1

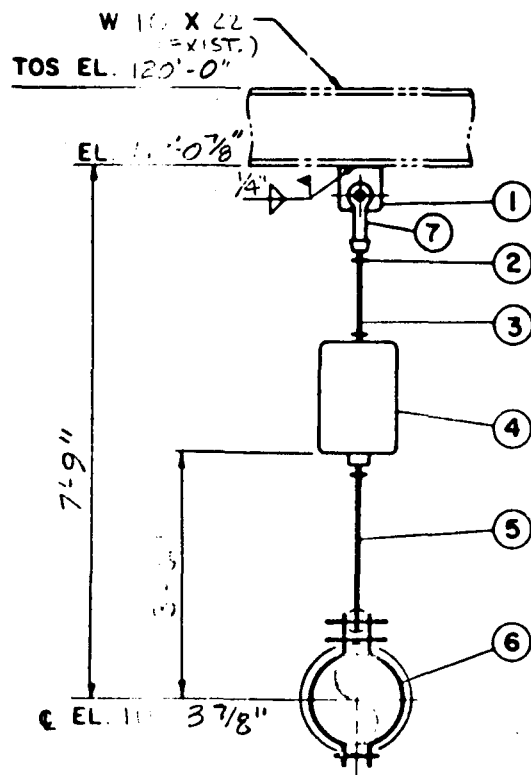
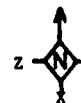
OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
98	C	8	12		
HOT LOAD		741#	11		
COLD LOAD		628#	10		
VERT. TRAVEL C. TO H.		1 1/2" DN	9		
T. T. CONST. SUPPORT		N.A.	8		
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7	1	5/8" DIA. WELDLESS EYENUT FIG. 290
E	PIPING P9-3	1	6	1	10" PIPE CLAMP FIG. 295A
D	STRUCTURAL 333-4	1	5	1	5/8" DIA. R. H. THD. ROD FIG. 140
C	ELECTRICAL		4	2	5/8" DIA. R. H. HEX NUT
B			3	1	SPRING SEE DATA
A			2	1	3/4" DIA. PIN W/COTTER PIN FIG. 291
			1	1	5/8" DIA. STRUCT. WELDING LUG FIG. 5544
ENGINEERING RECORD			5		
DESIGNED	MLM	CHECKED	KEH	FVH	
DATE	3-11-80	DATE	3-24-80	3-27-80	
REVIEWED	HTH	APPROVED			
DATE	3-11-80	DATE			
PROJECT	EXM				
DATE	8-28-80				
ANALYSIS ID. CODE	T/W-A10-1-A-14/9				
			PROJECT NO	C-21700	LINE NO 10"MS-7-FEA
			MARK NO	H/M3-7-4	
			REVISIONS		
			ITEM REQD		
			SCALE:	NONE	
			Stearns-Roger		
			10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
			11165/8		

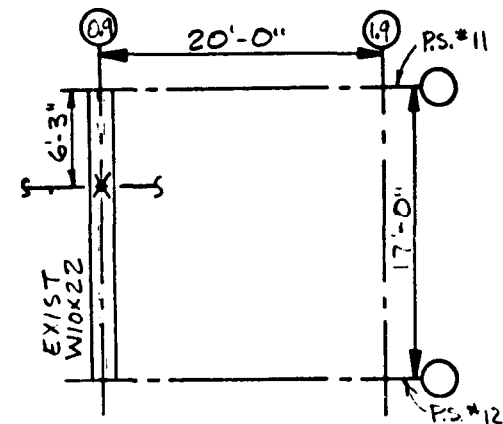
NOTES:

PIPE TEMPERATURE: 865°F
STRUCTURAL DESIGN LOAD: 1.4k
PIPE SIZE: 10" S"
PIPE INSULATION: 5"
PIPE MATERIAL: TM A335 P11

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
- ✱ LOCATION OF PIPE ATTACHMENT
- $\Delta X = -15/16"$
- $\Delta Z = -15/16"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. NO.	TYPE	SIZE	13			
4	A	6	12			
HOT LOAD			11			
COLD LOAD			10			
VENDOR ENG. REV.			9			
VERT. TRAVEL C. TO H.			1 3/16 IN			
T. T. CONST. SUPPORT			N/A	8		
REFERENCE DRAWINGS			REV.	7	1	5/8" DIA. F.S. CLEVIS FIG. 299
PIPING			13	6	1	10" ϕ PIPE CLAMP FIG. 295 A
STRUCTURAL			1	5	1	5/8" DIA. R.H. WE. ROD FIG. 278
ELECTRICAL				4	1	SPRING
				3	1	5/8" DIA. R.H. THD ROD FIG. 140
				2		5/8" DIA. HEX. NUT R.H.
				1	1	1/2" DIA. WELD LUG SHORT FIG. 55
ITEM REQD						COMPONENT DESCRIPTION
SCALE:						REMARKS
NONE						

1/W/X-11 1-A-14/9/4
ANALYSIS ID. CODE

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
	DATE		

PROJECT NO C-21700 LINE NO H-115-7-5

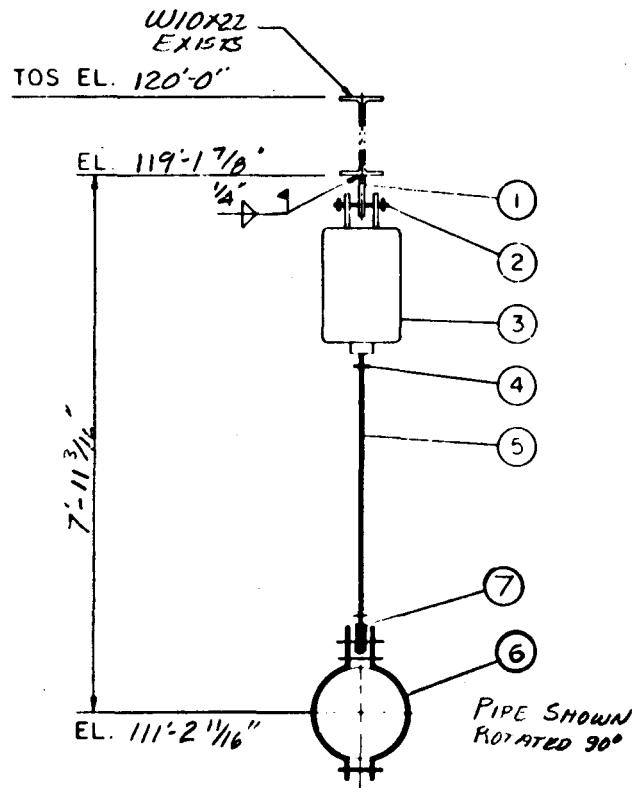
NOTES:
PIPE TEMPERATURE: 545° F.
STRUCTURAL DESIGN LOAD: .8 K.
PIPE SIZE: 10" O.D.
PIPE INSULATION: 5" THK.
PIPE MATERIAL: ASTM A335 M

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

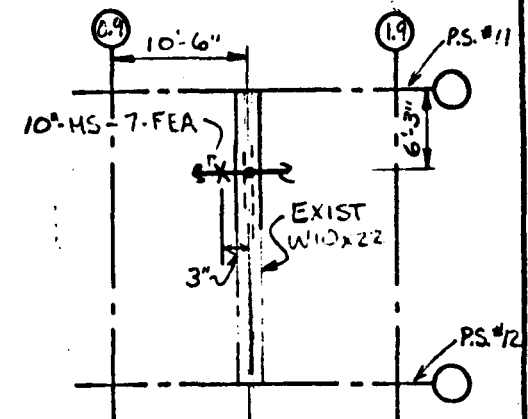
Stearns-Roger

11165/8

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta X = -1 \frac{1}{16}''$
 $\Delta Z = -1 \frac{1}{16}''$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA		
FIG. NO.	TYPE	SIZE
82	C	7
HOT LOAD		606#
COLD LOAD		513#
VERT. TRAVEL C. TO H.		7/16" DN
T.T. CONST. SUPPORT		N.A.

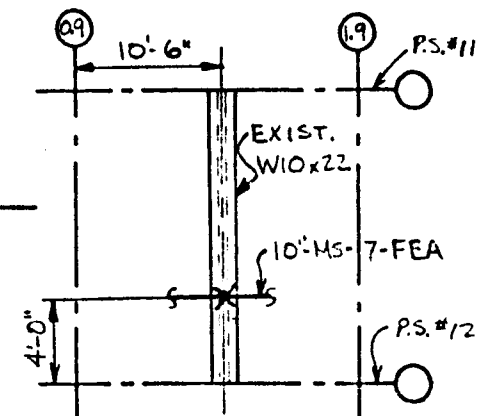
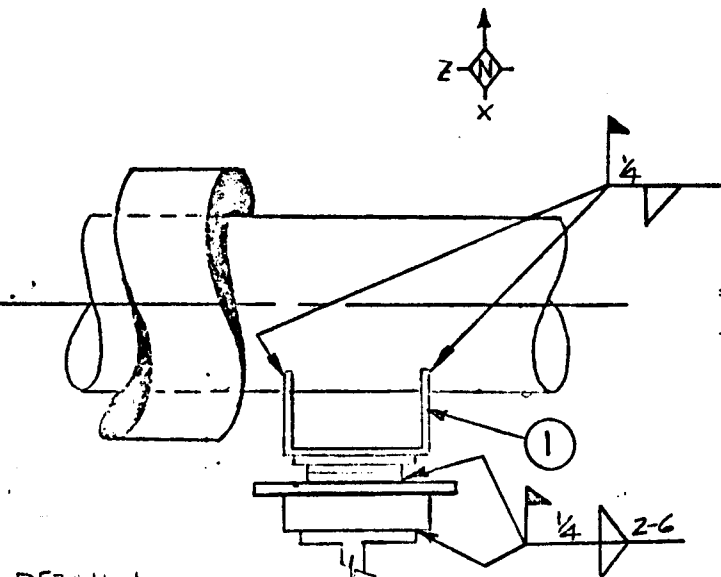
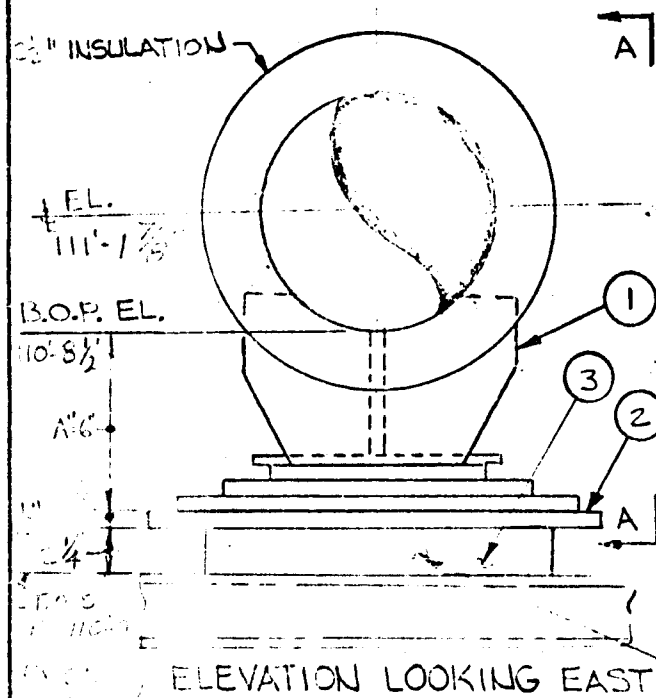
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	19-A 1
D	STRUCTURAL	33-1 1
C	ELECTRICAL	
B		
A		

Δ REVISED FROM RIGID TO SLANG HANG
Δ REVISED TO LD SYMBOL

NOTES
PIPE TEMPERATURE: 800°F
STRUCTURAL DESIGN LOAD: 1.2 K
PIPE SIZE: 2" O.D.
PIPE INSULATION: 5"
PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
14	5/8" WELDLESS EXCENT F14 270	
13	10" PIPE CLAMP FIG. 295 A	
12	5/8" R.H. THD ROD FIG. 140	
11	5/8" R.H. HEX ANT	
10	SPRING SEE DATA	
9	3/4" PIN W/ COTTER PIN FIG. 291	
8	5/8" STAGT WELDING FIG. 255	
7		
6		
5		
4		
3		
2		
1		
SCALE:	NONE	
Stearns-Roger		11165/B
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	
LINE NO	10'-HS-7-FEA	
MARK NO	11'-HS-7-6	



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

$$\Delta x = -\frac{1}{16}$$
$$\Delta Z = 1\frac{1}{16}$$

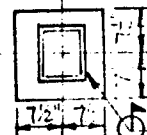
VOI, P60-1

SECTION A-A

Do NOT WFLD

ACROSS WIDTH OF FLANGE

VOI, P60-1



DETAIL 1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-8	P ₂
D		STRUCTURAL	33-2	A
C		ELECTRICAL		
B				
A				

ENGINEERING RECORD

DESIGNED	<i>W. J. ...</i>	CHECKED	<i>R. ...</i>
DATE	<i>1-15-80</i>	DATE	<i>1-15-80</i>
REVIEWED	<i>W. J. ...</i>	APPROVED	<i>R. ...</i>
DATE	<i>1-15-80</i>	DATE	<i>1-15-80</i>
PROJECT	<i>R. M. ...</i>		
DATE	<i>1-15-80</i>		
ANALYSIS ID. CODE	<i>T/r/x-15-1-A-14/19/4</i>		

5	
4	
3	
2	
1	
REVISIONS	

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	1	7" 5 1/4" STRUT TURNING 28(16)	
3	1	1-2 x 6" x 1" C.S. (SEE FIG. 1)	
2		A-66 (SEE FIG. 1)	
1	1	10" DIA. FLAT FIG. 612 2/10	STRAP
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE: NONE	Stearns-Roger		11165/B
10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE NO 101165-1-1	MARK NO 11-165-7-7	

REVISE NO. CAN ELEV. & TEMP. & ANALYSIS NO.

A REVERSE TO SYMBOL

NOTES

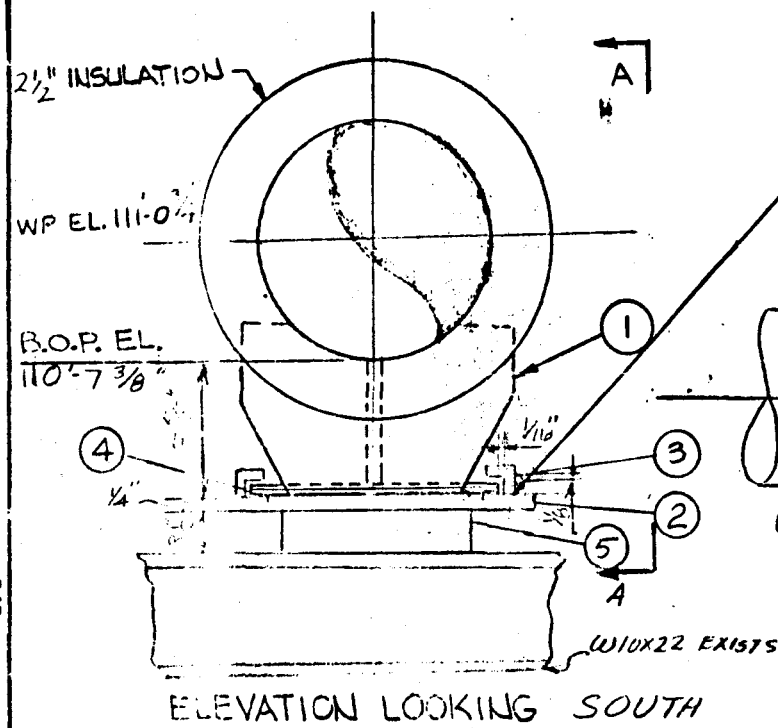
PIPE TEMPERATURE: 870°F

STRUCTURAL DESIGN LOAD: 1.8K

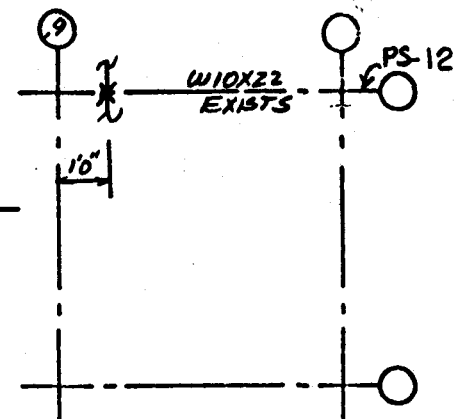
PIPE SIZE:

PIPE INSULATION: 2 1/2"

PIPE MATERIAL: 011 A335 P1



SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1 1/6'$
 $\Delta Z = 0$

VOL. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-B	1
D	STRUCTURAL S33-2	1
C	ELECTRICAL	
B		
A		

REVISOR: LOCAL, MOVIS, ITEMS 1, 2, 3 & 5

NOTES

PIPE TEMPERATURE: $F_z = 2.5K$
 STRUCTURAL DESIGN LOAD: $F_x = 3.7K$
 PIPE SIZE: 10.75" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: A335 P11

ENGINEERING RECORD

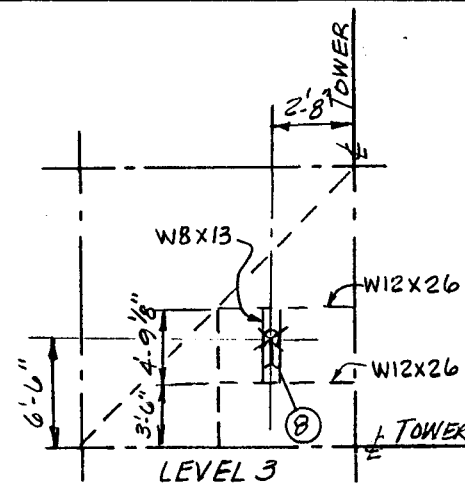
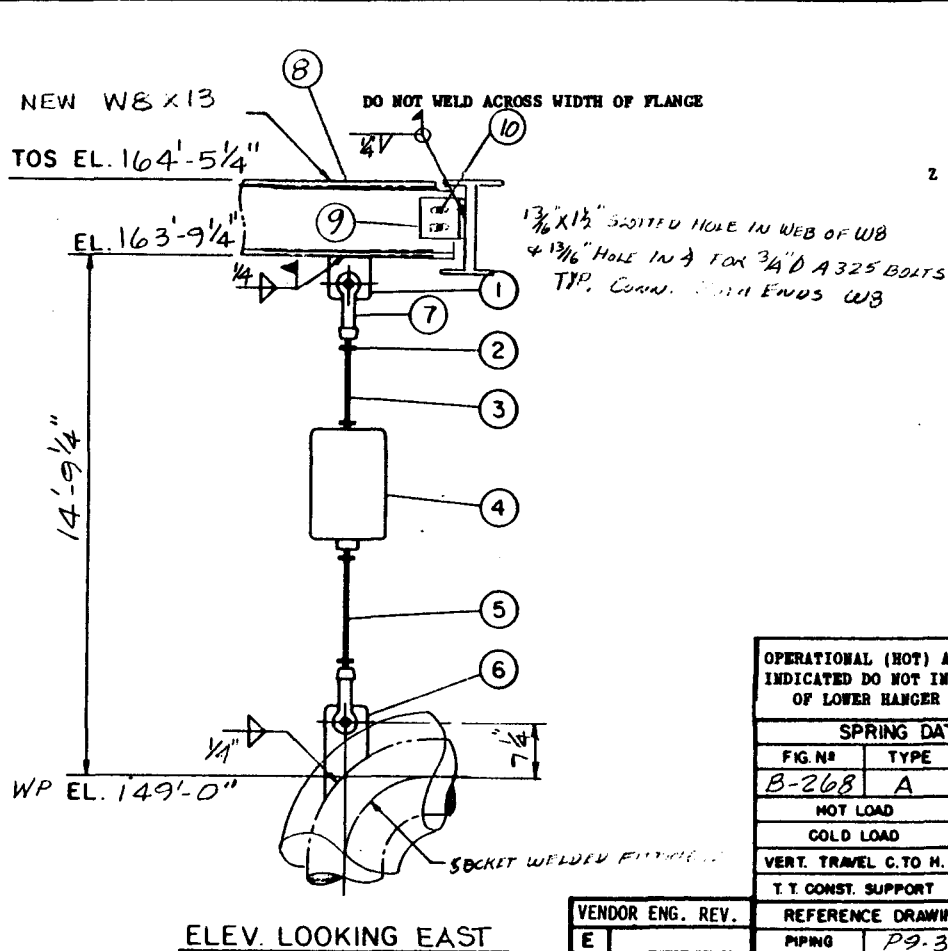
DESIGNED	MLM	CHECKED	MLM
DATE	3-12-80	DATE	3-12-80
REVIEWED	J. J. J.	APPROVED	J. J. J.
DATE	3-12-80	DATE	3-12-80
PROJECT	P. K. M.		
DATE	8-28-80		

5	
4	
3	
2	
1	
REVISIONS	

14			
13			
12			
11			
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9			
8			
7			
6			
5	1	7" X 5" STRUCTURAL TUBING	3 1/2' LG
4	1	12" X 7" X 1/4" GRAPHITE R. BOWED TO	①
3	2	1" X 1" X 1/4" 5" 4" TUBING AS A.S.	
2	1	1/4" X 9" X 6" R.C.S.	
1	1	PIPE SADDLE FIG. 605, 10" A387 GR. D	
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE:	NONE		
	Stearns-Roger		11165/B

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 10 A13-7-FEA MARK NO H-MS-7-B



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

Δ x = -7/16"

Δ z = 2 1/16"

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
B-268	A	3	12		
HOT LOAD			11		
COLD LOAD			10	4	3/4" X 3" A325 BOLTS
VERT. TRAVEL C. TO H.			9	4	4 1/2" X 3" X 3/8" X 5/26
T.T. CONST. SUPPORT			8	1	W8 X 13 4'-8 1/2" LG
REFERENCE DRAWINGS			7	2	1/2" DIA. P. S. CLEVIS W/PIN FIG. 299
PIPING			6	1	2" DIA. WELDING LUG
STRUCTURAL			5	1	1/2" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	1	SPRING
			3	1	1/2" DIA. R. H. THD. ROD FIG. 140
			2	4	1/2" DIA. R. H. HEX NUT
			1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55

SEE DATA

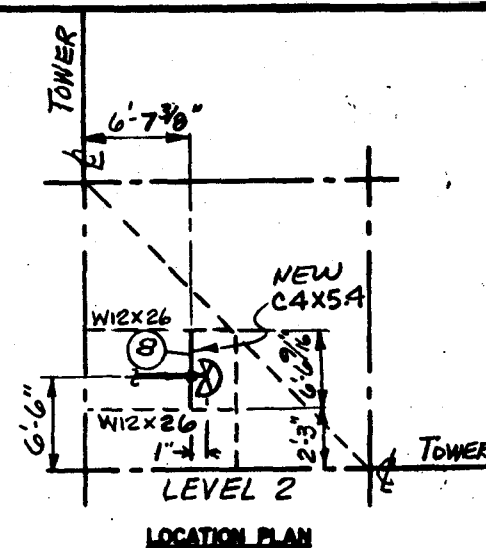
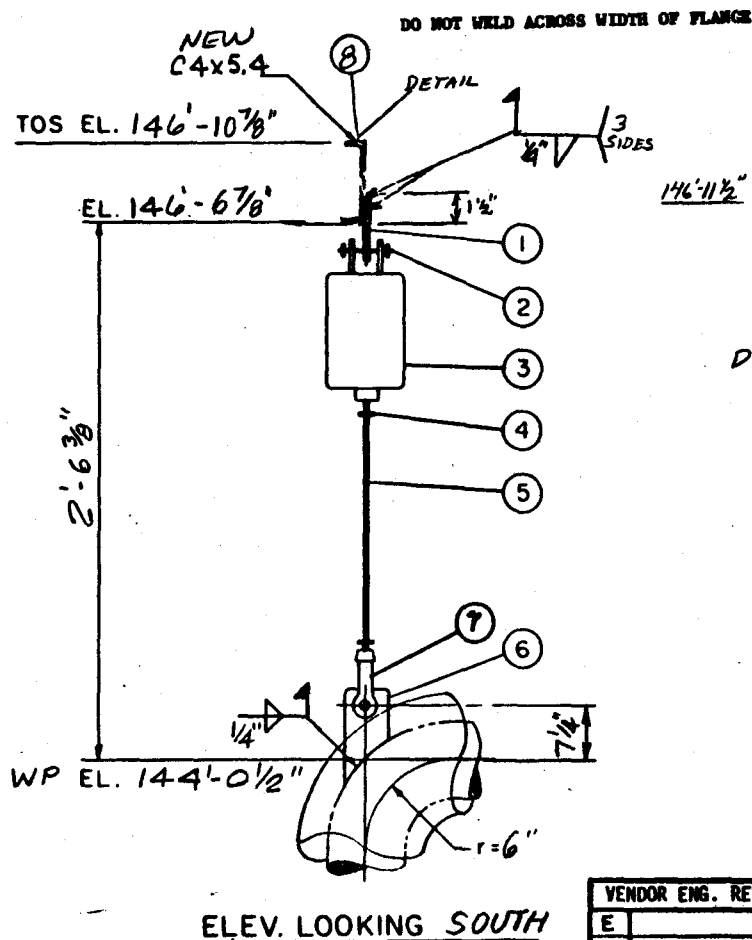
NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .3K
PIPE SIZE: 2.375" O.D.
PIPE INSULATION: 3 1/2"
PIPE MATERIAL: ASTM A535 P22

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	ROH	FVH
DATE	3-5-80	DATE	3-24-80	3-27-80
REVIEWED	W.F.	APPROVED	W.F.	
DATE	3-12-80	DATE	3-27-80	
PROJECT				
DATE				

5		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4		SCALE:	NONE	
3				
2				
1				
REVISIONS				
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO C-21700		LINE NO 2/A15-B-QEB		MARK NO H-MS-B-1



OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
98	C	C	12		
HOT LOAD			362 #	11	
COLD LOAD			409 #	10	
VERT. TRAVEL C. TO H.			1 ¹ / ₈ " UP	9	
T.T. CONST. SUPPORT			N.A.	8	1
					C4x5.4 6'-6 ⁷ / ₈ " LG
REFERENCE DRAWINGS			REV	7	1
					5/8" DIA. P. S. CLEVIS W/PIN FIG. 299
				6	1
					5/8" DIA. WELDING LUG ALLOY FOR GEAR
				5	1
					5/8" DIA. R. H. THD. ROD FIG. 146
				4	2
					5/8" DIA. R. H. HEX NUT
				3	1
					SPRING
					SEE DATA
				2	1
					5/8" DIA. PIN W/COTTER PIN FIG. 291
				1	1
					5/8" DIA. STRUCT. WELDING LUG FIG. 55
					LONG

REVISOR HOT & COLD LOAD & ANALYSIS No.

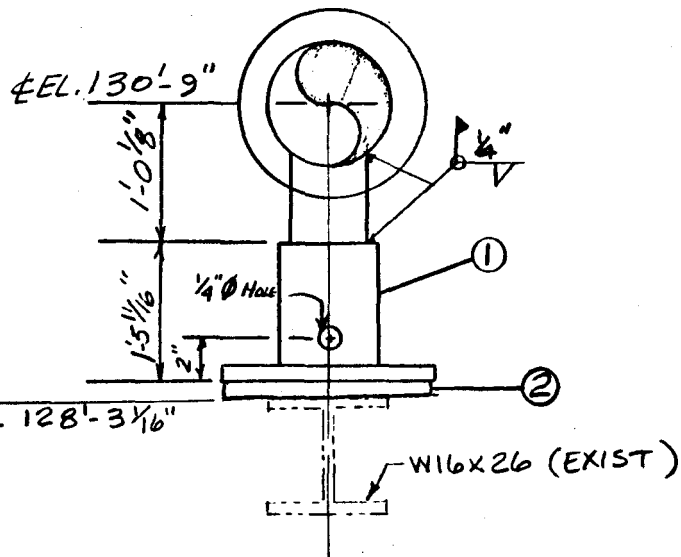
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .5K
PIPE SIZE: 2.375" O.D.
PIPE INSULATION: 3¹/₂"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5		
DESIGNED	MLM	CHECKED	REV	4		
DATE	3-5-80	DATE	3-7-80	3		
REVIEWED	MLM	APPROVED		1		
DATE	3-10-80	DATE	3-10-80			
PROJECT						
DATE						
ANALYSIS ID. CODE				REVISIONS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
T/W-MS-1-A-1-6				PROJECT NO	C-21700	LINE NO
					2" / 15-8-6	MARK NO
						H-MS-8-2

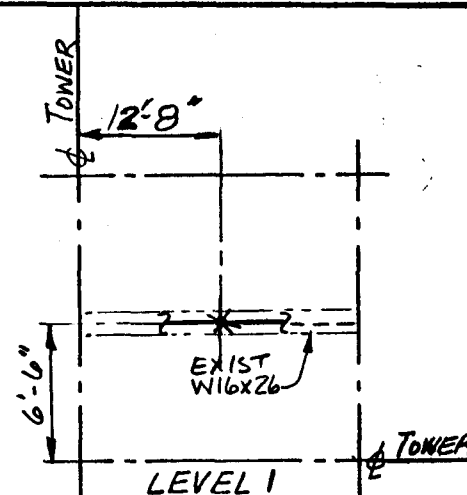
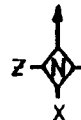
SCALE:
NONE

Stearns-Roger
INCORPORATED

11165/8



ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = 0
- △ Z = 1/2"

VOL. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P3-3	P3
D	STRUCTURAL S32 2	
C	ELECTRICAL	
B		
A		

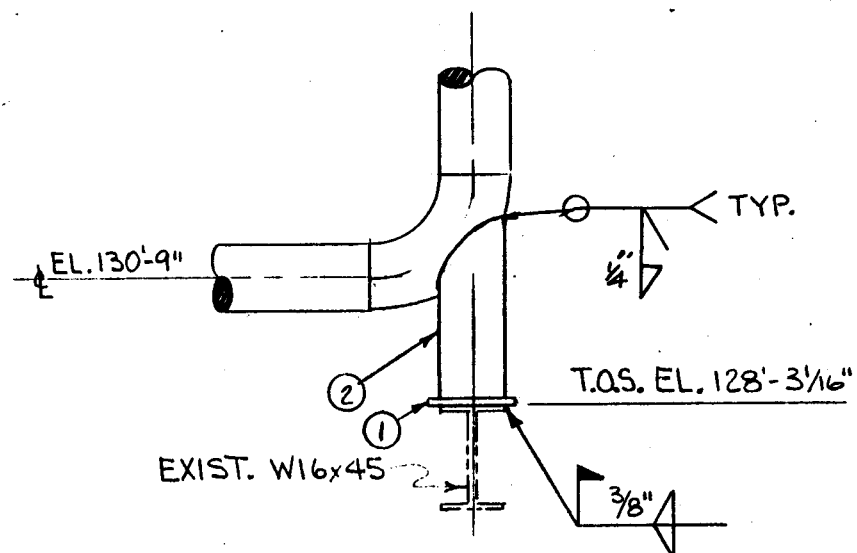
- △ LOC. PLAN, S.D. LOG, ITEM 1 & ANALYSIS NO.
- △ WELD SYMBOLS

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 3.7K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: A371-A335 P22

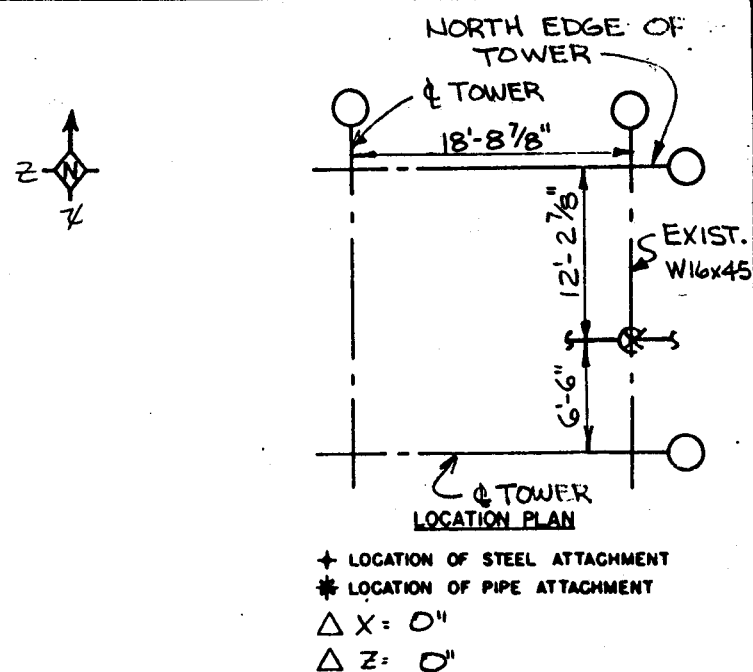
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	6/20 EVH
DATE	3-27-80	DATE	3-27-80
REVIEWED	1/9/81	APPROVED	3-27-80
DATE	3-27-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-1-1-A-13/6	PROJECT NO	C-21700

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3	1	Y8 X10" X10" GRAPHITE R BONDED TO ①	
2	1	TOP PORTION A335 P22 MATL.	
1	1	#4 ADJ. PIPE STANCHION TYPE C	H.S. 62
		COMPONENT DESCRIPTION	REMARKS
		Stearns-Roger	11165/8
		SCALE: NONE	
		10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
		LINE NO 6-11-3-418	MARK NO 1-11-8-3

X-11-11-5



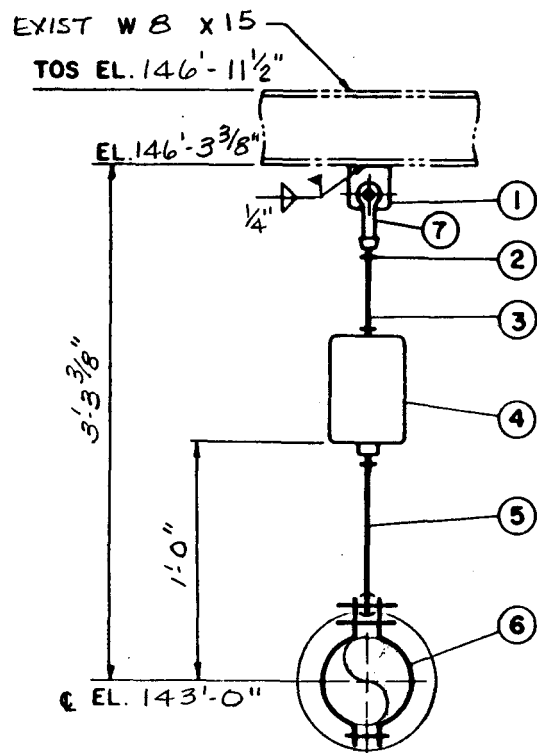
ELEVATION LOOKING NORTH



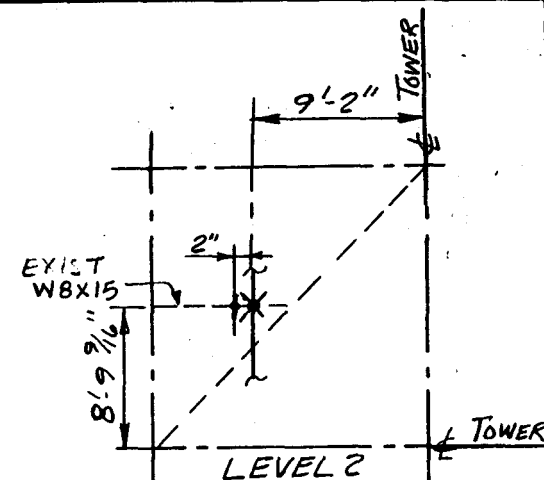
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2	1	6" ϕ STD. ASTM A335 P11 PIPE	BY FAX
1	1	1/2" X 8" X 8" A387 GR. D R	BY FAX
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
	SCALE:	Stearns-Roger INCORPORATED	11165/B
	NONE		
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE # 6"-MS-9-FEA	MARK # H-MS-9-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.	7	1	1/2" DIA. WELDLESS EYENUT FIG. 290	
E		PIPING	P9-3	P3	6	1	2" PIPE CLAMP FIG. 295A	
D		STRUCTURAL	532-3		5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
C		ELECTRICAL			4	2	1/2" DIA. R. H. HEX NUT	
B					3	1	SPRING	SEE DATA
A					2	1	1/2" DIA. PIN W/COTTER PIN FIG. 291	
ENGINEERING RECORD				5		1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	SHORT
	CHECKED	PER	FVH	4		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	DATE	1-29-60	3-17-60	3		SCALE:	Stearns-Roger INCORPORATED	11165/8
	APPROVED	J. J. J.		2		NONE		
	DATE	3-17-60		1				
				1	APR 3-28-60			
				REVISIONS		10 MwE SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
T/W-ST-13-A-111				PROJECT N° C-21700		LINE N° 3113-10-358		MARK N° H-M3-10-1

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1/16"$
- $\Delta Z = 2' 5/16"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

$\Delta Z = 2' 15 \frac{1}{16}"$

VOL. PG 0-1

SPRING DATA				14			
FIG. NO	TYPE	SIZE		13			
B-268	A	1		12			
HOT LOAD		76#		11			
COLD LOAD		87#		10			
VERT. TRAVEL C. TO H.			1/2" UP	9			
I.T. CONST. SUPPORT			N/A.	8			
REFERENCE DRAWINGS			REV	7	1	1/2" DIA. F.S. CLEVIS FIG. 299	W/PIN
PIPING			P9-3 P3	6	1	2" PIPE CLAMP FIG. 295 A	
STRUCTURAL			S32-3 0	5	1	1/2" DIA. R.H. WE. ROD FIG. 278	
ELECTRICAL				4	1	SPRING	SEE DATA
				3	1	1/2" DIA. R.H. THD ROD FIG. 140	
				2		1/2" DIA. HEX. NUT R.H.	
				1	1	1/2" DIA. WELD LUG SHORT FIG. 55	

VENDOR ENG. REV.

E	
D	
C	
B	
A	

T-13-A-1/1

SIS ID. CODE

ENGINEERING RECORD		5			
CHECKED	KBL FVH	4		ITEM REQD	COMPONENT DESCRIPTION
DATE	3-24-80 3-27-80	3		SCALE:	
APPROVED	N/A	2		NONE	
DATE	3-27-80	1	NFC 4-29-80		
		REVISIONS			

INCORPORATED

11165/8

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700

LINE NO 2"MS-10-QEB

MARK NO H-MS-10-2

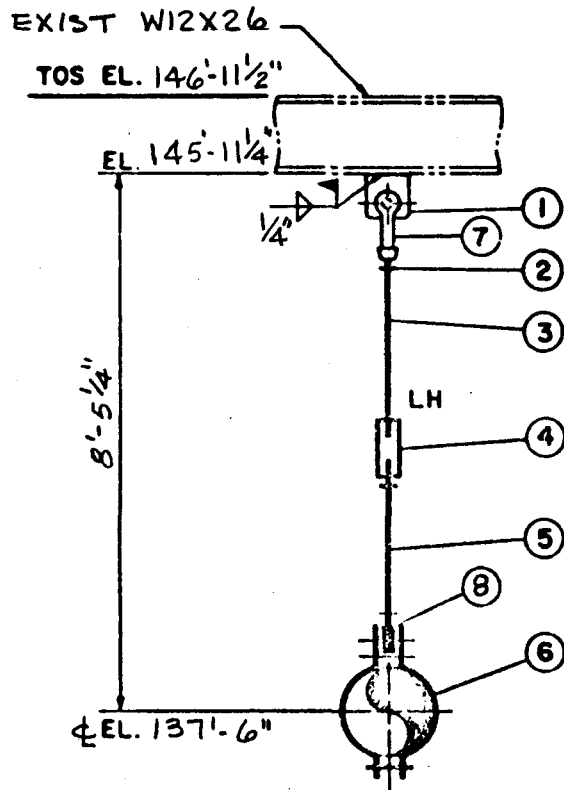
NOTES:

PIPE TEMPERATURE: 960°F.
 STRUCTURAL DESIGN LOAD: .2 K.
 PIPE SIZE: 2.375 O.D.
 PIPE INSULATION: 3 1/2 THK.
 PIPE MATERIAL: ASTM-A335 P22

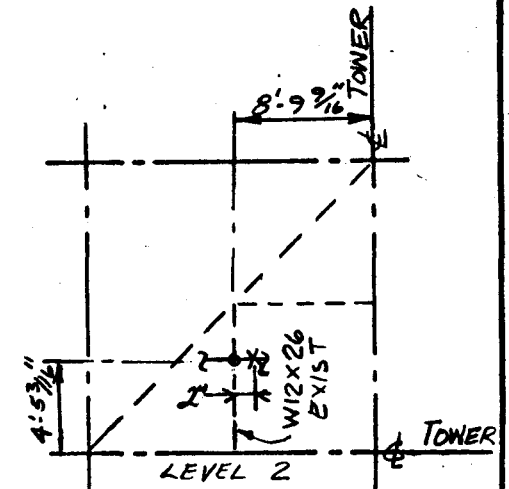
ENGINEERING RECORD

DESIGNED	ALM	CHECKED	KBL	FWH
DATE	3-10-80	DATE	3-24-80	3-27-80
REVIEWED	JRM	APPROVED	JRM	
DATE	3-12-80	DATE	3-27-80	
PROJECT				
DATE				

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT

$\Delta x = -7/16"$
 $\Delta z = 2 3/4"$

VOL. P60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV	
E		PIPING	P9-3	R3	
D		STRUCTURAL	S32-3	0	
C		ELECTRICAL			
B					
A					

ENGINEERING RECORD				5	
DESIGNED	MLM	DRAWN	FJH	4	
DATE	3-10-50	DATE	3-10-50	3	
REVIEWED	8/7/50	APPROVED	MLM	2	
DATE	3-12-50	DATE	3-12-50	1	
PROJECT					
DATE					
ANALYSIS ID. CODE	T/W-13-A-1/1			REVISIONS	

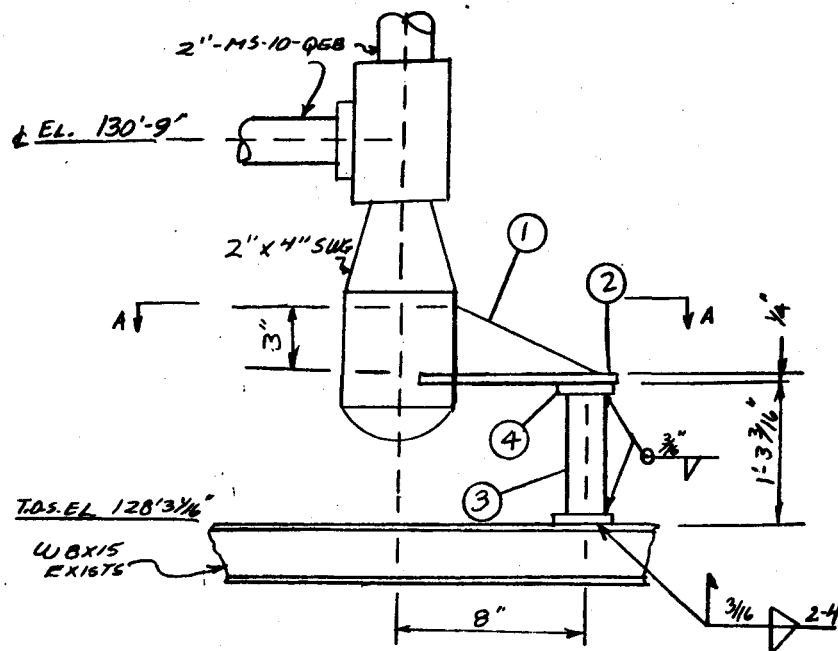
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
1	1	1/2" DIA. WELDLESS EYENUT FIG. 290	
2	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
3	1	2" PIPE CLAMP FIG. 295A	
4	1	1/2" DIA. R. H. THD. ROD FIG. 140	
5	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230	
6	1	1/2" DIA. R. H. - L. H. THD. ROD FIG. 253	
7	1	1/2" DIA. R. H. HEX NUT	
8	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	

SCALE:	NONE
PROJECT N°	C-21700
LINE N°	2413-10-425
MARK N°	1-MS-10-3

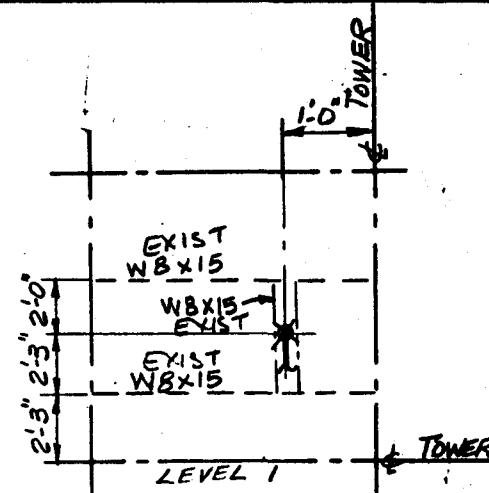
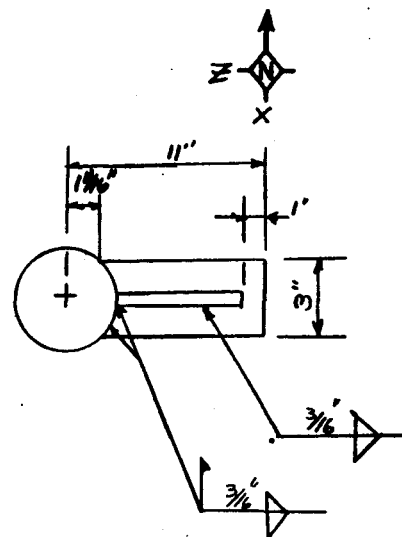
NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 2K
 PIPE SIZE: 2.375" O.D.
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

Δ REVISED LOCATION PLAN DIM.



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1"$
 $\Delta Z = 1' 3/16"$

VOL. P60-1

14			
13			
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5			
4	2	5"X5"X1/4" R C.S.	
3	1	3" SCH. 40 PIPE C.S. 1'-2 1/2" LG	LG
2	1	9 3/16" X 3" X 1/4" A387 GR. D R	CUT TO SUIT
1	1	3" X 7 3/4" X 1/4" A387 GR. D R	CUT TO SUIT
ITEM REQD			
SCALE: NONE			
COMPONENT DESCRIPTION			
Stearns-Roger			
REMARKS			
11165/8			
TO M&E SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700			
LINE NO 2'-MS-10-QEB			
MARK NO H-MS-10-4			

VENDOR	ENG.	REV.	REFERENCE	DRAWINGS	REV.
E			PIPING	P9-3	R3
D			STRUCTURAL	S32-2	O
C			ELECTRICAL		
B					
A					

△ COMPLETELY REVISED EXCEPT LOAD

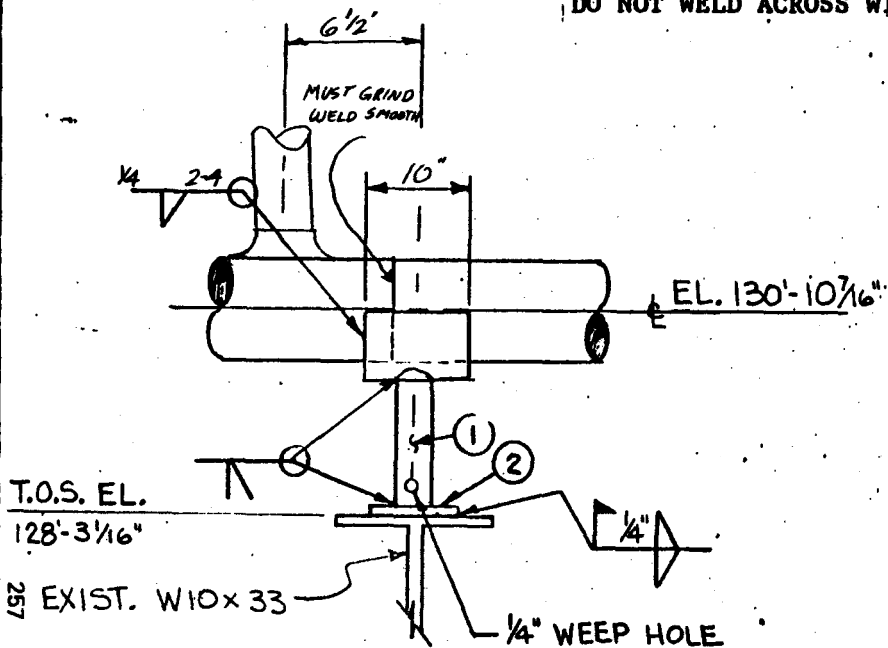
NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .7K
 PIPE SIZE: 4.50" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

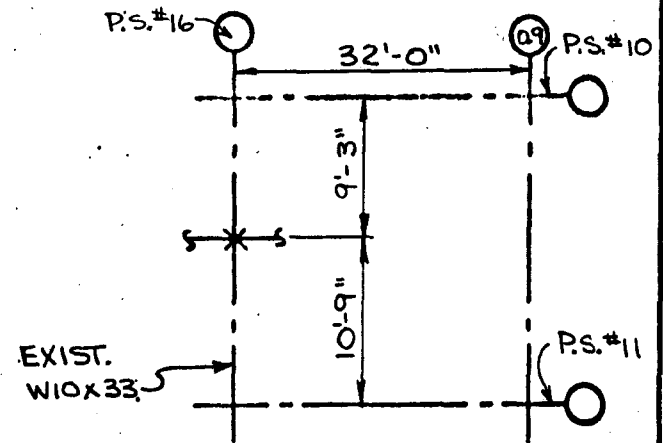
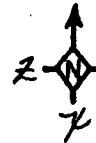
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	ROR EVH
DATE	3-10-80	DATE	3-27-80 3-27-81
REVIEWED	1/2/81	APPROVED	1/2/81
DATE	3-12-80	DATE	3-21-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-ST-13-A-1/1		

5	
4	
3	
2	RAT
1	APC
REVISIONS	

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X: 0"
- Δ Z: 0"

Vol. P60-1

Δ REVISED PIPE SIZE, MARK NO. (FORMERLY H-ST-6-1), ITEMS 12+3
Δ WELD SYMBOLS

VENIXOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPHG	P9-3	P4
D		STRUCTURAL	S33-4	1
C		ELECTRICAL		
B				
A				

NOTES.
PIPE TEMPERATURE: 530°F
STRUCTURAL DESIGN LOAD: $F_x = 0.1K$, $F_y = -0.8K$
PIPE SIZE: 4.50" O.D. $F_x = -0.1K$ $M_x = .3'K$
PIPE INSULATION: 2 1/2" $M_y = .4'K$ $M_z = .3'K$
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD				5
DESIGNED	DATE	DRAWN	DATE	4
REVIEWED	DATE	APPROVED	DATE	3
PROJECT	DATE			2
ANALYSIS ID. CODE				1

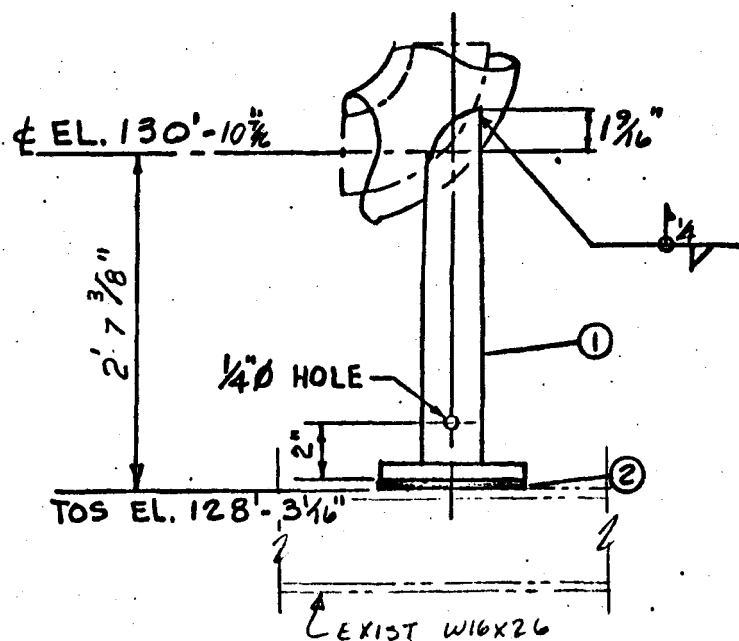
14			
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6			
5			
4			
3			
2			
1			
ITEM	RECD	COMPONENT DESCRIPTION	REMARKS
1		TO FORM PIPE SADDLE	
2		1/4" x 4 1/2" x 10" C.S. P, SHALED	
3		1/2" x 5" x 5" C.S. P	
4		3" XS PIPE	
5			
6			
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8			
9			
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11			
12			
13			
14			

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

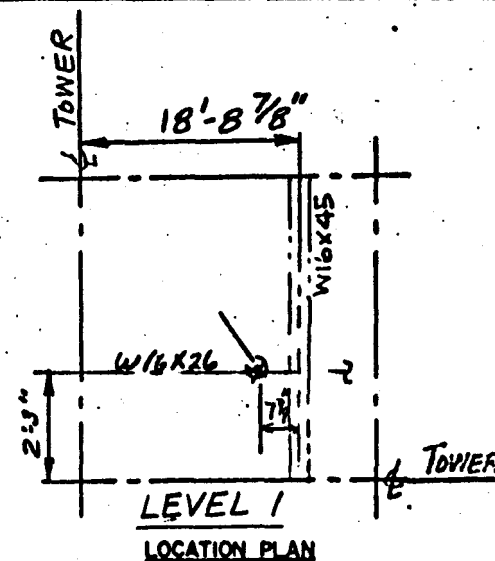
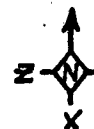
PROJECT NO C-21700 LINE NO 1" ST. B. MARK NO H-ST. B-1

Stearns-Roger

11165/8



ELEVATION LOOKING SOUTH



- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = \frac{1}{16}"$
 $\Delta Z = \frac{1}{4}"$

VOL. P60-1

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING	P2-3 P3
D		STRUCTURAL	532-2 0
C		ELECTRICAL	
B			
A			

- A REVISD ELEV.
 A REVISD ELEVATION & LOAD

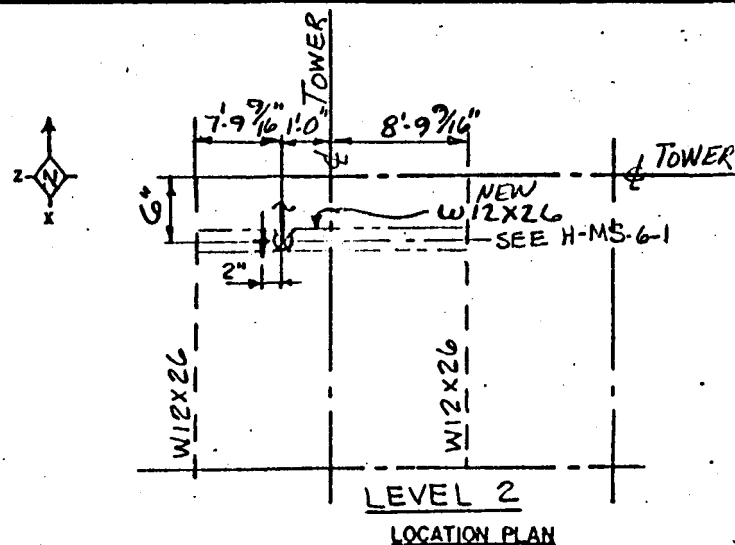
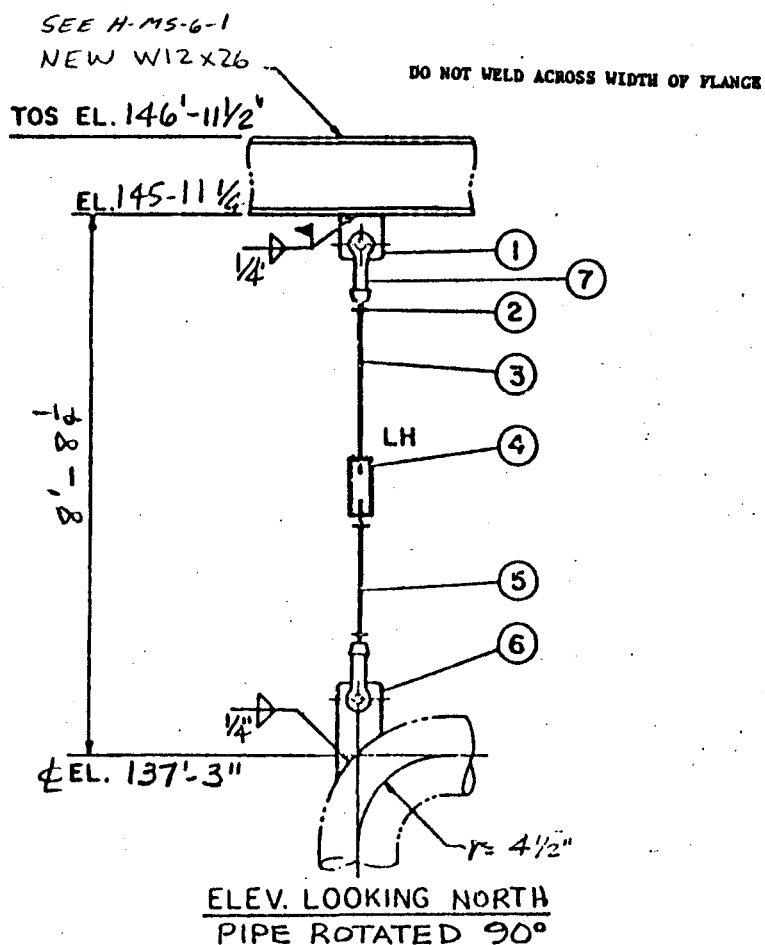
NOTES:
 PIPE TEMPERATURE: 865°F.
 STRUCTURAL DESIGN LOAD: 1.0 K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD				5			
DESIGNED	MCAN	CHECKED	ALZ	DATE	3-27-80	3	SCALE: NONE
DATE	3-27-80	DATE	3-27-80	APPROVED	3-27-80	2	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
REVIEWED	X-9-80	DATE	3-27-80	REVISIONS		1	PROJECT NO C-21700
DATE	3-27-80						LINE NO 4" ST-9-FEA
PROJECT							MARK NO H-ST-9-1
DATE							
ANALYSIS ID. CODE	T/W-A15-1-A-12/5						

14			
13			
12			
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6			
5			
4			
3			
2			
1			
ITEM	RECD	DESCRIPTION	REMARKS
3		PIPE STANCHION 'A'	HS-63
		COMPONENT DESCRIPTION	11165/H

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 4" ST-9-FEA MARK NO H-ST-9-1



+ LOCATION OF STEEL ATTACHMENT
~~+~~ LOCATION OF PIPE ATTACHMENT

$$\Delta x = -3/16"$$

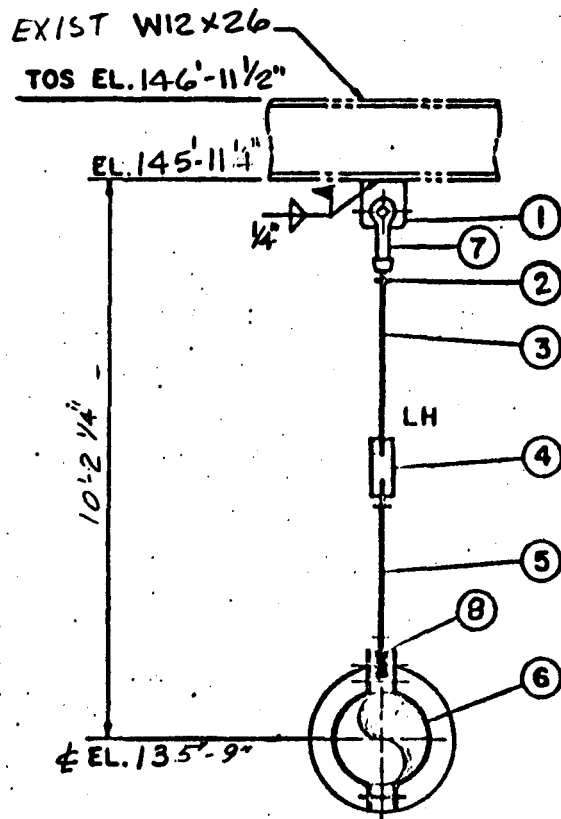
VOL. P-60-1.

			14				
VENLOR ENG. REV.			13				
E			12				
D			11				
C			10				
B			9				
A			8				
ENGINE DRAWINGS			REV	7	2	1/2"	DIA. F. S. CLAVIS W/PIN FIG. 299
P9-3			P3	6	1	1/2"	DIA. WELDING LUG H. S. 53 BY FAB.
S32-3			O	5	1	1/2"	DIA. R. II. THD. ROD FIG. 140
				4	1	1/2"	DIA. F. S. TURNBUCKLE FIG. 230
				3	1	1/2"	DIA. R. II. - L. II. THD. ROD FIG. 253
				2	3	1/2"	DIA. R. II. HEX NUT
				1	1	1/2"	DIA. STRUCT. WELDING LUG SHORT FIG. 55
DATE JUN 27-80		5	4	ITEM REQD	COMPONENT DESCRIPTION		REMARKS
		3		SCALE:	Stearns-Roger		
		↑ RATE		NONE			
							11165/8

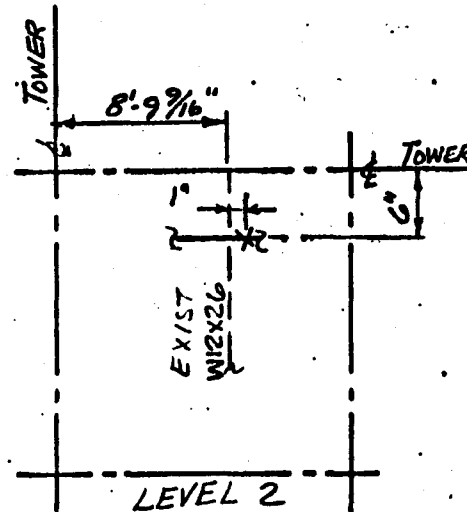
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 4K.
PIPE SIZE: 3.5" O.D.
PIPE INSULATION: 3½"
PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD				5	1	1	1/2"	DIA. STRUCT. WELDING LUG SHORT FIG. 55	
DESIGNED	MIM	CHECKED	HEA EVH	4	ITEM REQD		COMPONENT DESCRIPTION		REMARKS
DATE	3-10-80	DATE	3-24-80 3-27-80	3	SCALE:		Stearns-Roger		11165/8
REVIEWED	NHA	APPROVED	QHA	2	NONE				
DATE	3/12/80	DATE	3-27-80	1	AFC				
PROJECT				REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
ANALYSIS ID. CODE	T/W-ST-13-A-1/1			PROJECT NO		C-21700		LINE NO	9 ST-13-FEA
								MARK NO	H-ST-13-1

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = 0$
 $\Delta z = 1 \frac{1}{8}"$

VOL. PGD-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		MPNO	PD-3	P3
D		STRUCTURAL	332-3	0
C		ELECTRICAL		
D				
A				

14			
13			
12			
11			
10			
9			
8	1	1/2" DIA. WELDLESS EYEBOLT FIG. 290	
7	1	1/2" DIA. F. S. CLAVIS W/PIN FIG. 299	
6	1	3" PIPE CLAMP FIG. 295 A	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. - L. H. THD. ROD FIG. 253	
2	3	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUT, WELDING LUG SHORT FIG. 35	

REvised PIPE ELEV.

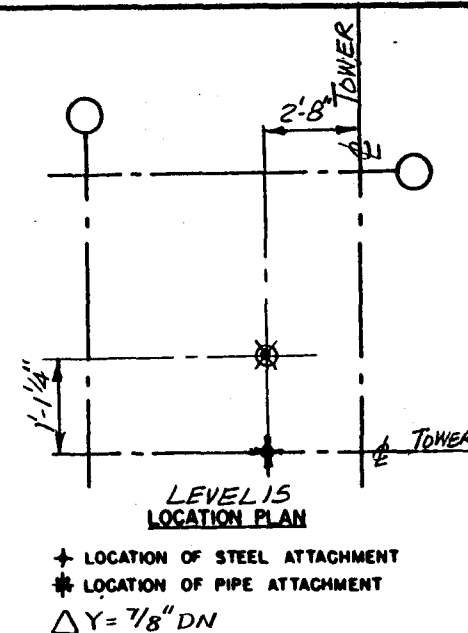
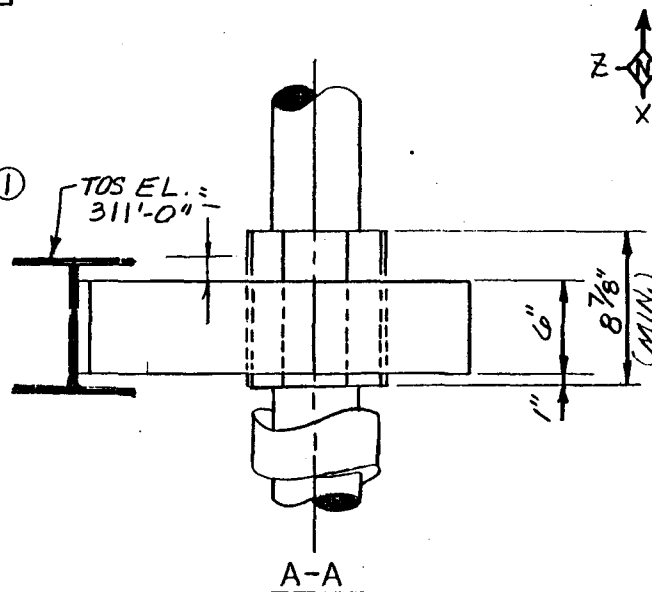
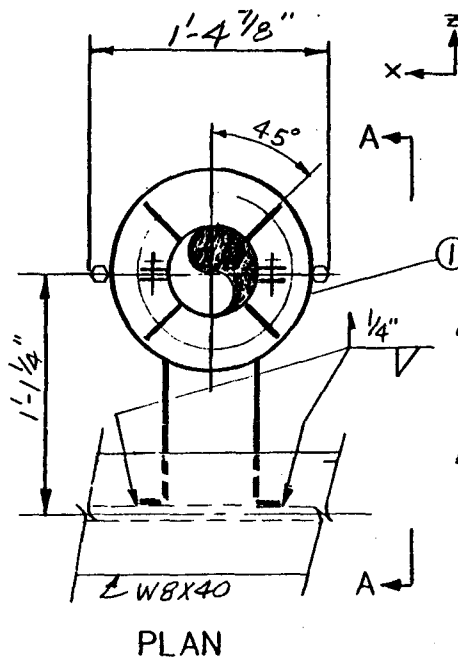
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .2K
PIPE SIZE: 3.5" O.D.
PIPE INSULATION: 3 1/2"
PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD				5
DESIGNED	ALAI	CHECKED	SEA	4
DATE	3-10-80	DATE	3-12-80	3
REVIEWED	ALAI	APPROVED	SEA	1
DATE	3-12-80	DATE	3-27-80	
PROJECT				
DATE				
ANALYSIS ID. CODE	T/WI-ST-13-A-1/1			REVISIONS

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/H

10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO ST-13-11A MARK NO ST-13-2



VOL. P60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-2	P4
D		STRUCTURAL	S32-5	O
C		ELECTRICAL		
B				
A				

14			
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12			
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9			
8			
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6			
5			
4			
3			
2			
1			

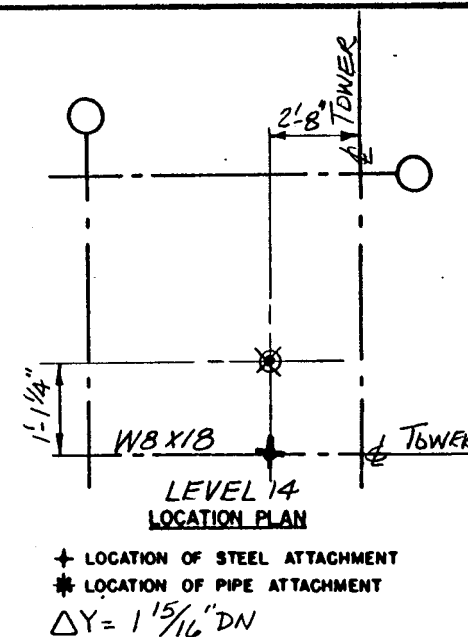
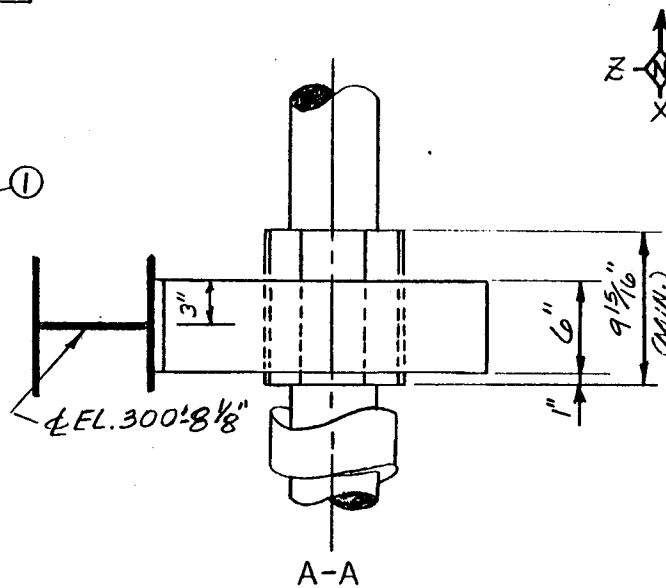
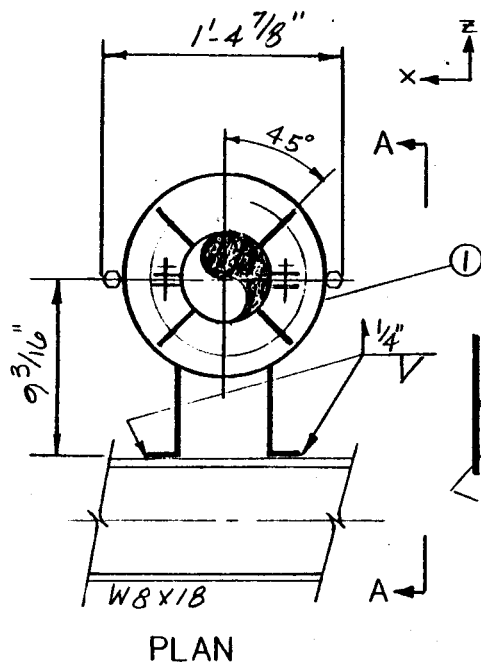
PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .6k$ $F_z = .6k$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 F22

ENGINEERING RECORD				5
DESIGNED	MLM	CHECKED	W. R. Y.	4
DATE	4-21-80	DATE	6/13/80	3
REVIEWED	W. R. Y.	APPROVED		2
DATE	4-29-80	DATE		1
PROJECT	BDR			
DATE	6-12-80			
ANALYSIS ID. CODE	T-VT-1-A-4/B-2, W-VT-1-A-5			REVISIONS

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 4"VT-1-KEB	MARK NO H-VT-1-2



VOL. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-2
D	STRUCTURAL	532-5
C	ELECTRICAL	
B		
A		

14		
13		
12		
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10		
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8		
7		
6		
5		
4		
3		
2		
1		

PIPE ALIGNMENT GUIDE SIM. FIG. 256

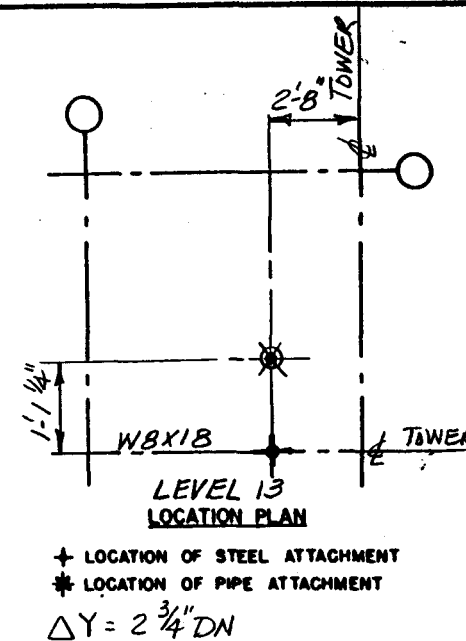
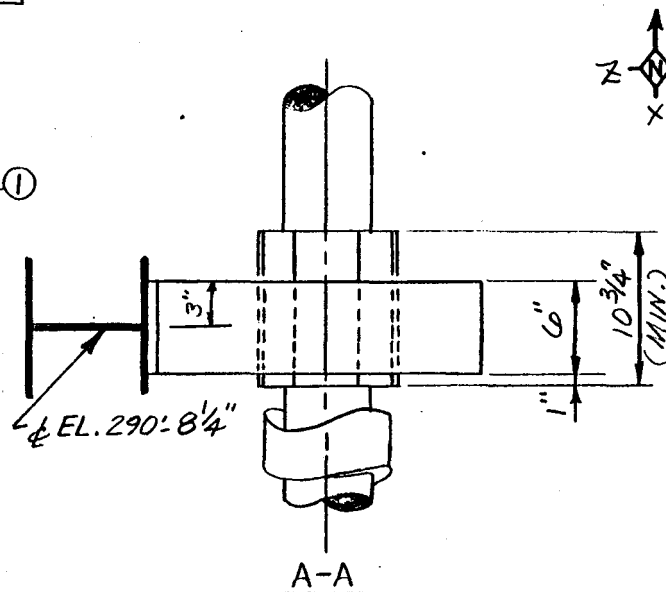
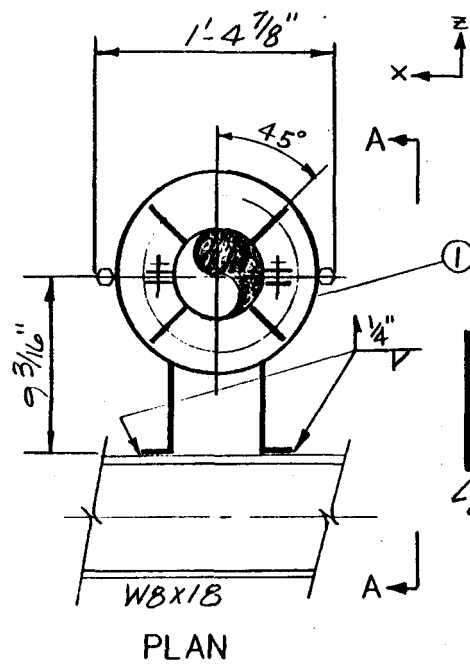
NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .3\text{K}$ $F_z = .3\text{K}$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: A3TM, A335 P22

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	
DATE	4-21-80	DATE	5-11-80
REVIEWED	W.F.M.	APPROVED	
DATE	4-27-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T-VT-1-A-1/B-2, W-VT-1-A-5		

5		
4		
3		
2		
1		
REVISIONS		
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	
	Stearns-Roger	11165/8
	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700	LINE NO 4"VT-1-KEB MARK NO H-VT-1-3



VOL. P60-1

14			
13			
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8			
7			
6			
5			
4			
3			
2	/	PIPE ALIGNMENT GUIDE SIM. FIG. 256	

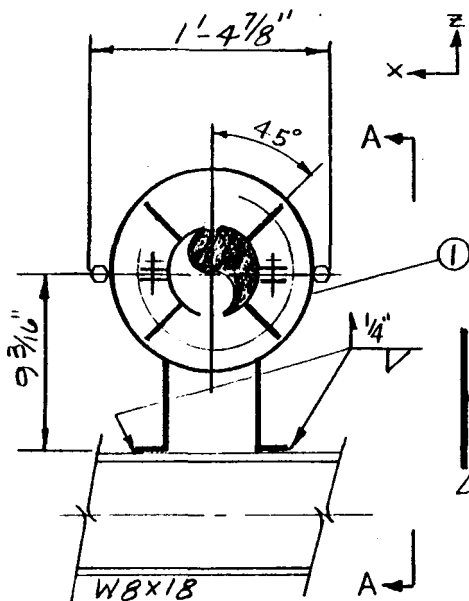
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-2	P4
D		STRUCTURAL	S32-5	0
C		ELECTRICAL		
B				
A				

NOTES:

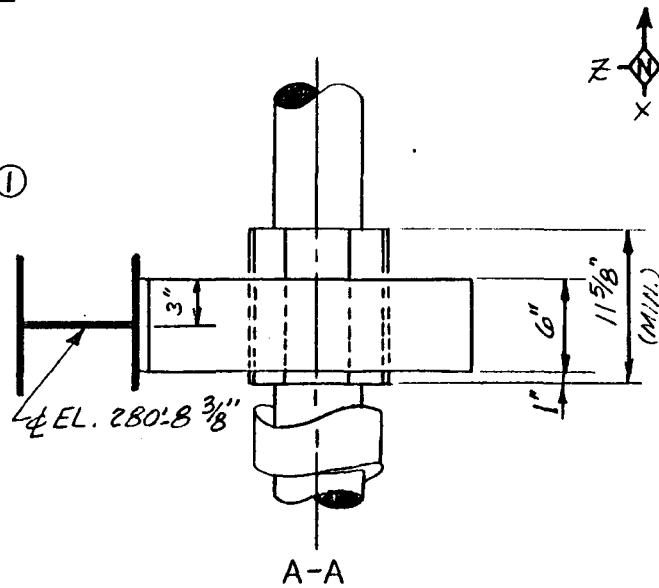
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = .2\text{K}$ $F_z = .2\text{K}$
PIPE SIZE: $4.5''\text{O.D.}$
PIPE INSULATION: $4''$
PIPE MATERIAL: $A37M A335 P22$

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	9/16/80
DATE	4-21-80	DATE	5-1-80
REVIEWED	RDR	APPROVED	
DATE	7-24-80	DATE	
PROJECT	RDR		R. R. Y.
DATE	6-12-80		6-12-80
ANALYSIS ID. CODE	T-VT-1-A-4/B-2, W-VT-1-A-3		

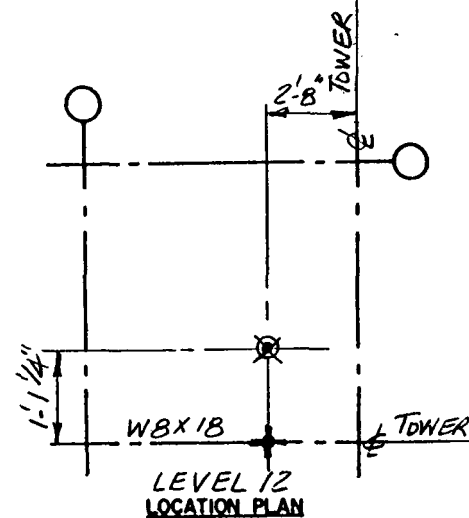
5					
4		ITEM REQD	COMPONENT DESCRIPTION		REMARKS
3		SCALE:	Stearns-Roger INCORPORATED		11165/8
2		NONE			
1					
REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
5	PROJECT N° C-21700		LINE N° 4 th VT-1-KEB	MARK N° 4 th VT-1-4	



PLAN



A-A



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 3 \frac{5}{8}"$

VOL. P60-1

14		
13		
12		
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VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-2
D	STRUCTURAL	9.32-5
C	ELECTRICAL	
B		
A		

NOTES:

PIPE TEMPERATURE: 960°F.

STRUCTURAL DESIGN LOAD: $F_x = .3K$, $F_z = .3K$

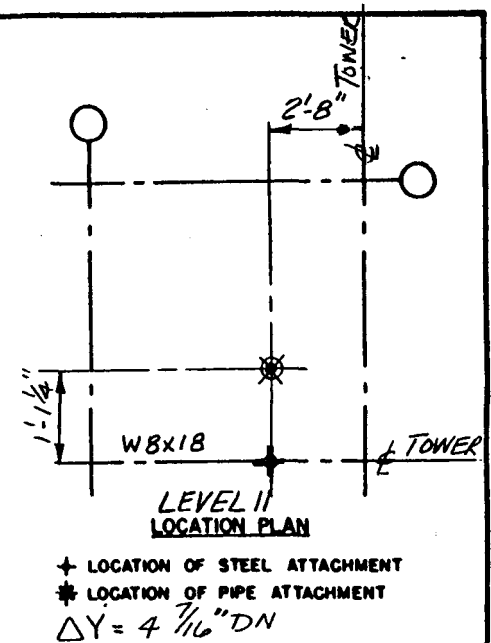
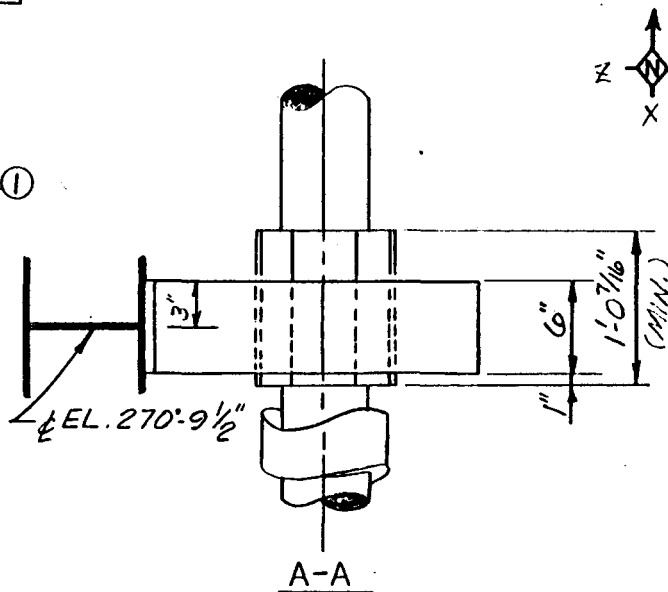
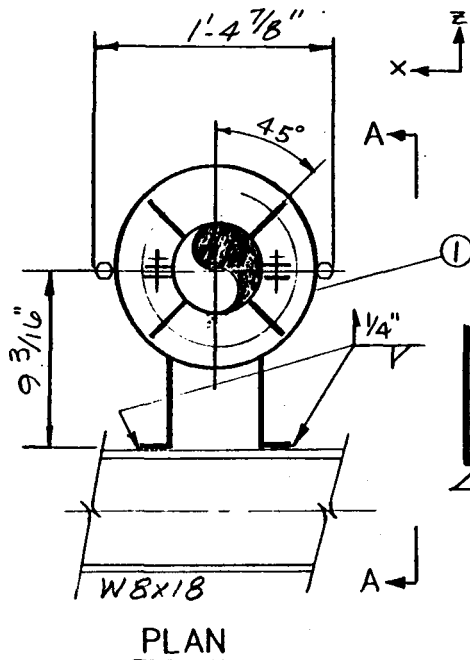
PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 1"

PIPE MATERIAL: A516 A335 P22

ENGINEERING RECORD				5
DESIGNED	A/LA	CHECKED		4
DATE	4-21-80	DATE		3
REVIEWED		APPROVED		2
DATE	4-29-80	DATE		1
PROJECT	BDR			
DATE	6-12-80			
ANALYSIS ID. CODE	TVI-1 A-4/R-3, W-VI-1-A-5			

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 4-VI-1-KEB	MARK NO 4-VI-1-5



VOL. P60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-2	P4
D	STRUCTURAL 332-4	O
C	ELECTRICAL	
B		
A		

14		
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5		
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2		
1		

PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.6k$ $F_z = 7.1k$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 1"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	JTB
DATE	1-21-80	DATE	5-11-80
REVIEWED	JTB	APPROVED	
DATE	4-24-80	DATE	
PROJECT	BDR	PROJECT	J.P.Y.
DATE	6-12-80	DATE	6-12-80
ANALYSIS ID. CODE	T-VT-1-A-1/3-2, W-VT-1-A-5		

5				
4		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3		SCALE:	Stearns-Roger INCORPORATED	11165/8
2		NONE		
1				
REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700		LINE NO 4-VT-1-KEB	MARK NO 4-VT-1-6	

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

DO NOT WELD ACROSS WIDTH OF FLANGE

EXIST. W8x24

TOS EL 271'-1 1/2"

EL. 270'-5 5/8"

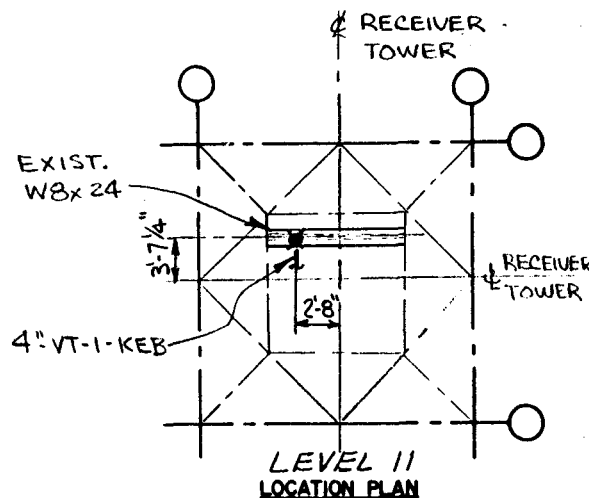
6'-2 3/16"

EL. 264'-3 7/16"

PIPE ROTATED
90° SOUTH

r = 6"

ELEV. LOOKING NORTH



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta x = -1/16"$
 $\Delta z = 0"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO	TYPE	SIZE	13		
80V	C	26	12		
HOT LOAD		9811b	11		
COLD LOAD		N.A.	10		
VERT. TRAVEL C. TO H.		5 1/4" DN	9		
T. T. CONST. SUPPORT		6 1/2"	8		
REFERENCE DRAWINGS			REV	7	
E	PIPING	P4-2	P3	6	1 5/8" DIA. F. S. CLEVIS W/PIN FIG. 299
D	STRUCTURAL	S32-4	O	5	1 5/8" DIA. WELDING LUG C-7 1/2" H. S. 53 BY FAB.
C	ELECTRICAL			4	1 5/8" DIA. R. H. THD. ROD FIG. 140
B				3	2 5/8" DIA. R. H. HEX NUT
A				2	1 SPRING
				1	1 5/8" DIA. STRUCT. WELDING LUG FIG. 55
ENGINEERING RECORD			5		
DESIGNED	DATE	CHECKED	DATE	4	ITEM RECD
REVIEWED	DATE	APPROVED	DATE	3	SCALE:
PROJECT	DATE			2	NONE
ANALYSIS ID. CODE			1	1	COMPONENT DESCRIPTION
T-VT-1-A-4/LV, W-VT-1-A-5			1	1	REMARKS

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: 1.5 V

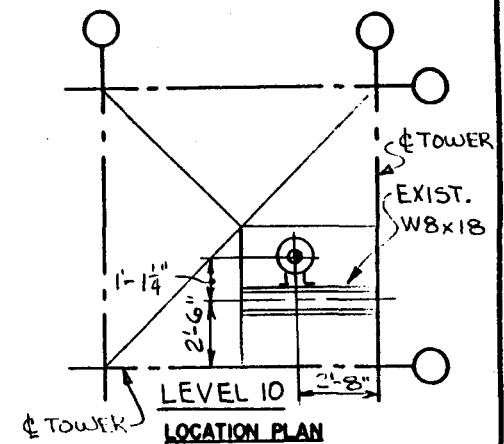
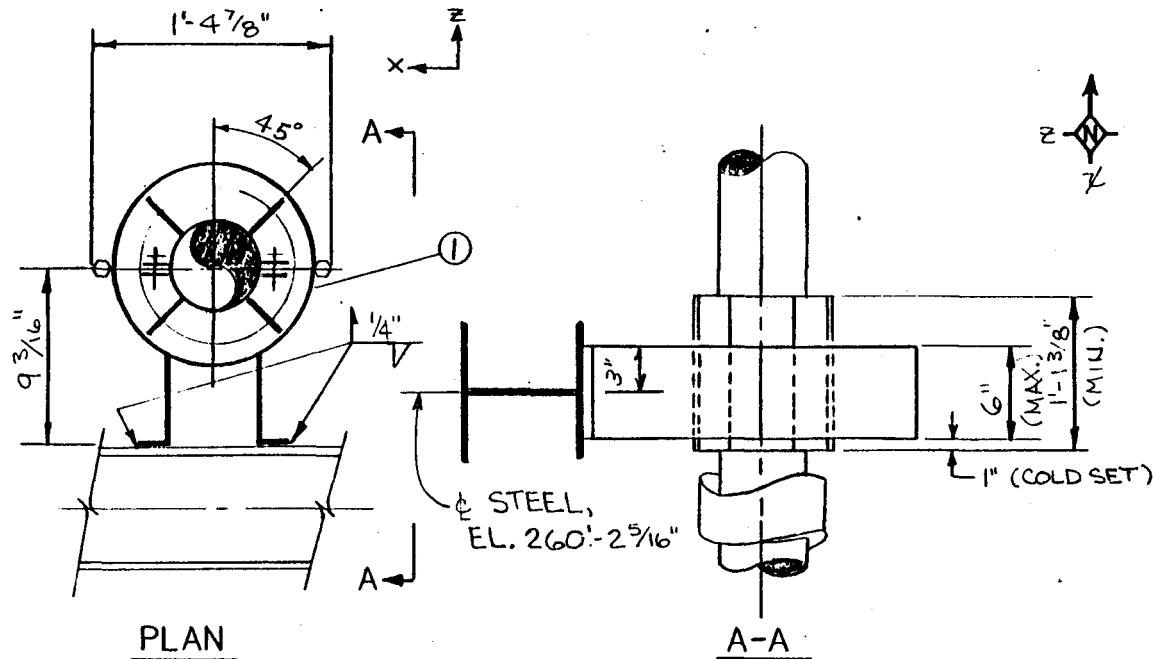
PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 4"

PIPE MATERIAL: ASTM A335 GR. P22

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 4"-VT-1-KEB MARK NO H-VT-1-7



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta Y = 5 \frac{3}{8}"$ DN.

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P13-6
D	STRUCTURAL	S32-4
C	ELECTRICAL	
B		
A		

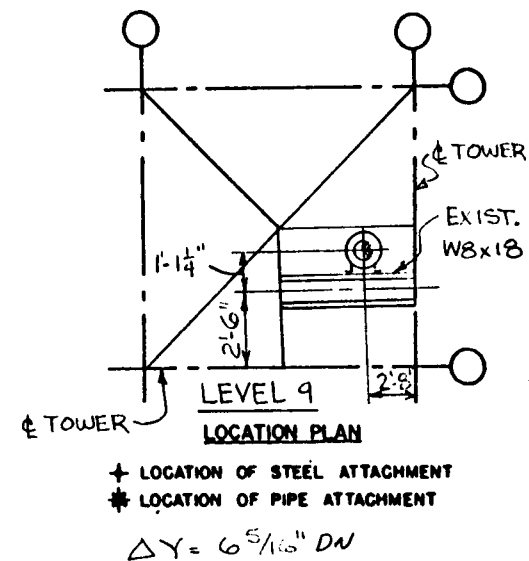
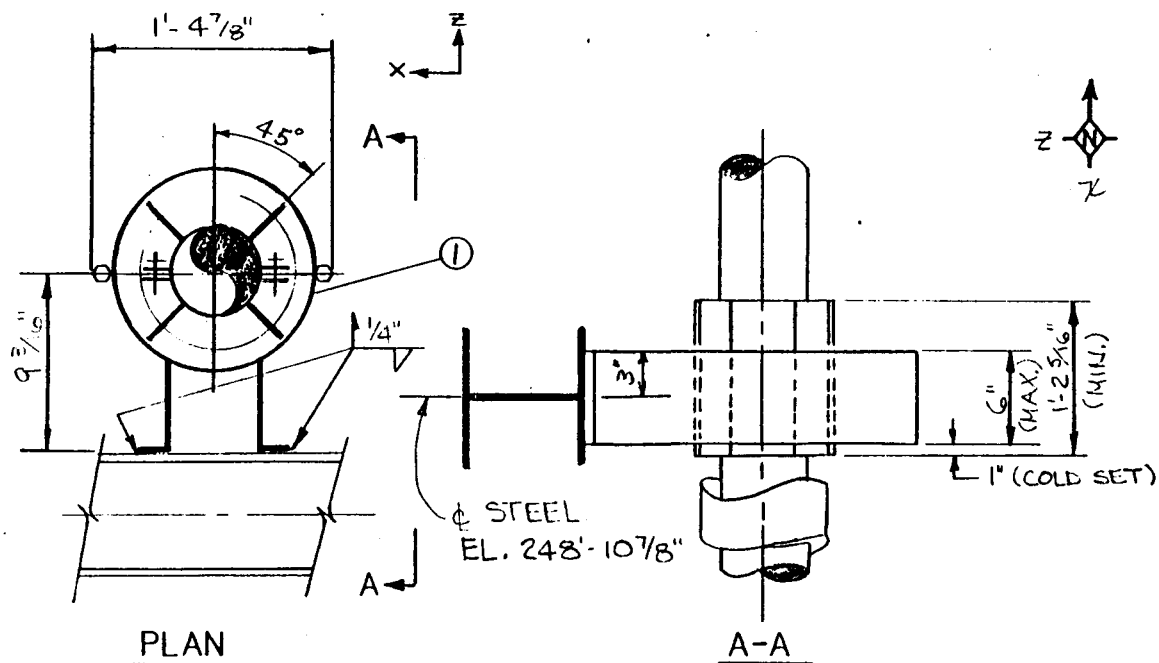
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1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.8K$,
 $F_z = 0.8K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	DATE	CHECKED	DATE	4
REVIEWED	DATE	APPROVED	DATE	3
PROJECT	DATE			2
ANALYSIS ID. CODE				1

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 4"-VT-1-KFP	MARK NO H-VT-1-8



VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P13-6	A
D	STRUCTURAL S32-4	O
C	ELECTRICAL	
B		
A		

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1		

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 0.5K$, $F_y = 0.7K$

PIPE SIZE: 45" O.D.

PIPE INSULATION: 4"

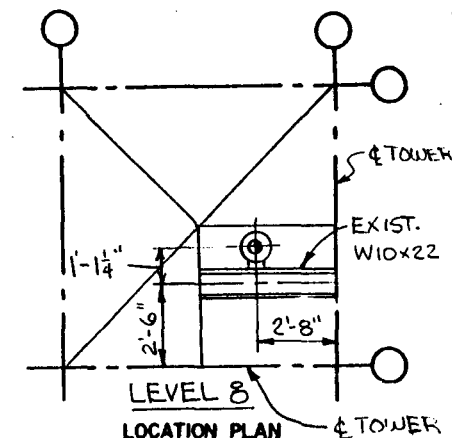
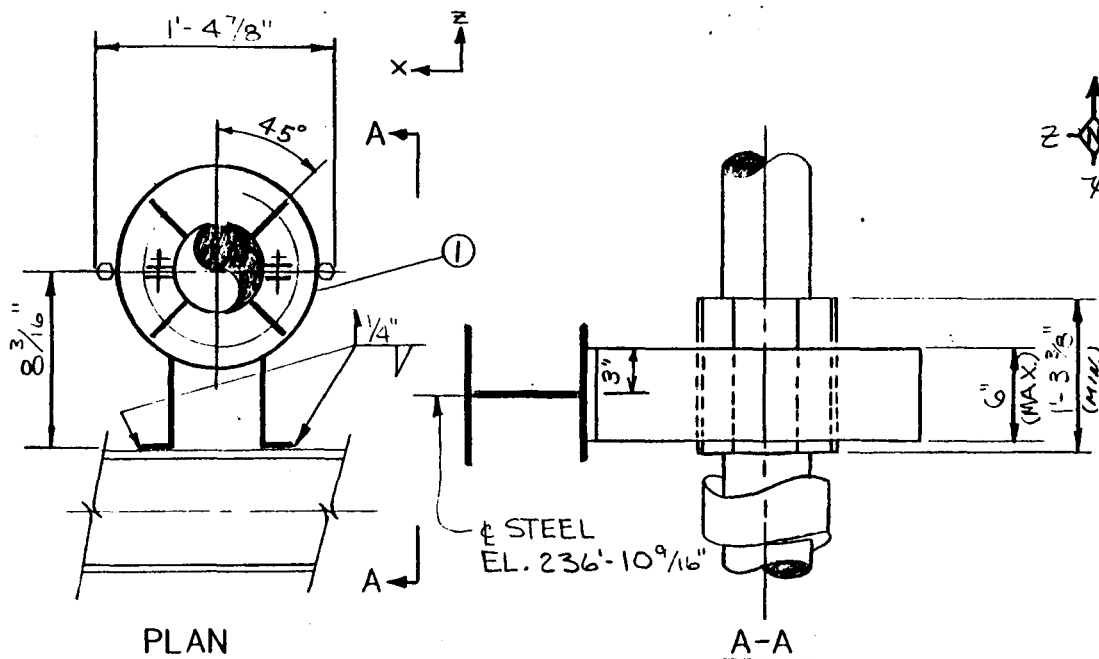
PIPE MATERIAL:

ASME B31.1

ENGINEERING RECORD

DESIGNED	CHECKED
DATE	DATE
REVIEWED	APPROVED
DATE	DATE
PROJECT	DATE
DATE	DATE

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 4"-VT-1-KFR	MARK NO H-VT-1-9



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	TS-116	A
D		STRUCTURAL	S32-4	O
C		ELECTRICAL		
B				
A				

14			
13			
12			
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6			
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4			
3			
2			
1			
PIPE ALIGNMENT GUIDE SIM-FIG. 256			
ITEM NO.	RECD	COMPONENT DESCRIPTION	REMARKS
1		SCALE: NONE	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700 LINE NO 4-VT-1-KFK MARK NO H-VT-1-10			

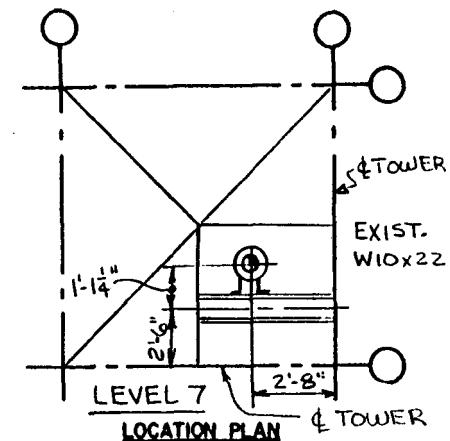
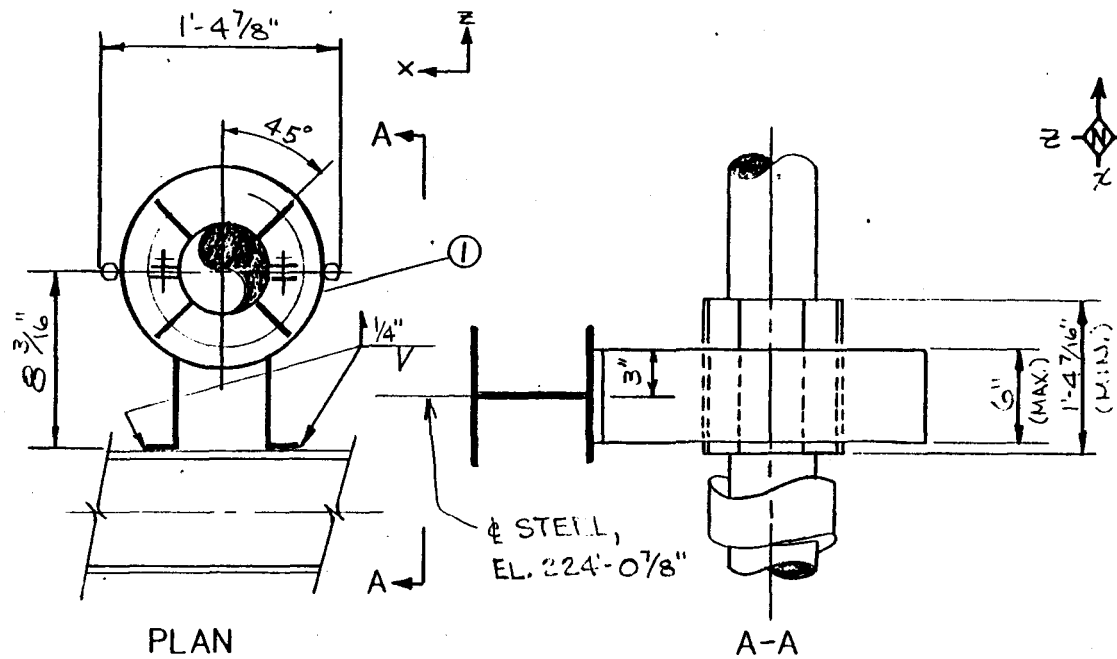
NOTES:

PIPE TEMPERATURE: 950°F
 STRUCTURAL DESIGN LOAD: 1/2" WIND, 1/2" OCK
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 1"
 PIPE MATERIAL: ASTM A335 1-10

ENGINEERING RECORD			
DESIGNED	4/12/80	CHECKED	8/12/80
DATE	4/12/80	DATE	8/12/80
REVIEWED	8/12/80	APPROVED	
DATE	8-30-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T-VT-1-A-4-VT-1-A-5		

5
4
3
2
1
REVISIONS

ITEM NO.	RECD	COMPONENT DESCRIPTION	REMARKS
1		SCALE: NONE	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700 LINE NO 4-VT-1-KFK MARK NO H-VT-1-10			



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT

$$\Delta Y = 8 \frac{7}{16}'' \text{ DN}$$

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P13-16
D	STRUCTURAL	S32-4
C	ELECTRICAL	
B		
A		

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4	
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2	
1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 0.4K$, $F_z = 0.9K$

PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 4"

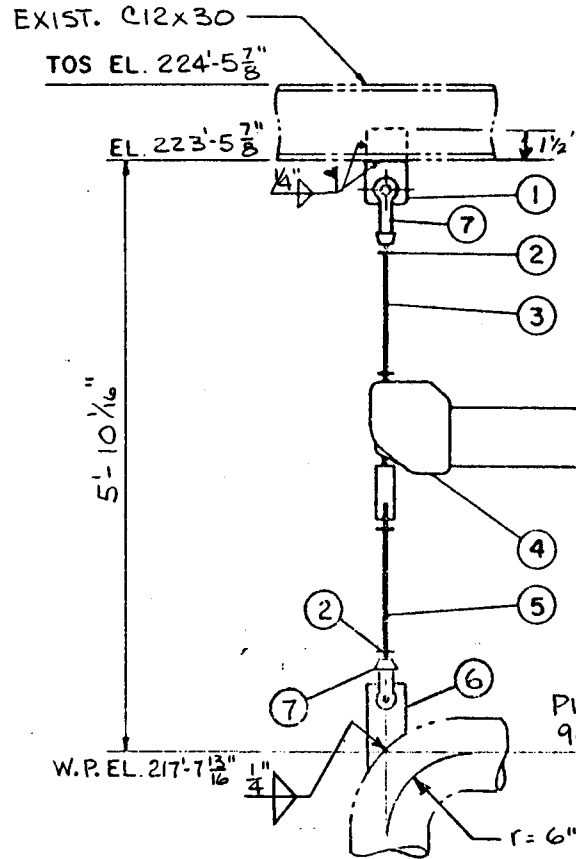
PIPE MATERIAL: A307

ENGINEERING RECORD

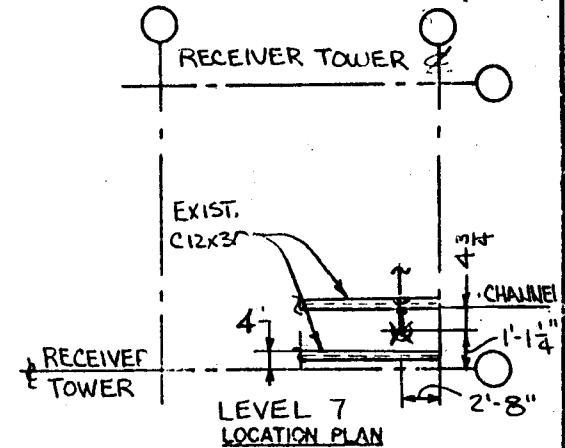
DESIGNED	5/23/80	CHECKED	5/23/80
DATE	4/22/80	DATE	5/23/80
REVIEWED	5/23/80	APPROVED	
DATE	4-30-80	DATE	
PROJECT	BDR		
DATE	6-12-80		

5		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4		SCALE:	Stearns-Roger	
3		NONE		11165/8
2				
1				
REVISIONS			10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700	LINE NO	4-VT-1-KEB	MARK NO
				H-VT-1-11

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING SOUTH



OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

SPRING DATA				14
FIG. NO.	TYPE	SIZE		
91H	A	33		13
HOT LOAD		11521b		11
COLD LOAD		N.A.		10
VERT. TRAVEL C.T.O. H.		9 1/16" DIA		9
T.T. CONST. SUPPORT		11"		8
VENDOR ENG. REV.			REV	
E			7	2
D			6	1
C			5	1
B			4	1
A			3	1
			2	1
			1	1

VOL. P60-1

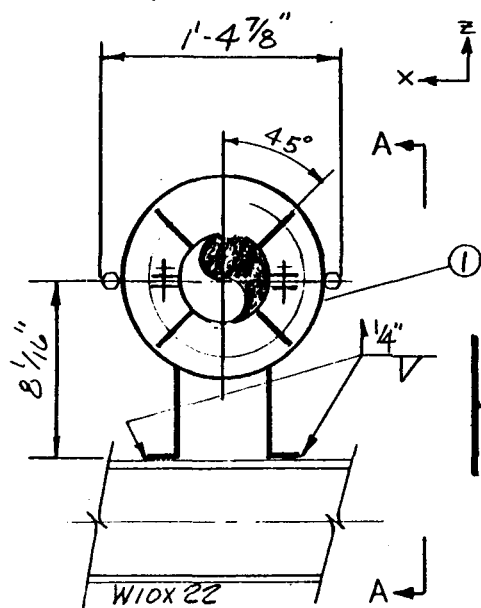
REFERENCE DRAWINGS		REV		
PIPING	139-2	P3	6	1
STRUCTURAL	S32-4	O	5	1
ELECTRICAL			4	1
			3	1
			2	1
			1	1

NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 1.7 K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

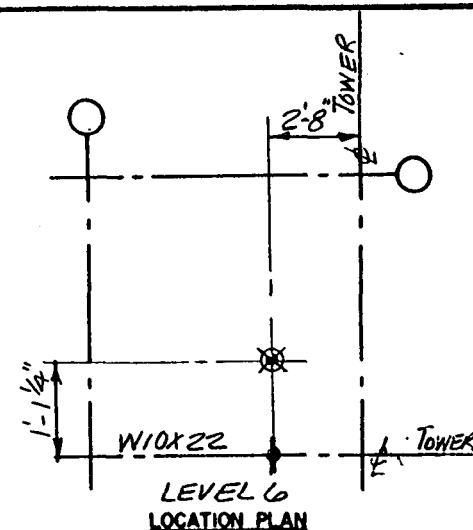
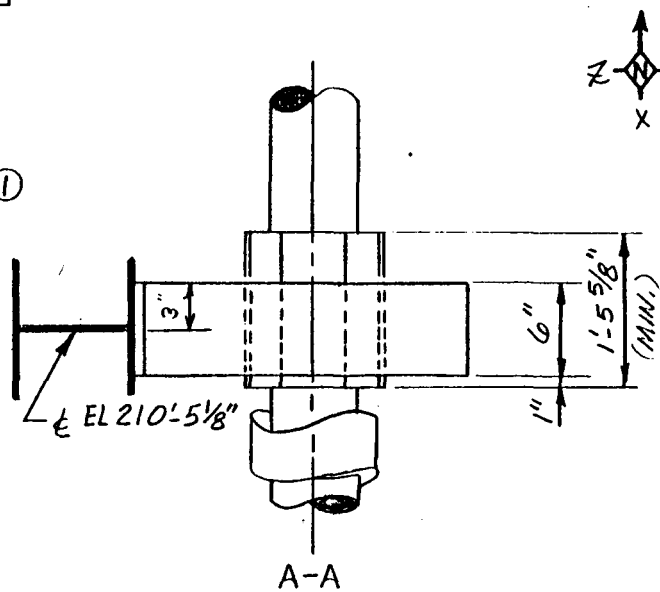
ENGINEERING RECORD				5
DESIGNED	7/12/80	DATE	3-27-80	4
REVIEWED	7/12/80	DATE	3-27-80	3
PROJECT		DATE	3-27-80	2
ANALYSIS ID. CODE	T-VT-1-A-4/13-2, W-A5	PROJECT NO	C-21700	1
		LINE NO	4"-VT-1-KFB	1
		MARK NO	H-VT-1-12	1

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Siearns-Roger	11165/8

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA



PLAN



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 9 \frac{5}{8}'' \text{DN}$

Vol. P60-1

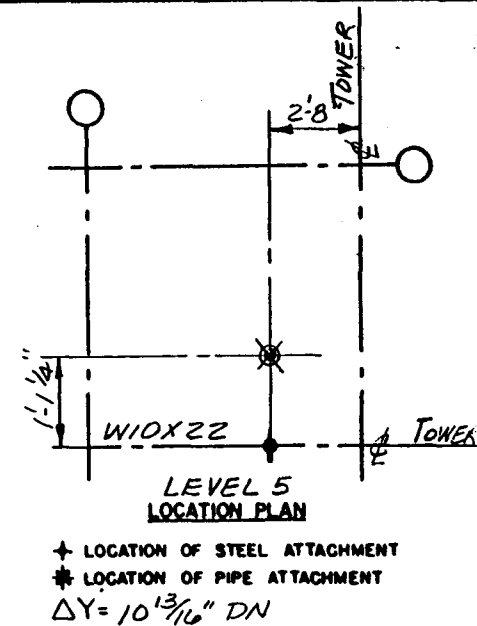
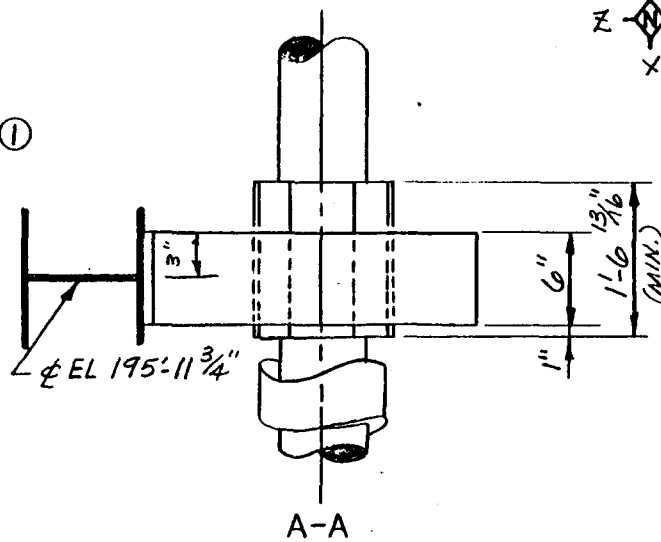
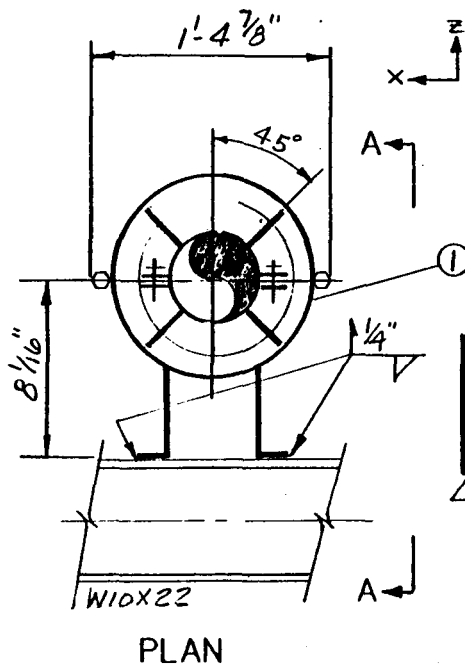
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	0
C		ELECTRICAL		
B				
A				

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4			
3			
1	1	PIPE ALIGNMENT GUIDE SIM.FIG. 256	

NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = 1.0\text{ k}$ $F_z = 1.0\text{ k}$
PIPE SIZE: $4.5''\text{O.D.}$
PIPE INSULATION: $4''$
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5					
DESIGNED	MLM	CHECKED	7/9/80	4	ITEM REQD	COMPONENT DESCRIPTION		REMARKS	
DATE	4-22-80	DATE	7/12/80	3	SCALE: NONE	Stearns-Roger INCORPORATED		11165/8	
REVIEWED	MLM	APPROVED		2					
DATE	4-27-80	DATE		1					
PROJECT	BDR		W. R. Y.	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA					
DATE	6-12-80		6-12-80	REVISIONS					
ANALYSIS	ID. CODE	T-VT-1-A-4/B-2 W-VT-1-A-5		PROJECT NO	C-21700	LINE NO	4"VT-1-KEB	MARK NO	H-VT-1-13



VOL. P60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	O
C		ELECTRICAL		
B				
A				

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PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 1.0K$ $F_z = 1.0K$

PIPE SIZE: 4.5" O.D.

PIPE INSULATION: 4"

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	JTB
DATE	4-21-80	DATE	4-21-80
REVIEWED	NRM	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		
DATE	6-12-80		

5

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2

1

ITEM REQD

SCALE:

NONE

COMPONENT DESCRIPTION

Stearns-Roger

REMARKS

11165/8

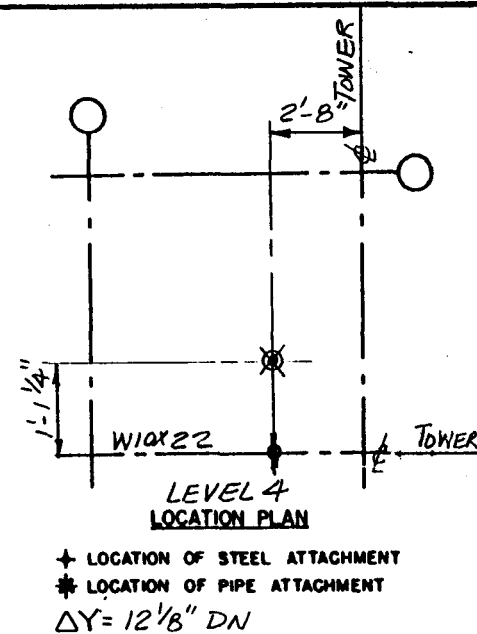
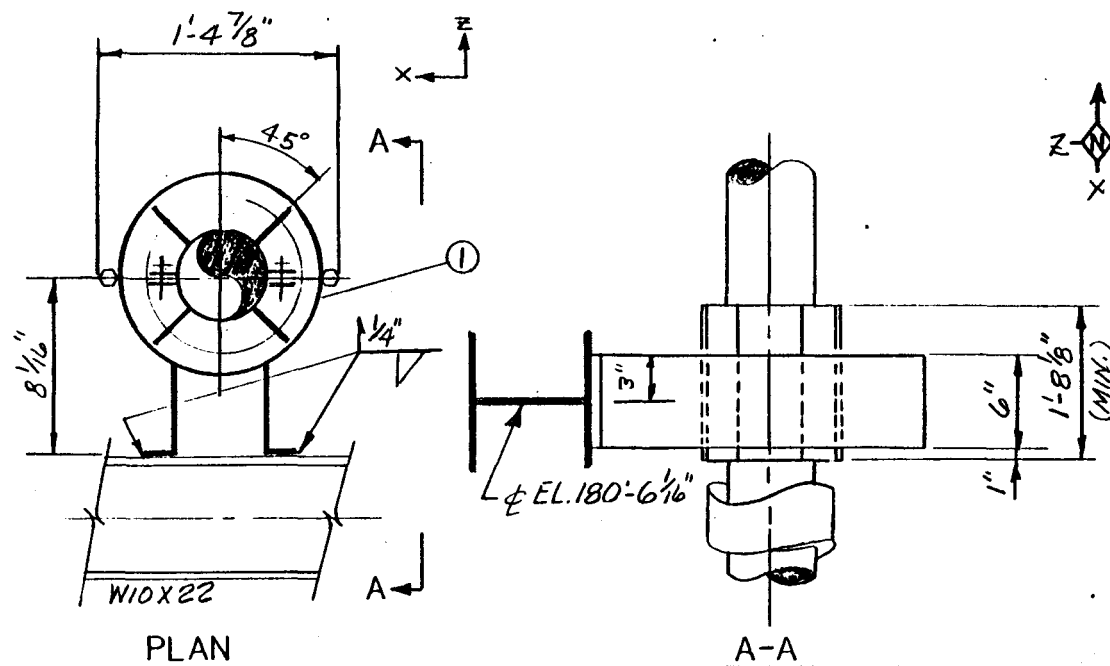
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE T-VT-1-A-1/8-Z W-VT-1-A-5

PROJECT NO C-21700

LINE NO 4"VT-1-KEB

MARK NO H-VT-1-14



VOL. P60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	532-3	O
C		ELECTRICAL		
B				
A				

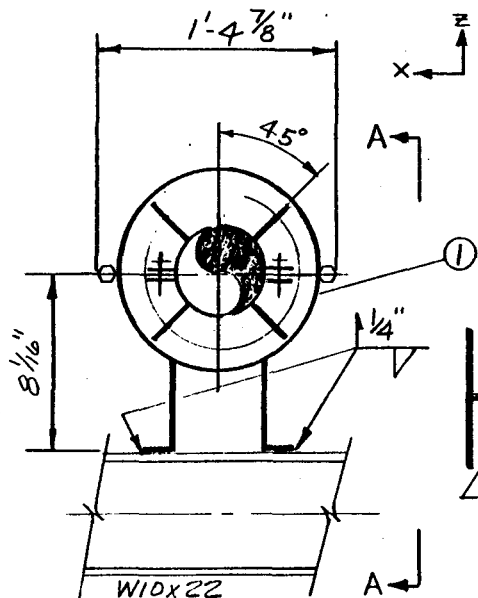
14	
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1	PIPE ALIGNMENT GUIDE SIM-FIG. 256

NOTES:

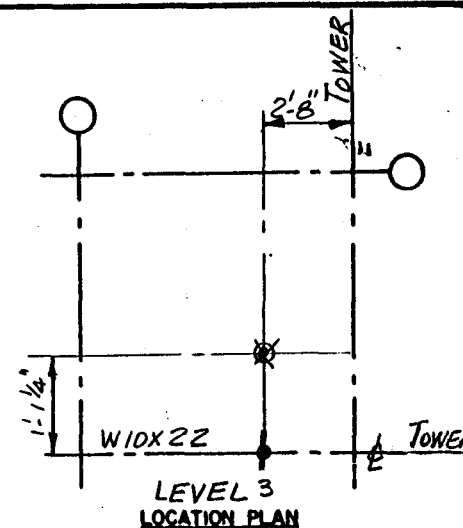
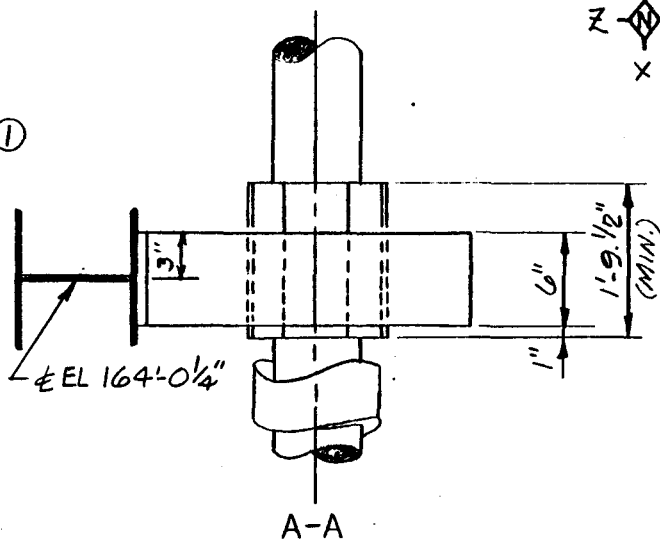
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x .9K$ $F_z .9K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	W. H. Y.
DATE	4-21-80	DATE	6-12-80
REVIEWED	BDR	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T-VT-1-A-4/B-2 W-VT-1-A-5		

5		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4		SCALE:	Stearns-Roger	11165/8
3		NONE		
2				
1				
REVISIONS				
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO C-21700 LINE NO 4"VT-1-KEB MARK NO H-VT-1-15				



PLAN



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 13\frac{1}{2}" DN$

VOL. P60-1

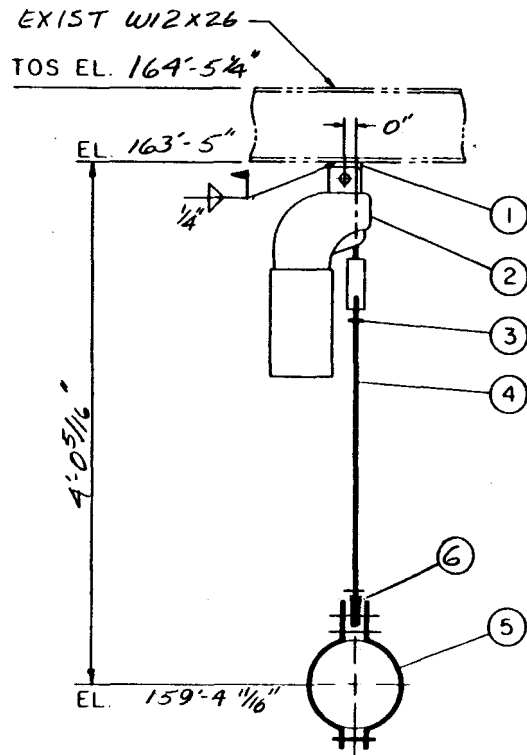
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
1	/	PIPE ALIGNMENT GUIDE SIM. FIG. 256	
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger REGULATED	11165/8
10 Mile SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE N° 4"VT-1-KEB	MARK N° H-VT-1-16

NOTES:

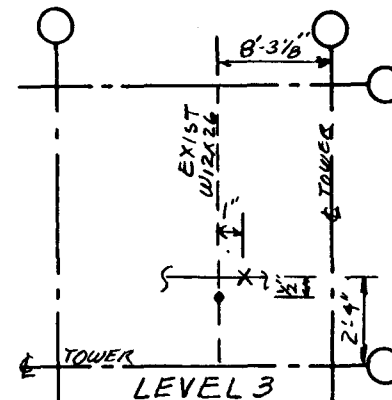
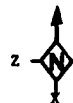
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = .9k$ $F_z = .9k$
PIPE SIZE: $4.5'' \text{ O.D.}$
PIPE INSULATION: $4''$
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	1/18/80
DATE	4-21-80	DATE	5-12-80
REVIEWED	4-21-80	APPROVED	
DATE	4-21-80	DATE	
PROJECT	BDR		W. R. Y.
DATE	6-12-80		6-12-80
ANALYSIS	ID. CODE	T-VI-1-A-4/B-2	W-VI-1-A-5

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH
PIPE ROTATED 90°



LOCATION PLAN

✦ LOCATION OF STEEL ATTACHMENT
✦ LOCATION OF PIPE ATTACHMENT
△ x = 1/16"
△ z = 1/16"

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO	TYPE	SIZE	13		
80V	C	21	12		
HOT LOAD		297#	11		
COLD LOAD		N.A.	10		
VERT. TRAVEL C. TO H.		13" DN	9		
T T CONST. SUPPORT		15"	8		
REFERENCE DRAWINGS			7		
PIPING	P3-3	P3	6	1	1/2" DIA. WELDING LUG FIG. 290
STRUCTURAL	S32-3	Q	5	1	4" DIA. PIPE CLAMP FIG. 295A
ELECTRICAL			4	1	1/2" DIA. R. H. THD. ROD FIG. 140
			3	2	1/2" DIA. R. H. HEX NUT
			2	1	SPRING
			1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55

VENDOR ENG. REV.	
E	
D	
C	
B	
A	

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	KER	FUH
DATE	2-29-80	DATE	3-25-80	3-27-80
REVIEWED	KER	APPROVED	KER	3-27-80
DATE	3-9-80	DATE	3-27-80	
PROJECT				
DATE				

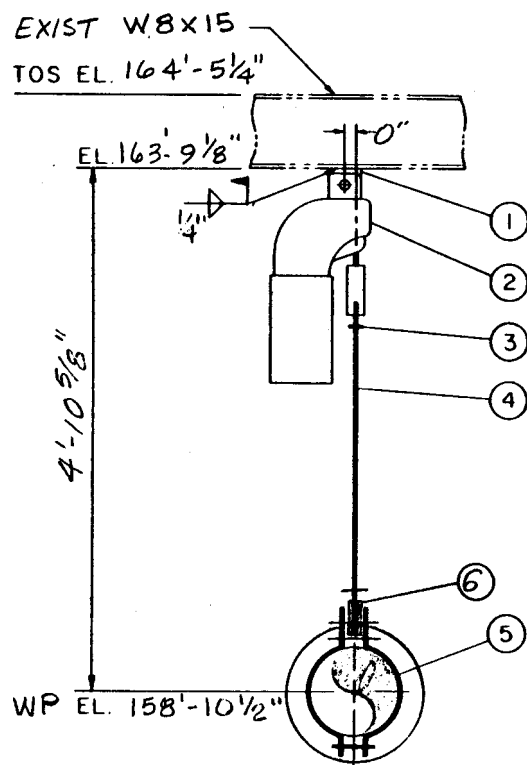
5			
4			
3			
2			
1			
REVISIONS			
ITEM REQD			
SCALE	NONE		
COMPONENT DESCRIPTION			
REMARKS			

NOTES:

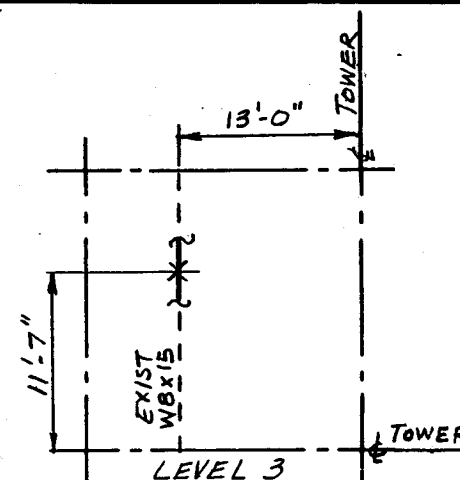
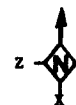
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .5K
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 4" THICK
PIPE MATERIAL: ASTM A335 P22

ANALYSIS ID. CODE	T-VT-1-A	4/18-2	W-A-5	PROJECT NO	C-21700	LINE NO	4-VT-1-KEB	MARK NO	H-VT-1-17
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DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST
PIPE ROTATED 90°



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$$\Delta x = 3/16"$$

$$\Delta z = 3 9/16"$$

VOL. P60-1

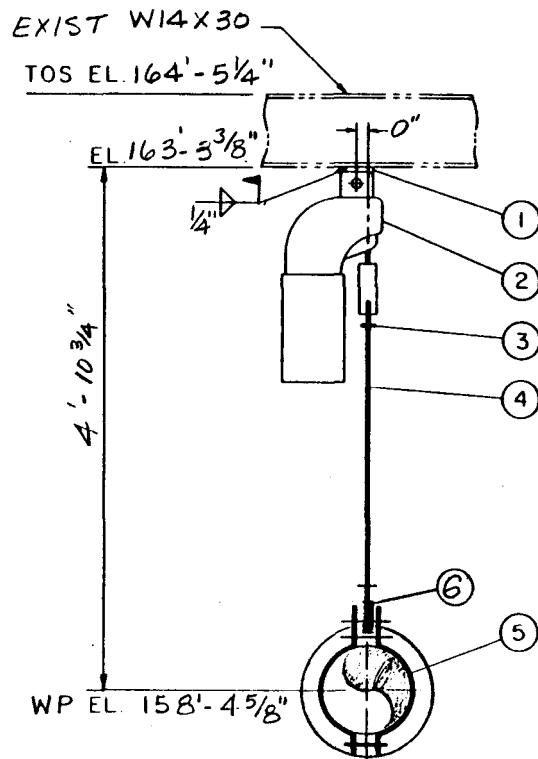
OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. NO.	TYPE	SIZE	13			
80V	C	16	12			
HOT LOAD		206#	11			
COLD LOAD		N.A.	10			
VERT. TRAVEL C. TO H.		10 3/16 IN	9			
T.T. CONST. SUPPORT		12 1/2"	8			
REFERENCE DRAWINGS			REV.	7		
PIPING	P9-3	P3	6	1	1/2" DIA. WELDLESS EYENUT FIG. 290	
STRUCTURAL	S32-3	O	5	1	4" DIA. PIPE CLAMP FIG. 293A	
ELECTRICAL			4	1	1/2" DIA. R. H. THD. ROD FIG. 140	
			3	2	1/2" DIA. R. H. HEX NUT	
			2	1	SPRING W/EXTENDED LOAD ARM	SEE DATA
			1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	LONG
ENGINEERING RECORD			5		ITEM REQD	REMARKS
DESIGNED	MLA	CHECKED	REV	4		
DATE	2-29-80	DATE	3-25-80	3	SCALE:	
REVIEWED	SM	APPROVED	SM	1	NONE	
DATE	3-9-80	DATE	3-27-80	1		
PROJECT						
DATE						
ANALYSIS ID. CODE	T-VT-1-A-4/13-2	W-VT-1-A-5				
			REVISIONS			
			PROJECT NO	C-21700	LINE NO	4"VT-1-KEB
					MARK NO	H-VT-1-18

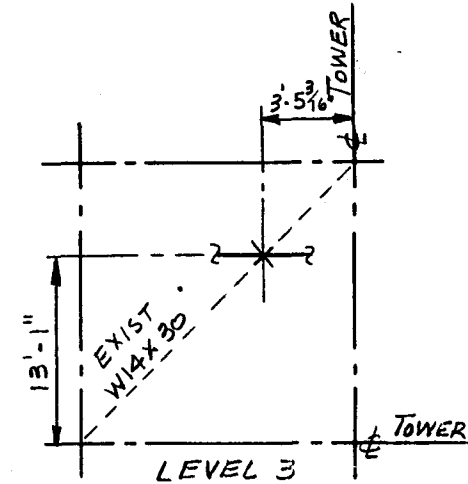
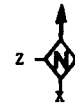
NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .4k
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 4"
PIPE MATERIAL: ASTM A335 P22

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTHWEST
PIPE ROTATED 45°



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta x = -7/8"$
 $\Delta z = 3 1/16"$

VOL. PG0-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14
FIG. N°	TYPE	SIZE	13
80V	C	1/6	12
HOT LOAD			11
COLD LOAD			10
VERT. TRAVEL C. TO H.			9
T.T. CONST. SUPPORT			8

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-3
D	STRUCTURAL	S32-3
C	ELECTRICAL	
B		
A		

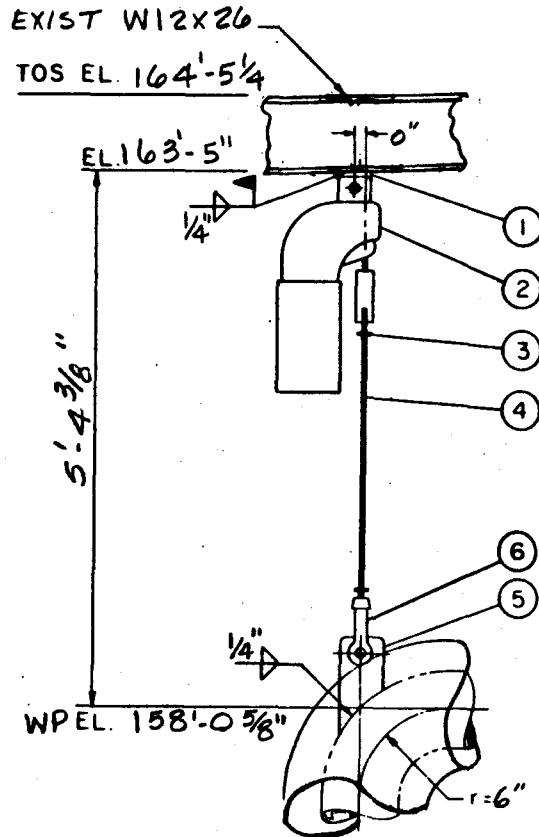
6	1	1/2" DIA. WELDLESS EYE BOLT	SEE DATA
5	1	4" DIA. PIPE CLAMP FIG. 295 A	2 ON 1/2
4	1	1/2" DIA. R. H. THD. ROD FIG. 140	
3	2	1/2" DIA. R. H. HEX NUT	
2	1	SPRING W/EXTENDED LOAD ARM	
1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	

NOTES:
PIPE TEMPERATURE: 760 °F
STRUCTURAL DESIGN LOAD: 4K
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 4"
PIPE MATERIAL: ASTM A335 P22

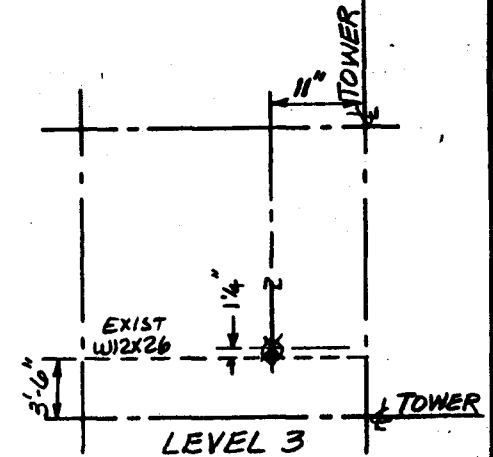
ENGINEERING RECORD			
DESIGNED	MIN	CHECKED	FIN
DATE	4-22-80	DATE	5-25-80
REVIEWED	FIN	APPROVED	FIN
DATE	3-9-80	DATE	3-22-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T-VT-1-A-4-5-3	W-VT-1-A-5	

5	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	SEE DATA
4	1	ITEM REQD	
3	1	SCALE: NONE	
2	1	REVISIONS	
1	1	REVISIONS	
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT N° C-21700 LINE N° 4" VT-1-KEB MARK N° H-VT-1-19			

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST
(STEEL ROTATED 90°)



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT

$$\Delta x = -5\frac{1}{16}''$$

$$\Delta z = 2\frac{1}{2}''$$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14			
FIG. NO.	TYPE	SIZE	13			
8/H	C	17	12			
HOT LOAD			11			
COLD LOAD			10			
VERT. TRAVEL C. TO H.			9			
T.T. CONST. SUPPORT			8			
REFERENCE DRAWINGS			REV	7		
PIPING	P0-3	P#	6	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
STRUCTURAL	132-3	0	5	1	1/2" DIA. WELDING LUG C-7 1/2" H. S. 53 BY FAB.	
ELECTRICAL			4	1	1/2" DIA. R. H. THD. ROD FIG. 140	
			3	2	1/2" DIA. R. H. HEX NUT	
			2	1	SPRING W/EXTENDED LOAD ARM	SEE DATA
			1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 54	

VENDOR ENG. REV.

E	
D	
C	
B	
A	

Δ REVISED HOT LOAD, SPRING SIZE & ANALYSIS NO.

NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .7 K.
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 4"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MLF	CHECKED	RCP	FWH
DATE	2-29-80	DATE	2-23-80	2-11-80
REVIEWED	7/1/80	APPROVED	7/1/80	
DATE	3-9-80	DATE	2-1-80	
PROJECT				
DATE				

5		1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 54	
4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS
3		SCALE:	NONE		
2					
1					
REVISIONS					
PROJECT NO C-21700					
LINE NO 4"VT-1-KEB					
MARK NO H-VT-1-20					

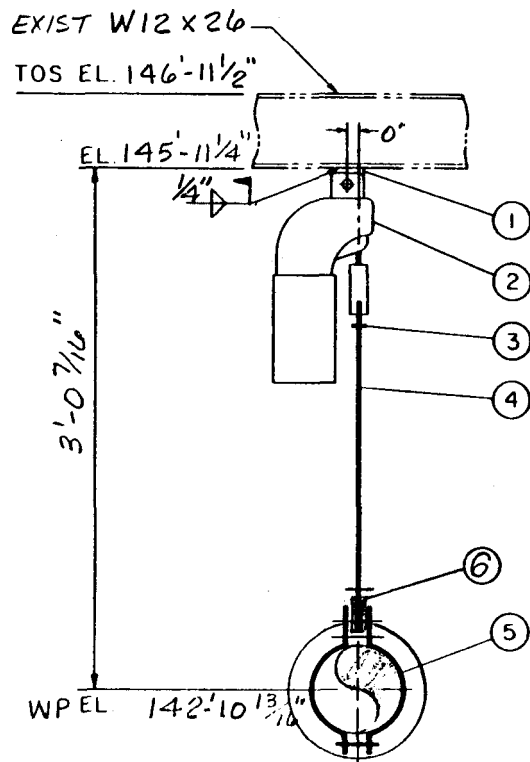
ANALYSIS ID. CODE T-VT-1-A-6 N-VT-1-A-7

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

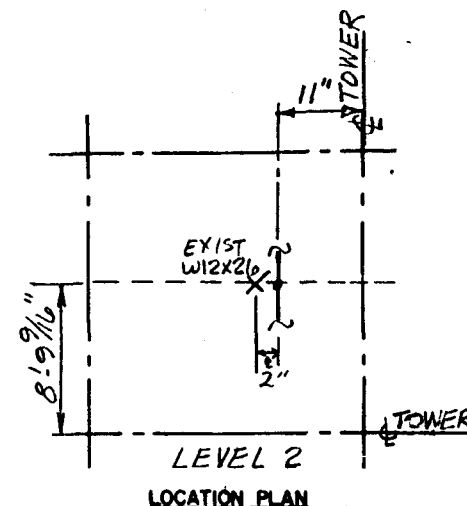
Stearns-Roger
INCORPORATED

11165/8

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta x = -3\frac{1}{16}"$
- $\Delta z = 2\frac{1}{2}"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
80V	C	17	12		
HOT LOAD		296#	11		
COLD LOAD		N.A.	10		
VERT. TRAVEL C. TO H.		8 1/16" DN	9		
T.T. CONST. SUPPORT		10"	8		
REFERENCE DRAWINGS			REV	7	
PIPING	P9-3	P3	6	1	1/2" DIA. WELDLESS EYE BOLT FIG. 290
STRUCTURAL	S-32-3	0	5	1	4" DIA. PIPE CLAMP FIG. 295A
ELECTRICAL			4	1	1/4" DIA. R. H. THD. ROD FIG. 140
			3	2	1/2" DIA. R. H. HEX NUT
			2	1	SPRING W/ EXTENDED LOAD ARM SEE DATA
			1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55

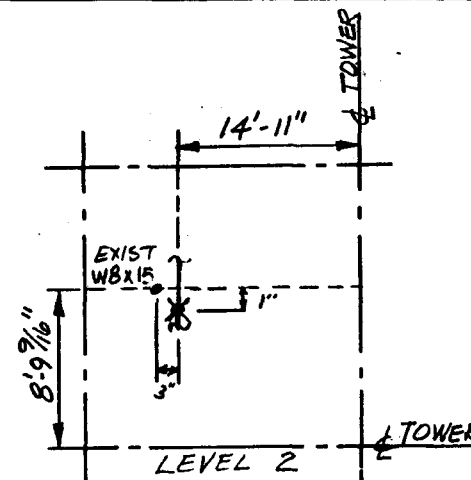
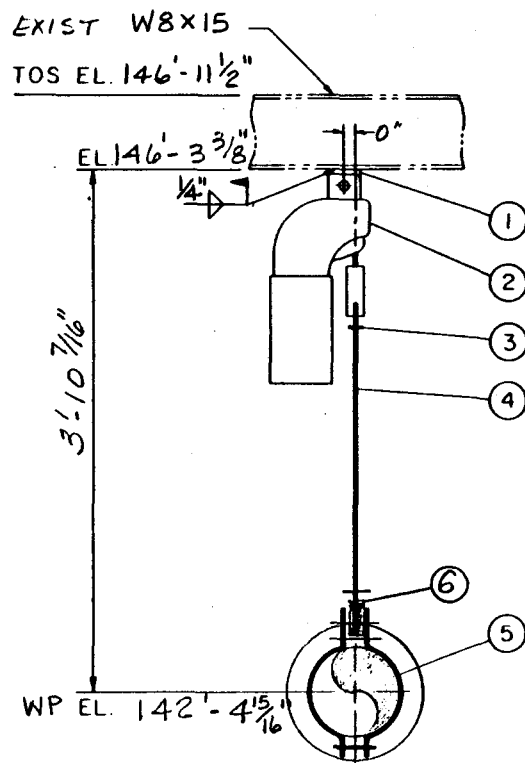
VENDOR ENG. REV.	
E	
D	
C	
B	
A	

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .5K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 1"
 PIPE MATERIAL: ASTM A335 GR P22

ENGINEERING RECORD				5			
DESIGNED	ALM	CHECKED	FEH	4		ITEM REQD	COMPONENT DESCRIPTION
DATE	2-28-80	DATE	3-27-80	3		SCALE:	11165/8
REVIEWED	ALM	APPROVED	FEH	2		NONE	
DATE	3-9-80	DATE	3-27-80	1			
PROJECT							
DATE							
ANALYSIS ID. CODE	T-VT-1-A-4/F-2	W-VT-1-A-5					
PROJECT NO	C-21700	LINE NO	1-VT-1-KEB				
MARK NO	H-VT-1-21						

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

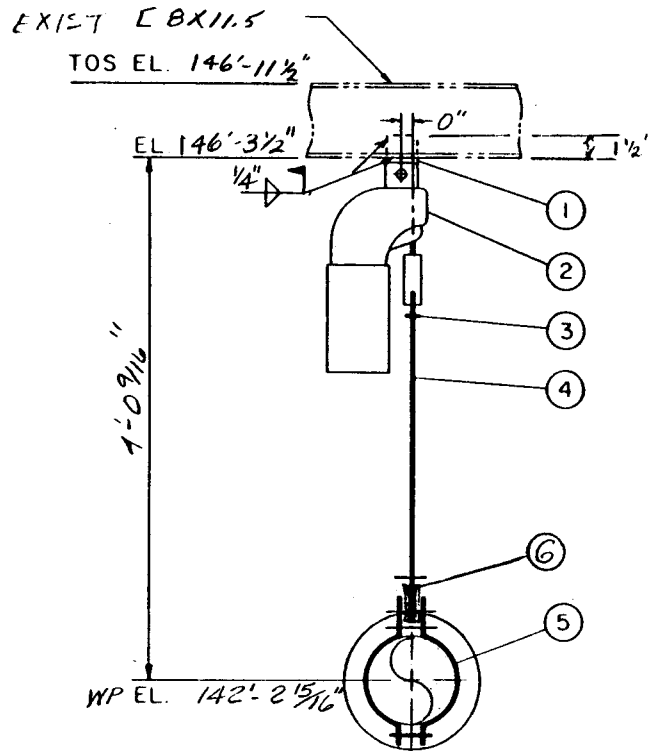
 $\Delta x = -1 \frac{3}{16}"$ $\Delta z = 3 \frac{3}{4}"$

VOL. P60-1

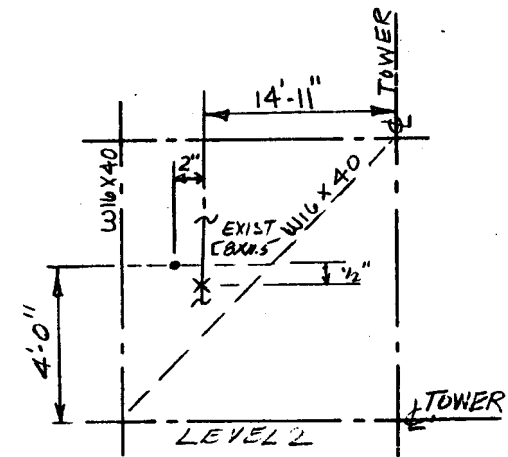
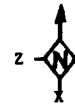
OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14				
FIG. NO	TYPE	SIZE	13				
80V	C	12	12				
HOT LOAD		193#	11				
COLD LOAD		N.A.	10				
VERT. TRAVEL C. TO H.		5' 5 1/16" DN	9				
T. T. CONST. SUPPORT		7 1/2"	8				
REFERENCE DRAWINGS			REV.	7			
PIPING	P9-3	P3	6	1	1/2" DIA. WELDLESS EYENUT FIG. 290		
STRUCTURAL	S32-3	O	5	1	4" DIA. PIPE CLAMP FIG. 295A		
ELECTRICAL			4	1	1/2" DIA. R. H. THD. ROD FIG. 140		
			3	2	1/2" DIA. R. H. HEX NUT		
			2	1	SPRING SINGLE ROD SUSP.	SEE DATA	
			1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	LONG	
RD			5				
FVH			4		ITEM REQD		
2-27-80			3		COMPONENT DESCRIPTION	REMARKS	
3-27-80			2	RAEL 3-2-80	Stearns-Roger INCORPORATED	11165/8	
3-27-80			1	WPC 3-22-80			
			REVISIONS				
			10 MME SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
W-VT-1-A-5		PROJECT NO	C-21700	LINE NO	4"VT-1-KEB	MARK NO	H-VT-1-22

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta x = -3/4"$ $\Delta z = 4 1/8"$

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
80V	C	14	12		
HOT LOAD		313#	11		
COLD LOAD		N.A.	10		
VERT. TRAVEL C. TO H.		5 1/16" DN	9		
T.T. CONST. SUPPORT		6 1/2"	8		
REFERENCE DRAWINGS			REV	7	
E	PIPING	P9-3	P3	6	1 1/2" DIA. WELDLESS EYE-BOLT FIG. 290
D	STRUCTURAL	S32-3	O	5	1 4" DIA. PIPE CLAMP FIG. 295A
C	ELECTRICAL			4	1 1/2" DIA. R. H. THD. ROD FIG. 140
B				3	2 1/2" DIA. R. H. HEX NUT
A				2	1 SPRING

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .5 K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 1"

PIPE MATERIAL: ASTM A335 GR. 12

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	YEB	PVH
DATE	2-28-80	DATE	2-27-80	3-27-80
REVIEWED	NPM	APPROVED	YEB	
DATE	3-9-80	DATE	3-27-80	
PROJECT				
DATE				

5	1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	SEE DATA
4			ITEM REQD	COMPONENT DESCRIPTION
3			SCALE: NONE	REMARKS
2				
1				

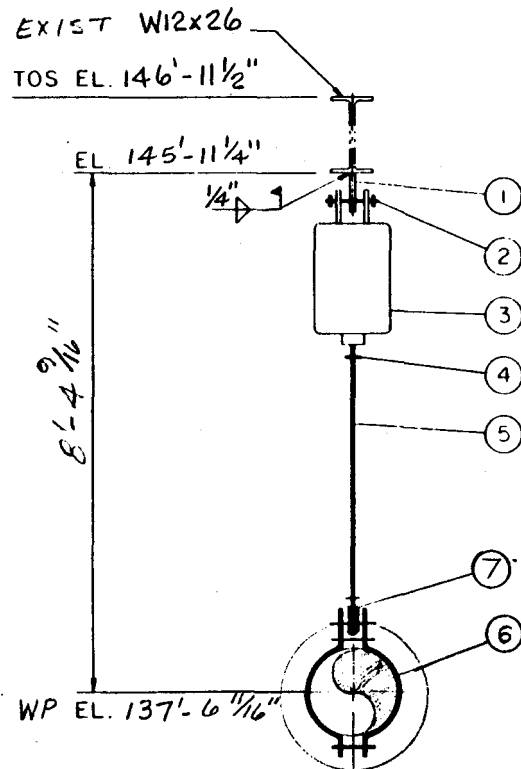
Stearns-Roger
INCORPORATED

11165/8

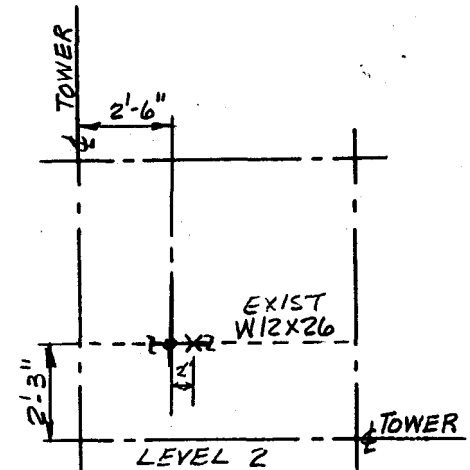
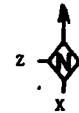
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE T-VT-1-A-114-2 W-VT-1-A-5 PROJECT NO C-21700 LINE NO 4"VT-1-KEB MARK NO H-VT-1-23

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -3/8"$
 $\Delta z = 2 3/16"$

VOL. P 60-1

OPERATIONAL (HOT) AND COLD LOADS
 INDICATED DO NOT INCLUDE WEIGHT
 OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
82	C	7	12		
HOT LOAD		623#	11		
COLD LOAD		553#	10		
VERT. TRAVEL C. TO H.		5/16" DN	9		
T.T. CONST. SUPPORT		N.A.	8		
VENDOR ENG. REV.			7	1	5/8" DIA. WELDLESS EYENUT FIG. 290
REFERENCE DRAWINGS			6	1	4" PIPE CLAMP FIG. 295A
PIPING			5	1	5/8" DIA. R. H. THD. ROD FIG. 140
STRUCTURAL			4	2	5/8" DIA. R. H. HEX NUT
ELECTRICAL			3	1	SPRING
			2	1	5/8" DIA. PIN W/COTTER PIN FIG. 291
			1	1	5/8" DIA. STRUCT. WELDING LUG FIG. 55

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .9 K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 J5 P2C

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	KEB	FWH
DATE	2-28-80	DATE	3-27-80	3-27-80
REVIEWED	J. H. H.	APPROVED	J. H. H.	
DATE	3-9-80	DATE	3-27-80	
PROJECT				
DATE				

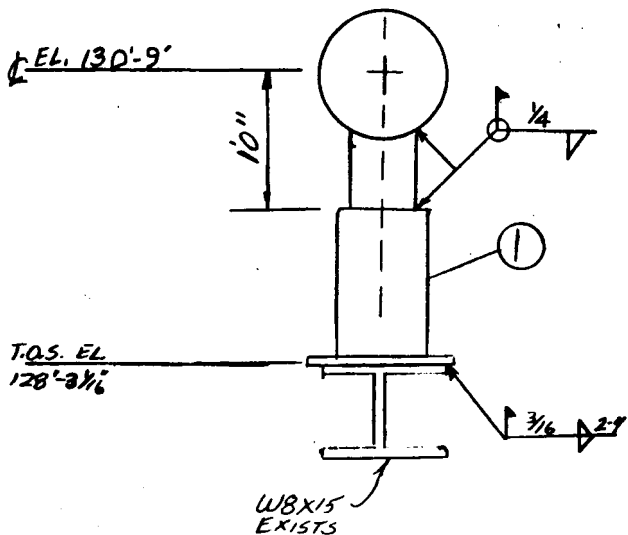
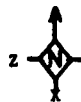
5		ITEM REQD		REMARKS
4		SCALE:		
3		NONE		
2				
1				
REVISIONS		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		

Stearns-Roger
 INCORPORATED

11165/8

ANALYSIS ID. CODE T-VT-1-A-4/H-C W-VF1-A-5 PROJECT NO C-21700 LINE NO 4"VT-1-KEB MARK NO H-VT-1-24

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST

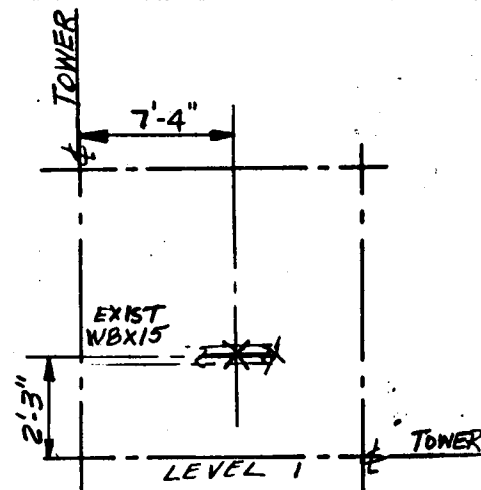
REVISD FROM SPRING ROD TO RIGID FLOOR SYST.

ADDED ITEMS 899.

VENDOR ENG. REV.	
E	
D	
C	
B	
A	

REFERENCE DRAWINGS			REV.
PIPING	P9.3	P3	6
STRUCTURAL	S32-3	0	5
ELECTRICAL			4

T-VT-1-A-6	W-VT-1-A-7
ANALYSIS I.D. CODE	



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = 1/4"
- Δ Z = 3/4"

VOL. P60-1

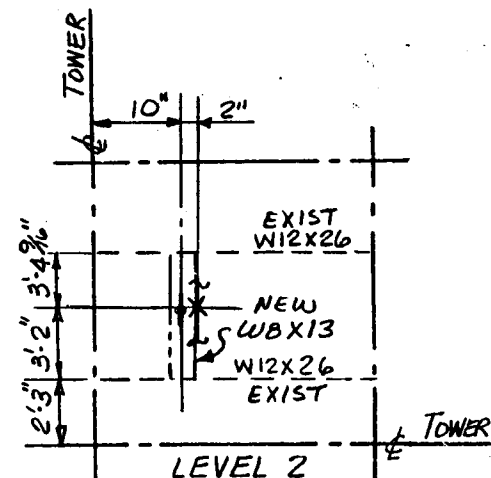
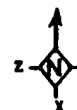
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1			

NOTES:
 PIPE TEMPERATURE: 960° F.
 STRUCTURAL DESIGN LOAD: 1.8 K.
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4" THK.
 PIPE MATERIAL: ASTM A335 GR P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	REN EVH
DATE	2-1-80	DATE	5-2-80 3-17-80
REVIEWED	J. J. J.	APPROVED	J. J. J.
DATE	3-9-80	DATE	3-17-80
PROJECT			
DATE			

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1	

1	1	COMB. #2 ADJ. PRE STN. H.S. 62, 10'	X10" x 3/4" R.
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE:	Stearns-Roger INCORPORATED		11165/8
NONE			
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE NO 4"VT-1-KEB	MARK NO H VT-1-25	

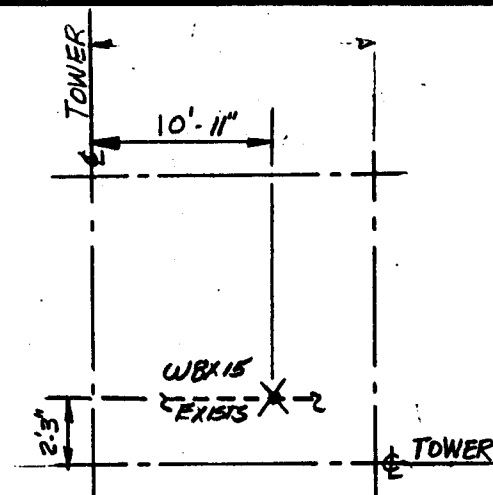
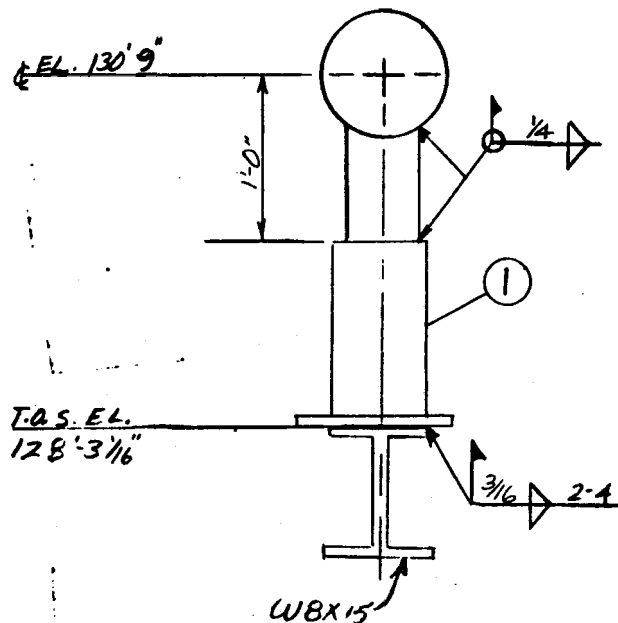


+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -\frac{1}{2}"$
 $\Delta z = 2\frac{7}{16}"$

ELEV. LOOKING EAST
PIPE ROTATED 90°

14			
13			
12			
11	4	3/4" X 3" LG A325 BOLTS	
10	4	4" X 3" X 3/8" X 5" LG	
9	1	W 8 X 13 6'-5 1/2" LG	
8	1	1/2" DIA. WELDLESS EYENUT FIG. 290	
7	1	1/2" DIA. F. S. CLEVIS W/FIN FIG. 299	
6	1	2" PIPE CLAMP FIG. 295A	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. - L. H. THD. ROD FIG. 253	
2	3	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ITEM NO	REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger INCORPORATED	11165/8
10 MwE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE NO	2" VT-1-KEB	MARK NO 1- VT-1-26

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
 ✦ LOCATION OF PIPE ATTACHMENT
 Δ X = -1/4"
 Δ Z = 9/16"

VOL. P 60 - 1

14			
13			
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3			
		5" SCH. 40 A35111.6" SCH. 80 C.S.	10" 10" x 38"

VENDOR ENG. REV.	
E	
D	
C	
B	
A	

REFERENCE DRAWINGS		REV
PIPING	P9-3	P3
STRUCTURAL	S32-3	0
ELECTRICAL		

ELEV. LOOKING EAST

3 REVISED FROM SPRING HGR. TO RIGID FLOOR SUPPORT

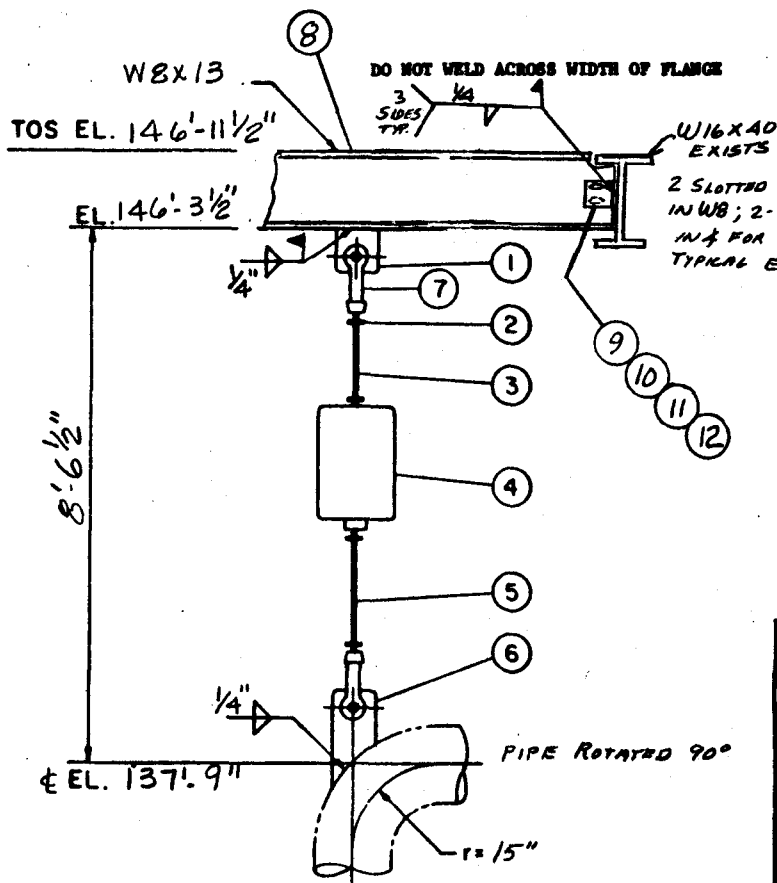
REVISÉD STEEL DETAIL

T-VT-1-A-6	W-VT-1-A-7
ANALYSIS ID. CODE	

NOTES:
PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: 2.3 K.
PIPE SIZE: 10.75" O.D.
PIPE INSULATION: 5" THK.
PIPE MATERIAL: ASTM A335 GR P11

ENGINEERING RECORD			
DESIGNED	<i>W. J. J.</i>	CHECKED	<i>W. J. J.</i>
DATE	<i>3-9-80</i>	DATE	<i>3-27-80</i>
REVIEWED	<i>W. J. J.</i>	APPROVED	<i>W. J. J.</i>
DATE	<i>3-9-80</i>	DATE	<i>3-27-80</i>
PROJECT			
DATE			

5		1	1	COMB.#5 ADJ. PIPE STN. H. S. 62 TYPE C	
4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS
3	RATE R. 12.00	SCALE:		Stearns-Roger INCORPORATED	11165/8
2	RATE R. 51.00	NONE			
1	R. 25.00				
REVISIONS		10 Mile SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 10/VT-11-177A		MARK NO 11 VT-11-1	



ELEV. LOOKING NORTH

△ REVISED NOTY COLD LOADS, SPRING & ROD SIZES. ADDED STEEL. STEEL FORMERLY ON H-VT-11-1.

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 3.2K
PIPE SIZE: 10.75" O.D.
PIPE INSULATION: 5"
PIPE MATERIAL: ASTM A335 GR P11

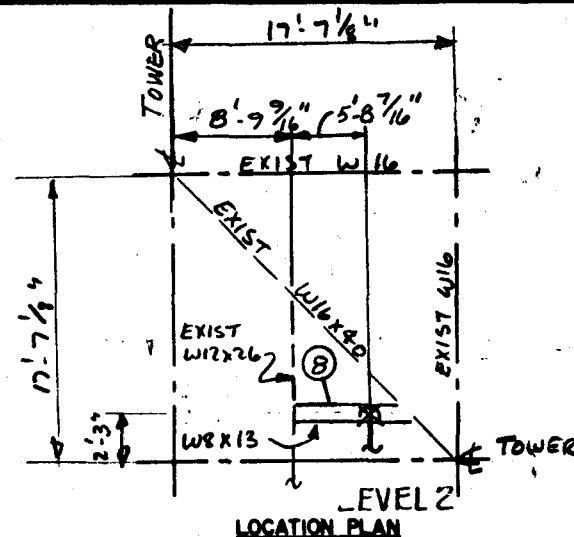
ENGINEERING RECORD

DESIGNED	MLM	CHECKED	FEEL	FUH
DATE	3-3-80	DATE	5-25-80	3-27-80
REVIEWED	8/2/81	APPROVED	2/2/81	
DATE	3-9-80	DATE	3-27-80	
PROJECT				
DATE				

ANALYSIS ID. CODE T-VT-1-A-6 W-VT-1-A-7

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
B-268	A	11	12	4	3/4" x 3" A325 BOLTS W/ NUTS
HOT LOAD			11	2	44 x 3 x 3/8, 5" LG @ 90°
COLD LOAD			10	1	44 x 3 x 3/8, 5" LG @ 135°
VERT. TRAVEL C. TO H.			9	1	44 x 3 x 3/8, 5" LG @ 45°
T.T. CONST. SUPPORT			8	1	W8x13, 6'-5 1/2" LG TRIM AS REQ'D.
VENDOR ENG. REV.			7	2	7/8" DIA. F. S. CLEVIS W/PIN FIG. 299
REFERENCE DRAWINGS			6	1	7/8" DIA. WELDING LUG C-7 1/2" H. S. 53
PIPING			5	1	7/8" DIA. R. H. THD. ROD FIG. 140
STRUCTURAL			4	1	SPRING
ELECTRICAL			3	1	7/8" DIA. R. H. THD. ROD FIG. 140
			2	4	7/8" DIA. R. H. HEX NUT
			1	1	7/8" DIA. STRUCT. WELDING LUG FIG. 55



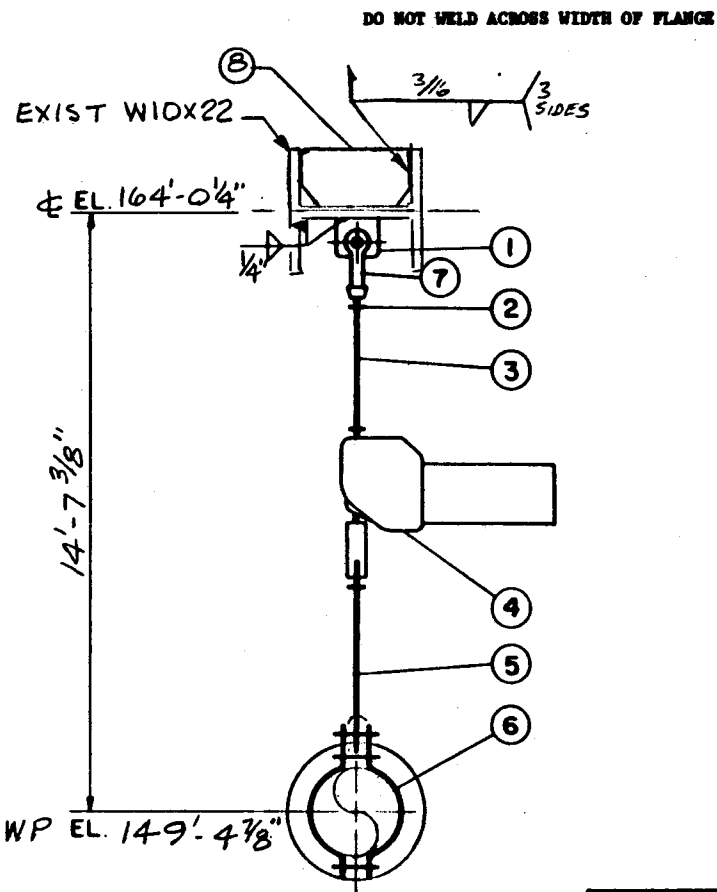
△ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δ x = -1/4"
 Δ z = 3/8"

VOL. P60-1

ITEM REQ'D	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 10"VT-11-FEA MARK NO H-VT-11-2



ELEV. LOOKING EAST
PIPE ROTATED 45°

Δ REVISED HOT LOAD & SPRING
SIZE & ANALYSIS NO.

Δ REVISED WELD SYMBOL

NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .2
PIPE SIZE: 2.875" O.D.
PIPE INSULATION: 3"
PIPE MATERIAL: A3TM A335 P22

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	JLS
DATE	3-7-80	DATE	3-27-80
REVIEWED	MLM	APPROVED	JLS
DATE	3-7-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T-VT-1-A-6		

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REVISIONS

ITEM REQD

SCALE:

NONE

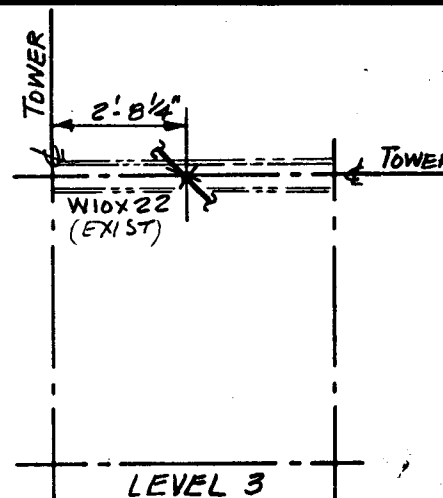
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

LINE NO 24-VT-12-A-2 MARK NO H-VT-12-1

OPERATIONAL (NOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO	TYPE	SIZE	13		
B1H	A	10	12		
HOT LOAD		141#	11		
COLD LOAD		N.A.	10		
VERT. TRAVEL C. TO H.		10 1/8" DN	9		
T.T. CONST. SUPPORT		7 1/2"	8	1	3/8" STIFF. PL
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
E	PIPING	12-3	6	1	2 1/2" PIPE CLAMP FIG. 295A
D	STRUCTURAL	13-3	5	1	1/2" DIA. R. H. THD. W. E. ROD FIG. 278
C	ELECTRICAL		4	1	SPRING SEE DATA
B			3	1	1/2" DIA. R. H. THD. ROD FIG. 140
A			2	3	1/2" DIA. R. H. HEX NUT
			1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55

VOL. P60-1



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

Δ x = 5/8"

Δ z = 2"



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 1\frac{1}{16}"$
 $\Delta Z = 1"$

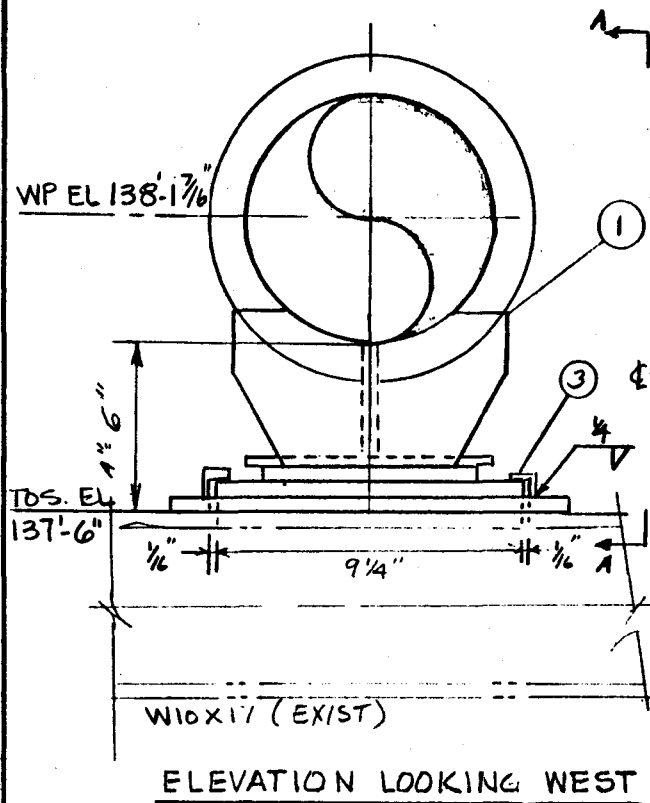
VOL. P 60-1

VENDOR ENG. REV.			SPRING DATA		14		
	FIG. NO	TYPE	SIZE	13			
	98	F	2	12			
E	HOT LOAD		153#	11			
D	COLD LOAD		134#	10			
C	VERT. TRAVEL C.T.O H.		1 1/2" DN	9			
B	T T CONST. SUPPORT		N A.	8			
A	REFERENCE DRAWINGS		REV.	7			
	PIPING	P9-3	P3	6			
	STRUCTURAL	332-3	0	5			
	ELECTRICAL			4			
				3	1	SPRING, U/L LOAD FLANGE	SEE DATA
				2		5"x5"x1/4" BOND TO 1/8" THICK GALVANNE B.	

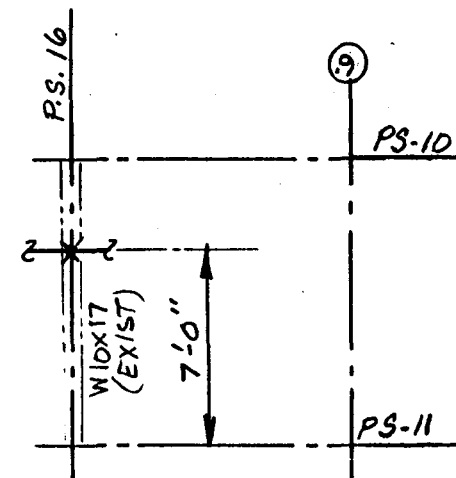
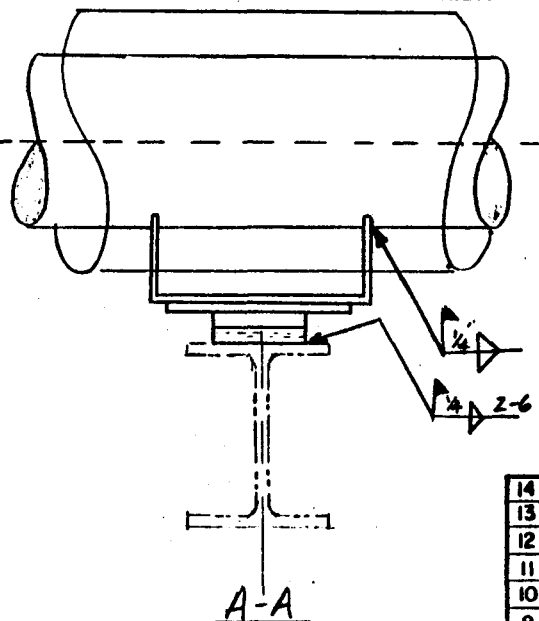
3 REVISED HOT & COLD LOAD & ANALYSIS AB.
 2 REVISED WELD SYMBOL

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .2K
PIPE SIZE: 2.875" O.D.
PIPE INSULATION: 3" THK.
PIPE MATL: ASTM A335 P22

ENGINEERING RECORD				5		1 1/2" PIPE SCH. 80 (BY FRB)	CUT TO
DESIGNED	M.A.A.	CHECKED	R.E.H.	4		ITEM RECORD	COMPONENT DESCRIPTION
DATE	3-9-80	DATE	3-23-80	3	PAID	SCALE:	Stearns-Roger INCORPORATED
REVIEWED	R.H.	APPROVED	H.H.	2	PAID	NONE	
DATE	3-9-80	DATE	3-23-80	1	PAID		11165/8
PROJECT				10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
DATE				REVISIONS			
ANALYSIS ID. CODE	SEE ABOVE			PROJECT NO	C-21700	LINE NO	2 1/2" VT-R-KEK
				MARK NO	H-VT-12-2		



DO NOT WELD ACROSS WIDTH OF FLANGE



+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta X = 1/16"$ $\Delta Z = -1/4"$

VOL. P 60-1

REVISD S.D. LOAD & ANALYSIS NO.

ADDED GUIDE (ITEMS)

NOTES:

PIPE TEMPERATURE: 760°

STRUCTURAL DESIGN LOAD: $F_x = .1K$, $F_y = .5K$

PIPE SIZE: 2.875" O.D.

PIPE INSULATION: 3"

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE	APPROVED	DATE
MLM	3-7-80	KEA	3-21-80	EVH	3-21-80
REVIEWED	DATE	APPROVED	DATE	APPROVED	DATE
MLM	3-9-80	KEA	3-21-80	EVH	3-21-80
PROJECT	DATE	APPROVED	DATE	APPROVED	DATE

ANALYSIS ID. CODE T-VT-1-A-6 T-VT-1-A-7

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REVISIONS

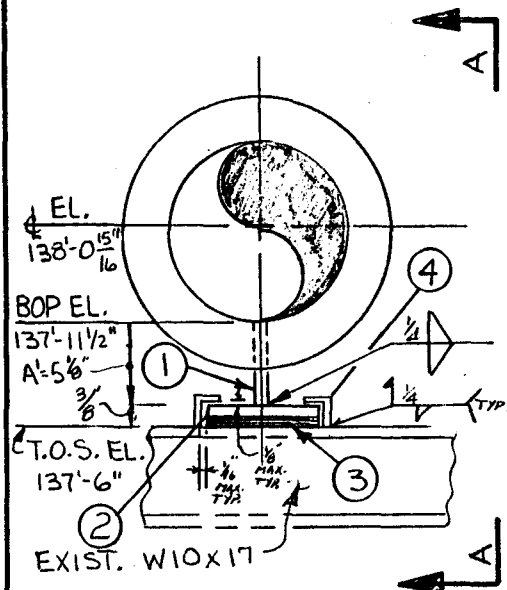
14			
13			
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9			
8			
7			
6			
5			
4			
3	2	* 1"X1"X5"	
2		A387 GR. D MAT'L. A"=6"	
1	1	2 1/2" Ø PIPE SADDLE FIG. 612	W/STAIN
0			
ITEM REQD	SCALE	COMPONENT DESCRIPTION	REMARKS
	NONE	Stearns-Roger	11165/8

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

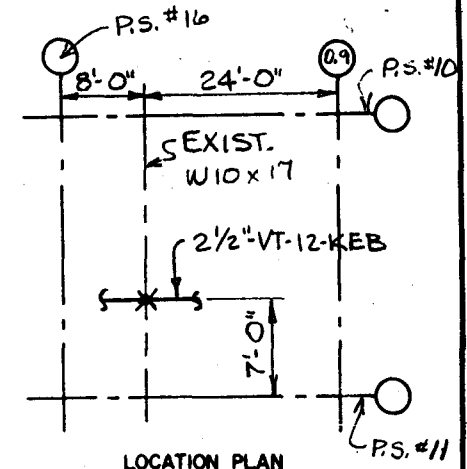
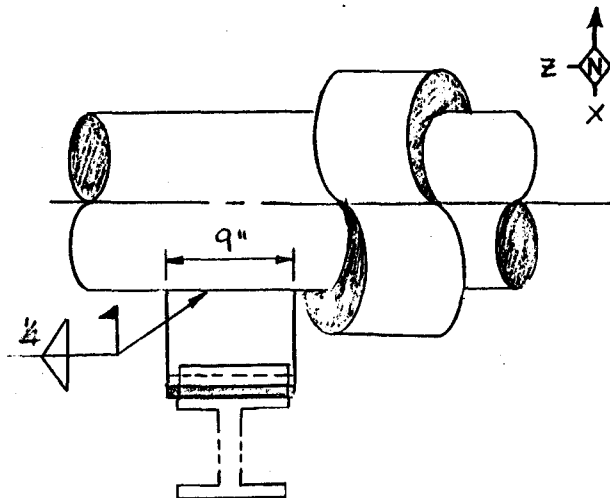
PROJECT NO C-21700

LINE NO 21-VT-12-REF

MARK NO 11-VT-12-3



ELEVATION LOOKING EAST



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT

$\Delta X = 0$
 $\Delta Z = -1 \frac{11}{16}$

VOL. P60-1

14			
13			
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4	2	1" X 1" X 1/4" * 4" LONG. TRIM LEECS REQ'D	
3	1	9" X 6" X 1/8" GRAPHITE R. BOUNDED TO (2)	
2	1	9" X 6" X 1/4" ASTM A387 GR.D 16	
1	1	9" X 5 1/2" X 1/4" ASTM A387 GR.D 16	
ITEM REQ'D		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
ANALYSIS ID. CODE	T-VT-1-A-4/B-2, W-VT-1-A-5	PROJECT N°	C-21700
LINE N°	2 1/2" VT-12-KEB	MARK N°	H-VT-12-4

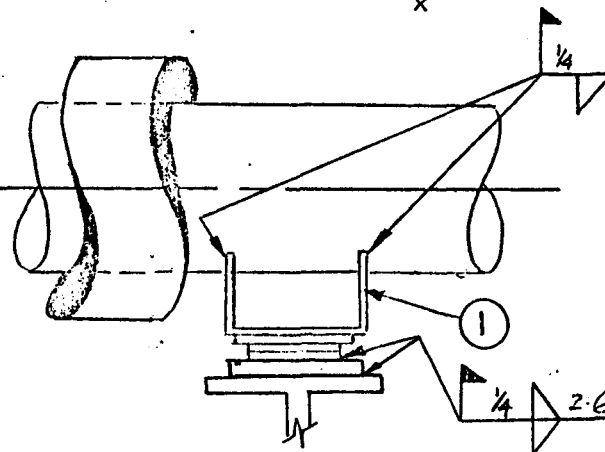
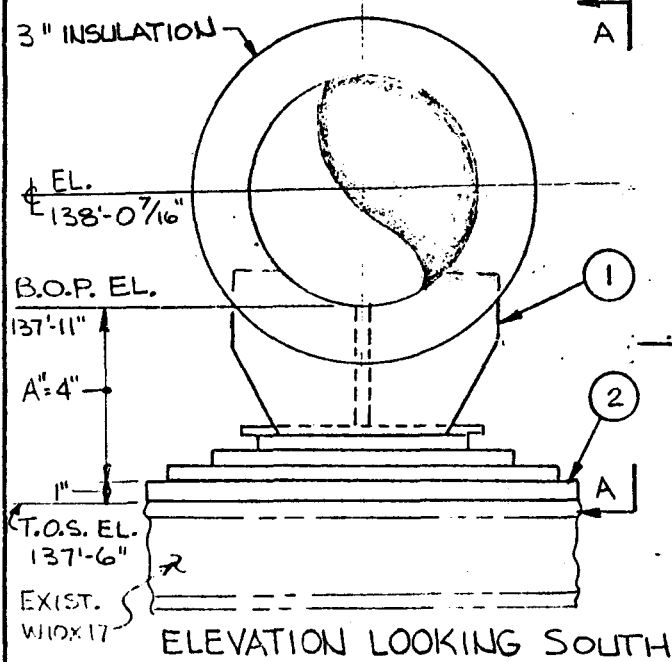
NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1K$
 $F_y = .5K$
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 5"
 PIPE MATERIAL: ASTM A335 P22

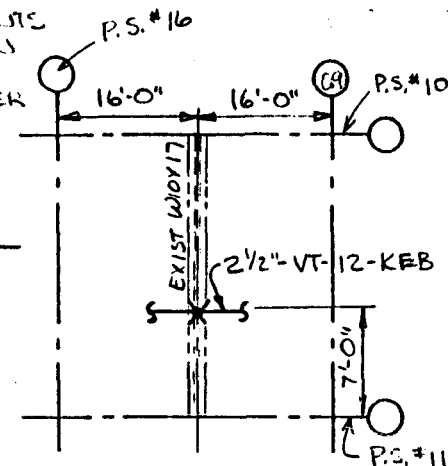
ENGINEERING RECORD

DESIGNED	MX	CHECKED	KEB	FUH
DATE	3/10/80	DATE	2-24-80	3-27-80
REVIEWED	2/2/81	APPROVED	1/2/81	3-27-80
DATE	3/12/80	DATE		
PROJECT				
DATE				
ANALYSIS ID. CODE	T-VT-1-A-4/B-2, W-VT-1-A-5	PROJECT N°	C-21700	LINE N° 2 1/2" VT-12-KEB

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2	RAIC
1	APC
REVISIONS	



NOTE: STEEL AT RIGHT REPRESENTS STEEL BETWEEN MAIN RACK AND RECEIVER TOWER.



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 0$
 $\Delta Z = -2 \frac{1}{8}$ "

VOL. PG0-1

DO NOT WELD ACROSS WIDTH OF FLANGE

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P ₁
D	STRUCTURAL	A
C	ELECTRICAL	
B		
A		

NOTES

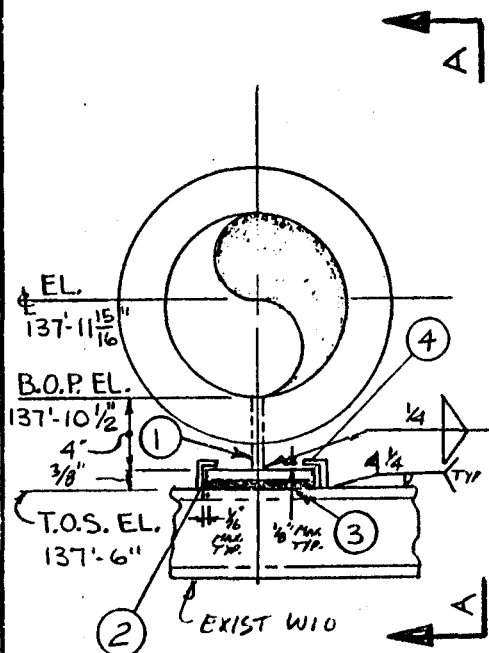
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 3K
 PIPE SIZE: 2.615"
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

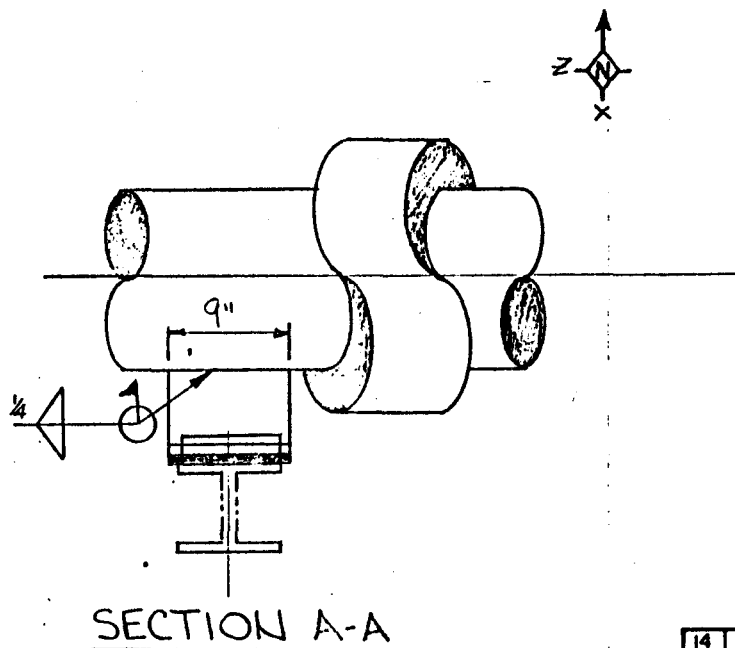
DESIGNED	DATE	CHECKED	DATE
DATE	3-27-80	DATE	3-27-80
REVIEWED	DATE	APPROVED	DATE
DATE	3-27-80	DATE	3-27-80
PROJECT	DATE		
DATE			
ANALYSIS ID. CODE	T-VT-1-A-4/12, W-VT-1-A-5		

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REVISIONS	

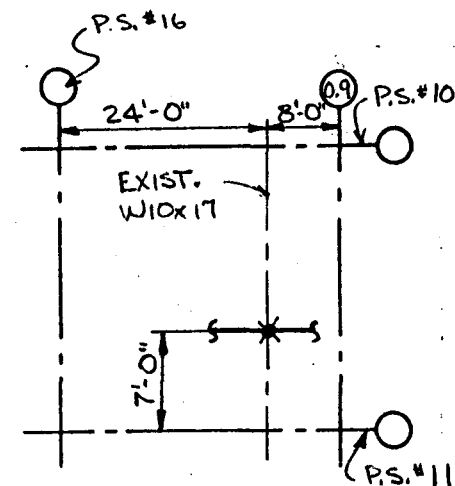
14			
13			
12			
11			
10			
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8			
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6			
5			
4			
3			
2	1	1'-2" x 5" x 1" C.S. PL	
1		A=4" (MADE OF A387 GR. D PL)	
1	1	2 1/2" PIPE SADDLE FIG. 612	1/2" SADDLE
ITEM RECD		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	2 1/2" VT-12-KEB
MARK NO	H-VT-12-5		



ELEVATIONAL VIEW LOOKING EAST



SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta X = 0$ $\Delta Z = -2\frac{1}{2}"$

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	2	1"X1" X 1/4" 4' LG TRIM LEG AS REQ'D	
3	1	9" X 6" X 1/8" GRAPHITE R, TILED TO ②	
2	1	9" X 6" X 3/8" ASTM A387 GR. D IR	
1	1	9" X 4" X 1/4" ASTM A387 GR. D IR	
ITEM REQ'D	COMPONENT DESCRIPTION		REMARKS
SCALE: NONE	Stearns-Roger INCORPORATED		11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE # 2 1/2"-VT-12-KF	MARK # H-VT-12-6	

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 1K$, $F_y = .5K$

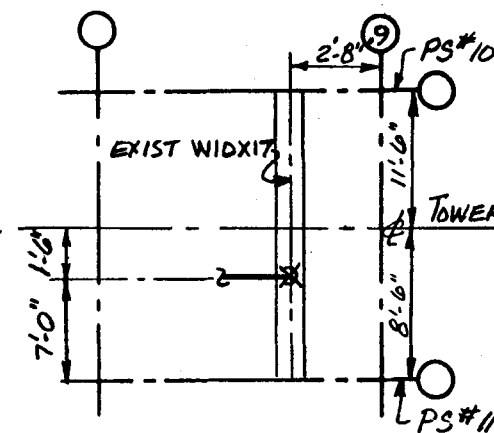
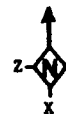
PIPE SIZE: 2.875" O.D.

PIPE INSULATION: 3"

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	7/27/80	CHECKED	REP	DATE	3-25-80
DATE	3/11/80	DATE	3-27-80	DATE	3-27-80
REVIEWED	7/27/80	APPROVED	7/27/80	DATE	3-27-80
DATE	3/12/80	DATE	3-27-80	DATE	3-27-80
PROJECT					
DATE					
ANALYSIS ID. CODE	T-VT-1-A-4/B-2, W-VT-1-A-5				



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = 1/16"$
 $\Delta z = -2 3/4"$

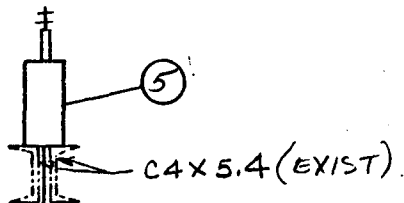
VENDOR ENG. REV.		14		
E		13		
D		12		
C		11		
B		10		
A		9		
		8		

REVISÉ S. D. LONG

ENGINEERING RECORD			
DESIGNED	MEM	CHECKED	ADD FIVE
DATE	3-11-80	DATE	3-11-80
REVIEWED	MEM	APPROVED	MEM
DATE	3-12-80	DATE	3-12-80
PROJECT			
DATE			
ANALYSIS	ID. CODE	F-VT-1-A-1/1-B-2 W-VT-1-A-5	

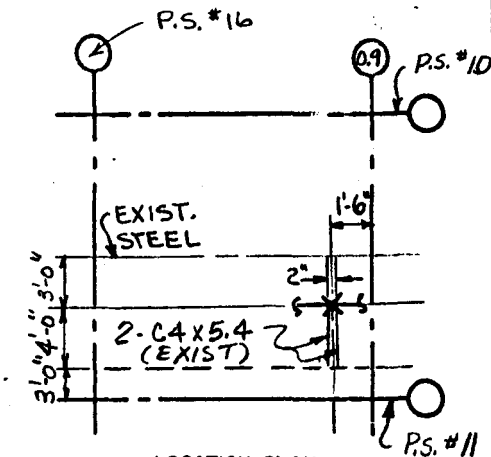
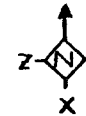
5		1	1	1/2"	DIA. STRUCT. WELDING LUG SHORT FIC. 55
4		ITEM REQD	COMPONENT DESCRIPTION		
3		SCALE:	Stearns-Roger		
		NONE	11165/8		
1		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
REVISIONS					
PROJECT NO C-21700		LINE NO 21700-12-7		MARK NO H-VT-12-7	

T.O.S. EL. 128'-3 1/16"
EL. 127'-11 1/16"



EL. 118'-2 7/16"

ELEVATION LOOKING NORTH
PIPE ROTATED 90°



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

$\Delta X = -2 5/8"$

$\Delta Z = -1 1/2"$

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS
INDICATED DO NOT INCLUDE WEIGHT
OF LOWER HANGER COMPONENTS

SPRING DATA			14		
FIG. NO.	TYPE	SIZE	13		
98	D	5	12		
HOT LOAD		271 lb.	11		
COLD LOAD		240 lb.	10		
VERT. TRAVEL C. TO H.		1" DN.	9		
T.T. CONST. SUPPORT			8		
REFERENCE DRAWINGS			REV.	7	
E	PIPING	P9-3	P3	6	
D	STRUCTURAL	S33-4	A	5	1 SPRING SEE DATA
C	ELECTRICAL			4	1 1/2" DIA. R.H. THD. ROD FIG. 140
B				3	3 1/2" DIA. R.H. HEX NUT
A				2	1 1/2" DIA. WELDLESS EYELET FIG. 290
				1	1 2 1/2" PIPE CLAMP FIG. 295A

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: 0.5 K

PIPE SIZE: 2.815" O.D.

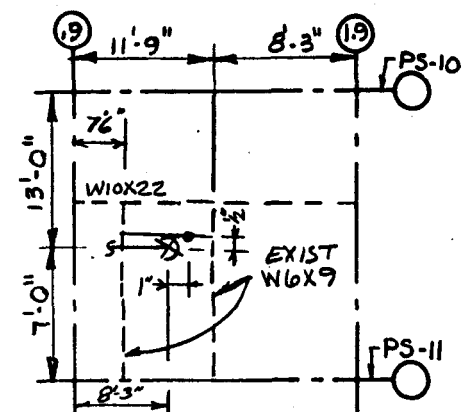
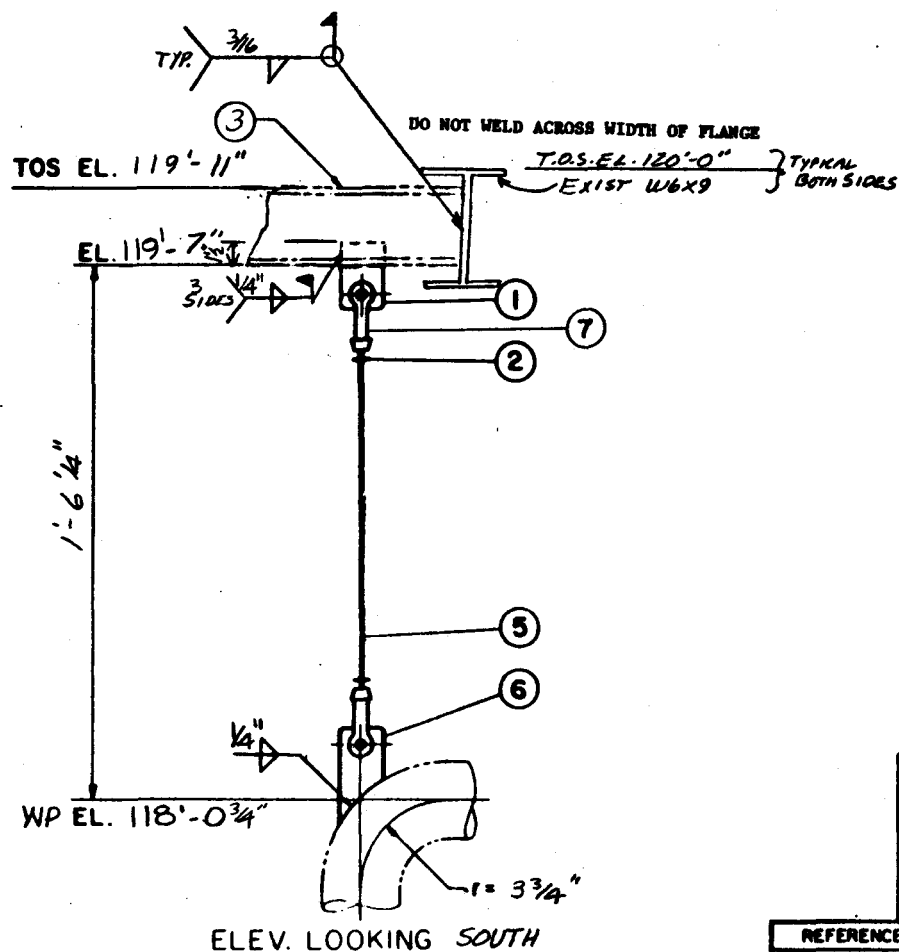
PIPE INSULATION: 3"

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	7/12/80	CHECKED	KEB	PAH
DATE	3/12/80	DATE	3-22-80	3-27-80
REVIEWED	H.M.H.	APPROVED	H.M.H.	
DATE	3-12-80	DATE	3-27-80	
PROJECT				
DATE				

5			
4		ITEM REQD	COMPONENT DESCRIPTION
3		SCALE:	NONE
2			
1	APR 28 1980		
REVISIONS			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700			
LINE NO 2 1/2" VT-12-KEB			
MARK NO H-VT-12-8			



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -1\frac{1}{4}"$
 $\Delta z = -2\frac{1}{4}"$

VOL. P60-1

VENDOR ENG. REV.		14			
E		13			
D		12			
C		11			
B		10			
A		9			
		8			

REFERENCE DRAWINGS		REV.	7	2	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
PIPING	P2-10	P3	6	1	1/2" DIA. WELDING LUG C-75% H.S. 53 BY F18
STRUCTURAL	S33-1	-	5	1	1/2" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	-	
			3	1	C4X5.4 4'-2 3/8" LG
			2	2	1/2" DIA. R. H. HEX NUT

ENGINEERING RECORD

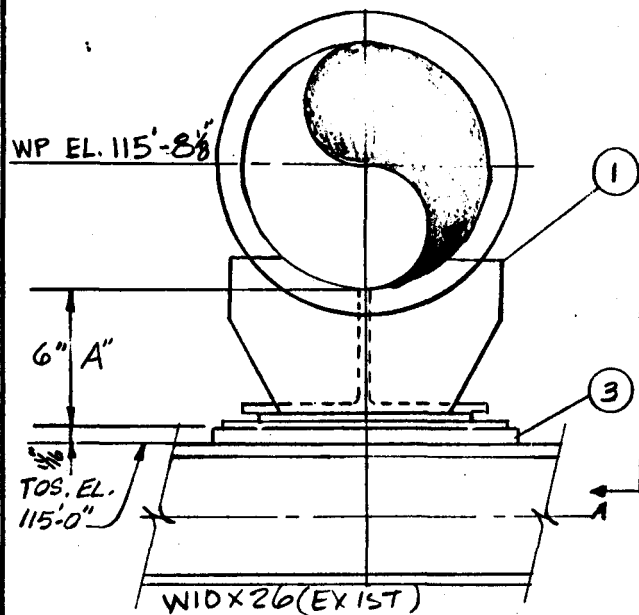
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DATE	2-2-80	DATE	2-2-80	2/2/80
REVIEWED	Jgr	APPROVED		
DATE	3-10-80	DATE		
PROJECT				
DATE				

5		1	1	1/2"	DIA. STRUCT. WELDING LUG	2.46	FIG. 55
4		ITEM	REQD		COMPONENT DESCRIPTION		REMARK
3		SCALE:			Stearns-Roger		
2	7/11/68		NONE				11165/8
1	11/15/68						
REVISIONS		TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA					

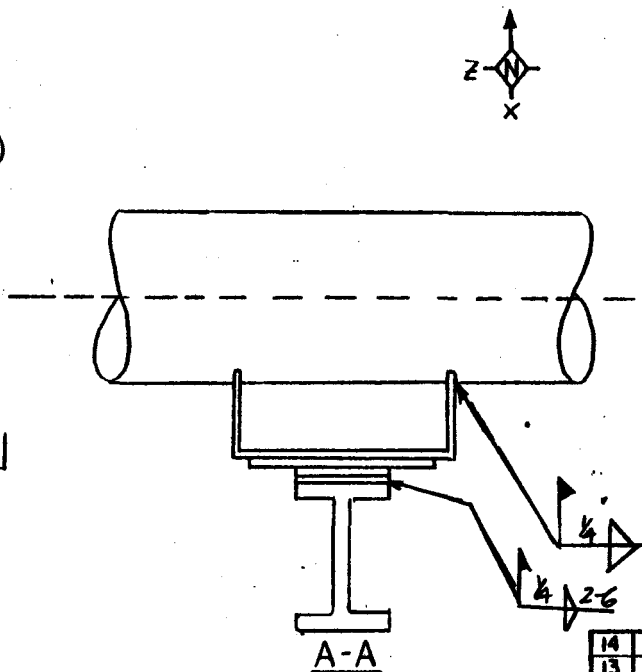
NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 2K
PIPE SIZE: 2.875" O.D.
PIPE INSULATION: 3"
PIPE MATERIAL: ASTM A335

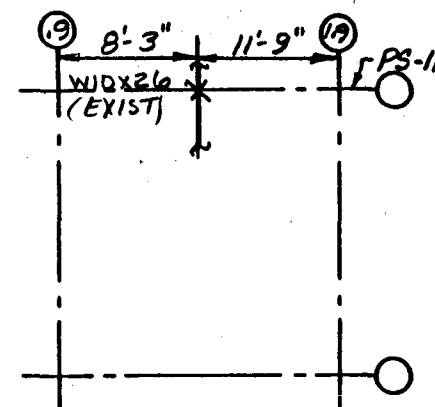
△ ADD [4x5.4, RELOCATE PIPE, REVISE ELEVS. & ITEM 1



ELEVATION LOOKING NORTH



DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT

$\Delta X = -7/8"$
 $\Delta Z = -1"$

VOL. P60-1

REVISED ELEV. ITEM 3 & LOC. PLAN & ANALYSIS NO.

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .3K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 P22

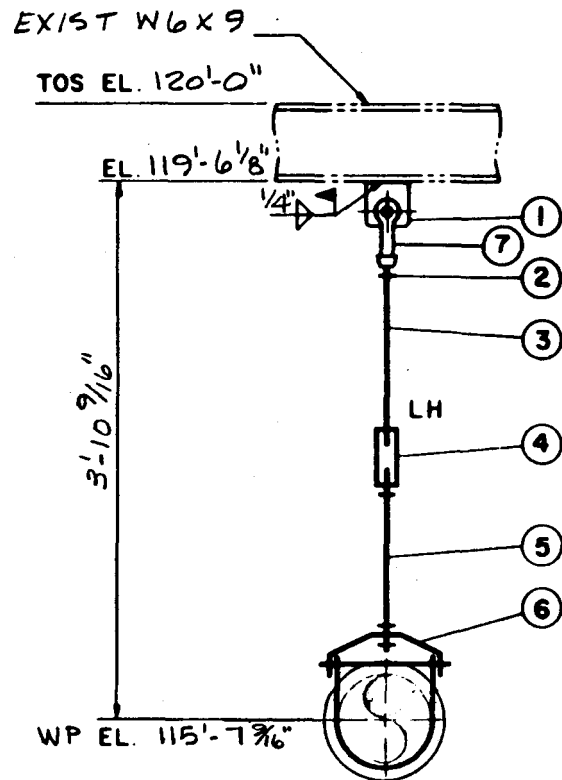
ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
MLM	2-27-80	FVH	3-27-80
REVIEWED	DATE	APPROVED	DATE
MLM	3-10-80	FVH	3-10-80
PROJECT	DATE		

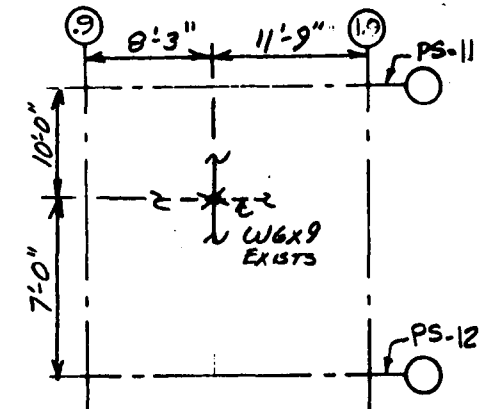
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-10
D	STRUCTURAL	S33-3
C	ELECTRICAL	
B		
A		

14			
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6			
5			
4			
3	1	1'-2" X 5" X 1/4" CS. P	
1		SPECIAL A387 GR D R	
1	1	2 1/2" PIPE SADDLE FIG. 612	substat
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE:	Stearns-Roger		
NONE	INCORPORATED		11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE NO 11-VT-12-10	MARK NO 11-VT-12-10	

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta x = -1/2"$
- $\Delta z = 1/4"$

VOL. P60-1

14			
13			
12			
11			
10			
9			
8			
7	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
6	1	2 1/2" DIA. ADJUSTABLE CLEVIS FIG. 300A	
5	1	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230	
3	1	1/2" DIA. R. H. -L. H. THD. ROD FIG. 253	
2	4	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 2 1/2" VT-12-KEB	MARK NO H-VT-12-11

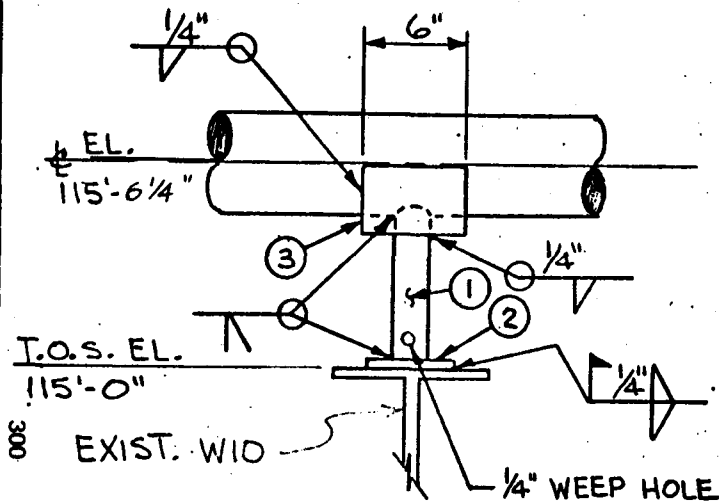
REVISION LOCATION PLAN & ANALYSIS NO.

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .2K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 P22

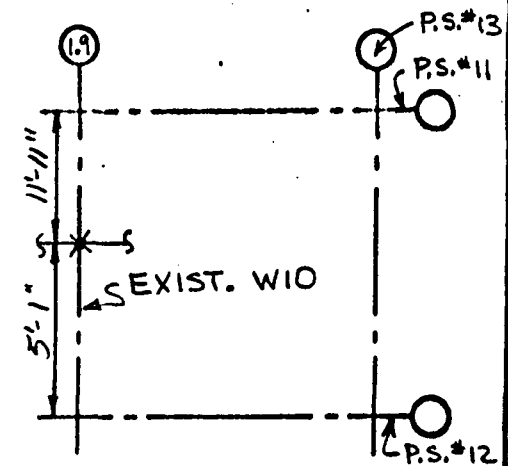
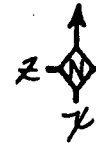
ENGINEERING RECORD			
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REVIEWED	EVH	APPROVED	EVH
DATE	3-27-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	VT-1-A-6	W-VT-1-1-7	

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REVISIONS	

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 0"$
- $\Delta Z = 0"$

* ALL ITEMS BY
PIPE FABRICATOR

Vol. P60-1

VENOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P-10	P.S.
D		STRUCTURAL	S23-3	1
C		ELECTRICAL		
B				
A				

△ REVISE LOCATION PLAN & PIPE ELEV.

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.1K$, $F_y = 0.14K$
 PIPE SIZE: 2.5" O.D. $F = 0.16K$ $M_x = 25K$
 PIPE INSULATION: 3" $M_y = 22K$, $M_z = 21K$
 PIPE MATERIAL: A335 P22

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
REVISED	DATE	APPROVED	DATE
PROJECT	DATE		

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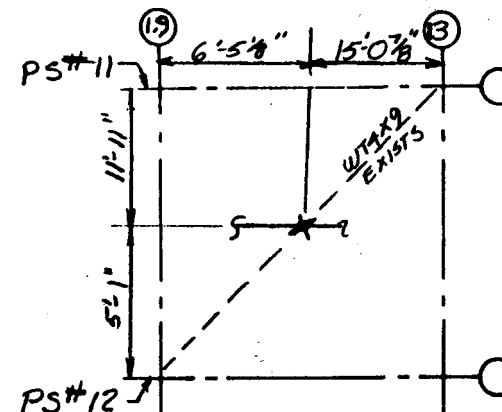
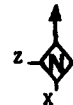
TO FORM PIPE SADDLE 1876AU
 1/4" x 4 1/2" x 6" C.S. PL. SHHD
 1/4" x 4" x 4" C.S. PL
 2" x 8" PIPE STATIONARY 335 P22

ITEM	RECD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO	C-21700	LINE NO		MARK NO	H-11165-11
------------	---------	---------	--	---------	------------

301



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
 ✦ LOCATION OF PIPE ATTACHMENT
 △ x - 5/16"
 △ z - 9/16"

VOL. P60-1

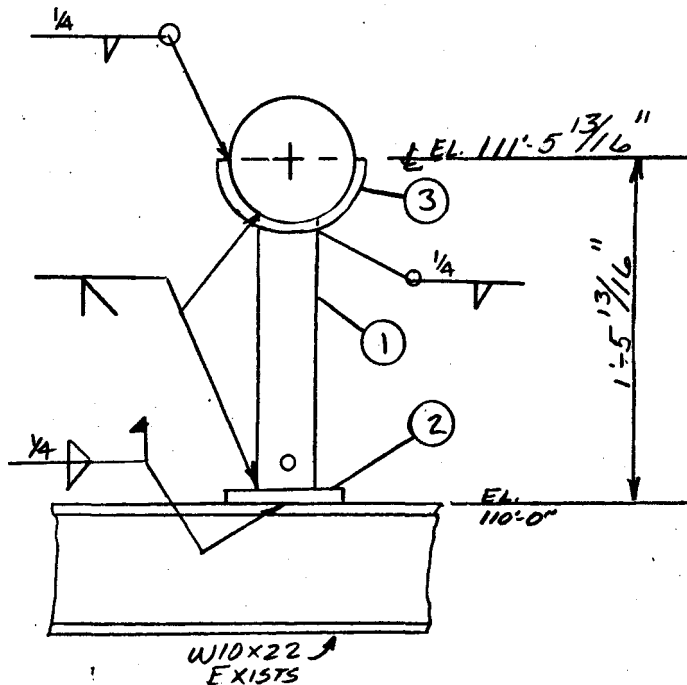
14		
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7	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
6	1	2 1/2" DIA. ADJUSTABLE CLEVIS FIG. 300A
5	1	1/2" DIA. R. H. THD. ROD FIG. 140
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230
3	1	1/2" DIA. R. H. -1. H. THD. ROD FIG. 253
2	4	1/2" DIA. R. H. HEX NUT
1	1	1/4" DIA. STRUCT. WELDING LUG LONG FIG. 55

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 2 K
PIPE SIZE: 2.875" O.D.
PIPE INSULATION: 3"
PIPE MATERIAL: ASTM A335

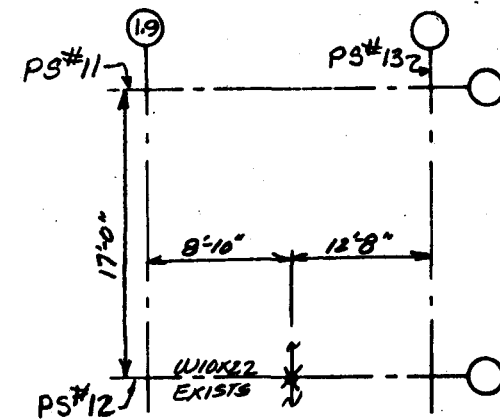
ENGINEERING RECORD				5		1	1	1/2" DIA. STRUCT. WELDING LUG LONG FIG. 55	
DESIGNED	MLM	CHECKED	RJR	4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS
DATE	2-26-80	DATE	3-27-80	3		SCALE:		Stearns-Roger INCORPORATED	11165/8
REVIEWED	HJR	APPROVED		2	NONE				
DATE	3-10-80	DATE	3-27-80	1	REVISED		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT				REVISIONS					
DATE									
ANALYSIS ID. CODE		T-VT-1-A-6		N-VT-1-A-7		PROJECT NO C-21700		LINE NO 2 1/2" VT-12-KEB	MARK NO H-VT-12-13

000 073-1-51

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x = 0"
- △ z = 0"

VOL. P60-1

△ REVISED FROM ROD TO ANCHOR. PIPE LOC. LOADS

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .2K$, $F_y = .2K$, $F_z = .5K$
 PIPE SIZE: 3.50" O.D. $M_x = .6'K$, $M_y = .16'K$, $M_z = .5'K$
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	KEP	FVH
DATE	2-26-80	DATE	2-26-80	3-27-80
REVIEWED	X 7/11/80	APPROVED	X 7/11/80	
DATE	3-10-80	DATE	3-27-80	
PROJECT				
DATE				
ANALYSIS ID. CODE	J-VT-1-A-6		W-VT-1-A-7	

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10		
9		
8		
7		
6		
5		
4		
3	1	5 1/2" X 6" 1/4" R A387 GR. D SHAPED
2	1	4" X 4" X 3/8" C.S. R BY PIPE FAB
1	1	2 1/2" SCH. 80 PIPE STN. A335 P22. PIPE FAB
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	SCALE: NONE	
	Stearns-Roger	11165/8
	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	PROJECT N° C-21700	LINE N° 3"VT-12-KEH MARK N° H-VT-12-14

SPECIFICATION

SR-E8

D.O.E. NO. 40 P 700 - 32S

June 11, 1980

(For Bids)

September 26, 1980

(For Purchase)

for

PIPE SUPPORT SNUBBERS

for

10MW_e SOLAR PILOT PLANT

SOLAR - ONE

DAGGETT, CA.

Prepared by:

Stearns-Roger
ENGINEERING CORP.

PROJECT NO. C-21700



TABLE OF CONTENTS

	<u>Page</u>
<u>SPECIAL INSTRUCTIONS</u>	1
<u>SPECIFICATION FOR PRIMARY PIPE SUPPORTS</u>	
1. Scope	DS-1
2. Supplements	DS-1
3. Codes, Standards and Regulations	DS-1
4. Environmental Conditions	DS-2
5. Work to be Performed and Items to be Furnished by Seller	DS-2
6. Work or Items to be Furnished by Others	DS-3
7. Engineer's Drawings	DS-3
8. Definitions	DS-3
9. Design and Construction	DS-4
10. Nameplates	DS-6
11. Shop Painting and Protection	DS-6
12. Preparation for Shipment	DS-6
13. Guarantees	DS-7
14. Documentation	DS-7
15. Engineering Schedule	DS-9
16. Shipping Schedule	DS-9
<u>BID DATA</u>	
1. Shipping Date Commitment	DS-10
2. Subcontractors	DS-10



SPECIAL INSTRUCTIONS

An asterisk has been placed in the right hand margins to denote changes to this "For Bid" Specification. The subject changes were made to conform this document to awardee's proposal and subsequent updating and/or negotiations.

All further changes to this "For Purchase" document shall be made by the issuance of a numbered revised copy.



SPECIFICATION
FOR
PRIMARY PIPE SUPPORTS

1. SCOPE

- A. The scope of the work hereunder shall consist of furnishing, preassembling and delivering Pipe Supports for the piping systems as specified herein.
- B. The data as specified herein and as specified on the supplements is descriptive of the Engineer's design intent but does not enumerate all details of accessories and appurtenances. Such details and descriptive data shall be provided by the Seller for approval by the Engineer.
- C. The Engineer is furnishing Pipe Support Design Drawings to the Seller in this Specification.
- D. Unloading, storage, installation, field inspection and field testing will be performed by others.

2. SUPPLEMENTS

The following Stearns-Roger Incorporated supplements are included with and form a part of this Specification:

- A. Volume I, P60-2 Pipe Support Design Drawings, 66 pages.
- B. Specification No. FJ50.50, Documentation, dated 11/3/76, 7 pages.
- C. Engineering Standard No. FJ60.60, Documentation Requirements, dated 10/22/79, 1 page.
- D. Engineering Standard No. EJ14.37.1, Welding Symbols, dated 5/5/78, 1 page.
- E. Engineering Standard No. EE16.01.9, Supplementary Steel Sizes and End Connections Details for Pipe Supports in Fossil Fuel Power Plants, dated 12/15/77, 2 pages.

3. CODES, STANDARDS AND REGULATIONS

Pipe supports shall be in accordance with the following Codes, Standards and Regulations:

- A. Pipe supports and accessories specified herein shall, as a minimum, meet the requirements of Paragraphs 120 and 121 of ANSI Standard Code for Pressure Piping, ANSI B31.1-1977 Edition with Addenda through Winter 1978, hereinafter referred to as the "Code."

- B. The material, design and fabrication criteria to be used in the manufacture of the pipe support assemblies and components shall be in accordance with MSS-SP-58-1975 Edition, "Pipe Hangers and Supports."
- C. Supplemental structural steel design shall be in accordance with the standards as prescribed by the latest edition of the Manual of Steel Construction of the American Institute of Steel Construction.
- D. Welding symbols shall be in accordance with Stearns-Roger Engineering Standard EJ14.37.1.
- E. Dimensions shall be English units of pounds, degrees, inches, or feet and inches.
- F. In addition to the Codes, Standards and Regulations specified above and elsewhere in this Specification, work shall comply with Federal, State and Municipal Laws in effect at the time the Purchase Order is signed. If there is a conflict between any of the requirements of this Specification and the requirements of the Williams-Steiger Occupational Safety and Health Act of 1970, Part 1910, "Occupational Safety and Health Standards," as amended and/or any other applicable statute, ordinance or code, then the requirement which is the most stringent or has governing jurisdiction shall apply. Seller will not be liable for factors over which he has no control, e.g., installation, operation and maintenance.

4. ENVIRONMENTAL CONDITIONS

The design of the Pipe Supports shall incorporate all features necessary for satisfactory operation under the following environmental conditions:

- A. Altitude of plant above sea level: 1950 feet.
- B. Barometric pressure: 13.72 psia.
- C. Indoor ambient temperature range: 16°F to 113°F.
- D. Outdoor ambient temperature range: 9°F to 117°F.
- E. Shelter type: The pipe supports will be used outdoors unless otherwise specified on the drawings.
- F. Seismic Loads: The piping to be supported by assemblies furnished in accordance with this Specification shall be subjected to loads resulting from response to a horizontal ground acceleration of 0.25g simultaneously with normal operating loads.

5. WORK TO BE PERFORMED AND ITEMS TO BE FURNISHED BY SELLER

- A. The Seller shall furnish and deliver to the jobsite complete vibration control assemblies, as shown on the pipe support design drawings.

- B. The Seller shall furnish the supplemental structural steel required in accordance with the pipe support design drawings, bundled and tagged for easy identification and installation.
- C. The work shall include the furnishing of all documentation requirements as detailed in Paragraph DOCUMENTATION.
- D. Shop prime painting of all pipe support assemblies as specified herein.

6. WORK OR ITEMS TO BE FURNISHED BY OTHERS

- A. Unloading, installation, field inspection and field testing.
- B. Design and furnish shop welded attachments for piping.
- C. Field painting.
- D. Piping analysis.
- E. Pipe Support Design Drawings.

7. ENGINEER'S DRAWINGS

- A. The design detail drawings show the location of each pipe support, the structural steel available for supporting the pipe supports, and the support arrangement and size.
- B. Pacific Scientific figure numbers have been used on all detail drawings. This is for identification only and is not intended to exclude acceptable equivalent components of other manufacturers. After award the Seller is responsible for revising to his nomenclature.

8. DEFINITIONS

- A. Pipe Supports. as used herein shall mean all types of hangers, supports, guides, anchors, or restraints including seismic restraints or vibration control devices.
- B. Assembly. as used herein shall mean the entire supporting or restraining device including all the pipe support, bolting, supplemental structural steel, clip angles, slide or stationary bases, etc., necessary to attach the piping to the structure. The definition is independent of the contract scope.

- C. Hangers. as used herein generally refers to suspension devices capable of resisting downward acting forces only. Hangers are included in the more general definition of Pipe Supports.
- D. Structure. as used herein shall mean the system of primary members of the building or other supporting structure.
- E. Supplemental Structural Steel as used herein shall mean those necessary additional structural members which are components of a pipe support assembly as defined above.

9. DESIGN AND CONSTRUCTION

A. Pipe Supports

a. General

- (1) Each Pipe Support and its accessories shall be furnished in accordance with this Specification and all other supplements attached hereto.
- (2) It is the intent of this Specification to establish the engineering design criteria for complete workable assemblies capable of performing as specified herein.
- (3) The equipment to be furnished hereunder shall meet or exceed the requirements of this Specification. Materials shall be new and of first-line quality, and shall be free of all defects which would affect performance or service life of the equipment, or which would cause unsightly or unworkmanlike appearance.
- (4) Component materials shall meet the requirements of ANSI B31.1, Paragraph 121.1.2.
- (5) The support assemblies shall, where practical, incorporate commercially available, load rated and tested component parts.
- (6) Snubber devices weighing in excess of 90 pounds shall be furnished with lifting lugs.
- (7) Supports furnished for outdoor service or to be located in a corrosive environment shall be constructed or protected such that the elements will not corrode or otherwise interfere with their intended function.

b. Bolts and Threaded Connections

Threaded connections shall be designed to avoid having loads bear against threads. Where this is not completely avoidable, a maximum limit of 33-1/3 percent of the load bearing support length may bear against the threads.

c. Vibration Control or Seismic Restraints

- (1) Vibration, seismic, or shock suppressing devices, hereinafter called snubbers, shall be of mechanical type as specified. Bolted or pinned connections for snubber devices shall be fitted for close clearance, maximum clearance .002 inches in diameter. Normal bolt-to-bolt hole tolerances are not acceptable.
- (2) These devices shall be arranged to permit the full thermal expansion movement of the piping +20% with minimum backload or restraint.
- (3) All snubbers shall be capable of resisting dynamic forces in tension and compression.
- (4) All snubbers shall be provided with structural type rear bracket attachment, both ends consisting of spherical ball bushing permitting at least plus or minus 5 degrees angular rotation in any direction.
- (5) The Seller shall furnish the following information for these devices as applicable:
 - (a) Force-displacement characteristic curve for suddenly-applied load and for constant load.
 - (b) Amount of free movement or clearance.
 - (c) Backload versus displacement speed.
 - (d) Maximum load-carrying capacity of device (normal and one time).

B. Supplementary Structural Steel and Attachments

- a. Supports shall normally be attached to adequately sized steel channels, beams and columns which are primary members in the building or other supporting structure. When this is not possible, the Engineer has designed such additional structural steel as necessary for the safe and proper attachment of the pipe supports in a manner that will not impose excessive loading or torsional moment on the existing steel. Supplemental steel shall be in accordance with AISC and ASTM A36.

10. NAMEPLATES

Each snubber shall have a durable metal nameplate with the model number, serial number, tag number, size, stroke, hot and cold position settings, Contract number, and other pertinent information clearly inscribed thereon. Each nameplate shall be permanently attached in a conspicuous place on its piece of equipment.

11. SHOP PAINTING AND PROTECTION

A. Preparation for Painting

After fabrication, all exposed surfaces shall have oil and grease removed by solvent cleaning; loose mill scale and powdered rust removed by mechanical cleaning; and shall have all burrs removed and sharp edges eased. Solvent cleaning shall precede mechanical cleaning.

B. Painting

Mechanical suppressor units only will be furnished with standard finish (nickel-cadmium diffused) with components painted with standard green primer. Pipe support hardware shall be painted with one coat of the manufacturer's standard rust-inhibitive primer suitable for the maximum temperature at which the component will operate. In addition, each pipe support assembly shall be coated for a corrosive environment when the drawings designate that the pipe support assembly will be installed in a corrosive environment. *

C. Surfaces Not To Be Painted

Shop paint shall not be applied to surfaces of stainless steel, threads, name and data plates, and indicator scales and pointers. Shop paint shall be omitted for a distance of approximately 3 inches back from each connection to be field welded. Threads shall be protected with heavy coating of grease or antirust compound.

12. PREPARATION FOR SHIPMENT

A. To the greatest extent possible, the components comprising each support assembly shall be grouped, bundled, crated, or otherwise shipped as a unit. Loose components shall be strung on wire and securely attached to a bundle or to a major component to prevent their loss.

B. Tagging Instructions

a. All items packaged in crates, boxes, or bags as well as items shipped loose or skidded shall be identified with the following information on metal tags securely fastened to the items with wire:

(1) Purchase Order number.

(2) Mark or tag number as shown on the applicable drawings.

- b. Additionally, crates, boxes, or bags shall be externally identified with the information in Paragraph a. above.
 - c. Identification tags shall be of durable metal, such as brass, aluminum, or stainless steel, indelibly marked, and attached with wire.
 - d. Seller shall require subsuppliers to follow these tagging instructions.
- C. Shipments shall not be made by the Seller until bills of material have been provided in accordance with Paragraph DOCUMENTATION.

13. GUARANTEES

- A. The Seller shall guarantee that the equipment furnished conforms to the requirements set forth and to the specified Codes, Standards and Regulations and that all specified tests have been satisfactorily completed.
- B. The foregoing shall not be construed in any way to limit or negate any other standard guarantee or portion thereof which may provide a more comprehensive guarantee than those required by this Specification.
- C. Seller's liability shall be limited to the cost of the hanger material only - unless otherwise mutually agreed upon. *

14. DOCUMENTATION

A. General

Documentation shall be furnished in accordance with Specification No. FJ50.50, Engineering Standard No. FJ60.60, and the requirements specified herein.

B. Exceptions or Modifications to Specification No. FJ50.50

- a. Paragraphs 3.A.b., c., and g. are deleted in their entirety.
- b. Paragraphs 3.D.b.(1) thru (4) are deleted in their entirety.
- c. Paragraphs 3.D.c.(1), (3) and (4) are deleted in their entirety.
- d. Paragraphs 3.D.d.(1) and (2) are deleted in their entirety.
- e. Paragraph 3.E. is deleted in its entirety; however, a bill of material shall be added to each Pipe Support Design Drawing or shop detail sheet.

C. Exceptions or Modifications to Engineering Standard No. FJ60.60

a. Pipe Support Design Drawings

- (1) Item 2A of Standard FJ60.60 shall include detailed shop drawings for each pipe support for the Engineer's approval and/or comment.
- (2) The Seller has the option of adding the necessary shop detail information to the Engineer's Pipe Support Design Drawings or furnish his own shop detail drawings.
- (3) The shop detail drawings shall, in addition to the information required in Paragraph 3.A.d. of Specification FJ50.50, show the following information for each pipe support:
 - (a) Manufacturer's figure number, type, size, arrangement and weight.
 - (b) Details of integral pipe attachments required for shop welding to piping.
 - (c) Dimensions needed for installation.
 - (d) Dimensioned location plan and elevation.
 - (e) Design loads and movements plus hot and cold load settings.
 - (f) Complete list of parts referenced on the drawings.
 - (g) Description of each piece of material including cut lengths.
 - (h) Weld size, type, and location for field welds.
 - (i) Bolt type, size, location, and size of all bolt holes.
 - (j) Seller's drawing revision letters.

b. Operation and Maintenance Manuals

Item 4A of Standard JF60.60 shall include performance characteristics and operation, erection, adjustment and maintenance instructions for each mechanical suppressor for Engineer's approval and/or comments.

D. Shipping Information

The Seller shall submit the following specific shipping data prior to shipment:

- a. Name of carrier.
- b. Proposed routing.
- c. Proposed breakdown by carload and/or truckload.
- d. Packing and classification description.

15. ENGINEERING SCHEDULE

Engineering schedule shall be as follows:

	<u>Date or Sequence Required</u>
A. Erection and operating information	
a. Maintenance and operating instructions	At time of shipment
b. Erection instructions	At time of shipment
B. Shipping papers	At time of shipment

16. SHIPPING SCHEDULE

Seller shall schedule engineering, fabrication, preparation for shipment and delivery to a carrier in such a manner that all items covered by this Specification shall be delivered to the power plant site by: February 1, 1981.

*

BID DATA

NAME OF BIDDER

PIPE HANGER DIV. ITT GRINNELL

In addition to all other data and descriptive material furnished with the Bidder's Proposal, Bidder shall fill in all blank spaces of the following Bid Data Section:

1. SHIPPING DATE COMMITMENT

All supports shall be shipped 12 to 14 weeks after Grinnell's drawings are approved for construction. *

2. SUBCONTRACTORS

Vendor who shall supply any major components:

Pacific Scientific supplies basic snubber unit. *

Stearns-Roger

Page
i

Project No. C-21700

Spec. No. FJ50.50

November 3, 1976

SPECIFICATION

NO. FJ50.50

FOR

DOCUMENTATION

FOR

10MW_e SOLAR PILOT PLANT
SOLAR - ONE
DAGGETT, CA.

TABLE OF CONTENTS

	<u>Page</u>
1. Scope	1
2. Type, Quantities and Quality of Copies	1
A. Reproducible Drawings	1
B. Prints	1
C. Other Documentation	2
3. Documentation by Seller	2
A. General	2
B. Progress Reports	3
C. Review and Comment	3
D. Operation and Maintenance Manuals	5
E. Bills of Material	6
4. Drawings by Engineer	6
5. Transmittals	7
6. Special Considerations	7

STEARNS-ROGER ENGINEERING CORP.
DENVER, COLORADO

PROJECT NO. C-21700

Stearns-Roger

Page

1

Project No. C-21700
Spec. No. FJ50.50

DOCUMENTATION

1. SCOPE

- A. This Specification outlines the requirements for, and the procedures associated with, the preparation and exchange of documentation for the work, equipment and/or materials specified in the Contract or Specification to which this Specification is a supplement.
- B. This Specification supplements requirements in Engineering Standard No. FJ60.60.
- C. This Specification also supplements requirements, where specified, in Paragraph DOCUMENTATION of the Contract or Specification to which this Specification is a supplement.
- D. This Specification and supplementary references specified in the foregoing paragraphs cover minimum requirements for documentation and are not intended to limit the amount of additional documentation which may be required for the engineering coordination, use or maintenance of the work, equipment and/or materials being furnished. Such additional documentation shall be provided by Seller or Contractor.
- E. All references to "Seller" herein shall apply to Seller or Contractor. All references to "Buyer" herein shall apply to the Buyer or the Owner. All references to "Engineer" herein shall apply to Stearns-Roger Incorporated.

2. TYPE, QUANTITIES AND QUALITY OF COPIES

The type and quantities of copies for required documentation are specified on Engineering Standard No. FJ60.60. Quality requirements shall be as follows:

A. Reproducible Drawings

All reproducible drawings submitted to Engineer shall be furnished on ozalid vellum, auto-positive vellum or Mylar, black line on vellum, or other Engineer-approved medium, each to be suitable for legible reproduction by the diazo copy process. Reproducible drawings shall be rolled, not folded, and enclosed in mailing tubes when mailed to Engineer or otherwise handled.

B. Prints

Where designated by the word "Prints" on Engineering Standard No. FJ60.60, it shall be understood to mean suitable "blueprint print/copy," "blueprint," or other Engineer-accepted reproduction of an original Seller-prepared tracing or sepia.

Stearns-Roger

Page

2

Project No. C-21700

Spec. No. FJ50.50

2. TYPE, QUANTITIES AND QUALITY OF COPIES (CONTD)

C. Other Documentation

Where designated by the word "Copies" on Engineering Standard No. FJ60.60, applicable documentation shall be submitted on legible, black on white, 8-1/2-inch by 11-inch pages.

3. DOCUMENTATION BY SELLER

A. General

a. Required types of documentation are specified on Engineering Standard No. FJ60.60. Where this Standard does not fully describe individual categories of documentation that are required, such detailed categories are specified in Paragraph DOCUMENTATION of the Contract or Specification to which this Specification is a supplement.

b. Where equipment for Units 1 and 2 is identical, or where equipment is common to Units 1 and 2, one (1) set of documentation shall be furnished. If equipment is identical, Seller shall certify, on each document, that it is applicable to both Units 1 and 2. Where equipment is neither identical for nor common to Units 1 and 2, two (2) complete, individual sets of documentation shall be furnished, appropriately identified.

c. The title block of each drawing shall denote the applicability of the drawing either to "Unit 1," "Unit 2" or "Units 1 and 2." Other documentation submitted by Seller shall carry similar identification.

d. The following information shall be included in each drawing:

- (1) Buyer's Name.
- (2) Engineer's Project Number.
- (3) Plant or station name.
- (4) Unit number (if applicable).
- (5) Buyer's Purchase Order Number.

Other documentation submitted by Seller shall carry similar identification.

e. Unless specifically approved by the Engineer, "typical" or "similar" documentation is not acceptable for review.

Project No. C-21700Spec. No. FJ50.50**3. DOCUMENTATION BY SELLER (CONTD)****A. General (Contd)**

- f. "Standard Hardware Items" are defined as standard commercial items, such as air and hydraulic cylinders and operating valves, gear reducers, small motors, instruments, etc. For such items, review drawings are not required. Certified sheets showing exact mounting dimensions, overall dimensions, cross-sectional arrangement, parts nomenclature and material designation shall be submitted. Details of parts shall be furnished when requested by Buyer.
- g. Within 30 days after written notice of award, Seller shall submit a complete Definitive Drawing List, by drawing and title, of all drawings that will be submitted to Engineer. On this list, each drawing shall be identified by its appropriate category as defined in Items 1 or 2 on Engineering Standard No. FJ60.60, and as supplemented in Paragraph DOCUMENTATION of the Contract or Specification. Any drawing that does not fall under these predefined categories shall be identified on the list as "Miscellaneous." This list shall include proposed submittal dates for each drawing. This drawing list and schedule, together with any subsequent modifications, shall be subject to Engineer's review and comments.

B. Progress Reports

Seller shall furnish Engineer monthly progress reports and schedule status reports. These reports and schedules shall cover the complete status and progress of engineering, documentation, fabrication, materials, labor and shipment.

C. Review and Comment

- a. Entries in the column "WEEKS AFTER AWARD" on Engineering Standard No. FJ60.60 designate maximum time spans for Seller's submittal of documentation for review after the date of Buyer's written notification of award, whether such notification be in the form of a Purchase Order, a Letter of Intent or similar written authorization.
- b. All documentation to be certified and submitted by Seller for interface coordination shall show sufficient details of design so that the Engineer may proceed with his overall project design where interrelated with Seller's design.
- c. All documentation submitted in the correct and complete form to Engineer for his review and comment will be processed and a copy sent to Seller within 3 weeks after receipt of Seller's submittal. If more than 3 weeks review time is necessary, Engineer will advise Seller in writing as to his review schedule for such data. Seller shall then advise Engineer in writing what effect the extended review schedule has on the scheduled delivery of Seller's materials and equipment.

*
*

Project No. C-21700
Spec. No. FJ50.50

3. DOCUMENTATION BY SELLER (CONTD)

C. Review and Comment (Contd)

- d. Drawings and data will be returned to Seller marked either "REVIEWED/NO COMMENTS," "REVIEWED/SEE COMMENTS" or "REVISE PER COMMENTS AND RESUBMIT FOR REVIEW."
- e. When the documentation is returned marked "REVIEWED/NO COMMENTS" or "REVIEWED/SEE COMMENTS," final certified submittals incorporating the noted changes shall be furnished, unless otherwise authorized by Engineer in writing, within 3 weeks from the time of receipt of copy by Seller or at least 3 weeks before the scheduled delivery of Seller's work, whichever is earlier. Where Engineering Standard No. FJ60.60 stipulates that drawing review is required before release for fabrication, "REVIEW/SEE COMMENTS" shall constitute such release.
- f. When the documentation is returned marked "REVISE PER COMMENTS AND RESUBMIT FOR REVIEW," the documentation with the noted revisions incorporated shall be resubmitted for review and comment within weeks from the time of receipt of copy by Seller. The review and comment and final submittal schedule shall be as specified in Sub-paragraphs 3.C.c. and 3.C.e. above.
- g. The documentation submittal schedules shall be adhered to by Seller, unless otherwise authorized by Engineer in writing. In any case, final submittals shall be furnished at least 3 weeks before the scheduled delivery of Seller's work.
- h. When reviewed information is subsequently revised by Seller, or is subsequently found to be deficient because of Seller's error or omission, additional Seller submittals shall be made to Engineer as developed. Any Engineer's design changes and any changes in equipment or construction by others which are required to make such subsequent revisions an integral part of the overall project shall be made at Seller's expense.
- i. Fabrication or shipment shall be at Seller's risk, whether or not Engineer has reviewed Seller's drawings as specified on Engineering Standard No. FJ60.60.
- j. Seller will be notified of review by a stamped copy of Stearns-Roger Form 02.145 or TRMSR05A stating "Supplier: As to all Drawings/Data listed on this transmittal: PROCEED TO FABRICATE." All Seller drawings which are submitted as final shall be stamped "Final." Where specified on Engineering Standard No. FJ60.60, final drawings shall be certified for construction.
- k. Neither review of, nor comment or revision on drawings by Engineer relieves Seller or Contractor from compliance with Specifications or with all other requirements of Purchase Order or Contract, nor shall the procedures outlined herein be cause for delay of equipment deliveries, except as otherwise specified herein.

Stearns-Roger

Page

5

Project No. C-21700

Spec. No. FJ50.50

3. DOCUMENTATION BY SELLER (CONTD)

C. Review and Comment (Contd)

1. Notations made during the review of drawings shall not be construed to authorize contractual changes in price or delivery of equipment or materials furnished by Seller. If the scope of work has been changed as a result of such notations, Seller shall request a change in Purchase Order price and/or delivery date(s). Seller shall make the request in writing to Engineer before proceeding with the work.

D. Operation and Maintenance Manuals

a. General

- (1) Seller shall furnish Operation and Maintenance Manuals which shall be complete for all equipment and systems furnished by Seller and by Seller's suppliers. Any differences between equipment supplied for Unit 1 and Unit 2 with regard to operation and maintenance shall be clearly defined in these Manuals.
- (2) Manuals shall be forwarded four (4) weeks prior to complete delivery of equipment in accordance with Engineering Standard No. FJ60.60.
- (3) If the publication of a subassembly manufacturer does not contain a complete operation, maintenance and parts breakdown meeting the intent of this Specification, then it shall be the responsibility of Seller to include such information in the Operation and Maintenance Manual.
- (4) All necessary precautions and warnings relative to the safety of life and equipment shall be included.

b. Operation

As a minimum, the Operation Section of the Manual shall contain the following:

- (1) Starting instructions, including, as applicable, instructions for initial startup, normal starting, starting after overhaul and startup after emergency trip.
- (2) Operating instructions, including trouble-shooting procedures.
- (3) Shutdown instructions, for both normal and emergency shutdown.
- (4) Design data for all equipment and systems, specifying horsepower, kilowatts, voltage, amperage, pressure, temperature, revolutions per minute, flow, etc.

Project No. C-21700Spec. No. FJ50.50**3. DOCUMENTATION BY SELLER (CONTD)****D. Operation and Maintenance Manuals (Contd)****c. Maintenance**

As a minimum, the Maintenance Section of the Manual shall contain the following:

- (1) Disassembling and reassembling instructions.
- (2) Preventive maintenance and lubrication information.
- (3) Description and identification of special maintenance tools.
- (4) Settings, clearance and adjustment data.

d. Parts Breakdown

The Parts Breakdown Section of the Manual shall contain:

- (1) A list of replacement parts, including drawings and data for all equipment assemblies and subassemblies. The material shall cover all information required for ordering replacement parts such as part name, part number, equipment serial number, supplier, address and normal delivery time.
- (2) Complete instructions for procuring replacement parts. Recommended forms for tabulating replacement part information and instructions for returning material to the factory shall also be included. Special storage, handling or packaging procedures required for any particular parts shall be noted.

E. Bills of Material

Detailed Bills of Material are required to facilitate identification by constructors of the items received. Shipment, therefore, shall be preceded by submittal of Bills of Material in accordance with Engineering Standard No. FJ60.60, Item 4 C.

4. DRAWINGS BY ENGINEER

- A. For applicable equipment, prints of drawings prepared by Engineer for use by others in constructing foundations, building components and major piping and wiring requiring coordination with the work associated herewith will be furnished to Seller for review as soon as possible after Engineer's receipt from Seller of the certified equipment drawings and design information necessary for their preparation.
- B. Where material, locations, etc., are marked HOLD on Engineer's Drawings, that material, location, etc., shall not be detailed or fabricated by Seller until the HOLD is removed by Engineer.

Stearns-Roger

Project No. C-21700
Spec. No. FJ50.50

Page
7
Final

4. DRAWINGS BY ENGINEER (CONTD)

- C. Within 30 calendar days after the date of transmittal to Seller, Seller shall return to Engineer two (2) copies of each of these drawings marked to indicate Seller's review thereof either without change, or with any corrections or necessary changes clearly marked thereon in red or other contrasting color.
- D. After making such corrections or changes as shown on the review copies returned by Seller, Engineer will release these drawings for construction. Subsequent changes or corrections to foundations, building components, wiring or piping fabricated or installed in accordance with drawings corresponding to the review copies approved by the Seller, such changes having been necessitated by Seller-initiated modifications, shall be done in a manner satisfactory to Buyer and at Seller's expense.

5. TRANSMITTALS

When transmitting documentation, Seller shall:

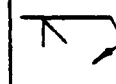
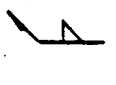
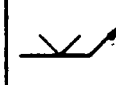
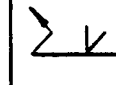
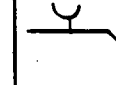
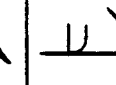
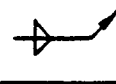
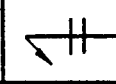
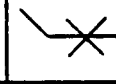
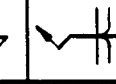
- A. Prepare original and four (4) copies of transmittal letters to accompany each submittal of documentation. Drawing transmittal letters shall identify the purpose of the transmittal (drawings for review, revised drawings, final drawings), the piece of equipment or material involved, and shall list the drawing numbers with applicable revision numbers or dates.
- B. Identify each letter and parcel with Buyer's Project Name, Engineer's Project Number, Purchase Order Number and Seller's Shop Order Number, and transmit it by air mail or first class mail. Each parcel shall contain an enclosed copy of the transmittal letter.
- C. Stamp each document to be submitted with reproduction date and purpose of the transmittal, e.g., "For Review," "Revised," "Final," etc.

6. SPECIAL CONSIDERATIONS

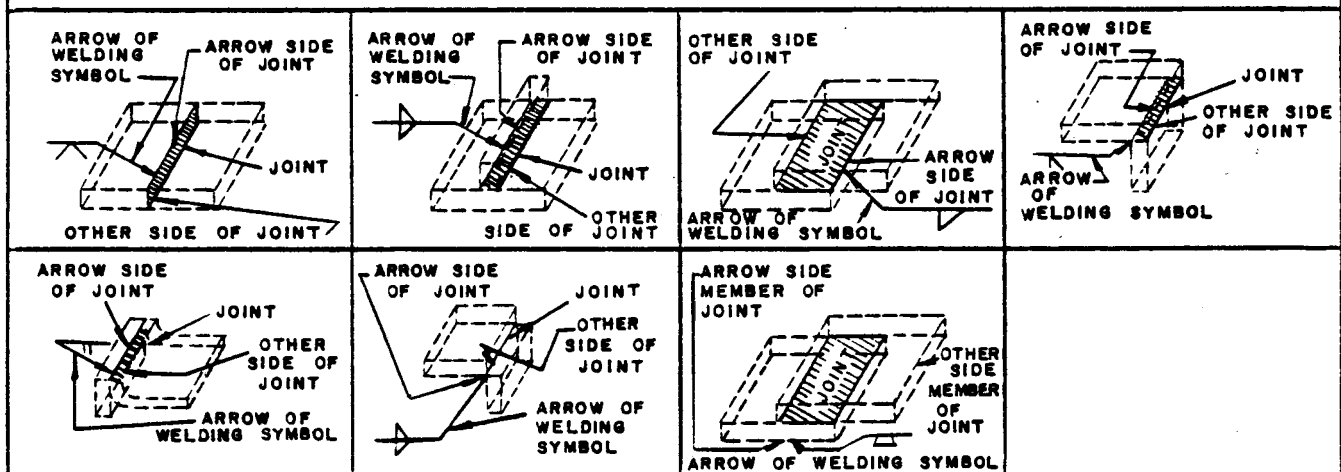
- A. It is understood that upon delivery of Seller's documentation without any restrictive notations concerning such work, they shall become Buyer's property and may be used in any manner desired for obtaining replacements, repairs and spare parts.
- B. Seller's final invoice will not be paid by Buyer until all materials and/or equipment governed hereunder have been received complete at the delivery point, and final certified submittals of all specified documentation have been received by Engineer.

DIVISION USAGE							Stearns-Roger ENGINEERING STANDARD				STANDARD NUMBER		
MM	P	PP	SH	FI	SP						FJ 60.60		
APPROVALS Des. Sec. <i>[Signature]</i> Sect. <i>[Signature]</i> Div. <i>[Signature]</i> DOCUMENTATION REQUIREMENTS PROJECT: SOLAR ONE CONTRACT/REQUISITION NUMBER: SR-E8 TITLE: PRIMARY PIPE SUPPORTS							C-21700						
							ISSUED 10/22/79		REVISED				
TYPE OF DOCUMENTATION							TYPE OF COPIES	FOR REVIEW		FINAL		REVIEW	CTFY.
							NO. OF COPIES	WEEKS AFTER AWARD*	NO. OF COPIES	"X" IF REQ'D	REQ'D BEFORE FAB.**	FINAL ISSUE ***	
1-ENGINEERING DRAWINGS							Repro-						
A-Outline, General Arrangement and Principal Dimensions							ducibles						
B-Cross Sections							Prints						
C-Foundation Requirements, including Loadings & Anchoring Locations													
D-Physical Locations of Piping and/or Wiring Terminals													
E-Control Diagrams													
F-Electrical Schematic Diagrams													
G-Wiring Diagrams, Including Internal External and Interconnecting													
H-Standard Hardware Items													
2-ERECTION OR INSTALLATION INFO.							Repro-						
A-Shop Fabrication Drawings							ducibles						
B-Erection or Installation Drawings							Prints	4	6	4	X	X	X
C-Erection or Install. Instructions							Copies						
3-SPECIAL DOCUMENTATION													
A-Performance Data, including Curves							Copies						
B-Design Calculations							Copies						
C-Test Reports							Copies						
D-Code Papers and Certificates							Copies						
E-Shop Fab. and/or Welding Proce.							Copies						
F-Shop Fabrication Reports							Copies						
G-Welder's Qualification Reports							Copies						
H-Operating Certificates							Copies						
4-MISCELLANEOUS													
A-Operation and Maintenance Manuals							Manuals	4	4				
B-Recommended Spare Parts List for 1 Year's Operation, with Unit Prices							Copies						
C-Bills of Material							Copies						
D-Definitive Drawing List							Copies						
*-Entries in the column "WEEKS AFTER AWARD" designate which types of review documentation are required. Blank spaces in this column denote that review documentation is <u>not</u> required. **-"X" in this column means drawing review req'd. before fabric. release. ***-"X" in this column means final issue must be certified for construction. #-At least 2 weeks before each shipment, detailed Bills of Material shall be sent to the plant site. This form supplements requirements, where specified, in Article 4. in the Specification.													

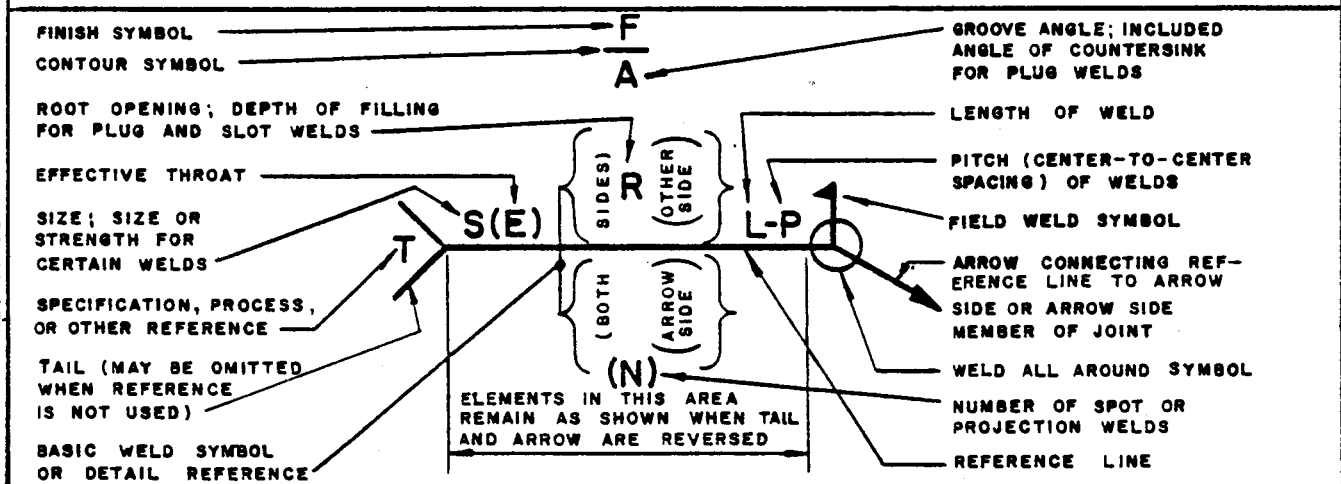
DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP		EJ 14.37.1
APPROVALS						PAGE <u>1</u> OF <u>1</u>	
Des. Sect. _____ Sect. Supv. _____ Div. <u>Welding</u>						WELDING SYMBOLS	
						ISSUED 5/5/78 REVISED	

LOCATION SIGNIFICANCE	ARC AND GAS WELDING SYMBOLS							
	BEAD	FILLET	PLUG OR SLOT	GROOVE				
				SQUARE	V	BEVEL	U	J
ARROW SIDE	GROOVE WELD SYMBOL							
OTHER SIDE	GROOVE WELD SYMBOL							
BOTH SIDES	NOT USED		NOT USED					
NO ARROW SIDE OR OTHER SIDE SIGNIFICANCE		NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED

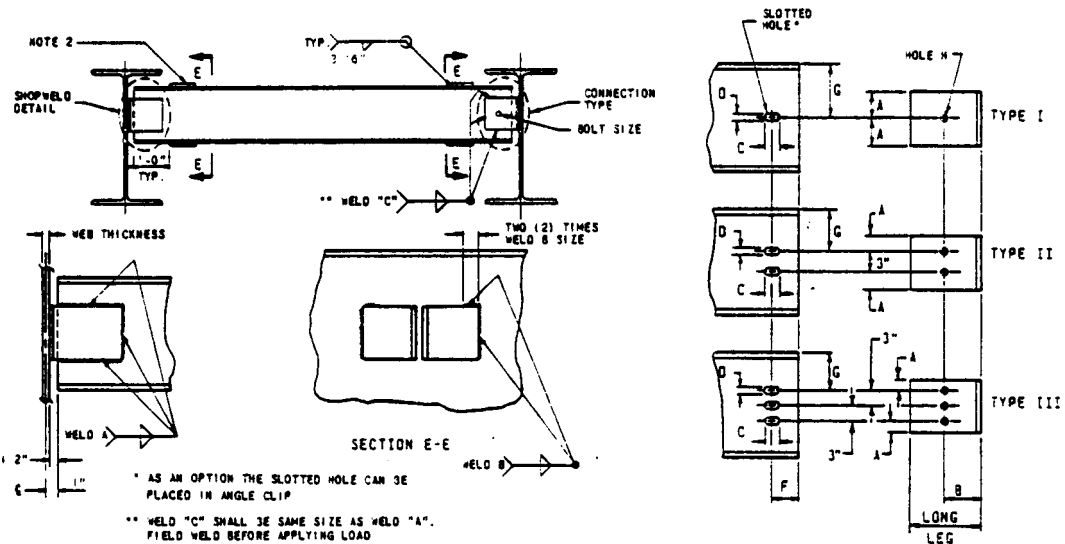
**IDENTIFICATION OF ARROW SIDE AND OTHER SIDE OF JOINT
AND ARROW-SIDE AND OTHER-SIDE MEMBER OF JOINT**



LOCATION OF ELEMENTS OF A WELDING SYMBOL



DIVISION USAGE						STEARNS-ROGER INCORPORATED ENGINEERING STANDARD		STANDARD NUMBER EE 16.01.9	
MM	P	PP	SH	FI	SP				
	X								
APPROVALS						SUPPLEMENTARY STEEL SIZES AND END CONNECTIONS			
Des. Sect. <i>[Signature]</i>						DETAILS FOR PIPE SUPPORTS IN			
Sect. Super <i>[Signature]</i>						FOSSIL FUEL POWER PLANTS			
Div. <i>[Signature]</i>						PAGE <u>1</u> OF <u>2</u>			
						ISSUED 11-24-75			
						REVISED 12-15-77			



▲ - NOTE 4

BEAM SIZE	CONNECTION TYPE	ANGLE CLIP SIZE	A	B	H	BOLT SIZE	QTY	C	D	F	G	SHOP WELD A	WELD B
NOTE 3													
▲ C 4x5.4 (2)	I	4"x3"x3/8"x2 1/2"	1 1/4"	2 3/4"	13/16"	5/8" x 3 1/2"	1	1 1/2"	13/16"	1 3/4"	2"	3/16"	
▲ C 5x6.7 (2)	I	4"x3"x3/8"x3 5/8"	1 3/16"	2 3/4"	13/16"	5/8" x 3 1/2"	1	1 1/2"	13/16"	1 3/4"	2 1/2"	3/16"	
▲ C 6x10.5 (2)	I	4"x3"x3/8"x4"	2"	2 3/4"	13/16"	5/8" x 3 1/2"	1	1 1/2"	13/16"	1 3/4"	3"	1/4"	
▲ C 8x11.5 (2)	II	4"x3"x3/8"x6"	1 1/2"	2 3/4"	13/16"	5/8" x 3 1/2"	2	1 1/2"	13/16"	1 3/4"	2 1/2"	3/16"	
▲ C 9x13.4 (2)	II	4"x3"x3/8"x7"	2"	2 3/4"	13/16"	5/8" x 3 1/2"	2	1 1/2"	13/16"	1 3/4"	3"	3/16"	
▲ C 10x15.3 (2)	II	4"x3"x3/8"x8"	2 1/2"	2 3/4"	13/16"	5/8" x 3 1/2"	2	1 1/2"	13/16"	1 3/4"	3 1/2"	3/16"	
▲ C 12x20.7 (2)	III	4"x3"x3/8"x10"	2"	2 3/4"	13/16"	5/8" x 3 1/2"	3	1 1/2"	13/16"	1 3/4"	3"	1/4"	
4x7.7	I	4"x3"x3/8"x2 1/2"	1 1/4"	2 3/4"	13/16"	5/8" x 2 1/2"	1	1 1/2"	13/16"	1 3/4"	2"	3/16"	
5x10	I	4"x3"x3/8"x3 5/8"	1 3/16"	2 3/4"	13/16"	5/8" x 2 1/2"	1	1 1/2"	13/16"	1 3/4"	2 1/2"	3/16"	
6x13.0	I	4"x3"x3/8"x4 1/2"	1 1/4"	2 3/4"	13/16"	5/8" x 2 1/2"	1	1 1/2"	13/16"	1 3/4"	2"	3/16"	
6x12.0	I	4"x3"x3/8"x4"	2"	2 3/4"	13/16"	5/8" x 2 1/2"	1	1 1/2"	13/16"	1 3/4"	3"	3/16"	
▲ 6x15.5	I	4"x3"x3/8"x4"	2"	2 3/4"	13/16"	5/8" x 2 1/2"	1	1 1/2"	13/16"	1 3/4"	3"	3/16"	
6x17	II	4"x3"x3/8"x6"	1 1/2"	2 3/4"	13/16"	5/8" x 2 1/2"	2	1 1/2"	13/16"	1 3/4"	2 1/2"	3/16"	
6x20	II	4"x3"x3/8"x6"	1 1/2"	2 3/4"	13/16"	5/8" x 2 1/2"	2	1 1/2"	13/16"	1 3/4"	2 9/16"	3/16"	
▲ 6x24	II	4"x3"x3/8"x6"	1 1/2"	2 3/4"	13/16"	5/8" x 2 1/2"	2	1 1/2"	13/16"	1 3/4"	2 7/16"	3/16"	
▲ 6x29	III	4"x3"x3/8"x8"	1"	2 3/4"	13/16"	5/8" x 2 1/2"	3	1 1/2"	13/16"	1 3/4"	2 1/8"	1/4"	
▲ 6x40	III	4"x3"x3/8"x8"	1 1/2"	2 3/4"	13/16"	5/8" x 2 1/2"	3	1 1/2"	13/16"	1 3/4"	3"	1/4"	
▲ 6x50	III	4"x3"x3/8"x9"	1 1/2"	2 3/4"	13/16"	5/8" x 2 1/2"	3	1 1/2"	13/16"	1 3/4"	3 1/8"	5/16"	
▲ 6x58	III	4"x3"x3/8"x9"	1 1/2"	2 3/4"	13/16"	5/8" x 2 1/2"	3	1 1/2"	13/16"	1 3/4"	2 1/8"	5/16"	
▲ 6x34	III	4"x3"x3/8"x12"	3"	2 3/4"	13/16"	5/8" x 2 1/2"	3	1 1/2"	13/16"	1 3/4"	4"	1/4"	

1/16" SMALLER THAN WEB THICKNESS OF EXISTING MEMBER BUT NOT GREATER THAN 5/16"

DIVISION USAGE							Stearns-Roger INCORPORATED ENGINEERING STANDARD		STANDARD NUMBER	
MM	P	PP	SH	FI	SP	EE 16.01.9				
	X							PAGE <u>2</u> OF <u>2</u>		
APPROVALS Des. Sect. <u>[Signature]</u> Sect. Supv. <u>[Signature]</u> Div. <u>[Signature]</u>							SUPPLEMENTARY STEEL SIZES AND END CONNECTIONS DETAILS FOR PIPE SUPPORTS IN FOSSIL FUEL POWER PLANTS		ISSUED 11-24-75 REVISED 12-15-77	

NOTES:

1. (Reference Only) Selection of steel sizes has been made in accordance with PDG-10, "Supplementary Steel Sizing for Pipe Supports in Fossil Fuel Power Plants".
2. For back to back channel assemblies, 1/2" x 2" Batten Plates shall be shop welded as shown to insure both members act as a unit under load.
3. All bolting to be ASTM-A-325 high strength bolting with flat washers provided under the turned surface. For back to back channels, 1" XS pipe spacer shall be provided. Bolt length dimension as specified allows for a maximum back to back dimension of 1 7/8". Bolt length must be specified for back to back dimensions greater than 1 7/8".
4. All members marked with a triangle (▲) shall have the flanges trimmed on a forty-five degree angle not to exceed 1 3/8" in leg length. This operation is to be performed on the end of the supplementary member to be field bolted and welded and is required on one side only.
5. All welding to be performed using AWS A5.1 (Latest Edition), E-70XX Electrodes.

September 26, 1980
(For Purchase)

HAPCOIR VOLUME

P60-2

D.O.E. NO. 40 P 700 - 171

for

PRIMARY PIPE SUPPORTS SNUBBERS

Prepared by:

Stearns-Roger
ENGINEERING CORP.

PROJECT NO. C-21700



PRIMARY PIPE SUPPORTS SNUBBERS
P60-2
REVISION NO. 1
SEPTEMBER 25, 1980

Revision No. 1 issued to incorporate revisions to pipe support snubbers.

Supersede Vol. P60-2 issued for bids June 16, 1980 and replace with Revision No. 1.

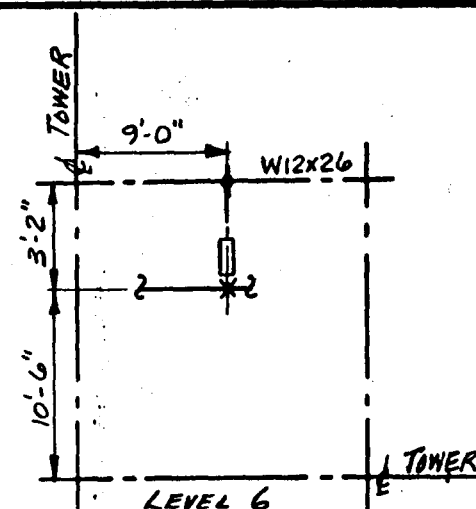
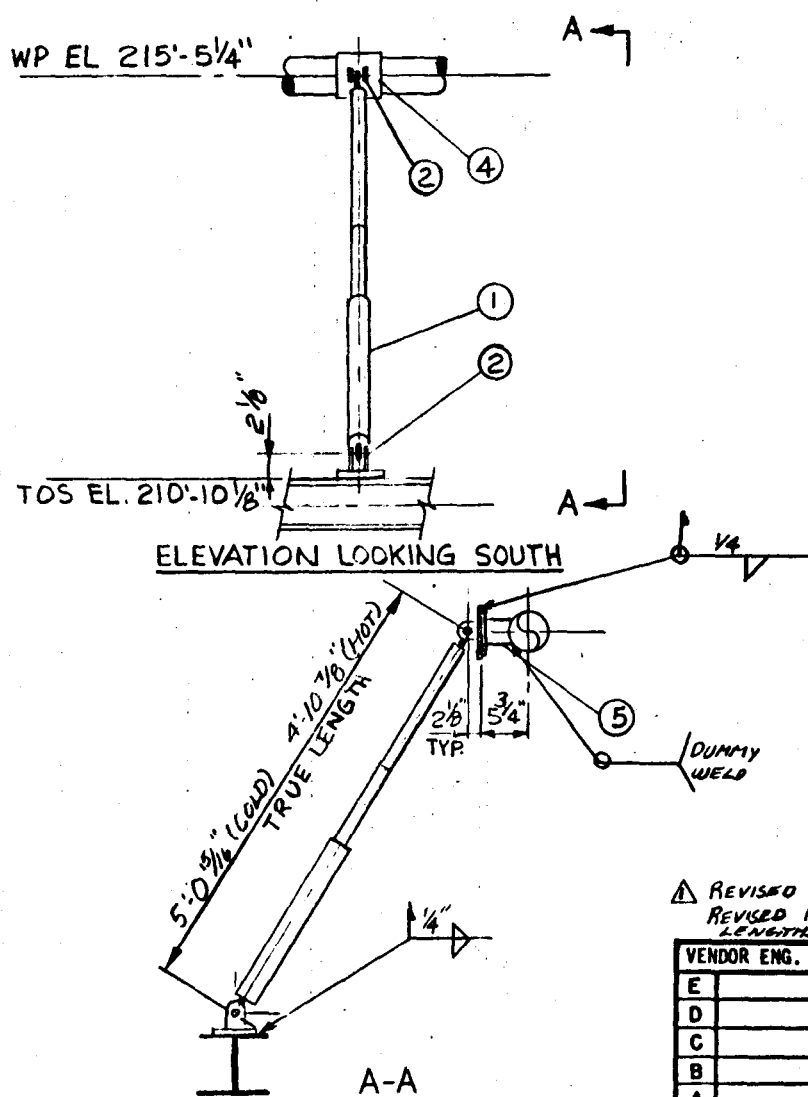
This revision 1 includes:

1. Cover Sheet
2. Pipe Hanger Index Rev. 2
3. Sixty-six snubber drawings as listed in the Pipe Hanger Index.



DIVISION USAGE							Stearns-Roger INCORPORATED ENGINEERING STANDARD		STANDARD NUMBER	
MM	P	PP	SH	FI	SP	FE03.0				
APPROVALS ES. Sect. <u>[Signature]</u> S. Supv. <u>[Signature]</u> Div. <u>[Signature]</u>							PIPE HANGER INDEX VOL. P60-2 PIPE SUPPORT SNUBBERS		PAGE <u>1</u> OF <u>1</u> ISSUED 2-14-75 REVISED	
HANGER NO.	REV	HANGER NO.	REV	HANGER NO.	REV	HANGER NO.	REV			
H-FW-2-34	1*	H-VT-1-37	1*							
H-FW-2-35	1*	H-VT-1-38	1*							
H-FW-2-36	1*	H-VT-1-39	1*							
H-FW-2-37	1*	H-VT-1-40	1*							
H-FW-2-38	1*	H-VT-1-41	1*							
H-FW-2-39	1*	H-VT-1-42	1*							
H-FW-2-40	1*	H-VT-1-43	1*							
H-FW-2-41	1*	H-VT-1-44	1*							
		H-VT-1-45	1*							
H-MS-2-38	1*									
H-MS-2-39	1*	H-VT-11-3	1*							
H-MS-2-40	1*	H-VT-11-4	1*							
H-MS-2-41	1*									
H-MS-2-42	1*	H-VT-12-20	1*							
H-MS-2-43	1*	H-VT-12-21	1*							
H-MS-2-44	1*	H-VT-12-22	1*							
H-MS-2-45	1*	H-VT-12-23	1*							
H-MS-2-46	1*	H-VT-12-24	1*							
H-MS-2-47	1*	H-VT-12-25	1*							
H-MS-2-48	1*	H-VT-12-26	1*							
H-MS-2-49	1*	H-VT-12-27	1*							
H-MS-2-50	1*	H-VT-12-28	1*							
		H-VT-12-29	1*							
H-MS-3-9	1*	H-VT-12-30	1*							
H-MS-3-10	1*	H-VT-12-31	1*							
H-MS-8-4	1*									
H-MS-8-5	1*									
H-MS-8-6	1*									
H-MS-8-7	1*									
H-MS-8-8	1*									
H-MS-8-9	1*									
H-T0-3-6	1*									
H-T0-3-7	1*									
H-T0-21-16	1*									
H-T0-21-17	1*									
H-VT-1-27	1*									
H-VT-1-28	1*									
H-VT-1-29	1*									
H-VT-1-30	1*									
H-VT-1-31	1*									
H-VT-1-32	1*									
H-VT-1-33	1*									
H-VT-1-34	1*									
H-VT-1-35	1*									
H-VT-1-36	1*									
				PROJECT NO. C-21700						
335				DATE September 25,		SHEET NO. 1 OF 1				
				REV. 2						

*Indicates Revised this issue.



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -3/4"$
 $\Delta Z = -1/8"$
 $\Delta Y = 2" \text{ DN}$

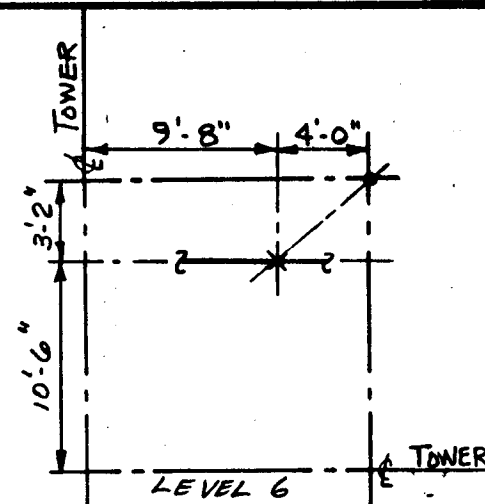
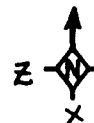
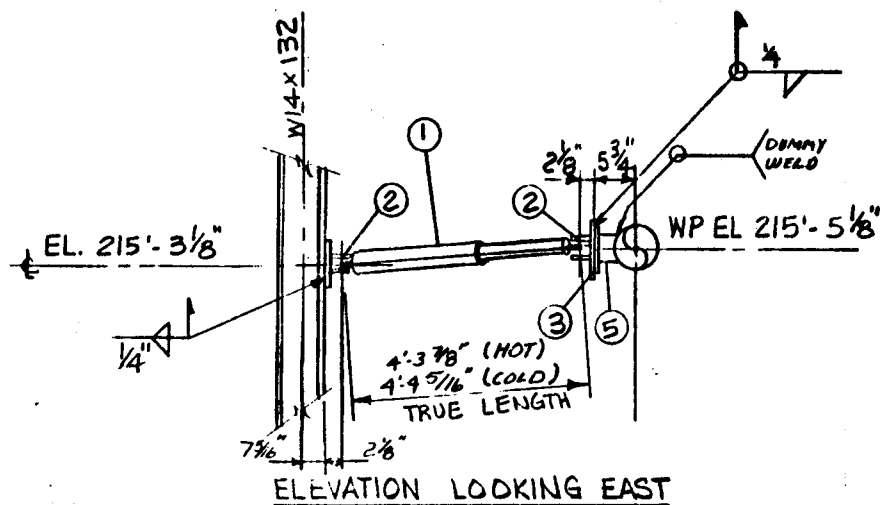
VOL. P60-2

14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	3" XS PIPE STANCHION BY PIPE FAB	
4	1	4 1/2"x4 1/2"x 1/2" C.S. P. BY PIPE FAB.	
3			
2	2	REAR BRACKET SIZE 3	
1	1	MECHANICAL SHUDDER SIZE 3 FG	307
ITEM NO.	COMPONENT DESCRIPTION		REMARKS
SCALE:	Stearns-Roger REGD. PATENT		11165/8
NONE			
10 Mwde SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
0 C-21700	LINE N° 4" FW-2-1MBA	MARK N° H-FW-2-34	

NOTES:

PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: $F_x = 1.2\text{K}$ $F_y = 2.1\text{K}$
PIPE SIZE: 4.5" O.D. $F_{\text{TOTAL}} = 2.5\text{K}$
PIPE INSULATION: $2\frac{1}{2}"$
PIPE MATERIAL: ASTM A106 GR B

ENGINEERING RECORD				5	
DESIGNED	MLM	CHECKED		4	
DATE	3-28-80	DATE		3	
REVIEWED	GMM	APPROVED		2	
DATE	7-7-80	DATE		1	APPROVED
PROJECT	FWP				REVISIONS
DATE					
ANALYSIS ID. CODE	X-FWI	-1-10/C-4			PROJECT NO.



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -3/4"$
- $\Delta Z = -1/8"$
- $\Delta Y = 2" \text{ DN}$

VOL. P60-2

VENDOR ENG. REV.			REFERENCE DRAWINGS		REV.	
E			PPING	P9-2	A	7
D			STRUCTURAL	S32-1	O	6
C			ELECTRICAL			5
B						4
A						3
						2
						1

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3	3" XS PIPE STANCHION BY PIPE FAB.	
4 1/2	4 1/2" X 4 1/2" X 1/2" C.S. R BY PIPE FAB.	
2	REAR BRACKET SIZE 3	
1	MECHANICAL SNUBBER SIZE 3 FG 307	

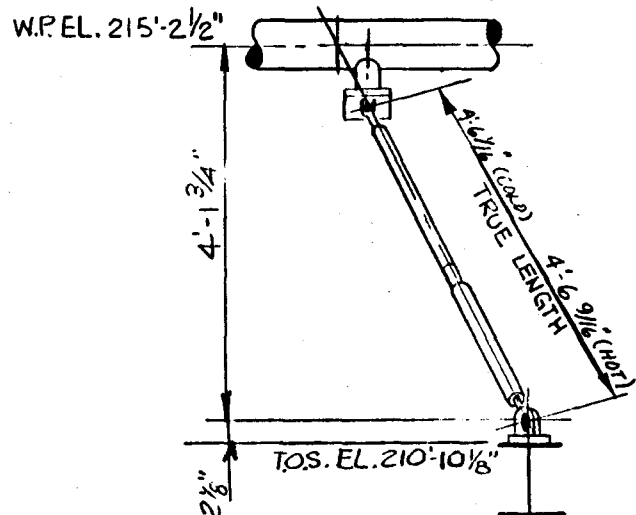
DESIGNED	MLM	CHECKED	
DATE	3-31-80	DATE	
REVIEWED		APPROVED	
DATE		DATE	
PROJECT			
DATE			

ANALYSIS ID. CODE	X-FW-2-A-6/C-4	PROJECT NO	C-21700	LINE NO	4"FW-2-MBA	MARK NO	H-FW-2-35
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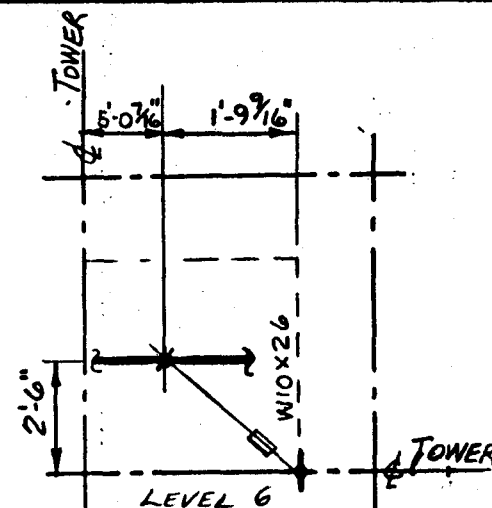
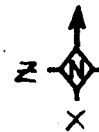
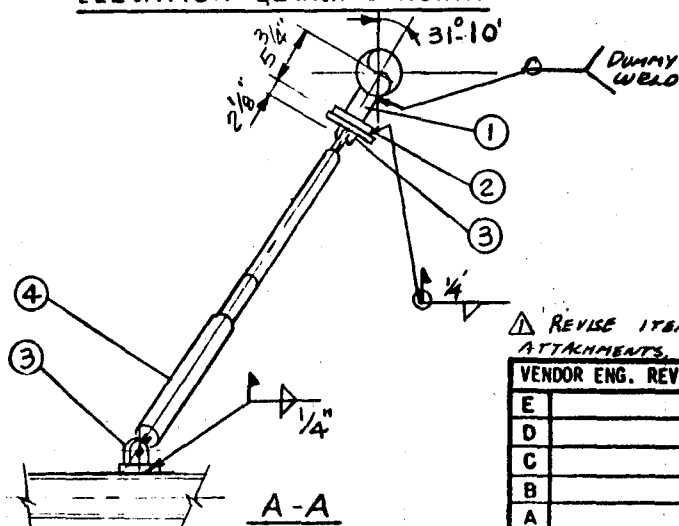
△ REVISE ITEMS 1, 2 & 4, REVISE LENGTHS & BRACKET ATTACH.

NOTES:

PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = .8K$ $F_z = 1.8K$
 PIPE SIZE: 4.5" O.D. $F_{TOTAL} = 2.0K$
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR.B



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -5/16$
 $\Delta Z = -3/16$
 $\Delta Y = 1/16$ DN

VOL P60-2

Δ REVISE ITEMS 3, 4, 5, REVISE BRACKET
 ATTACHMENTS, REVISE LENGTHS

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-2	P3
D	STRUCTURAL S33-3	1
C	ELECTRICAL	
B		
A		

NOTES:

PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.4K$ $F_y = 2.0K$
 PIPE SIZE: 4.50" O.D. $F_e = 1.3K$ $F_{Tot.} = 2.7K$
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD

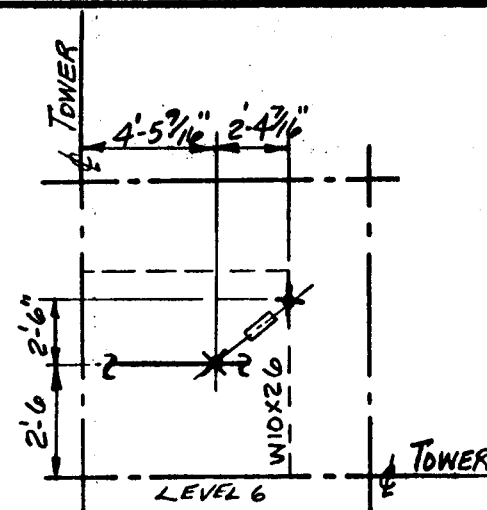
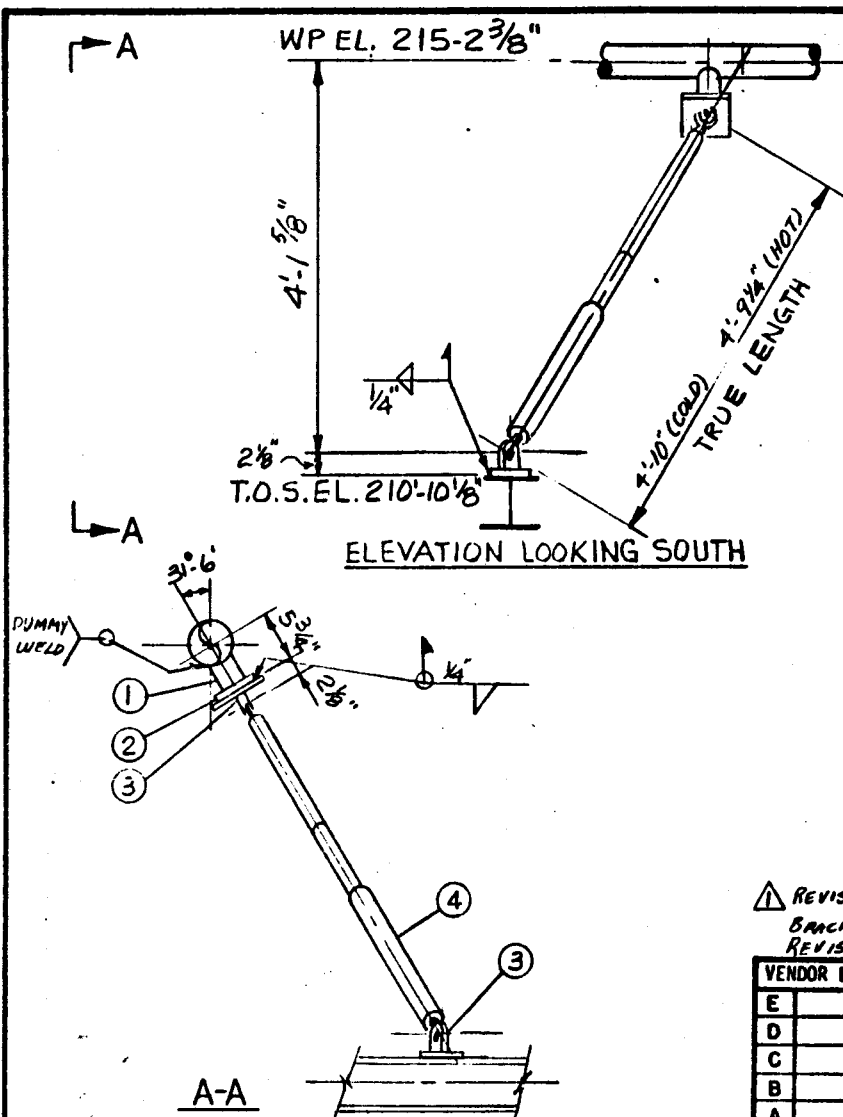
DESIGNED	MLM	CHECKED	
DATE	3-27-80	DATE	
REVIEWED	GKI	APPROVED	
DATE	4-7-80	DATE	
PROJECT	BOR	PROJECT	
DATE	4-22-80	DATE	
ANALYSIS ID. CODE	X-FW-1-1-6/10-4	PROJECT NO	C-21700

5
4
3
2
1
REVISIONS

14		
13		
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7		
6		
5		
4	1	MECHANICAL SNUBBER SIZE 3 FG 307
3	2	REAR BRACKET SIZE 3
2	1	4 1/2" x 4 1/2" x 1/2" R.C.S. BY PIPE FAB.
1	1	3" XS PIPE STANCHION BY PIPE FAB.
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

TO MWE SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 4" FW-2-A/3A MARK NO HFW-2-36



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
 ✦ LOCATION OF PIPE ATTACHMENT
 $\Delta X = -5/16"$
 $\Delta Z = -3/16"$
 $\Delta Y = 1/16" \text{ DN}$

VOL. P60-2

⚠ REVERSE ITEMS 3,445, REVERSE REAR
BRACKET ATTACHMENTS & WELDS.
REVERSE LEANINGS

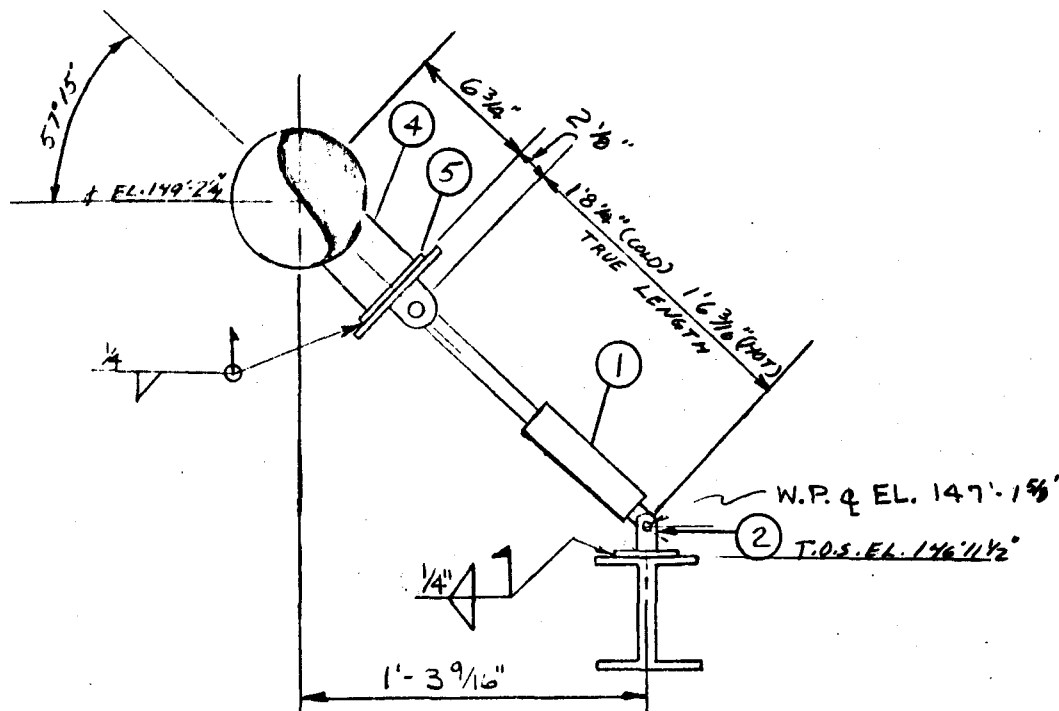
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-2	P ₂
D		STRUCTURAL	S33-3	1
C		ELECTRICAL		
B				
A				

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	1	MECHANICAL SNUBBER SIZE 3 FG. 307	
3	2	REAR BRACKET SIZE 3	
2	1	4 1/2" x 4 1/2" x 1/2" R.C.S. BY PIPE FAB.	
1	1	3" X S PIPE STANCHION BY PIPE FAB.	
ITEM	QTY	COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger INCORPORATED	11165/8
NONE			

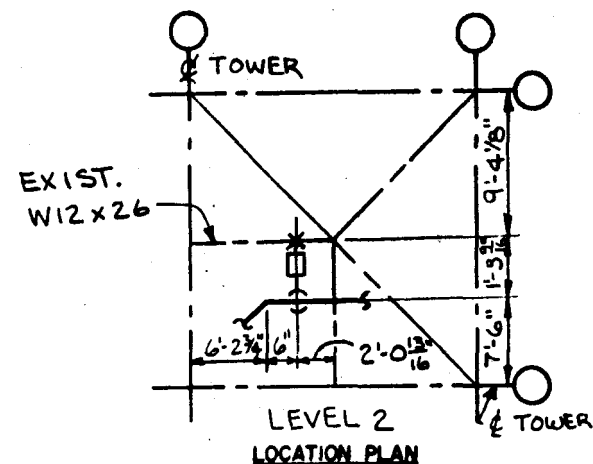
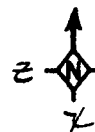
NOTES:
PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: $F_x = 1.4K$ $F_y = 2.0K$
PIPE SIZE: 4.50" $F_z = 1.6K$ $F_{TOTAL} = 2.9K$
PIPE INSULATION: 2 1/2"
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	3-27-81	DATE	
REVIEWED		APPROVED	
DATE		DATE	
PROJECT	12-33		12-33
DATE	3-27-81		3-27-81
ANALYSIS ID. CODE	X-FW-1-A-C/C-4		

5	1	1	3"XS PIPE STANCHION BY PIPE FAB.	
4	ITEM REQD	COMPONENT DESCRIPTION		REMARKS
3	SCALE:	Stearns-Roger INCORPORATED		11165/8
2	NONE			
 A/C 11/23		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
REVISIONS				
PROJECT N° C-21700		LINE N° 4 th FW-2-MBA	MARK N° H- FW-2-37	



ELEVATION LOOKING WEST



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -3/4"$
 $\Delta Y = 2" \text{ DN}$
 $\Delta Z = +1"$

VOL. P60-2

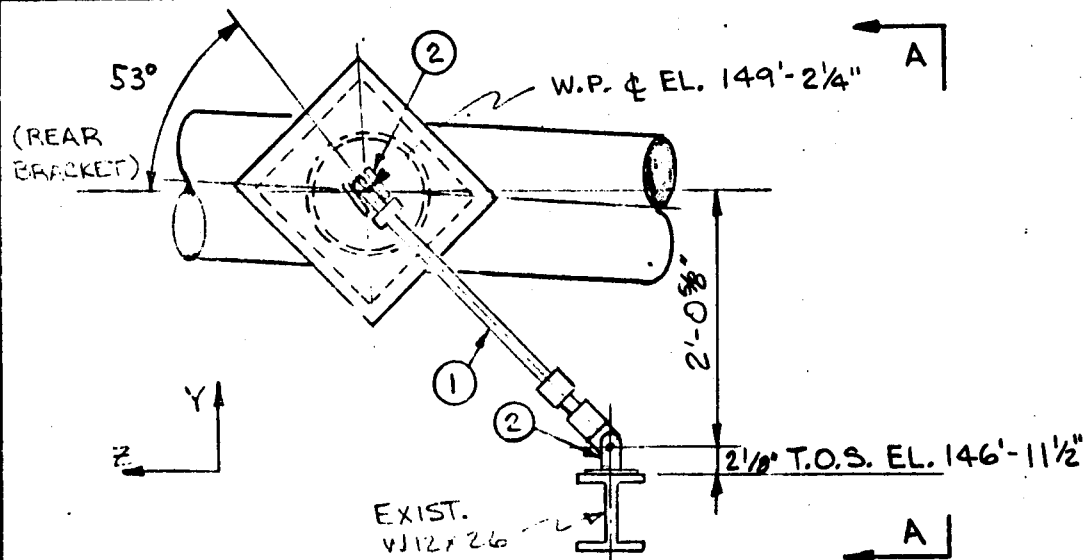
14			
13			
12			
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10			
9			
8			
7			
6			
5	1	4 1/2 x 4 1/2 x 1/2 R BY PIPE TAG.	
4	1	3" X 5 PIPE STANCHION BY PIPE FRT.	
3			
2	2	REAR BRACKET, SIZE 3	
1	1	MECHANICAL SNUBBER, SIZE 3	FIG. 306
ITEM	QTY	COMPONENT DESCRIPTION	REMARKS
SCALE:			11165/8
NONE			
10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 4-FW-2-MFA	MARK NO H-FW-2-28

⚠ REVEE STANCHION, REAR BRACKET ATTACH, WELD SYMBOLS
LENGTHS, ITEMS 142, DELETED ITEM 3

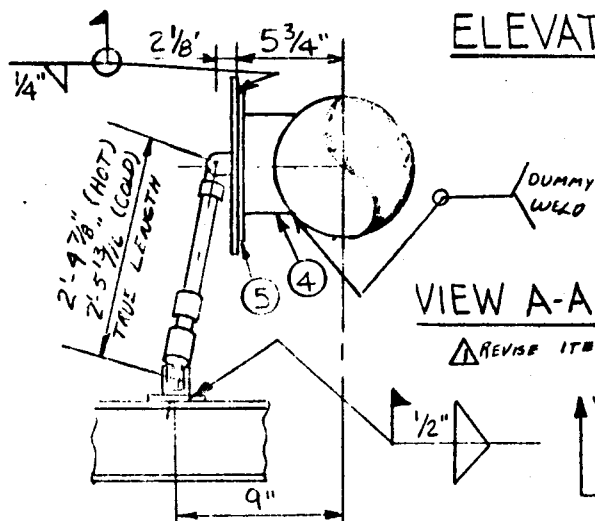
NOTES:

NOTES:
PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: $F_x = 1.9K$, $F_y = 1.9K$
PIPE SIZE: 4" SCH 40 $F_{TUBE} = 2.4K$
PIPE INSULATION: 2" π
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE		X-EV-1-1-618-4	



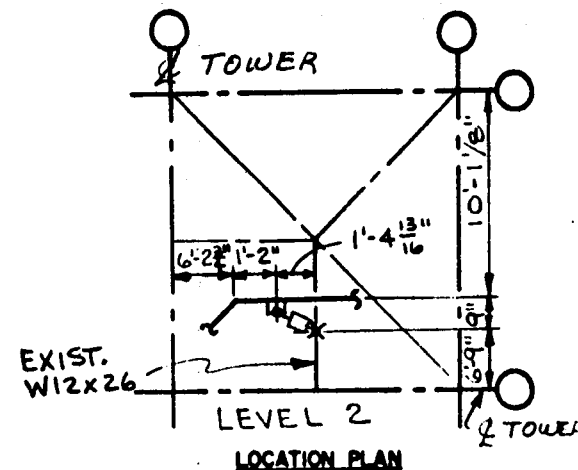
ELEVATION LOOKING NORTH



VIEW A-A-ELEVATION LOOKING WEST

△ REVISE ITEMS 1,2,3 LENGTHS, REAR BRACKET ATTACHMENTS

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING	F9-3
D		STRUCTURAL	522-3
C		ELECTRICAL	
B			
A			



- ★ LOCATION OF STEEL ATTACHMENT
- ✱ LOCATION OF PIPE ATTACHMENT
- Δ X = -3/4"
- Δ Y = 2" DN
- Δ Z = 1"

Vol. P60-2

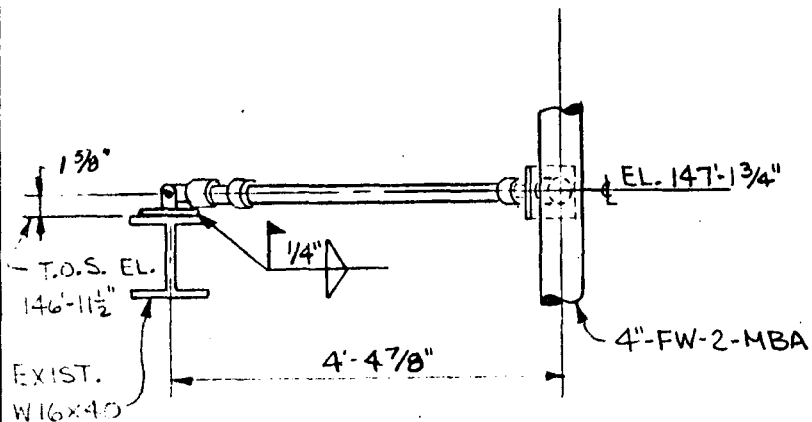
14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	4 1/2" x 4 1/2" x 1/2" RB BY PIPE FAB.	
4	1	3" XS PIPE STANCHION BY PIPE FAB.	
3			
2	2	REAR BRACKET, SIZE 3	
1	1	1 1/2" x 1 1/2" x 1/2" SNUBBER, SIZE 3, FIG 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger INCORPORATED	11165/8

NOTES:
PIPE TEMPERATURE: 4-10°F
STRUCTURAL DESIGN LOAD: F_y = 3.5 K, F_t = 2.5 K
PIPE SIZE: 3" O.D. TOTAL LOAD = 4.3 K
PIPE INSULATION: 1/2"
PIPE MATERIAL: A-36

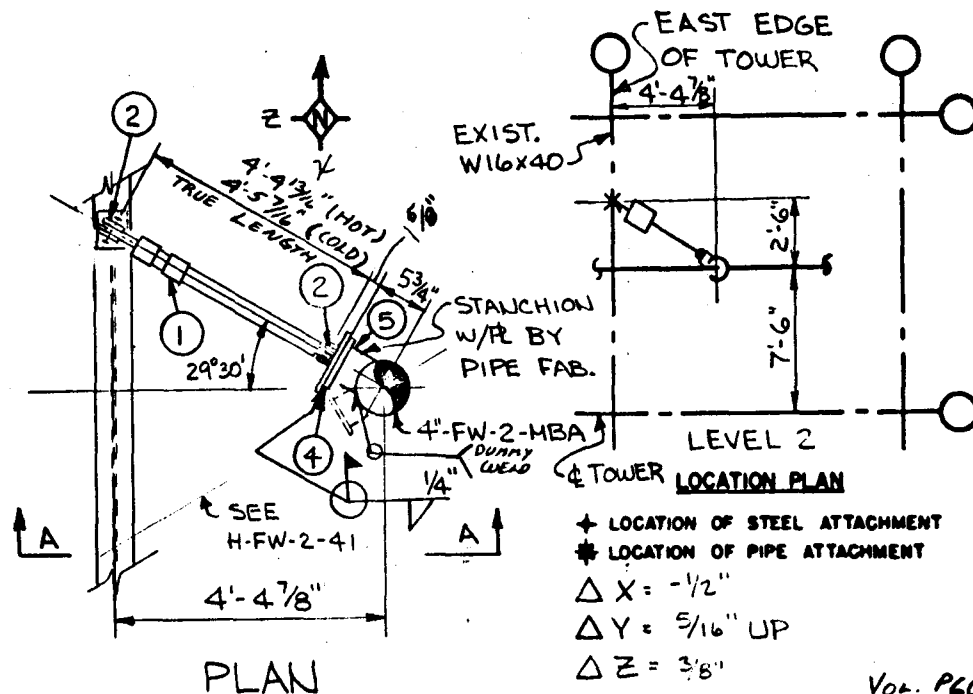
ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

5		
4		
3		
2		
REVISIONS		
PROJECT NO	C-21700	
LINE NO		
MARK NO	H: F-11-2-80	

TO MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA



A-A ELEVATION LOOKING NORTH



- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/2"$
 $\Delta Y = 5/16" \text{ UP}$
 $\Delta Z = 3/8"$

Vol. P60-2

↑ REVISE ITEMS 1, 2, 3, LENGTHS & REAR BRACKET ATTACH.

NOTES

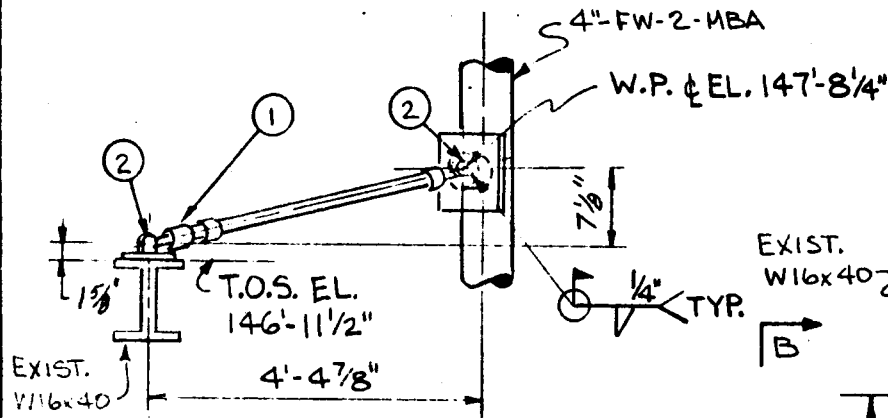
PIPE TEMPERATURE: 140°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.6\text{K}, F_z = 1.0\text{K}$
 PIPE SIZE: 4" S.D. $F_{\text{TOTAL}} = 1.3\text{K}$
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV	
E		PIPING	P9-3	P2	6
D		STRUCTURAL	S32-3	O	5
C		ELECTRICAL			4
B					3
A					2

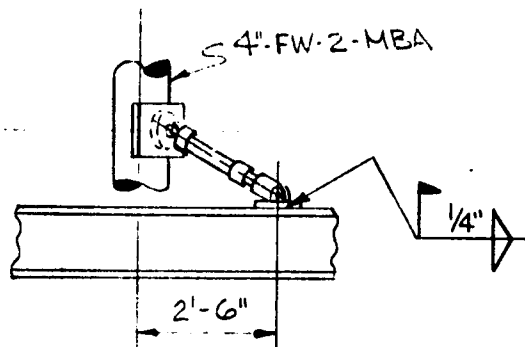
ENGINEERING RECORD		5	
DESIGNED	5/11/77	4	
DATE	5/11/77	3	
REVIEWED	6/1/77	2	
DATE	6/1/77	1	
PROJECT	10 Mw SOLAR PILOT PLANT		
DATE	6/12/80		
ANALYSIS ID. CODE			

14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	3" X 5" PIPE STANCHION BY PIPE FAB.	
4	1	4 1/2" X 4 1/2" X 1/2" C.S. PLATE BY PIPE FAB.	
3			
2	2	REAR BRACKET, SIZE 1	
1	1	MATERIAL: SAUERBRER, SIZE 1 FB 307	

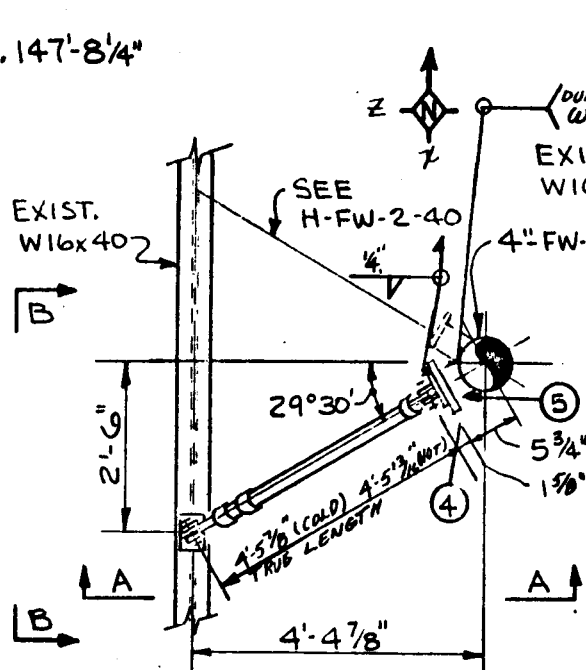
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO	MARK NO H-FB-2-4-2



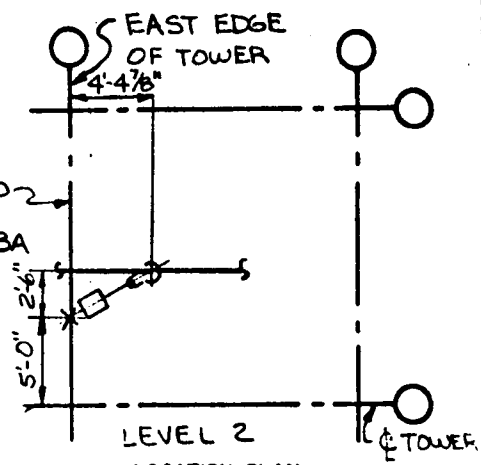
A-A ELEVATION LOOKING NORTH



B-B ELEVATION LOOKING EAST



PLAN



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/2"$
 $\Delta Y = 5/16" \text{ UP}$
 $\Delta Z = 3/8"$

Vol. P60-2

Δ REVISE ITEMS 1,2,3, LENGTH, REAR
 BRACKET ATTACHMENTS

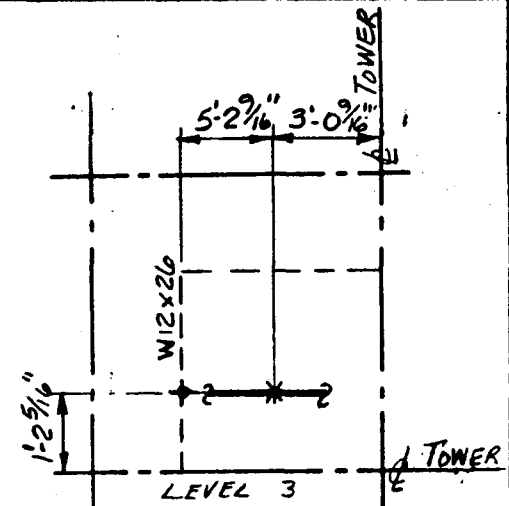
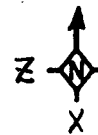
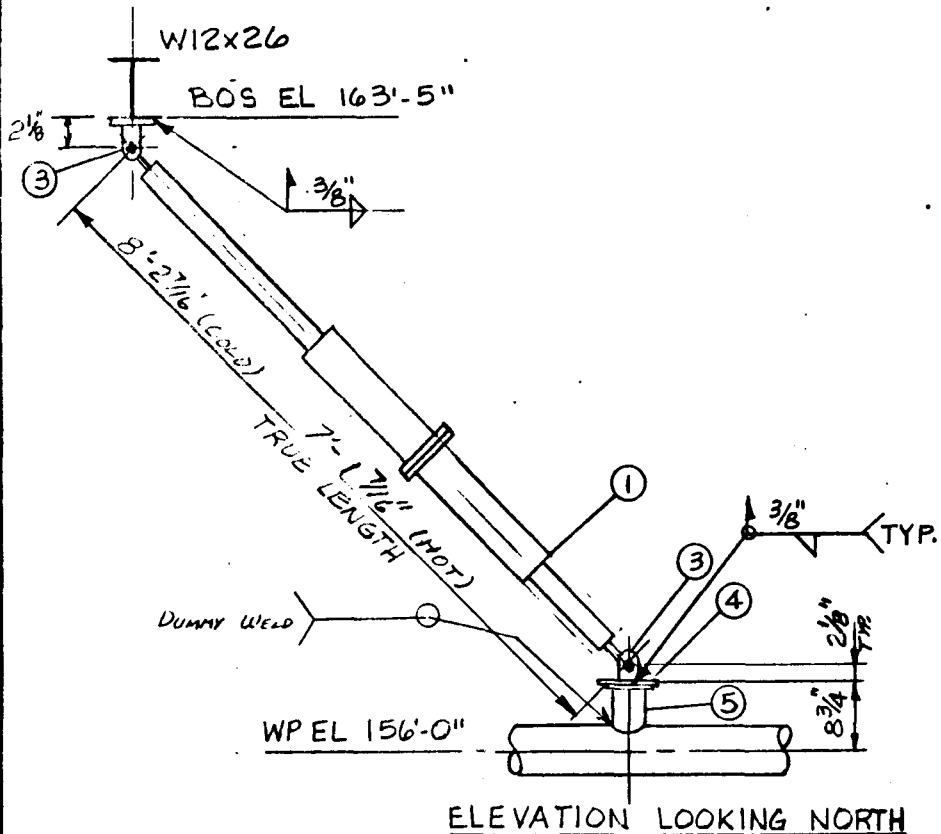
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P2
D	STRUCTURAL S32-2	O
C	ELECTRICAL	
B		
A		

14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	3" XS PIPE STANCHION BY PIPE FAB.	
4	1	4 1/2 x 4 1/2 x 1/2 PL BY PIPE FAB.	
3			
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNUBBER SIZE 1 FIG. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger *****	
NONE			11165/8

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.6 \text{ K}$, $F_z = 1.2 \text{ K}$
 PIPE SIZE: 4.5" O.D., $F_{\text{TOTAL}} = 1.3 \text{ K}$
 PIPE INSULATION: 1 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE	PROJECT	DATE
ANALYSIS ID. CODE	X-FW-1-A	MARK	H-FW-2-41

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA
 PROJECT NO C-21700
 LINE NO 4-FW-2-MBA
 MARK NO H-FW-2-41



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 0"$
- $\Delta Z = 3/16"$
- $\Delta Y = 17 5/8" \text{ DN}$

VOL P60-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P3
D	STRUCTURAL S32-3	0
C	ELECTRICAL	
B		
A		

↑ REVISE ITEMS 1,2,4,3, LENGTHS & REAR BRACKET ATTACHMENTS

14		
13		
12		
11		
10		
9		
8		
7		
6		
5	1	4" XXS PIPE STANCHION BY PIPE FAB.
4	1	1/2" X 5/8" X 1/2" C.S.R. BY PIPE FAB.
3	2	REAR BRACKET SIZE 3
2		
1	2	MECHANICAL SNIBBER SIZE 3L FIN. 307
ITEM NO.	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 6" MS-2-QEB
MARK NO	H-MS-2-35	

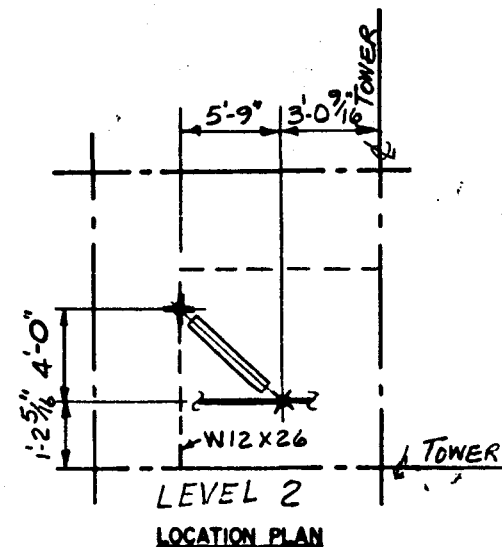
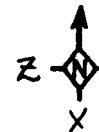
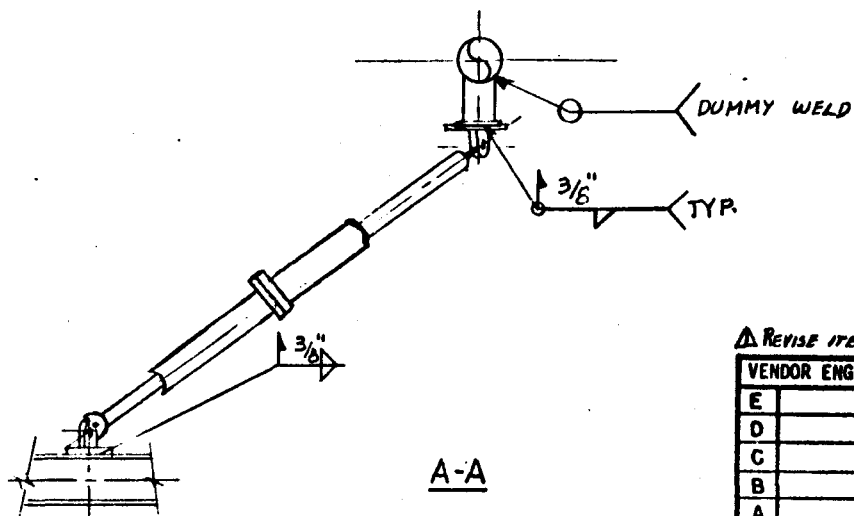
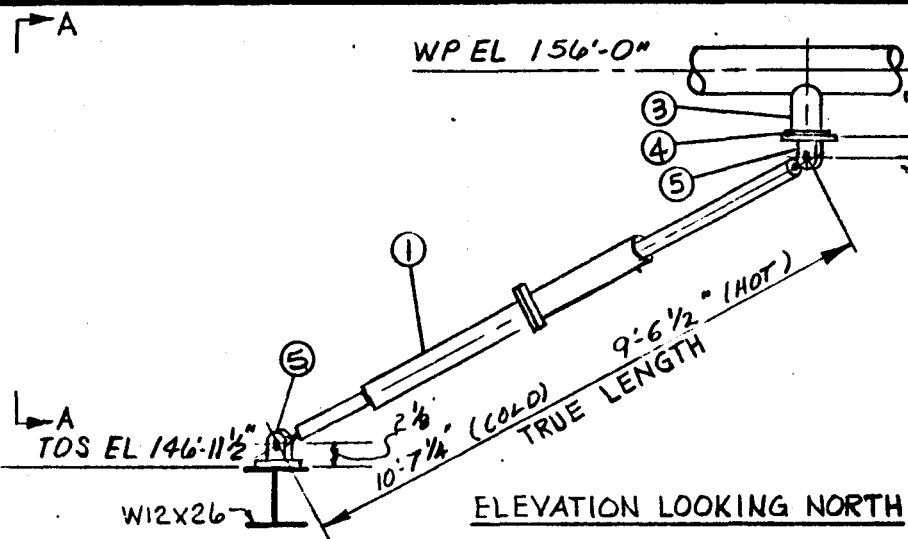
NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_y = 2.8k$, $F_z = 2.3k$
 $F_{TOTAL} = 3.4k$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	M.L.M.	CHECKED	
DATE	3-31-80	DATE	
REVIEWED		APPROVED	
DATE	4-1-80	DATE	
PROJECT	F.T.P.		
DATE	4-1-80		
ANALYSIS ID. CODE	K-A15-1-A-4	PROJECT NO	C-21700
		LINE NO	6" MS-2-QEB
		MARK NO	H-MS-2-35

5
4
3
2
1
REVISIONS



✦ LOCATION OF STEEL ATTACHMENT
✦ LOCATION OF PIPE ATTACHMENT

$$\Delta X = 0''$$
 $\Delta z = 3/16''$
$$\Delta Y = 17\frac{5}{8}'' \text{ DN}$$

VOL. P60-2

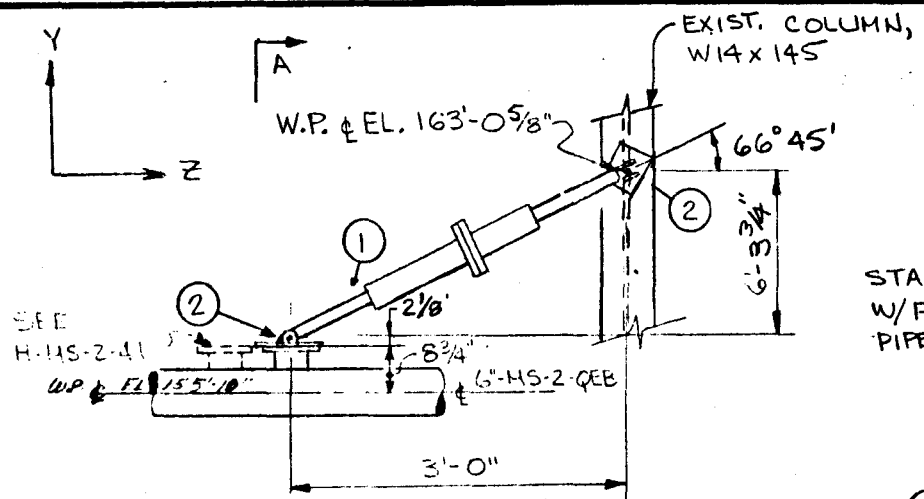
△ REVISE ITEMS, L245. LENGTHS & REAR BRACKETS

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-3	P3
D		STRUCTURAL	S32-3	O
C		ELECTRICAL		
B				
A				

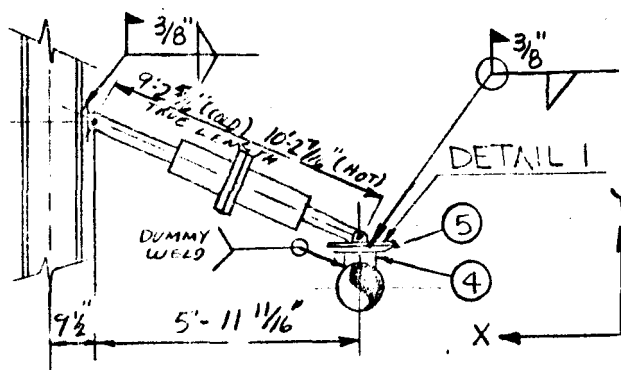
NOTES:
PIPE TEMPERATURE: 960°
STRUCTURAL DESIGN LOAD: $F_x = 1.8k$ $F_y = 2.8k$
PIPE SIZE: 6.625" O.D. $F_z = 23k$ $F_{TOTAL} = 4.0k$
PIPE INSULATION: 4.5"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	3-31-80	DATE	
REVIEWED	W. H. Z.	APPROVED	
DATE	4-16-80	DATE	
PROJECT	MLP		P. P. Y.
DATE			6-12-80
ANALYSIS ID. CODE	X-M-1-A-1		

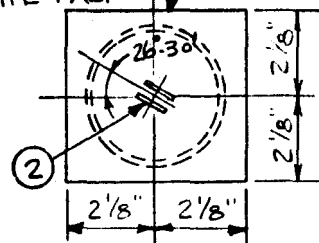
5		1	2	MECHANICAL SNUBBER SIZE 3L FIG 307	
4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS
3		SCALE:		Stearns-Roger	
2		NONE		INCORPORATED	11165/8
		TO MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
REVISIONS					
PROJECT NO C-21700		LINE NO 6MS-2-0EB		MARK NO H-MS-2-39	



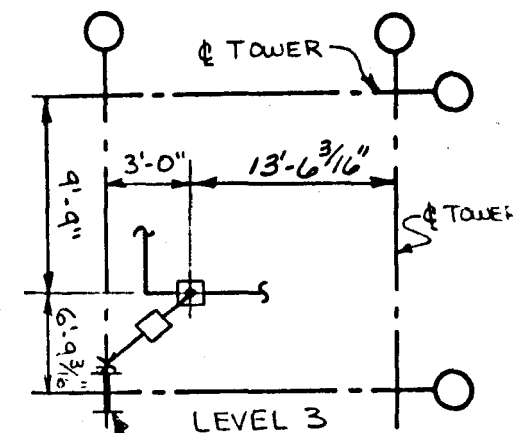
ELEVATION LOOKING SOUTH



VIEW A-A - ELEVATION LOOKING WEST

STANCHION
W/RE BY
PIPE FAB.

DETAIL 1

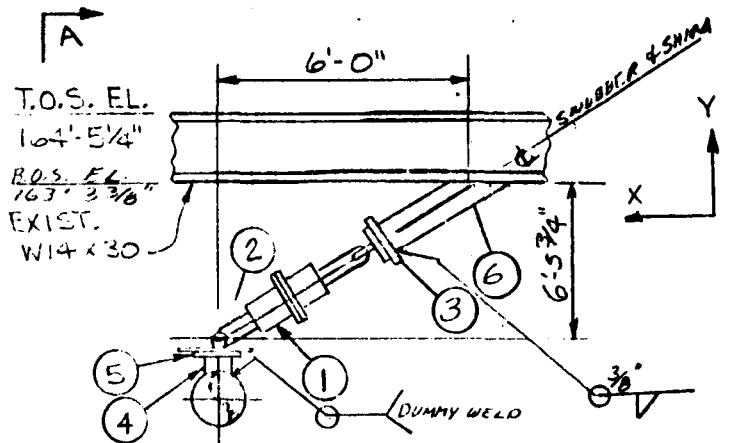


LOCATION PLAN

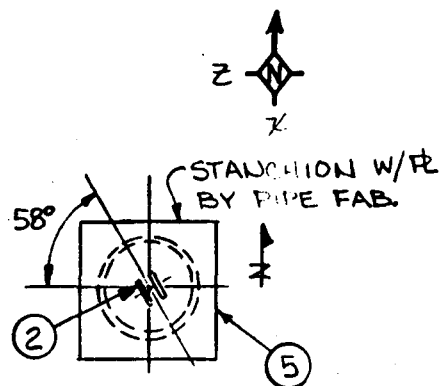
EXIST. COL.
W14x145+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT $\Delta X = 1 \frac{3}{16}$ " $\Delta Y = 18$ " DN $\Delta Z = 15 \frac{1}{16}$ "

VOL. P60-2

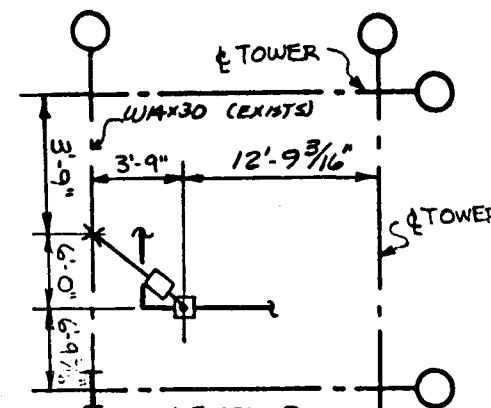
1) REVISE ITEMS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 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1514, 1515, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1526, 1527, 1528, 1529, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 1540, 1541, 1542, 1543, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 1681, 1682, 1683, 1684, 1685, 1686, 1687, 1688, 1689, 1690, 1691, 1692, 1693, 1694, 1695, 1696, 1697, 1698, 1699, 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 1710, 1711, 1712, 1713, 1714, 1715, 1716, 1717, 1718, 1719, 1720, 1721, 1722, 1723, 1724, 1725, 1726, 1727, 1728, 1729, 1730, 1731, 1732, 1733, 1734, 1735, 1736, 1737, 1738, 1739, 1740, 1741, 1742, 1743, 1744, 1745, 1746, 1747, 1748, 1749, 1750, 1751, 1752, 1753, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779, 1780, 1781, 1782, 1783, 1784, 1785, 1786, 1787, 1788, 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1814, 1815, 1816, 1817, 1818, 1819, 1820, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1835, 1836, 1837, 1838, 1839, 1840, 1841, 1842, 1843, 1844, 1845, 1846, 1847, 1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 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ELEVATION LOOKING WEST



DETAIL 1

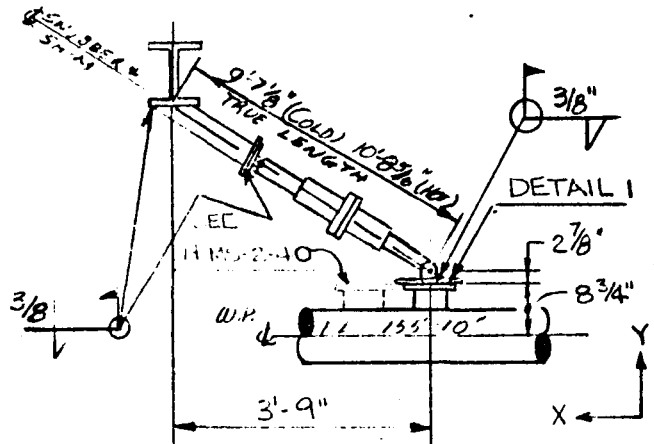


LOCATION PLAN

EXIST. W14 x 145

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 1 \frac{3}{16}"$
- $\Delta Y = 18" \text{ DU}$
- $\Delta Z = 15 \frac{1}{16}"$

VOL. P60-2



VIEW A-A- ELEVATION LOOKING NORTH

REVISE ITEMS 1, 2, 3 & 6, ADD SHIM REV. REAR BRACKET

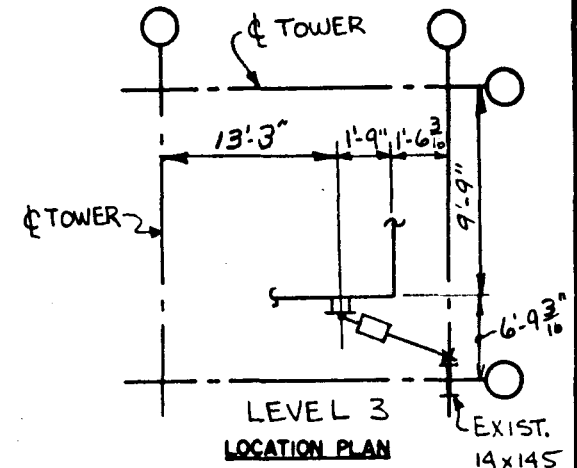
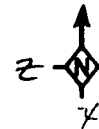
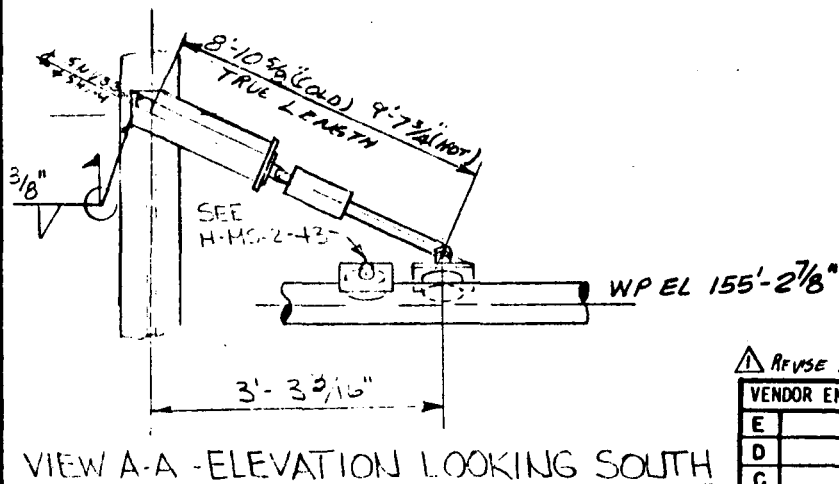
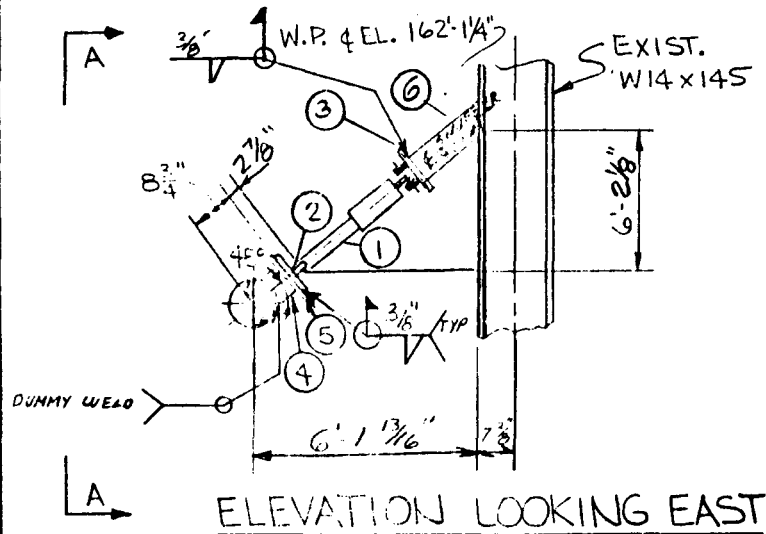
VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING	P9-3
D		STRUCTURAL	232-2
C		ELECTRICAL	
B			
A			

14			
13			
12			
11			
10			
9			
8			
7			
6	1	4" X 4" X 3/8" STRUCTURAL TUBE	
5	1	4 1/2" X 4 1/2" X 3/4" C.S. IR. BY PIPE FAB.	
4	1	4" X 5" PIPE STANCHION BY PIPE FAB.	
3	1	5" X 5" X 1/2" C.S. IR.	
2	2	REAR BRACKET, SIZE 3	
1	2	MECHANICAL CARVEFR. SIDE 3L FR. 307	

NOTES:
PIPE TEMPERATURE: 920°F
STRUCTURAL DESIGN LOAD: F_y = 2.3K, F_t = 3.0K
PIPE SIZE: 6" O.D., 1/2" I.D. F_{total} = 4.0K
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 P-2

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-MS-1-A-1		

5			
4			
3			
2			
1			
SCALE: NONE		COMPONENT DESCRIPTION	REMARKS
		Stearns-Roger	11165/8
		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT N° C-21700		LINE N°	MARK N° H-MS-2-41



- ✦ LOCATION OF STEEL ATTACHMENT
- ✦ LOCATION OF PIPE ATTACHMENT

$$\Delta X = -3/4"$$

$$\Delta Y = 12 3/4" \text{ DN}$$

$$\Delta Z = -1 1/2"$$

VOL. P60-2

⚠ REVISE ITEMS 12, 316, REAR BRACKET, & ADD SHIM

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-3
D	STRUCTURAL	S32-2
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6	1	4"X4" X 3/8" STRUCTURAL TUBING
5	1	5 1/2"X5 1/2" X 3/4" S. PL. BY PIPE FAB.
4	1	4"XXS PIPE STANCHION BY PIPE FAB.
3	1	5"X5" X 1/2" C.S. PL.
2	2	PIPE HANGING SIZE 10
1	1	MECHANICAL HANGING R. SIZE 10L FB.307

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

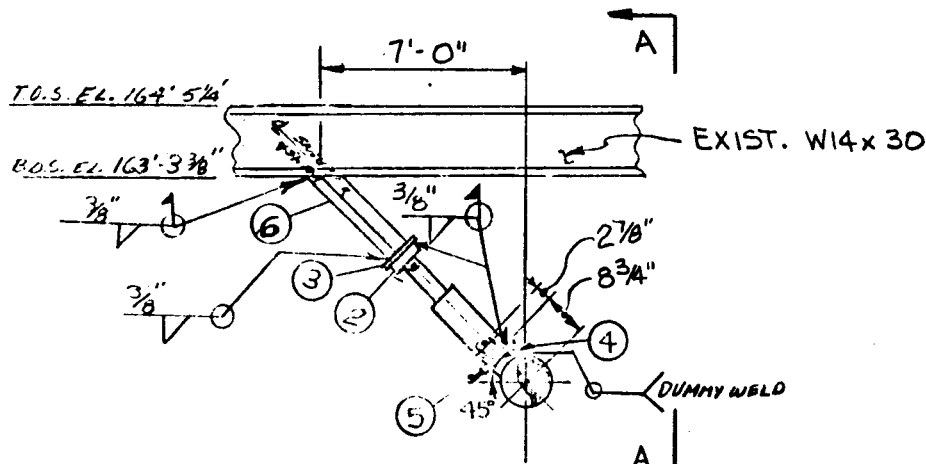
PROJECT NO C-21700 LINE NO 01165/8 MARK NO H-MS-2-42

NOTES:
 PIPE TEMPERATURE: 900°F
 STRUCTURAL DESIGN LOAD: $F_x = 3.3K$, $F_y = 4.5K$
 PIPE SIZE: 4" XXS $F_2 = 2.0K$ $F_{TOTAL} = 6.0K$
 PIPE INSULATION: 4" $F_2 = 2.0K$
 PIPE MATERIAL: A230 T22

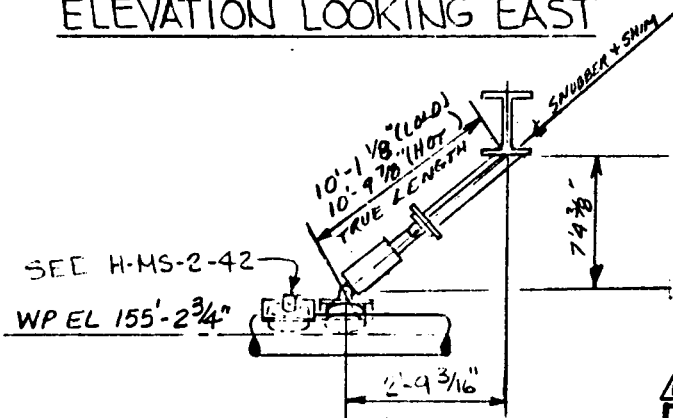
ENGINEERING RECORD			
DESIGNED	DATE	OWNED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-M-2-A-7		

5
4
3
2
1

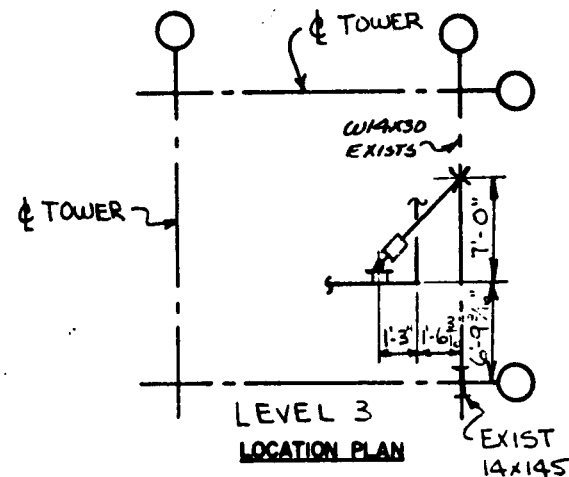
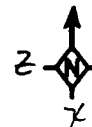
REVISIONS



ELEVATION LOOKING EAST



VIEW A-A - ELEV. LOOKING NORTH



- ✦ LOCATION OF STEEL ATTACHMENT
- ✦ LOCATION OF PIPE ATTACHMENT
- $\Delta X = -3/4"$
- $\Delta Y = 12 3/4"$ DN.
- $\Delta Z = -1 1/2"$

VOL. P60-2

⚠ REVISIT ITEMS 1,2,3,4,6, ADD SHIM, REUSE REAR BULK

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-3
D	STRUCTURAL	532-3
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6	1	4"X4"X3/8" STRUCTURAL TUBING
5	1	5 1/2"X5 1/2"X3/4" C.S. R, BY PIPE FAB.
4	1	4"X4"X5, PIPT STAUCHION, BY PIPE FAB.
3	1	5"X5"X1/2" C.S. TL
2	2	REAR TIE ROD, SIZE 10
1	1	MECHANICAL STOP, SIZE 10L

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_1 = 3.5 \text{ K}$, $F_2 = 4.6 \text{ K}$
 PIPE SIZE: 6.625" O.D. $F_2 = 1.5 \text{ K}$ $F_{\text{TOTAL}} = 6.0 \text{ K}$
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A325 F22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-MS-1-A-4		

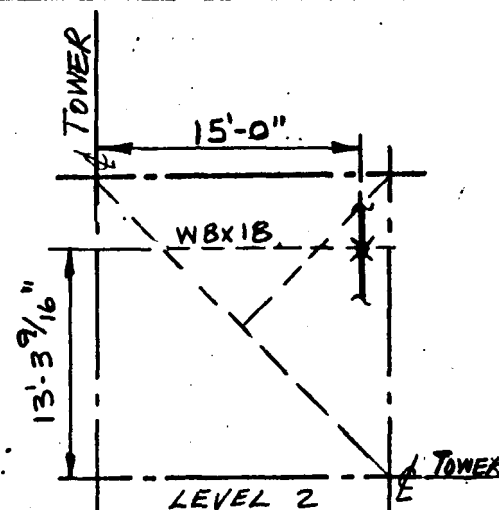
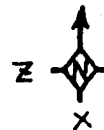
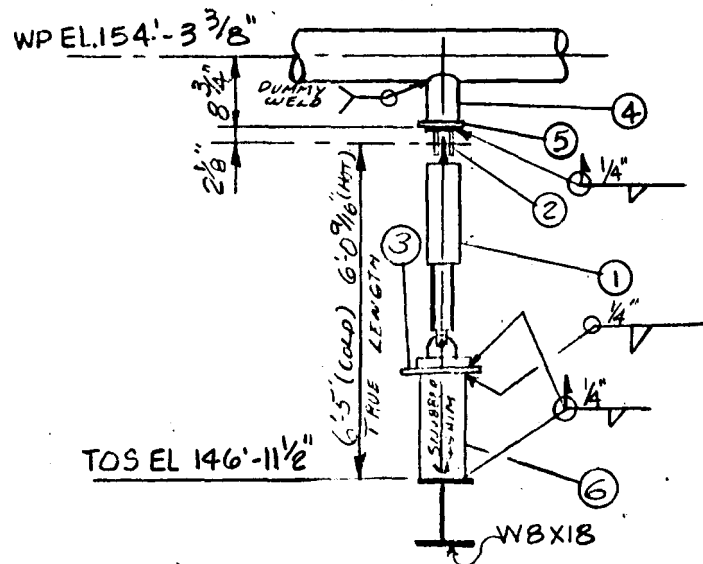
5		
4	ITEM REQD	COMPONENT DESCRIPTION
3	SCALE:	NONE
2		
1	REVISIONS	
PROJECT NO C-21700		LINE NO 101165-2
MARK NO H-MS-2-42		

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

Stearns-Roger

11165/8

FIG. 307



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

LOCATION OF PIPE ATTACHMENT

 $\Delta X = -2 \frac{13}{16}''$ $\Delta Z = 1''$ $\Delta Y = 4 \frac{1}{2}'' \text{ DN}$

VOL. P60-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P3
D	STRUCTURAL S32-3	0
C	ELECTRICAL	
B		
A		

REVISE ITEMS 1,2,3,4. ADD SHIM. REVISE REAR BRACKETS

NOTES.

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_y = 2.3K$

PIPE SIZE: 6.625" O.D.

PIPE INSULATION: 4 1/2"

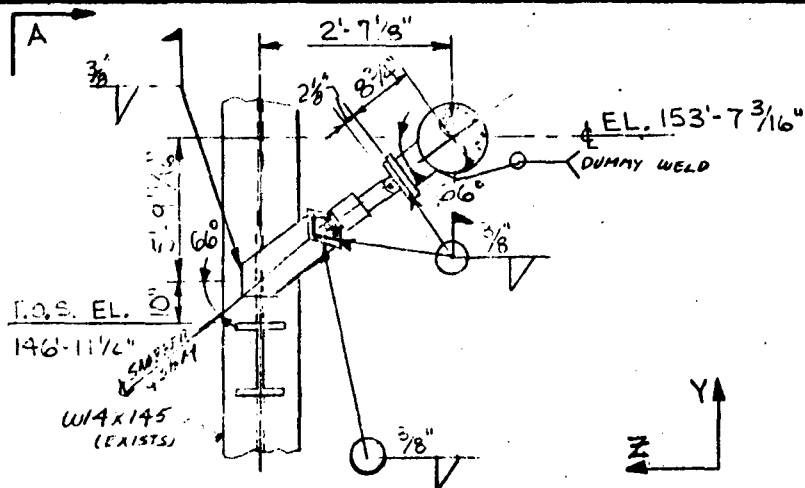
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

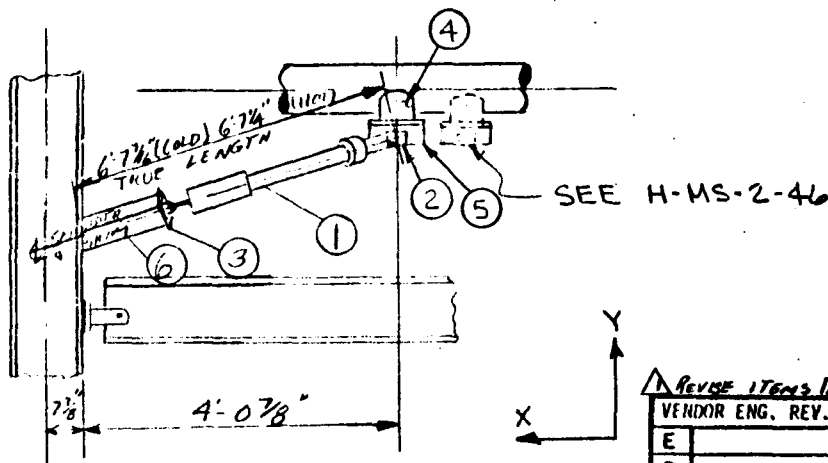
DESIGNED	MLM	CHECKED	
DATE	4-3-80	DATE	
REVIEWED		APPROVED	
DATE	4-16-80	DATE	
PROJECT	BDP	PROJECT	
DATE		DATE	
ANALYSIS ID. CODE			

5
4
3
2
1

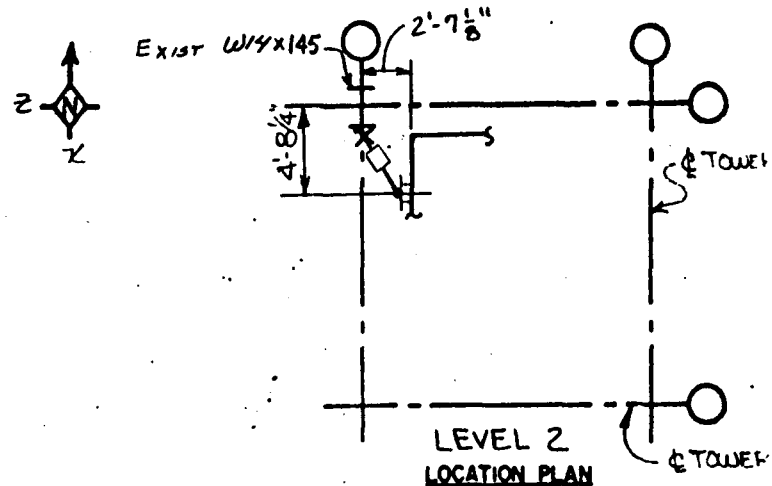
14			
13			
12			
11			
10			
9			
8			
7			
6	1	4"X4"X3/8" STRUCTURAL TUBING	
5	1	5/2"X5/2"X3/4" C.S.P. BY PIPE FAB.	
4	1	4"X5" PIPE STANCHION BY PIPE FAB.	
3	1	5"X5"X1/2" C.S.P.	
2	2	REAR BRACKET SIZE 3	
1	1	MECHANICAL SNUBBER SIZE 36 FIG. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		NONE	
		Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 6"MS-2-QEB	MARK NO H-MS-2-44



ELEVATION LOOKING NORTH



VIEW A-A - ELEVATION LOOKING EAST



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1"$
- $\Delta Y = 1 1/16" \text{ UP}$
- $\Delta Z = 3 5/8"$

VOL. P60-2

REVISE ITEMS 1, 2, 3 & 6, REAR BRACKETS & ADD SHIM

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-3
D	STRUCTURAL	S32-3
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6	1	4" X 4" X 3/8" STRUCTURAL TUBING
5	1	5 1/2" X 5 1/2" X 3/4" C.S. PLATE BY PIPE FAB.
4	1	4" X 5" PIPE STALK/HIC BY PIPE FAB.
3	1	5" X 5" X 1/2" C.S. PLATE
2	2	REAR BRACKET, SIZE 3
1	1	MECHANICAL SHIMMER, SIZE 3 FIG. 307

NOTES

PIPE TEMPERATURE: 1100°F

STRUCTURAL DESIGN LOAD: $F_x = 2.5K$, $F_y = 3.4K$

PIPE SIZE: 2.5" O.D. $F_t = 1.3K$ $F_c = 4.5K$ TOTAL

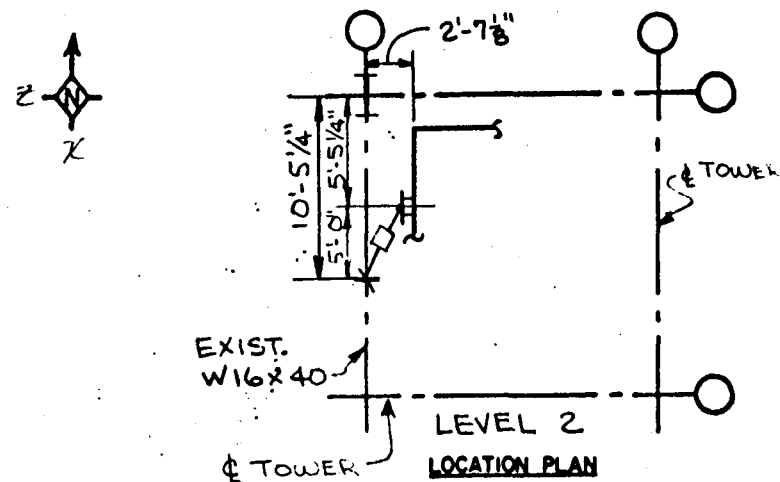
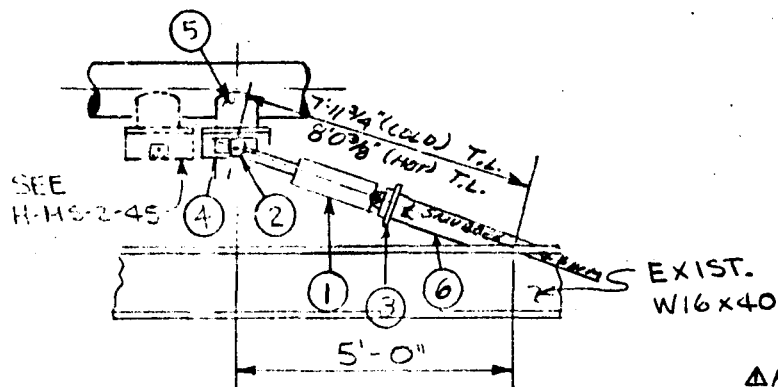
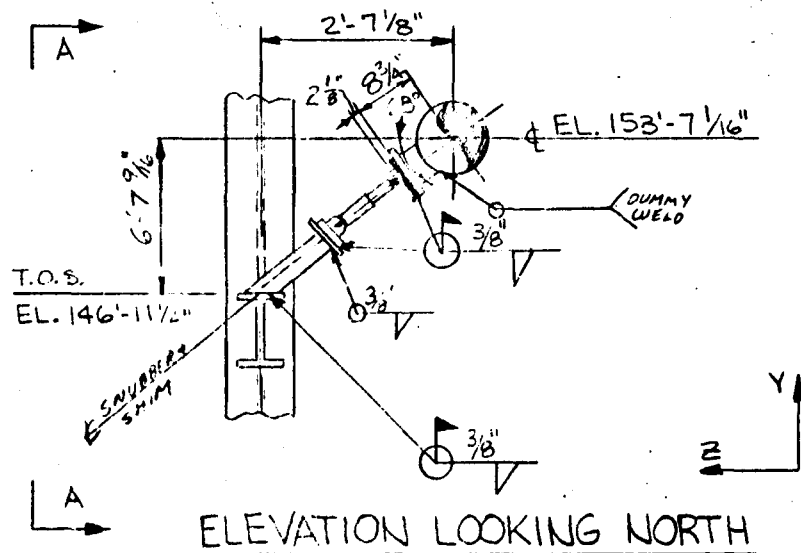
PIPE INSULATION: 4 1/2"

PIPE MATERIAL: A307 150S 100L

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

5
4
3
2
1

SCALE:	NONE	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	MARK NO H-MS-2-45



✦ LOCATION OF STEEL ATTACHMENT
✦ LOCATION OF PIPE ATTACHMENT

$$\begin{aligned}\Delta X &= -1'' \\ \Delta Y &= 1''/16'' \text{ UP} \\ \Delta Z &= 35/8''\end{aligned}$$

VOL. P60-2

△ REVERSE ITEMS 1,2,3,4, REAR BRACKETS & ADD SUM

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	Pg. 3	Pg.
D		STRUCTURAL	S32.3	0
C		ELECTRICAL		
B				
A				

14			
13			
12			
11			
10			
9			
8			
7			
6	1	4"X4"X $\frac{3}{8}$ " STRUCTURAL TUBING	
5	1	5 $\frac{1}{2}$ "X5 $\frac{1}{2}$ "X $\frac{3}{4}$ " R. BY PIPE FAB.	
4	1	4"XNS PIPE STATION ON BY INCL. FAB.	
3	1	5" X 5" X $\frac{1}{2}$ " C.S. P.	
2	2	REAR BRACKET, SIZE 3	
1	1	MECHANICAL SNIPPER, SIZE 3 FIG 307	
ITEM NO.	QTY	COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger	11165/8
NONE			

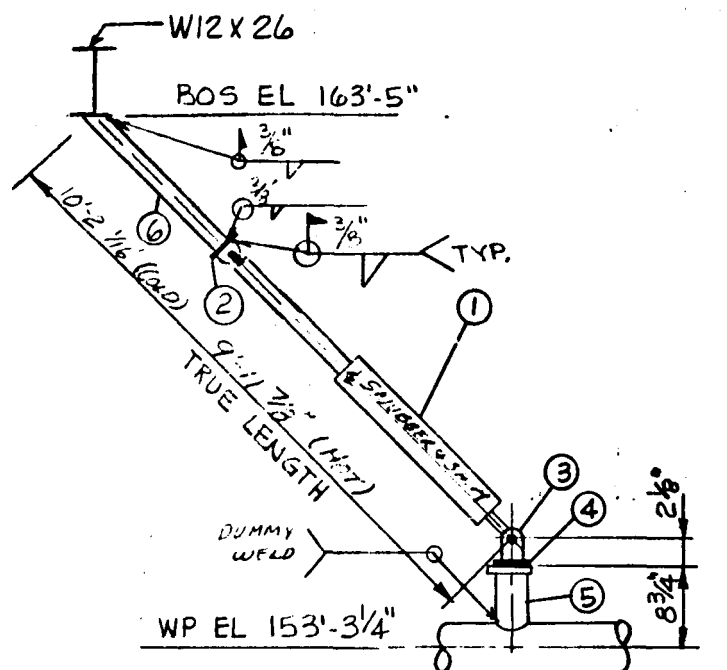
NOTES

NOTES
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = 2.5\text{K}$, $F_y = 2.8\text{K}$
PIPE SIZE: 12" SCH 40 $F_z = 1.0\text{K}$, $F_{\text{TOTAL}} = 3.9\text{K}$
PIPE INSULATION: 4" FIBERGLASS
PIPE MATERIAL: ASTM A335 P22

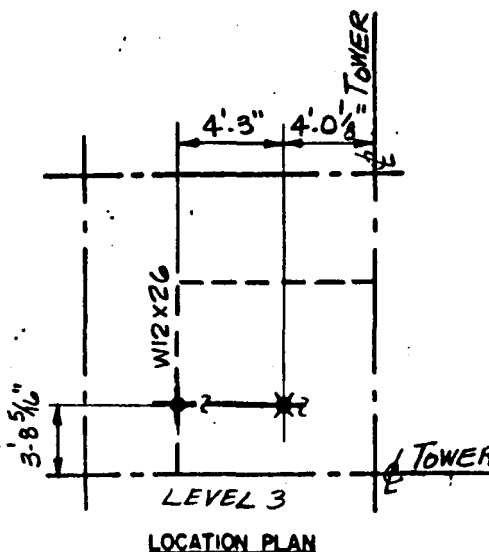
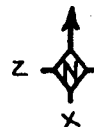
ENGINEERING RECORD						5
DESIGNED		DRAWN		CHECKED		4
DATE		DATE		DATE		3
REVIEWED		APPROVED				2
DATE		DATE				1
PROJECT	BPR					REVISED
DATE						PROJECT N
ANALYSIS	ID. CODE	X-1-1-1-1-A-A				

10 Mile SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700	LINE NO 6"-MS-2-0	MARK NO H-MS-2-46
--------------------	-------------------	-------------------



ELEVATION LOOKING NORTH



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1/4"$
- $\Delta Z = 2 1/2"$
- $\Delta Y = 1 1/4"$ UP

VOL. P60-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-3
D	STRUCTURAL	S32-3
C	ELECTRICAL	
B		
A		

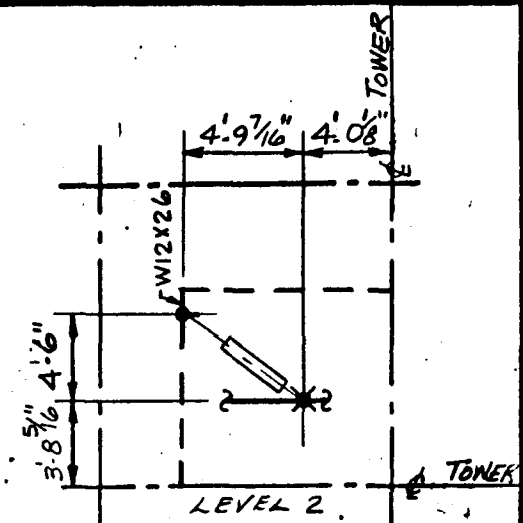
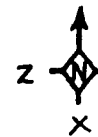
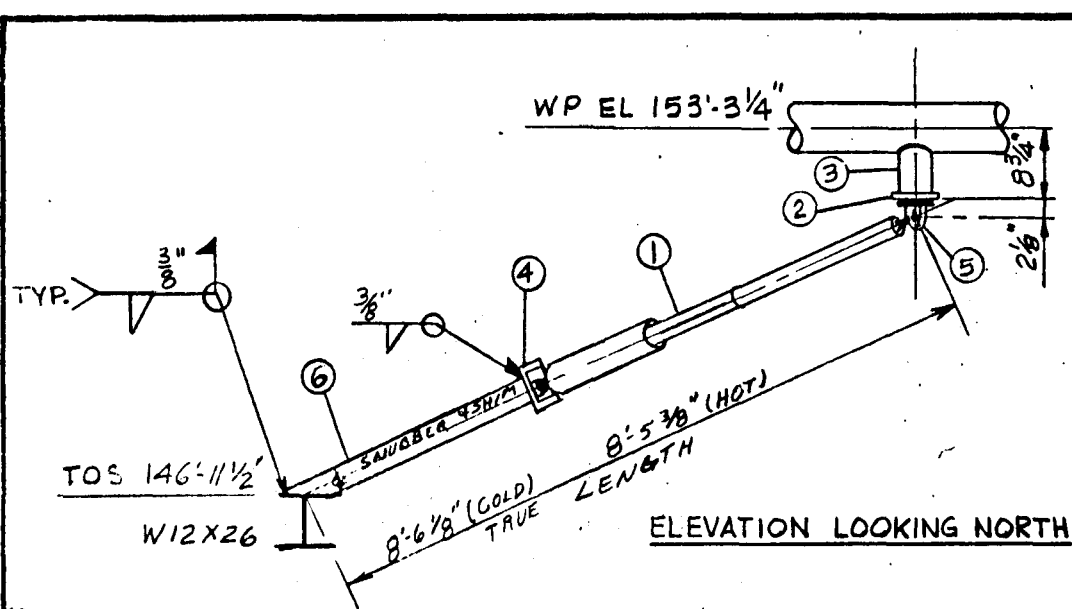
14			
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7			
6	1	4"X4"X ³ / ₈ " STRUCTURAL TUBING	
5	1	4"X5" PIPE STANCHION BY PIPE FAB.	
4	1	5 ¹ / ₂ "X5 ¹ / ₂ "X ³ / ₄ " TB BY PIPE FAB.	
3	2	REF. WELDING, SIZE 3	
2	1	5"X5"X ¹ / ₂ " C.S. TB	
1	1	MECHANICAL SHIPPER, SIZE 3 F1/2.307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger INCORPORATED	
NONE			11165/8

NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_y = 2.2K$, $F_z = 1.0K$
 PIPE SIZE: 6.625" O.D. $F_{TOTAL} = 2.5K$
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	DRAWN	
DATE	4-1-80	DATE	
REVIEWED	2/8/80	APPROVED	
DATE	4-16-80	DATE	
PROJECT	11165	PROJECT	
DATE	4-12-80	DATE	
ANALYSIS ID. CODE	X-11-1-A	ANALYSIS ID. CODE	

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REVISIONS		
PROJECT NO	C-21700	LINE NO
MARK NO	H-MS-2-47	

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1/4"$
- $\Delta Z = 2 1/2"$
- $\Delta Y = 1 1/4" \text{ UP}$

VOL. PG0-2

354

REVISIT ITEMS 1,3,4,5,6, REAR BRACKETS & ADD SHIM

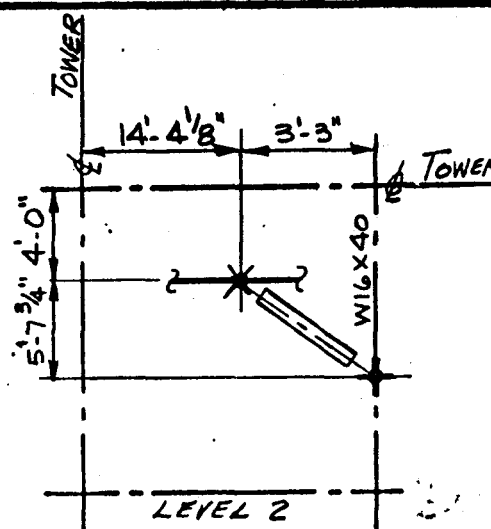
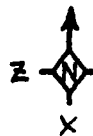
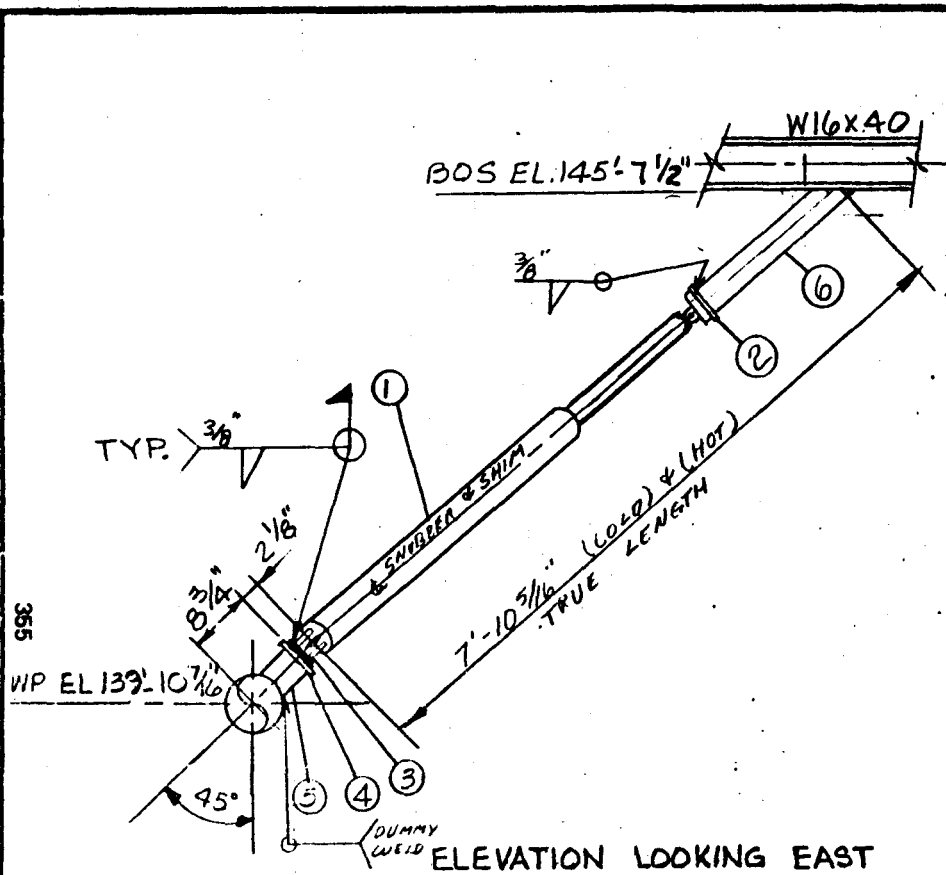
NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.9K$, $F_y = 2.3K$
 PIPE SIZE: 6.625" O.D. $F_t = 2.0K$ $F_c = 3.6K$ TOTAL
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-3	P3
D		STRUCTURAL	S32-3	O
C		ELECTRICAL		
B				
A				

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-1-80	DATE	
REVIEWED		APPROVED	
DATE	4-16-80	DATE	
PROJECT	HLR		
DATE			

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REVISIONS	

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7			
6	1	4"x4"x ³ / ₈ " STRUCTURAL TUBING	
5	2	REAR BRACKET SIZE 3	
4	1	5"x5"x ¹ / ₂ " C.S. PL	
3	1	4"x5" PIPE STANCHION BY PIPE FAB.	
2	1	5 ¹ / ₂ "x5 ¹ / ₂ "x ¹ / ₂ " PL BY PIPE FAB.	
1	1	MECHANICAL SWEEPER SIZE 3	FB-207
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger INCORPORATED	11165/8
NONE			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 6"MS-2-QEB	MARK NO H-MS-2-48



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta X = 1/4"$ $\Delta Z = 3/4"$ $\Delta Y = 3/4"$ UP

VOL. PG0-2

REVISE ITEMS 1,2,3,4,6, REAR BRACKET & ADD SHIM

NOTES

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 3K$, $F_y = 2.6K$,
 PIPE SIZE: 6.625" O.D. $F_e = 1.8K$, $F_t = 4.4K$
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

VENDOR ENG. REV.

E	
D	
C	
B	
A	

REFERENCE DRAWINGS

PIPING	P9-3
STRUCTURAL	S32-3
ELECTRICAL	

REV.

P3
0

ENGINEERING RECORD

DESIGNED	MLM	DRAWN	
DATE	4-3-50	DATE	4-3-50
REVIEWED	W.H.	APPROVED	
DATE	4-10-50	DATE	4-10-50
PROJECT	BDR		
DATE	4-10-50		
ANALYSIS ID. CODE	1-1-1		

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REVISIONS

ITEM REQD

SCALE:

NONE

11165/8

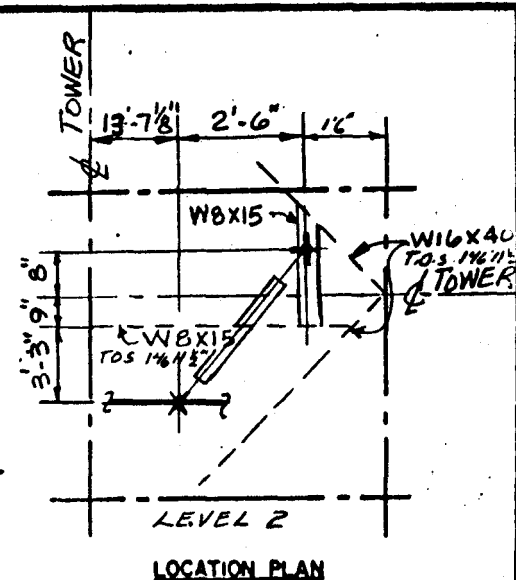
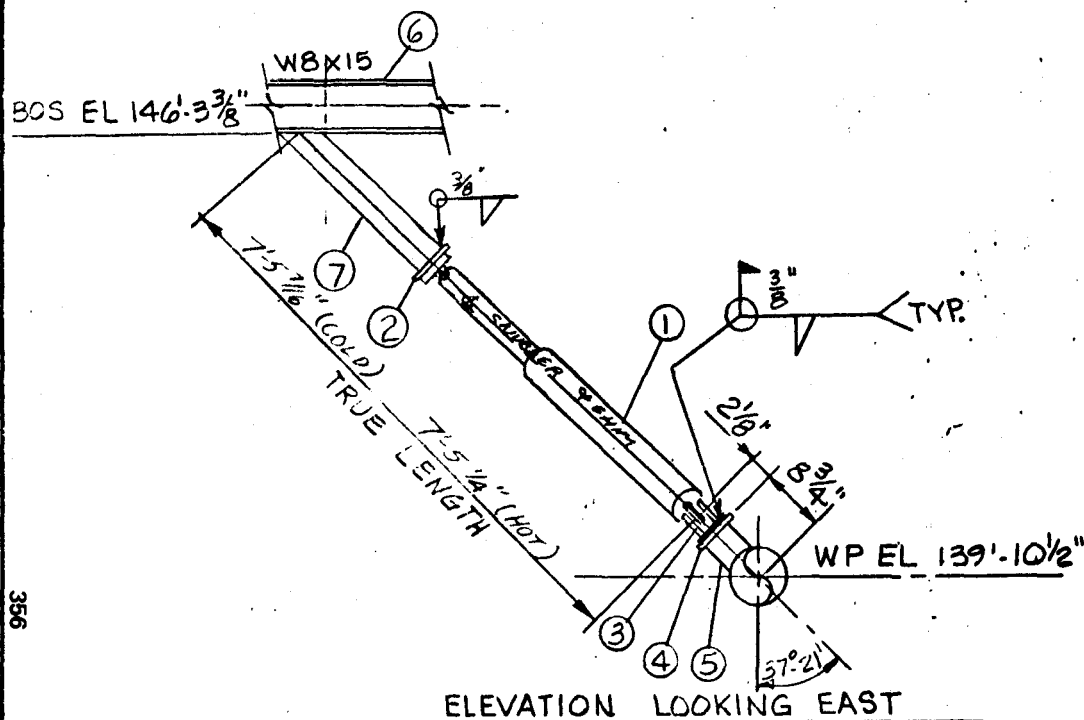
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700

LINE NO 6"MS-2.QEB

MARK NO H-MS-2-49

14			
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7			
6	1	4"X4"X 3/8" STRUCTURAL TUBING	
5	1	4"XKS PIPE STAYDOWN BY PIPE FAB.	
4	1	5/2"X 5/2"X 3/4" RB BY PIPE FAB.	
3	2	REAR BRACKET, SIZE E 3	
2	1	5"X5"X 1/2" C.S. PL	
1	1	MECHANICAL SNUFFER, SIZE 3 FIG. 307	
		COMPONENT DESCRIPTION	REMARKS
		Stearns-Roger	



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 1/4"$
- $\Delta Z = 3/4"$
- $\Delta Y = 3/4"$ UP

VOL. P60-2

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P3
D		STRUCTURAL	S32-3	0
C		ELECTRICAL		
B				
A				

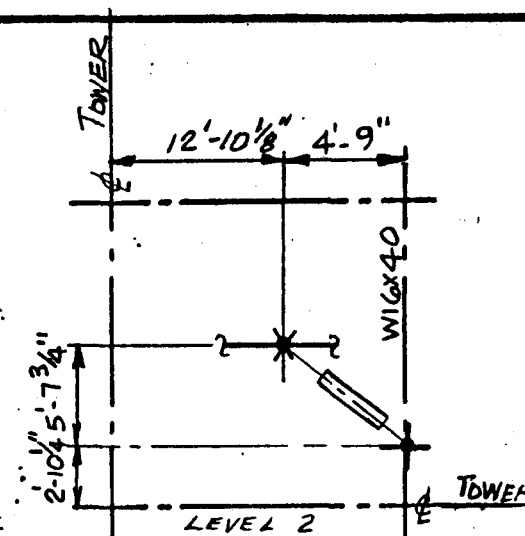
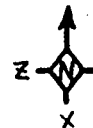
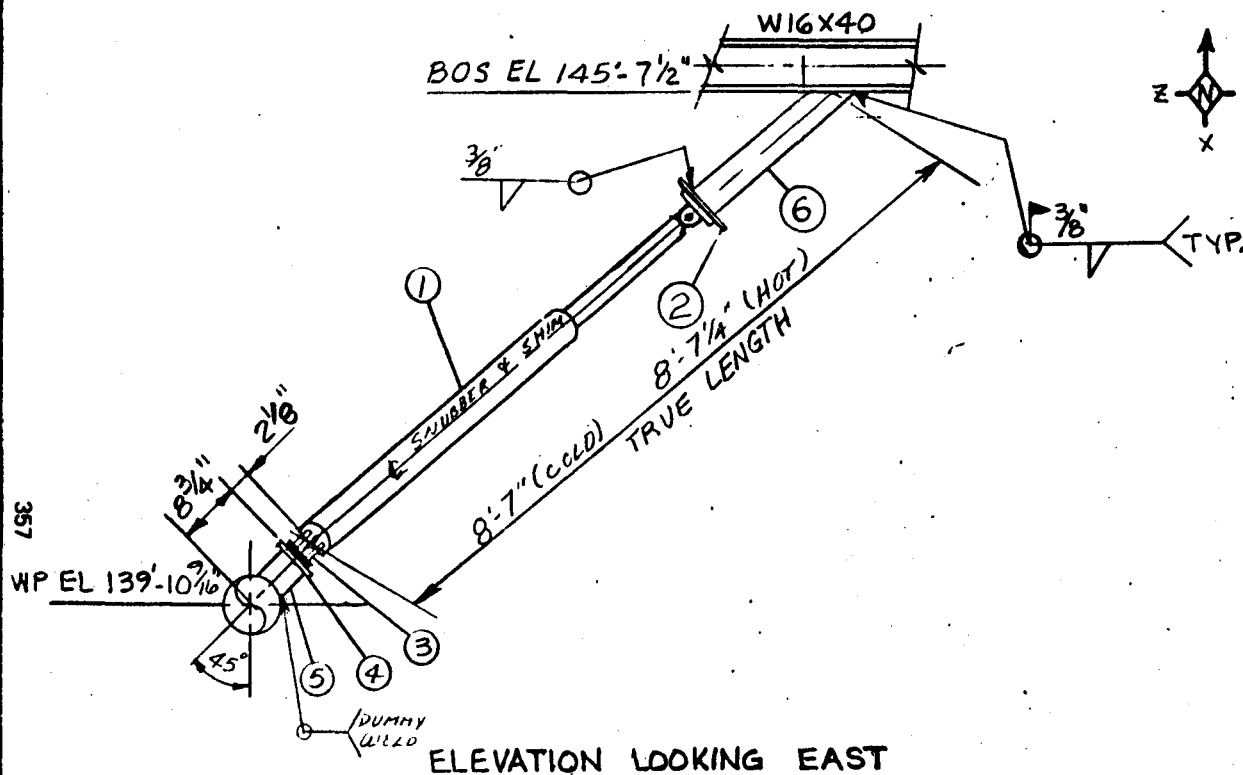
14			
13			
12			
11			
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9			
8			
7	1	4"X4"X ³ / ₈ " STRUCTURAL TUBING	
6	1	W8X15 2'-1 1/2 LG PER SK STD EEB	21.9
5	1	4" XVS PIPE (LUMINO) BY PIPE FAB	
4	1	5 1/2" X 5 1/2" X 3/4" TE BY PIPE FAB	
3	2	REAR BRACKET, SIZE 3	
2	1	5" X 5" X 1/2" C.S. PL	
1	1	MECHANICAL SURFACE, SIZE 3	FIG. 307
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE:	Sterns-Roger INCORPORATED		11165/8
NONE			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 6"MS-2-GE8	MARK NO H-MS-2-50

NOTE: VISE ITEMS 1, 2, 3 & 7, REAR BRACKETS & ADD SHIM

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 3K$, $F_y = 4K$, $F_z = 1.9K$
 PIPE SIZE: 6.625" O.D. $F_{TOTAL} = 5.3K$
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	MLM	GEORGE		4
DATE	4-3-80	DATE		3
REVIEWED	MLM	APPROVED		2
DATE	4-16-80	DATE		1
PROJECT	RTM			
DATE	4-16-80			
ANALYSIS ID. CODE	X-140-1-1-1-1			
PROJECT NO C-21700		REVISIONS		

357



+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta X = -3/8"$ $\Delta Z = 3/4"$ $\Delta Y = 5/8" \text{ UP}$

VOL. P60-2

REVISE ITEMS 1, 2, 3 & 6, REAR BRACKETS & ADD SHIM

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 3.6 \text{ K}$, $F_y = 3.5 \text{ K}$ PIPE SIZE: 6.625" O.D. $F_z = 3.4 \text{ K}$, $F_{\text{TOTAL}} = 6 \text{ K}$

PIPE INSULATION: 4 1/2"

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
MLM	4-2-80		
REVIEWED	DATE	APPROVED	DATE
	4-16-80		
PROJECT	DATE		
REAR BRACKET	4-16-80		
ANALYSIS ID. CODE	X-14		

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REVISIONS

ITEM REQD

SCALE:
NONE

Stearns-Roger

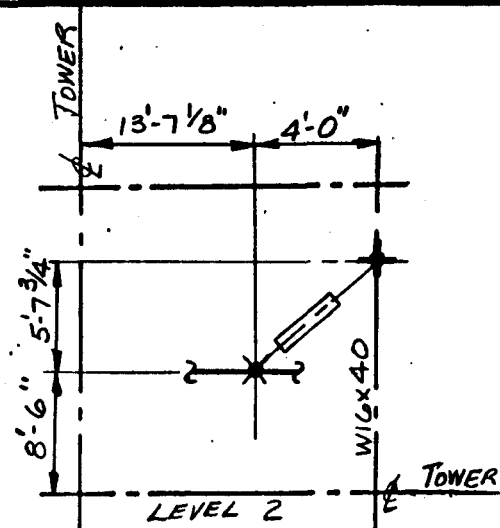
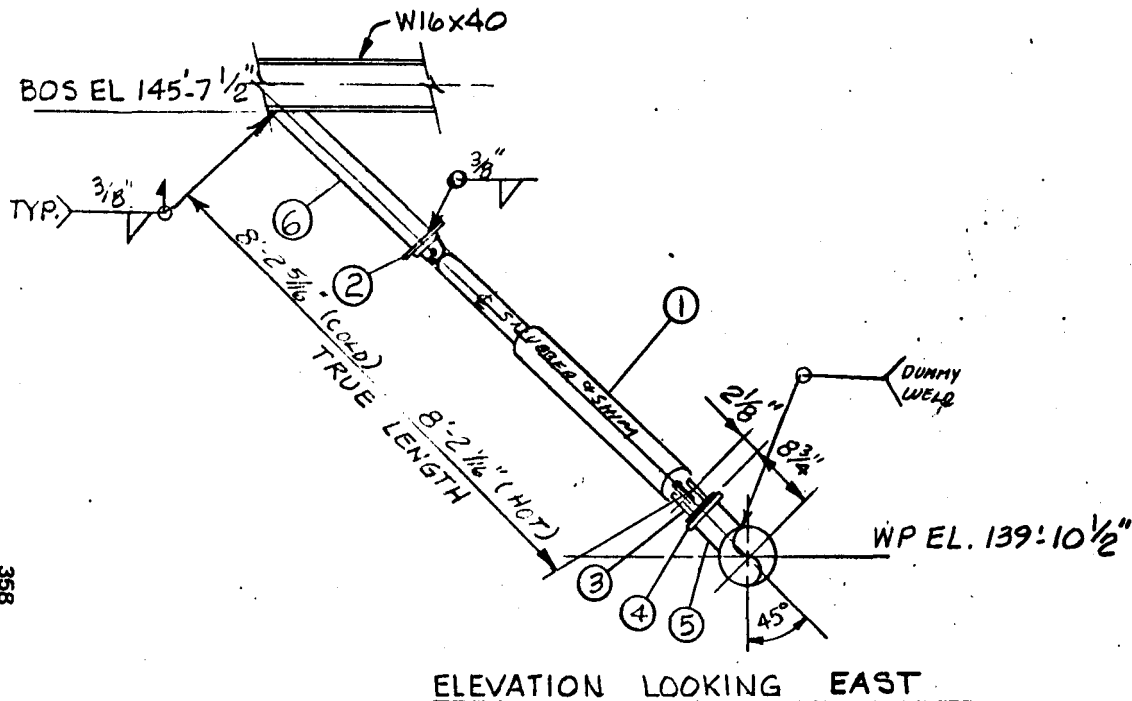
11165/8

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700

LINE NO 6" MS-3-4B MARK NO H-MS-3-9

14			
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7			
6	1	4" X 4" X 3/8" STRUCTURAL TUBING	
5	1	4" X 5" PIPE STANCHION BY PIPE FAB.	
4	1	5" X 5" X 3/4" TB BY PIPE FAB.	
3	2	REAR BRACKET, SIZE 3	
2	1	5" X 5" X 1/2" C.S. TB	
1	1	MECHANICAL SUPPORT, SIZE 3 FIG. 307	
ITEM REQD	COMPONENT DESCRIPTION	REMARKS	



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -3/8"$
 $\Delta Z = 3/4"$
 $\Delta Y = 5/8" \text{ UP}$

VOL. P60-2

VLN/REV	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P9-3	P3
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
B			
A			

REVISE ITEMS 1, 2, 3, 4, 6, REAR BRACKETS & ADD SHM

NOTES

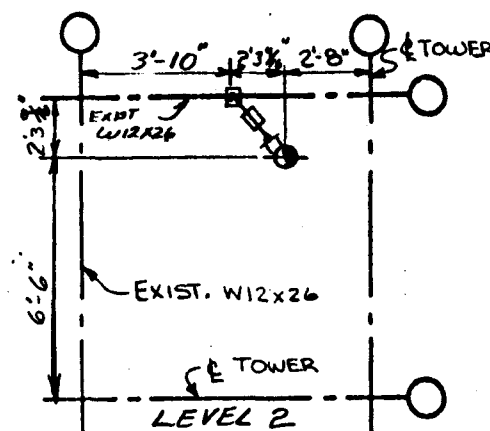
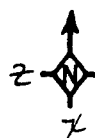
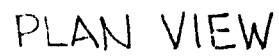
PIPE TEMPERATURE: 960°F.
 STRUCTURAL DESIGN LOAD: $F_x = 3.7k$, $F_y = 3.7k$
 PIPE SIZE: 6.625" O.D., $F_z = 3k$, $F_{TOTAL} = 6k$
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	
DATE	4-2-80	DATE	
REVIEWED		APPROVED	
DATE	4-16-80	DATE	
PROJECT	11K		
DATE			
ANALYSIS ID. CODE	X-M8-1-A-1		

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REVISIONS	

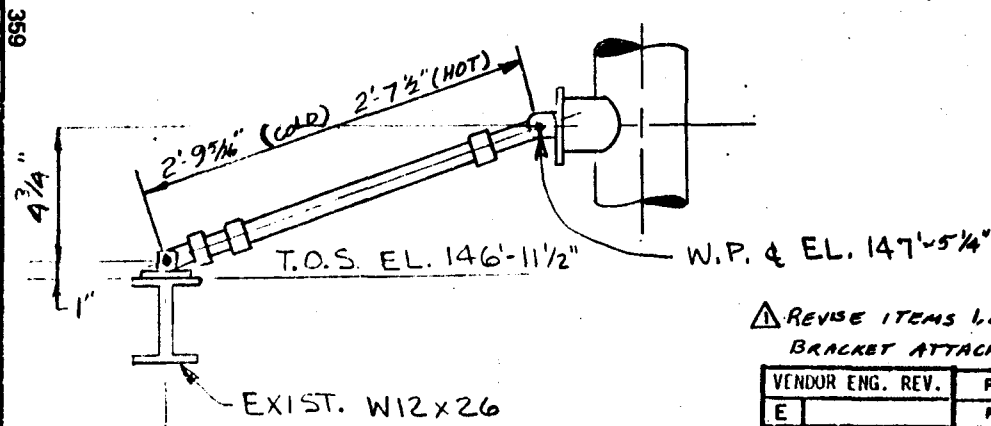
14			
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7			
6	1	4"X4"X 3/8" STRUCTURAL TUBES	
5	1	4"X5" PIPE STANCHION BY PIPE FAB.	
4	1	5 1/2"X5 1/2"X 3/4" C.S. F. BY PIPE FAB.	
3	2	REAR BRACKET, SIZE 3	
2	1	5"X5"X 1/2" C.S. F.	
1	1	MECHANICAL SNUBBER, SIZE 3 FIB.	327
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8
10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	6"MS-3-QCB
MARK NO	H-MS-3-10		



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/2"$
 $\Delta Y = 1/2"$ UP
 $\Delta Z = 2 1/4"$

VOL. P60-2



ELEVATION LOOKING EAST.

⚠️ REVISE ITEMS 1, 2 & 3, LENGTHS, & REAR
BRACKET ATTACHMENTS

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-3	P ₃
D		STRUCTURAL	532-3	O
C		ELECTRICAL		
B				
A				

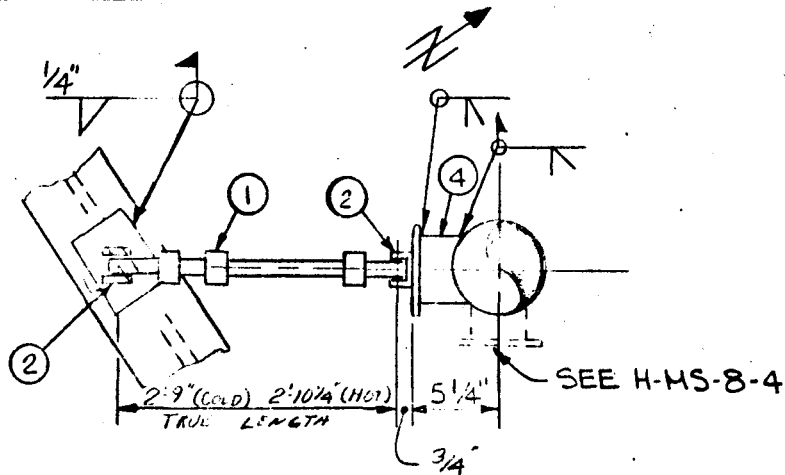
14			
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6			
5			
4	1	1 1/2" XS PIPE STANCHION A335P22	
3			
2	2	REAR BRACKET, SIZE Y2	
1	1	HITCH MOUNT SMUDDER SIZE 1/2 FK-307	
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger	11165/8
NONE			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 2" MS-R-OER	MARK NO H-MS-8-4

NOTES.

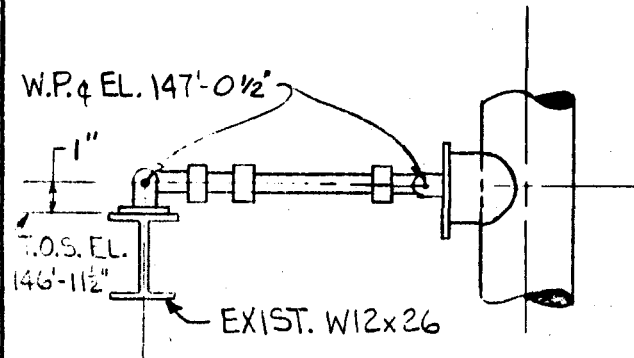
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = F_z = .3\text{K}$
PIPE SIZE: 2.345" O.D. $F_{\text{TOTAL}} = .4\text{K}$
PIPE INSULATION: 4"
PIPE MATERIAL: A387M A335, P22

ENGINEERING RECORD			
DESIGNED	4/14/70	CHECKED	
DATE	4/14/70	DATE	
REVIEWED	4/16/70	APPROVED	
DATE	4-16-70	DATE	
PROJECT	ELER		JP, JP, Y
DATE	4-16-70		6-12-80
ANALYSIS ID. CODE	X-MS-1-A-4		

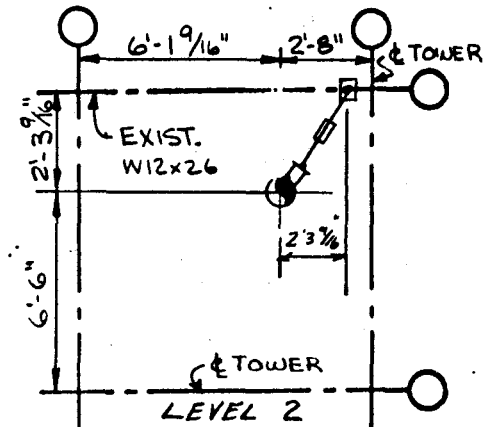
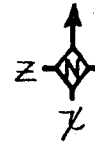
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1	<i>AFC</i> <i>3.1.8</i>
REVISIONS	



PLAN VIEW



ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1/2"$
- $\Delta Y = 1/2"$ UP
- $\Delta Z = 2 1/4"$

VOL. PG0-2

Δ REVISE ITEMS 1, 2 & 3, LENGTHS, ELEV.

Φ REAR BRACKET ATTACHMENTS

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P1-3	P3
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

14		
13		
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10		
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8		
7		
6		
5		
4	1	1 1/2" X 3 PIPE STANCHION A335P22
3		
2	2	REAR BRACKET, SIZE 1/2
1	1	MECHANICAL SWEEPER, SIZE 1/2, FIG. 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	
Stearns-Roger		
11165/8		
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		

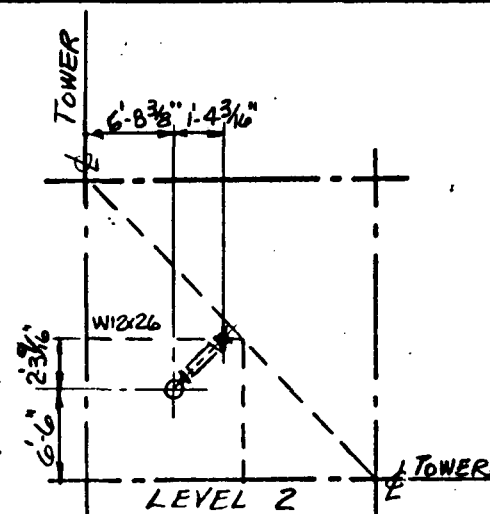
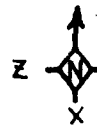
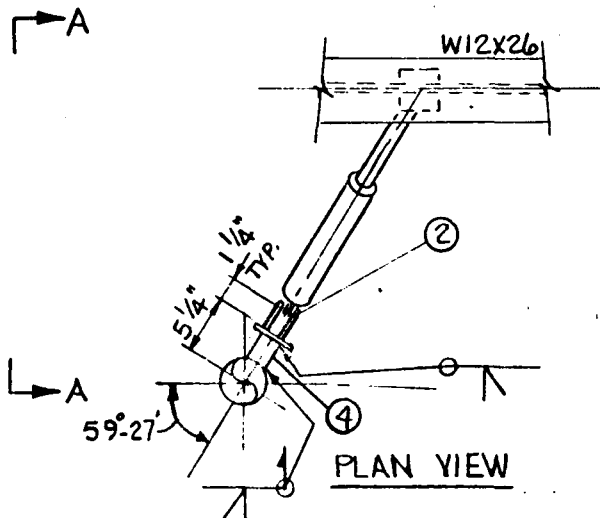
NOTES

PIPE TEMPERATURE: 950°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.3K$, $F_z = 1.3K$
 PIPE SIZE: 2 3/8" O.D. $F_{TOTAL} = .4K$
 PIPE INSULATION: 1"
 PIPE MATERIAL: ASTM A335, P22

ENGINEERING RECORD

DESIGNED	7/1/80	CHECKED	
DATE	4/4/80	DATE	
REVIEWED	7/30/80	APPROVED	
DATE	7/18/80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	X-MS-1-A-7	PROJECT NO	C-21700

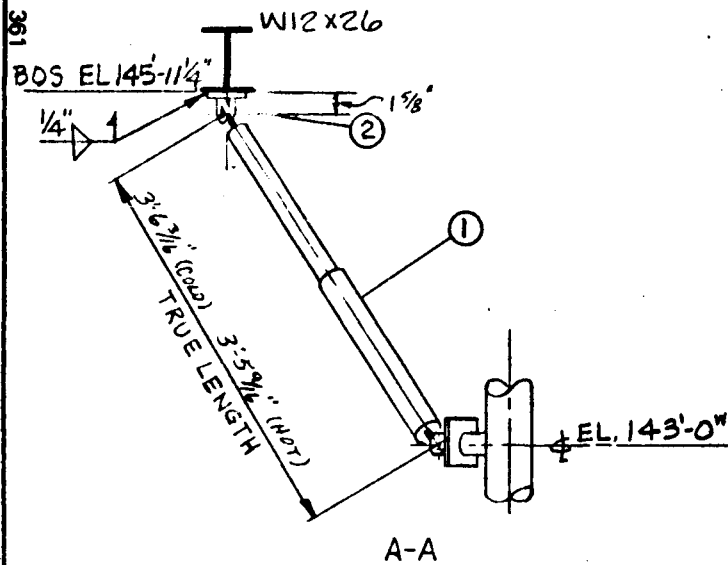
REVISIONS
 LINE NO 2"-MS-8-Q1B MARK NO H-MS-8-5



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -5/16"$
- $\Delta Z = 13/8"$
- $\Delta Y = 1/8"$ UP

VOL. P60-2



REVISIT ITEMS 1,2,4,3, LENGTHS, REAR BRACKET ATTACHMENTS

VENDOR	ENG.	REV.	REFERENCE DRAWINGS	REV.
E			PIPING P9-3	P4
D			STRUCTURAL S32-3	O
C			ELECTRICAL	
B				
A				

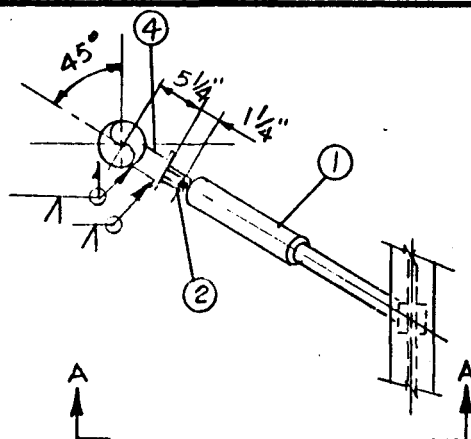
14			
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7			
6			
5			
4	1	1 1/2" XS PIPE STANCHION A335 P22	
3			
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNUBBER SIZE 1 FIG. 307	
ITEM NO.	RECD	COMPONENT DESCRIPTION	REMARKS
		SCALE: NONE	11165/8

NOTES:
 PIPE TEMPERATURE: 960° F.
 STRUCTURAL DESIGN LOAD: $F_x = .5K$, $F_y = .7K$
 PIPE SIZE: 2.375" O.D. $F_z = .2K$, $F_{TOTAL} = .9K$
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

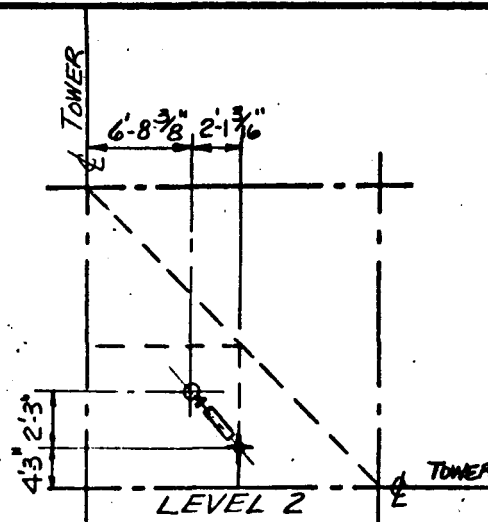
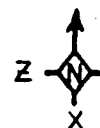
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-8-80	DATE	4-11-80
REVIEWED	N. J. M.	APPROVED	
DATE	4-16-80	DATE	
PROJECT	RDOP		
DATE	4-16-80		
ANALYSIS ID. CODE	X-MS-1-A-4		

5			
4			
3			
2			
1			
REVISIONS			
PROJECT NO	C-21700	LINE NO	2"MS-8-QEB
MARK NO	H-MS-8-6		

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA



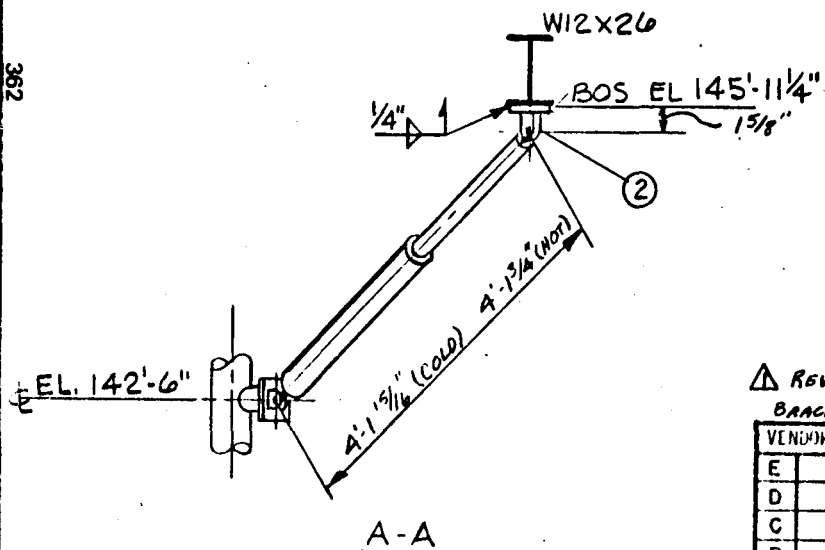
PLAN VIEW



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -5/16"$
- $\Delta Z = 13/8"$
- $\Delta Y = 1 1/8" \text{ UP}$

VOL. P60-2



A-A

△ REVISE ITEMS 1, 2 + 3, LENGTHS, REAR BRACKET ATTACHMENTS

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P9-3	P4
D		STRUCTURAL S32-3	O
C		ELECTRICAL	
B			
A			

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	1	1 1/2" XS PIPE STANCHION A335 P22	
3			
2	2	REAR BRACKET SIZE 1	
1	1	MECHANICAL SNUBBER SIZE 1 FIG. 307	
ITEM NO.	RECD	COMPONENT DESCRIPTION	REMARKS
		SCALE: NONE	
		Stearns-Roger	11165/8

NOTES

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .5K$ $F_y = .9K$
 PIPE SIZE: 2.375" O.D. $F_z = .5K$ $F_{TOTAL} = 1.1K$
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	
DATE	4-8-80	DATE	
REVIEWED		APPROVED	
DATE	4-16-80	DATE	
PROJECT	10 Mw		
DATE	4-12-80		
ANALYSIS ID. CODE	X-118-1-A-4		

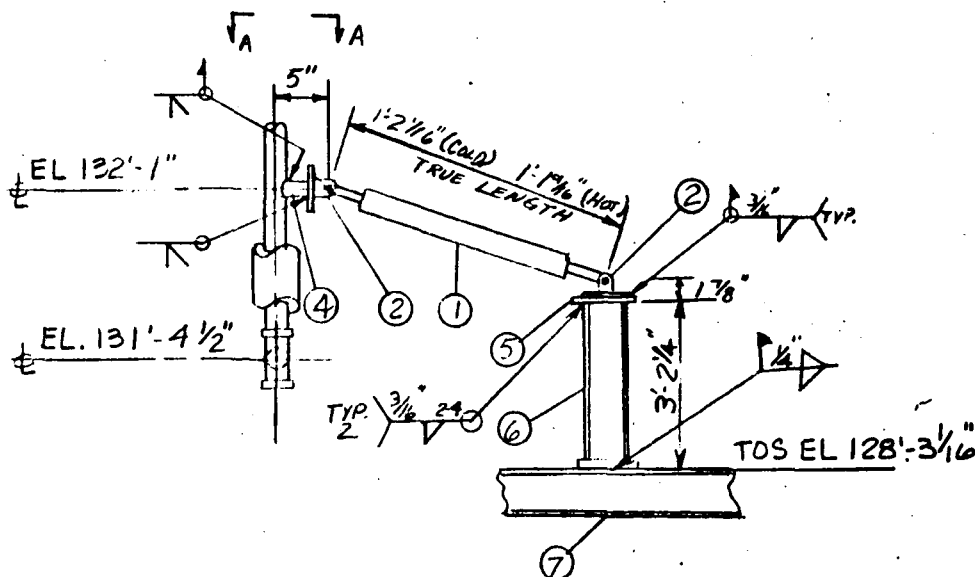
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1
REVISIONS

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

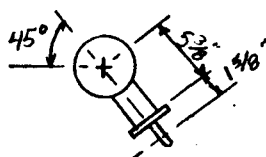
PROJECT NO C-21700

LINE NO 2" ME-9-9ES

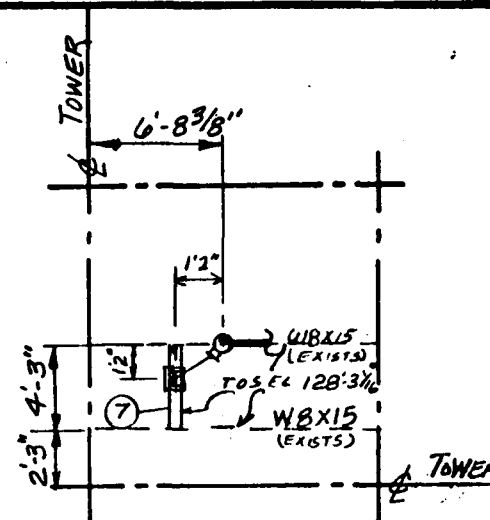
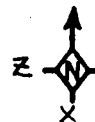
MARK NO H-MS-8-7



ELEVATION LOOKING EAST



SECTION A-A



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1/16"$
- $\Delta Z = 1"$
- $\Delta Y = 1/8" \text{ UP}$

VOL. PGD-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	
E	PIPING P9-3	P4	7 1 W8X15, 4'-1" LG. PER SR STD EFF 6/19
D	STRUCTURAL S32-2	1	6 1 W4X13, 3'-2" LG.
C	ELECTRICAL		5 2 4 1/2" X 1/2" X 1/4" C.S. PL
B			4 1 1 1/2" X 5" PIPE STANCHION (BY SNUBBER VENDOR) A335 P22
A			3
			2 2 REAR BRACKET, SIZE 1
			1 1 MECHANICAL SNUBBER, SIZE 1 FIG 306

REVISE ITEMS, 1, 2, 3, 5, 6, LENGTHS, REAR BRACKET ATT.

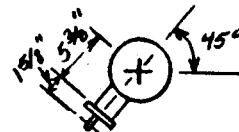
NOTES

PIPE TEMPERATURE: 760°F
 STRUCTURAL DESIGN LOAD: $F_x = .4K$, $F_y = .3K$, $F_z = .7K$
 PIPE SIZE: 2.375" O.D., $F_{TOTAL} = .7K$
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: A314M A335 P22

ENGINEERING RECORD				5	
DESIGNED	MLM	CHECKED		4	
DATE	4-23-6	DATE		3	
REVIEWED	MLM	APPROVED		2	
DATE	4/27	DATE		1	
PROJECT					
DATE					
ANALYSIS ID. CODE	10-ME-SOLAR-PILOT-PLANT	PROJECT NO	C-21700	LINE NO	21700-S-1-FR
				MARK NO	H-113-B-8

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

10 ME SOLAR PILOT PLANT DAGGETT, CALIFORNIA



SECTION A-A



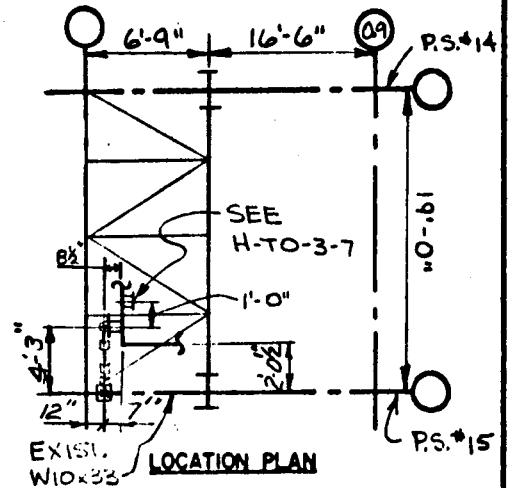
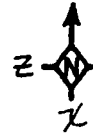
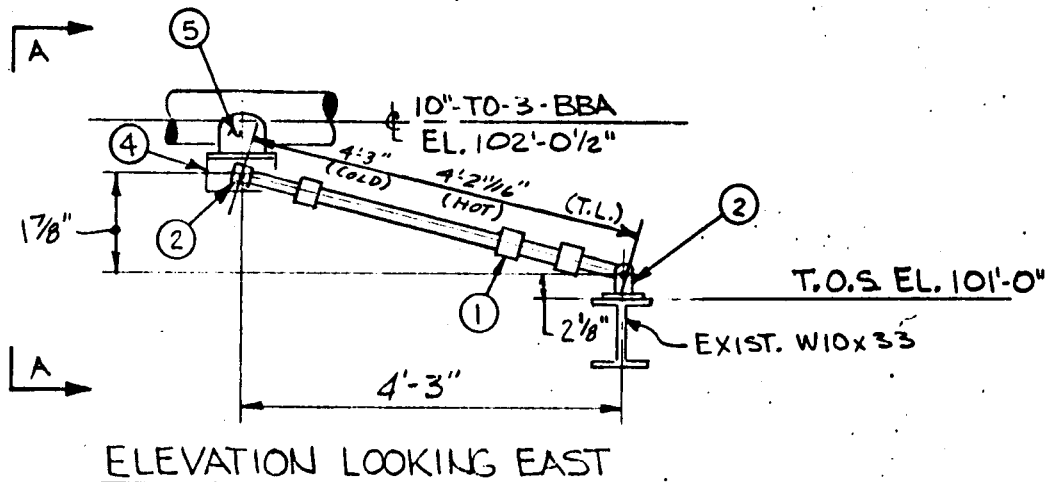
+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δ X = -1/16"
 Δ Z = 1"
 Δ Y = 1/8" UP

VOL. PG0-2

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV	
E		PIPING	P9-3	P4	7 1 W8X15, 4'-10" LG, PERKS-K STD (E/K/CH)
D		STRUCTURAL	S32-2	1	6 1 U-4X13, 3'-0" LG
C		ELECTRICAL			5 2 4 3/4 X 4 3/4 X 1/4 C.S. PL
B					4 1 1 1/2 X 5 PIPE STANCHION (BY SNUBBER VENDOR) (A-33, P-3)
A					3 2 2 REAR BRACKET, SIZE 1

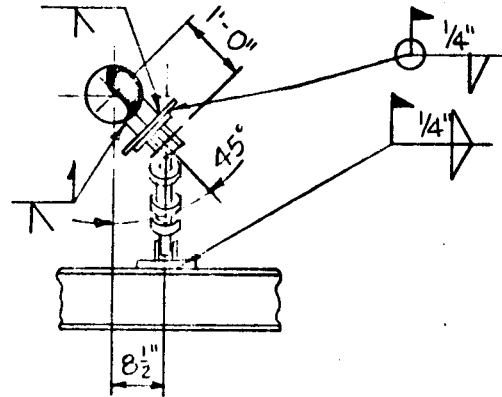
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = .4K$, $F_z = .4K$,
PIPE SIZE: 2.375" O.D.
PIPE INSULATION: 3 1/2"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5		1	1	MECHANICAL SNUBBER, SIZE 1 FIG. 306			
DESIGNED	WLM	CHECKED		4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS		
DATE	4-23-	DATE		3		SCALE:		Stearns-Roger	11165/8		
REVIEWED	WLM	APPROVED		2		NONE					
DATE	4-	DATE		1	AS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA					
PROJECT	BUR			REVISIONS							
DATE	1-1-73					PROJECT NO	C-21700	LINE NO	2-11-8-GT4	MARK NO	H-11-8-3



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 5' 6"$
- $\Delta Y = 1/4"$ UP TO $1 5/8"$ DN.
- $\Delta Z = -1 1/4"$

VOL. P60-2



△ REVISE ITEMS, 1,2,3, LENGTHS, REBAR
BRACKET ATTACHMENTS

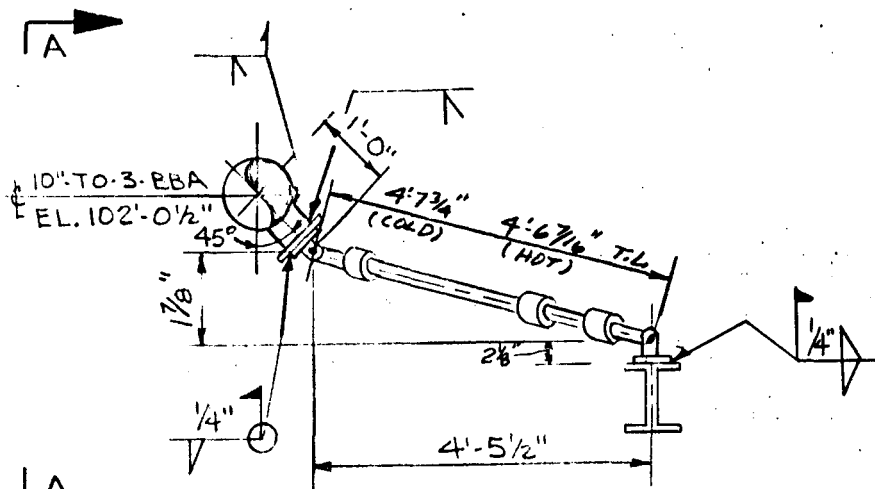
VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING Pq-5	B
D		STRUCTURAL S33-4	1
C		ELECTRICAL	
B			
A			

14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	8"STD PIPE STANCHION (BY SNUBBER VEH.) A106	
4	1	10" x 10" x 1/2" TE (BY SNUBBER VEH.) C.S.	
3			
2	2	BEAK BRACKET, SIZE 3	
1	1	MECHANICAL SNUBBER, SIZE 3 FIG. 307	
ITEM NO	COMPONENT DESCRIPTION		REMARKS
SCALE:	Stearns-Roger *****		11165/8
NONE			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 10-20-1-1	MARK NO H-T-O-3-1

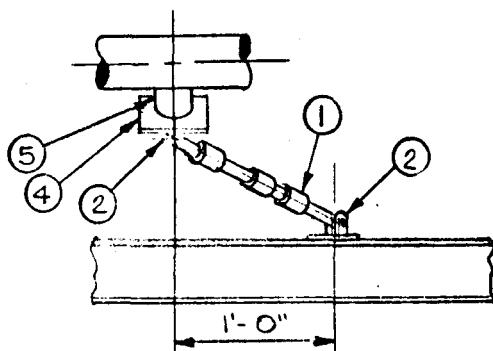
NOTES:
PIPE TEMPERATURE: 525 °F
STRUCTURAL DESIGN LOAD: $F_x = 3k$
PIPE SIZE: 10.75" O.D.
PIPE INSULATION: 3/4"
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

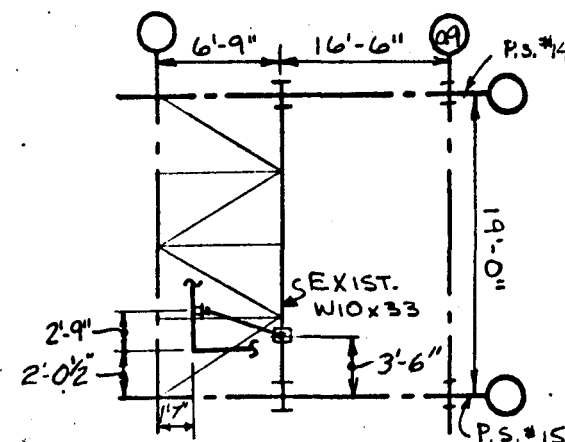
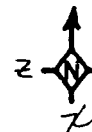
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1	
REVISIONS	



ELEVATION LOOKING NORTH



VIEW A-A-ELEVATION LOOKING EAST



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
- ✦ LOCATION OF PIPE ATTACHMENT
- $\Delta X = 5/16"$
- $\Delta Y = 1/4" \text{ UP TO } 1 5/8" \text{ DN.}$
- $\Delta Z = -1/4"$

VOL. P60-2

⚠ REVISE ITEMS 1, 2 & 3, LENGTHS & REAR BRACKET ATTACHMENTS

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING	P9-5
D		STRUCTURAL	S33-4
C		ELECTRICAL	
B			
A			

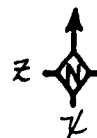
14		
13		
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6		
5	1	8" STD. STANCHION ALG GRB (BY SNUBBER VEN)
4	1	15" x 10" x 1/2" TE (BY SNUBBER VEN)
3		
2	2	REAR BRACKET, SIZE 3
1	1	MECHANICAL SUPPORT SIZE 3 FIG 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	
	Stearns-Roger	
		11165/8

NOTES
PIPE TEMPERATURE: 525°F
STRUCTURAL DESIGN LOAD: $F_x = 1.6k$; $F_z = 2.5k$
PIPE SIZE: 10.75" O.D. $F_{TOTAL} = 2.6k$
PIPE INSULATION: 3/4"
PIPE MATERIAL: 1018 ALG GR. B

ENGINEERING RECORD			
DESIGNED	DATE	DESIGNED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

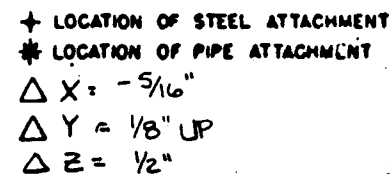
5	
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1	
REVISIONS	
PROJECT NO C-21700	LINE NO 101-1-1
MARK NO H-103-7	

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA



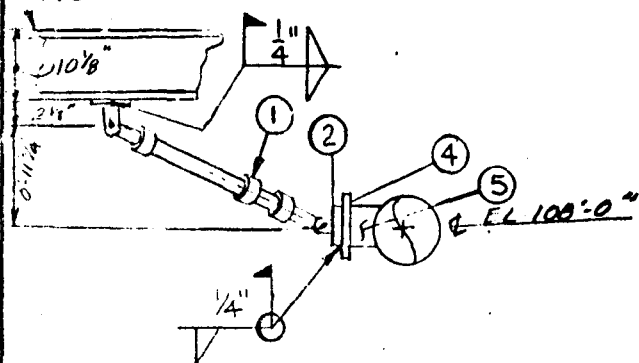
△ REVISE ITEMS 1, 2 & 3, LENGTHS & REAR BRACKET ATTACH.

PIPE MATERIAL: ASTM A106 GR. B



VOL. PG 0-2

14			
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6			
5	1	8" STD. PIPE STANCHION 1106 GRB (BY SNUBBER VEN.)	
4	1	10" X 10" X 1/2", FR (BY SNUBBER VEN.)	
3			
2	2	REAR BRACKET, SIZE 3	
1	1	MECHANICAL SHUTTER, SIZE 3 F18	307
ITEM REQ'D	COMPONENT DESCRIPTION		REMARKS
SCALE: NONE	Stearns-Roger		11165/B
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE NO. 101 TO 216	MARK NO. H. TO 21-16	

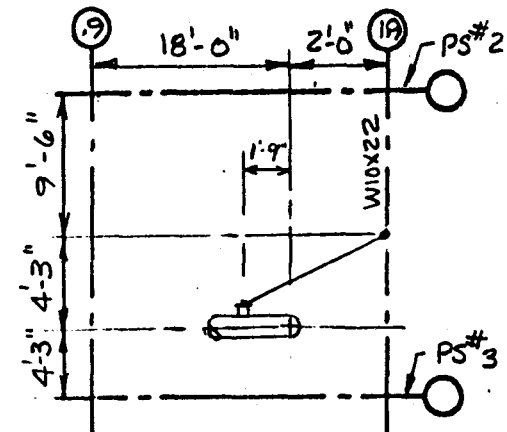
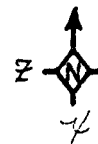


△ REVISE ITEMS 1, 2 & 3, LENGTHS
& REAR BRACKET ATTACHMENTS

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	Pg-7	B.
D		STRUCTURAL	S33-2	1
C		ELECTRICAL		
B				
A				

PIPE TEMPERATURE: 580°F
STRUCTURAL DESIGN LOAD: $F_x = 2.4 \text{ K}$, $F_y = -7 \text{ K}$,
PIPE SIZE: 10" NPS O.D. $F_z = 22 \text{ K}$, $F_{\text{TOTAL}} = 3.0 \text{ K}$
PIPE INSULATION: 3/2"
PIPE MATERIAL: 304 SS 1/2" SCH 40

ENGINEERING RECORD				5
DESIGNED	<i>W. J. ...</i>	DRAWN	<i>W. J. ...</i>	4
DATE	<i>1-2-58</i>	DATE	<i>1-2-58</i>	3
REVIEWED	<i>W. J. ...</i>	APPROVED	<i>W. J. ...</i>	2
DATE	<i>1-2-58</i>	DATE	<i>1-2-58</i>	1
PROJECT	<i>BDR</i>		<i>IP 118</i>	<i>AE 58</i>
DATE	<i>1-2-58</i>		<i>1-2-58</i>	REVISIONS
ANALYSIS	ID. CODE			PROJECT NO.

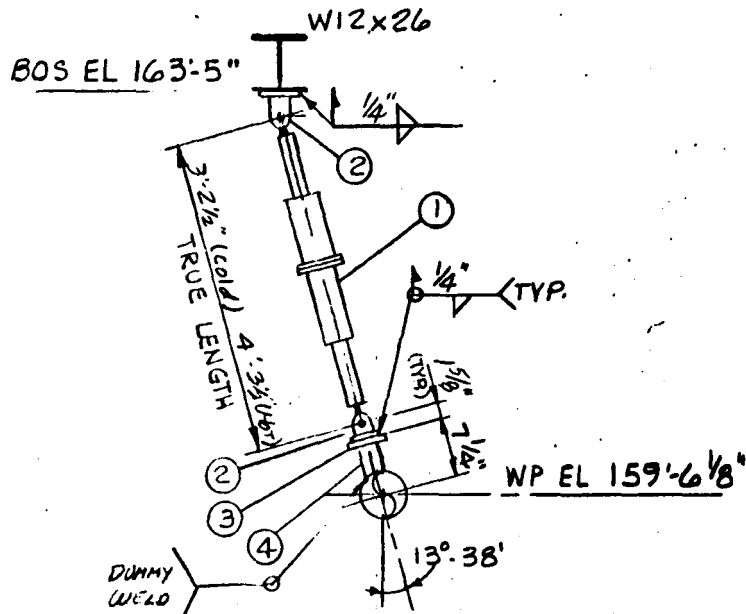


LOCATION PLAN

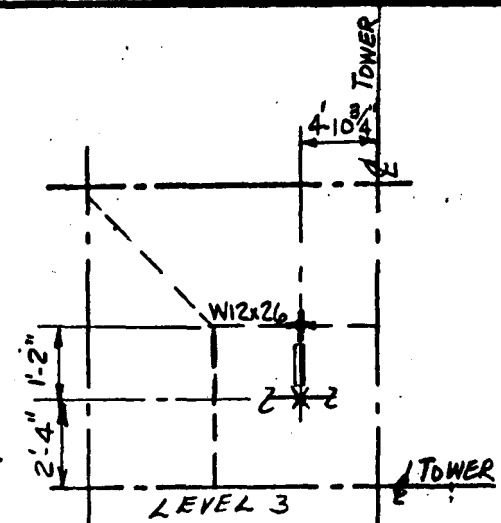
+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta X = -5/16"$
 $\Delta Y = 1/8" \text{ UP}$
 $\Delta Z = 1/2"$

VOL. P60-2

14			
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6			
5	1	8" STD. PIPE STANCHION AND GRB (BY SNOOBLER VENDOR)	
4	1	10" X 10" X 1/2" PL (BY SNOOBLER VENDOR)	
3			
2	2	REAR WHAILET, SIZE 3	
1	1	MECHANICAL SNUBBER, SIZE 3 FIG. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger - - - - -	
NONE			11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
• C-21700		LINE NO. 10-1700-117	MARK NO. M-10-17



ELEVATION LOOKING EAST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -3/16"$
 $\Delta Z = 1/16"$
 $\Delta Y = 13 9/16" \text{ DN}$

VOL. P60-2

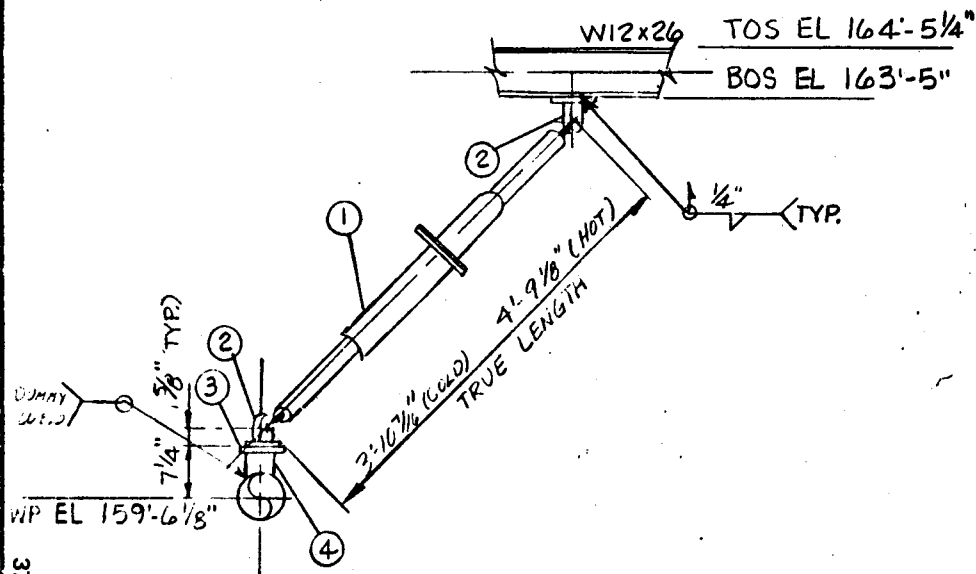
VENDOR	ENG.	REV.	REFERENCE DRAWINGS	REV.
E			PPNG P9-3	P4
D			STRUCTURAL S32-3	0
C			ELECTRICAL	
B				
A				

REVISE ITEMS 1, 2, 4, LENGTHS & REAR BRACKET ATTACH.

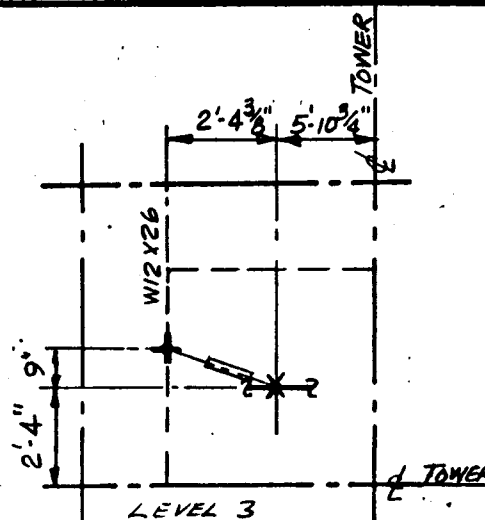
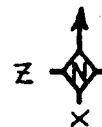
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .3K$ $F_y = 1.4K$
 PIPE SIZE: 4.5" O.D. $F_{TOTAL} = 1.5K$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	MLM	CHECKED		4
DATE	4-11-80	DATE		3
REVIEWED	1/9/80	APPROVED		2
DATE	4-29-80	DATE		1
PROJECT	EPK			
DATE				
ANALYSIS ID. CODE	1-17-1-A-9			

14			
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9			
8			
7			
6			
5			
4	1	3" STD PIPE STANCHION BY PIPE FAB.	
3	1	1/2" x 4" x 1/2" C.S. PL BY PIPE FAB.	
2	2	REAR BRACKET SIZE	
1	2	MECHANICAL SNUBBER SIZE	FIG. 306
ITEM NO		COMPONENT DESCRIPTION	REMARKS
		Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	4" VT-1-KEB
MARK NO	H-VI-1-27		



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT

$\Delta X = -3/16"$
 $\Delta Z = 11/16"$
 $\Delta Y = 13 9/16" DN$

VOL. PG0-2

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	O
C		ELECTRICAL		
B				
A				

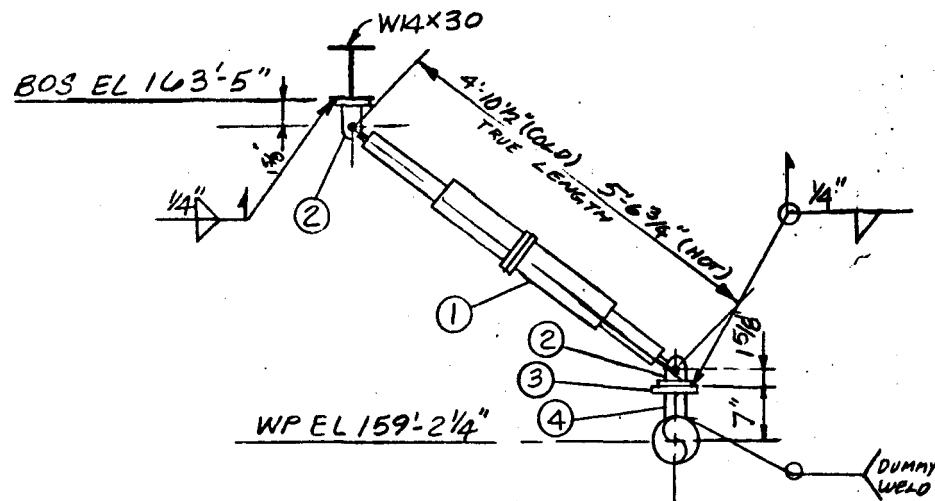
14	
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7	
6	
5	
4	1 3" STD PIPE STANCHION BY PIPE FAB.
3	1 4 1/2 x 4 1/2 x 1/2" C.S. PL. BY PIPE FAB.
2	2 REAR BRACKET SIZE 1
1	1 MECHANICAL SNUBBER SIZE 1L FIG. 307

REVISED ITEMS 1, 2, 5, LENGTHS & BRACKET ATTACHMENTS

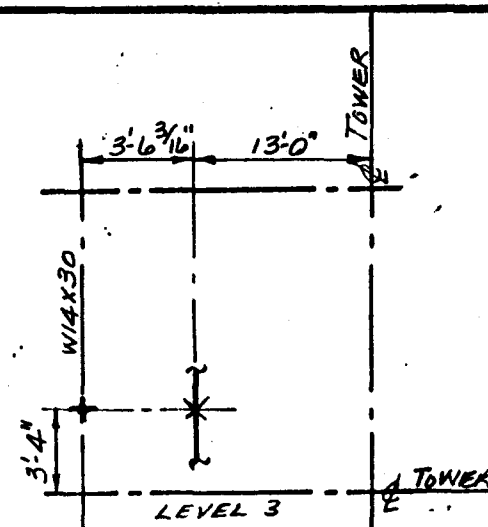
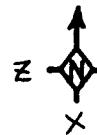
NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 2k$ $F_y = 1.0k$
 PIPE SIZE: 4.5" O.D. $F_R = 1.5k$ $F_{TOTAL} = 1.1k$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-11-80	DATE	
REVIEW'D	MLM	APPROVED	
DATE	4-29-80	DATE	
PROJECT	PEP		
DATE			
ANALYSIS ID. CODE	X-VT-1-A-3		

5		1	1	MECHANICAL SNUBBER SIZE 1/2 PG-307	
4		ITEM RECD	COMPONENT DESCRIPTION		REMARKS
3		SCALE:	Stearns-Roger		
2		NONE	11165/8		
A. 1.					



ELEVATION LOOKING NORTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

 $\Delta X = 1 \frac{9}{16}$ " $\Delta Z = 1 \frac{9}{16}$ " $\Delta Y = 12 \frac{7}{16}$ " DN

VOL. P60-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P4
D	STRUCTURAL S32-3	U
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4	1	3" STD PIPE STANCHION BY PIPE FAB.
3	1	4 1/4" X 4 1/4" L.C.S. R BY PIPE FAB.
2	2	REAR BRACKET SIZE 1
1	2	MECHANICAL SNUBBER SIZE 1L
ITEM REQD		COMPONENT DESCRIPTION
SCALE: NONE		REMARKS
		11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700		
LINE NO 4"VT-1-1005		
MARK NO H-VT-1-29		

REVISE ITEMS 1, 2, 4, 5, LENGTHS & REAR BRACKET ATTACH.

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_y = .3K$ $F_z = .2K$ PIPE SIZE: 4.5" O.D. $F_{TOTAL} = .4K$

PIPE INSULATION: 4"

PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-14-80	DATE	
REVIEWED	MLM	APPROVED	
DATE	4-24-80	DATE	
PROJECT	RTD	REVISIONS	
DATE	5-1-80		
ANALYSIS ID. CODE	X-VT-1-A-9		

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ITEM REQD

SCALE:

NONE

Stearns-Roger

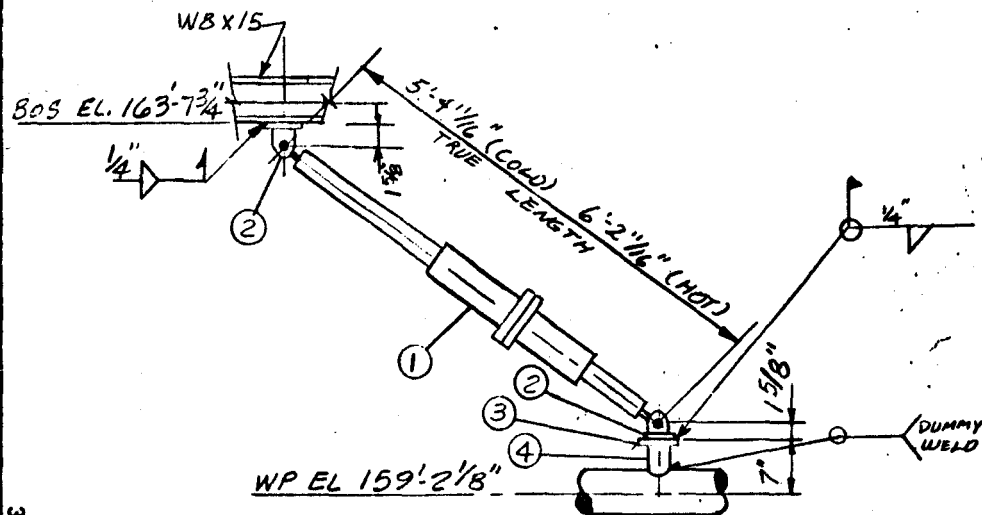
11165/8

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

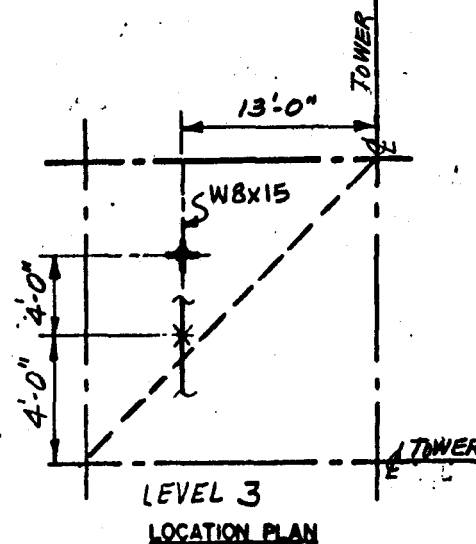
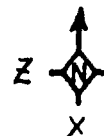
PROJECT NO C-21700

LINE NO 4"VT-1-1005

MARK NO H-VT-1-29



ELEVATION LOOKING EAST



- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 1\frac{9}{16}"$
 $\Delta Z = 1\frac{9}{16}"$
 $\Delta Y = 12\frac{7}{16}"$ DN

VOL. P60-2

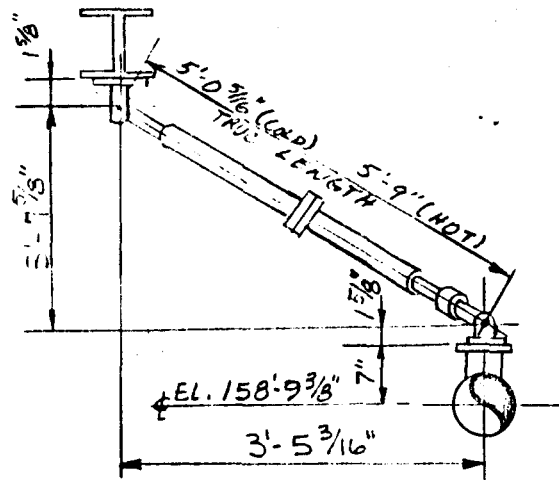
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P93
D	STRUCTURAL	332-3
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4	1	3" STD PIPE STANCHION BY PIPE FAB.
3	1	4"X4"X 1/4" C.S. PLATE BY PIPE FAB.
2	2	REAR BRACKET SIZE 1
1	2	MECHANICAL SNUBBER FIG. 14
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

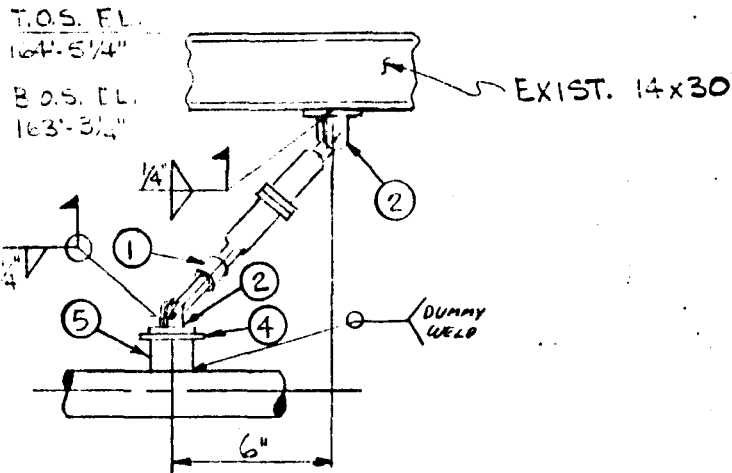
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .3k$ $F_y = .3k$
 $F_{TOTAL} = .4k$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-14-80	DATE	
REVIEWED	MLM	APPROVED	
DATE	4-22-80	DATE	
PROJECT	SPR		
DATE	6-2-80		
ANALYSIS ID. CODE	X-VT-1-A-8		

5	
4	
3	
2	
1	
REVISIONS	
PROJECT NO	C-21700
LINE NO	4"VT-1-KEB
MARK NO	H-VT-1-30



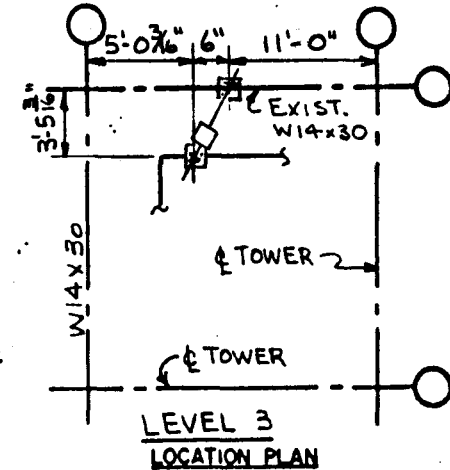
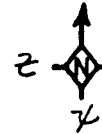
ELEVATION LOOKING EAST



VIEW A-A - ELEVATION LOOKING NORTH

NOTES
 PIPE TEMPERATURE: 100°F
 STRUCTURAL DESIGN LOAD: $F_x = .4k$, $F_y = .5k$
 PIPE SIZE: 14\"/>

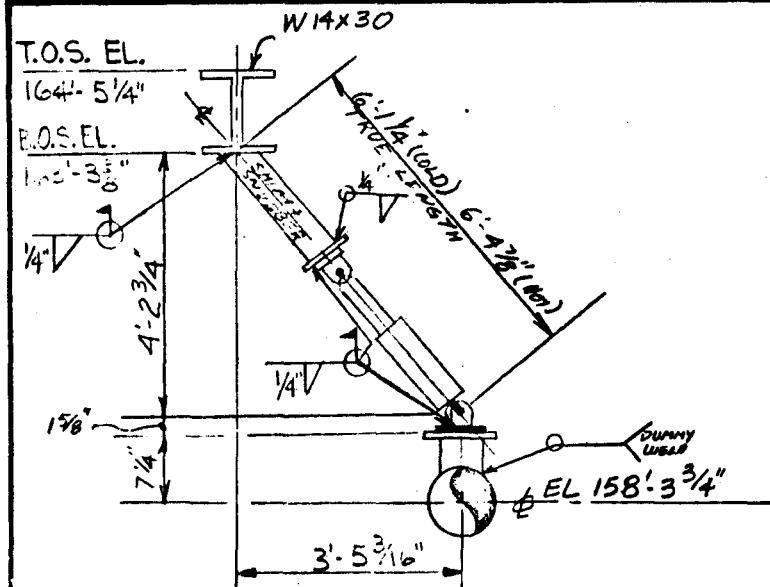
ENGINEERING RECORD				5
DESIGNED	DATE	DESIGNED	DATE	4
REVIEWED	DATE	APPROVED	DATE	3
PROJECT	DATE	DATE	DATE	2
ANALYSIS ID. CODE	X.V.T.-1-31			REVISIONS



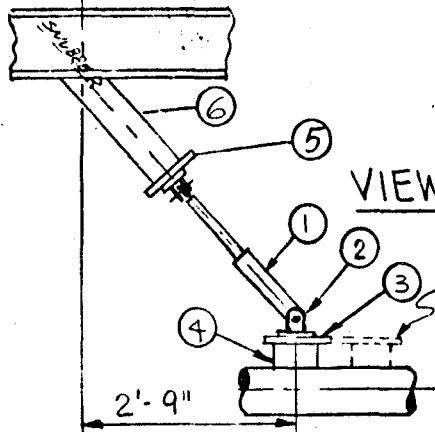
+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 9 \frac{1}{16}"$
 $\Delta Y = 9 \frac{3}{4}"$ DN.
 $\Delta Z = 3 \frac{7}{8}"$

VOL. P60-2

14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	3" STD. PIPE STALL (BY PIPE FAB.)	
4	1	4 1/4" x 4 1/4" x 1/4" C.S. PL. (BY PIPE FAB.)	
3			
2	2	REAR BRACKET, SIZE 1	
1	2	MECHANICAL SHUTTER, SIZE 14 FIG. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger *****	11165/8
NONE			
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO H-VT-1-31	MARK NO H-VT-1-31



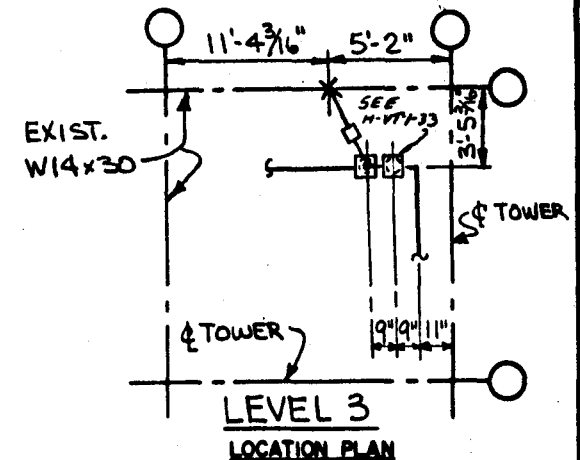
ELEVATION LOOKING EAST



VIEW A-A-ELEVATION LOOKING NORTH

REVISIONS 1, 2, 5, 6, REAR BRACKETS & ADD SHIM

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P4
D	STRUCTURAL S32-3	D
C	ELECTRICAL	
B		
A		



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1 1/8"$
- $\Delta Y = 7 9/16" \text{ DN.}$
- $\Delta Z = 2 15/16"$

VOL. PGD-2

14			
13			
12			
11			
10			
9			
8			
7			
6	1	4"X4"X 3/8" STRUCTURAL TUBING	
5	1	5"X5"X 1/2" R.C.S.	
4	1	3" STD. PIPE STANCHION, BY PIPE FAB.	
3	1	4-1/4 x 4-1/4 x 1/4" C.S. PL. BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNIP-FIT, SIZE 11/16, 30"	
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	4"-VT-1-KEF
MARK NO	H-VT-1-32		

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = .2K$, $F_y = .3K$

PIPE SIZE: 4.5" O.D. $F_z = .2K$, $F_{TOTAL} = .35K$

PIPE INSULATION: 4"

PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-VT-1-A-1		

5
4
3
2
1
REVISIONS



EXIST. W12x26

TRUE LENGTH

4 1/2" (100)

2 3/8" (62)

15/8"

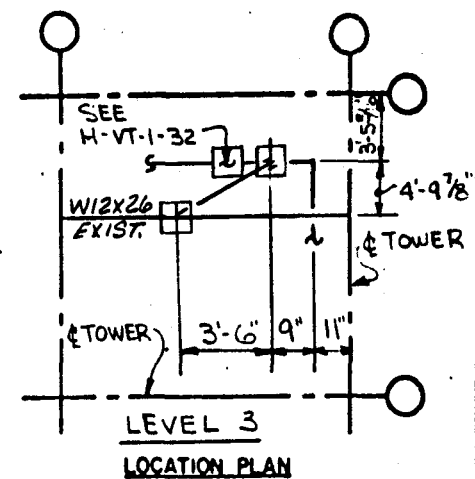
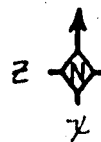
7 1/2"

6"

SEE -VT-1-32

VIEW A-A - ELE

△



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1\frac{1}{2}"$
 $\Delta Y = 7\frac{9}{16}"$ (11)
 $\Delta Z = 2\frac{15}{16}"$

VOL. P60-2

△ REVUE ITEMS 1, 2, 5 & 6, REAR BRACKETS & ADD SHIP

VIEW A-A - ELEVATION LOOKING NORTH

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	Pg-3	13
D		STRUCTURAL	500-2	0
C		ELECTRICAL		
B				
A				

ENGINEERING RECORD				5
DESIGNED	4/12	CHECKED	7/12	4
DATE	11/12/10	DATE	11/26/10	3
REVIEW'D	J. H. H.	APPROVED		2
DATE	4-29-80	DATE		1
PROJECT	BDR		J. H. H.	REVISIONS
DATE	5-1-10		6-17-10	PROJECT N°
ANALYSIS	ID. CODE			

14			
13			
12			
11			
10			
9			
8			
7			
6	1	4"X4"X3/8" STRUCTURAL TUBING	
5	1	5"X5" X3/8" C.S. P	
4	1	4 1/2" X 4 1/2" X 1/4" C.S. P, BY P.T.E. F.	
3	1	3" X STD. P.H. COUPLERS, BY P.T.E. F.	
2	2	FEET BRACKET, SIZE 1	
1	1	MECHANICAL STEERING SIZE 1L FTS 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger	11165/8
10 MwE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE NO: 4"-VT-1-KER		MARK NO: VT-1-33

NOTES.

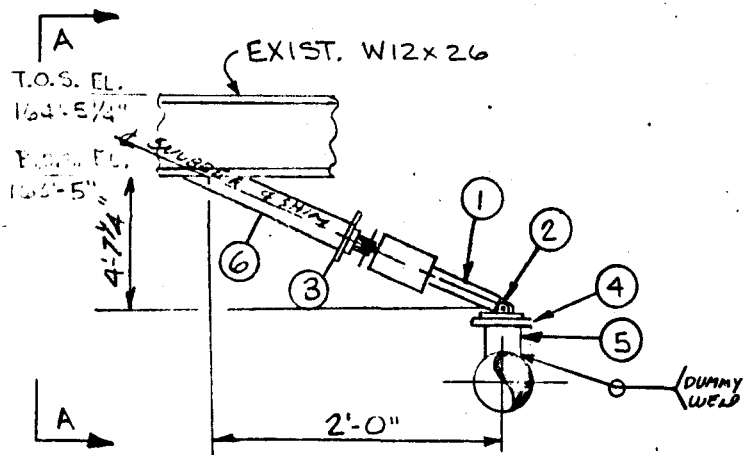
PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = .2\text{K}$, $F_y = .2\text{K}$

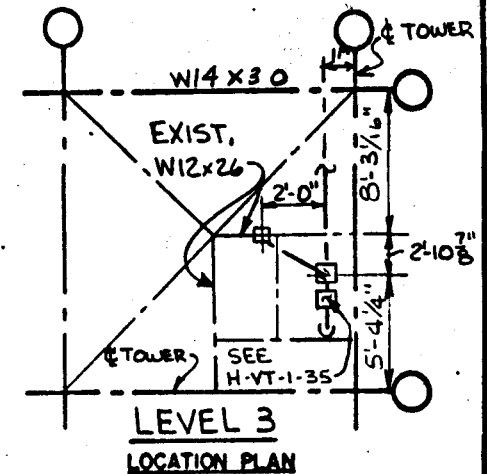
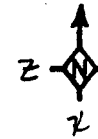
PIPE SIZE: 4.5" O.D. $F_z = .2\text{K}$, $F_{\text{TOTAL}} = .3\text{K}$

PIPE INSULATION: 4

PIPE MATERIAL: ASTM A335, P22

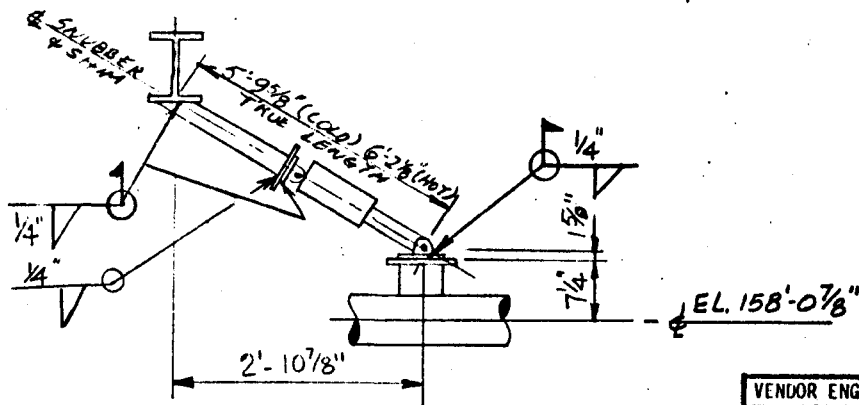


ELEVATION LOOKING NORTH



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -7/16"$
- $\Delta Y = 6 3/4" \text{ DN}$
- $\Delta Z = 2 9/16"$

VOL. PG 0-2



VIEW A-A - ELEVATION LOOKING EAST

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	PA-3	P4
D		STRUCTURAL	532-3	0
C		ELECTRICAL		
B				
A				

14			
13			
12			
11			
10			
9			
8			
7			
6	1	4'X4'X3/8" STRUCTURAL TUBING	
5	1	3" X STD. PIPE STANCHION (BY PIPE FAB.)	
4	1	4 1/4" X 4 1/4" X 1/2" C.S. PL (BY PIPE FAB.)	
3	1	5" X 5" X 1/2" C.S. PL	
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SHIMMER, SIZE 1/4 FR. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger	11165/8
NONE			
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 4-VT-1-KFB	MARK NO H-VT-1-24

1. REVISE HEATS 62346, REAR BRACKETS & ADD SHIM

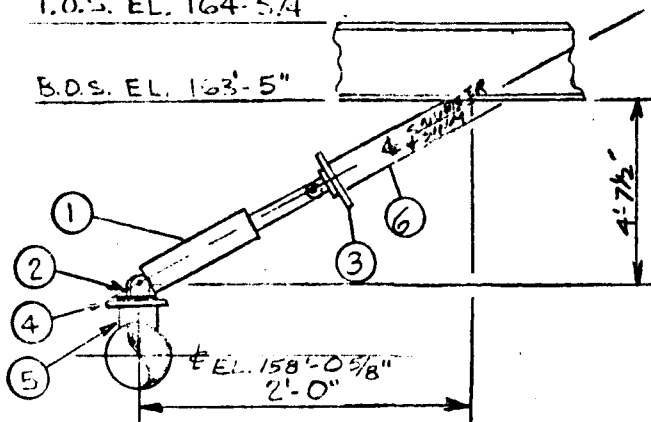
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .5K$ $F_y = .8K$
 PIPE SIZE: 4" O.D. $F_z = .3K$ $F_{TOTAL} = 1.0K$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-VT-1-A-B		

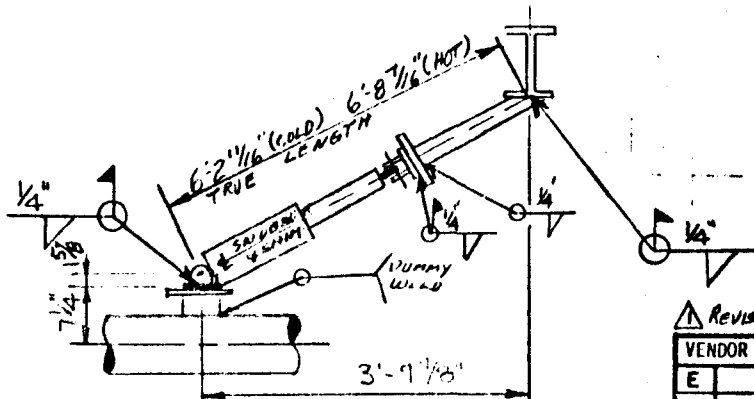
5	
4	
3	
2	
1	
REVISIONS	

T.O.S. EL. 164'-5 1/4"

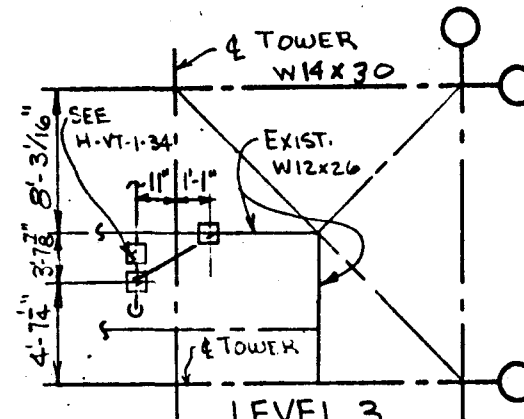
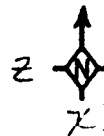
B.O.S. EL. 163'-5"



ELEVATION LOOKING NORTH



ELEVATION LOOKING WEST



LEVEL 3
LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -7/16"$
- $\Delta Y = 6 3/4" \text{ DN}$
- $\Delta Z = 2 3/16"$

VOL. P60-2

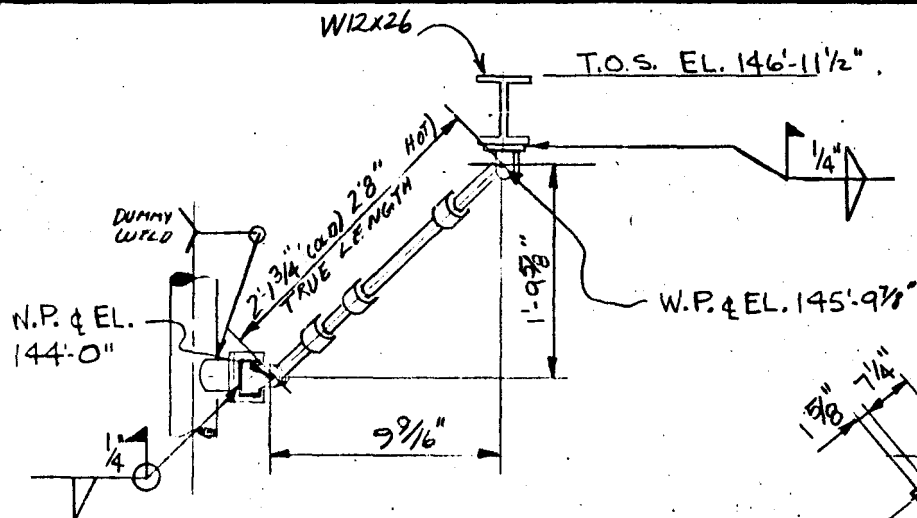
REVISIT ITEMS 1, 2, 3, 6, REAR BACK YARD SHIM

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P9
D	STRUCTURAL	O
C	ELECTRICAL	
B		
A		

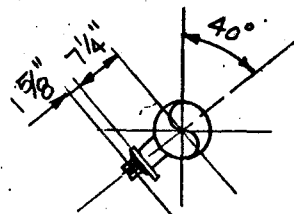
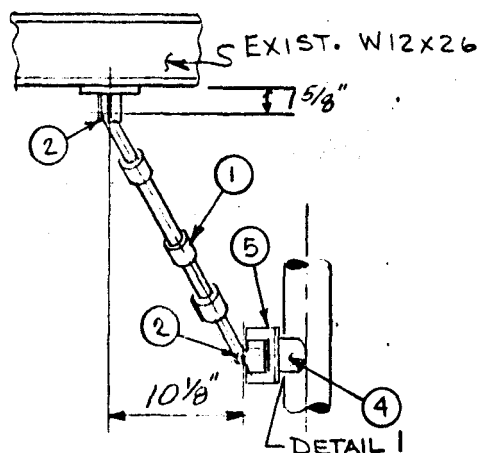
NOTES:
PIPE TEMPERATURE: 900°F
STRUCTURAL DESIGN LOAD: $F_x = .6K$, $F_y = .8K$
PIPE SIZE: 4" O.D. $F_x = .4K$, $F_y = 1.0K$
PIPE INSULATION: 1"
PIPE MATERIAL: ASTM A335 T102

ENGINEERING RECORD				5
DESIGNED	DATE	DATE		4
REVIEWED	DATE	APPROVED	DATE	3
PROJECT	DATE			2
ANALYSIS ID. CODE	X-VT-1-341			REVISIONS

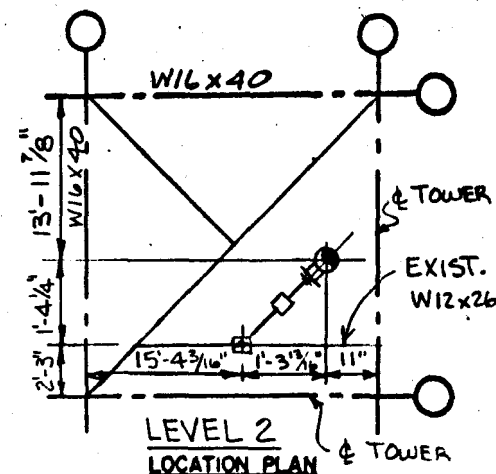
14			
13			
12			
11			
10			
9			
8			
7			
6	1	4"X4"X3/8" STRUCTURAL TUBING	
5	1	3" STD. PIP. - 1/2" WALL THICKNESS (SEE PIP. TAB.)	
4	1	4"X4"X1/4"X1/2" (SEE PIP. TAB.)	
3	1	5"X5"X1/2" C.S. P.	
2	2	FLAT WELDED, SIZE 1	
1	1	1/2" WELDED, SIZE 1/2 FIG. 307	
ITEM	RECD	COMPONENT DESCRIPTION	REMARKS
	SCALE:	NONE	
		Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	3-VT-1-100
MARK NO	H-VT-1-100		



ELEVATION LOOKING EAST

DETAIL 1
PLAN VIEW

ELEVATION LOOKING NORTH



- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 1/4"$
 $\Delta Y = 8" \text{ DN}$
 $\Delta Z = 2 1/2"$

VOL. PG0-2

4 LENGTHS
REVISE ITEMS 12+3 & REAR BRACKET ATTACH

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING PG-3	P ₃
D	STRUCTURAL SEC-2	O
C	ELECTRICAL	
B		
A		

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = .3K$, $F_y = .9K$,PIPE SIZE: 4" O.D. $F_x = .3K$, $F_y = 1.0K$

PIPE INSULATION: 4"

PIPE MATERIAL: ASTM A333-72

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
DATE	4/1/77	DATE	4/1/77
REVIEWED	DATE	APPROVED	DATE
DATE	4/1/77	DATE	4/1/77
PROJECT	DATE	DATE	DATE
DATE	4/1/77	DATE	4/1/77

5

4

3

2

1

A

A

A

A

A

A

A

A

A

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	MECHANICAL SPLITTING, SIZE 4, FIG. 307	
2	REAR BRACKET, SIZE 1	
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

SCALE:
NONE

Stearns-Roger

11165/8

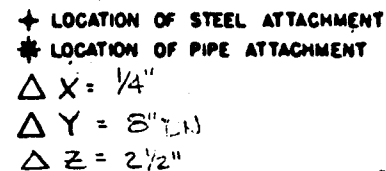
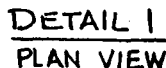
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE X-VI-1-A-2

PROJECT NO C-21700

LINE NO. 11165-1-36

MARK NO. H-VI-1-36



VOL. P60-2

14			
13			
12			
11			
10			
9			
8			
7			
6	1	4"x4"x $\frac{3}{8}$ " STRUCTURAL TUBING	
5	1	3/4"x3/4"x $\frac{1}{2}$ " TE, PY. TUBE FAL.	
4	1	3" STD. PIPE STANCHION, PY. PIPE FAL.	
3	1	5" X 5" X $\frac{1}{2}$ C.S. TE	
2	2	REAR BRACKET, SIZE 3	
1	1	MECHANICAL SILENCER, SIZE 3L	FIG. 3-6
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger *****	11165/8
TO MWE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO. 44-VT-1-1-EP	MARK NO. H-VT-1-2-7

NOTES

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_y = .3k$, $F_z = .9k$

PIPE SIZE: 4.5" O.D. F₁ = .3K F₂ = 1.0K

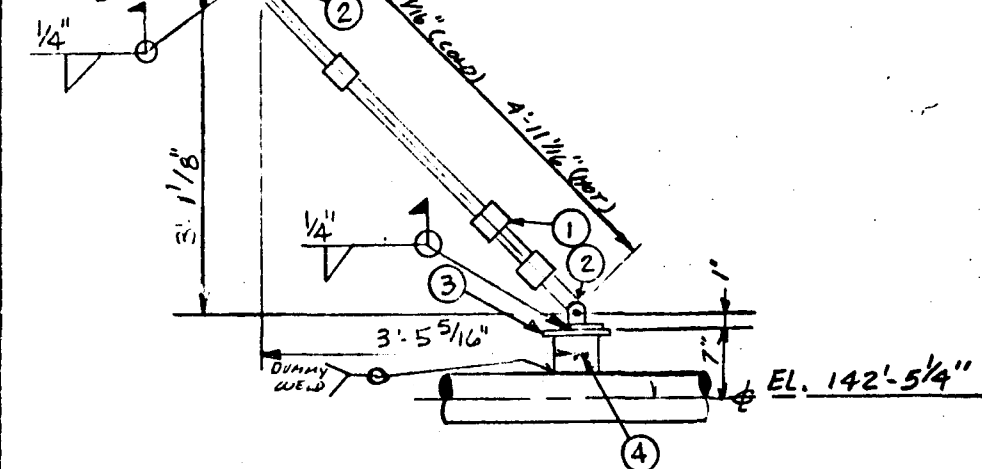
PIPE INSULATION: 4"

PIPE MATERIAL: 15011 A335 T42

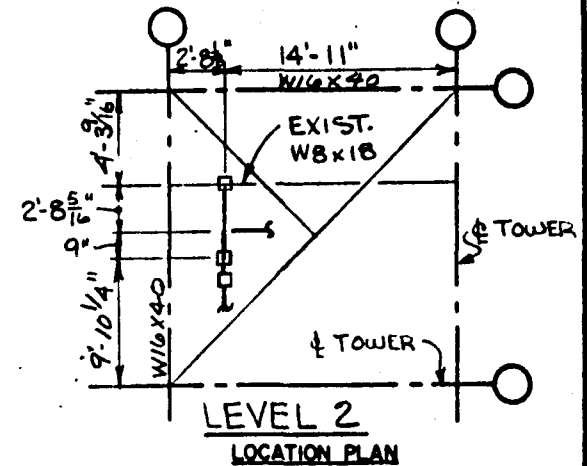
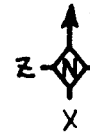
ENGINEERING RECORD										5	
DESIGNED	J.H.S.				CHECKED					4	
DATE	JAN 10				DATE					3	
REVIEWED	K.B.S.				APPROVED					2	
DATE	4-29-10				DATE					1	
PROJECT					1-18-10				REVISIONS		
DATE					6-30-10				PROJECT NO.		
ANALYSIS 10. CODE		ANALYSIS 11. CODE		ANALYSIS 12. CODE		ANALYSIS 13. CODE		ANALYSIS 14. CODE			

T.O.S. EL. 146'-11 1/2" EXIST. W8x18

B.O.S. EL. 146'-3 3/8"



ELEVATION LOOKING EAST



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1 1/4"$
 $\Delta Y = 6 7/8" \text{ LN}$
 $\Delta Z = 3 5/8"$

VOL. P60-2

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	0
C		ELECTRICAL		
B				
A				

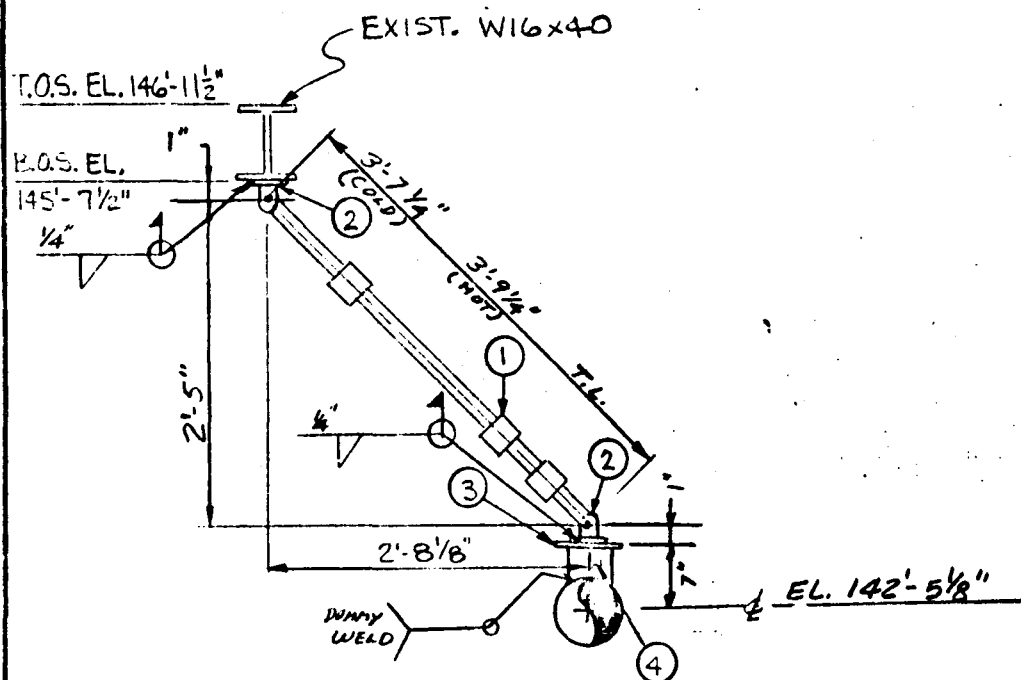
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	1	3" STD. PIPE BRACKET, BY PIP FAB.	
3	1	4 1/4" x 4 1/4" x 1/4" R, BY PIP FAB.	
2	2	REAR BRACKET, SIZE 1/4"	
1	1	THEORETICAL SUPPORT, SIZE 1/4"	Fig 307

REVISIT ITEMS 142, LENGTHS & REAR BRACKET ATTACH.

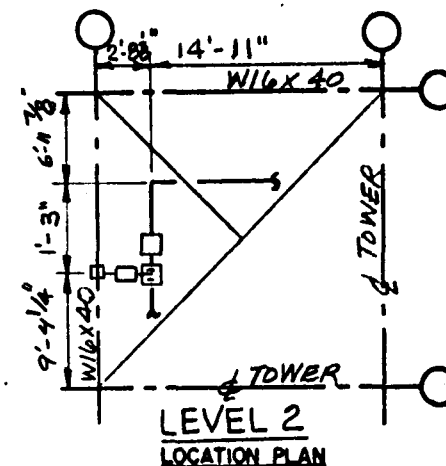
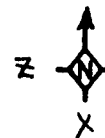
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_y = .25K$, $F_x = .25K$
 PIPE SIZE: 3" STD. $F_{min} = .35K$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	Y-VT-1-11		

5			
4			
3			
2			
1			
ITEM RECD	SCALE: NONE	COMPONENT DESCRIPTION	REMARKS
		Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700	LINE NO 4-VT-1-11	MARK NO H-VT-1-38	



ELEVATION LOOKING NORTH



- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1\frac{1}{4}"$
 $\Delta Y = 6\frac{1}{8}"$ DN
 $\Delta Z = 3\frac{5}{8}"$

VOL. P60-2

Δ REVISE ITEMS 142, WELD SYMBOLS, LENGTHS,
 PIPE ORIENTATION ON ELEV. VIEW

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_y = .25k$, $F_x = .25k$
 PIPE SIZE: 4" O.D. $F_{TENS} = .35k$
 PIPE INSULATION: 4"
 PIPE MATERIAL: A335 B2

ENGINEERING RECORD

DESIGNED	DATE	ORDED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE	PROJECT	DATE
ANALYSIS ID. CODE	X-101-1	PROJECT NO	C-21700

5

4

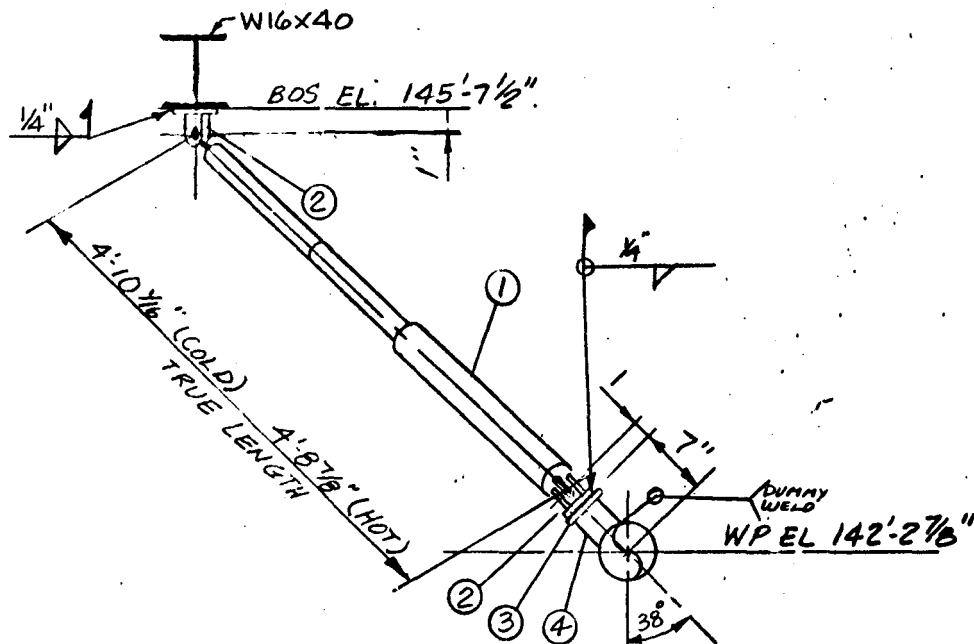
3

2

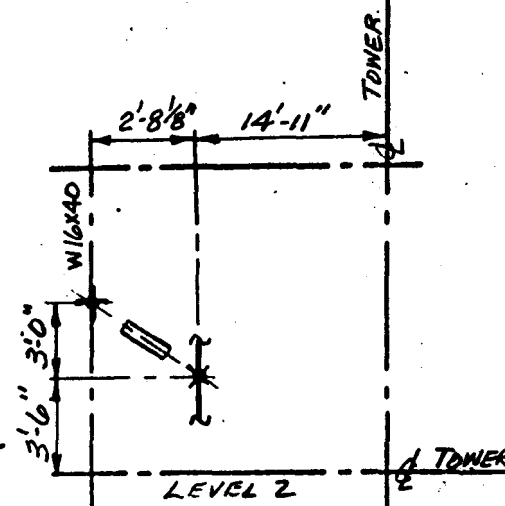
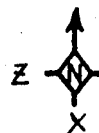
1

REVISIONS

ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	1	3" STD. PIPE STAND OFF, BY PIPE FAB.	
3	1	4 1/4 x 4 1/4 x 1/4 PL. BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1/4	
1	1	MECHANICAL SUPPORT, SIZE 1/4 F16 307	
Stearns-Roger			11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
LINE NO 41-11111 MARK NO H-11111-1			



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -5/8"$
- $\Delta Z = 4 3/16"$
- $\Delta Y = 4 7/8" DN$

VOL. P60-2

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	0
C		ELECTRICAL		
B				
A				

REVISE ITEMS 1, 2, 4, 5, LENGTHS & REAR BRACKET ATTACH.

NOTES

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .23K$, $F_y = .23K$,
 PIPE SIZE: 4.5" O.D. $F_z = .15K$, $F_{TOTAL} = .4K$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MEM	CHECKED	MEM
DATE	4-15-80	DATE	4-15-80
REVIEWED	MEM	APPROVED	MEM
DATE	4-29-80	DATE	4-29-80
PROJECT	KOR	PROJECT	KOR
DATE	4-29-80	DATE	4-29-80
ANALYSIS ID. CODE	X-VT-1-A-B	PROJECT NO	C-21700

5

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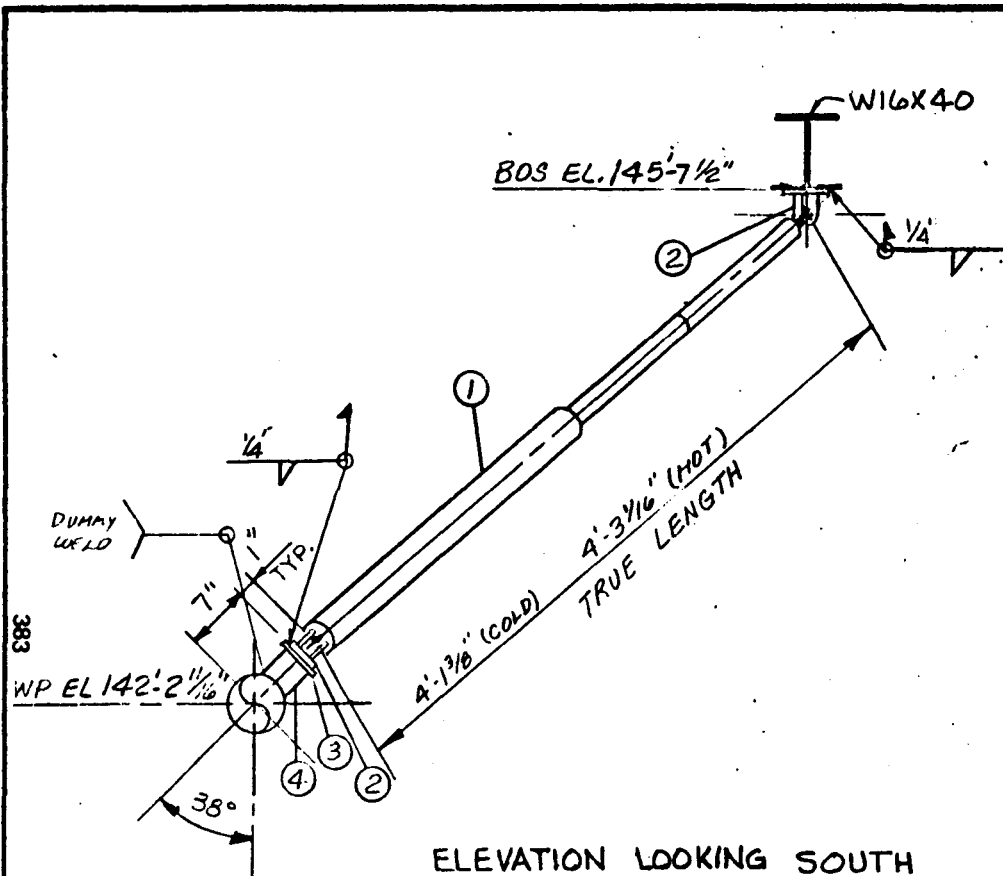
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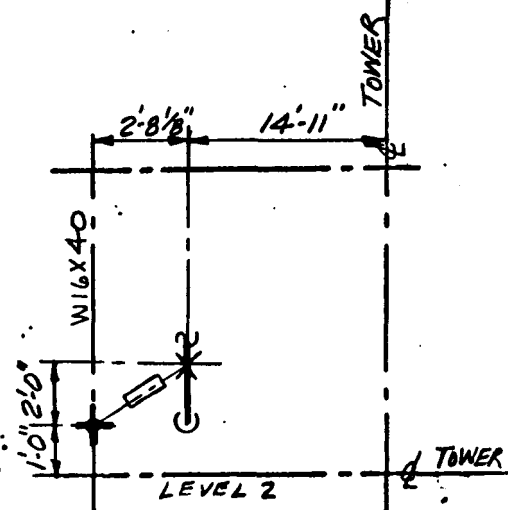
1

REVISIONS

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4	1	3" STD. PIPE STANCHION BY PIPE FAB.	
3	1	4" X 4" X 1/4" C.S. PLATE BY PIPE FAB.	
2	2	REAR BRACKET SIZE 1/2"	
1	1	MECHANICAL SNUBBER, SIZE 1/2" FIG. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	VT-1-KES
MARK NO	H-VT-1-40		



ELEVATION LOOKING SOUTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT

$$\Delta X = -5/8"$$

$$\Delta Z = 4 3/16"$$

$$\Delta Y = 4 7/8" \text{ DN VOL. P60-2}$$

383

WP EL 142'-2 1/16"

△ REVISE ITEMS 1, 2 & 5, LENGTHS & REAR BRACKET ATTACHMENTS

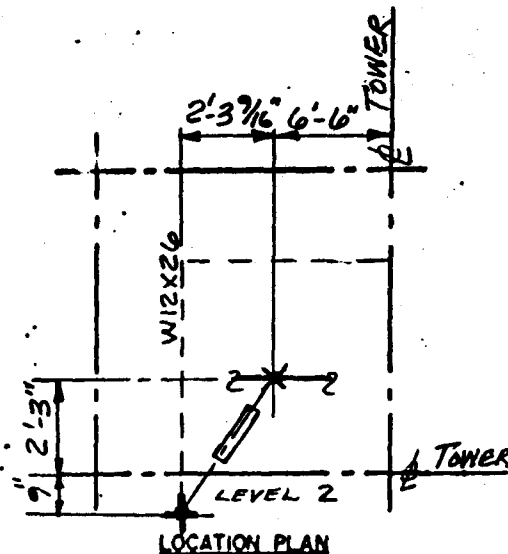
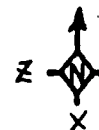
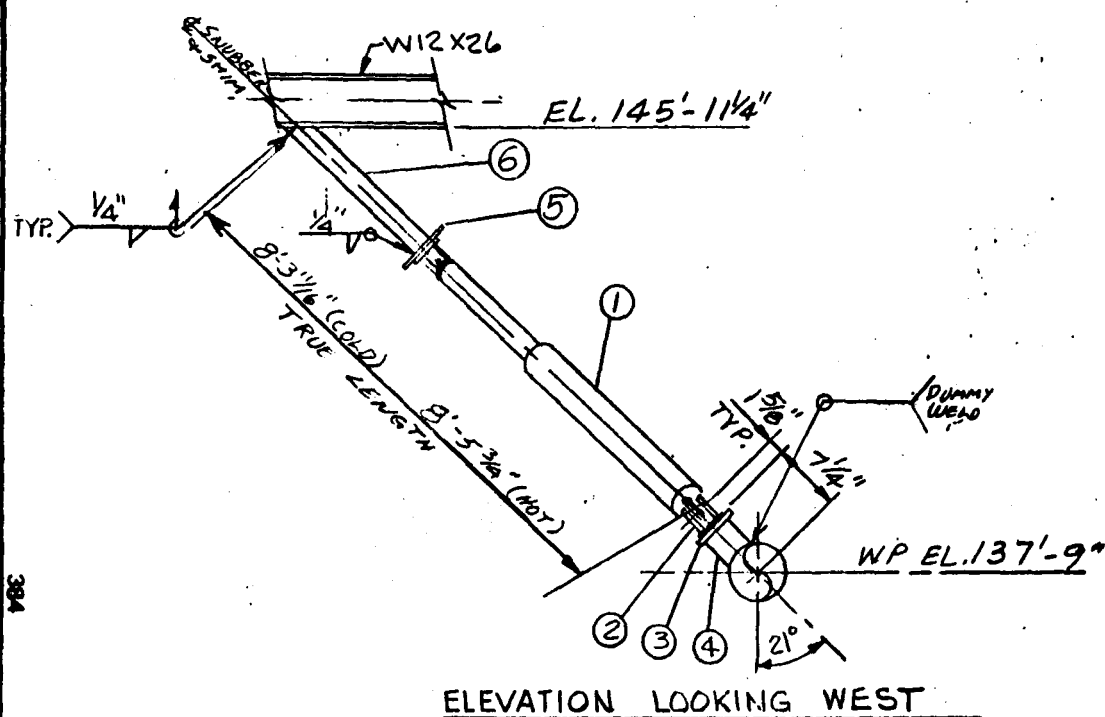
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P ₂
D		STRUCTURAL	S32-3	O
C		ELECTRICAL		
B				
A				

14		
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5		
4	1	3" STD. PIPE STANCHION BY PIPE FAB.
3	1	4 1/4" x 4 1/4" x 1/4" C.S. PLATE PIPE FAB.
2	2	REAR BRACKET SIZE 1/2"
1	1	MECHANICAL SNUBBER, SIZE 1/2" FIB. 307

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .23 \text{ K}$, $F_y = .33 \text{ K}$
 PIPE SIZE: 4.5" O.D. $F_z = .2 \text{ K}$, $F_{TOTAL} = .5 \text{ K}$
 PIPE INSULATION: 4"
 PIPE MATERIAL: A375M A335 P22

ENGINEERING RECORD				5
DESIGNED	MLM	DRAWN	9/1/80	4
DATE	4-16-80	DATE	9/1/80	3
REVIEWED	MLM	APPROVED		2
DATE	4-24-80	DATE		1
PROJECT	ELR	PROJECT	10 Mw SOLAR PILOT PLANT	
DATE	4-24-80	DATE	6-12-80	
ANALYSIS ID. CODE	X-VT-1-A-5	PROJECT NO	C-21700	

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
REVISIONS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	LINE NO 4" VT-1-KEB	MARK NO H-VT-1-41



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta X = -3/16"$
 $\Delta Z = 2 7/8"$
 $\Delta Y = 3" \text{ DN}$

VOL. P60-2

VINIUR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	582-3	0
C		ELECTRICAL		
B				
A				

↑ REVISE ITEMS 1,2,586, REAR BRACKETS 4 ADD SMM

NOTES

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = .3K$, $F_y = .7K$
PIPE SIZE: 4.5" O.D. $F_x = .3K$, $F_{TOTAL} = .8K$
PIPE INSULATION: 4"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	MLM	DRAWN	
DATE	4-16-80	DATE	5/11/80
REVIEW'D	MLM	APPROVED	
DATE	4-29-80	DATE	
PROJECT	ELR		
DATE	4-29-80		
ANALYSIS ID. CODE	X-VT-1-A-8		

5

4

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2

1

REVISIONS

1

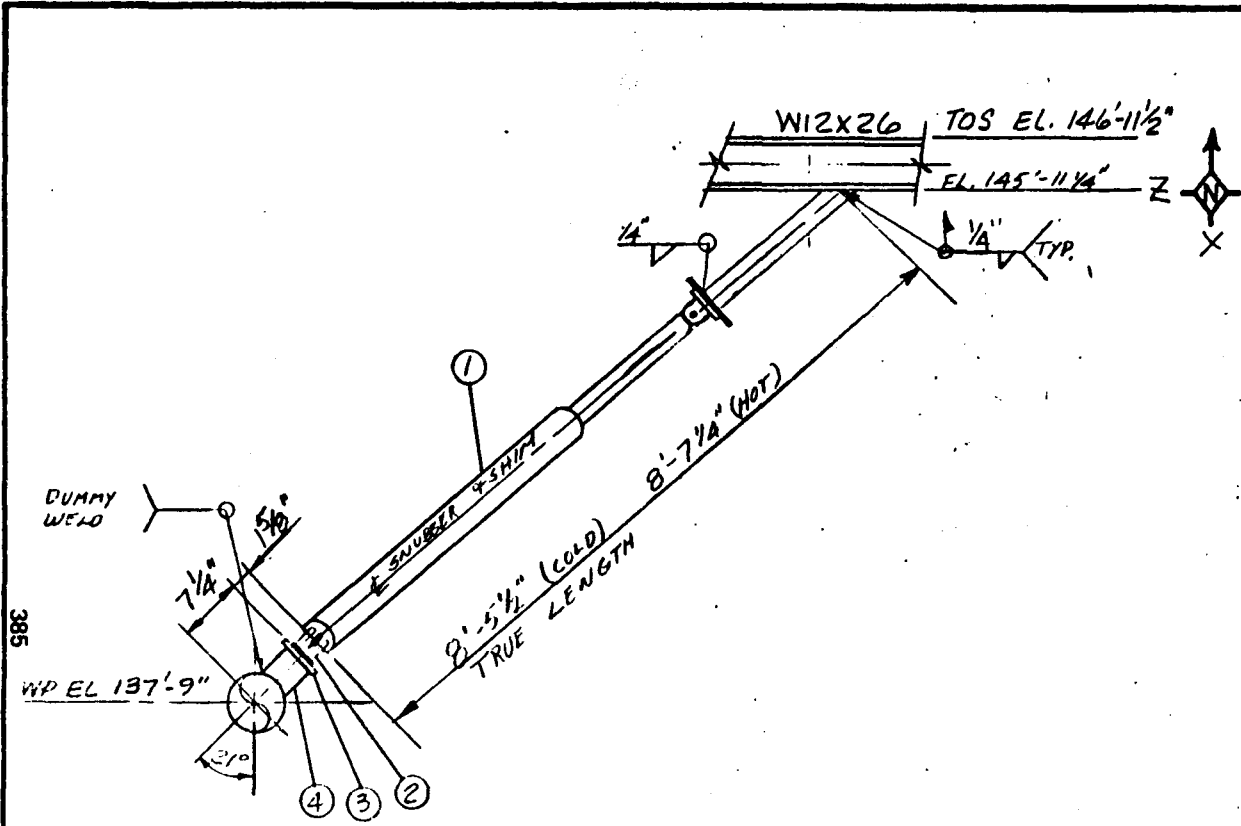
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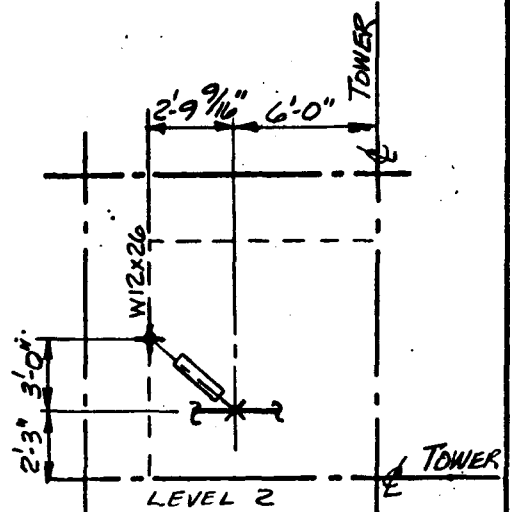
4

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14			
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9			
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7			
6	1	4" X 4" X 3/8" STRUCTURAL TUBING	
5	1	5" X 5" X 1/2" C.S. PL	
4	1	3" STD PIPE STANCHION BY PIPE FAB	
3	1	4 1/2" X 4 1/2" X 1/2" C.S. PL BY PIPE FAB	
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNUBBER, SIZE 1 FIG. 307	
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
		SCALE: NONE	11165/8
		Stearns-Roger	
		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
		PROJECT NO C-21700	LINE NO 4"VT-1-KEB
		MARK NO H-VT-1-42	



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -3/16"$
- $\Delta Z = 27/8"$
- $\Delta Y = 3"DN$

VOL. P60-2

VENIOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	0
C		ELECTRICAL		
B				
A				

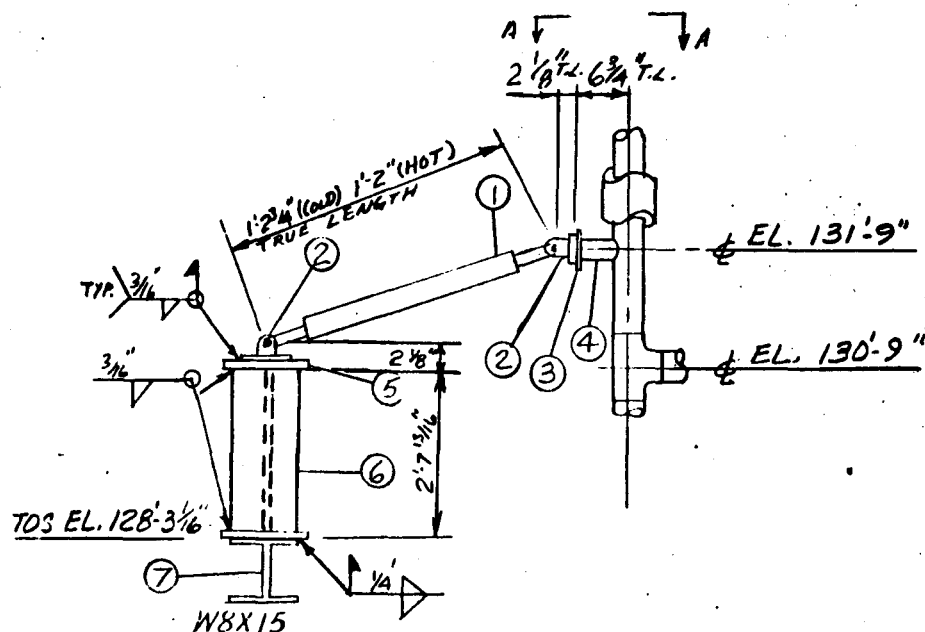
14			
13			
12			
11			
10			
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8			
7			
6	1	1"X4"X3/8" STRUCTURAL TUBING	
5	1	5X5X1/2" C.S. FB	
4	1	3 STD PIPE STANCHION BY PIPE FAB.	
3	1	4 1/2X4 1/2X1/2" C.S. FB BY PIPE FAB.	
2	2	REAR BRACKET SIZE 1	
1	1	MECHANICAL SNUBBER SIZE 1 FIG. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger	
NONE		11165/8	

REVISED ITEMS 1,2, SNUBBER LENGTHS, REAR BRACKET & ADD SHIM

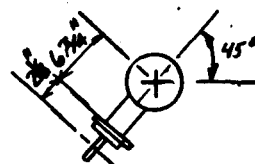
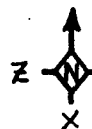
NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .3K$, $F_y = .7K$
 PIPE SIZE: 1.5" O.D. $F_L = .3K$ $F_{TOTAL} = .8K$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	ALM	DRAWN	ALM	4
DATE	4-10-50	DATE	4-12-50	3
REVIEWED	ALM	APPROVED		2
DATE	4-29-50	DATE		
PROJECT	HEAR	PROJECT	P. J. Y.	
DATE		DATE	6-12-50	
ANALYSIS ID. CODE				REVISIONS
X-VT-1-43				

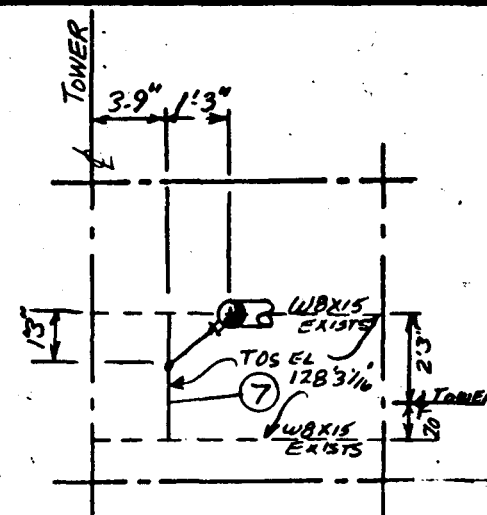
TO MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
 PROJECT NO C-21700 LINE NO 4"VT-1-KEB MARK NO H-VT-1-43



ELEVATION LOOKING NORTH



SECTION A-A



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/4"$
 $\Delta Z = 1"$
 $\Delta Y = 9/16" \text{ DN}$

VOL. P60-2

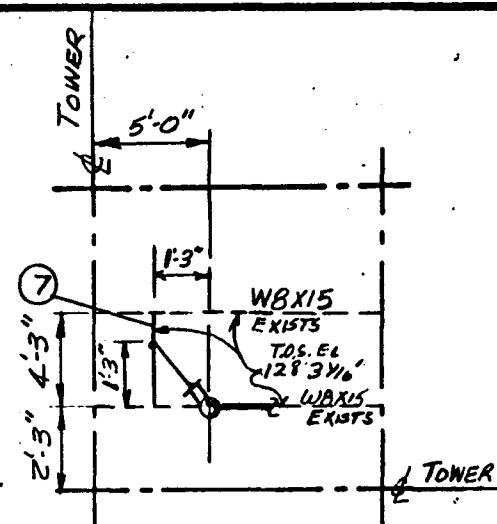
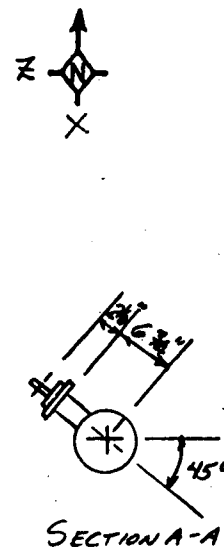
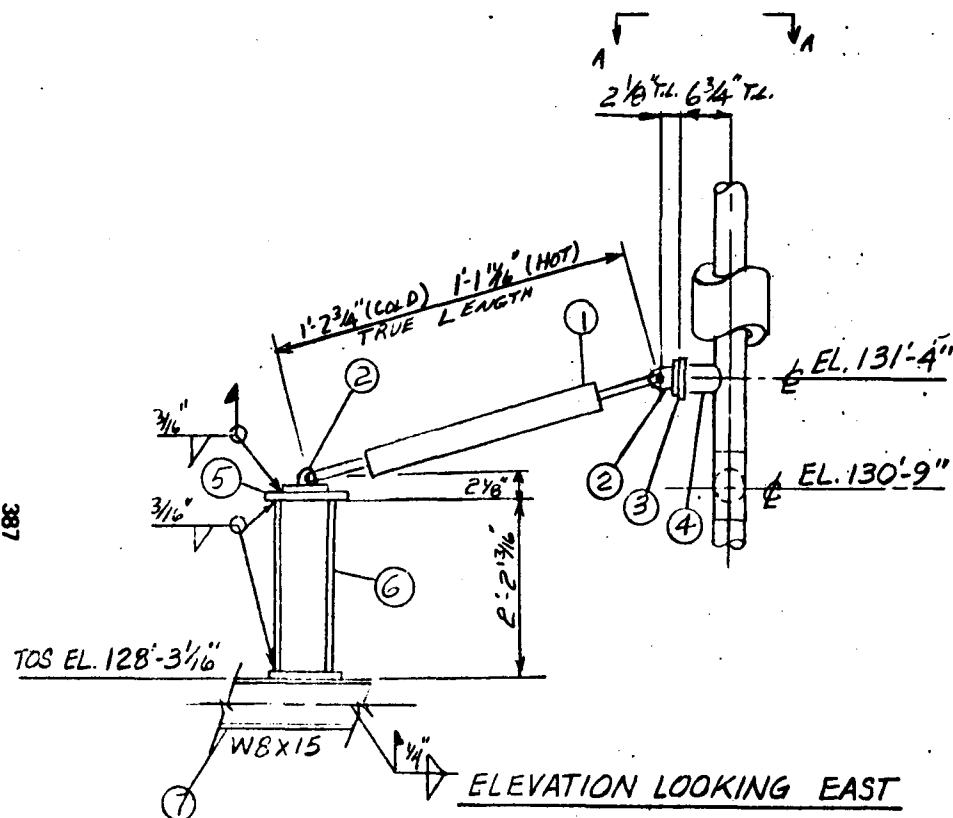
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV		
E		PIPING	P9-3	P4	6	1 WB X15, 4'1" LG. PER S-A STD. EE1601.9
D		STRUCTURAL	S32-2	1	5	2 4" X 4 3/4" X 1/2" C.S. TB
C		ELECTRICAL			4	1 3" STD. PIPE STANCHION BY PIPE FAB.
B					3	1 4 1/4" X 4 1/2" C.S. TB BY PIPE FAB.
A					2	2 REAR BRACKET, SIZE 1
ENGINEERING RECORD				5	1	1 MECHANICAL NUMBER SIZE 1 FR. 306

▲ REVISE ITEMS 1,2,5+6, LENGTHS & REAR BRACKET ATTACHMENTS

NOTES:

PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = .4\text{K}$, $F_y = .3\text{K}$
PIPE SIZE: $4.5''\text{O.D.}$ $F_z = .4\text{K}$, $F_{\text{TOTAL}} = .7\text{K}$
PIPE INSULATION: $4''$
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD						5		1	1	MECHANICAL NUMBER, SIZE & FR.	306
DESIGNED	MLM	DRAWN	[Signature]			4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS
DATE	4-23-51	DATE	[Signature]			3		SCALE:		Stearns-Roger	
REVIEWED	H.P.	APPROVED	[Signature]			2		NONE			11165/B
DATE	4-23-51	DATE	[Signature]			1	A 7 x 80				
PROJECT	EPR		[Signature]							10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
DATE	4-23-51		[Signature]								
ANALYSIS ID. CODE	11-1-A-5		11-1-A-5					PROJECT NO	C-21700	LINE NO	4"VT-1-KES
										MARK NO	H-VT-1-44



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -\frac{1}{4}"$
 $\Delta Z = 1"$
 $\Delta Y = \frac{9}{16}" \text{ DN.}$

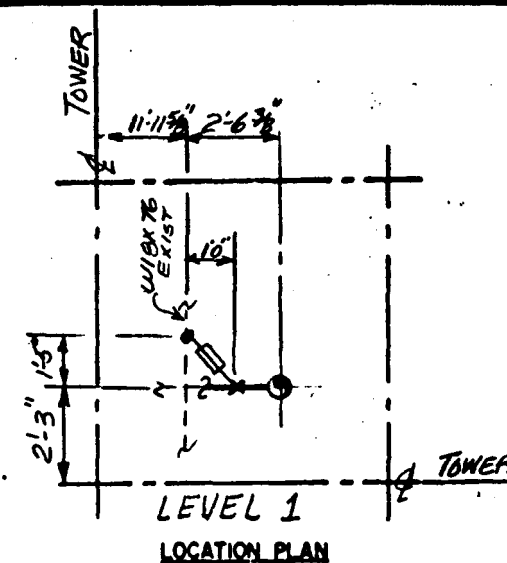
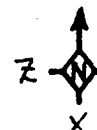
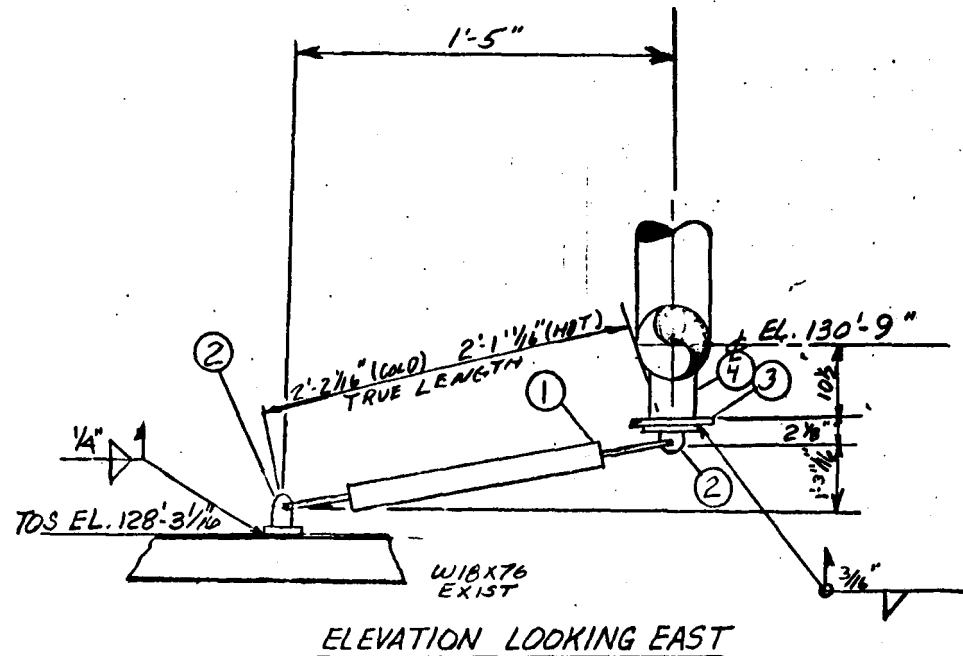
VOL. PGD-2

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV			
E		PIPING	P9-3	P4	6	1	W8X15, 4'-1" LG. PER S-R STD. EE16019
D		STRUCTURAL	S32-2	1	5	2	W4X13, 2'-2 3/4" LG.
C		ELECTRICAL			4	1	4 3/4 X4 3/4 X 1/2 C.S. PL
B					3	1	5" STD. TYPE STANCHION BY PIPE FAB.
A					2	1	4 1/2 X 4 1/2 X 1/2 C.S. PL BY PIPE FAB.
					2	2	REAR BRACKET SIZE 1

▲ REVISE ITEMS 1, 2, 5 & 6, LENGTHS & REAR BRACKET ATTACH.

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = 0.4K$, $F_y = 0.3K$
PIPE SIZE: 4.5" O.D. $F_z = 1.4K$, $F_{TOTAL} = 1.7K$
PIPE INSULATION: 4"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5		1	1	MECHANICAL SHAVER, SIZE 1	FIG. 306
DESIGNED	ALAI	DRAWN		4		ITEM REQD		COMPONENT DESCRIPTION	REMARKS
DATE	7-23-55	DATE	7-23-55	3		SCALE:		Stearns-Roger INCORPORATED	
REVIEWED	ALAI	APPROVED		2		NONE			11165/8
DATE	7-23-55	DATE		1	ALAI				
PROJECT				REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
DATE									
ANALYSIS ID. CODE	VT-1-A-5			PROJECT NO C-21700		LINE NO VT-1-K-5		MARK NO H-VT-1-45	



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -1/4"
- △ Z = 1/4"
- △ Y = 1/8" DN

VOL P60-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P4
D	STRUCTURAL S32-2	1
C	ELECTRICAL	
B		
A		

14			
13			
12			
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10			
9			
8			
7			
6			
5			
4	1	4"XS PIPE STANCHION BY PIPE FAB	
3	1	5"X 5" X 1/2"C.S.P. BY PIPE FAB	
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNUBBER, SIZE 1	FK 307
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE:	Stearns-Roger		
NONE			11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 10"VT-11-FA	MARK NO H- VT-11-3

REVISOR ITEMS 1,2,4,5, LENGTHS & REAR BRACKET ATTACH.

NOTES:
 PIPE TEMPERATURE: 900°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.0K$, $F_y = 0.9K$
 PIPE SIZE: 10.75" O.D. $F_z = 0.7K$ $F_{TOTAL} = 1.5K$
 PIPE INSULATION: 5"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	ALM	CHECKED	
DATE	4-24-80	DATE	
REVIEWED	ALM	APPROVED	
DATE	4-24-80	DATE	
PROJECT	10"VT-11-FA		
DATE	4-24-80		
ANALYSIS ID. CODE	10"VT-11-FA-5		

REVISIONS

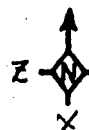


Diagram illustrating the location plan for Level 1. The plan shows a rectangular area with dimensions 11'-11 1/2" and 2'-0 7/8". The existing structure is labeled "W18x24 (EXISTS)". The proposed structure is labeled "W8x15 (EXISTS)". The plan also indicates the location of the "TOWER" and the "LEVEL 1" section.

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -\frac{1}{4}"$
 $\Delta Z = \frac{1}{4}"$
 $\Delta Y = \frac{1}{8}" \text{ DN}$

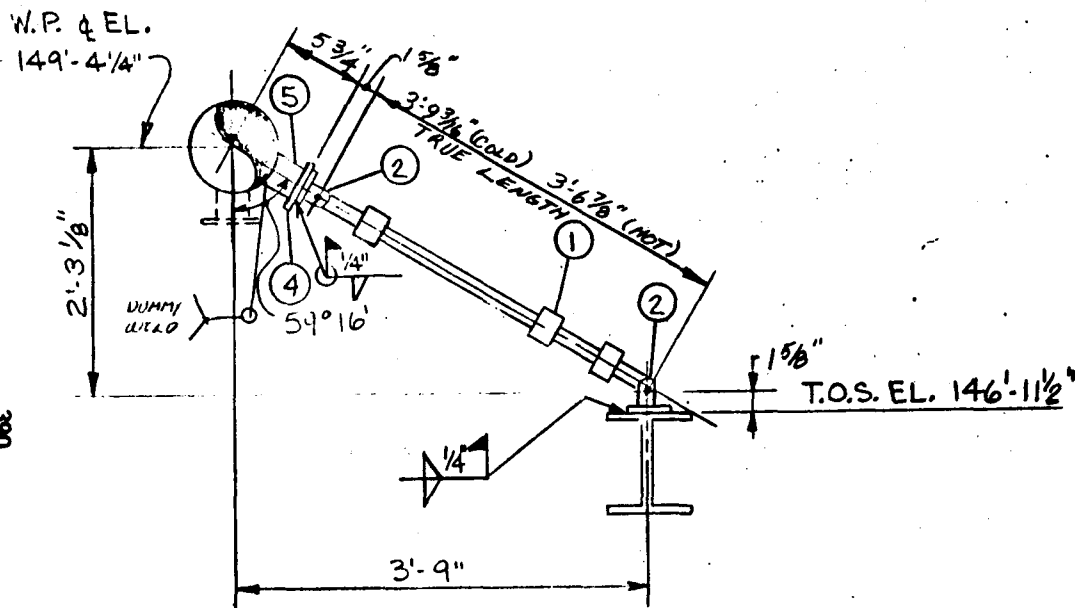
VOL P60-2

14			
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8			
7			
6			
5			
4	1	4"XS PIPE STANCHION BY P. OF FAB.	
3	1	5"X 5"X 1/2 C.S. R BY APE FAB.	
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SMUBBER SIZE 1 FE	307
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger INCORPORATED	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 10"VT-11-FEA	MARK NO H-VT-11-4

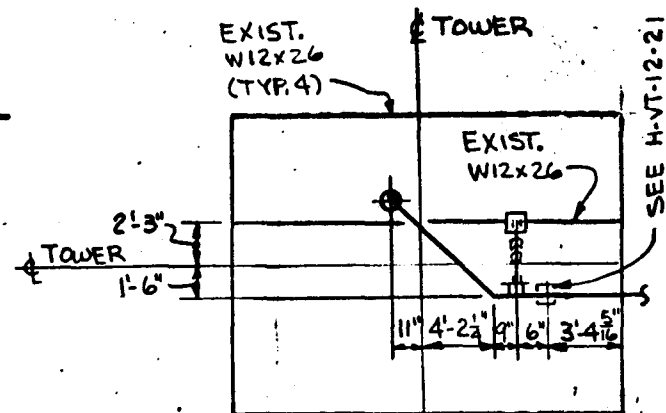
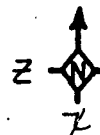
△ REVISE ITEMS 1,2 & 5, LENGTHS & REAR BRACKET ATTACHS.

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_1 = 0.6\text{K}$, $F_2 = 0.9\text{K}$
PIPE SIZE: $10.75''\text{O.D.}$ $F_{\text{TOTAL}} = 1.1\text{K}$
PIPE INSULATION: $5''$
PIPE MATERIAL: $A312M\ A335\ P22$

ENGINEERING RECORD				5	1	MECHANICAL SMUGGER SIZE 1 FE	307
DESIGNED	M.L.M.	CHECKED		4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
DATE	4-24-60	DATE		3	SCALE:	Stearns-Roger	11165/8
REVIEWED	H.L.	APPROVED		2	NONE		
DATE	4-24-60	DATE		1	10 Mw Solar Pilot Plant Daggett, California		
PROJECT	10 Mw			REVISIONS			
DATE	4-24-60			ANALYSIS ID. CODE	PROJECT NO C-21700	LINE NO 10/VT-11-FEA	MARK NO H-VT/11-4



ELEVATION LOOKING WEST



LEVEL 2
LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 5/8"$
- $\Delta Y = 6 3/8" \text{ LN}$
- $\Delta Z = 2"$

Vol. P60-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-3 1
D	STRUCTURAL	S32-3 0
C	ELECTRICAL	
B		
A		

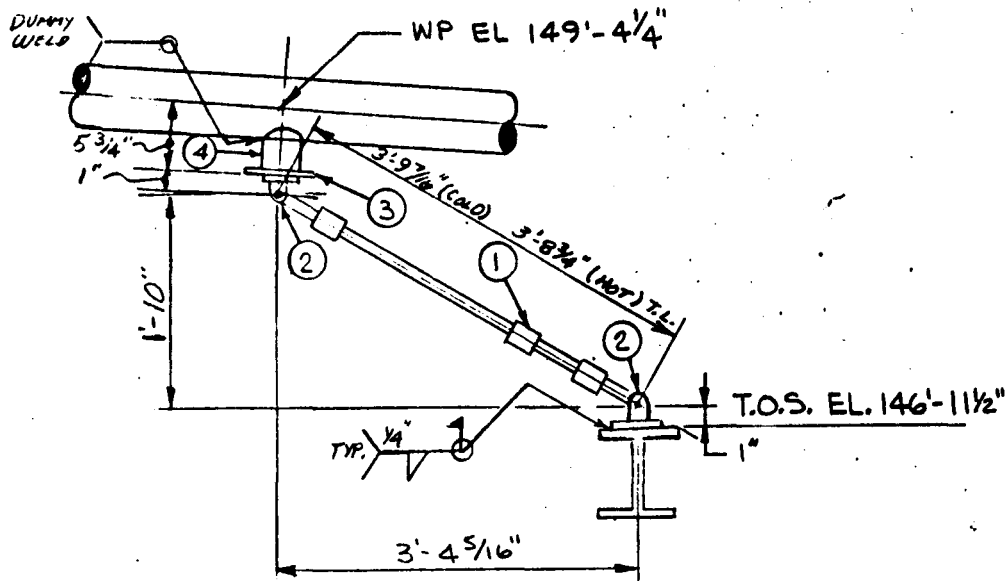
14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	2"XS PIPE, STALKING (BY FAB.)	
4	1	3"X 3"X 1/4" C.S. B (BY FAB.)	
3			
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SUBMITTER, SIZE 1 FIG. 307	
ITEM NO.	REV.	COMPONENT DESCRIPTION	REMARKS
		SCALE: NONE	
		Stearns-Roger	11165/8
		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
ANALYSIS ID. CODE		PROJECT NO C-21700	LINE NO 21700-100 MARK NO H-VT-12-20

REVISE ITEMS 1,2,3, LENGTHS, & REAR BRACKET ATTACHMENTS

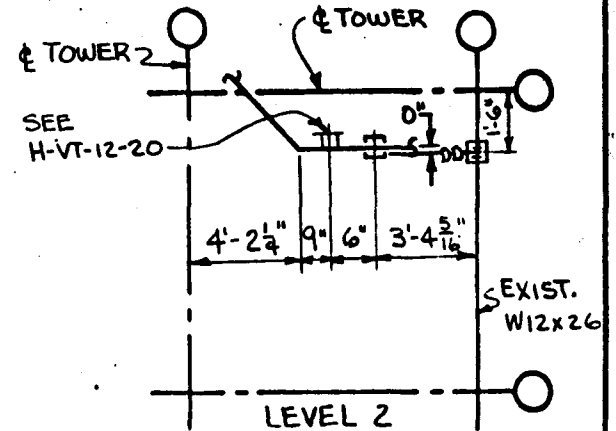
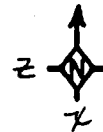
NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.1K$, $F_y = 0.3K$
 PIPE SIZE: 2.315" O.D. $F_{total} = 0.8K$
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
REVISIONS			
1			
2			
3			
4			
5			



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 5/8"$
- $\Delta Y = 6 3/8" \text{ DU}$
- $\Delta Z = 2"$

VOL. P60-2

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-3	
D		STRUCTURAL	S32-3	0
C		ELECTRICAL		
B				
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4	1	2"XS PIPE STANCHION, BY PIPE FAB.	
3	1	3"x3"x1/4" C.S. PLATE BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1/4"	
1	1	MECHANICAL STOP, SIZE 1/4" FIG. 307	
ITEM NO.	REV.	COMPONENT DESCRIPTION	REMARKS
		Stearns-Roger	11165/8

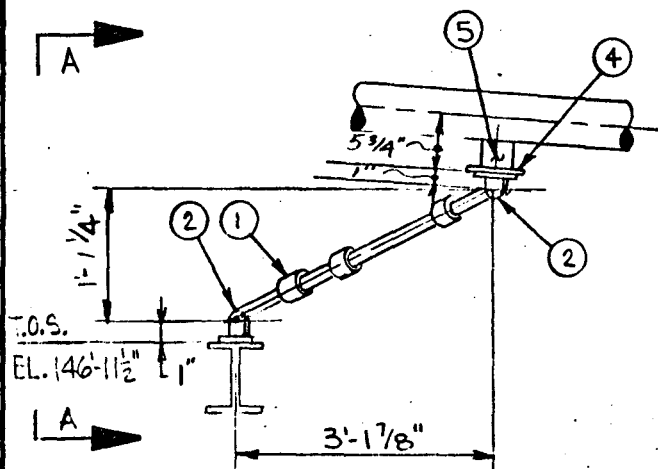
REVISIT ITEMS 13-2, LENGTHS & REAR BRACKET ATTACHMENTS

NOTES:

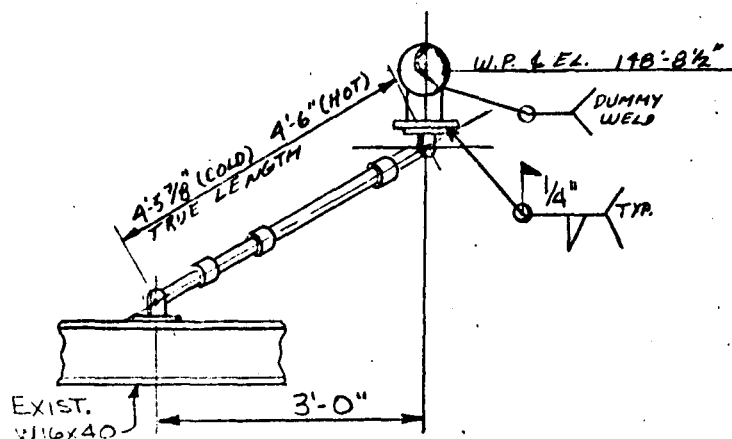
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_y = 0.1K$, $F_z = 0.24K$
 PIPE SIZE: 2.875" O.D., $F_{TOTAL} = 0.25K$
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A235 P22

ENGINEERING RECORD			
DESIGNED	DATE	DRAWN	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE	PROJECT	DATE
ANALYSIS ID. CODE	X-VT-12-21		

5		REVISIONS
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TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO
MARK NO	H-VT-12-21	



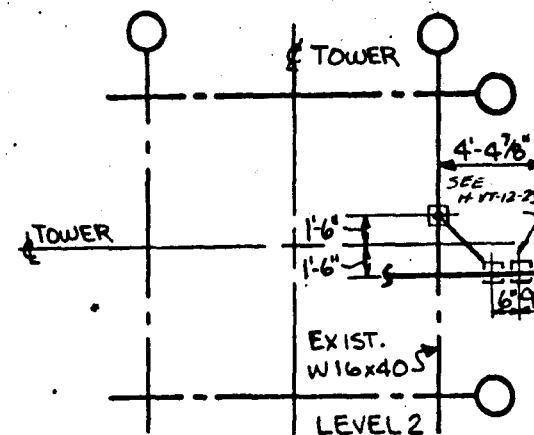
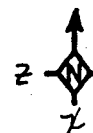
ELEVATION LOOKING NORTH



VIEW A-A - ELEVATION LOOKING EAST

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.4K$, $F_y = 0.13K$
 PIPE SIZE: 2" X 5" O.D. $F_2 = 0.4K$, $F_{TOTAL} = 0.6K$
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-VT-12-22		



LOCATION PLAN

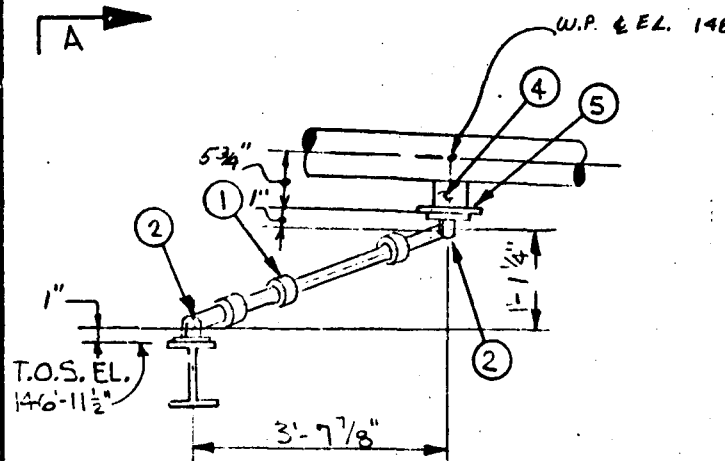
- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 9/16"$
- $\Delta Y = 1/2" \text{ UP}$
- $\Delta Z = 9/16"$

VOL. P60-2

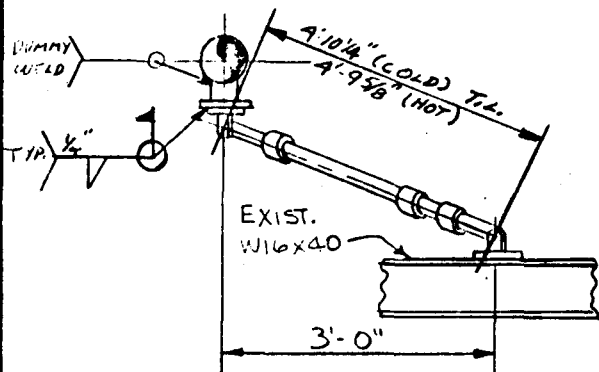
△ REVISE ITEMS 1, 2, 3, LENGTHS & REAR BRACKET ATTACHMENTS

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-3
D	STRUCTURAL	S32-3
C	ELECTRICAL	
B		
A		

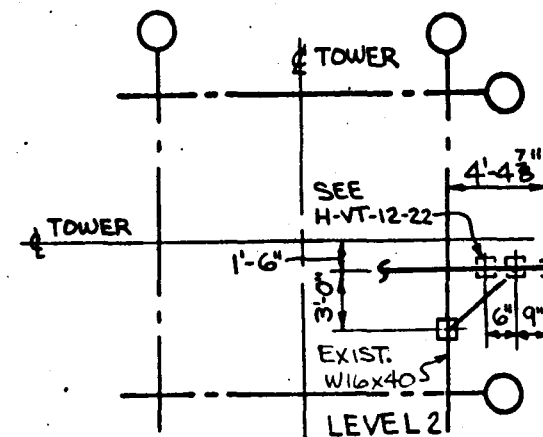
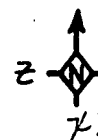
14			
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5	1	2" X 5" PIPE (STATION) (BY FAB.)	
4	1	3"x3"x1/4" C.S. PL (BY PIPE FAB.)	
3			
2	2	REAR BRACKET, SIZE 1/2	
1	1	MECHANICAL SNUBBER, SIZE 1/2 FIB	327
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE: NONE	Stearns-Roger *****		11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO	MARK NO H-VT-12-22



ELEVATION LOOKING NORTH



VIEW A-A - ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 9/16"$
- $\Delta Y = 1/2" \text{ LJP}$
- $\Delta Z = 9/16"$

VOL. P60-2

△ REVISE ITEMS 1, 2 & 3 LENGTHS REAR BRACKET ATTACHMENTS

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING	P9-3
D		STRUCTURAL	S32-3
C		ELECTRICAL	
B			
A			

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6			
5	1	3" x 3" x 1/4" IL (BY PIPE FAB.)	
4	1	2" X S PIPE STANCHION (BY PIPE FAB.)	
3			
2	2	REAR BRACKET, SIZE 1/2	
1	1	MECHANICAL SILL PLATE, SIZE 1/2	FIG. 207
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE:	Stearns-Roger		
NONE			11165/8
10 Mile SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700	LINE NO 21700-12-23	MARK NO H-VT-12-23	

NOTES:

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = 0.4 \text{ K}$, $F_y = 0.13 \text{ K}$

PIPE SIZE: $F_2 = 0.5 \text{ K}$, $F_{\text{TOTAL}} = .6 \text{ K}$

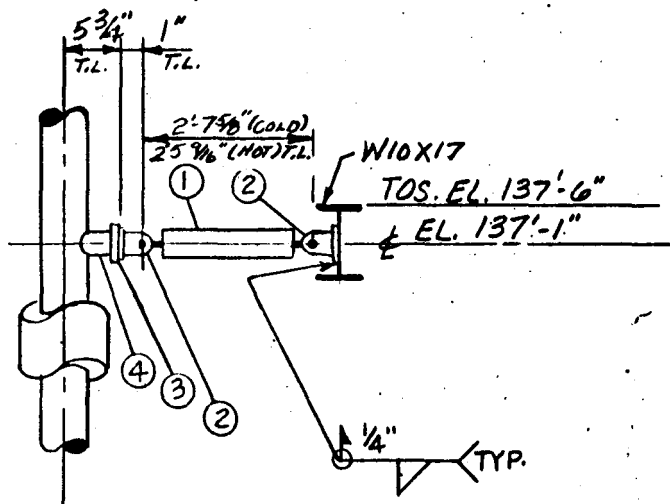
PIPE INSULATION: 3 1/2"

PIPE MATERIAL: 15TH APR 63 P22

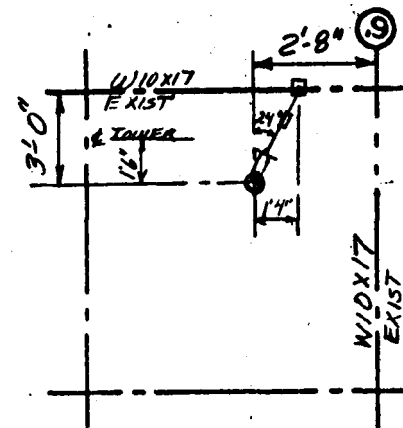
ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
M. J. J.	4/25/60		
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-VT-1-A-P		

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REVISIONS



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT

$\Delta X = -1"$
 $\Delta Z = -2 7/8"$
 $\Delta Y = 5/8" DN$

VOL. P60-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING	P9-3
D	STRUCTURAL	S33-4
C	ELECTRICAL	
B		
A		

14		
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5		
4	1	2"XS PIPE STANCHION BY PIPE FAB
3	1	3"X 3"X 1/4"CS.R BY PIPE FAB
2	2	REAR BRACKET SIZE 1/4
1	1	MECHANICAL SNUBBER SIZE 1/4 FIG. 307

△ REVER ITEMS 1 & 2, LENGTHS, ΔX MONT. & REAR BRACKET ATTACH.

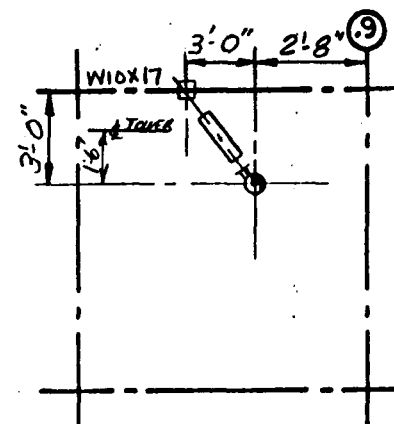
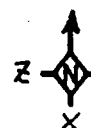
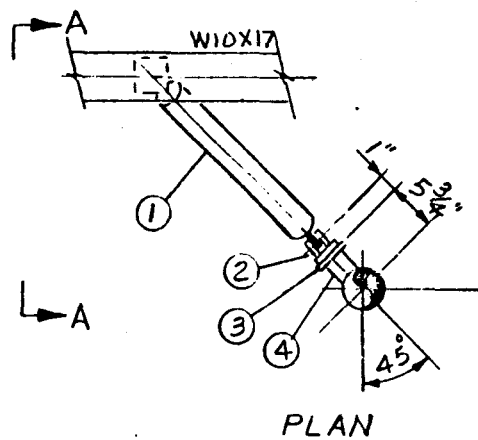
NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_X = .3K$, $F_Z = .15K$
 PIPE SIZE: 2.875" O.D. $F_{TOTAL} = .35K$
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-25-80	DATE	7/1/80
REVIEWED	J.P.L.	APPROVED	
DATE	7/20/80	DATE	
PROJECT	EDR		
DATE	6-20-80		
ANALYSIS ID. CODE	X-VT-1-A-9		

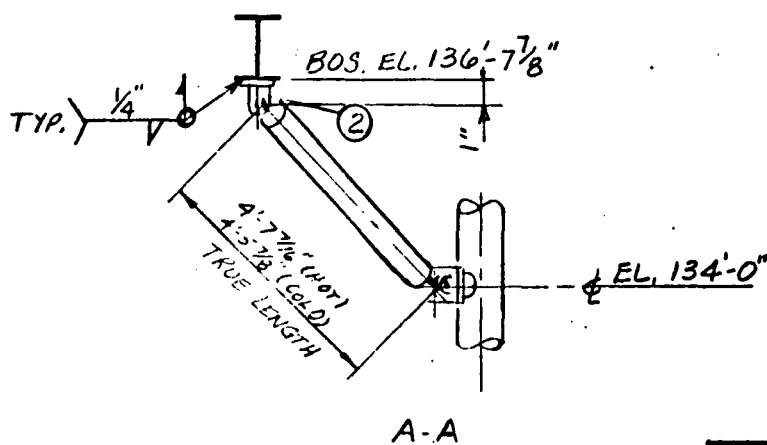
5		
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ITEM REQD		COMPONENT DESCRIPTION
SCALE:	NONE	Stearns-Roger
REVISIONS		
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 210-VT-12-KEP	MARK NO H-VT-12-24

11165/8



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1"$
- $\Delta Z = -2\frac{7}{8}"$
- $\Delta Y = \frac{5}{8}" \text{DN}$

VOL. P60-2



VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-3
D	STRUCTURAL	S33-4
C	ELECTRICAL	
B		
A		

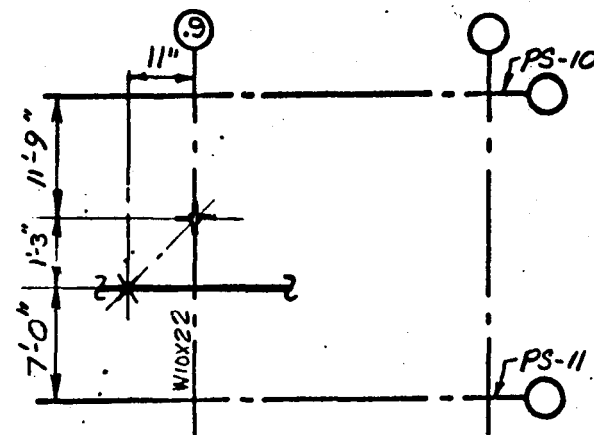
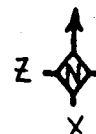
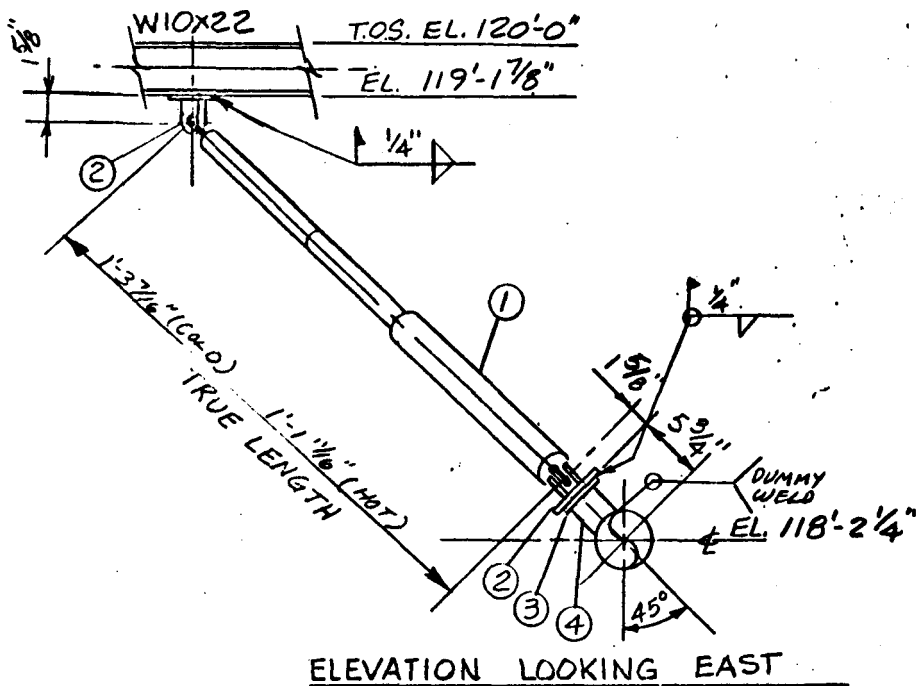
14			
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5			
4	1	2"XS PIPE STANCHION BY PIPE FAB	
3	1	3" X 3" X 1/4" C.S. PLATE BY PIPE FAB	
2	2	REAR BRACKET, SIZE 1/2	
1	1	MECHANICAL SNUBBER SIZE 1/2 FIG. 307	
ITEM	REQD	COMPONENT DESCRIPTION	REMARKS
		SCALE: NONE	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700 LINE NO 21000-10A-15 MARK NO H-VT-12-25			

RE-USE ITEMS 1, 2, 3, LENGTHS & REAR BRACKET ATTACH.

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .2K$, $F_y = .5K$
 PIPE SIZE: 2.875" OD, $F_z = .25K$, $F_{TOTAL} = .6K$
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-25-5	DATE	
REVIEWED		APPROVED	
DATE		DATE	
PROJECT			
DATE			
ANALYSIS ID. CODE	X-VI-14		

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REVISIONS



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- # LOCATION OF PIPE ATTACHMENT
- $\Delta X = -3 \frac{7}{8}"$
- $\Delta Z = -1 \frac{1}{16}"$
- $\Delta Y = 1 \frac{1}{16}"$ DN

P60-2

REAR BRACKET ATTACHMENTS
REVISE ITEMS 1, 2, 5, LENGTHS, STEEL ATTACH. LOC., S.D. LOAD

NOTES

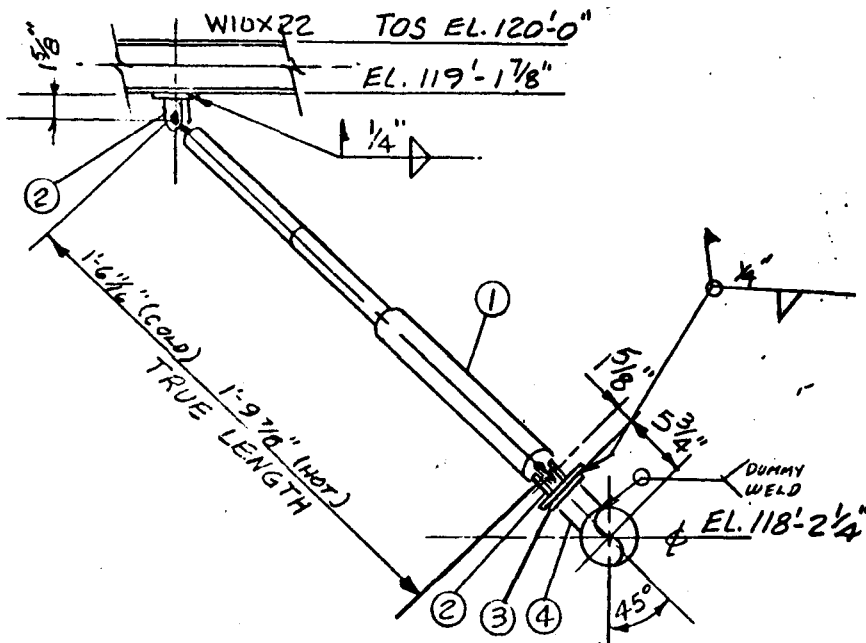
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: $F_x = .35k$, $F_z = .4k$
PIPE SIZE: 2.875" O.D. $F_y = .16k$ TOTAL = .56k
PIPE INSULATION: 3 1/2"
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

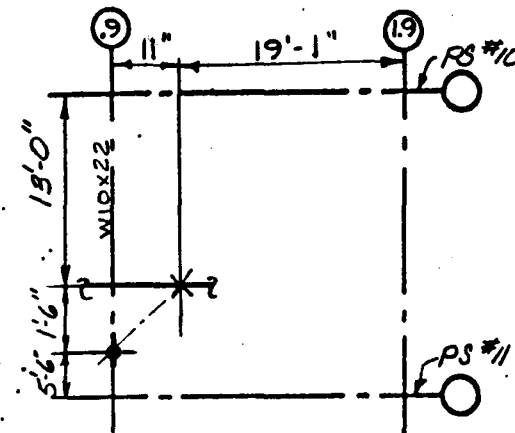
DESIGNED	MLM	CHECKED	J.P.M.
DATE	4-25-80	DATE	5/11/80
REVIEWED	J.P.M.	APPROVED	
DATE	5-21-80	DATE	
PROJECT	RDR	PROJECT	P.P.Y.
DATE	5-21-80	DATE	6-12-80
ANALYSIS ID. CODE	X-VT-12-3	PROJECT NO	C-21700

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4	1	2"XS PIPE STATION BY PIPE FAB.	
3	1	3"x3"x 1/4"C.S. PL BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNUBBER, SIZE 1, FK. 306	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger *****	11165/8
NONE			
TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
C-21700		LINE NO 21700-VT-12-KFB	MARK NO H-VT-12-3



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -3 \frac{7}{8}"$
- $\Delta Z = -1 \frac{1}{16}"$
- $\Delta Y = 1 \frac{1}{16}" \text{DN}$

P60-2

VENUE	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING	P9-10
D		STRUCTURAL	S33-1
C		ELECTRICAL	
B			
A			

ENGINEERING RECORD

DESIGNED	MLM	CHECKED	
DATE	4-25-6	DATE	
REVIEWED		APPROVED	
DATE		DATE	
PROJECT	EDR		
DATE			
ANALYSIS ID. CODE	V-17-1-A		

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4	1	2"XS PIPE STANCHION BY PIPE FAB.	
3	1	3"X3"X1/4"C.S.R. BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNUBBER, SIZE 12, F16	306
ITEM REQD	COMPONENT DESCRIPTION		REMARKS
SCALE:	Stearns-Roger REGISTERED		
NONE			11165/8

REAR BRACKET ATTACHMENTS

REVISE ITEMS 1, 2, 5, LENGTHS, STEEL ATTACH. LOC., S.D. LOAD

NOTES

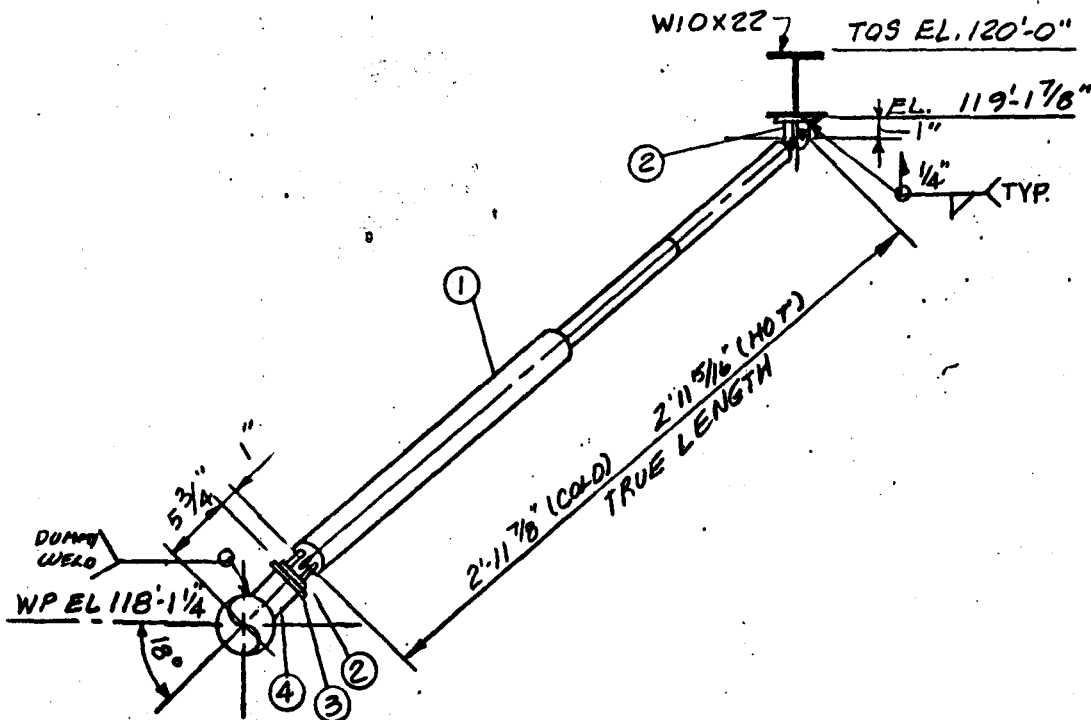
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .6K$, $F_y = .25K$
 PIPE SIZE: 2.875" O.D. $F_z = .2K$, $F_{TOTAL} = .80K$
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: A335 P22

TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA

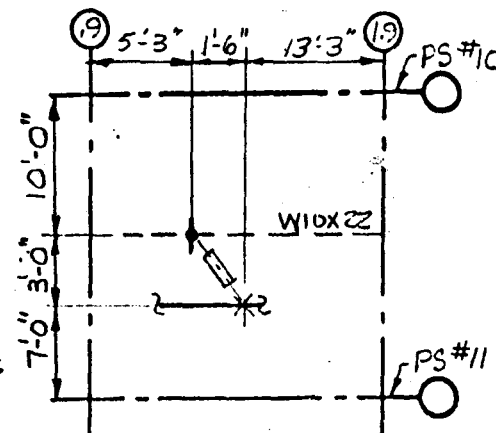
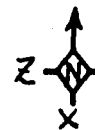
PROJECT NO C-21700

LINE NO 21-VT-12-K5B

MARK NO H-VT-12-27



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1\frac{5}{16}"$
- $\Delta Z = -2\frac{7}{8}"$
- $\Delta Y = \frac{1}{16}" \text{DN}$

VOL. P&ID-2

REVISIT ITEMS 1 & 2, LENGTHS, LOCATION, REAR BRACKET ATTACH

NOTES

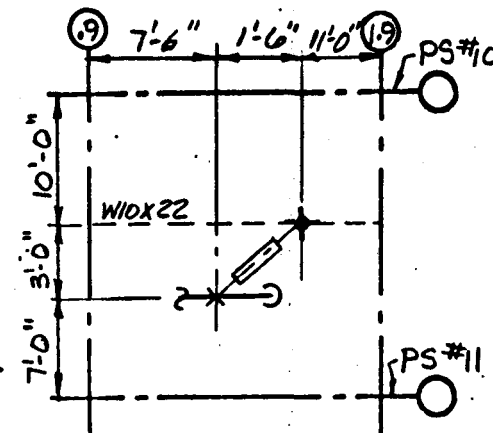
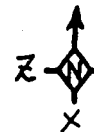
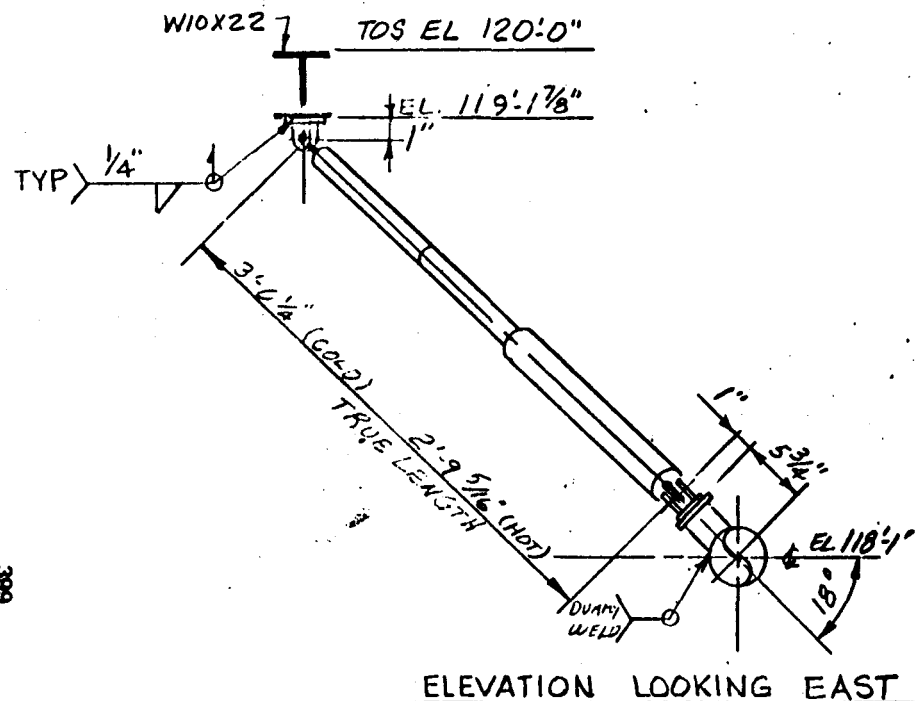
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .15k$, $F_y = .06k$,
 PIPE SIZE: 2.875" O.D. $F_z = .12k$, $F_{TOTAL} = .2k$
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: 3TM A335 P22

ENGINEERING RECORD

DESIGNED	MM	DESIGNED	MM
DATE	7-28-80	DATE	7-28-80
REVIEWED	MM	APPROVED	MM
DATE	11-30-80	DATE	11-30-80
PROJECT	BLR	PROJECT	BLR
DATE	5-24-80	DATE	5-24-80
ANALYSIS ID. CODE	X-VT-1-A-B	ANALYSIS ID. CODE	X-VT-1-A-B

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4	1	2"XS PIPE STATION BY PIPE FAB.	
3	1	3"X3"X 1/4" CS. B. BY PIPE FAB.	
2	2	REAR BRACKET 512T 1/4	
1	1	MECHANICAL BRACKET 512T 1/4	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE		
		Stearns-Roger	11165/8
		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700	LINE NO	2 1/2 VT-12-KEB MARK
			+ VT-12-25



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1 \frac{15}{16}"$
- $\Delta Z = -2 \frac{7}{8}"$
- $\Delta Y = \frac{1}{16}"$ DN

VOL. P60-2

VENIOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-10	P4
D	STRUCTURAL S33-1	1
C	ELECTRICAL	
B		
A		

REVISE ITEMS 1 & 2, LENGTHS, LOCATION & REAR BRACKET ATTACH

NOTES

PIPE TEMPERATURE: 960°F

STRUCTURAL DESIGN LOAD: $F_x = .115K$, $F_y = .06K$

PIPE SIZE: 3.875" O.D. $F_t = .08K$, $F_{TOTAL} = .2K$

PIPE INSULATION: 3 1/2"

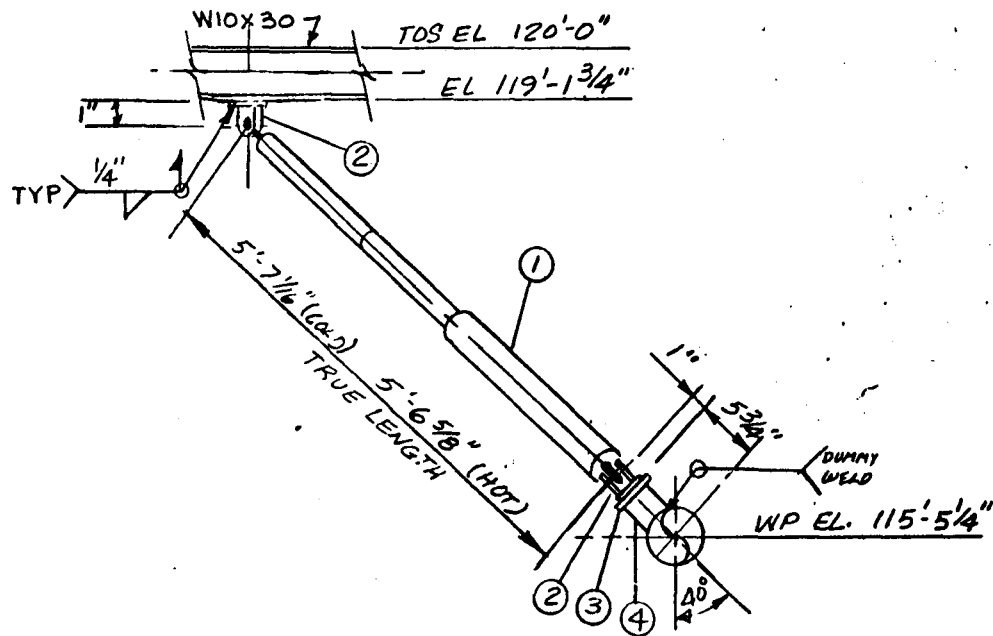
PIPE MATERIAL: A335 P22

ENGINEERING RECORD

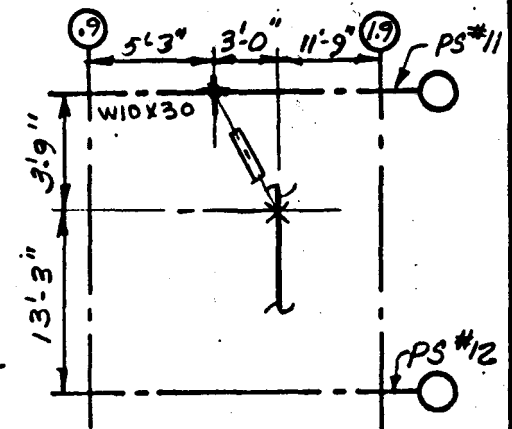
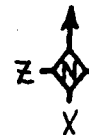
DESIGNED	MLM	DRAWN	MLM
DATE	4-25-60	DATE	4-25-60
REVIEWED	MLM	APPROVED	MLM
DATE	4-25-60	DATE	4-25-60
PROJECT	ADR	PROJECT	ADR
DATE	4-25-60	DATE	4-25-60
ANALYSIS ID. CODE	ADR-11165	ANALYSIS ID. CODE	ADR-11165

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REVISIONS	

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4	1	2"XS PIPE STANCHION BY PIPE FAB.	
3	1	3"X3"X 1/4 CS.R BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1/4	
1	1	MECHANICAL NUMBER, SIZE 1/4 FR. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:		Stearns-Roger	11165/8
NOTE			
		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
		PROJECT NO C-21700	LINE NO. C-12-10 MARK NO. H-VT-12-29



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1"$
- $\Delta Z = -1/2"$
- $\Delta Y = 0$

VOL. P60-2

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	P9-10	P4
D		STRUCTURAL	S33-1	1
C		ELECTRICAL		
B				
A				

△ REVISE ITEMS 1 & 2, LOCATION, LENGTH & REAR BRACKET ATTACH.

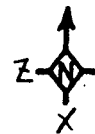
NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .1K$, $F_y = .1K$,
 PIPE SIZE: 2.875" O.D., $F_z = .1K$, $F_{TOTAL} = .18K$
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	NW
DATE	4-28-80	DATE	5/1/80
REVIEWED		APPROVED	
DATE		DATE	
PROJECT	SUP		
DATE	4-28-80		
ANALYSIS ID. CODE	Y-VT-1-1-8		

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4	1	2" X 3" PIPE STANCHION BY PIPE FAB.	
3	1	3" X 3" X 1/4" C.S. PLATE BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1/4"	
1	1	MECHANICAL SNUBBER, SIZE 1/4" FB	307
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 2 1/2" VT-12-KFE	MARK NO H-VT-12-30



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1''$
 $\Delta Z = -\frac{1}{2}''$
 $\Delta Y = 0''$

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4	1	2" X S PIPE STANCHION BY PIPE FAB.
3	1	3" X 3" 1/4" C.S. R BY PIPE FAB
2	2	REAR BRACKET SIZE 1/4

5	
4	
3	
2	
1	<i>APC</i>
REVISIONS	

1	1	MECHANICAL SNUBBER SIZE 1/4 FKG 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE: NONE		Stearns-Roger INCORPORATED	11165/8

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700	LINE NO 2 1/2" VT-12-KEH	MARK NO H-VT-12-31
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APPENDIX II

PURCHASE ORDERS

FOR

PIPING AND MECHANICAL EQUIPMENT

CONSTRUCTION PACKAGE 9

LONG LEAD MATERIAL

<u>Spec No.</u>	<u>P.O. No.</u>	<u>Description</u>
E6	--	Primary Prefabricated Pipe
E2	3001	Primary Pipe Supports
E8	3002	Pipe Support Snubbers

PRIMARY PREFABRICATED PIPE

The pipe fabrication effort was accomplished by Stearns-Roger Fabricators, Inc. as a separate job through Stearns-Roger Engineering Corporation and as such does not have a purchase order.

The incolloy pipe, fittings and weld wire required for the fabrication of certain portions of the Rocketdyne designed piping were furnished to Stearns-Roger Fabricators, Inc., by Rocketdyne.

For information on costs associated with the pipe fabrication effort, contact R. J. Perkins, MDAC at (714) 896-3073.

Stearns-Roger

PURCHASE ORDER

PAGE NO. 1 of 9	DATE Jul 23/80	REQUISITION E3 Rev. 1	ACCOUNT X73420	REL. NO.	ORDER NO. 3001 C21700
REQUIRED AT DESTINATION Oct 01/80			SELLER'S SHIPPING PROMISE See Below		
F.O.B. POINT Jobsite			SHIPPING POINT Brooklyn, NY		
SELLER F & S CENTRAL c/o Densand Inc. 1117 South Huron Denver, CO 80223 Attn: Mr. Gary E. Morgan (303) 777-9217			TERMS OF PAYMENT AND INVOICING INSTRUCTIONS ARE STATED AFTER LAST NUMBERED ITEM OF THIS ORDER DIRECT CORRESPONDENCE CONCERNING THIS ORDER TO: STEARNS-ROGER BOX 5888, DENVER, CO 80217 ATTN: Mr. A. N. Mullins PHONE (303) 758-1122 TWX 910-931-0453 TELEX 045-540		

CONSIGN TO: TOWNSEND AND BOTTOM, INC., c/o J. M. Abram, Construction
Manager, Solar-One, Pilot Plant, Dagget, CA 92327

ROUTE VIA: Prepaid - Truck - Vendor's Option

SUPPLEMENT SUMMARY - SELLER MUST CHECK EACH REVISION AND COMPLY WITH ALL CHANGES.

PREVIOUS SUPPLEMENT SUMMARIES, IF ANY, ARE RECOUNTED ON THE LAST NUMBERED PAGE OF THIS ORDER.

CONFIRMING ORDER - DO NOT DUPLICATE

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
		PRIMARY PIPE SUPPORTS, furnished to meet the requirements and specifications of Stearns-Roger Specification SR-E2, D.O.E. No. 40P700-20S dated Jul 02/80 (for Purchase) and Stearns-Roger Hanger Volume P60-1, D.O.E. No. 40P700-161, dated Jun 26/80 (Rev. 3).	

GENERAL CONDITIONS FOR JOB C21700
SPECS. ATTACHED
TERMS AND CONDITIONS FORM TC 5-76 ATTACHED

APPROX TOTAL VALUE OF ORDER \$28,499.00 (Part)
ORDER IS SUBJECT TO TERMS, CONDITIONS AND SPECIFICATIONS STATED HEREIN AND ATTACHED. ORDER AND ACCOUNT NUMBERS MUST BE STATED ON ALL INVOICES, CORRESPONDENCE, SHIPPING DOCUMENTS AND PACKAGES.

BUYER
STEARNS-ROGER ENGINEERING CORPORATION

BY

THIS DOCUMENT CONSISTS OF 9 PAGE(S) NOT INCLUDING REFERENCED ATTACHMENTS.

407 1521p/ANM/sf

Stearns-Roger

PURCHASE ORDER

PAGE NO. 2	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
		SCHEDULE FW-1	
1	1	H-FW-2-2	\$98.31 Ea.
2	1	H-FW-2-3	98.31 Ea.
3	1	H-FW-2-4	98.31 Ea.
4	1	H-FW-2-5	98.31 Ea.
5	1	H-FW-2-6	239.12 Ea.
6	1	H-FW-2-7	98.31 Ea.
7	1	H-FW-2-8	98.31 Ea.
8	1	H-FW-2-9	98.31 Ea.
9	1	H-FW-2-10	98.31 Ea.
10	1	H-FW-2-11	367.16 Ea.
11	1	H-FW-2-12	368.25 Ea.
12	1	H-FW-2-13	115.78 Ea.
13	1	H-FW-2-14	139.76 Ea.
14	1	H-FW-2-15	98.31 Ea.
15	1	H-FW-2-16	98.31 Ea.
16	1	H-FW-2-17	98.31 Ea.
17	1	H-FW-2-18	98.31 Ea.
18	1	H-FW-2-19	451.20 Ea.
19	1	H-FW-2-20	99.03 Ea.
20	1	H-FW-2-21	22.60 Ea.
		SCHEDULE FW-2	
21	1	H-FW-2-23	22.60 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO. 3	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
22	1	H-FW-2-24	\$94.83 Ea.
23	1	H-FW-2-25	15.93 Ea.
24	1	H-FW-2-26	22.60 Ea.
25	1	H-FW-2-27	20.50 Ea.
26	1	H-FW-2-28	22.60 Ea.
27	1	H-FW-2-29	24.14 Ea.
28	1	H-FW-2-30	25.67 Ea.
29	1	H-FW-2-31	22.60 Ea.
30	1	H-FW-2-32	115.78 Ea.
31	1	H-FW-2-33	368.25 Ea.
32	1	H-FW-9-1	22.60 Ea.
33	1	H-FW-9-2	17.23 Ea.
34	1	H-FW-9-3	22.60 Ea.
35	1	H-FW-9-4	17.73 Ea.
36	1	H-FW-9-5	21.21 Ea.
37	1	H-FW-9-6	82.24 Ea.
38	1	SCHEDULE MS-2 H-MS-2-6	189.94 Ea.
39	1	H-MS-2-7	189.94 Ea.
40	1	H-MS-2-8	189.94 Ea.
41	1	H-MS-2-9	189.94 Ea.
42	1	H-MS-2-10	189.94 Ea.
43	1	H-MS-2-11	1,240.52 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO.		REL. NO.	ORDER NO.
4	F & S CENTRAL		3001 C21700

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
44	1	H-MS-2-12	189.94 Ea.
45	1	H-MS-2-13	189.94 Ea.
46	1	H-MS-2-14	189.94 Ea.
47	1	H-MS-2-15	189.94 Ea.
48	1	H-MS-2-16	2,470.13 Ea.
49	1	H-MS-2-17	189.94 Ea.
50	1	H-MS-2-18	189.94 Ea.
51	1	H-MS-2-19	189.94 Ea.
52	1	H-MS-2-20	189.94 Ea.
53	1	H-MS-2-21	1,427.52 Ea.
54	1	H-MS-2-22	1,409.91 Ea.
55	1	H-MS-2-23	1,341.71 Ea.
56	1	H-MS-2-24	806.37 Ea.
57	1	H-MS-2-25	558.46 Ea.
58	1	H-MS-2-26	187.24 Ea.
59	1	H-MS-2-27	188.42 Ea.
60	1	H-MS-2-28	153.51 Ea.
61	1	H-MS-2-29	258.44 Ea.
62	1	H-MS-2-30	133.53 Ea.
63	1	H-MS-2-32	84.01 Ea.
64	1	H-MS-2-33	39.44 Ea.
65	1	H-MS-2-34	176.72 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO. 5	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
66	1	H-MS-2-35	\$66.30 Ea.
67	1	H-MS-2-36	93.98 Ea.
68	1	H-MS-2-37	Advise
69	1	SCHEDULE MS-3 H-MS-3-1	131.44 Ea.
70	1	H-MS-3-3	84.14 Ea.
71	1	H-MS-3-4	51.76 Ea.
72	1	H-MS-3-5	124.06 Ea.
73	1	H-MS-3-6	44.74 Ea.
74	1	H-MS-3-7	37.69 Ea.
75	1	H-MS-3-8	187.42 Ea.
76	1	SCHEDULE MS-6 H-MS-6-1	548.89 Ea.
77	1	H-MS-6-2	109.07 Ea.
78	1	H-MS-8-1	86.26 Ea.
79	1	H-MS-8-2	160.59 Ea.
80	1	H-MS-8-3	127.55 Ea.
81	1	H-MS-10-1	70.36 Ea.
82	1	H-MS-10-2	75.98 Ea.
83	1	H-MS-10-3	36.87 Ea.
84	1	H-MS-10-4	158.91 Ea.
85	1	SCHEDULE MS-7 H-MS-7-2	116.39 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO.		REL. NO.	ORDER NO.
6	F & S CENTRAL		3001 C21700

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
86	1	H-MS-7-3	\$51.92 Ea.
87	1	H-MS-7-4	184.98 Ea.
88	1	H-MS-7-5	170.22 Ea.
89	1	H-MS-7-6	61.03 Ea.
90	1	H-MS-7-7	61.11 Ea.
91	1	H-MS-7-8	93.98 Ea.
92	1	H-MS-7-9	66.30 Ea.
93	1	H-MS-7-10	51.92 Ea.
94	1	SCHEDULE MS-9 H-ST-9-1	189.48 Ea.
95	1	H-ST-13-1	34.26 Ea.
96	1	H-ST-13-2	41.11 Ea.
97	1	H-ST-14-1	27.47 Ea.
98	1	SCHEDULE VT-1 H-VT-1-2	127.91 Ea.
99	1	H-VT-1-3	127.91 Ea.
100	1	H-VT-1-4	127.91 Ea.
101	1	H-VT-1-5	127.91 Ea.
102	1	H-VT-1-6	127.91 Ea.
103	1	H-VT-1-7	572.76 Ea.
104	1	H-VT-1-8	127.91 Ea.
105	1	H-VT-1-9	127.91 Ea.
106	1	H-VT-1-10	127.91 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO.		REL. NO.	ORDER NO.
7	F & S CENTRAL		3001 C21700

<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
107	1	H-VT-1-11	\$127.91 Ea.
108	1	H-VT-1-12	760.68 Ea.
109	1	H-VT-1-13	127.91 Ea.
110	1	H-VT-1-14	127.91 Ea.
111	1	H-VT-1-15	127.91 Ea.
112	1	H-VT-1-16	127.91 Ea.
113	1	H-VT-1-17	779.34 Ea.
114	1	H-VT-1-18	660.66 Ea.
115	1	H-VT-1-19	440.17 Ea.
116	1	H-VT-1-20	474.56 Ea.
117	1	H-VT-1-21	436.71 Ea.
118	1	H-VT-1-22	399.54 Ea.
119	1	H-VT-1-23	427.13 Ea.
120	1	H-VT-1-24	104.37 Ea.
121	1	H-VT-1-25	91.86 Ea.
122	1	H-VT-1-26	116.79 Ea.
123	1	H-VT-11-1	164.12 Ea.
124	1	H-VT-11-2	166.77 Ea.
125	1	H-VT-12-1	389.27 Ea.
126	1	H-VT-12-2	92.80 Ea.
127	1	H-VT-12-3	56.15 Ea.
128	1	H-VT-12-4	42.25 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO.	REL. NO.	ORDER NO.
8	F & S CENTRAL	3001 C21700

ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
129	1	H-VT-12-5	62.71 Ea.
130	1	H-VT-12-6	46.84 Ea.
131	1	H-VT-12-7	32.03 Ea.
132	1	H-VT-12-8	112.34 Ea.
133	1	H-VT-12-9	29.60 Ea.
134	1	H-VT-12-10	64.50 Ea.
135	1	H-VT-12-11	33.97 Ea.
136	1	H-VT-12-13	32.59 Ea.
137	1	H-VT-12-14	32.75 Ea.

FIRM PRICES

TOTAL WEIGHT: 13,000 lbs. approx.

TAXES:

Purchases are exempt from California Sales, Use Tax under California Tax Permit No. Sy-A:-93-003153 for Resale by Authority of McDonnell - Douglas Corporation.

TERMS OF PAYMENT:

2% 30 days

INVOICING INSTRUCTIONS:

Mail original and 4 copies with original shipping documents to:

STEARNS-ROGER ENGINEERING CORPORATION
P. O. Box 5888
Denver, CO 80217

SELLER'S SHIPPING PROMISE

Delivery promised by Oct 01/80 if final pipe support details are received by Seller by Aug 01/80.

PRICING

Unit Pricing for this order is based on F & S Central Base Price List and Condensed Catalog effective Mar 19/79 less 30% and Constant Pipe Supports Bulletin 177 base price less 25%. Prices are firm thru Dec 31/80.

Stearns-Roger

PURCHASE ORDER

PAGE NO.		REL. NO.	ORDER NO.
9	F & S CENTRAL		3001 C21700

CONFIRMING ORDER

This confirms verbal order of Jul 14/80 to your Mr. Gary E. Morgan by our Mr. A. N. Mullins.

REFERENCE

For reference purposes only and not by way of incorporating the same in this Purchase Order, see your written quotation numbered 2711 of Apr 28/80 by Mr. Gary E. Morgan and Mr. Michael H. Osso, Supplement to quotation No. 2711 of May 01/80 by Mr. Michael H. Osso and letters of May 13/80 and Jul 14/80 by Mr. Gary H. Morgan.



P.O. 3002

PIPE SUPPORT SNUBBERS

(Not available at time of issue)