

10 MWe Solar Thermal
Central Receiver Pilot Plant

SOLAR FACILITIES DESIGN INTEGRATION

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

UPDATE: NOVEMBER 1980

September 1980

WORK PERFORMED UNDER CONTRACT
DE-AC03-79SF10499

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



U.S. Department of Energy



Solar Energy

10 MWe Solar Thermal
Central Receiver Pilot Plant

SOLAR FACILITIES DESIGN INTEGRATION

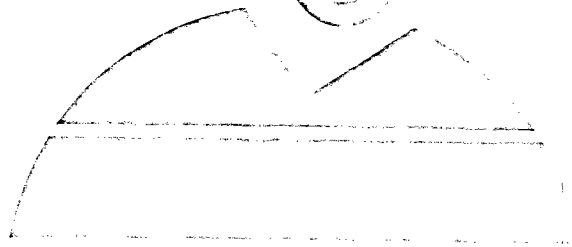
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**10 MWe Solar Thermal
Central Receiver Pilot Plant
Solar Facilities Design Integration**

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

September 1980

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4500 CHERRY CREEK DRIVE
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DENVER, CO 80217**

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

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.

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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 STMPO 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

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

**SPECIFICATION
S-R E6**

D. O. E. NO. 40 P 700 - 175

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.

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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: 1
- 3"-CO-222-QEX 1
 - 6"-MS-201-QEX Sheets 2 & 3 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 + 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 Incoloy 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 Deoxaluminum (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.

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APPENDIX A (CONTD)

Rocketdyne Piping (ASME B&PV Code)

3"-CO-222-QEX
4"-FW-200-MBX
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
4"-ST-202-QEX

Rocketdyne Piping (ANSI B31.1 Piping Code)

3",4"-CO-201-QEX
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)
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.

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

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

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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	↓	3
	ASTM A-234 Grade WPB	

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CORE PIPING MATERIAL

Feedwater Sys. 3-17-80

DESCRIPTION	MATERIAL SPEC.	QTY
4 x 2 1/2 NPS Sch 160 C Reducer	ASTM A-234 Grade WPB	1
2 1/2 x 1 1/2 NPS Sch 80 C Reducer	↑ ↑	3
4 x 3 NPS Sch 160 C Reducer	↑ ↓	2
3 x 1 1/2 NPS Sch 160 C Reducer	↑ ↓	2
1 1/2 x 3/4 NPS Sch 80 C Reducer	↑ ↓	2
3/4 x 1/2 NPS Sch 80 C Reducer	↑ ↓	6
4 NPS Sch 160 Cap	ASTM A-234 Grade WPB	1
4 x 2 NPS Sch 160 Weldolet	ASTM A-105	4
4 x 1 NPS Sch 160 x Sch 80 Weldolet	↑ ↑	1
3 x 1 NPS Sch 160 x Sch 80 Weldolet	↑ ↑	18
4 x 3/4 x 3 1/2 LG Sch 160 x Sch 80 Nipolet	↑ ↓	6
2 1/2 NPS Sch 80 Class 1500 WN Flange	↑ ↓	6
1 NPS Sch 80 Class 1500 WN Flange	ASTM A-105	72
<i>Form</i>		
<i>02-240 Rev 3/76</i>		
<i>PIPE SIZE SCH QTY</i>		

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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

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CORE PIPING MATERIAL

Steam & Start Sys. 3-17-80

DESCRIPTION	MATERIAL SPEC.	QTY
3 Sch 160 Tee	ASTM A335 Grade P22	2
6 Sch XX Cross	A335 P22	3
6 x 3 Sch XX Reducing Cross	A335 P22	2
6 x 2 Sch XX Weldolet	A182 F22	7
4 x 1 Sch XX - Sch 80 Weldolet	A182 F22	2
4 x 1 Sch 80 Weldolet	A182 F22	2
3 x 2 Sch XX Weldolet	A182 F22	1
3 1/2 Dia x 10" Bar Stock	A322 4140	12 ft.
3/4 x 48 x 72 Steel Plate	ASTM A387 Grade 22	1 Pc.
6 Sch XX Pipe	A335 P22	70 ft.
4 Sch XX Pipe	A335 P22	50 ft.
4 Sch 80 Pipe	A335 P22	20 ft.
3 Sch 160 Pipe	A335 P22	50 ft.
2 Sch 80 Pipe	A335 P22	25 ft.
1 Sch 160 Pipe	A335 P22	10 ft.
1 Sch 80 Pipe	ASTM A335 Grade P22	20 ft.
10 Sch 20 Pipe	ASTM A106 Grade B	16 ft.

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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>
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
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
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
SE00 .QEB	Pg 1, 2/4/80; Pg 2, 12/14/79	2
SE00 .QEX	Pg 1-2, 2/4/80	2
SE00 .RNX	Pg 1, 2/4/80	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
9033/4	P1-2	1	Line List
XL-22934	P3-1	1	P&ID
XL-22934	P3-2	1	P&ID
XL-22934	P9-2	1	Piping Drawing -Receiver
XL-22934	P9-3	1	Piping Drawing -Receiver
XL-22934	P9-4	1	Piping Drawing -Receiver
XL-22934	P9-8	1	Piping Drawing -Pipe Rack
XL-22934	P9-10	1	Piping Drawing -Pipe Rack
XL-22934	P9-13	1	Piping Drawing -Sections

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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

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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					
MM	P	PP	SH	FI	SP

Stearns-Roger

ENGINEERING STANDARD

STANDARD NUMBER
DN 00.2

APPROVALS
 As. Sect. *[Signature]*
 Ct. Supv. *[Signature]*
 Div. *[Signature]*

TYPICAL INSTRUMENTATION PRESSURE AND FLOW CONNECTIONS

PAGE 1 OF 3

ISSUED 2/6/70
REVISED 7/30/76

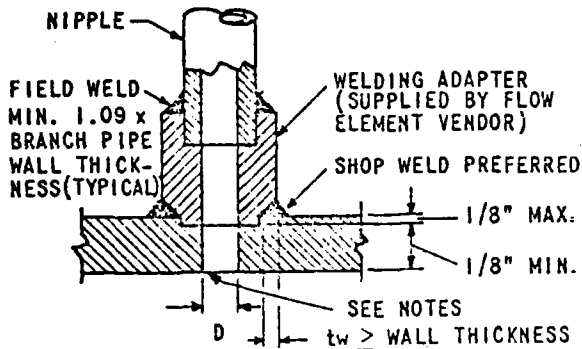


FIGURE 1
FOR TEMPERATURES UP TO 750°F.

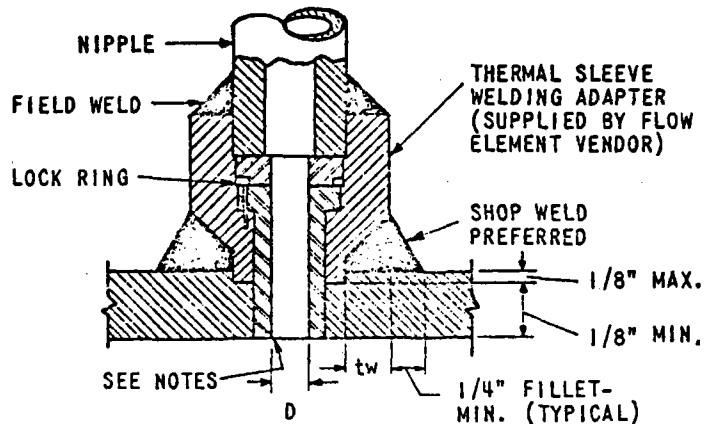


FIGURE 2
FOR TEMPERATURES ABOVE 750°F. AND A SECONDARY ELEMENT WITH APPRECIABLE DISPLACEMENT.

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. t_w = DIMENSION OF PARTIAL PENETRATION WELD.

DIVISION USAGE					
MM	P	PP	SH	FI	SP
	X				

Stearns-Roger
ENGINEERING STANDARD

STANDARD NUMBER
DN 00.2

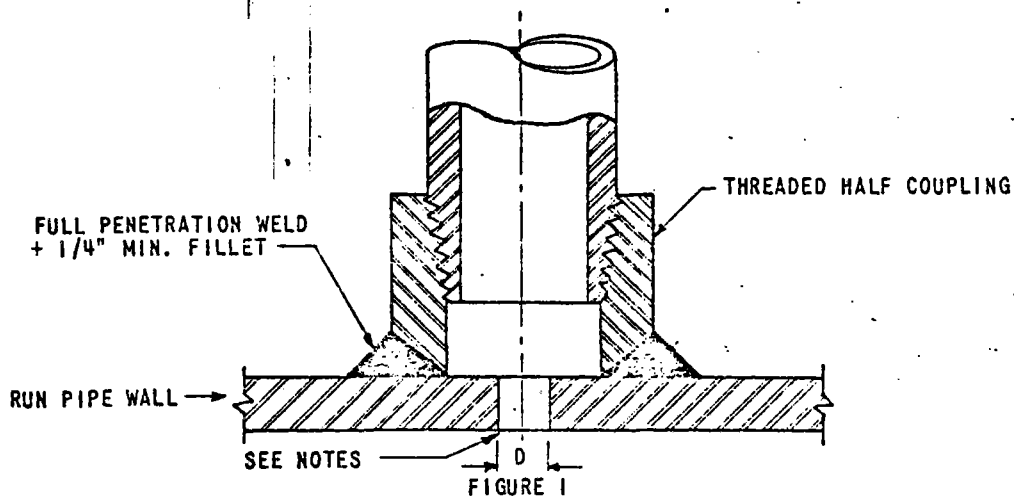
APPROVALS
Sect. *[Signature]*
t. Supv. *[Signature]*
Div. *[Signature]*

TYPICAL INSTRUMENTATION PRESSURE AND
FLOW CONNECTIONS

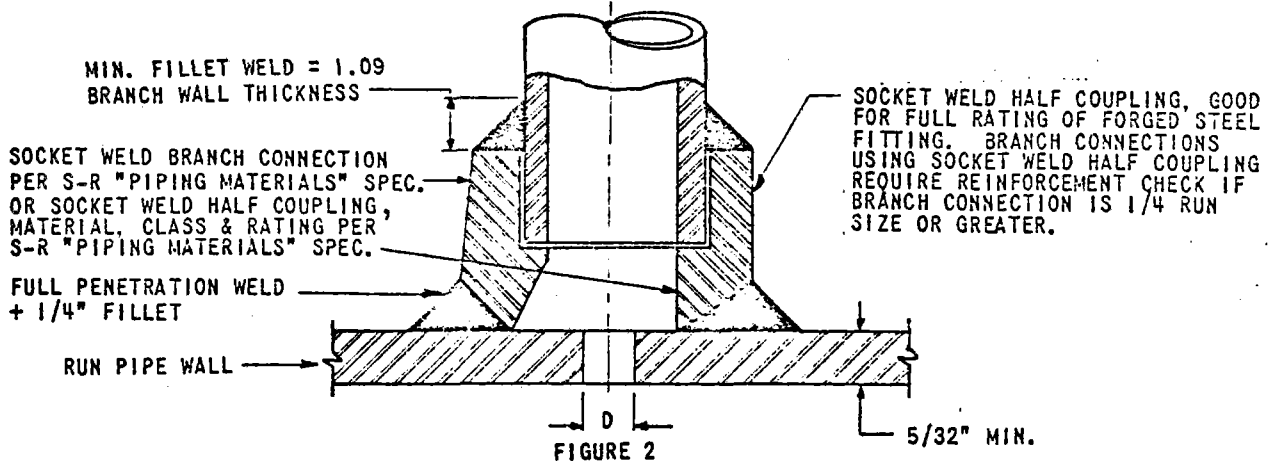
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ISSUED 7/30/76
REVISED

TO BE USED WHERE FULL PENETRATION WELDS ARE DESIRED



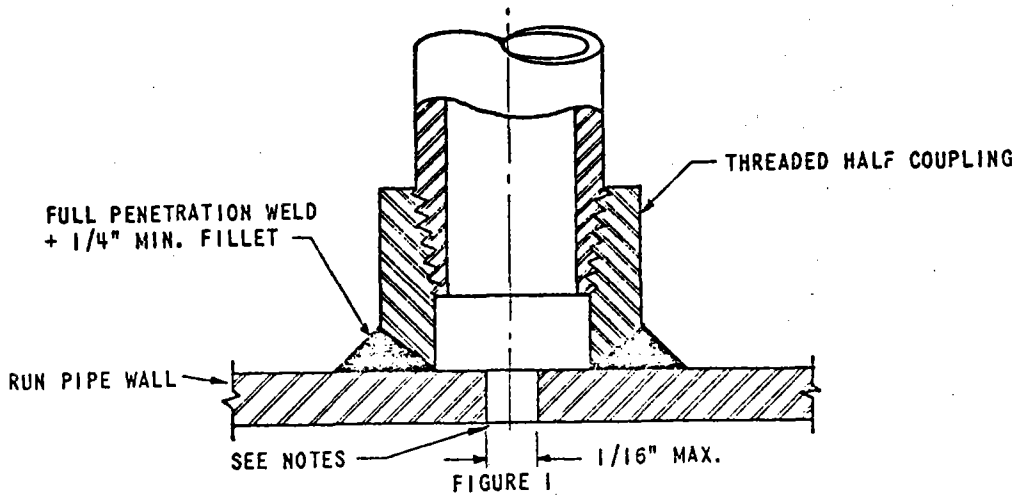
TO BE USED ONLY WHEN SPECIFIED ON PIPING DRAWINGS



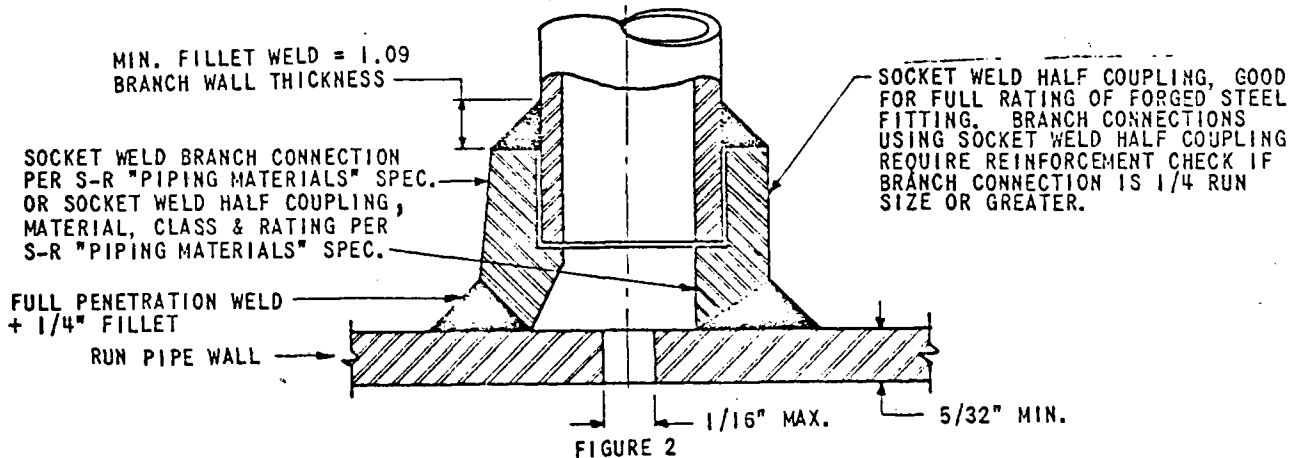
NOTES:

- 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 DN 00.2
MM	P	PP	SH	FI	SP		PAGE <u>3</u> OF <u>3</u>
APPROVALS						TYPICAL INSTRUMENTATION PRESSURE AND FLOW CONNECTIONS FOR ASME TEST CONNS. ONLY	ISSUED 7/30/76
Sect. <i>[Signature]</i>							REVISED
Mat. Supy. <i>[Signature]</i>							
Div. <i>[Signature]</i>							



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.
- 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					
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	X				

Stearns-Roger
INCORPORATED
ENGINEERING STANDARD

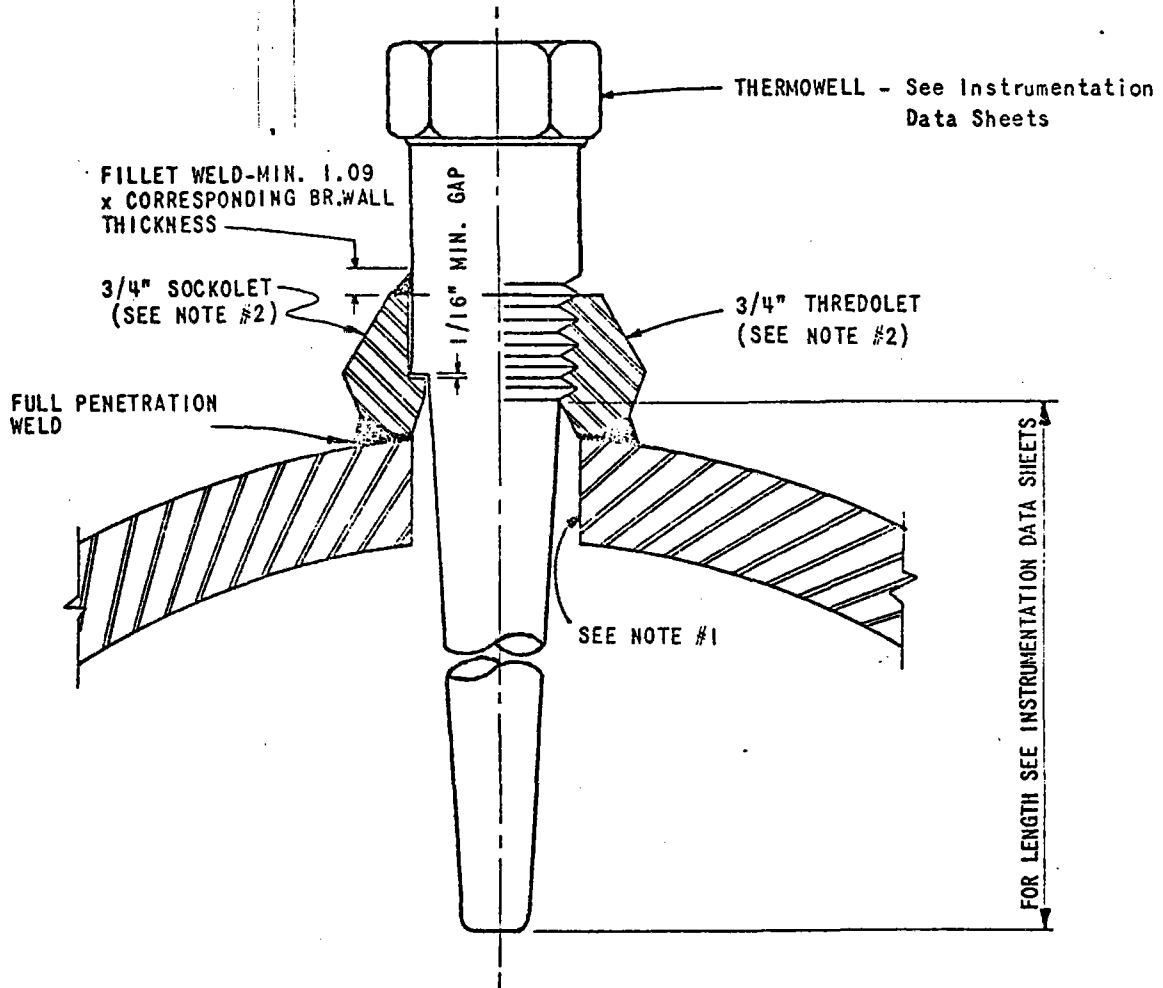
STANDARD NUMBER
DN 00.5

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

THERMOWELL INSTALLATION
STANDARD DETAIL

PAGE 1 OF 5
ISSUED 2/27/70
REVISED 7/30/76

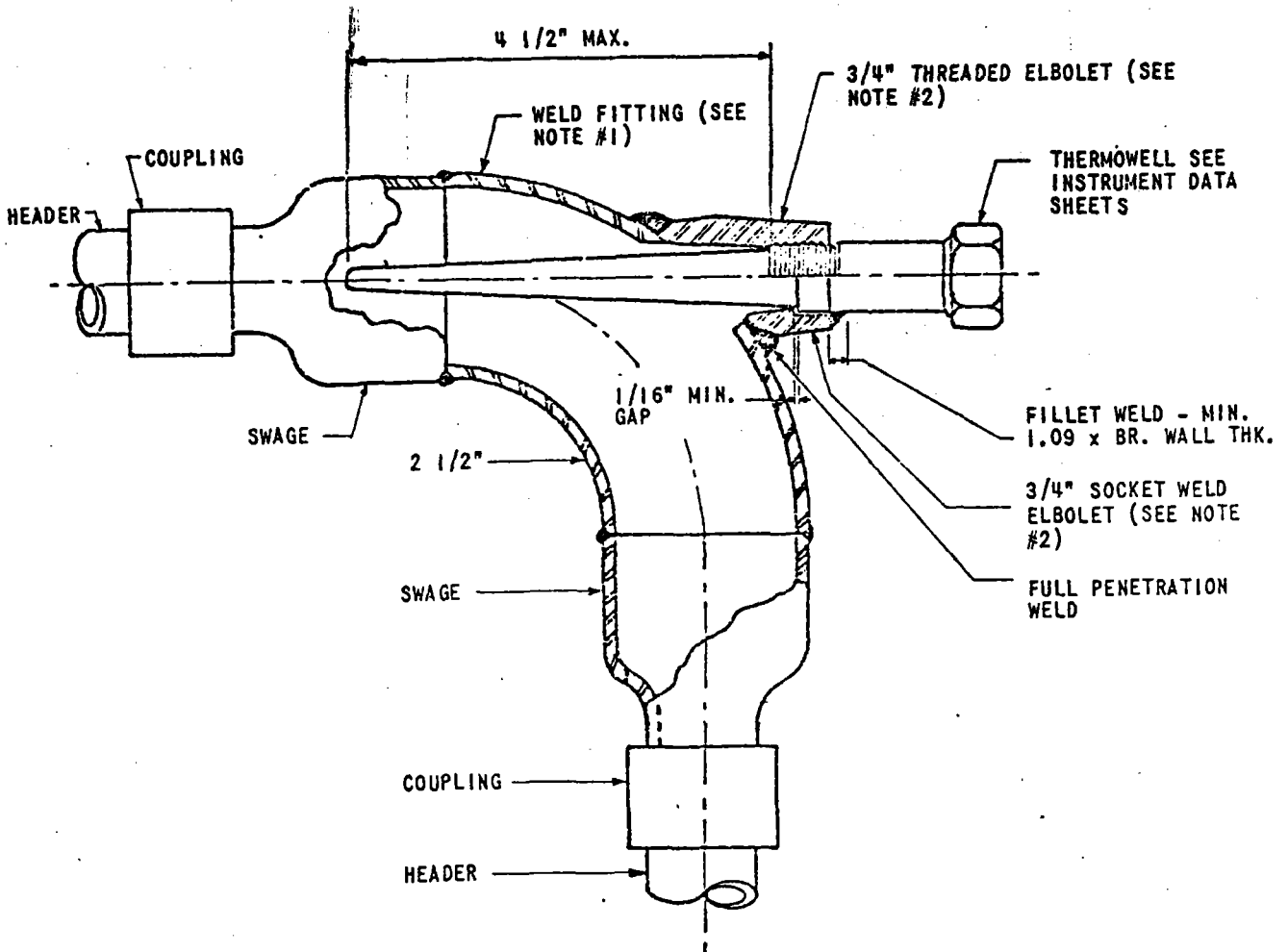
DO NOT USE FOR MAIN STEAM, HOT REHEAT OR COLD REHEAT



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 300°F.

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



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	
Sect. Supv. <i>[Signature]</i>							REVISED 4/11/74	
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

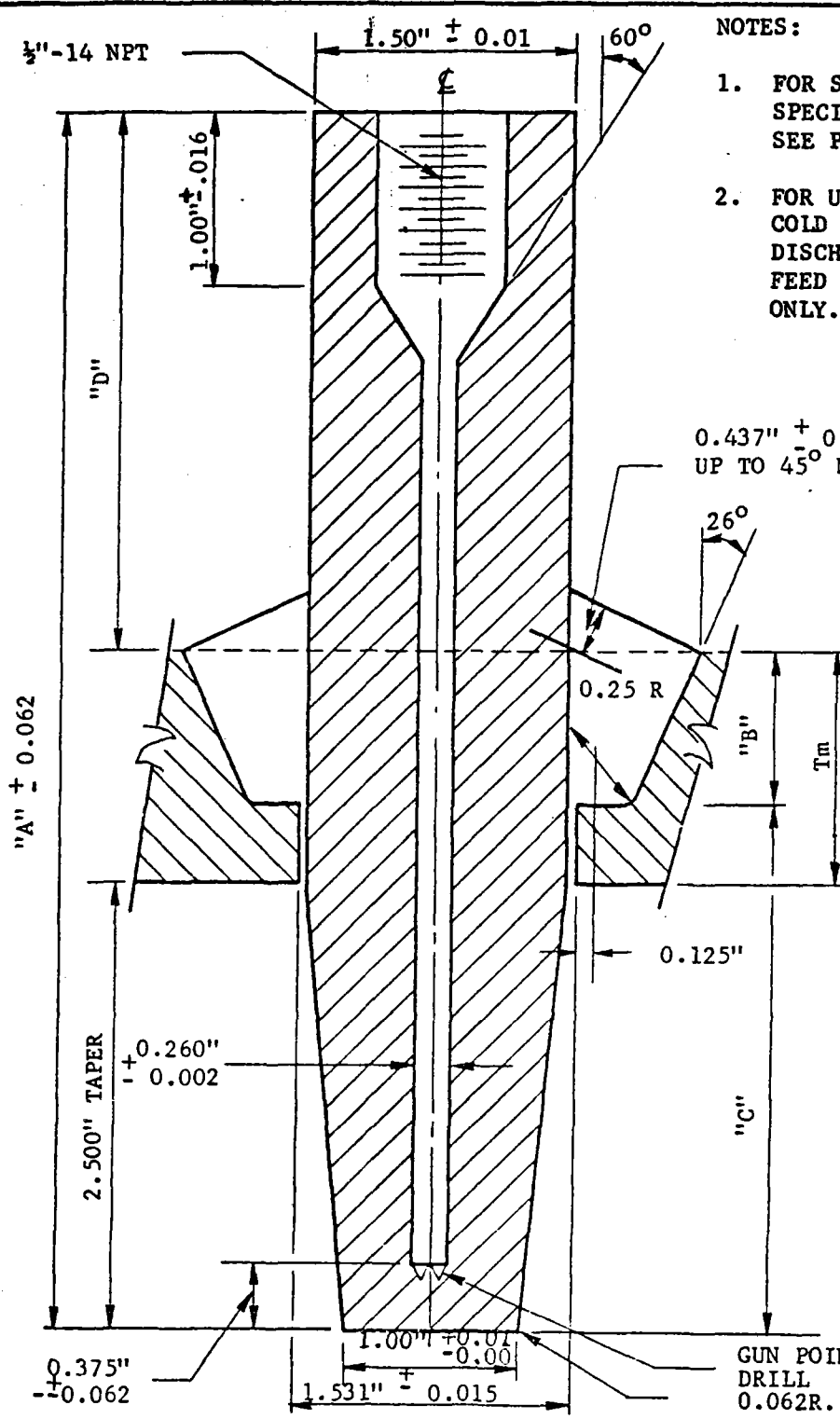
STANDARD NUMBER
DN 00.5

APPROVALS
Des. Sect. *[Signature]*
Sect. Supy. *[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.

0.437" \pm 0.062 FILLET WELD
UP TO 45° MAX. ANGLE

- "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					
MM	P	PP	SH	FI	SP

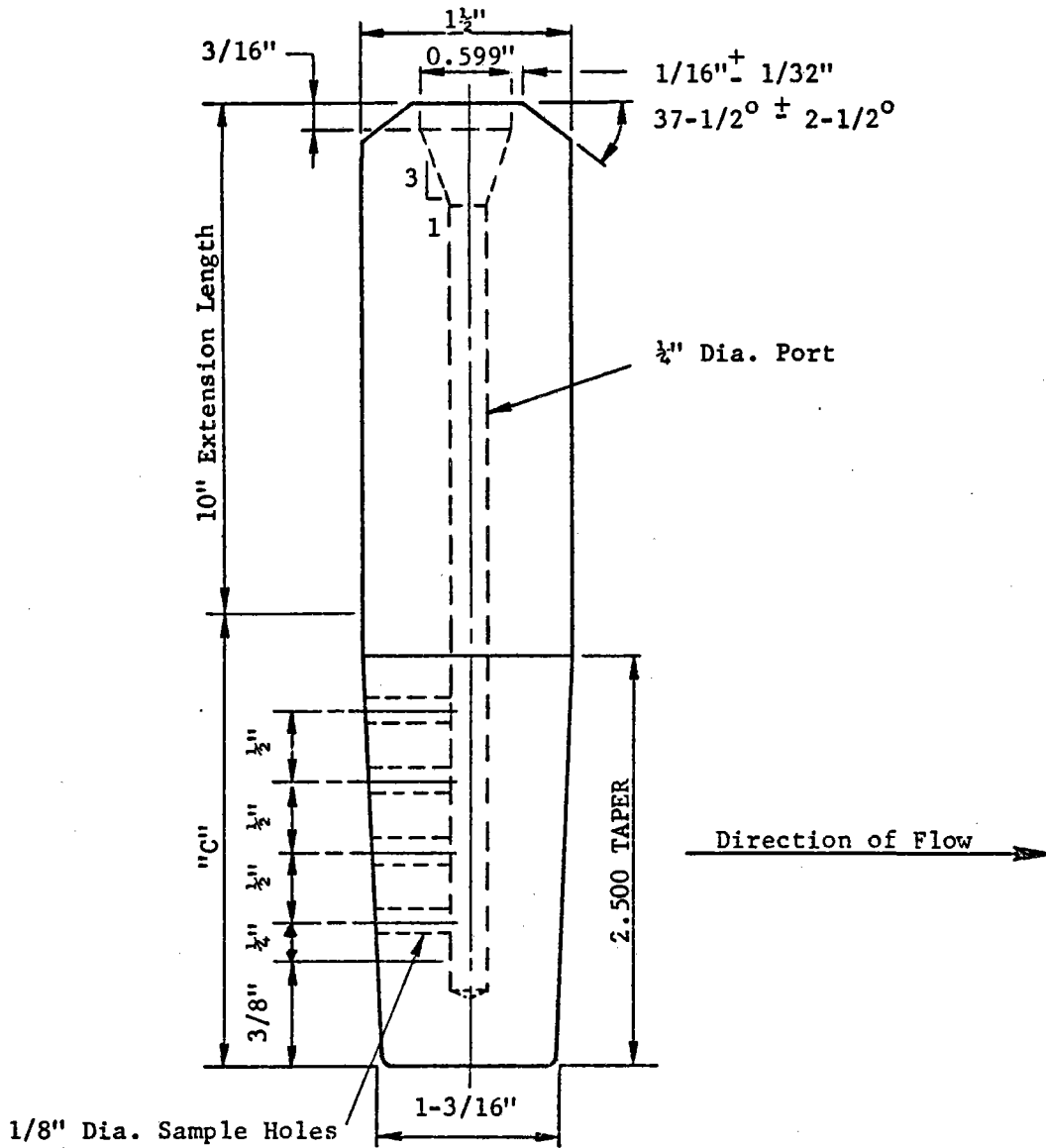
Stearns-Roger
INCORPORATED
ENGINEERING STANDARD

STANDARD NUMBER
DN 00.5

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

SAMPLE NOZZLE
MAIN STEAM LINE

PAGE 5 OF 5
ISSUED 5/18/73
REVISED 9/26/74



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 buttweld transition see Std. DE 21.9.

INSULATION SCHEDULE NO.	PP	1	2	3	4	5	6	7	8	9	10
TEMP. OF PIPE SIZE		<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	PERSONNEL PROTECTION SAME AS PIPE TEMPERATURE	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 SINGLE LAYER INSULATION	EXPANSION JOINTS REQUIRED SEE STD DP30.1 PAGE 3 DOUBLE LAYER INSULATION REQ'D EXCEPT ON LINES 1 1/2" & SMALLER
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NOTES: 1. INSULATION THICKNESSES SHOWN ARE ECONOMIC THICKNESS FOR FUEL COSTS OF \$2.00 PER 3.T.U. OR LESS.
 2. INSULATION THICKNESSES SHOWN ARE FOR CALCIUM SILICATE [OR MINERAL FIBER] WITH ALUMINUM LAGGING, HAVING A SURFACE RESISTANCE OF 0.680F - HR. PER 3.T.U.
 3. INSULATION THICKNESSES SHOWN ARE BASED ON 95°F AMBIENT TEMPERATURE, 150°F COLD FACE TEMPERATURE, AND 70" M.P.H. AIR VELOCITY.
 4. ASSUMES 1 1/2" MINIMUM INSULATION AVAILABLE.

DIVISION USAGE					
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	X				
APPROVALS					
Des. Sect. <i>[Signature]</i>					
Sect. Supv. <i>[Signature]</i>					
Div. <i>[Signature]</i>					

Stearns-Roger

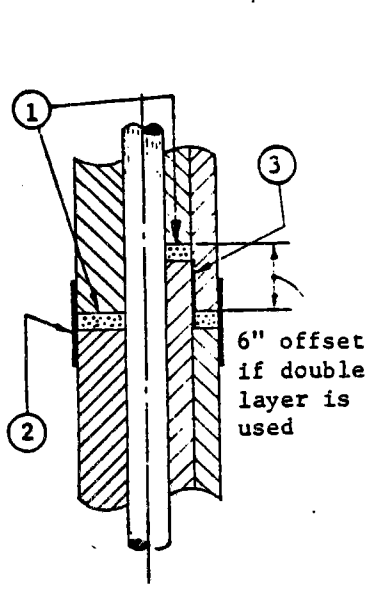
INCORPORATED
Engineering Standard

STANDARD NUMBER
DP30.1

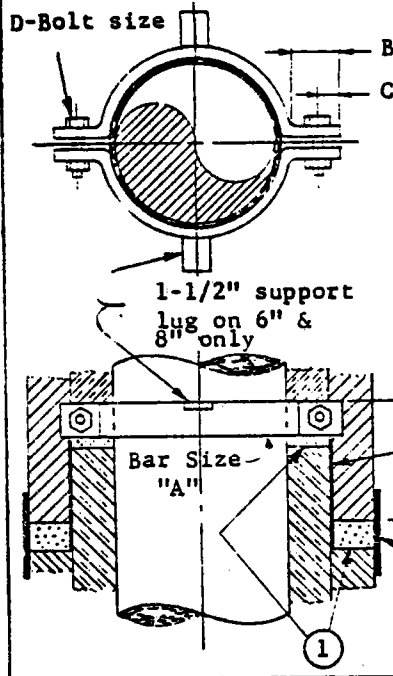
PAGE 3 OF 3

ISSUED 2/20/70
REVISED 5/7/75

PIPE INSULATION EXPANSION JOINTS FOR VERTICAL LINES



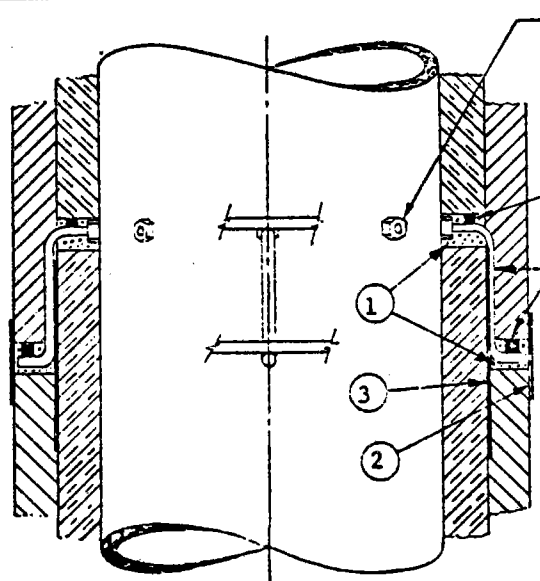
EXPANSION JOINT FOR PIPE SIZES 2" & UNDER



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 2-1/2", 3", 4", 6" & 8"



1/2" Nuts - Same material as pipe, welded to pipe, 6 req'd @ 60° for pipe sizes 10, 12, 14. 8 req'd @ 45° for pipes 16" and larger.

Support rings 3/4" x 1/2" bar (2 halves) O.D. of ring 1/4" less than O.D. of insulation layer

Support rods 1/2" Ø M.S. THRD one end

To suit insulation layers

EXPANSION JOINT FOR PIPE SIZES 10" & LARGER

- NOTES**
- ① 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

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2. Type, Quantities and Quality of Copies	1
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STEARNS-ROGER ENGINEERING CORP.
DENVER, COLORADO

PROJECT NO. C-21700

DOCUMENTATION1. 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.

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.

(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						STANDARD NUMBER	
MM	P	PP	SH	FI	SP		
<p style="text-align: center;">Stearns-Roger INCORPORATED ENGINEERING STANDARD</p>						FJ 60.60T	
<p>APPROVALS Des. Sec. <i>[Signature]</i> Sect. Supv. <i>[Signature]</i> Div. <i>[Signature]</i></p>						C-21700	
<p style="text-align: center;">DOCUMENTATION REQUIREMENTS</p>						ISSUED 10/22/79 REVISED	
<p>PROJECT: SOLAR ONE CONTRACT/REQUISITION NUMBER: S-R E6 TITLE: PRIMARY FABRICATED PIPE (HEAVY WALL AND ALLOY)</p>							
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		
<u>1-ENGINEERING DRAWINGS</u>	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							
<u>2-ERECTION OR INSTALLATION INFO.</u>	Repro-ducibles	2					
A-Shop Fabrication Drawings	Prints	1					
B-Erection or Installation Drawings				8	X	X	X
C-Erection or Install. Instructions	Copies				X	X	X
<u>3-SPECIAL DOCUMENTATION</u>							
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						
<u>4-MISCELLANEOUS</u>							
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						
<p>**-"X" in this column means drawing review req'd. before fabric. release. ***-"X" in this column means final issue must be certified for construction.</p> <p>#-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</p>							

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
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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.

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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						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER													
MM	P	PP	SH	FI	SP		SECO.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 2½" 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																				

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APPROVALS						PIPING MATERIAL SPECIFICATION "FEA" CLASS 300 - ALLOY STEEL	ISSUED 12/1/76
Des. Sect. _____							REVISED 12/14/79
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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 ENGINEERING STANDARD	STANDARD NUMBER																		
MM	P	PP	SH	FI	SP		SEOO.KEB																		
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APPROVALS						PIPING MATERIAL SPECIFICATION "KEB" CLASS 900 - ALLOY STEEL	ISSUED 12/1/76																		
Des. Sect. _____							REVISED 2/4/80																		
Sect. Supv. _____																									
Div. _____																									
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 1/2" - 2": Schedule 80 2 1/2" - 6": Schedule 40																								
VALVES	<table border="0"> <tr> <td style="width: 50%;">2" & Smaller</td> <td style="width: 50%;">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:	<p>* 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.</p> <p>** 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. <i>FAC</i></p>																								

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DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
NM	P	PP	SH	FI	SP		SEOO.KEB
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APPROVALS						PIPING MATERIAL SPECIFICATION "KEB" CLASS 900 - ALLOY STEEL	ISSUED 12/1/76
Des. Sect. _____							REVISED 9/6/79
Sect. Supv. _____							
Div. _____							

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.

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		X						
APPROVALS						ENGINEERING STANDARD	PAGE <u>3</u> OF <u>3</u>	
Des. Sect. _____							PIPING MATERIAL SPECIFICATION "KEB" CLASS 900 - ALLOY STEEL	ISSUED 12/1/76
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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.

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	X						

APPROVALS		PIPING MATERIAL SPECIFICATION "MBA" CLASS 1500 - CARBON STEEL	PAGE 1 OF 2
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MAXIMUM ALLOWABLE PRESSURE AND TEMPERATURE FOR SPECIFICATION:							
TEMPERATURE, °F:	400	500	600	650	700	750	Do not use over 750 F
PRESSURE, PSIG:	3170	2995	2735	2685	2665	2520	

PIPE MATERIAL	Seamless Carbon Steel ASTM A106, Grades B and C Supplementary Requirements: See Sheet 2.	
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PIPE SCHEDULE	1/2" thru 1-1/4": Schedule 80 Grade B 1-1/2" thru 4": Schedule 160 Grade B 6": XKS Grade B 8" thru 16": Schedule 160 Grade C	
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VALVES	2" & Smaller Class 1500 Carbon Steel Socket Weld	2-1/2" & Larger Standard Class 1500 Carbon Steel-Butt Weld Check V209	For Rocketdyne Valve See R Valve List Globe V558 (T-Pattern) Globe V559 (Y Pattern, Spec. Throt.) Globe V560 (T Pattern, Spec. Throt.) Globe V575 (3-Way)
	Check V3159 Globe V7950	Gate V413 Globe V557 (Y-Pattern)	

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PIPE SIZE	2" & Smaller	2-1/2" & Larger
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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
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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
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UNIONS	Flanges as specified above where necessary.	
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BACKING RINGS	Not Applicable	None Allowed
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CONSUMABLE INSERT RINGS	Not Applicable	None Allowed
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BRANCH CONNS.	Socket Weld Tee. (Use insert for reducing.)	Full Size Branch: Tee Branch 2-1/2" & Larger: * Branch 2" & Smaller: *
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BOLTS	Alloy Bolt Studs ASTM A193 Grade B7, Hex Nuts ASTM A194 Grade 2H Heavy Weight. See General Notes (Finished Ends).	
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GASKETS	ANSI B16.5, Class 1500 spiral wound gaskets with 304 Stainless Steel and asbestos filler and 1/8" carbon steel compression gage rings.	
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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.

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APPROVALS						PIPING MATERIAL SPECIFICATION "MBA" CLASS 1500 - CARBON STEEL	PAGE 2 OF 2
Des. Sect. _____							ISSUED 8/1/79
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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.

DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER			
MM	P	PP	SH	FI	SP		SEOO.QEB			
X										
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" style="width: 100%;"> <tr> <td style="width: 50%;"> 2" & Smaller Class 2500 Alloy Steel Socket Weld Check V3244 Globe V7974 </td> <td style="width: 50%;"> 2-1/2" & Larger Standard Class 2500 Alloy Steel Butt Weld Check V214 Gate V403 Globe V504 (T-Pattern) Globe V509 (T-Pattern, Spec. Throt.) Globe V513 (Y-Pattern, Spec. Throt.) Globe V572 (Y-Pattern) </td> </tr> </table>						2" & Smaller Class 2500 Alloy Steel Socket Weld Check V3244 Globe V7974	2-1/2" & Larger Standard Class 2500 Alloy Steel Butt Weld Check V214 Gate V403 Globe V504 (T-Pattern) Globe V509 (T-Pattern, Spec. Throt.) Globe V513 (Y-Pattern, Spec. Throt.) Globe V572 (Y-Pattern)
2" & Smaller Class 2500 Alloy Steel Socket Weld Check V3244 Globe V7974	2-1/2" & Larger Standard Class 2500 Alloy Steel Butt Weld Check V214 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.										

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DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
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APPROVALS						PIPING MATERIAL SPECIFICATION "QEB" CLASS 2500 - ALLOY STEEL	ISSUED 8/1/79
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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
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							Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	F1	SP	SEOO.MBX		
APPROVALS Des. Sect. _____ Sect. Supv. _____ Div. _____							PIPING MATERIAL SPECIFICATION CLASS 1500 - CARBON STEEL (BY ROCKETDYNE)**	PAGE <u>1</u> OF <u>2</u>
								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	½" 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
vs. 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

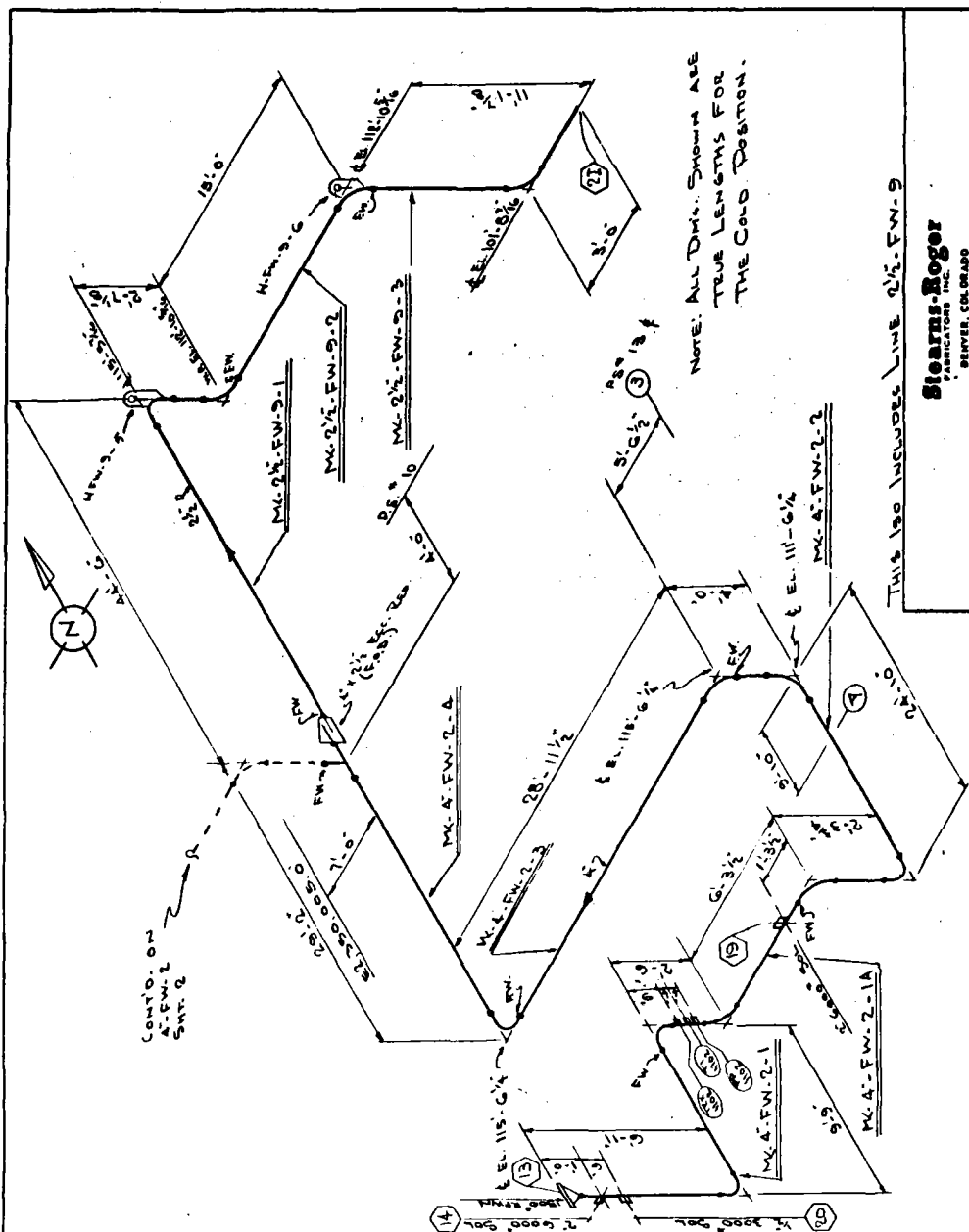
VT-1, 11 & 12

CO-6 & 12

LINE NO. **A-FW-2** REF. PS-8 (REV. 15) DRG. PS-10

ITEM	DESCRIPTION	MAT'L.	REQ'D.
1	Loose Mat'l. (Various)		
2	4" 1500 SPIRAL WOUND CASSETT W/ 304 STL. 8" X 8" X 1/2" COMP. 2" X 6" BUNG.		
3	1/2" X 8" LG. ALLOY STUDS AIR'S CE. B.7 W/ TWO HWY. HEX. NUTS. QTY. AIRC. GERTH.		

REVIEW BY: O COMMENTS
 BY: W D L E COMMENTS
 R.V.S. FOR COMMENTS & SUBMIT FOR REVIEW
 SEE LISTING IN DRAWING 01 1980
 ENG. DEPT. 87
 DATE: 8/1/80
 THIS DRAWING IS THE PROPERTY OF STEARNS-ROGER INC. IT IS TO BE USED ONLY FOR THE PROJECT AND CONTRACT AGREEMENTS.
 RETURN TO
Stearns-Roger
 INCORPORATED
 ON OR BEFORE
FINAL AUG 01 1980
C. E. FILE
Stearns-Roger
 021700 AUG 01 80
 SR No. E.6 File No. 0322



DESIGN	2500 PH 9 440 9F	DRAWN BY	S-20-B0
SPEC./MATEL	MDA A106B SCH 160	CHECKED BY	S-20-B0
N.D.E. VISUAL		APPROVED BY	J-11-B0
O.D. PREP. FEELS		LINE NO.	A-FW-2
I.D. PREP. FEELS		REV.	
JOB NO.	D-02583	P.R.I.M.T.	
CUSTOMER	MD/S-R/R	SHEET	1 OF 3

REVISIONS

SHOP WELDING
 JM

TIG BOUT ALL

PROJECT 10 MW SOAR PLANT

THIS ISO INCLUDES LINE D.C.-FW-9

Stearns-Roger
 MANUFACTURERS INC.
 DENVER, COLORADO

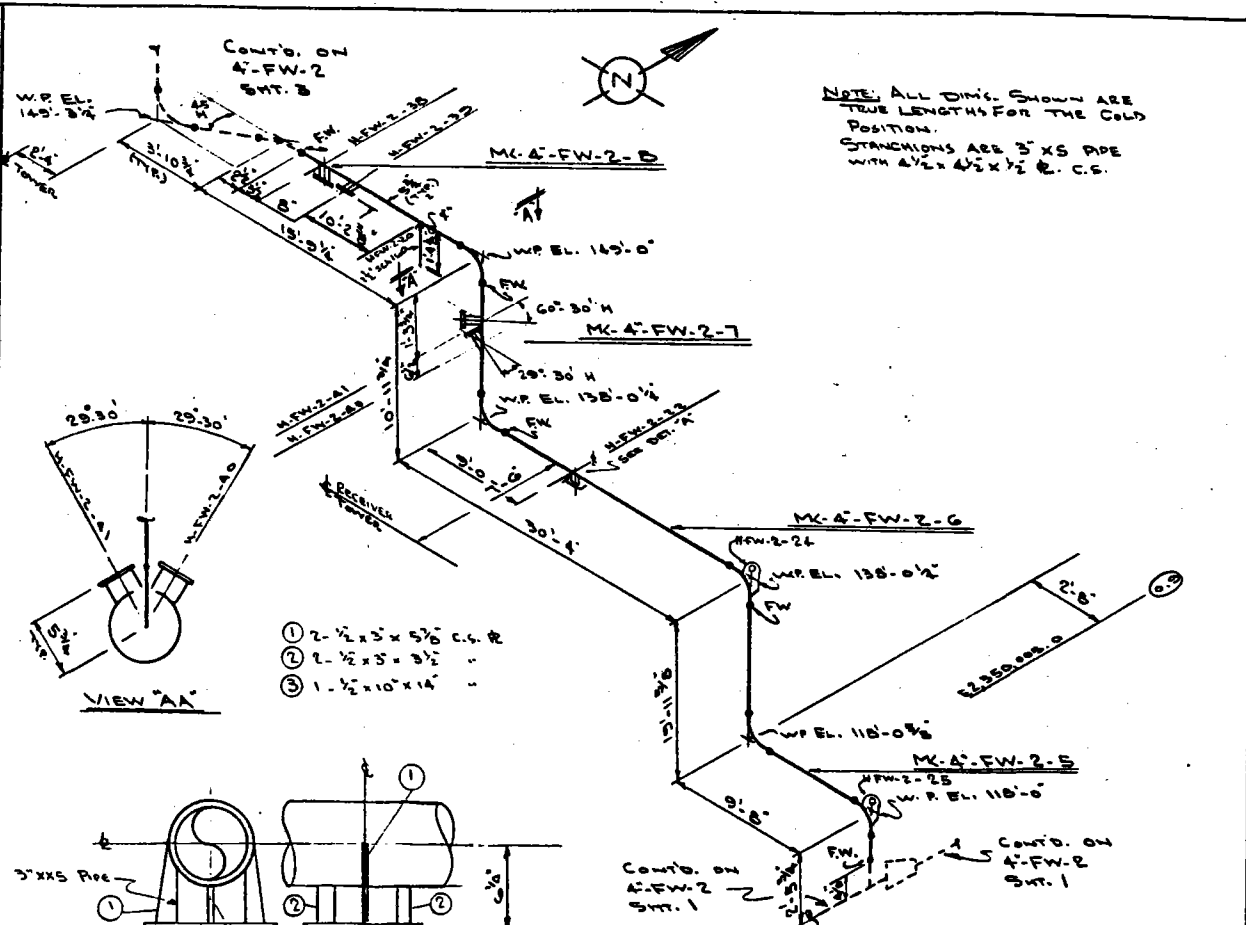
NOTE: ALL DIMS. SHOWN ARE TRUE LENGTHS FOR THE COLD POSITION.

LINE No. **A-FW-2** REF. PS-3 
 DWG.


MATERIAL LIST

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

<input type="checkbox"/> REVIEWED/NO COMMENTS <input type="checkbox"/> REVISE/DISE COMMENTS <input type="checkbox"/> REVISE P.R. COMMENTS & PREP. FOR REVIEW <input type="checkbox"/> S.I. MATERIAL INITIAL ENG. DEPT BY <i>[Signature]</i> AUG 01 1980 RETURN TO Stearns-Roger INCORPORATED ON OR BEFORE FINAL AUG 01 1980 C. E. FILE Stearns-Roger C217UU AUG 01 '80 OR No. E-6 File No. 0 33
--



- ① 2-1/2" x 3" x 5/16" C.S. P.
- ② 2-1/2" x 3" x 3/8" "
- ③ 1-1/2" x 10" x 1/4" "

Stearns-Roger FABRICATORS INC. DENVER, COLORADO	
DESIGN 2500 PSI @ 440 OF	DRAWN PK 5-20-80
SPEC./MAT'L. MBA A106B SCH 160	CHECKED 4 5-23-80
N.D.E. VISUAL	APPR. 7-23-80
O.D. PREP. PFI-ESS	P.W.N.T.
I.D. PREP. PFI-ESS	LINE No. A-FW-2
	SHEET 2 OF 3 

CUSTOMER **MD/S-R/R** PROJECT **10MW & SOLAR FLOT PLANT**

SHOP WELDING **J.M.**
 TIG ROOT ALL
 JOB No. **D-82583**

72

LINE No. **A-FW-2** REF. **PS-2** 
 DWG.

MATERIAL LIST

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

REVIEWED/NO COMMENTS
 REVIEWED/SSEE COMMENTS
 REVISE PER COMMENTS & RESUBMIT FOR REVIEW
 SEE COMMENTS FOR MATERIAL
 ENG. DEPT. BY: *[Signature]* DATE: **AUG 01 1980**
 NO. OF REV. *[Blank]*
 CONTRACT NO. *[Blank]*
 RETURN TO

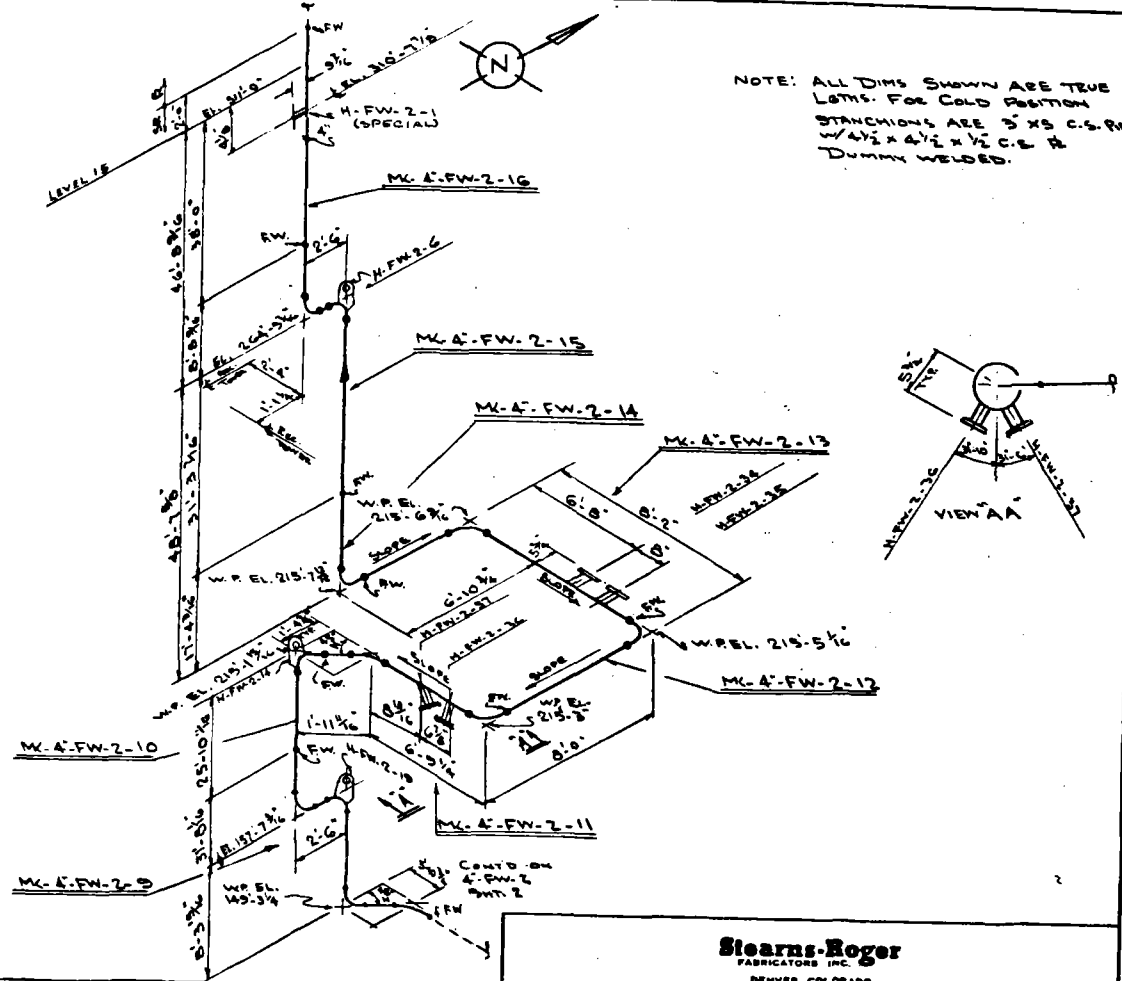
Stearns-Roger
 INCORPORATED
 ON OR BEFORE

FINAL AUG 01 1980 **C. E. FILE**


Stearns-Roger

C21700 AUG 01 '80

SR No. **E6** File No. **037**



REVISIONS	SHOP WELDING
	TO ROOT ALL

Stearns-Roger FABRICATORS, INC. DENVER, COLORADO	
DESIGN	2500 PH & 440 OF
SPEC. / MAT'L.	MDA SCH 160 A106B
N.D.E.	100% X-RAY DW
O.D. PREP.	PF-LES-25
I.D. PREP.	PF-ES-25
DRAWN BY	5-19-80
CHECKED BY	5-19-80
APPR. BY	7-30-80
LINE No.	A-FW-2
REV.	
SHEET 3 OF 3	

CUSTOMER **MD/SR/R**

PROJECT **10MW₂ SOLAR RLOT PLANT**

JOB No. **D-82583**

73

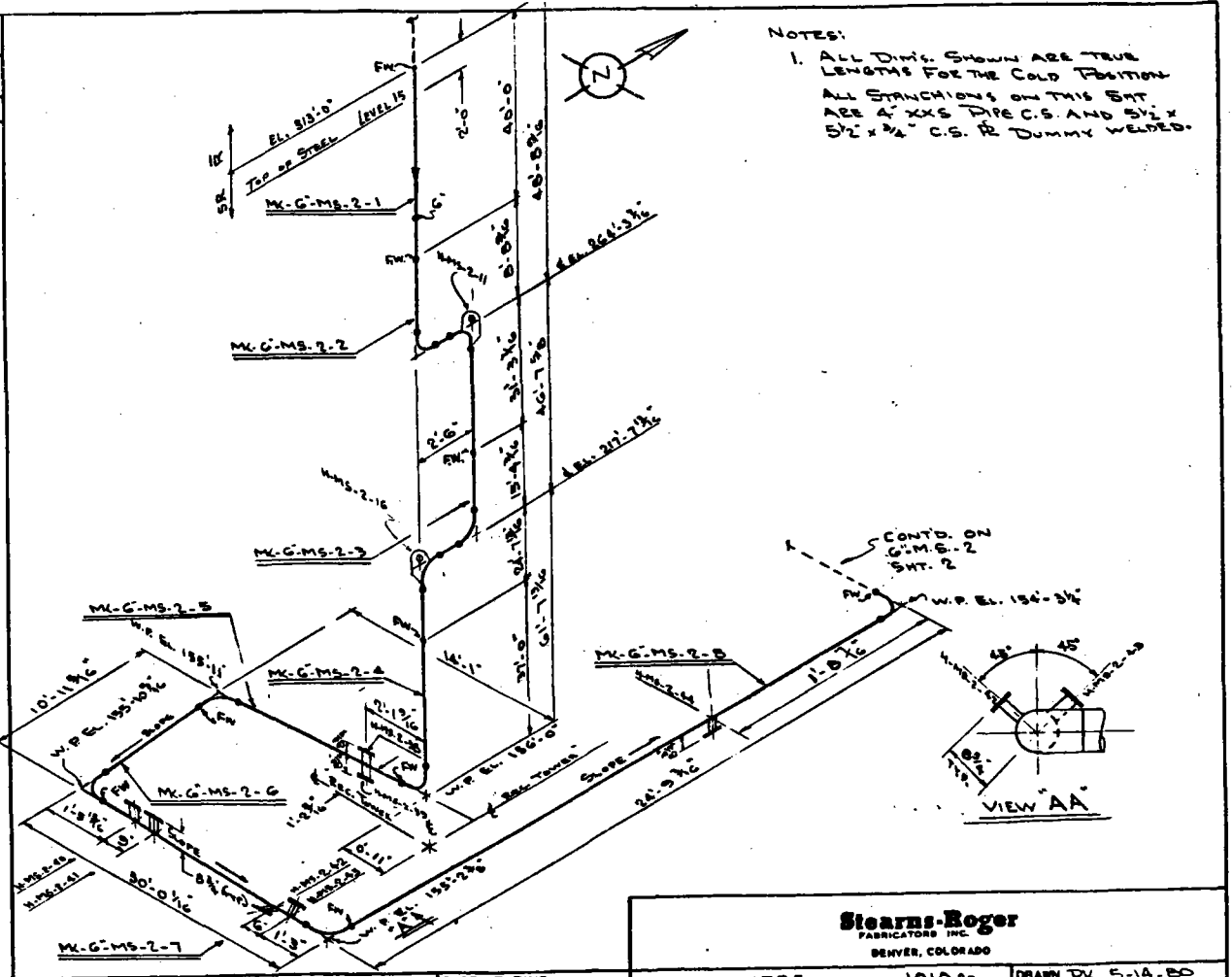
LINE No. G-MS-2 REF. PD-2 & PD-4 & PD-3 & DWG. PD-3 &

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQN.
	LOOSE MATL. — NONE —		

REVIEWED NO COMMENTS
 REVIEW DISISE COMMENTS
 REVISE P.R. COMMENTS & RESUBMIT FOR REVIEW
 SEE LIST OF REVISIONS
 ENG. DEPT. BY: [Signature] DATE: AUG 01 1980
 RETURN TO
Stearns-Roger
 INCORPORATED
 ON OR BEFORE

FINAL AUG 01 1980
Stearns-Roger
 C21700 AUG 01 80
 SR No. EG File No. 001
 C.E. FILE



NOTES:
 1. ALL DIMS. SHOWN ARE TRUE LENGTHS FOR THE COLD POSITION
 ALL BRANCHES ON THIS SHT ARE 4" XXS PIPE C.S. AND 5/8" X 5/8" X 1/4" C.S. & DUMMY WELDED.

Stearns-Roger FABRICATORS INC. DENVER, COLORADO		
DESIGN	1775 PSI @ 1010 OF	DRAWN BY 5-14-80
SPEC. / MAT'L.	REQ A335-P22 XXS	CHECKED BY 8/15/80
N.D.E.	100% TW/MT OR PT FILLET WELDS	APPROVED BY 7-31-80
O.D. PREP.	PT. 1.525	P.W.M.T. Yes
I.D. PREP.	PT. 1.525	LINE No. REV. G-MS-2
		SHEET 1 OF 3

CUSTOMER MD/SR/R

PROJECT 10 MW_s SOLAR PLOT PLANT

REVISIONS
 SHOP WELDING
 JM
 TIC-ALL
 JOB No. D-B2553

74

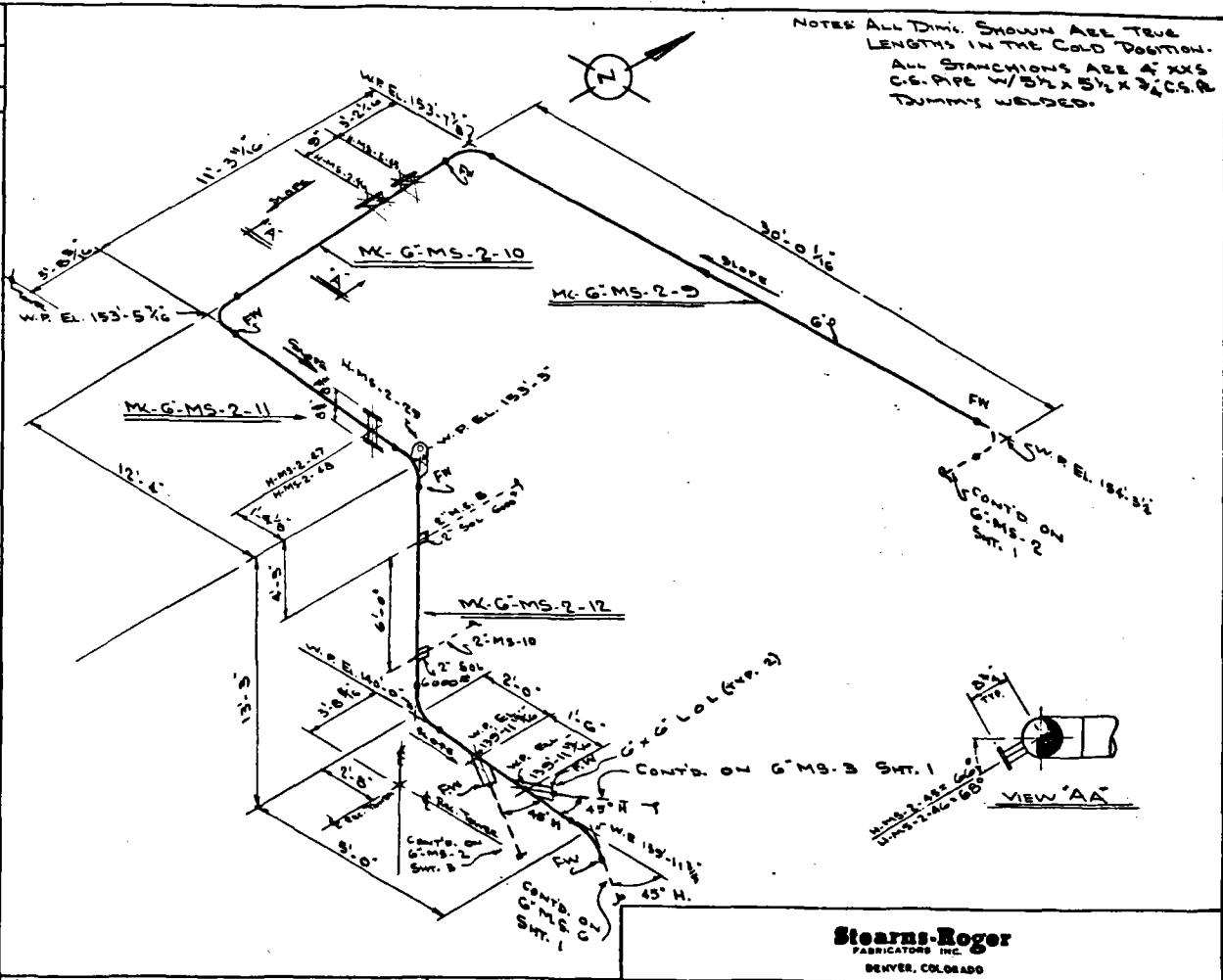
LINE No. G-MS-2 REF. PD-3A
DWG.

MATERIAL LIST

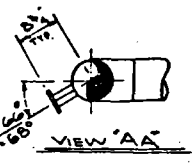
ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L. -NONE-		

REVIEWED/NO COMMENTS
 REV. W/DISTE COMMENTS
 REVISE P.R. COMMENTS FOR SUBMIT FOR REVIEW
 SELECTED FOR TRANSMITTAL
 INC. DEPT. BY [Signature] DATE 01 1980
 RETURN TO
Stearns-Roger
 INCORPORATED
 ON OR BEFORE

FINAL AUG 01 1980
 C. E. FIVE
Stearns-Roger
 021700 AUG 01 '80
 SR No. E6 File No. 022



NOTE ALL DIMS. SHOWN ARE TRUE
 LENGTHS IN THE COLD POSITION.
 ALL STANCHIONS ARE 4\"/>



REVISIONS	SHOP WELDING JM TIG ALL
CUSTOMER <u>MD/SR/R</u>	PROJECT <u>10 MW_e SOLAR PLOT PLANT</u>
	JOB No. <u>D-02503</u>

Stearns-Roger FABRICATORS INC. DENVER, COLORADO	
DESIGN <u>1775 PH & 1010 OF</u>	DRAWN <u>PK 5-16-80</u>
SPEC. / MAT'L. <u>QEB A335-P22 XXS</u>	CHECKED <u>JA 5-15-80</u>
N.D.E. <u>1007</u> <u>BW-MTCEPT FILLET WELDS</u>	APPR. <u>JK 7-23-80</u>
O.D. PREP. <u>FE-ESS</u>	P.W.N.T. <u>YES</u>
I.D. PREP. <u>FE-ESS</u>	LINE No. <u>G-M.S-2</u>
	SHEET <u>2</u> OF <u>3</u>

75

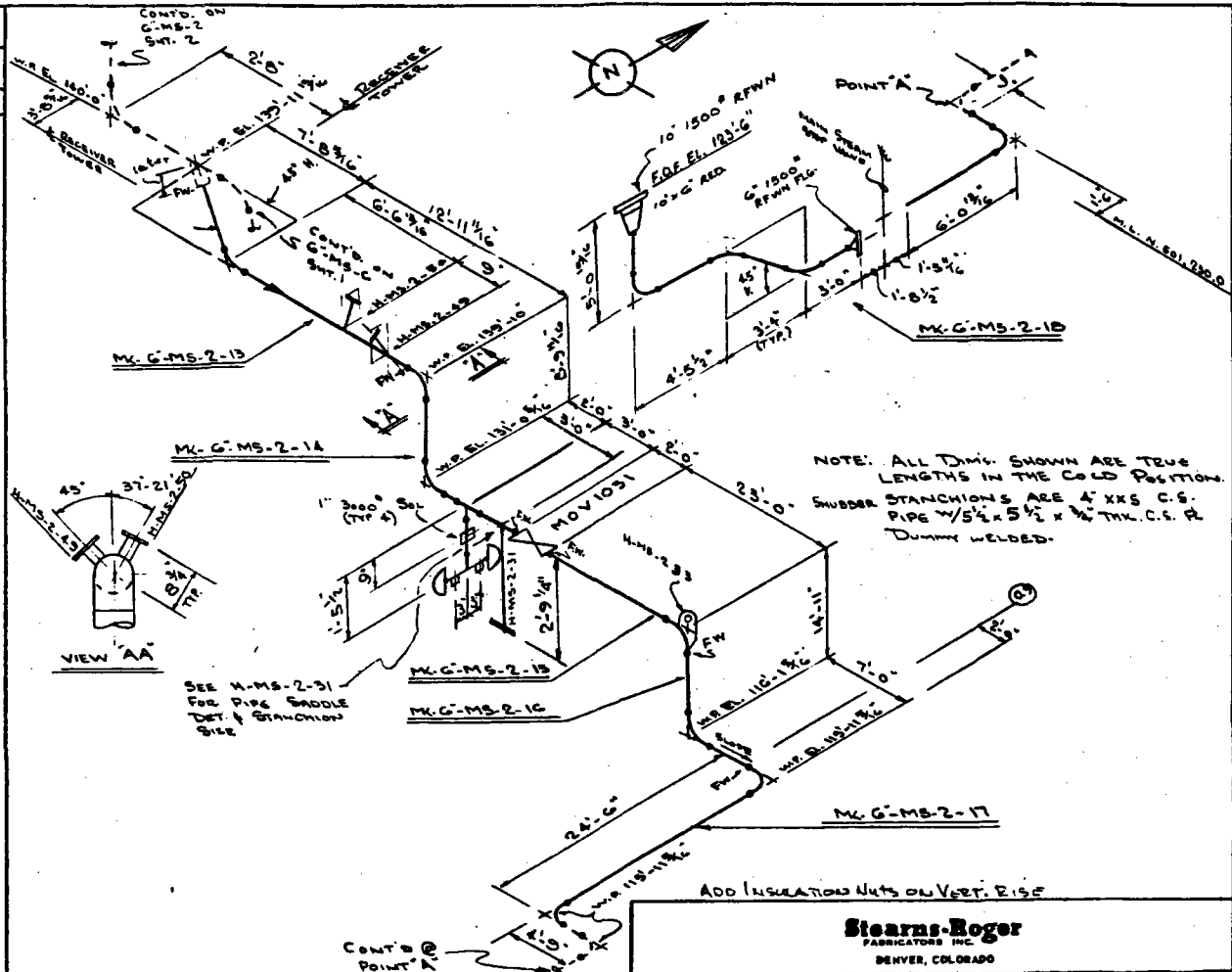
LINE No. **G-MS-2** REF. PDS **A**
 DWG. PDS-10 **B**

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L	REQ'N.
	LOOSE MAT'L.		
1	10' 1500° F. FERTALIC CONT. T406 CG W/347 8/31 & ASBESTOS FILLER & C-STL COMP. BASE RING.		
1	G 1500°		
12	1 1/8" x 1 1/2" LG ALUM STUDS A193 GR B16 1/2" HEX HEX NUTS EA. A94-GR 7		
12	1 1/8" x 10 1/4" LG. ALLOY STUDS A193- GR B16 W/2 HEX HEX NUTS EA. A94-GR 7		

REVIEWED/NO COMMENTS
 REV. W/ DISC. COMMENTS
 REVISE PER COMMENTS OR SUITABLE FOR REVIEW
 SEE COMMENTS FOR MATERIAL
 ENT. DEPT. BY: *[Signature]* 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. **E6** File No. **002**



REVISIONS
 SHOP WELDING
JM
 TIG ALL

DESIGN 1775 PSI @ 1010 °F
 SPEC. / MAT'L. QES A335-P22 XXS
 N.D.E. 100% XRAY & W-LATOR PT FILLT WELDS
 O.D. PREP. PF-E5E P.W.N.T. YES
 I.D. PREP. PF-E5D

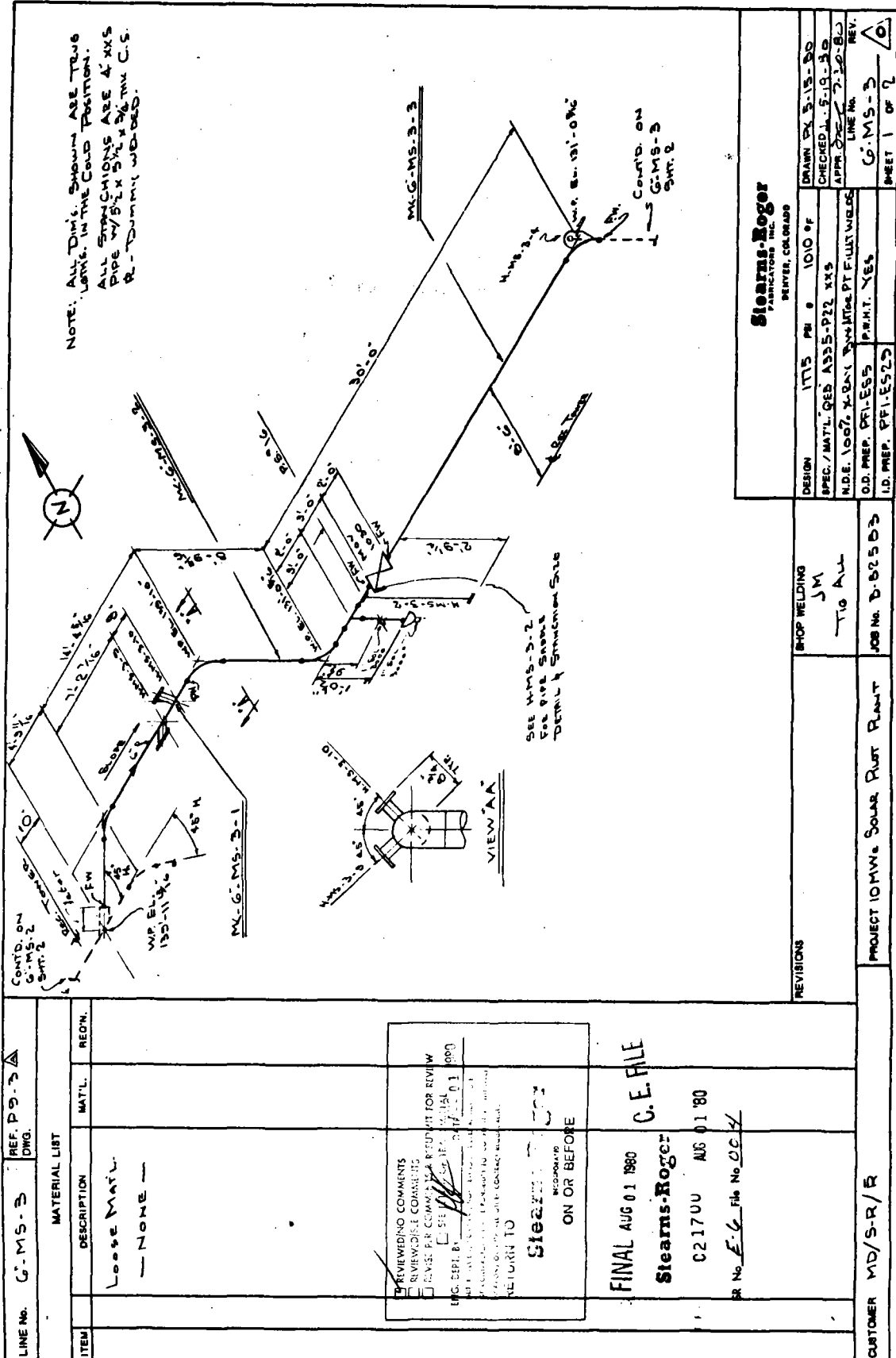
Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO
 DRAWN BY 5-14-80
 CHECKED BY 5-15-80
 APPR. BY 7-31-80
 LINE No. **G-MS-2**
 REV. **A**
 SHEET 5 OF 5

CUSTOMER **MD/SR/R**

PROJECT **10 MW_s SOLAR PILOT PLANT**

JOB No. **D-82503**

76



NOTE: ALL DIM'S SHOWN ARE TRUE
 EXCEPT WHERE SHOWN OTHERWISE.
 ALL BRANCHES ARE 4" X 5"
 PIPE W/ 5/8" DIA. X 3/8" THK C.S.
 R- DUMMIES WELDED.

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

DESIGN 1775 PM 1010 of
 SPEC. / MAT'L REQ. ASSY-P22 XYS
 N.D.E. 100% X-RAY QUALITY PT. FULL W/LGS
 O.D. PREP. PF-1-ESS P.R.H.T. YES
 I.D. PREP. PF-1-ESS

DRAWN BY 3-15-80
 CHECKED BY 5-19-80
 APPROVED BY 7-10-80
 LINE NO. G.M.S.-3
 REV. SHEET 1 OF 2

REVISIONS	SHOP WELDING	JOB NO.
	JM TLO All	D-02503

LINE No.	G.M.S.-3	REF. P. 3-3	DWG.
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L	REQ'D.
	Loose Mat'l.		
	NONE		
REVIEWING COMMENTS <input type="checkbox"/> REVIEW THESE COMMENTS <input type="checkbox"/> REVISE PER COMMENTS & RETURN FOR REVIEW <input type="checkbox"/> SEE COMMENTS FOR MATERIAL ENG. DEPT. BY: [Signature] 8/1/80 RETURN TO: Stearns-Roger ON OR BEFORE: [Signature] FINAL AUG 01 1980 Stearns-Roger C.E. FILE 021700 AUG 01 80 PR No. E-6 File No. 0014 CUSTOMER MD/SR/R			

LINE No. G-MS-3 REF. PD-3
 DWG. PD-4 Δ P9-10A

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	Loose Matl. - NONE -		

REVIEWED/NO COMMENTS
 REVIEWED/SEE COMMENTS
 REVISE P.R. COMMENTS & RESUBMIT FOR REVIEW
 SEE INDEX OF TRANSMITTALS
 ENG. DEPT. DATE AUG 01 1980

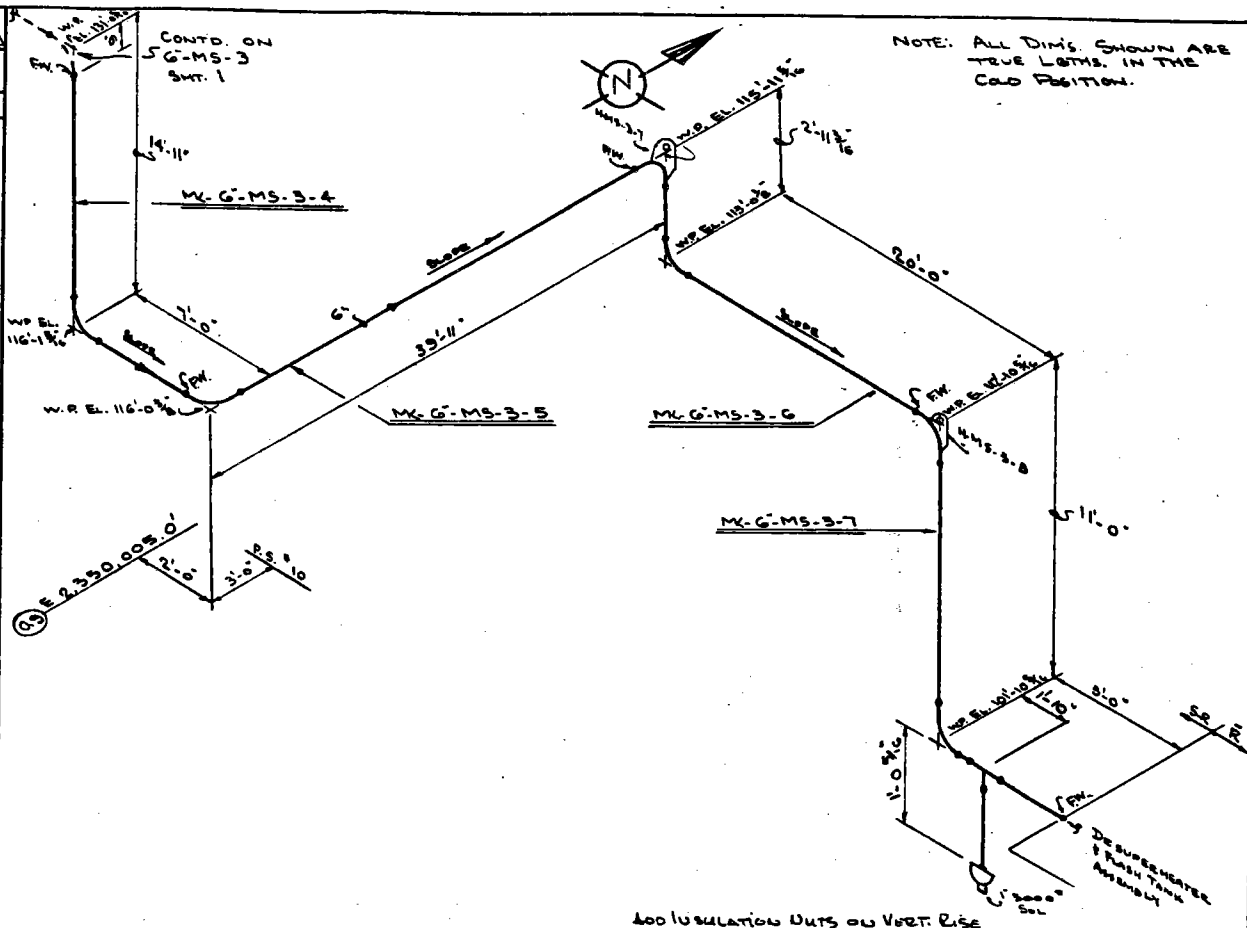
RETURN TO
Stearns-Roger
 INCORPORATED
 ON OR BEFORE

FINAL AUG 01 1980

Stearns-Roger C. E. FILE

MR. C21700 AUG 01 '80

SR No. EG File No. 005



REVISIONS

SHOP WELDING
 JM
 TIG ALL

Stearns-Roger FABRICATORS INC. 6 DENVER, COLORADO			
DESIGN	1775 PSI @ 1010 SF	DRAWN BY	5-19-80
SPEC. / MAT'L	QEB A335-P22 XKS	CHECKED BY	8-19-80
N.D.E.	100% XRAY DW. MTOEPT FILLET WELDS	APPR. BY	2-30-80
D.D. PREP.	PF-ESS	P.W.N.T.	YES
I.D. PREP.	PF-ES2D	LINE No.	G-MS-3
		REV.	Δ
		SHEET	2 OF 2

CUSTOMER MD/SR/R

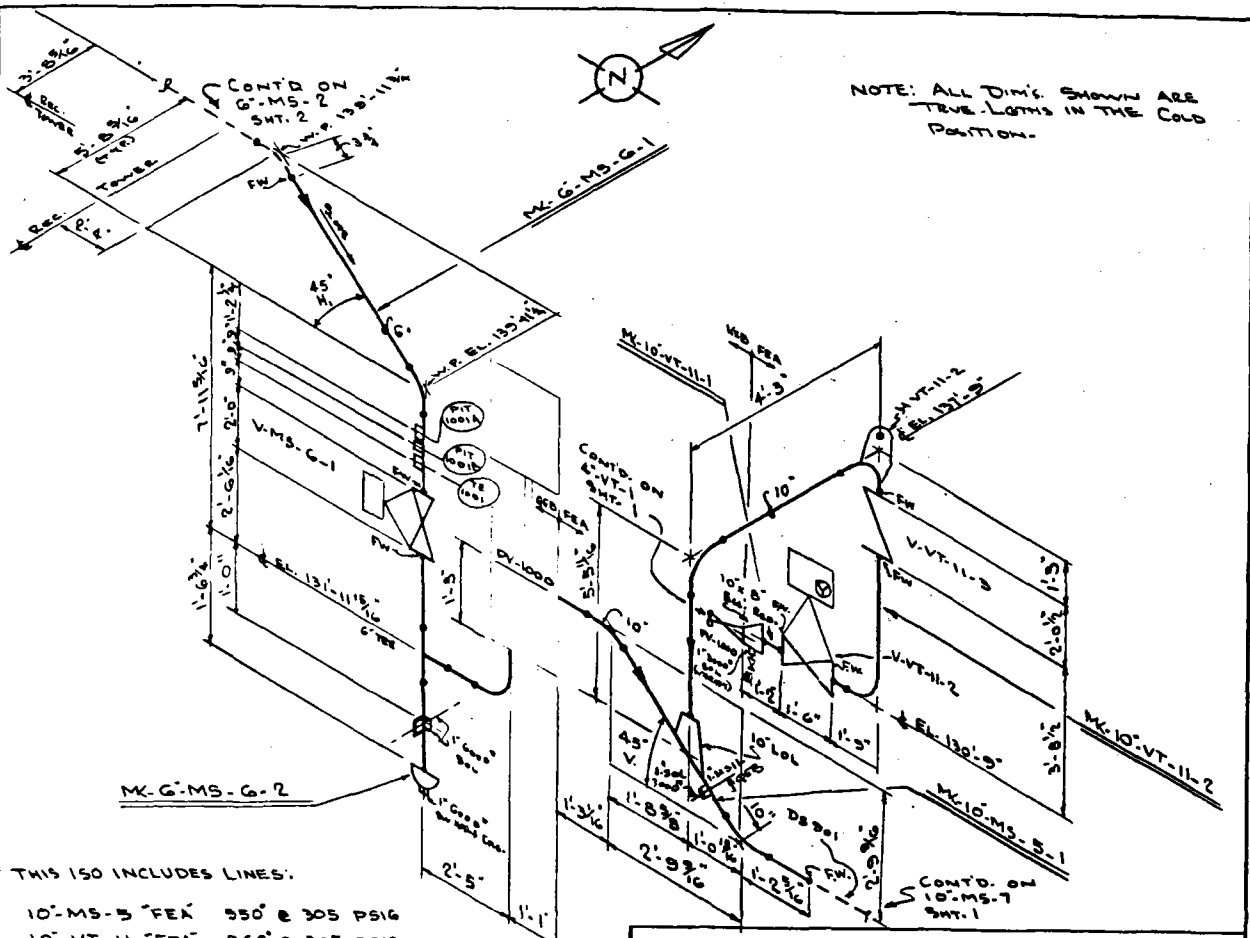
PROJECT 10MW SOLAR PLOT PLANT

JOB No. D-82503

78

61

LINE No. G-MS-G				REF. PD-3 DNG. PD-4	
MATERIAL LIST					
ITEM	DESCRIPTION	MAT'L.	REQ'N.		
	LOOSE MAT'L. - NONE -				
<input checked="" type="checkbox"/> REVIEWED IN COMMENTS <input type="checkbox"/> REVISED IN COMMENTS <input type="checkbox"/> REVISED PER COMMENTS OR SUBMIT FOR REVIEW <input type="checkbox"/> SEE COMMENTS FOR REASONABLE AUG 01 1980 ENG. DEPT BY: [Signature] DPT: [Signature] DATE: AUG 01 1980 RETURN TO:					
Stearns-Roger INCORPORATED ON OR BEFORE					
FINAL AUG 01 1980 Stearns-Roger C. E. FILE C21700 AUG 01 '80 SR No. E.G. File No. 006					



NOTE: ALL DIM'S SHOWN ARE
TRUE LENGTHS IN THE COLD
POSITION.

THIS ISO INCLUDES LINES:

- 10"-MS-5 FEAS 950' @ 305 PSIG
- 10"-VT-11 FEAS 960' @ 305 PSIG
- G-MS-G QEB 1010' @ 175 PSIG

REVISIONS


SHOP WELDING
J.M.
TIO ALL

DESIGN SEE ABOVE P&ID SEE ABOVE OF		DRAWN DK 5-16-80	
SPEC. / MAT'L. SEE ABOVE P&ID SEE ABOVE		CHECKED BY S-19-80	
N.D.E. 1007- XRAY QW		APPR. J.E. 7-31-80	
O.D. PREP. PFI-ESS P.H.T. Yes		LINE No. REV.	
I.D. PREP. PFI-ESS		G-MS-G	
		SHEET 1 OF 1	

CUSTOMER MD/SR/R



PROJECT 10MW SOLAR PILOT PLANT

JOB No. B-82585

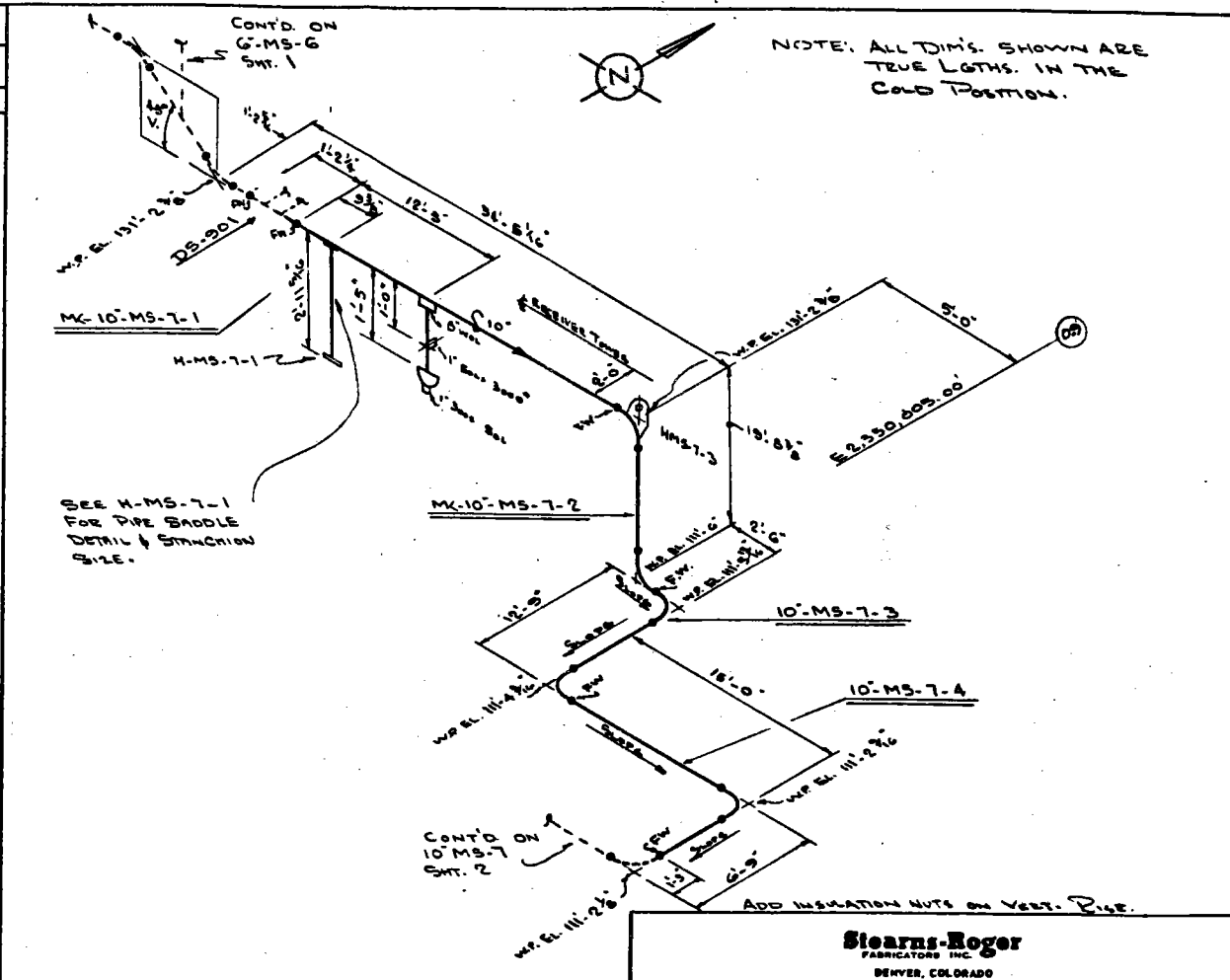
LINE No. 10⁰MS-7 REF. PD-3 

MATERIAL LIST

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


REVIEWED/NO COMMENTS
 REVISED/SEE COMMENTS
 REVISE PER COMMENTS & RESUBMIT FOR REVIEW
 SEE  FOR TRANSMITTAL
 ENG. DEPT. BY  DATE AUG 01 1980
 RETURN TO
Stearns-Roger
 INCORPORATED
 ON OR BEFORE

FINAL AUG 01 1980
Stearns-Roger
 C21700 AUG 01 '80
 SR No. EL File No. 002
C. E. FILE



REVISIONS


SHOP WELDING
 JM
 TIC ALL

DESIGN	305 PM & DSO OF	DRAWN BY	5-15-80
SPEC. / MAT'L.	FEA A335-P11 STD	CHECKED BY	5-21-80
N.D.E.	100% X-RAY DW. MTOEPT FILLED W/30%	APPROVED BY	7-30-80
O.D. PREP.	PF1-E55 P.W.M.T. YES	LINE NO.	10 ⁰ MS-7
I.D. PREP.	PF1-E525	REV.	
		SHEET	1 OF 2

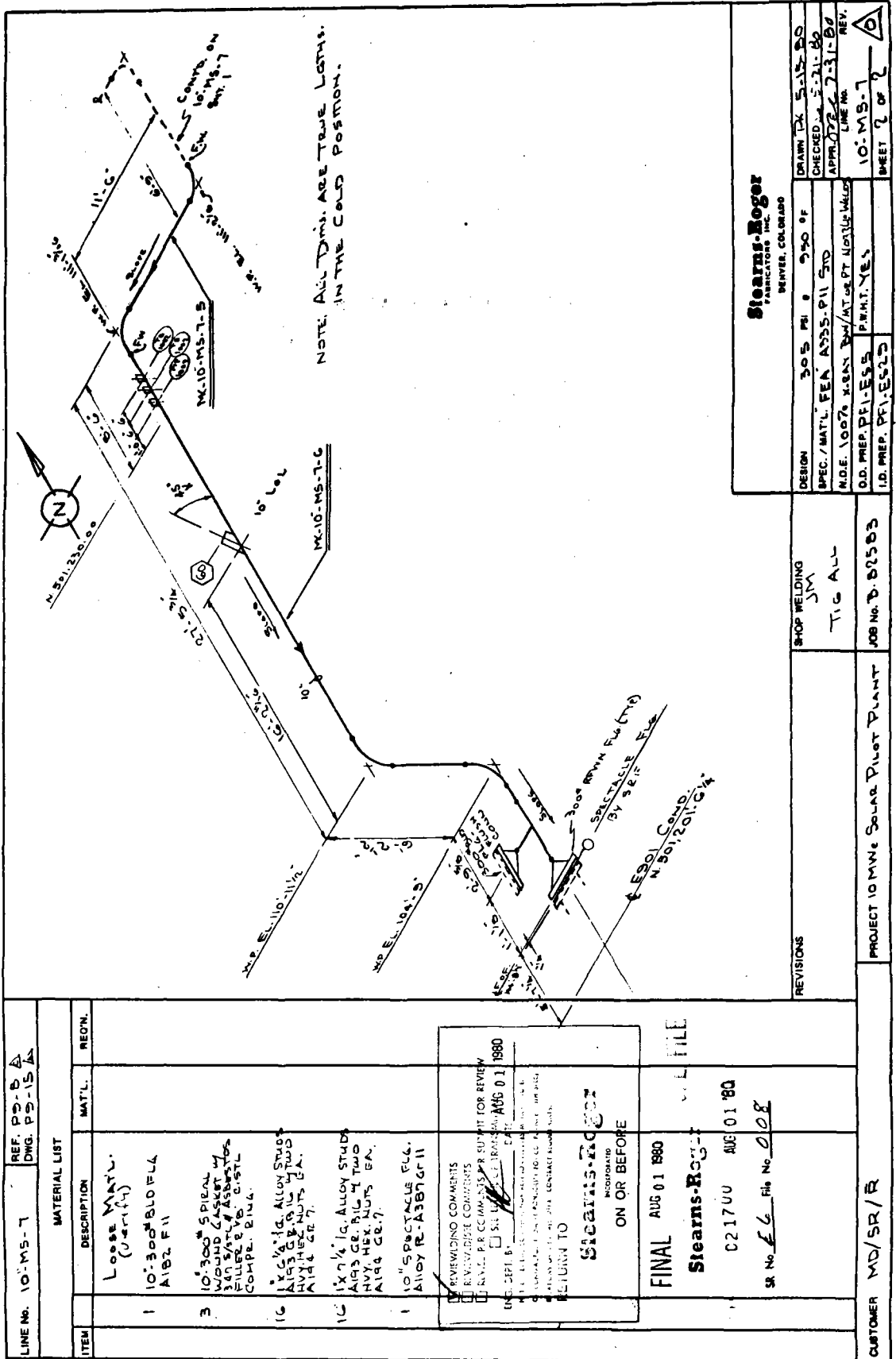
CUSTOMER MD/SR/R

PROJECT 10MW_e SOLAR FLOT PLANT

JOB No. B-82583

DESIGN 305 PM & DSO OF
 SPEC. / MAT'L. FEA A335-P11 STD
 N.D.E. 100% X-RAY DW. MTOEPT FILLED W/30%
 O.D. PREP. PF1-E55 P.W.M.T. YES
 I.D. PREP. PF1-E525
 DRAWN BY 5-15-80
 CHECKED BY 5-21-80
 APPROVED BY 7-30-80
 LINE NO. 10⁰MS-7
 REV. 
 SHEET 1 OF 2

08



ITEM	DESCRIPTION	MAT'L.	REQ'N.
1	Loose Mat'u. (Verify)		
3	10" 300 S PICAL WOUND CASSET W/ 34N S/S ST. ASBESTOS FILLER & V.B. C/STL COMPE. BUNG.		
10	1" x 1/4" ALLOY STUDS A193 GR. B16 IN. BY TWO HVV. HEX. NUTS (A. A194 CR.7.		
10	1" x 7/16" ALLOY STUDS A193 GR. B16 IN. TWO HVV. HEX. NUTS (A. A194 CR.7.		
1	10" SPECTACULUS FLG. ALLOY R-A387011		

REVIEWING COMMENTS
 REVISE/DISE COMMENTS
 REVISE PER COMMENTS FOR REVIEW
 ENG. DEPT. B. *[Signature]* AUG 01 1980
 RETURN TO
Stearns-Roger
 MODIFIED
 ON OR BEFORE
 FINAL AUG 01 1980
Stearns-Roger
 C21700 AUG 01 '80
 SR No. EL File No. 008

Stearns-Roger FABRICATORS INC. DENVER, COLORADO	
DESIGN	305 P1 9 950 P1
SPEC./MATEL. FEAS. ASSY. P11 STD	DRAWN TX 5-15-80
M.D.E. 100% X-RAYS DW/AT CRPT NOTIFY WELD	CHECKED TX 5-21-80
O.D. PREP. P1-ES5 P.M.T. YES	APPROVED TX 7-31-80
I.D. PREP. P1-ES5	LINE NO. 10-MS-7
	REV. SHEET 2 OF 2


SHOP WELDING JM	REVISIONS
TIG ALL	
JOB No. P. 02553	PROJECT 10 MW Solar Pilot Plant

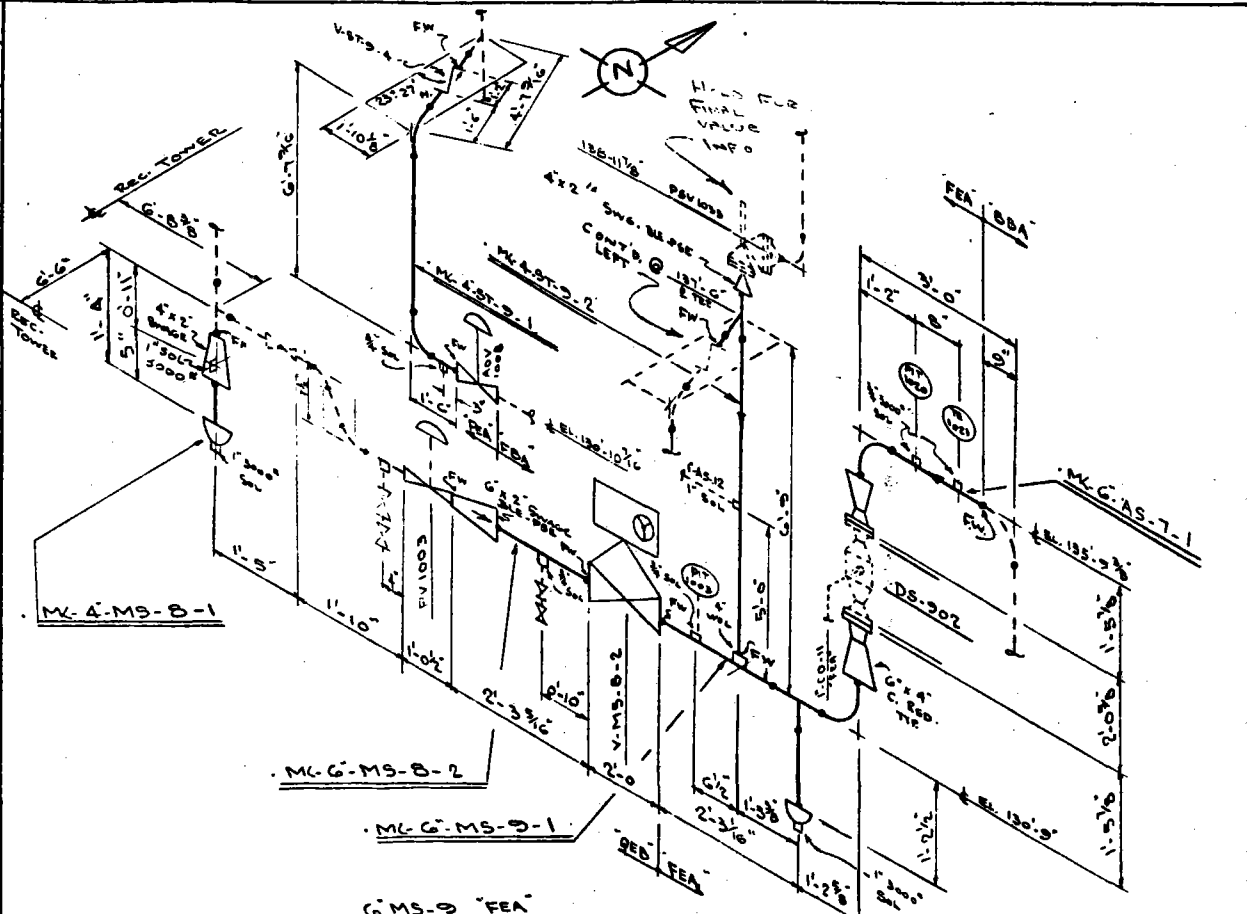
CUSTOMER MD/SR/R

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 1/2" A194 GR7 HEX NUTS		
3	4" 300° STYLE CG 347 SS FLEXITALK GASKET		

<input type="checkbox"/> REVIEW/DISC. COMMENTS <input type="checkbox"/> REVISE/DISC. COMMENTS <input type="checkbox"/> REVISE PER COMMENTS & RECOMM. FOR REVIEW <input type="checkbox"/> SEE LIST OF TRANSMITTED ENG. DEPT. BY:  DATE: AUG 01 1980 FOR: Q. CONSULTED FROM: RETURN TO: Stearns-Roger INCORPORATED ON OR BEFORE	FINAL AUG 01 1980 Stearns-Roger C21700 AUG 01 '80 SR No. <u>F-6</u> File No. <u>D-31</u>	C. E. FILE
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THIS ISO. INCLUDES LINES
 G-MS-B "FEA"
 4-MS-B "QEB"
 G-AS-7 "FEA"
 4-ST-3 "FEA"

Stearns-Roger
 FABRICATORS, INC.
 DENVER, COLORADO

REVISIONS	SHOP WELDING JM TIG ROOT ALL	DESIGN: QEB 175 SPEC. / MAT'L: QEB ASS-873 N.D.E. 100% PW X-RAY MT/PT BRKLNH CONLU O.D. PREP. PF-ESS P.W.H.T. YES- NOTED I.D. PREP. PF-ESS	DRAWN: PK 5-14-80 CHECKED:  5-22-80 APPR:  7-31-80 LINE NO. REV. G-MS-B  SHEET 1 OF 1
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CUSTOMER MD/SR/R

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

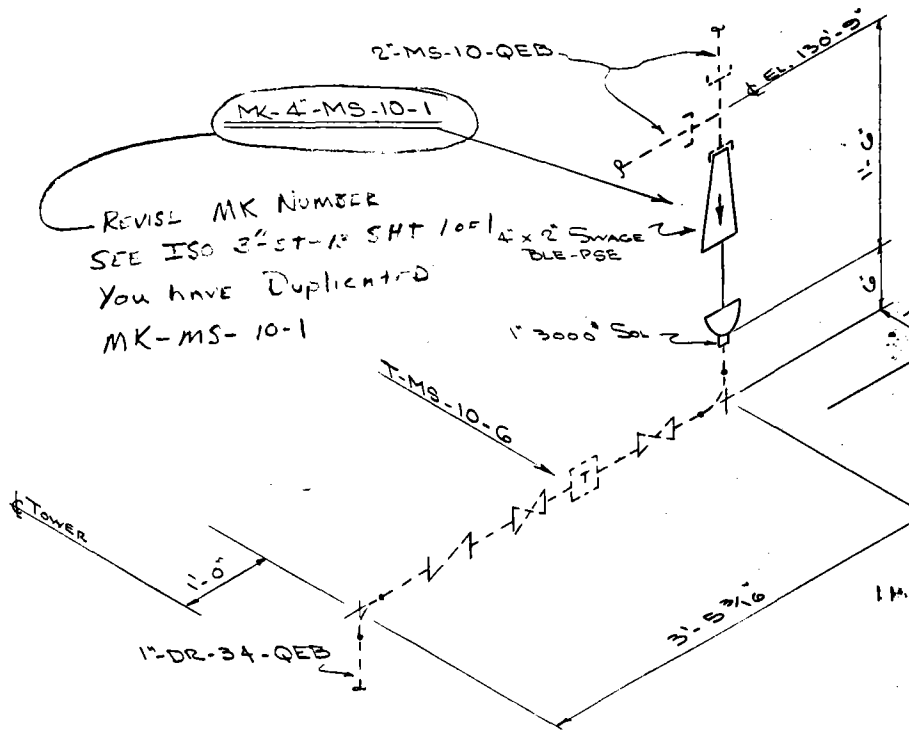
82

REF. DWG. P9-13 Δ & P9-3 Δ



MATERIAL LIST

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



REVIEWED/NO COMMENTS
 REVIEWED/SEE COMMENTS
 REVISE PER COMMENTS & RESUBMIT FOR REVIEW
 SEE TITLE OF TRANSMITTAL
 ENG. DEPT. BY SR DATE 15 SEP 1980
NOT TO BE USED FOR CONSTRUCTION UNLESS MANUFACTURED OR CONFORMS TO THE POWERSHIP PROJECT SPECIFICATIONS OR CONTRACT DOCUMENTS AND CONTRACT REQUIREMENTS.
 RETURN TO
Stearns-Roger
INCORPORATED
 ON OR BEFORE

C. E. FILE
Stearns-Roger
 14. 021700 SEP 10 '80
 SR No. E-6 File No. 122

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

NO.	REVISION	BY	DATE	SHOP WELDING	DESIGN	1775 PSI @ 1010 OF	DRAWN	PK B-14-80	
				TIG	SPEC./MAT'L	QEB SCH 160 A335-P22	CHECKED	9-5-80	
CUSTOMER MD/SR				PROJECT	10MWE SOLAR PLANT	JOB No.	B-825B3	N.D.E.	100% BW-MT @ PT Sol
								O.D. PREP.	PF1-ES5 P.W.H.T. YES
								I.D. PREP.	PF1-ES29
							LINE No.	REV.	
							4-MS-10	Δ	
							SHEET	1 OF 1	

83

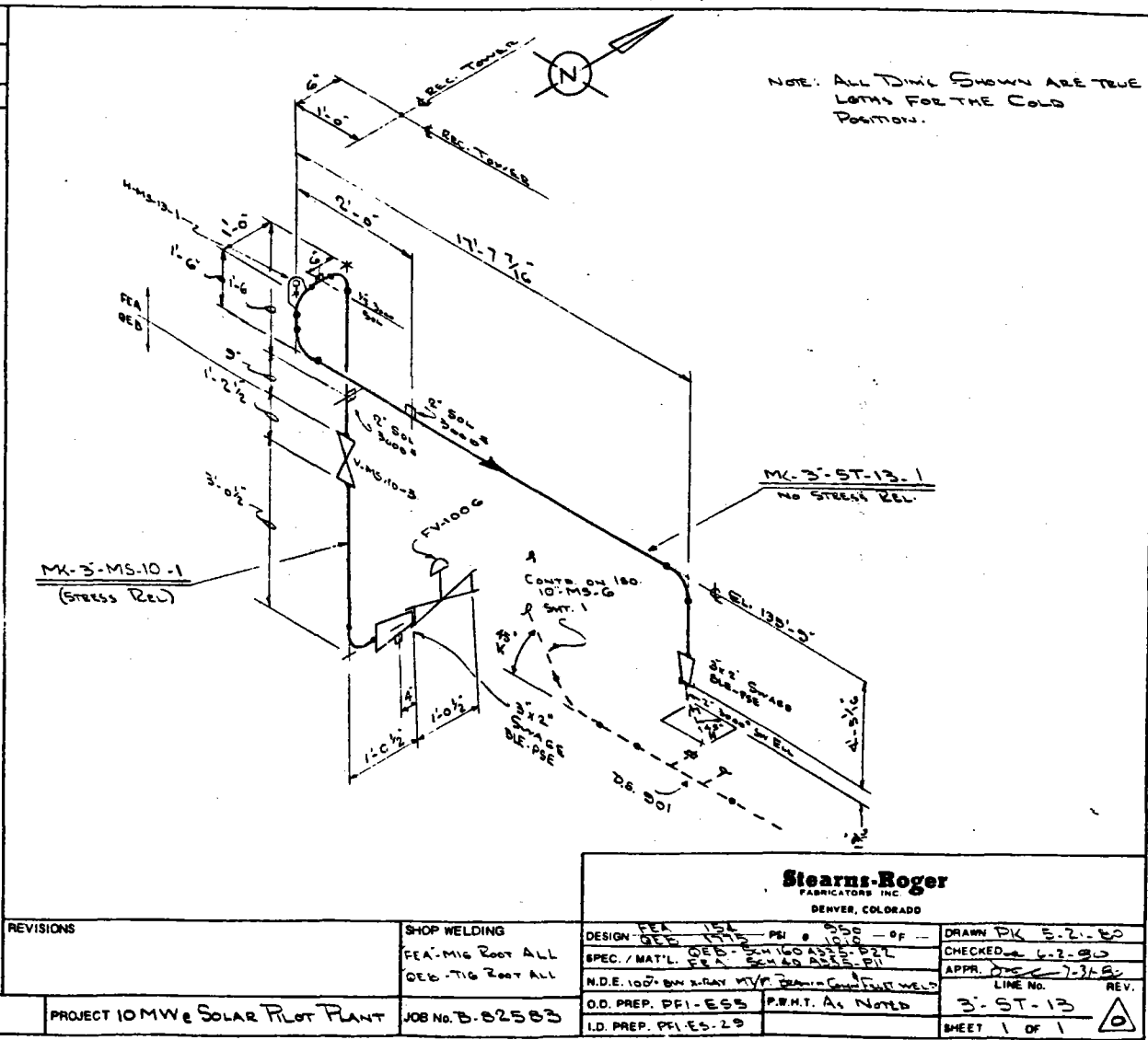
LINE No. 3-ST-13 REF. PD-3 DWG.

MATERIAL LIST

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

REVIEWED/NO COMMENTS
 REVIEWED/SIC COMMENTS
 REVISE PER COMMENTS & RESULTANT FOR REVIEW
 SEE BY TRANS. INITIAL
 ENG. DEPT. BY: *[Signature]* DATE: AUG 01 1980
NOT TO BE USED FOR FABRICATING OR ASSEMBLING UNLESS APPROVED BY THE DESIGN OFFICE. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL MATERIALS AND SUPPLIES. SEE CONTRACT SPECIFICATIONS FOR MORE DETAILS. RETURN TO: *[Signature]*
 ON OR BEFORE

FINAL AUG 01 1980
Stearns-Roger
 C21700 AUG 01 '80
 SR No E-6 File No 277
C. E. FILE



CUSTOMER MD/SR/R

PROJECT 10MW_e SOLAR PILOT PLANT

SHOP WELDING
 FEA-MIG Root ALL
 DEB-TIG Root ALL
 JOB No. B-02583

Stearns-Roger			DENVER, COLORADO		
DESIGN	FEA 156 - PH 0 055 - 0F -	DRAWN	PK 5-2-80	REV.	
SPEC./MAT'L.	QEB - SCH 160 A358 - P21 FEA - SCH 160 A358 - P21	CHECKED	6-2-80	APPR.	7-31-80
N.D.E.	100% W/ X-RAY MYP	DATE	LINE NO.		
O.D. PREP.	PFI-ESS	P.W.M.T.	A ₁ NOTED	3-ST-13	
I.D. PREP.	PFI-ES-29	SHEET 1 OF 1			⊙

84

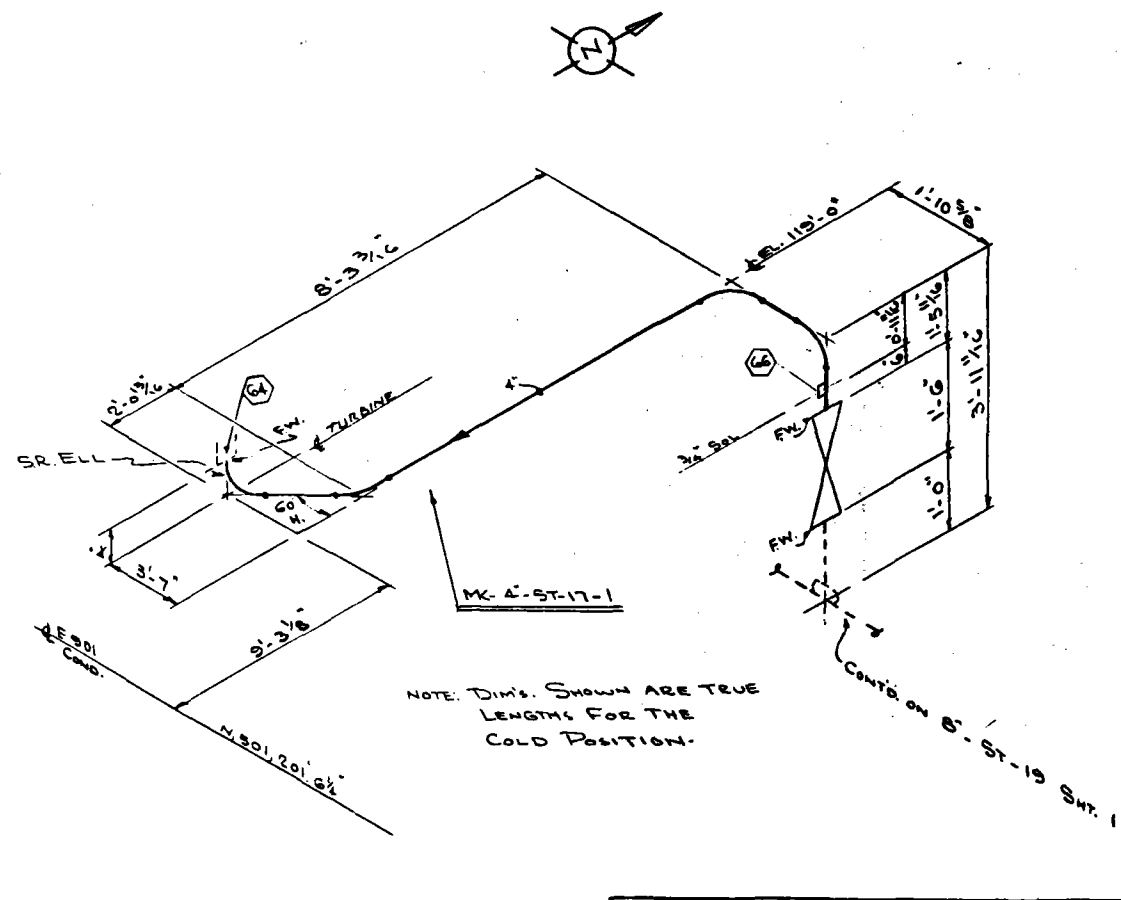
LINE No. A-ST-17 REF. DWG. PS-15 Δ

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	Loose Mat'l. — NONE —		

REVIEWED/D NO COMMENTS
 REVIEWED/D SEE COMMENTS
 REVISE PER COMMENTS & RESULT FOR REVIEW
 SEE COMMENTS & REVISE
 ENG. DESIGNED BY [Signature] DATE AUG 01 1980
 INCORPORATED ON OR BEFORE

FINAL AUG 01 1980 C. E. FILE
Stearns-Roger
 C21700 AUG 01 '80
 Sp. No. E-6 File No. C42



NOTE: DIM'S. SHOWN ARE TRUE LENGTHS FOR THE COLD POSITION.

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

REVISIONS	SHOP WELDING JM TIG ALL
CUSTOMER <u>MO/SR/R</u>	PROJECT <u>10Mwe SOLAR Plot PLANT</u>
	JOB No. <u>B-82583</u>

DESIGN <u>144B</u>	PSI # <u>902</u> OF	DRAWN <u>PK 7-15-80</u>
SPEC./MAT'L. <u>QED A355-P22 3/4\"</u>		CHECKED <u>[Signature] 7-21-80</u>
N.D.E. <u>100% XR BW MT PT No. WELDS</u>		APPROVED <u>[Signature] 7-23-80</u>
D.D. PREP. <u>PF-ES-5</u>	P.W.H.T. <u>Yes</u>	LINE No. <u>A-ST-17</u>
I.D. PREP. <u>PF-ES-29</u>		REV. <u>1</u>
		SHEET <u>1</u> OF <u>1</u>

85

LINE No. **8-ST-19** REF. DWG. **P9-15 A**

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	Loose Mat'l.		
2	4" COLD FLEXITALLIC CASKET TYPE CG-7347 MAT'L ASS-ESTDS FILLER 2 C-STE COMPE. RING.		
16	7/8" x 5 3/4" LG. ALLOY STUDS A193 GR. B16 TWO HUY. HEY UNYS FR. A193 GR. 7		

REVIEWED/NO COMMENTS
 REVIEWED/SOME COMMENTS
 REVISE P.P. COMMENTS & RESUBMIT FOR REVIEW
 SEE LETTER
 ENGR. DESIGNED BY *W* AUG 01 1980
 INCORPORATED ON OR BEFORE

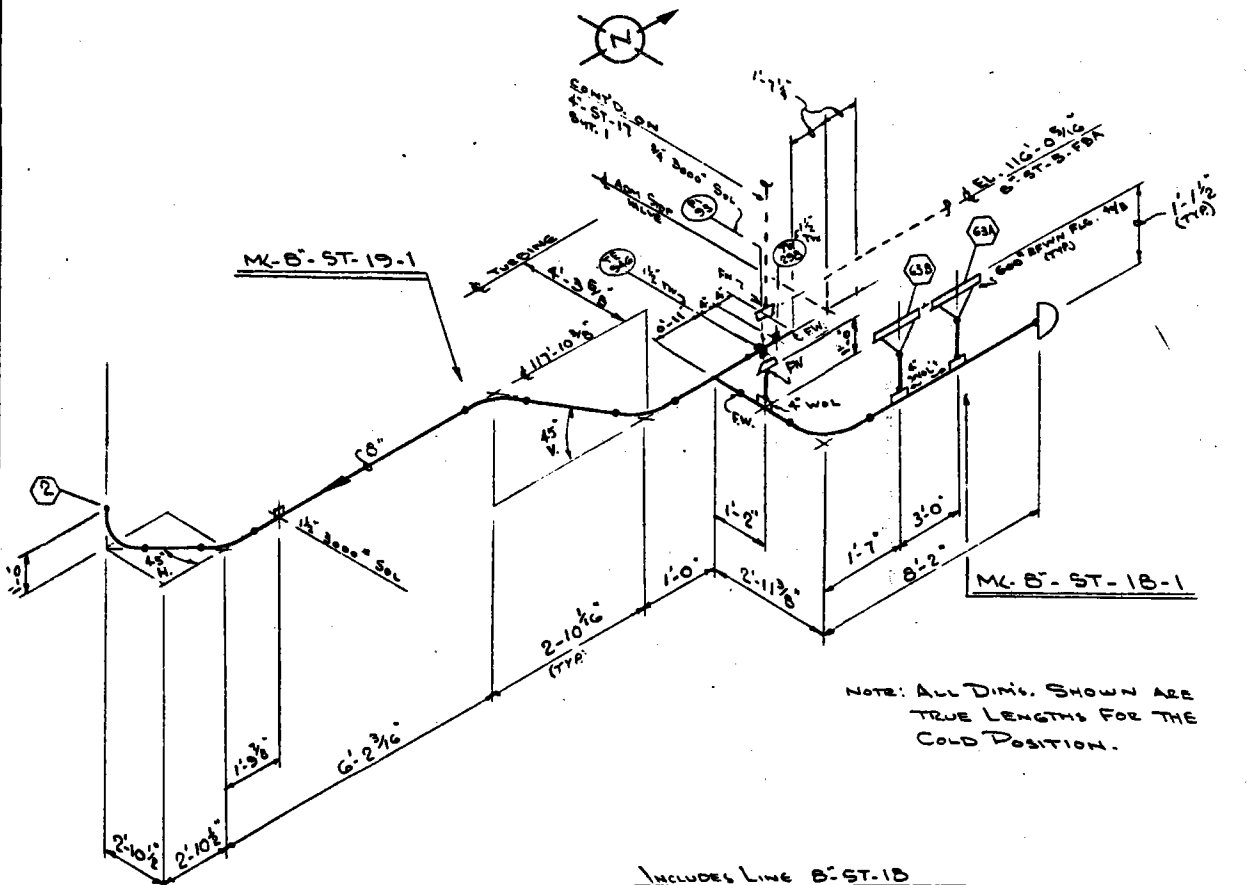
FINAL AUG 01 1980

Stearns-Roger

D21744 AUG 01 '80

SE No. E-6 File No. 043

C. E. FILE



INCLUDES LINE 8-ST-18

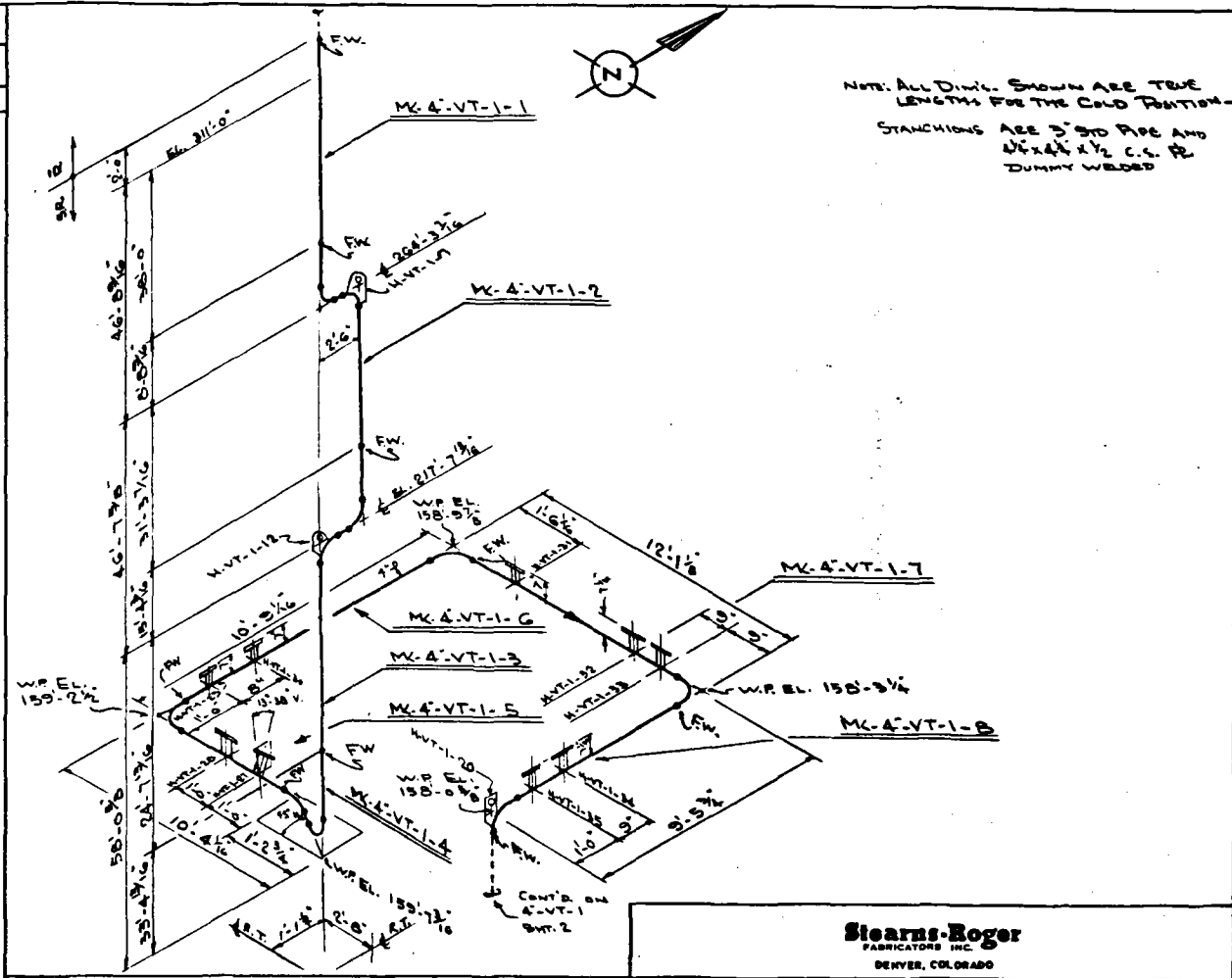
Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS	SHOP WELDING JM TIG ALL	DESIGN ABD PER 902 OF	DRAWN DIC 7-15-80
		SPEC./MAT'L. HEA A335.P11 SCH. 40	CHECKED 7-21-80
		N.D.E. 100% X 2 BW MT & PT NOZZLE WELDS	APPR. 7-31-80
		O.D. PREP. PF. ES-5	LINE NO. 8-ST-19
		I.D. PREP. PF. ES-7	REV. 1
CUSTOMER M.D./SR/R		PROJECT 10 MW SOLAR PLANT	JOB No. B-82585
		SHEET 1 OF 1	

98

28

LINE No. A-VT-1		REF. DWG. PD-3	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L. - NONE -		
<input checked="" type="checkbox"/> REVIEWED/NO COMMENTS <input type="checkbox"/> REVIEW/DISE COMMENTS <input type="checkbox"/> REVISE FOR COMMENTS & RESUBMIT FOR REVIEW <input type="checkbox"/> SEE LIST FOR MATERIAL ENG. DATE: AUG 01 1980 RETURN TO: C.E. FILL ON OR BEFORE:			
FINAL AUG 01 1980		C.E. FILL	
Stearns-Roger			
C21700 AUG 01 '80			
SR No. E-6 File No. Q39			



NOTE: ALL DIMS. SHOWN ARE TRUE LENGTHS FOR THE COLD POSITION. STANCHIONS ARE 3" STD PIPE AND 1/2" X 1/2" C.S. PL. DUMMY WELDED

REVISIONS	SHOP WELDING JM TIG ROOT ALL	DESIGN 585 PH & 960 PF	DRAWN DK 5-21-80
		SPEC. / MAT'L. KEB A325.P12 STD	CHECKED JK 6-3-80
		N.D.E. 100% BY X-RAY - NYT BONER CORP / FLUET WELD	APPR. JK 7-30-80
		O.D. PREP. PF-ES5	P.W.M.T. No.
		I.D. PREP. PF-ES-23	REV. 4-VT-1
CUSTOMER MO/S-R/R		PROJECT 10MW & SOLAR PLOT PLANT	JOB No. D-82583
			SHEET 1 OF 2

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

LINE No. **A-VT-1**

REF. PD-3
DNG. PD-4

MATERIAL LIST

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

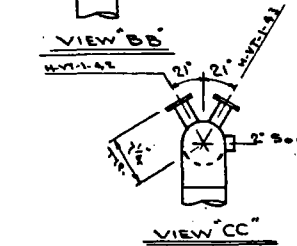
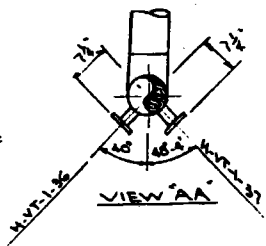
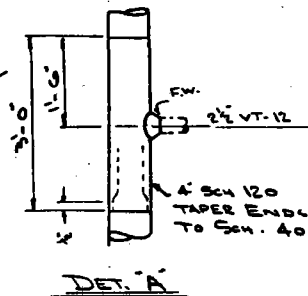
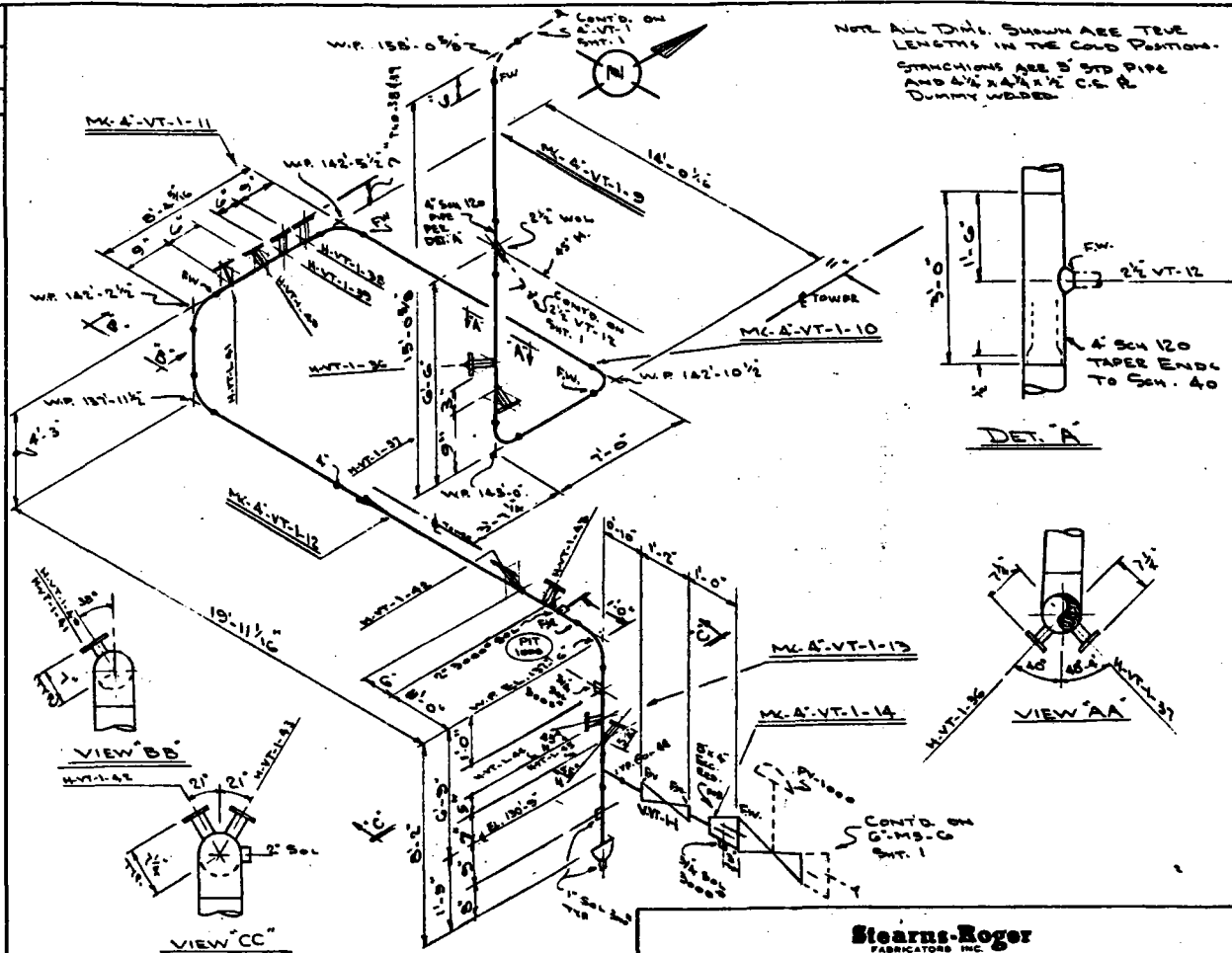
REVIEWED/NO COMMENTS
 REVIEW/DISE COMMENTS
 REVISE FOR COMMENTS & RESUBMIT FOR REVIEW
 SEE LIST FOR COMMENTS
 ENG. DESIGNED BY [Signature] DATE AUG 01 1980
 RETURN TO

ON OR BEFORE

FINAL AUG 01 1980 C. E. FILE

Stearns-Roger
021700 AUG 01 '80

SR No. E-6 File No. 040



Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

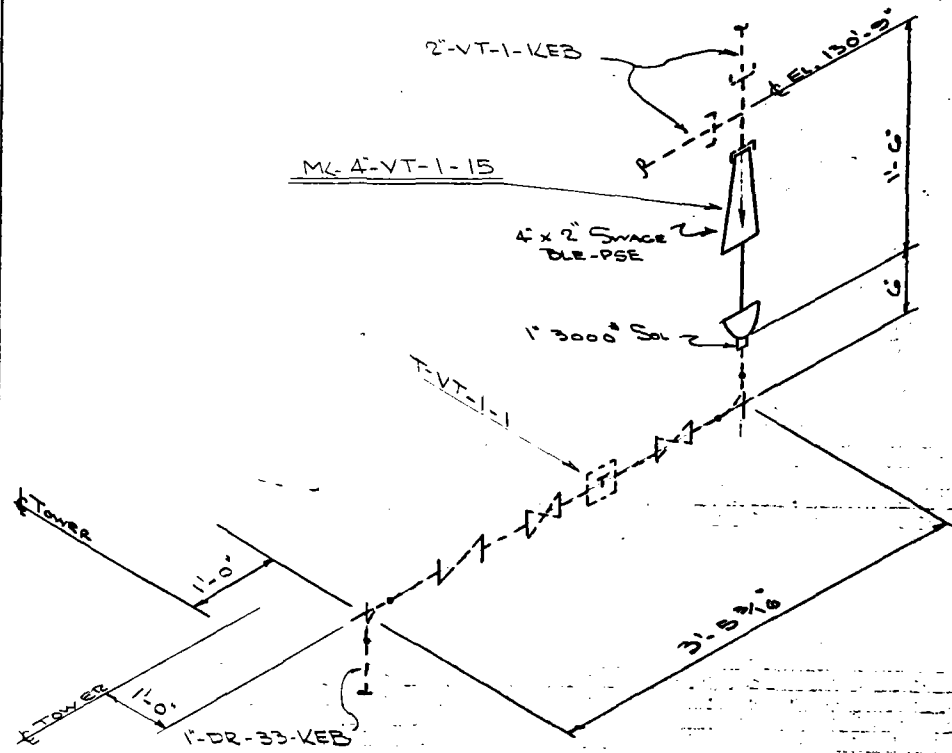
REVISIONS	SHOP WELDING JM TIG Rept ALL	DESIGN 585 PSI @ 960 OF	DRAWN PK 5-22-80
		SPEC. / MAT'L. KEB A335-P22 STD	CHECKED 6-3-80
		N.D.E. 100% BY X-RAY. MIT/PT BRANCA Conn.	APPR. DEC 7-30-80
		O.D. PREP. PFL-ESS P.W.H.T. NO	LINE No. REV.
		I.D. PREP. PFL-ESS	A-VT-1
CUSTOMER MD/SR/R	PROJECT 10MW & SOLAR PLOT PLANT	JOB No. B-82583	SHEET 2 OF 2

REF. DWG. P9-18 Δ & P9-3 Δ



MATERIAL LIST

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





REVIEW/DISC. COMMENTS
 R.V. W/DISE. COMMENTS
 REVISE PER COMMENTS & R'SUBMIT FOR REVIEW
 REVISE PER COMMENTS & R'SUBMIT FOR REVIEW
 REVISE PER COMMENTS & R'SUBMIT FOR REVIEW
 REVISE PER COMMENTS & R'SUBMIT FOR REVIEW
 INC. DEPT. BY SR DATE SEP 15 1980
 RELEASE - REVIEW, COMMENT, NOT REVISIONABLE IN THIS CASE
 ON CONTRACTOR FROM RESPONSIBILITY FOR COMPLIANCE WITH SPECIFICATIONS AND ALL OTHER CONTRACT REQUIREMENTS.
 RETURN TO
Stearns-Roger
 INCORPORATED
 ON OR BEFORE
C. E. FILE
Stearns-Roger
 021700 SEP 12 '80
 SR No. F-6 File No. 131

Stearns-Roger
 FABRICATORS, INC.
 DENVER, COLORADO


CUSTOMER	MD/SR	PROJECT	10MW Solar Phot Plant	JOB No.	B-825B3	SHOP WELDING	DESIGN	585 PS @ 960'	DRAWN	PK B-14-80
						TIG	SPEC./MAT'L	KEB STD A335-P22	CHECKED	B-9-80
							N.D.E.	100% BW-MT @ PT Sol	APPR.	
							O.D. PREP.	PFL-ES 3	P.W.H.T.	
							I.D. PREP.	PFL-ES 29	LINE No.	4-VT-1
									REV.	△
									SHEET	1A OF 1

68

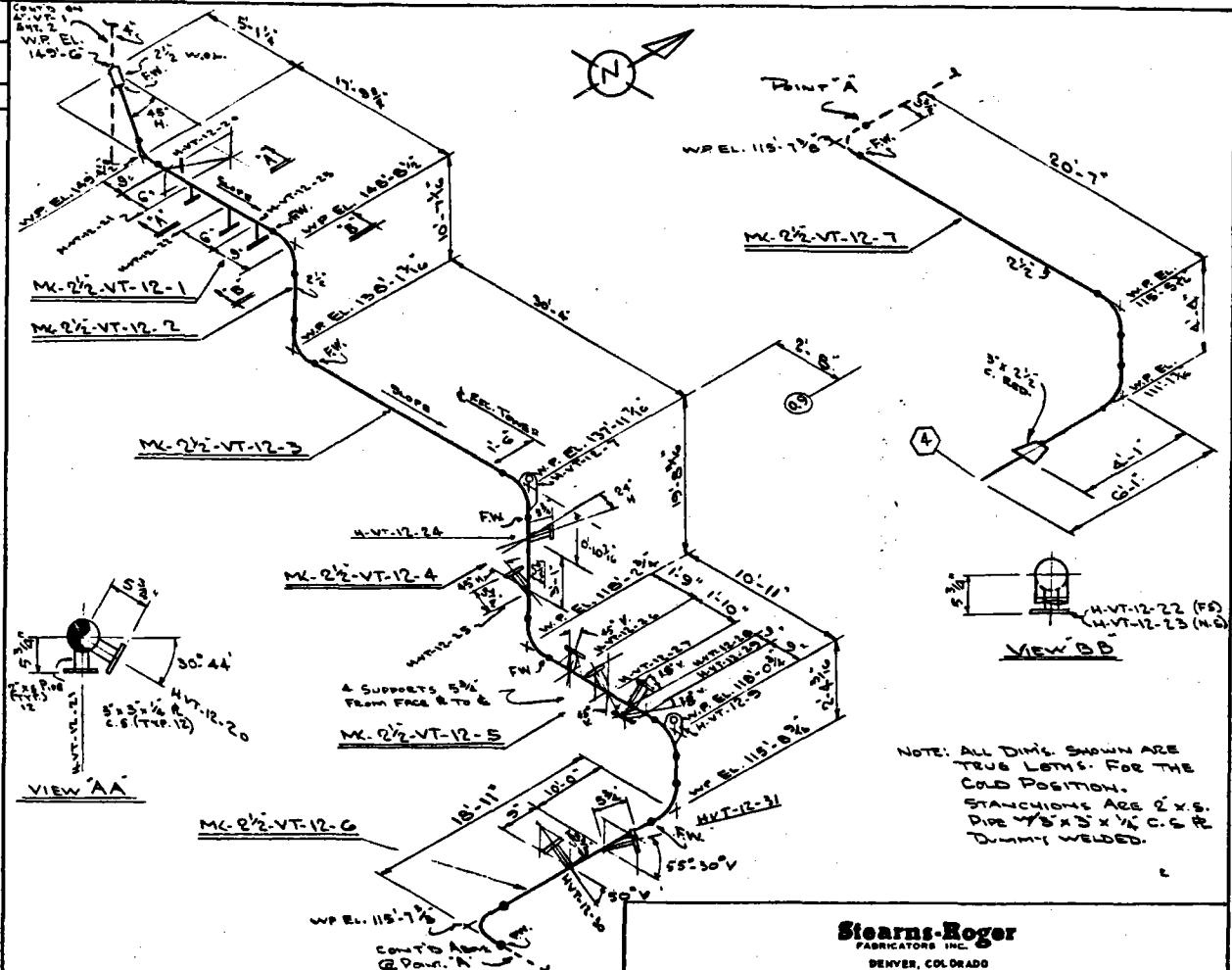
LINE No. **2 1/2-VT-12** REF. **DS-3** 
 DWG. **DS-10** 

MATERIAL LIST

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

REVIEWED NO COMMENTS
 REVIEW DISSE COMMENTS
 REVISE FOR COMMENTS & RETURN FOR REVIEW
 SEE LIST FOR COMMENTS
 EMP. DEPT. BY:  **AUG 01 1980**
 RETURN TO: _____
 INCL. FORA'D TO _____
ON OR BEFORE

FINAL AUG 01 1980 **C. E. FILE**
Stearns-Roger
 C21700 AUG 01 '80
 SR No. E-6 File No. 041



REVISIONS

SHOP WELDING	DESIGN	585 PH @ 560 OF	DRAWN BY 5-16-80
JM	SPEC. / MAT'L KEYS	A335-P22 STD	CHECKED 6-4-80
TIG ROOT ALL	N.D.E. 100% ON XRAY - 1/4\"/>		
	O.D. PREP. P.F.L.E.S.S.	P.W.M.T. NO	APPR. 7-31-80
	I.D. PREP. P.T. F523		LINE NO. REV.
			2 1/2-VT-12
			SHEET 1 OF 1

CUSTOMER **MD/S-R/R**

PROJECT **10MW_s SOLAR PILOT PLANT**

JOB No. **B-82583**

Stearns-Roger
 FABRICATORS, INC.
 DENVER, COLORADO

06

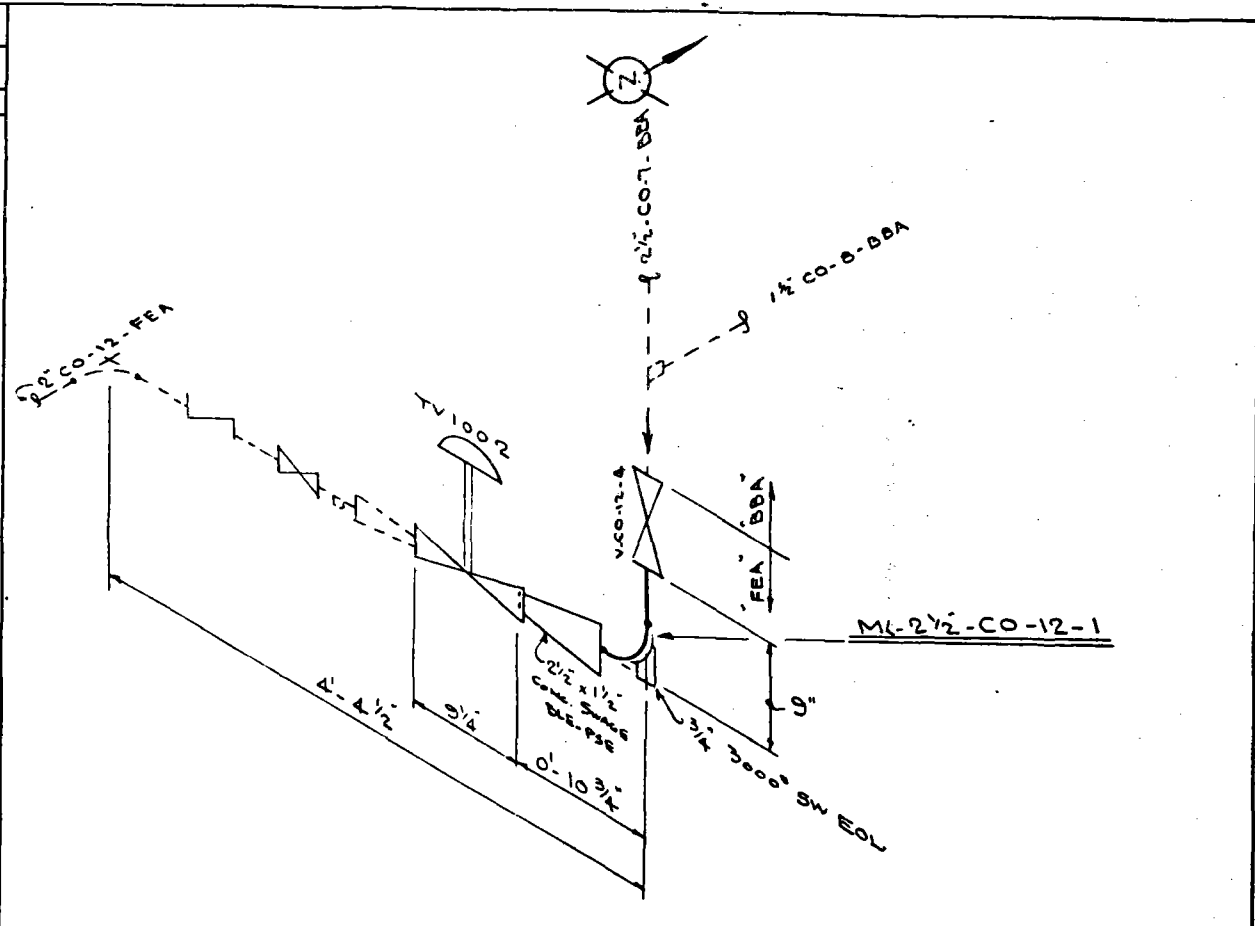
LINE No. 2 1/2-CO-12 REF. DWG. 89-18 A

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	Loose Mat'l. - NONE -		

REVIEWED/NO COMMENTS
 REVIEWED/DIGE COMMENTS
 REVISE PER COMMENTS & RESUBMIT FOR REVIEW
 SUBMIT FOR FINAL REVIEW
 ENG. DESIG. BY *[Signature]* DATE **AUG 01 1980**
 INCORPORATED ON OR BEFORE

FINAL AUG 01 1980
C. E. FILE
Stearns-Roger
 C21700 AUG 01 '80
 R. No. *E.G.* File No. *051*



91

REVISIONS
 CUSTOMER **MD/SR/R**
 PROJECT **10 MW_e SOLAR PILOT PLANT**

SHOP WELDING
TIG ALL
 JOB No. **B-02583**

Stearns-Roger
FABRICATORS, INC.
DENVER, COLORADO

DESIGN 102 PBI @ 865 °F	DRAWN <i>TL 7-28-80</i>
SPEC. / MAT'L. FEA A335-P11 STD	CHECKED <i>L 7-29-80</i>
N.D.E. 100% X-RAY SW-MT & PT Dr. Cont.	APPR. <i>DTG 7-31-80</i>
O.D. PREP. PELESS P.W.M.T.	LINE No. 2 1/2-CO-12
I.D. PREP. PELESS	REV. 1

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 Δ
 DWG. 40M2005131945 Δ

MATERIAL LIST

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

CONT'D ON
 2 1/2"-FW-201-MBX
 SHT 1

CONT'D ON
 2 1/2"-FW-202-MBX
 SHT 1

CONT'D ON
 2 1/2"-FW-203-MBX
 SHT 1

Stearns-Roger

D21700 JUN 1 1980

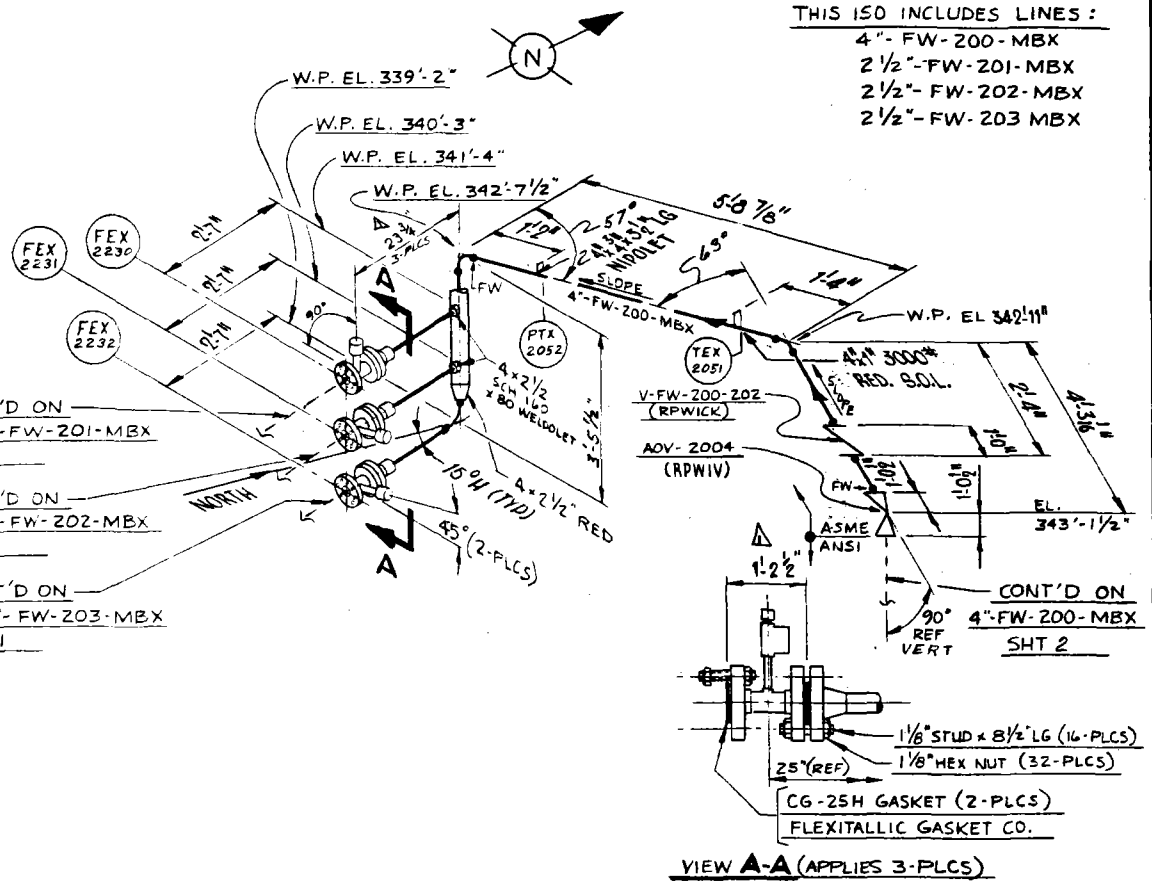
SR No. E-61 File No. 023

REVISIONS CHECKED BY: [] SHOP WELDING

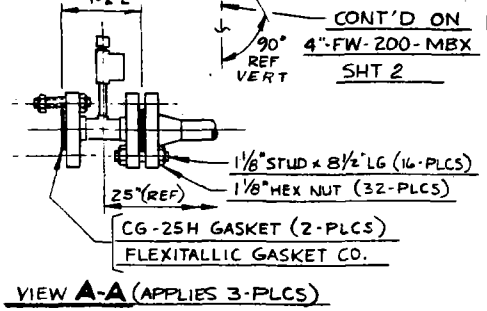
CUSTOMER MD/SR/R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.



THIS ISD INCLUDES LINES :
 4"-FW-200-MBX
 2 1/2"-FW-201-MBX
 2 1/2"-FW-202-MBX
 2 1/2"-FW-203-MBX



VIEW A-A (APPLIES 3-PLCS)

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

DESIGN E.D.S. 2000 PSI • 440 OF	DRAWN [Signature]
SPEC. / MAT'L. MBX / CL1500 CARBON ST	CHECKED [Signature]
N.D.E.	APPR. [Signature]
O.D. PREP.	P.W.M.T.
I.D. PREP.	LINE No. REV.
	4"-FW-200-MBX
	SHEET 1 OF 2

56

LINE No. 4"-FW-200-MBX REF. 40M2005131931
 DWG. 932, 933, 934, 935

4945

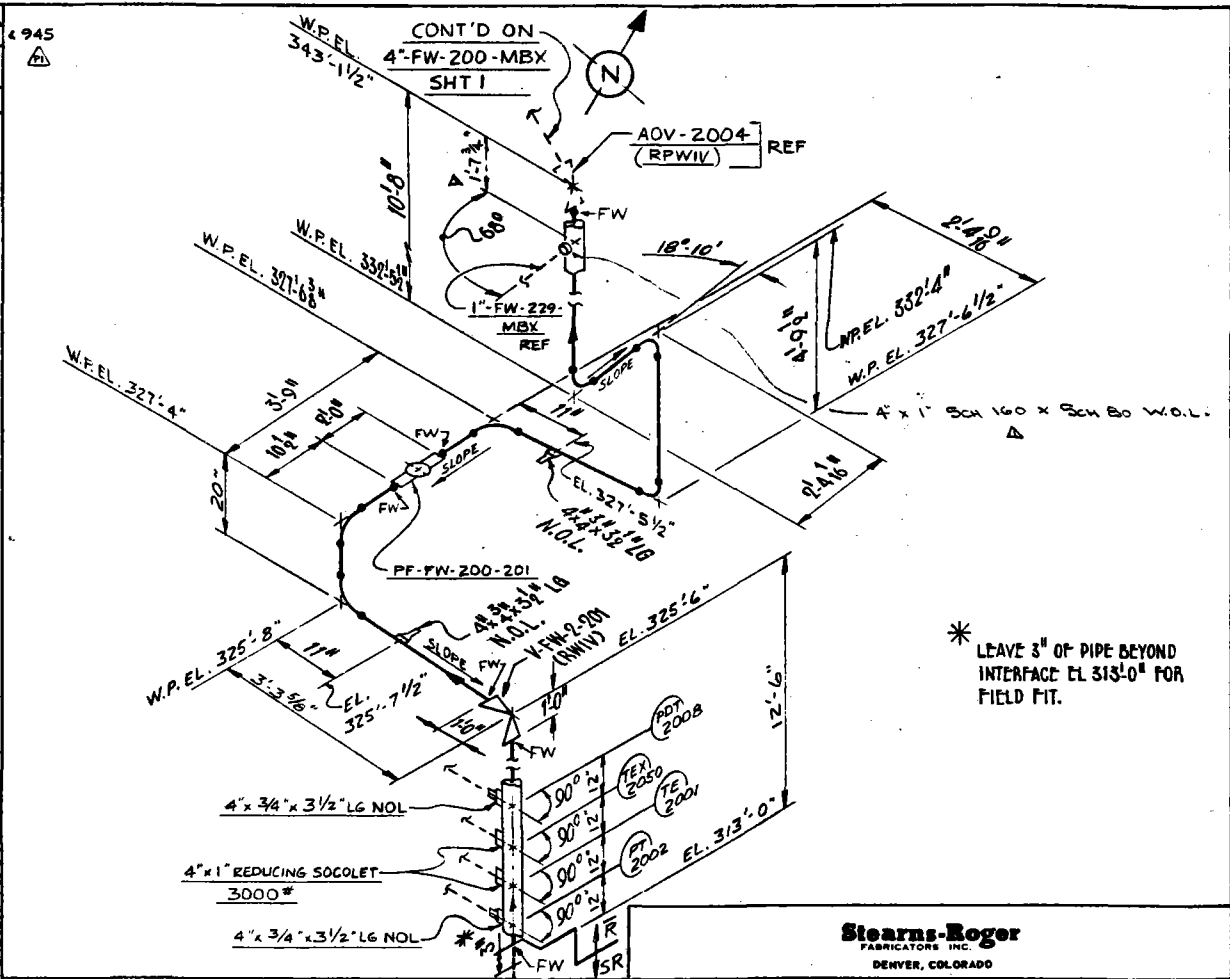
MATERIAL LIST

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

Stearns-Roger

FORM C21700 JUN 11 '80

SE No. E-6.1 File No. C24



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

REVISIONS Δ REV. PER E. O. 16-87

SHOP WELDING

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

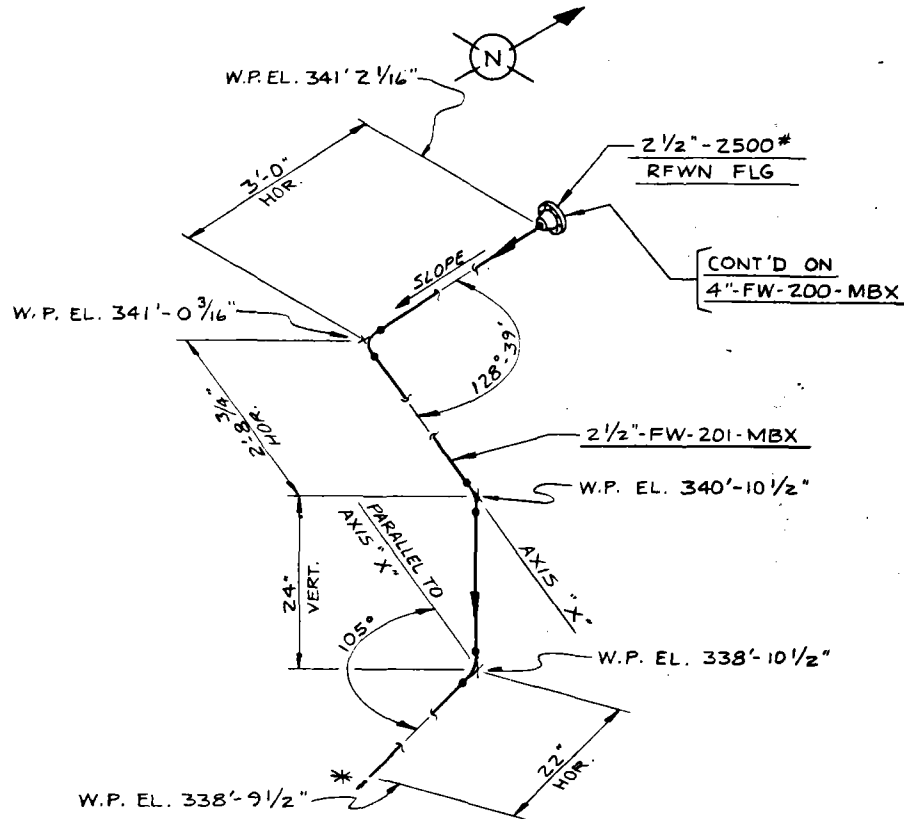
DESIGN EDS/8000 PBI & ADC OF	DRAWN <i>cutball</i> 7/5/80
SPEC. / MAT'L. MBX / 20 1500-348011 ET.	CHECKED <i>[Signature]</i> 7/2/80
N.D.E.	APPR <i>[Signature]</i>
O.D. PREP.	P.W.M.T.
I.D. PREP.	LINE No. 1 REV.

CUSTOMER MD / SR / R PROJECT 10 MWe SOLAR PILOT PLANT JOB No. SHEET 2 OF 2

LINE No. $2\frac{1}{2}$ "-FW-201-MBX REF. 40M2005131932
 DWG. 40M2005131945

MATERIAL LIST

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



* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

Stearns-Roger

Order No. C21700 JUN 16 '80

SR No. 26-1 File No. 635

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

REVISIONS

SHOP WELDING

DESIGN EDS/SSOO PH # 440 OF
 SPEC. / MAT'L. MBX/QL1550-08FEDN. CT
 N.D.E.

DRAWN G. H. HARRIS
 CHECKED E. H. HARRIS
 APPR. E. H. HARRIS
 LINE No. REV.

CUSTOMER MD/SR/R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.

O.D. PREP.
 I.D. PREP.

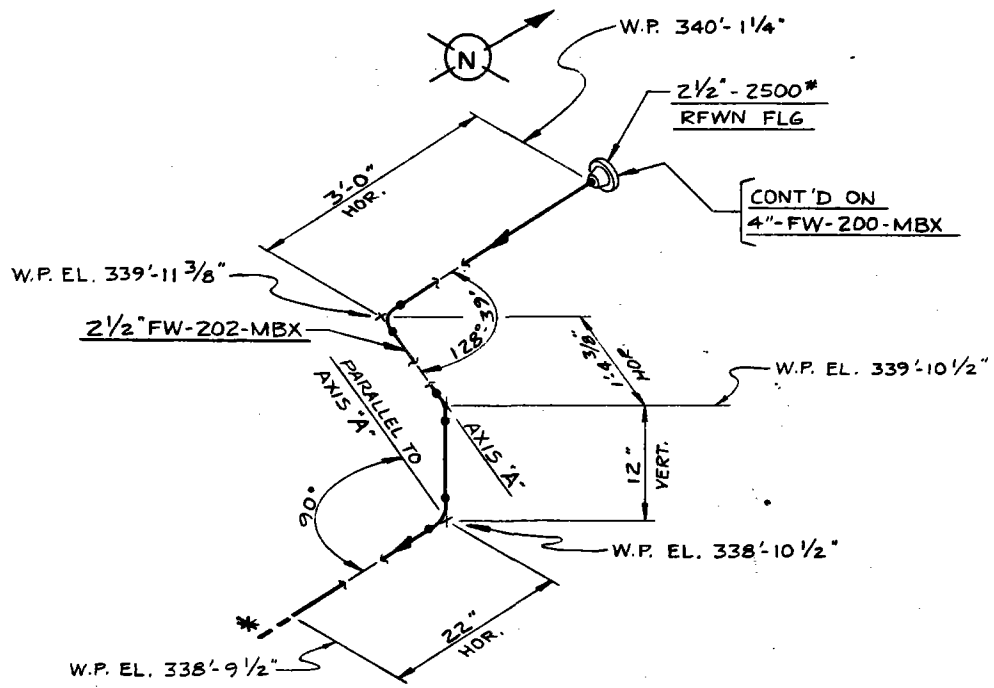
P.W.M.T.

2 1/2"-FW-201-MBX
 SHEET 1 OF 1

LINE No. $2\frac{1}{2}$ "-FW-202-MBX REF. 40M2005131932
 DWG. 40M2005131945

MATERIAL LIST

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



* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

Stearns-Roger
 C21700 AM 16 '80
 SR No. EG-1 File No. 033

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

DESIGN <u>EDS/2000</u> PSI @ <u>445</u> OF	DRAWN <u>G.P. 4/1/80</u>
SPEC. / MAT'L. <u>MBX/CL 1500 STEEL ST</u>	CHECKED <u>[Signature]</u>
N.D.E.	APPROVED <u>[Signature]</u>
O.D. PREP.	P.W.H.T.
I.D. PREP.	LINE No. REV.

2 1/2"-FW-202-MBX
 SHEET 1 OF 1

REVISIONS
 SHOP WELDING
 PROJECT 10 MWe SOLAR PILOT PLANT
 JOB No.

CUSTOMER MD/SR/R

66

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

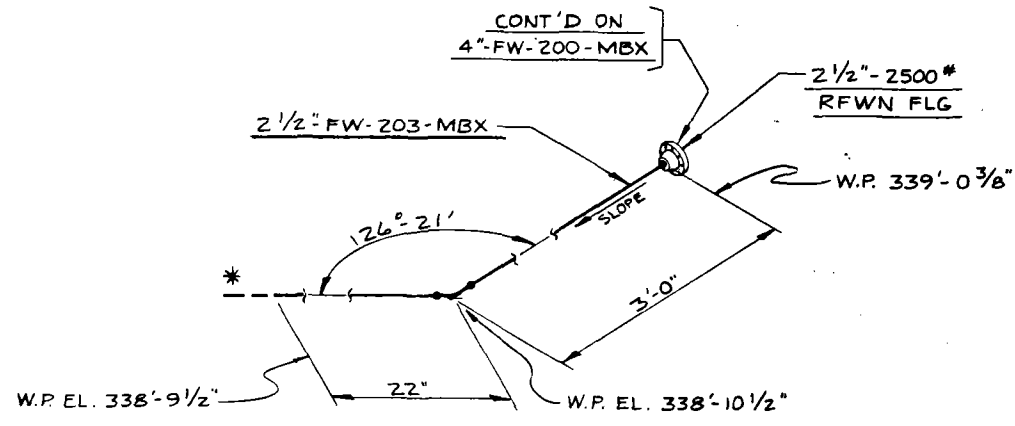
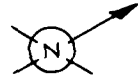
MATERIAL LIST

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

Stearns-Roger

Order No. C21700 JAN 16 '80

Rev. No. 1.1 File No. 034



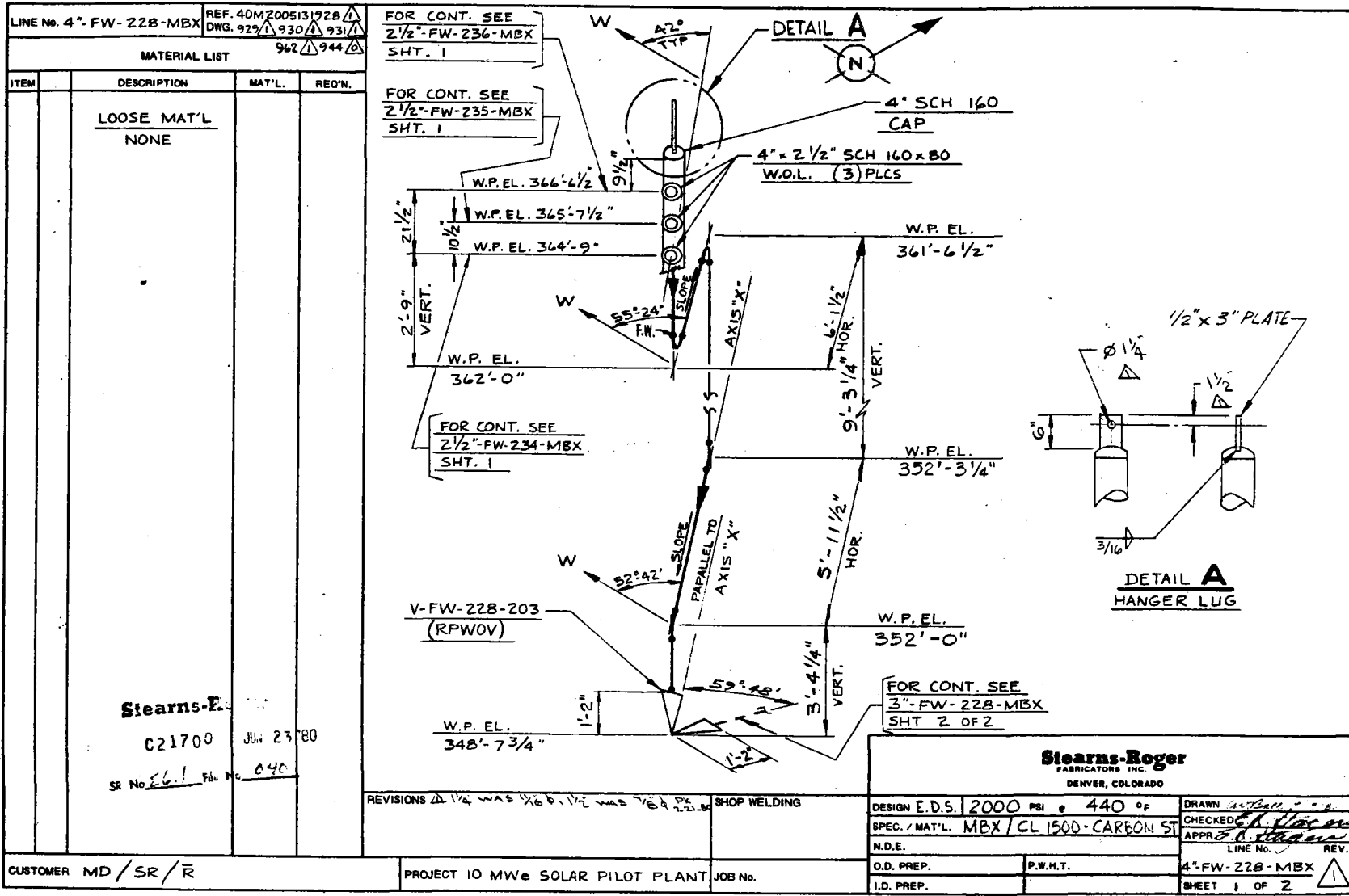
* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

CUSTOMER MD/SR/R	PROJECT 10 MWe SOLAR PILOT PLANT	JOB No.	DESIGN EDS/2003 PBI & AAC OF	DRAWN <i>W. J. ...</i> 4/1/80
			SPEC. / MAT'L MEX / CL1500-CARBON ST	CHECKED <i>P. ...</i>
			N.D.E.	APPR <i>F. ...</i>
			O.D. PREP.	P.W.M.T.
			I.D. PREP.	2 1/2"-FW-203-MBX

LINE No. REV.
 SHEET 1 OF 1

100



LINE No. 4"-FW-228-MBX REF. 40M2005131228
 DWG. 929 930 931
 MATERIAL LIST 962 944

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

FOR CONT. SEE 2 1/2"-FW-236-MBX SHT. 1

FOR CONT. SEE 2 1/2"-FW-235-MBX SHT. 1

FOR CONT. SEE 2 1/2"-FW-234-MBX SHT. 1

FOR CONT. SEE 3"-FW-228-MBX SHT 2 OF 2

Stearns-Roger
 C21700 JUN 23 '80
 SR No. 26.1 File No. 040

REVISIONS Δ 1/4 WAS 1/8 Δ 1/2 WAS 7/8 Δ 2 WAS 2 1/2 Δ 3 WAS 3 1/2 Δ 4 WAS 4 1/2 Δ 5 WAS 5 1/2 Δ 6 WAS 6 1/2 Δ 7 WAS 7 1/2 Δ 8 WAS 8 1/2 Δ 9 WAS 9 1/2 Δ 10 WAS 10 1/2 Δ 11 WAS 11 1/2 Δ 12 WAS 12 1/2 Δ 13 WAS 13 1/2 Δ 14 WAS 14 1/2 Δ 15 WAS 15 1/2 Δ 16 WAS 16 1/2 Δ 17 WAS 17 1/2 Δ 18 WAS 18 1/2 Δ 19 WAS 19 1/2 Δ 20 WAS 20 1/2 Δ 21 WAS 21 1/2 Δ 22 WAS 22 1/2 Δ 23 WAS 23 1/2 Δ 24 WAS 24 1/2 Δ 25 WAS 25 1/2 Δ 26 WAS 26 1/2 Δ 27 WAS 27 1/2 Δ 28 WAS 28 1/2 Δ 29 WAS 29 1/2 Δ 30 WAS 30 1/2 Δ 31 WAS 31 1/2 Δ 32 WAS 32 1/2 Δ 33 WAS 33 1/2 Δ 34 WAS 34 1/2 Δ 35 WAS 35 1/2 Δ 36 WAS 36 1/2 Δ 37 WAS 37 1/2 Δ 38 WAS 38 1/2 Δ 39 WAS 39 1/2 Δ 40 WAS 40 1/2 Δ 41 WAS 41 1/2 Δ 42 WAS 42 1/2 Δ 43 WAS 43 1/2 Δ 44 WAS 44 1/2 Δ 45 WAS 45 1/2 Δ 46 WAS 46 1/2 Δ 47 WAS 47 1/2 Δ 48 WAS 48 1/2 Δ 49 WAS 49 1/2 Δ 50 WAS 50 1/2 Δ 51 WAS 51 1/2 Δ 52 WAS 52 1/2 Δ 53 WAS 53 1/2 Δ 54 WAS 54 1/2 Δ 55 WAS 55 1/2 Δ 56 WAS 56 1/2 Δ 57 WAS 57 1/2 Δ 58 WAS 58 1/2 Δ 59 WAS 59 1/2 Δ 60 WAS 60 1/2 Δ 61 WAS 61 1/2 Δ 62 WAS 62 1/2 Δ 63 WAS 63 1/2 Δ 64 WAS 64 1/2 Δ 65 WAS 65 1/2 Δ 66 WAS 66 1/2 Δ 67 WAS 67 1/2 Δ 68 WAS 68 1/2 Δ 69 WAS 69 1/2 Δ 70 WAS 70 1/2 Δ 71 WAS 71 1/2 Δ 72 WAS 72 1/2 Δ 73 WAS 73 1/2 Δ 74 WAS 74 1/2 Δ 75 WAS 75 1/2 Δ 76 WAS 76 1/2 Δ 77 WAS 77 1/2 Δ 78 WAS 78 1/2 Δ 79 WAS 79 1/2 Δ 80 WAS 80 1/2 Δ 81 WAS 81 1/2 Δ 82 WAS 82 1/2 Δ 83 WAS 83 1/2 Δ 84 WAS 84 1/2 Δ 85 WAS 85 1/2 Δ 86 WAS 86 1/2 Δ 87 WAS 87 1/2 Δ 88 WAS 88 1/2 Δ 89 WAS 89 1/2 Δ 90 WAS 90 1/2 Δ 91 WAS 91 1/2 Δ 92 WAS 92 1/2 Δ 93 WAS 93 1/2 Δ 94 WAS 94 1/2 Δ 95 WAS 95 1/2 Δ 96 WAS 96 1/2 Δ 97 WAS 97 1/2 Δ 98 WAS 98 1/2 Δ 99 WAS 99 1/2 Δ 100 WAS 100 1/2

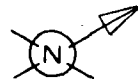
SHOP WELDING	DESIGN E.D.S. 2000 PSI @ 440 °F	DRAWN <i>[Signature]</i>
	SPEC. / MAT'L. MBX / CL 1500-CARBON ST	CHECKED <i>[Signature]</i>
	N.D.E.	APPR. <i>[Signature]</i>
	O.D. PREP.	P.W.H.T.
	I.D. PREP.	4"-FW-228-MBX
		SHEET 1 OF 2

CUSTOMER MD/SR/R PROJECT 10 MWe SOLAR PILOT PLANT JOB No. 4"-FW-228-MBX SHEET 1 OF 2

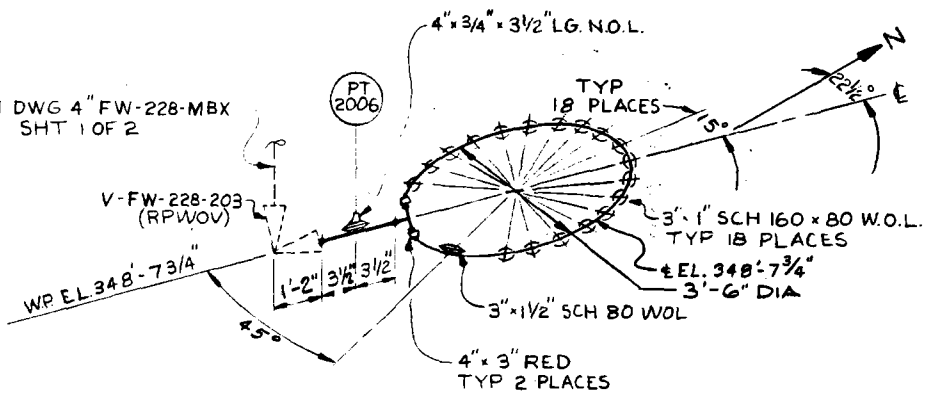
LINE No. 3 4'-FW-22B-MBX REF. 40M2005131931
 DWG. 9446

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.



CONT. ON DWG 4'-FW-22B-MBX
 SHT 1 OF 2



THIS ISO. INCLUDES LINES
 3'-FW-22B-MBX ; 4'-FW-22B-MBX

Stearns-Roger

021700 NOV 23 '80

SR No. 561 File No. 541

Stearns-Roger
 FABRICATORS, INC.
 DENVER, COLORADO

REVISIONS	SHOP WELDING	DESIGN E.D.S. 2000 PR 440 OF	DRAWN 2/11/61/9/80
		SPEC. / MAT'L. MBX/CL 1500-CARBON ST	CHECKED <i>[Signature]</i>
		N.D.E.	APPR. <i>[Signature]</i>
		O.D. PREP.	LINE No.
		I.D. PREP.	3'-FW-22B-MBX REV.
			SHEET 2 OF 2

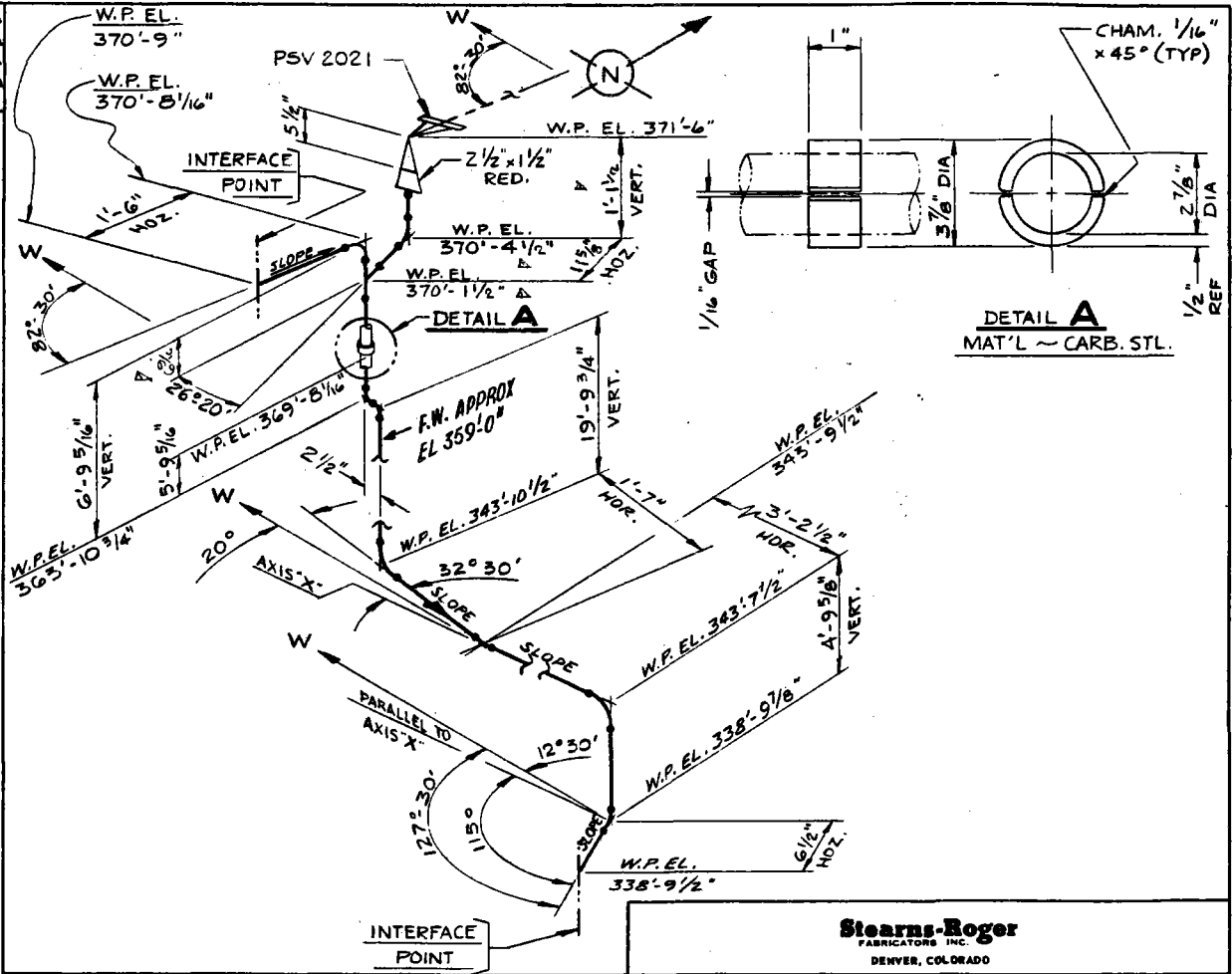
CUSTOMER MD / SR / R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.

101

LINE No. $2\frac{1}{2}$ "-FW-231-MBX		REF. 40M2005131927	
		DWG. 928/929/930	
MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L NONE		
Stearns-Roger 021700 JUN 23 '80 SR No. <u>EL.1</u> File No. <u>038</u>			



REVISIONS Δ REV PER TO SHG-80	SHOP WELDING
CUSTOMER MD / SR / R	PROJECT 10 MWe SOLAR PILOT PLANT
	JOB No.

Stearns-Roger FABRICATORS INC. DENVER, COLORADO		
DESIGN E.D.S.	2000 PSI @ 440 °F	DRAWN <i>W. B. ...</i>
SPEC. / MAT'L.	MBX / CL 1500 CARBON STL	CHECKED <i>E. J. ...</i>
N.D.E.		APPR. <i>E. J. ...</i>
O.D. PREP.	P.W.H.T.	LINE No. REV.
I.D. PREP.		2 1/2"-FW-231-MBX
		SHEET 1 OF 1

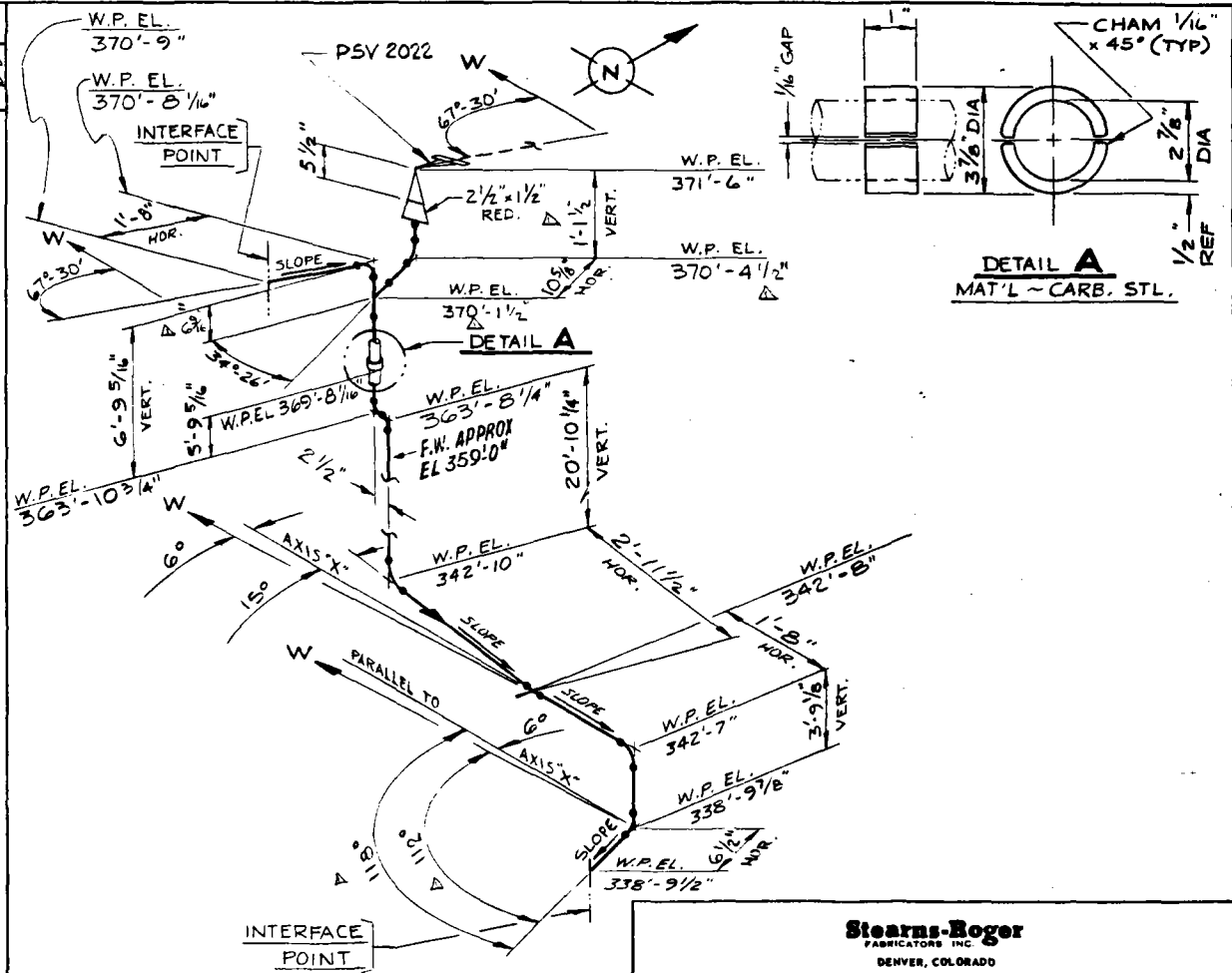
103

LINE No. 2 1/2 - FW-232-MBX REF. 4DM2005131927
 DWG. 928/929/930

MATERIAL LIST 931/932/944/945

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

Stearns-Roger
 C21700 JUN 23 1980
 SR No. EL1 File No. 039



REVISIONS Δ REV PER R 0-16-80

SHOP WELDING

DESIGN E.D.S. | 2000 PSI @ 440 °F
 SPEC. / MAT'L. MEX / CL 1500-CARBON ST

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

CUSTOMER MD / SR / R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.

O.D. PREP. P.W.H.T.
 I.D. PREP.

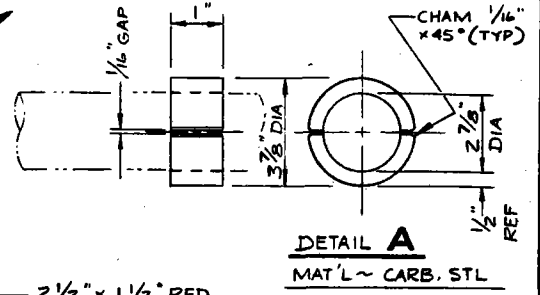
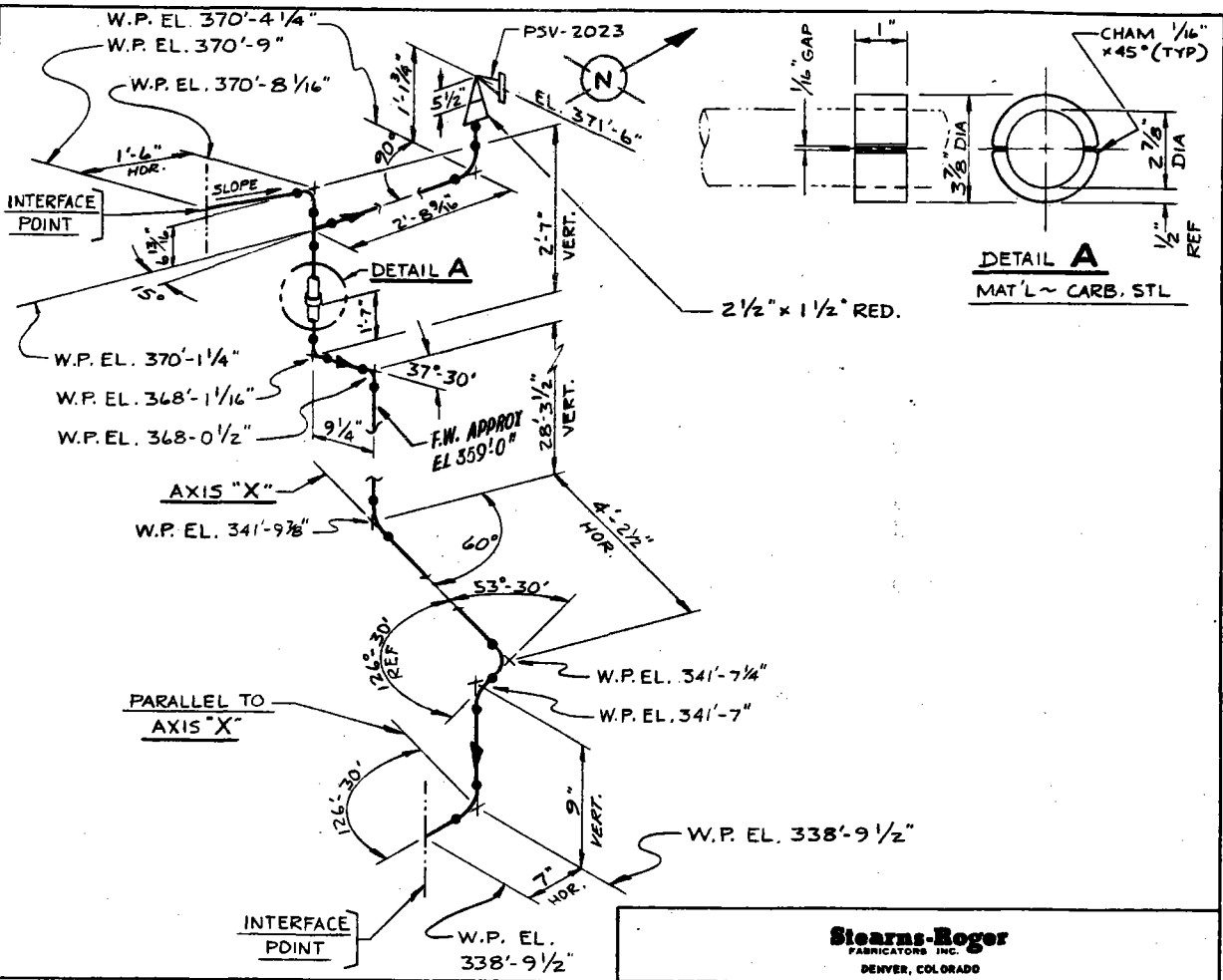
DRAWN 4/17/80
 CHECKED [Signature]
 APPR [Signature]
 LINE No. REV.
 2 1/2 - FW-232-MBX
 SHEET 1 OF 1

101

LINE No. 2 1/2"-FW-233-MBX
 REF. 40M2005131927
 DWG. 928 929 930
 MATERIAL LIST 931 932 944
 945

ITEM	DESCRIPTION	MAT'L	REQ'N.
1	LOOSE MAT'L SPLIT RING (SEE DETAIL A)	CARB. STL	

Stearns-Roger
 C21700 JUN 16 80
 SR No. *C22* File No. *C22*



REVISIONS	SHOP WELDING
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Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

DESIGN <i>EDS/ROG</i> PSI @ <i>440</i> OF	DRAWN <i>Cutler</i> 6/13/80
SPEC. / MAT'L <i>NE 1/2\"</i>	CHECKED <i>[Signature]</i>
N.D.E.	APPR. <i>[Signature]</i>
O.D. PREP.	P.W.H.T.
I.D. PREP.	SHEET 1 OF 1

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

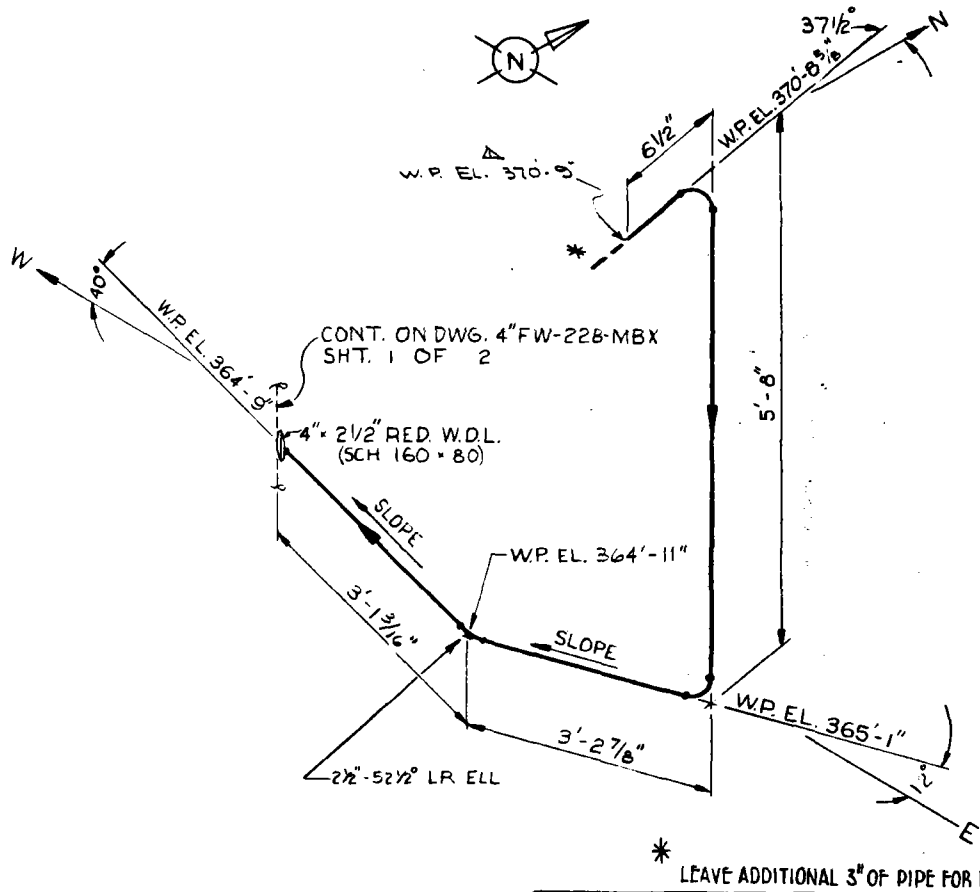
105

LINE No. 2 1/2" FW-234-MBX REF. 40M2005131927
DWG. -9284, -944

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.

Stearns-Roger
021700 JUN 25 1980
SR No. 86.1 Proj No. 044



REVISIONS Δ REV. PER E 5-16-80	SHOP WELDING	DESIGN E.D.S. 2000PS @ 440 °F	DRAWN BY SLS/SJ
		SPEC. / MAT'L. MEX / C1 1500 CARBON STEEL	CHECKED BY [Signature]
		N.D.E.	APP'D BY [Signature]
		O.D. PREP.	LINE NO. REV.
		I.D. PREP.	2 1/2" FW-234-MBX
			SHEET 1 OF 1

CUSTOMER MD/SR/R

PROJECT 10 MWe SOLAR PILOT PLANT

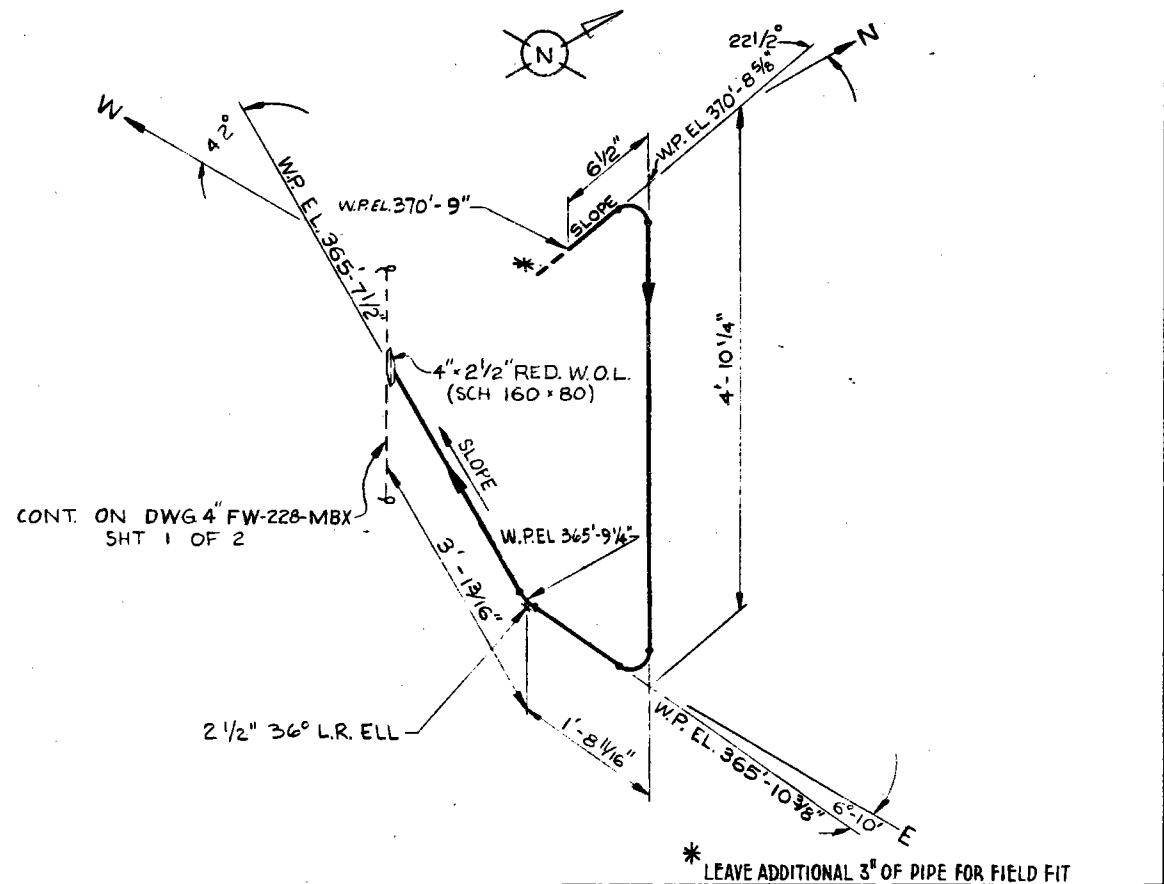
JOB No.

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO



LINE No. 2 1/2" FW-235-MBX REF. AOM 20051319270
 DWG. 928 944

MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.



Stearns-Roger
 021700 JUN 21 '50
 SR No. 26-1 File No. 643

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

REVISIONS	SHOP WELDING
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DESIGN E.D.S.	2000 PSI @ 440 °F	DRAWN <u>E.D.S.</u>
SPEC. / MAT'L.	MEX / CL 1500-CARBON STEEL	CHECKED <u>E.A. Hays</u>
N.D.E.		APPR <u>E.A. Hays</u>
O.D. PREP.	P.W.M.T.	LINE No. REV.
I.D. PREP.		2 1/2" FW-235-MBX
		SHEET 1 OF 1

CUSTOMER MD/SR/R PROJECT 10 Mwe SOLAR PILOT PLANT

JOB No.

106

LINE No. 2 1/2" FW-236-MBX REF. 40M2005131927 △
DWG.-928 △ 944 △

MATERIAL LIST

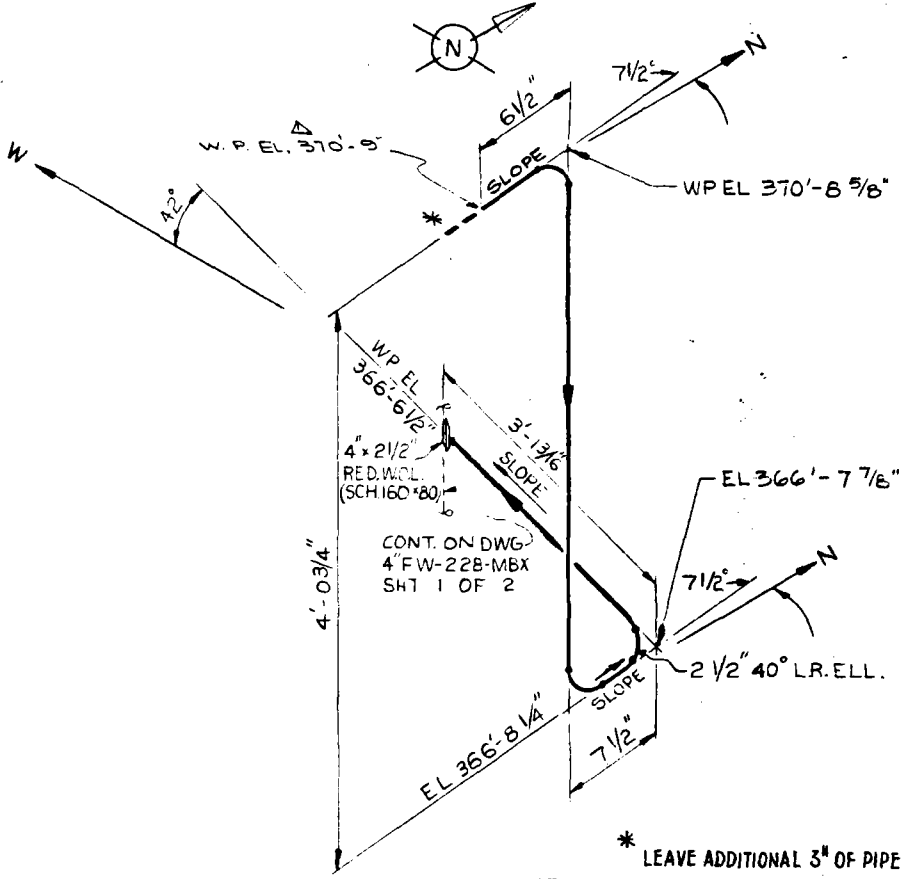
ITEM	DESCRIPTION	MAT'L.	REQ'N.

Stearns-Roger

021700

JUN 23 '88

SR No. 26.1 File No. 042



* LEAVE ADDITIONAL 3" OF PIPE FOR FIELD FIT

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS △ REC. DEC. 2 9-16-80

SHOP WELDING

DESIGN E.D.S.	2000 PSI @ 440 °F	DRAWN
SPEC. / MAT'L.	MEX / CL 1500 - CARBON ST	CHECKED
N.D.E.		APPR
O.D. PREP.	P.W.M.T.	REV.
I.D. PREP.		

LINE No.	2 1/2" FW-236-MBX
SHEET	1 OF 1

CUSTOMER MD/SR/R

PROJECT IO MWe SOLAR PILOT PLANT

JOB No.



107

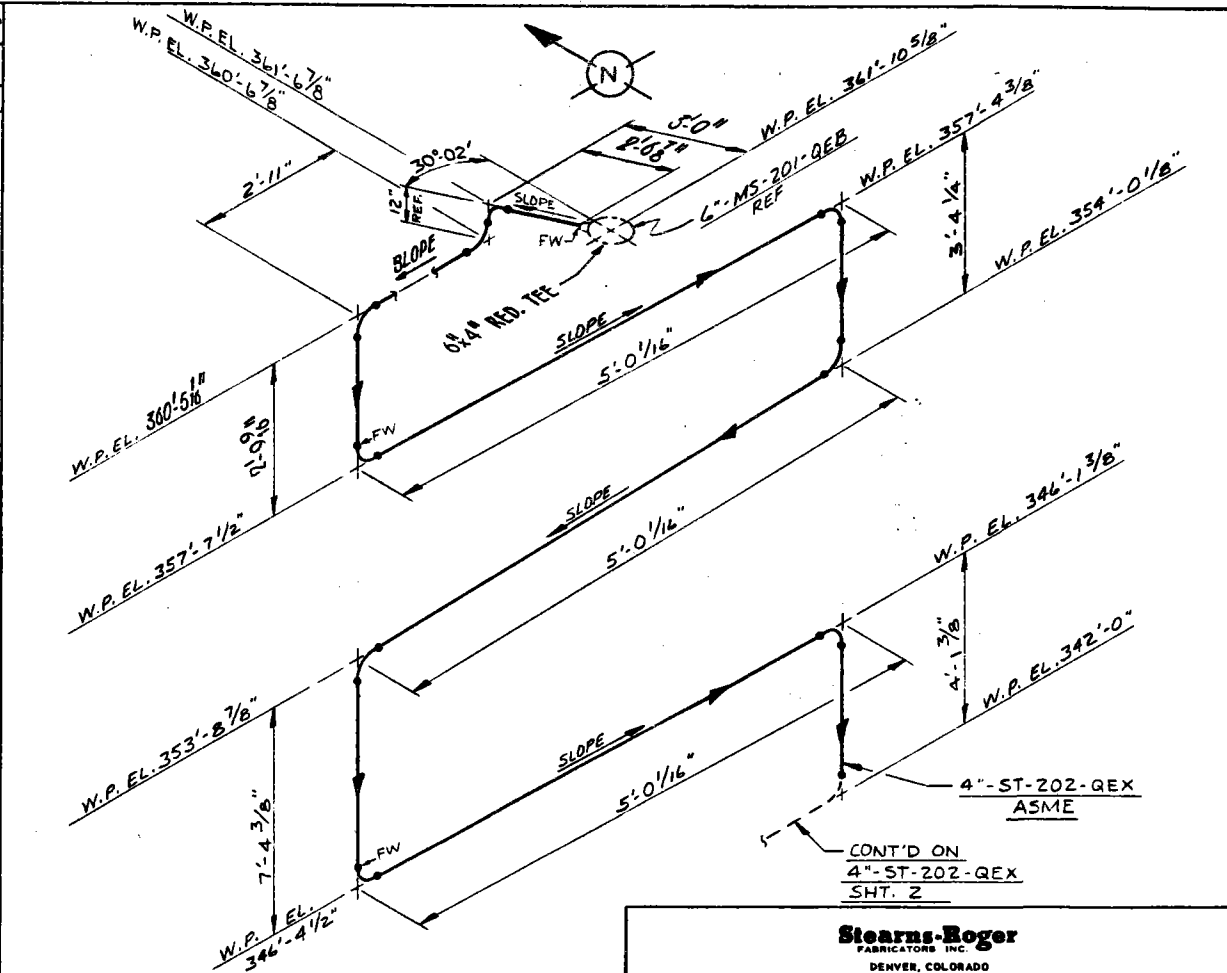
108

LINE No. 4"-ST-202-QEX REF. 40M200531930
 DWG. 931/932/933

MATERIAL LIST 939 & 940

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

Stearns-Roger
 C21700 JUN 11 '80
 SR No. ELL File No. 025



REVISIONS

SHOP WELDING

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

DESIGN EDS / TTS	PSI # 1010	OF	DRAWN <u>5/22/80</u>
SPEC. / MAT'L. QEX/CL 2500-ALDY STL	CHECKED <u>6/25/80</u>		APPR. <u>W. H. HARRIS</u>
N.D.E.	LINE No. 1		REV.
O.D. PREP.	P.W.H.T.	4"-ST-202-QEX	
I.D. PREP.	SHEET 1 OF 2		△

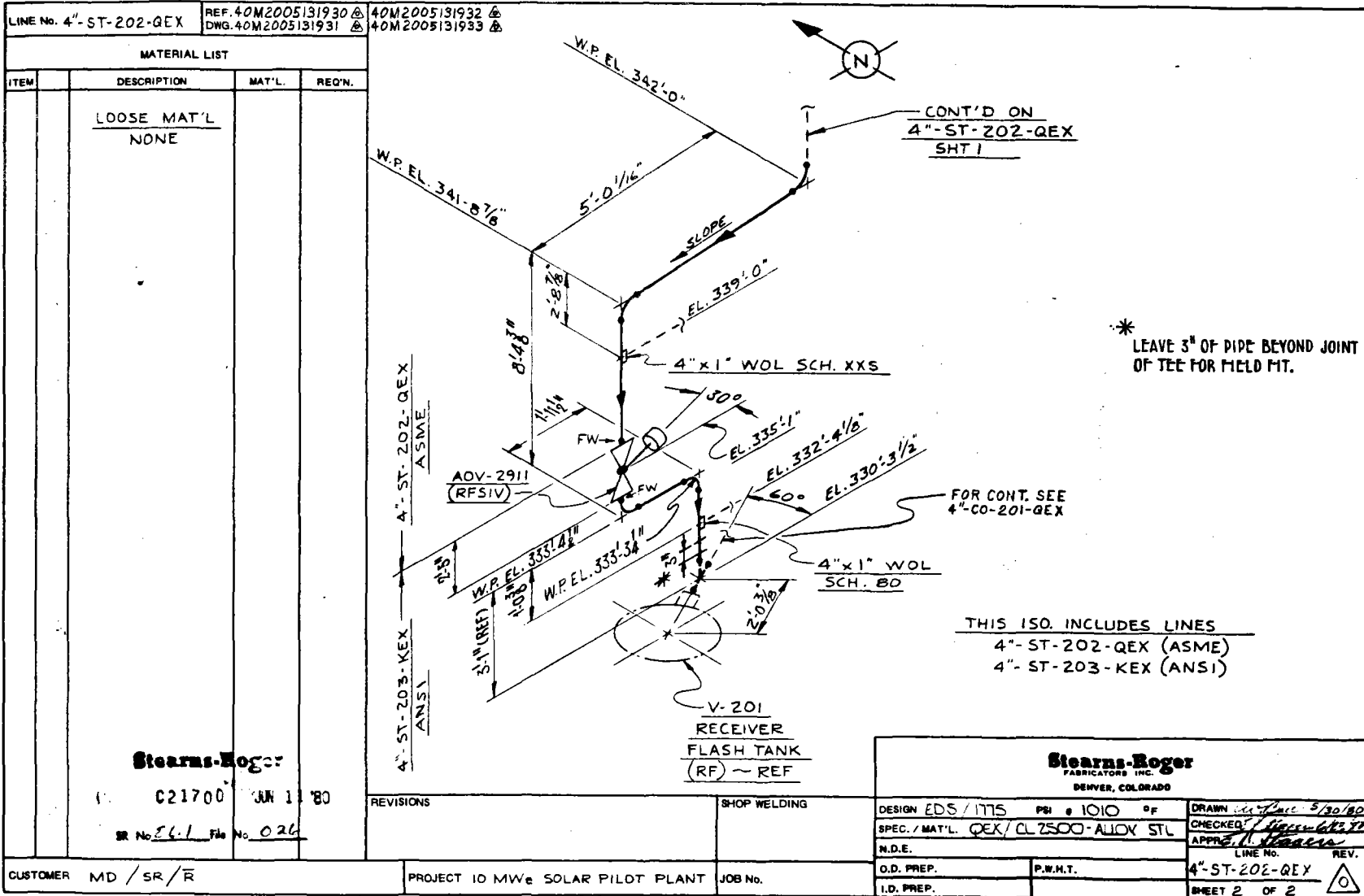
CUSTOMER MD / SR / R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.

CONT'D ON
 4"-ST-202-QEX
 SHT. 2

101



Stearns-Roger

C21700 JAN 1 '80

SR No. 26.1 File No. 026

REVISIONS

SHOP WELDING

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

DESIGN EDS / ITTS	PSI # 1010	OF	DRAWN <i>[Signature]</i> 5/20/80
SPEC. / MAT'L. QEX / CL 2500-ALLOY STL			CHECKED <i>[Signature]</i>
N.D.E.			APPROV. <i>[Signature]</i>
O.D. PREP.	P.W.M.T.	LINE NO. REV.	
I.D. PREP.		4"-ST-202-QEX	
			SHEET 2 OF 2

CUSTOMER MD / SR / R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.

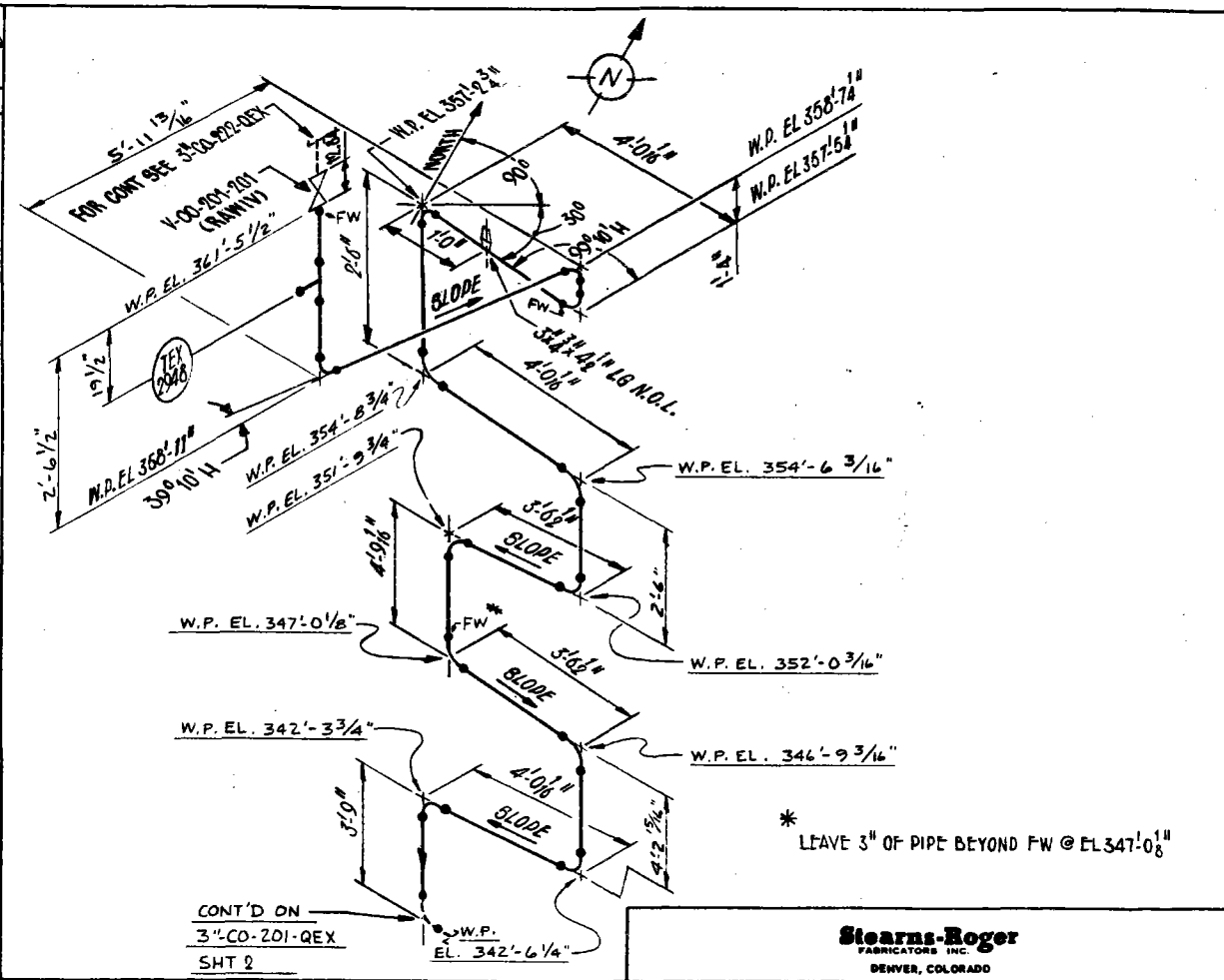


110

LINE No. 3-CO-201-QEX REF. 40M2005131930
 DWG. 932, 742, 4943/0

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L NONE		
Stearns-Roger 021700 JUN 11 1980 SR 241 File No. 025			



* LEAVE 3" OF PIPE BEYOND FW @ EL. 347'-0 1/8"

CONT'D ON
 3-CO-201-QEX
 SHT 2

REVISIONS	SHOP WELDING	DESIGN E.D.S. 1775 PSI @ 1010°F	DRAWN <i>W. B. ...</i>
		SPEC. / MAT'L. QEX / G12500 ALLOY STEEL	CHECKED <i>F. J. ...</i>
		N.D.E.	APPROVED <i>W. B. ...</i>
		O.D. PREP.	LINE No. REV.
		P.W.M.T.	3-CO-201-QEX
		I.D. PREP.	SHEET 1 OF 2

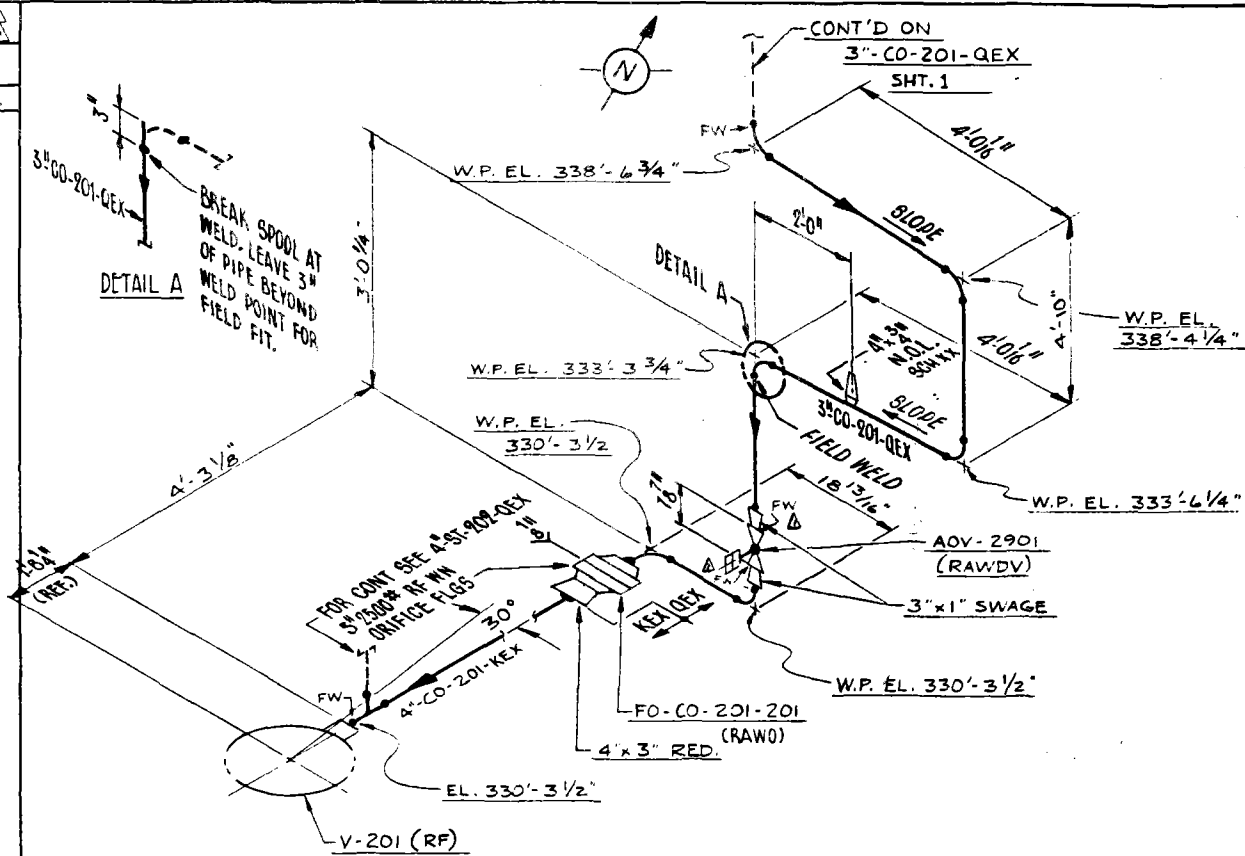
CUSTOMER MD / SR / R PROJECT 10 MWe SOLAR PILOT PLANT JOB No.

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

LINE No. 3" x 4' CO-201-QEX REF. 40M2005131932
 DWG. 933/934/943

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.
	LOOSE MAT'L NONE		
Stearns-Roger No. 021700 JUN 11 '80 SR No. 201 File No. 024			



111

REVISIONS CHECK FOR LOCATION 9/11/80
 Per City project of SR Inc.

SHOP WELDING

Stearns-Roger FABRICATORS INC. DENVER, COLORADO	
DESIGN E.C.D. 1775 PSI @ 1010°F	DRAWN <i>W. B. ...</i>
SPEC. / MAT'L. QEX / C12502 ALLOY STEEL	CHECKED <i>E. ...</i>
N.D.E.	APPR. <i>E. ...</i>
O.D. PREP.	P.W.H.T.
I.D. PREP.	
LINE No. REV. 3" x 4' CO-201-QEX SHEET 2 OF 2	

CUSTOMER MD/SR/R

PROJECT 10 MWe SOLAR PILOT PLANT

JOB No.

112

LINE No. 3"-CO-203-MBX REF. DWG. 40M2005131935

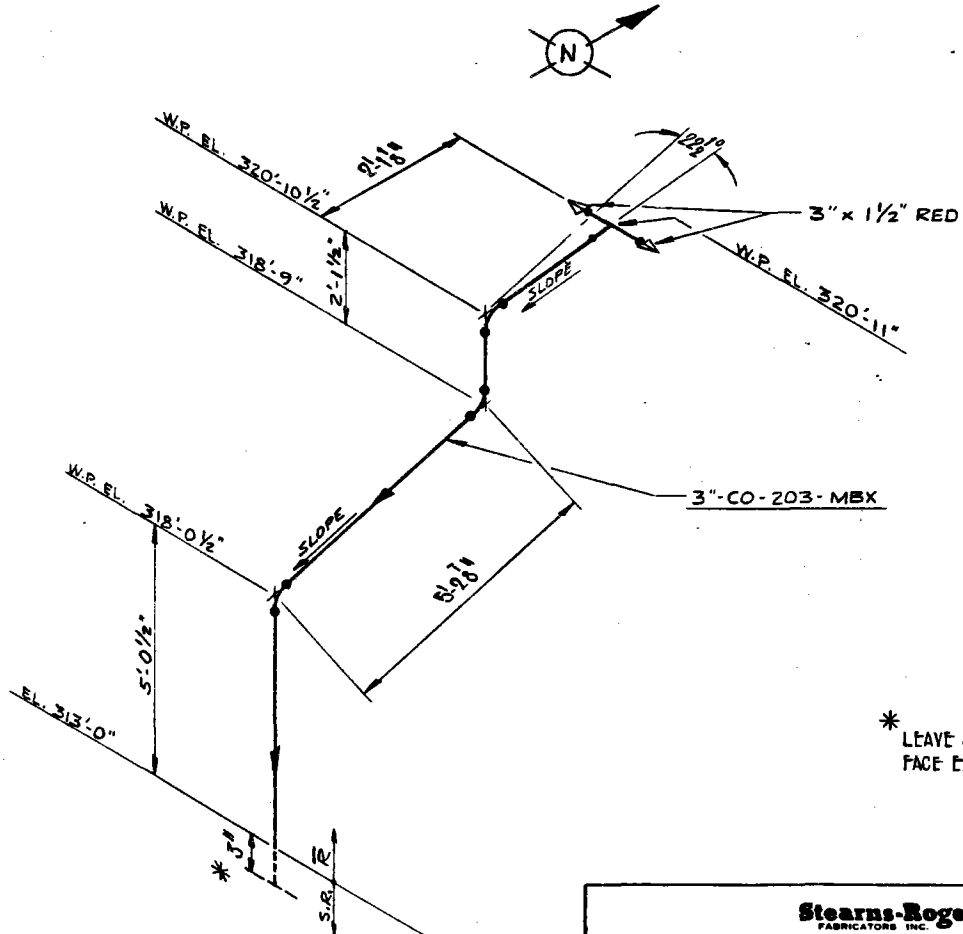
MATERIAL LIST

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

Stearns-Roger

C21700 JUN 11 '80

DR No. 561 Rev No. 030



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

Stearns-Roger
FABRICATORS, INC.
DENVER, COLORADO

REVISIONS

PROJECT 10 MWe SOLAR PILOT PLANT

SHOP WELDING

JOB No.

DESIGN E.D.S. 200 PSI @ 400°F

SPEC. / MAT'L MBX / C1500 CARBON STEEL

N.D.E.

O.D. PREP. P.W.M.T.

I.D. PREP.

DRAWN *W. B. ...*

CHECKED *E. H. ...*

APPR *E. H. ...*

LINE No. 1 REV.

3"-CO-203-MBX

SHEET 1 OF 1

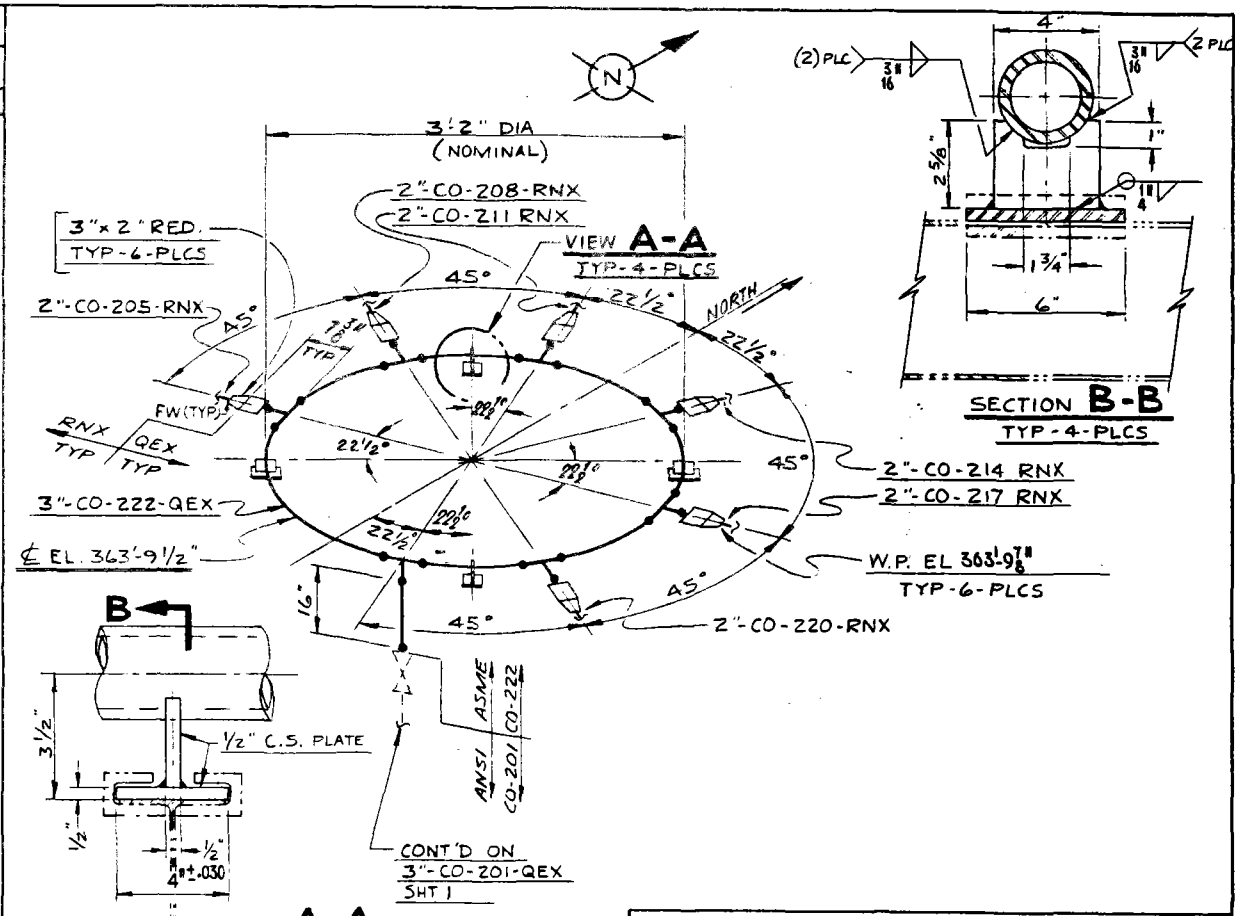
CUSTOMER MD / SR / R

113

LINE No. 3'-CO-222-QEX REF. 40M2005131929 DWG. 40M2005131942

MATERIAL LIST

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



Stearns-Roger

ORDER NO. C21700 JUN 1 1970
 No. 6-1 No. 027

REVISIONS
 SHOP WELDING
 PROJECT 10MWE SOLAR PILOT PLANT
 JOB No.

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

DESIGNED BY S. 1775 PSI @ 1010 OF	DRAWN <i>W. P. H. T.</i> 4/6/60
SPEC. / MAT'L. QEX/C12500 ALLOY STEEL	CHECKED <i>E. H. STERN</i> 6/1/60
N.D.E.	APPR. <i>E. H. STERN</i>
O.D. PREP.	P.W.H.T.
I.D. PREP.	LINE No. REV. 3'-CO-222-QEX
	SHEET 1 OF 1

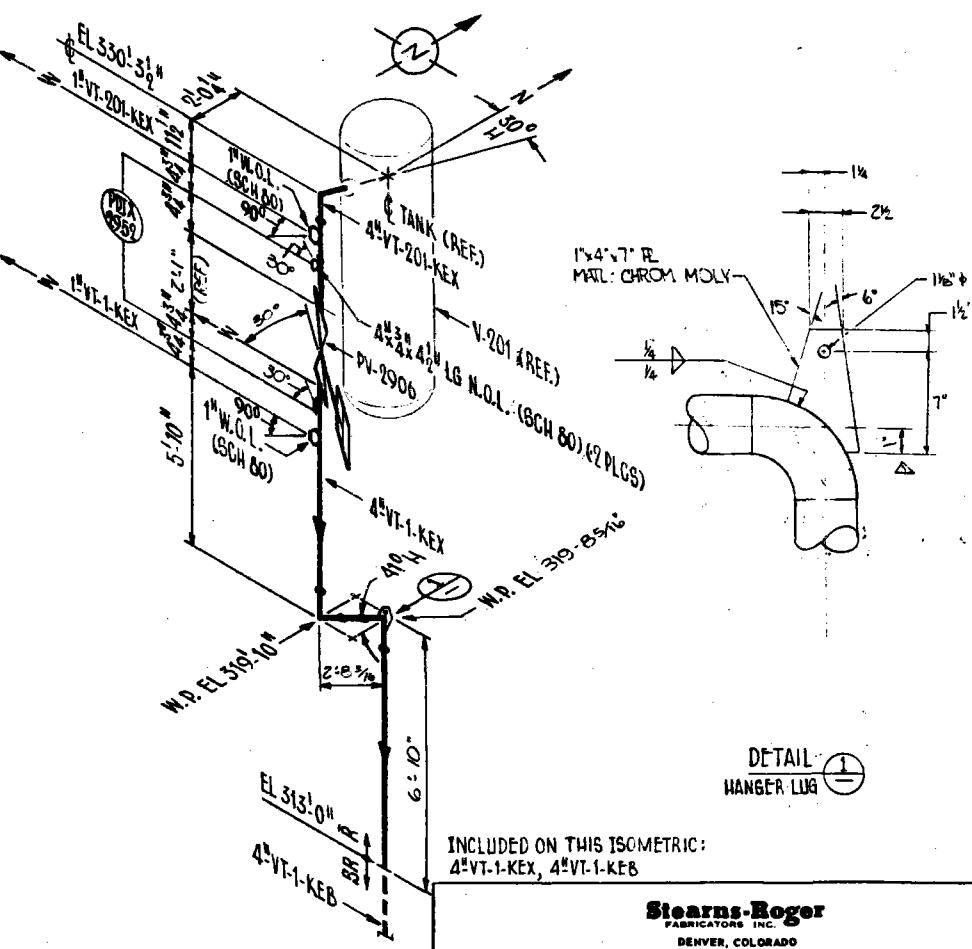
CUSTOMER MD/SR/R

LINE No. 4[#]VT-201-KEX REF. 40M2005131934
 DWG. 935, 943

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.

Stearns-Roger
 Order No. C21700 JUN 30 '80
 SR No. 221 File No. 445



DETAIL
 HANGER LUG

INCLUDED ON THIS ISOMETRIC:
 4[#]VT-1-KEX, 4[#]VT-1-KEB

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

REVISIONS 2 REV. FILE 2-16-80

SHOP WELDING

DESIGN EDJ / 600 PSI @ 1010 OF
 SPEC. / MAT'L. KEX / CL 900 - ALLOY STL
 N.D.E.
 O.D. PREP.
 I.D. PREP.

DRAWN TOM
 CHECKED *E. K. Hooper*
 APPR. *E. K. Hooper*
 LINE No. REV.
 4[#]VT-201-KEX
 SHEET 1 OF 1

CUSTOMER MD, SR, R

PROJECT 10Mwe SOLAR PILOT PLANT

JOB No.

115

LINE No. 3" VT-208-QEX REF. ADM2005131927A; -934A; -937A; -938A
 DWG. 928A; -929A; -930A; -931A; -932A; -933A

MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L	REQ'N.

Stearns-Roger

021700 JUN 16 1964

SR No. SL-1 File No. 036

REVISIONS

CUSTOMER MD/SR/R PROJECT 10 MWe SOLAR PILOT PLANT

SHOP WELDING

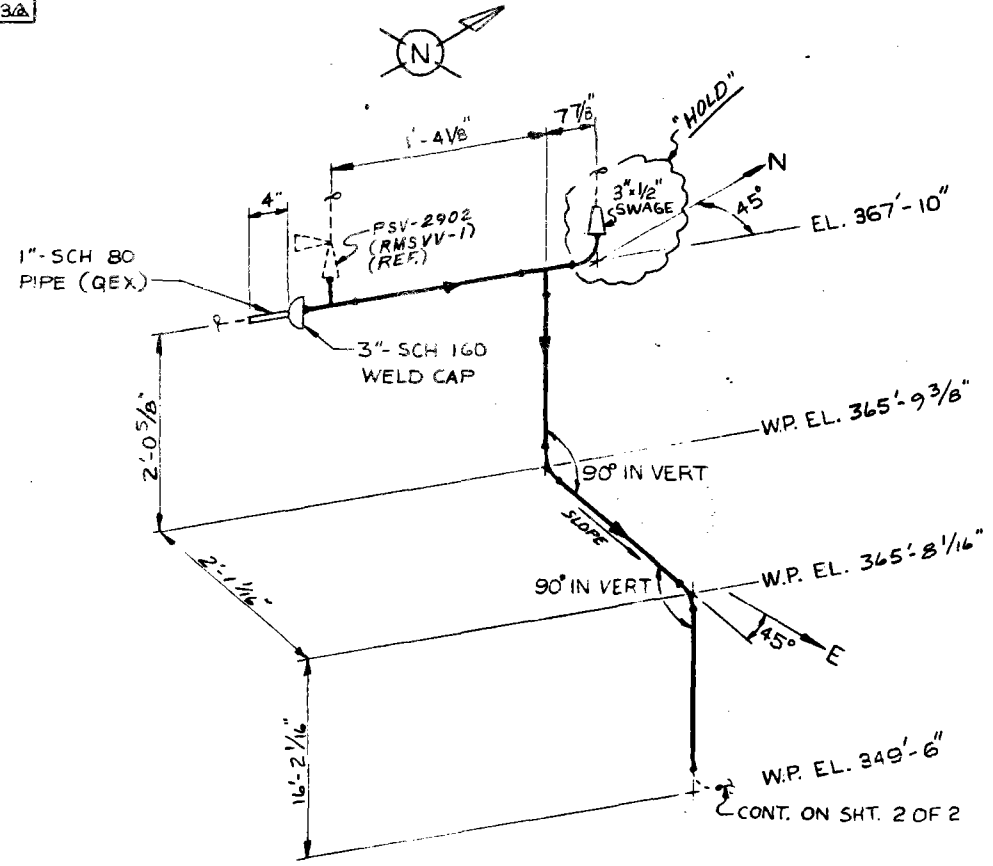
JOB No.

Stearns-Roger
 FABRICATORS, INC.
 DENVER, COLORADO

DESIGN E.D.S. 600PSI @ 1010 °F	DRAWN <i>[Signature]</i>
SPEC. / MAT'L. QEX/C/ 2500 ALLOY STEEL	CHECKED <i>[Signature]</i>
N.D.E.	APPR. <i>[Signature]</i>
O.D. PREP.	P.W.H.T.
I.D. PREP.	

LINE No. 3" VT-208-QEX REV. A

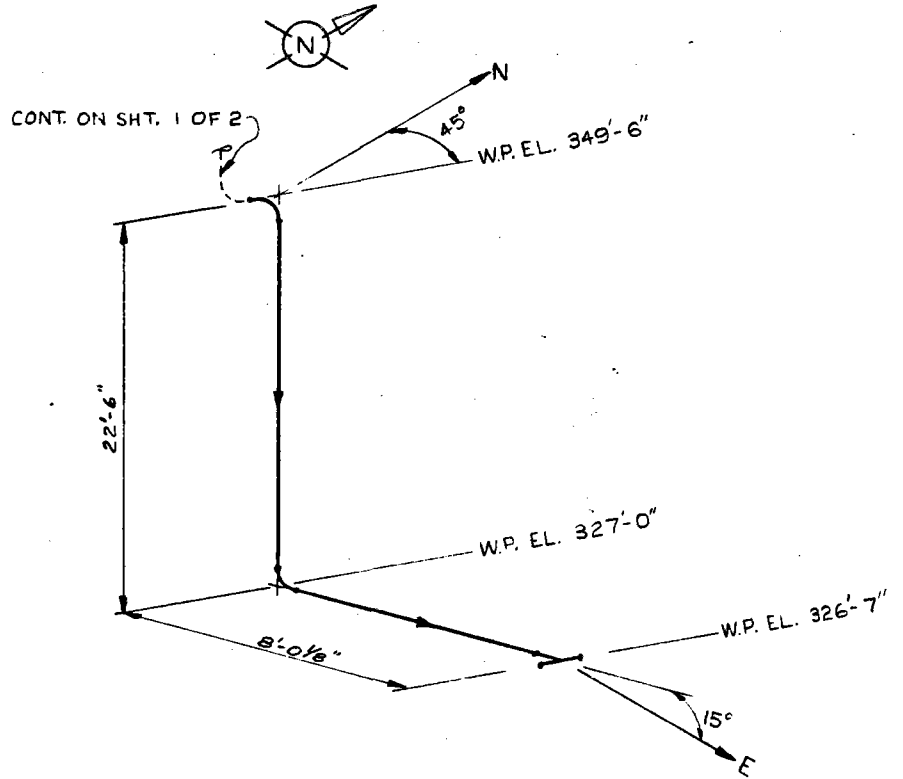
SHEET 1 OF 2



LINE No. 3 VT-208-QEX REF. 40M2005131937A; 928A; 929A; 930A
 DWG. 931A; 932A; 933A; 934A; 937A; 938A

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.



Stearns-Roger
 021700 JUN 16 80
 SR No. 86-1 Job No. 037

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

REVISIONS	SHOP WELDING

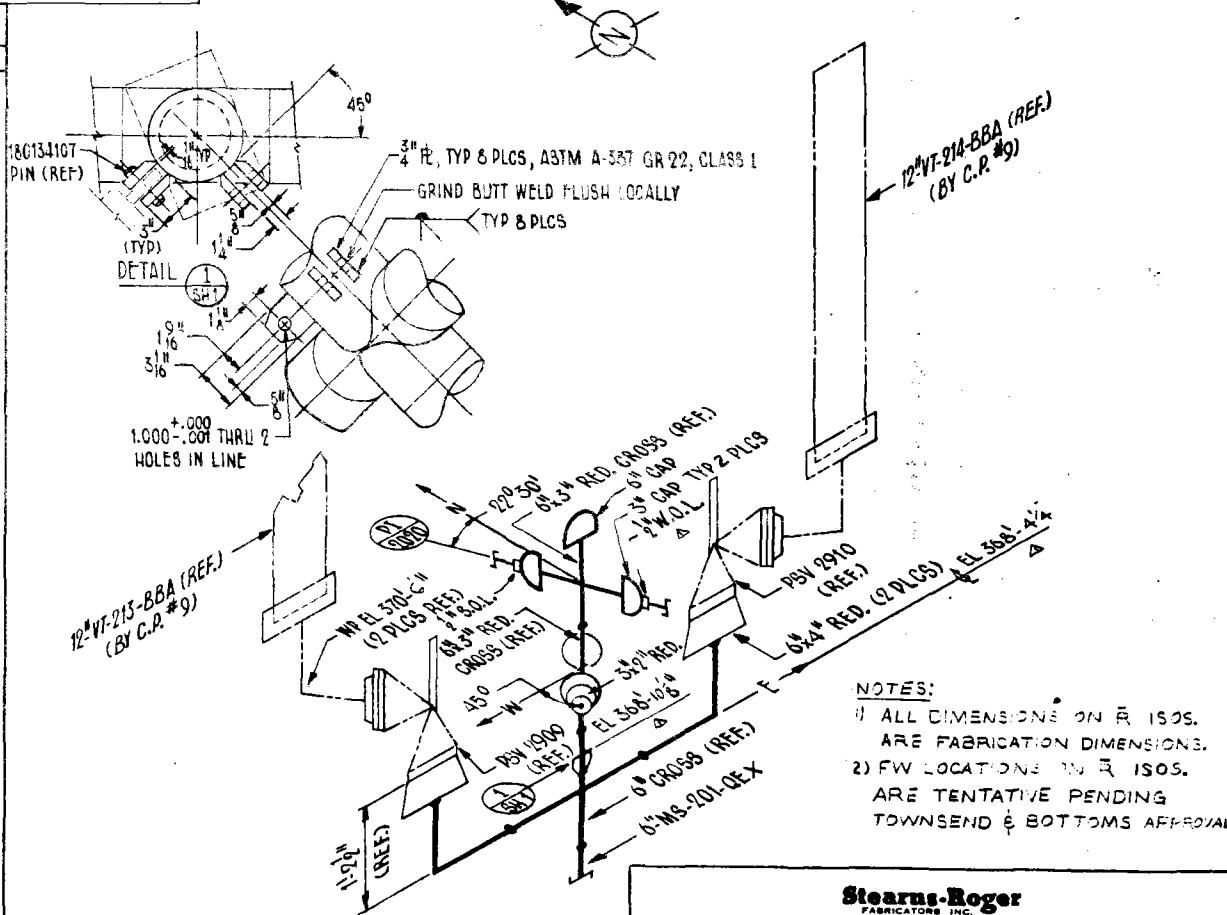
DESIGN EDC / 200 PSI @ 1510 OF	DRAWN LBN
SPEC. / MAT'L. QEX / CL 2500-ALLOY ST.	CHECKED [Signature]
N.D.E.	APPR. [Signature]
O.D. PREP.	P.W.H.T.
I.D. PREP.	
	LINE No. REV.
	3"VT-208-QEX
	SHEET 2 OF 2

CUSTOMER MD / SR / R PROJECT 10 MWE SOLAR PILOT PLANT

JOB No.

LINE No. 6^HMS-201-QEX REF. DWG. 4CM2005131927 Δ, 4CM2005131937 Δ

MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.



NOTES:
 1) ALL DIMENSIONS ON R ISOS. ARE FABRICATION DIMENSIONS.
 2) FW LOCATIONS IN R ISOS. ARE TENTATIVE PENDING TOWNSEND & BOTTOMS APPROVAL

Stearns-Roger

SR No. 021700 JUN 30 1980
 SR No. 1 L No. 27

REVISIONS
 1. REV. 2. CHANGE EL. 386.10 TO 386.1
 2. REV. 3. CHANGE EL. 386.1 TO 386.1-4'x
 3. REV. 4. CHANGE EL. 386.1-4'x TO 386.1-4'x

SHOP WELDING

Stearns-Roger FABRICATORS INC. DENVER, COLORADO			
DESIGN E.D.S.	1775 PSI	1010 OF 10	DRAWN TDM
SPEC. / MAT'L. QEX / CL 2500-ALLOY STL			CHECKED <i>[Signature]</i>
N.D.E.			APPR. <i>[Signature]</i>
O.D. PREP.	P.W.H.T.		REV. 11 LINE No. 6-MS-201-QEX
I.D. PREP.			SHEET 1 OF 4

CUSTOMER MD, SR, R

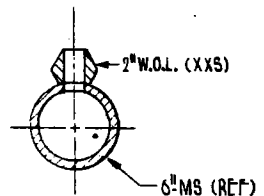
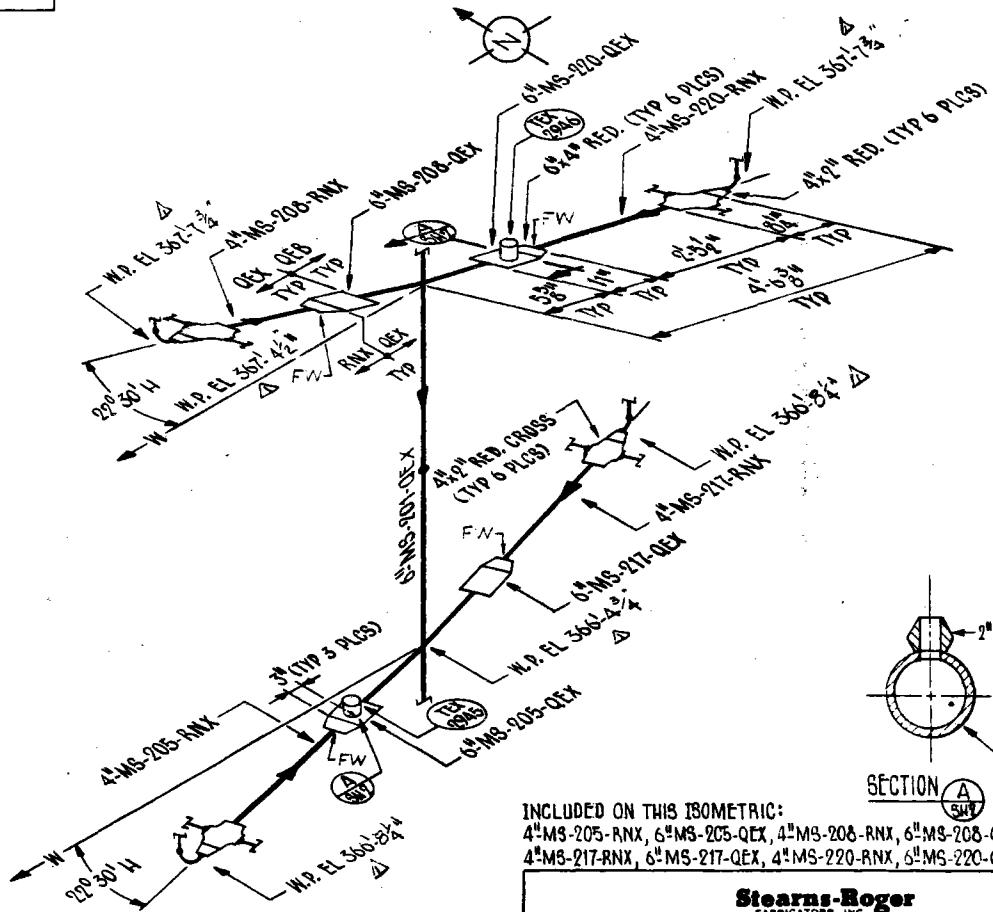
PROJECT 10M We SOLAR PILOT PLANT

JOB No.

LINE No. 6[#]MS-201-QEX REF. DWG. 40M2005131928 Δ, 10M2005131937 Δ

MATERIAL LIST

ITEM	DESCRIPTION	MAT'L.	REQ'N.



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

Serial No. C21700 JUN 30 '80

SR No. File No. 102

REVISIONS Δ Chgd. Cross EL. 9-16-80
 CACO WP #L. 9-16-80

SHOP WELDING

Stearns-Roger
 FABRICATORS INC.
 DENVER, COLORADO

DESIGN E.D.S.	1775 PSI	1010 OF	DRAWN TDM
SPEC. / MAT'L.	QEX / CL 2500-ALLOY STL		CHECKED <i>E.H. Hansen</i>
N.D.E.			APPR. <i>E.H. Hansen</i>
O.D. PREP.	P.W.M.T.	LINE No.	REV.
I.D. PREP.		6 [#] MS-201-QEX	
			SHEET 2 OF 4

CUSTOMER MD, SR, R

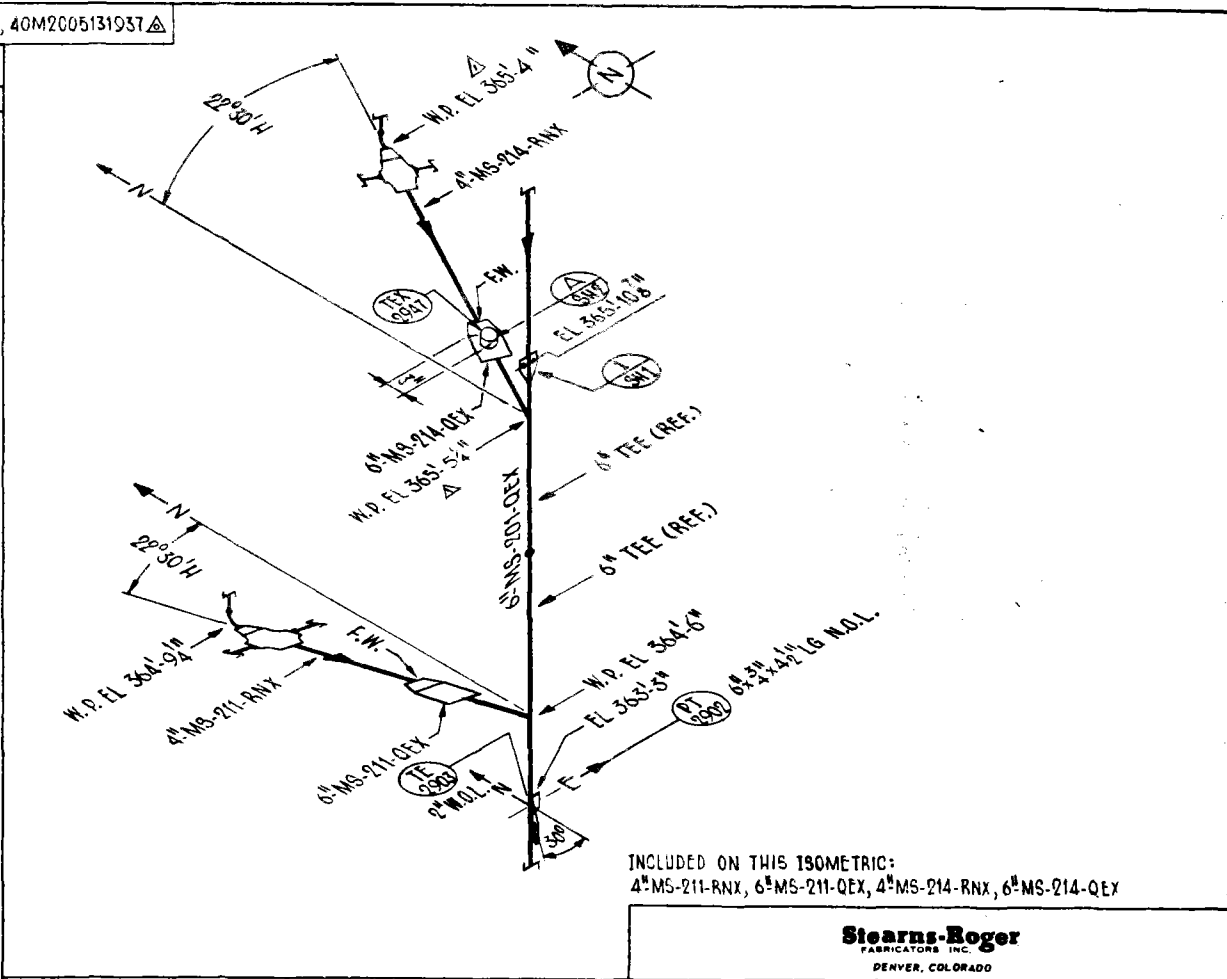
PROJECT 10MWe SOLAR PILOT PLANT

JOB No.

118

LINE No. 6[#]MS-201-QEB REF. DWG. 40M2005131928, 40M2005131937

MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L	REQ'N.



Stearns-Roger

021700 JUN 30 '80

SR No. 61 File No. 102

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

REVISIONS 2026 TEE EL 3653.8

SHOP WELDING

DESIGN E.D.S. 1775 PSI 1010 OF
SPEC. / MAT'L QEX / CL250C ALLOY STL
N.D.E.
O.D. PREP. P.W.H.T.
I.D. PREP.

DRAWN IDH
CHECKED *[Signature]*
APPR. *[Signature]*
LINE No. 6[#]MS-201-QEX
REV. 1

CUSTOMER MD, BR, R

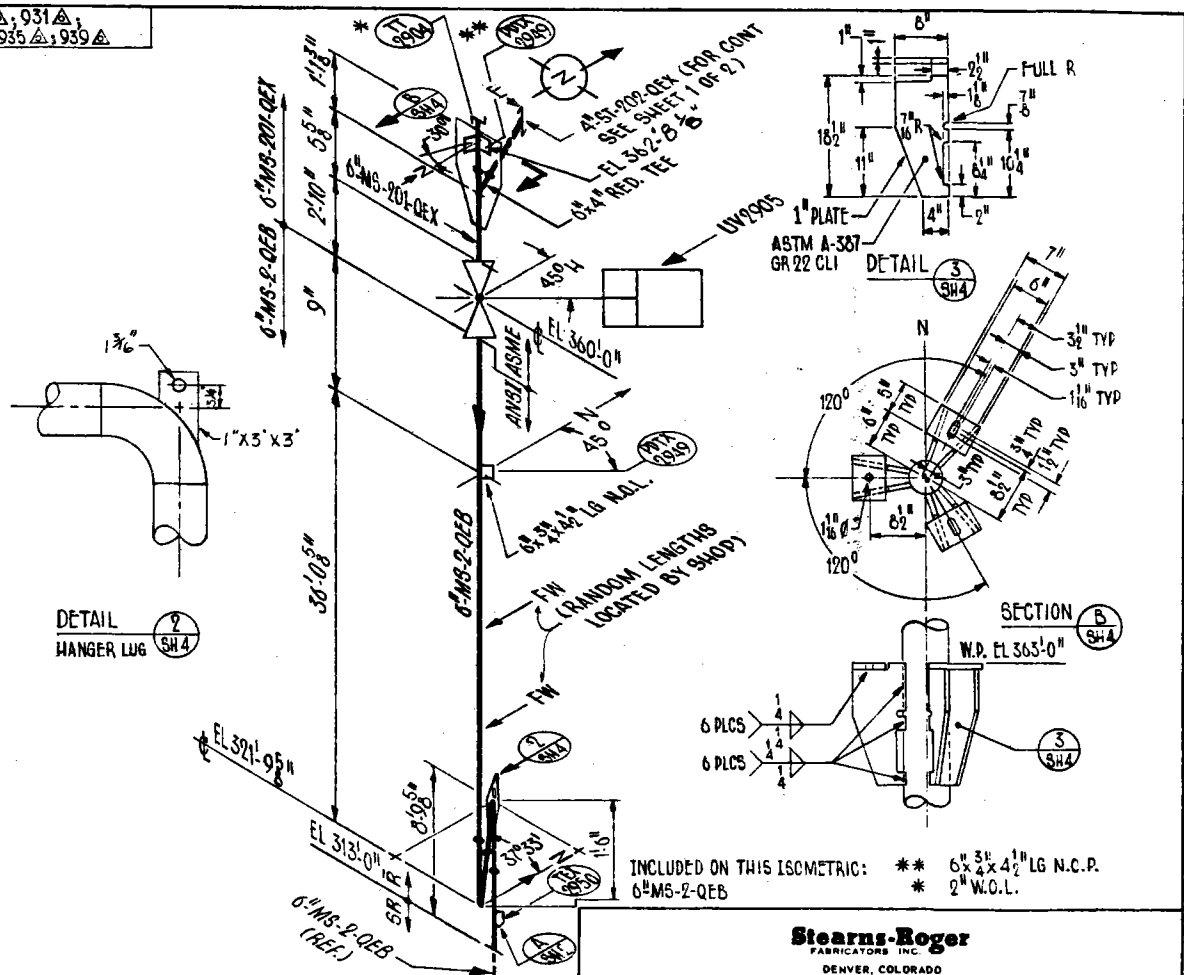
PROJECT 10MWe SOLAR PILOT PLANT

JOB No.

SHEET 3 OF 4

LINE No. 6"MS-201-QEX REF. 40M2005131929, 930, 931, 932, 933, 934, 935, 939

MATERIAL LIST			
ITEM	DESCRIPTION	MAT'L.	REQ'N.



Stearns-Roger

FORM 021700 JUN 30 '80

SR No. 611 File No. 104

Stearns-Roger
FABRICATORS INC.
DENVER, COLORADO

REVISIONS	SHOP WELDING	DESIGN E.D.S. 1775 PSI 1010 OF 17	DRAWN T.T.M.
		SPEC. / MAT'L. QEX / CL 2500 - ALLOY 6TL	CHECKED <i>[Signature]</i>
		N.D.E.	APPR. <i>[Signature]</i>
		O.D. PREP.	LINE No. 6"MS-201-QEX
		P.W.H.T.	REV.
		I.D. PREP.	SHEET 4 OF 4

CUSTOMER MD/SR/R

PROJECT 10 Mwe SOLAR PILOT PLANT

JOB No.

July 2, 1980
(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

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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 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 eye nuts 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:

	<u>Date or Sequence Required</u>
A. Erection and operating information	
a. Maintenance and operating instructions	At time of shipment

C-21700
S-R E2

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.

DS-11

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

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i

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

November 3, 1976

SPECIFICATION

NO. FJ50.50

FOR

DOCUMENTATION

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STEARNS-ROGER ENGINEERING CORP.
DENVER, COLORADO

PROJECT NO. C-21700

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.

Project No. C-21700Spec. No. FJ50.502. 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 SELLERA. 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. FJ50.50**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 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. FJ50.503. 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.

Project No. C-21700

Spec. No. FJ50.50

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

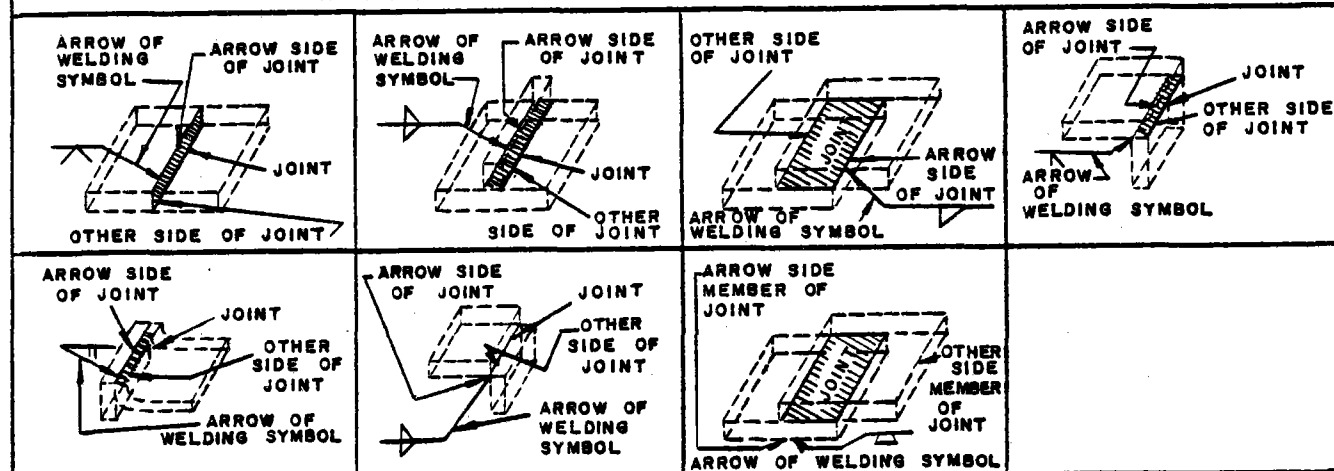
- A. It is understood that upon delivery of Seller's documentation without any restrictive notations concerning such work, they shall become Buyer's property and may be used in any manner desired for obtaining replacements, repairs and spare parts.
- B. Seller's final invoice will not be paid by Buyer 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						STANDARD NUMBER	
MM	P	PP	SH	FI	SP		
						FJ 60.60	
Stearns-Roger <small>INCORPORATED</small> ENGINEERING STANDARD						C-21700	
APPROVALS: <i>[Signature]</i> Des. Sec. <i>[Signature]</i> Sect. Supv. <i>[Signature]</i> Div. <i>[Signature]</i>						ISSUED 10/22/79	
DOCUMENTATION REQUIREMENTS PROJECT: SOLAR ONE CONTRACT/REQUISITION NUMBER: S-R E2 TITLE: PRIMARY PIPE SUPPORTS						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.						Except where otherwise specified, send all documentation to: Stearns-Roger Engineering Corp. P.O. Box 5888 Denver, CO 80217 Attn: R.K. Brushel	
#-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.							

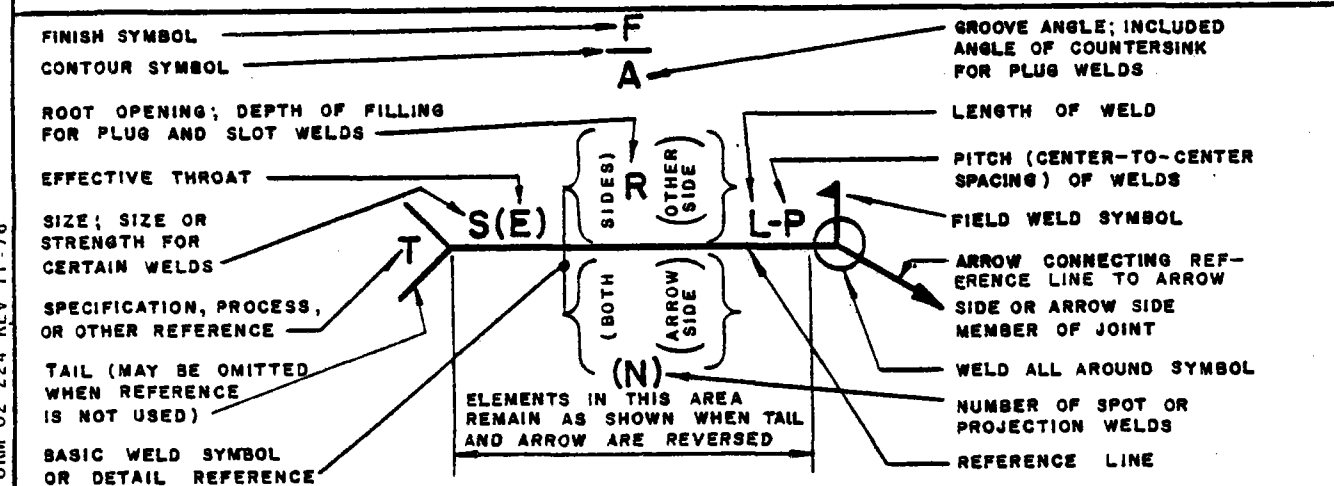
DIVISION USAGE						Stearns-Roger INCORPORATED ENGINEERING STANDARD	STANDARD NUMBER	
MM	P	PP	SH	FI	SP		EJ 14.37.1	
APPROVALS						WELDING SYMBOLS		PAGE <u>1</u> OF <u>1</u>
Des. Sect. _____								ISSUED 5/5/78
Sect. Supv. _____								
Div. <u> </u>								

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



FORM 02 224 REV 11-76

September 2, 1970

Rev. No. 5

HANGER VOLUME

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						STANDARD NUMBER	
MM	P	PP	SH	FI	SP	FE03.0	
APPROVALS						PAGE <u>1</u> OF <u> </u>	
Dec. Sect. <i>[Signature]</i> .. Supv. <i>[Signature]</i> Div. <i>[Signature]</i>						ISSUED 2-14-75	
Stearns-Roger INCORPORATED ENGINEERING STANDARD						REVISED	
PIPE HANGER INDEX							
VOL. P60-1							

HANGER NO.	REV	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-MS-10-1	1
H-FW-2-2	0	H-MS-2-18	0	H-ST-13-2	2	H-MS-10-2	1
H-FW-2-3	0	H-MS-2-19	0			H-MS-10-3	2
H-FW-2-4	0	H-MS-2-20	1	H-ST-14-1	1	H-MS-10-4	2
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-ST-6-1 (Delete)	
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-ST-9-1	3
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-VT-12-12	1
H-FW-2-11	1	H-MS-2-27	2	H-VT-1-7	1	H-VT-12-13	2
H-FW-2-12	1	H-MS-2-28	2	H-VT-1-8	0	H-VT-12-14	2
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-ST-8-1	1
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						

*Indicates Drawing is Revised this Issue.

PROJECT NO. C-21700

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'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)
							X	VERT. Y	Z			STYLE	FIG. NO. TYPE	SIZE	TT (IN)						
H-FW-2-1	440	SEE S.D.L.	4.50	2 1/2	N.A.	5	0	0	0	-	ANC	-	-	-	-	-	-	-	-	LATER	BY OTHERS (PIPE FABRICATOR)
-2						10	0	5/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = .3K Fy = .2K Fz = .2K	BY SPEC. E-2 SEE DETAIL
-3						15	0	5/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = .2K Fy = .2K Fz = .2K	
-4						20	0	1 3/16 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = .4K Fy = .4K Fz = .4K	
-5						25	0	1 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = 1.4K Fy = 1.4K Fz = 1.4K	
-6		224a				35N	0	1 1/2 DN	0	-	VSH	S	98	12	-	225	1	1928	-	2.5	
-7		SEE S.D.L.				40	0	1 1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = 1.1K Fy = .5K Fz = .5K	
-8						45	0	1 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = .6K Fy = .6K Fz = .6K	
-9						50	0	2 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = 1.0K Fy = 1.1K Fz = 1.1K	
-10						55	0	2 1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = 1.4K Fy = 1.5K Fz = 1.5K	
-11		288				65	-1/8	2 3/4 DN	1/16	-	CSH	S	80-V	11	4	-	1/2	-	-	.4	
-12		293				85	-9/16	1 3/8 DN	-3/16	-	CSH	S	81-H	7	3	-	1/2	-	-	.4	
-13		222				92	-1/2	1 DN	-3/8	-	VSH	S	98	4	-	23	1/2	199	-	.3	
-14		1917				100N	-1/4	3/4 DN	-3/16	-	VSH	S	B-268	11	-	340	1/8	1726	-	2.3	
-15		SEE S.D.L.				105	0	3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = 2.5K Fy = 3.0K Fz = 3.0K	
-16						110	0	1 1/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = 2.7K Fy = 2.9K Fz = 2.9K	
-17						115	0	1 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = 3.5K Fy = 3.5K Fz = 3.5K	
-18						120	0	2 1/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	Fx = 1.7K Fy = 2.3K Fz = 2.3K	
-19		951				130N	-1/8	2 1/2 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	-	-	-	-	-	-	-	LATER	BY OTHERS (PIPE FABRICATOR)

NOTES

- MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 40° SWING ANGLE FROM VERTICAL.
- VSH VARIABLE SPRING HANGER, CSH CONSTANT SUPPORT HANGER, R RIGID, HYD HYDRAULIC SHUBBER, 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-FW-01-A-2/2
PIPE MATERIAL:	ASTM A106 GR. B
REFERENCES	2 ALL DETAILS COMPL. 1/16/80 GMY 1 FOR BID 3/26/80 GMY NR REVISIONS DATE BY SCH DWG ISO. LS.

PIPE HANGER SCHEDULE		
RECEIVER FEEDWATER		
Stearns-Roger		
10 Mc SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
CHECKED BY: NLM	DATE: 4-1-80	JOB NO: C-21700
APPROVED BY: LD	DATE: 9/1/80	SHEET NO: 1 OF 1

951

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			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)			
							ANALYST <i>J.P. Ray</i> DATE <i>2-14-80</i>	DESIGNED BY <i>GM</i> DATE <i>2/18/80</i>	COLD			HOT	Z	STYLE						FIG. NO	SIZE	
X	Y	Z																				
H-FW-2-23	440	475	4.50	2 1/2	N.A.	175	-1/16	0	-1/4	-	R	F	-	-	-	-	-	-	1.6	BY SPEC E2 SEE DETAIL		
-24		1083				190F	-1/4	1/2 UP	-1/16	-	VSH	S	82	10	-	520	3/4	1213	-	1.3		
-25		639				205F	-15/16	0	-13/16	-	R	S	-	-	-	-	5/8	-	-	-	1.2	
-26		726				225	-1/2	0	-3/8	-	R	F	-	-	-	-	-	-	-	-	.9	
-27		489				235	-1/8	0	-3/4	-	R	S	-	-	-	-	1/2	-	-	-	.7	
-28		456				240	-1/2	0	-1/16	-	R	F	-	-	-	-	-	-	-	-	.7	
-29		532				245	-1	0	-1/2	-	R	S	-	-	-	-	1/2	-	-	-	.9	
-30		597				260	-15/16	0	-13/8	-	R	S	-	-	-	-	1/2	-	-	-	1.1	
-31		327				265	-1/16	0	-13/8	-	R	F	-	-	-	-	-	-	-	-	1.1	
-32		414				270	-5/16	1/2 DN	-5/8	-	VSH	S	82	6	-	168	5/8	393	45	.5	BY SPEC E2 DETAIL LAYER BID PER H-FW-2-23 ARRET BY SPEC E2 DETAIL LAYER BID PER H-FW-2-23 ARRET	
-33		887				285	-1/8	1/2 UP	-3/16	-	VSH	S	82	9	-	400	3/4	912	163	1.0	BY SPEC E2 DETAIL LAYER BID PER H-FW-2-12-12 ARRET	
H-FW-9-1	440	226	2.875	2	N.A.	405	-1/16	0	-1/4	-	R	F	-	-	-	-	-	-	-	.7	BY SPEC E2 SEE DETAIL	
-2		170				410	-13/16	0	-19/16	-	R	S	-	-	-	-	1/2	-	-	-	.3	
-3		122				415	-13/8	0	-9/16	-	R	F	-	-	-	-	-	-	-	-	.2	
-4		252				420	-13/8	0	5/16	-	R	S	-	-	-	-	1/2	-	-	-	.4	
-5		271				420M	-23/16	0	11/16	-	R	S	-	-	-	-	1/2	-	-	-	.5	
-6		389				445F	-13/16	3/8 UP	1/8	-	VSH	S	82	6	-	168	5/8	452	-	.5		

- NOTES**
- MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 4° SWING ANGLE FROM VERTICAL.
 - VSH VARIABLE SPRING HANGER, CSH CONSTANT SUPPORT HANGER, R RIGID, HYD HYDRAULIC SHIMMER, 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-FW-02-A-4/3

REFERENCES

PIB-4

PIPE MATERIAL:

ASTM A106 GR.B



FOR BID

DATE BY SCH/DWG/ISO. LS.

PIPE HANGER SCHEDULE

RECEIVER FEEDWATER



10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

CHECKED BY: *MLM* DATE: *4-1-80* JOB NO: *C-21700*
 APPROVED BY: */80* DATE: *4/1/80*
 SCHEDULE NO: *FW-2* SHEET NO: *1 OF 1*

Form 100774 Rev. 1

FUNCTIONAL REQUIREMENTS

PIPE SUPPORT DESIGN DATA

ANALYST J.P. (JPL) DATE 3-26-80

DESIGNED BY JYM DATE 3-26-80

MARK NO	HOT TEMP (°F)	OPERATIONAL (HOT) LOAD (LBS)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS.)	LOC NO	DISPLACEMENT			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
							COLD	HOT				STYLE	FIG. NO	TYPE	SIZE						
H-MS-2-1	960	SEE S.D.L.	6.625	4 1/2	-	20	0	1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =2 F _y =2	BY OTHERS (ROCKETDYNE)
-2						25	0	2 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =8 F _y =7	
-3						30	0	2 7/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =1.0 F _y =.9	
-4						32	0	3 1/4 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =1.2 F _y =1.3	
-5		3902			5.0	35F	1/16	3 3/8 DN	1/16	4-0	CSH	S		45	5	1 1/2	-	-	5.5		
-6		SEE S.D.L.				45	0	4 1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =1.1 F _y =1.1	BY 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 13/16 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =2.2 F _y =1.1	
-11		3147			3.5	75N	0	8 1/2 DN	0	-	CSH	S	81N-A	51	10 1/2	-	-	-	-	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 1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =.9 F _y =.4	
-14						90	0	10 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =1.0 F _y =.7	
-15						95	0	11 1/8 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 1/2 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =1.8 F _y =1.4	
-19						120	0	15 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =1.2 F _y =1.3	
-20						125	0	16 3/8 DN	0	-	GDE	-	-	-	-	-	-	-	-	F _x =1.5 F _y =1.8	
-21		1083			1.2	137	1/2	17 3/8 DN	1/4	-	CSH	S	80V-B	44	20	-	3/8	-	-	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 3/16	4 1/2 DN	1	-	CSH	S	80V-B	23	6	-	5/8	-	-	1.2	
-26		1252			1.4	152	-1 3/16	1 1/2 DN	2 1/4	-	VSH	S	98	17	-	130	3/4	1057	-	1.6	
-27		979			1.1	158	-1/8	1 3/4 UP	3 3/8	-	VSH	S	98	9	-	100	3/4	1154	-	1.3	

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 SUPPCT HANGER, R RIGID, HYD HYDRAULIC SNUBBER, ARC ANCHOR, GDE GUIDS.
- 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-MS-01-A-12/5

PIPE MATERIAL:

ASTM A335 P22

PIPE HANGER SCHEDULE

MAIN STEAM

Stearns-Roger

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

REFERENCES

P13-142 A

- ③ ALL DETAILS COMPLETE SIM/GM
- ② FOR ROCKETDYNE SIM/GM
- ① FOR BID SIM/GM

CHECKED BY: M/LM

DATE: 4-1-80

JOB NO

APPROVED BY: JEO

DATE: 4/1/80

C-21700

NO REVISIONS

DATE BY SCH. DWG. ISO. LS.

SCHEDULE NO MS-2

SHEET NO 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	ANALYST <i>J.W.M.</i> DATE 3-26-80			MIN. RECD. VERT. DIST (FT./IN.)	BASIC SUPPORT TYPE	DESIGNED BY <i>J.W.M.</i> DATE 3-26-80				K (LBS./IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)		STR. DESIGN LOAD (KIPS.)
							DISPLACEMENT COLD → HOT					PIPE SUPPORT SELECTION									
							X	Y	Z		STYLE	FIG. NO	SIZE	TT (IN.)							
H-MS-2-28	960	615	6.625	4 1/2	.7	162	-1/16	1 3/16 UP	3 1/4	-	VSH	S	98	8	-	75	3/8	713	-	.8	BY SPEC. E2 SEE DETAIL
-29		2099			2.4	165N	-3/16	1 1/4 UP	2 1/2	-	VSH	S	98	12	-	225	1	2380	-	2.6	
-30		994			1.1	182	5/16	3/16 UP	1 3/16	-	VSH	S	B-268	9	-	200	3/4	1106	-	1.3	
-31		SEE S.D.L.			-	195	0	0	0	-	ANC	F	-	-	-	-	-	-	-	LATEC	BY OTHERS (PIPE FABRICATOR)
-32		SEE S.D.L.			1.8	220	0	0	-1/16	-	R+GDE	F	-	-	-	-	-	-	-	F ₁ = 8.5K F ₂ = 3.0K	BY SPEC. E2 SEE DETAIL
-33		1825			2.0	235N	-2 3/16	0	-2 1/4	-	R	S	-	-	-	-	3/8	-	-	2.7	
-34		1278			1.4	255	-4 5/8	1 5/16 DN	-1 1/2	-	VSH	S	98	10	-	520	3/4	1107	-	1.6	
-35		1847			2.1	265	-2 3/16	0	1/8	-	R	S	-	-	-	-	7/8	-	-	3.6	
-36		SEE S.D.L.			-	280	-2	3/16 DN	0	-	GDE	-	-	-	-	-	-	-	-	F ₂ = 3.0	BY SPEC. E2 DETAIL LATER
-37		2@1898			4.5	280	-1 3/4	5/16 DN	3/16	-	VSH	D	82	11	-	650	7/8	201655	175	5.0 (TOTAL)	BY SPEC. E2 DETAIL LATER

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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 SNUBBER, 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-MS-1-A-12/5 GMS-2-28, 29, 30 2 T/W-MS-2-A-17/5 (MS-2-31 thru 37)	PIPE MATERIAL: ASTM A335 P22	PIPE HANGER SCHEDULE MAIN STEAM Stearns-Roger 10 Mm SOLAR PILOT PLANT DAGGETT, CALIFORNIA
	REFERENCES P13-142 A	E REV. H-MS-2-36 & 37 1 FOR BID REVISIONS	4/10/80 GMY 3/10/80 GMY

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 <i>J.M.</i> DATE <i>3-26-80</i>			DISPLACEMENT COLD → HOT	MIN. REQ. VERT. DIST (FT./IN.)	BASIC SUPPORT TYPE	DESIGNED BY <i>J.M.</i> DATE <i>3-26-80</i>				REMARKS					
							X	VERT. Y	Z				PIPE SUPPORT SELECTION									
													STYLE	FIG. N°-TYPE	SIZE	T T (IN.)		K (LBS./IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)	STR. DESIGN LOAD (KIPS)
H-M5-3-1	960	1122	6.625	4 1/2	1.3	207	-9/16	1/2 UP	1 1/4	-	VSH	S	B-268	10	-	260	3/4	1252	-	1.5	BY SPEC. E2 SEE DETAIL	
-2		SEE S.D.L.				220	0	0	0	-	ANC	F	-	-	-	-	-	-	-	-	LATER	BY OTHERS (PIPE FABRICATOR)
-3					1.7	330	0	0	-1/16	-	R+GDE	F	-	-	-	-	-	-	-	-	1.5	BY SPEC. E2 SEE DETAIL
-4		1835			2.1	345N	1	0	-2 1/4	-	R	S	-	-	-	-	3/4	-	-	3.3		
-5		938			1.1	365	1 1/16	1 5/16 DN	-2 1/2	-	VSH	S	B-268	9	-	200	3/4	755	-	1.3		
-6		2300			2.6	370	0	0	-1/16	-	R	S	-	-	-	-	7/8	-	-	3.4		
-7		1384			1.5	380N	-1 3/8	0	-2 3/8	-	R	S	-	-	-	-	5/8	-	-	2.1		
-8		2117			2.4	390N	-1/16	7/8 UP	1/2	-	VSH	S	B-268	12	-	450	1	2511	-	2.8		

NOTES

- ① MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO $\frac{1}{2}$ 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 SKUBBER, ANC = ANCHOR, GDE = GUIDE.
- ③ K = SPRING SCALE LBS./IN. (FOR VARIABLE SPRING HANGER).
- ④ STYLE: S = SINGLE ROD ASSY, T = TRAPEZE ASS'Y, F = FLOOR SUPPORT, D = DUAL ROD ASS'Y.
- ⑤ OPERATIONAL (HOT) AND COLD LOADS (INDICATED) DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS.

ANALYSIS I.D. CODE

T/W/Y-M5-3-A-3/3/1

PIPE MATERIAL:

ASTM A335 P22

PIPE HANGER SCHEDULE

MAIN STEAM

Stearns-Roger

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

REFERENCES

P/3-2A

FOR BID REVISIONS

DATE BY SCH/DWG/ISO. LS.

CHECKED BY: *MJM*

APPROVED BY: *160*

DATE: 4-1-80

DATE: 7/1/80

JOB N°

C-21700

SCHEDULE N° M5-3

SHEET N° 1 OF 1

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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			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	TT (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	245A	1/16	0	3/4	-	R	F	-	-	-	-	-	-	-	5.5	↓
H-MS-8-1	960	172	2.375	3 1/2	0.2	335A	-7/16	7/8 UP	2 3/8	-	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	345A	-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	-1/16	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	-1/16	1/2 UP	2 3/8	-	VSH	S	B-268	1	-	21	1/2	87	-	0.2	↓
↓ -3	↓	150				927	-7/16	0	2 3/4	-	R	S	-	-	-	-	-	-	-	0.2	↓
↓ -4	↓	612				935A	-1	0	1 1/2	-	R	F	-	-	-	-	-	-	-	0.7	↓

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 SHUBBER, ANC ANCHOR, SFC 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-MS-1-A-12/5 (MS-6, MS-8)
 T/W-ST-13-A-1/1 (MS-10)

PIPE MATERIAL:

ASTM A335 P22

PIPE HANGER SCHEDULE

MAIN STEAM

Stearns-Roger

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

REFERENCES

P13-1 (MS-6, MS-8) A
 P13-B (MS-10) A

FOR BID
 REVISIONS

DATE BY SCH/DWG/ISO. LS.

CHECKED BY: *MLM*

DATE: 4-1-80

JOB NO.

APPROVED BY: *160*

DATE: 4/1/80

C-21700

SCHEDULE NO. MS-6

SHEET NO. 1 OF 1

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FUNCTIONAL REQUIREMENTS											PIPE SUPPORT DESIGN DATA							REMARKS			
MARK N°	HOT TEMP (°F)	OPERATIONAL (HOT) LOAD (LBS.)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS.)	LOG N°	DISPLACEMENT GOLD → HOT			MIN. RECD. 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. N° TYPE	SIZE	TT (IN.)						
H-MS-7-1	885	SEE S.P.L.	10.75	5	-	275 515	0	0	0	-	ANC.	F	-	-	-	-	-	-	-	LATER	BY OTHERS (PIPE FABRICATOR)
-2		1640			1.3	440	0	0	-1 1/16	-	R+GDE.	F	-	-	-	-	-	-	-	F=2.5 FV=2.2	BY SPEC. E-2, SEE DETAIL
-3		770			1.2	475	-1 3/16	0	1 9/16 DN	-1	VSH	S	98	8	-	75	5/8	671	-	1.4	
-4		421			0.7	482	-1/8	0	1 9/16 DN	-1/2	VSH	S	98	6	-	42	5/8	382	-	0.8	
-5		2367			3.7	484	3/4	0	-1 5/16	-	R	F	-	-	-	-	-	-	-	4.0	
-6	350	585		2 1/2	1.0	492	1	0	-9/16	-	R	F	-	-	-	-	-	-	-	1.1	
-7		SEE S.D.L.			5.4	500	-1/2	0	0	-	R+GDE.	S	-	-	-	-	3/4	-	-	F=2.5 FV=3.7	
-8		857			1.5	505	1/8	0	1/4	-	R	S	-	-	-	1/2	-	-	-	1.7	BY SPEC. EE DETAIL 2. AFTER BID PER H-MS-7-3 ARRANG. BY SPEC. E2 DETAIL 2. AFTER BID PER H-MS-7-3 ARRANG.
-9		916			1.6	520	-1/8	1/16	UP	1/16	VSH	F	82F	9	-	400	-	941	-	1.8	

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 SHUBBER, 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/X-MS-4-A-5/3/1	PIPE MATERIAL: A335 P11	PIPE HANGER SCHEDULE MAIN STEAM Stearns-Roger 10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	REFERENCES P13-Z	FOR BID N° REVISIONS	3/11/80 GNT DATE BY SCH. DWG. ISO. LS.	CHECKED BY: <i>MLM</i> DATE: 4-1-80 JOB N° C-21700 APPROVED BY: <i>160</i> DATE: 4/1/80 SCHEDULE N° MS-7 SHEET N° 1 OF 1

Form 110774 Rev. 1

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			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)		
							ANALYST <i>J.H. May</i> DATE <i>2-19-80</i>	GOLD	HOT			X	Y	Z						STYLE	FIG. NO. TYPE
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	7/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .6 F ₃ = .6	BY SPEC. E-2 SEE DETAIL	
-3						22	0	1 1/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .3 F ₃ = .3		
-4						24	0	2 3/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .2 F ₃ = .2		
-5						26	0	3 5/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .3 F ₃ = .3		
-6						28	0	4 1/2 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .4 F ₃ = .4		
-7		981			1.3	35F	1/16	5 1/2 DN	0		CSH	S	80-V	2 1/2	6 1/2		5/8		1.5		
-8		SEE S.D.L.				37	0	5 7/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .8 F ₃ = .8		
-9						39	0	6 3/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .5 F ₃ = .5		
-10						41	0	7 3/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .5 F ₃ = .5		
-11						43	0	8 7/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .5 F ₃ = .5		
-12		1152			1.5	50F	1/8	9 1/2 DN	1/16		CSH	S	B1-H	33	11		5/8		1.7		
-13		SEE S.D.L.				52	0	9 5/8 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = 1.0 F ₃ = 1.0		
-14						54	0	10 1/2 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = 1.0 F ₃ = 1.0		
-15						56	0	12 1/2 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .9 F ₃ = .9		
-16						58	0	13 1/2 DN	0		GDE	-	-	-	-	-	-	-	F ₂ = .9 F ₃ = .9		
-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 W/ EXTENDED LOAD ASSY	
-18		206			.3	72	1/16	10 3/8 DN	3/16		CSH	S	80V-C	16	12 1/2		1/2		.4		
-19		238			.3	77	7/8	8 DN	3/16		CSH	S	80V-C	16	10		1/2		.4		
-20		436			.6	85F	3/16	6 3/8 DN	2 1/2		CSH	S	B1H-C	18	8 1/2		1/2		.7		
-21		296			.4	92	3/16	8 1/4 DN	2 1/2		CSH	S	80V-C	17	10		1/2		.5		
-22		193			.3	102	1 1/8	5 1/8 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	3/4	5 1/8 DN	4 1/8		CSH	S	80V-C	14	6 1/2		1/2		.5		
-24		623			.8	112	3/8	3 1/8 DN	2 3/8		VSH	S	B2	7		224	5/8	553	.9		
-25		101			.2	126	1/4	7 1/8 DN	3/4		VSH	S	B-268	1		21	1/2	92	.2	BY SPEC E-2 SEE DETAIL MUST ALSO ACCOMMODATE 3 1/2" DN	
-26		572	2.375	3 1/2	.7	83Z	1/2	0	2 1/8		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 1/2 DN	9/16		VSH	S	B2	10		520	3/4	1208		2.3	

- NOTES**
- ① MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 40° SWING ANGLE FROM VERTICAL.
 - ② VSH VARIABLE SPRING HANGER, CSN CONSTANT SUPPORT HANGER, R RIGID, HYD HYDRAULIC SHUBBER, ANC ANCHOR, GDE GUIDE.
 - ③ K SPRING SCALE LBS./IN. (FOR VARIABLE SPRING HANGER).
 - ④ STYLE: S SINGLE ROD ASSY, T TRAPEZOID ASSY, F FLOOR SUPPORT, D DUAL ROD ASSY.
 - ⑤ OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS.

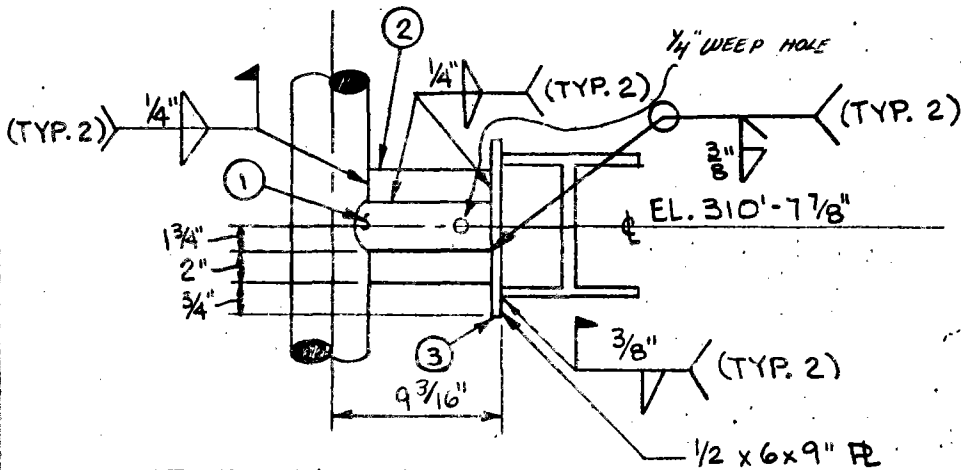
ANALYSIS I.D. CODE		PIPE MATERIAL:	
T-VT-1-A-4/B-2		ASTM A335 P22 EXCEPT PT. 134 ASTM A335 P11	
W-VT-1-A-5			
T/W-ST-13-A-1/1 (H-VT-1-26)			
REFERENCES			
PI3-6			
REVISIONS		DATE BY SCH. DWG. ISO. LS.	

PIPE HANGER SCHEDULE	
RECEIVER FLASH TANK VENT	
Stearns-Roger	
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
CHECKED BY: <i>MJM</i>	DATE: 4-1-80
APPROVED BY: <i>flc</i>	DATE: 4/1/80
SCHEDULE NO: VT-1	JOB NO: C-21700
SHEET NO. 1 OF 2	

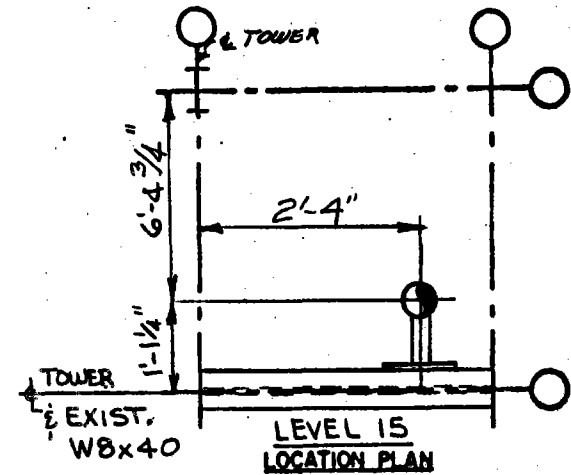
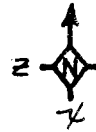
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FUNCTIONAL REQUIREMENTS													PIPE SUPPORT DESIGN DATA												
MARK N°	HOT TEMP (°F)	OPERATIONAL (HOT) LOAD (LBS)	PIPE O.D. (IN.)	INS. THK (IN.)	HYDRO LOAD (KIPS.)	LOC N°	DISPLACEMENT			MIN. REQ. VERT. DIST (FT./IN)	BASIC SUPPORT TYPE	PIPE SUPPORT SELECTION				K. (LBS./IN.)	ROD SIZE (IN.)	COLD LOAD (LBS.)	ASSY WT. (LBS.)	STR. DESIGN LOAD (KIPS)	REMARKS				
							ANALYST <i>J.H.M.</i> DATE <i>3-26-80</i>					DESIGNED BY <i>J.H.M.</i> DATE <i>3-26-80</i>										STYLE	FIG. N°-TYPE	SIZE	TT (IN)
							X	VERT.	Z			COLD	HOT												
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	3/8	6/8 DN	2	-	CSH	S	81H	9	7 1/2	-	1/2	-	-	.2					
-2		127			.2	204	1/16	1 1/2 DN	1	-	VSH	F	98	2	-	13	-	-	-	.2					
-3		322			.3	212	1/16	0	-1 1/4	-	R	F	-	-	-	-	-	-	-	.5					
-4		SEE S.D.L.			.2	215	0	0	-1 1/16	-	R+GDE	F	-	-	-	-	-	-	-	Fx = 1.0 Fy = .5					
-5		124			.2	217	0	0	-2 1/4	-	R	F	-	-	-	-	-	-	-	.3					
-6		71			.2	220	0	0	-2 1/2	-	R+GDE	F	-	-	-	-	-	-	-	Fx = 1.0 Fy = .5					
-7		99			.1	225H	1/16	0	-2 3/4	-	R	S	-	-	-	-	1/2	-	-	.3					
-8		271			.4	232	-2 3/8	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 1/2	0	-2 1/4	-	R	S	-	-	-	-	1/2	-	-	.2	BY SPEC. E2 SEE DETAIL				
-10		172			.3	242	-7/8	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	-	-	-	-	-	-	-	-	LATEL	BY OTHERS (PIPE FABRICATOR)				
-13		137			.2	249	-5/16	0	-9/16	-	R	S	-	-	-	-	1/2	-	-	.2	BY SPEC. E2 SEE DETAIL				
-14		138			.2	255H	-9/16	0	-1 3/16	-	R	S	-	-	-	-	1/2	-	-	.2					
-15		104			.2	262	-9/8	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 1 3/8" DN				
-17		188			.3	277	-7/16	1/4 DN	-7/16		VSH	S	82	3	-	70	1/2	183	30	.4	BY OTHERS (SCE)				
-18	660	1144	6.625		1.6	286	-5/16	1/4 DN	3/16		VSH	S	82	10	-	520	3/4	1111	70	1.8					
-19		219			.3	290H	-3/8	1/8 DN	-1/4		VSH	F	82	4	-	94	-	207	30	.4					

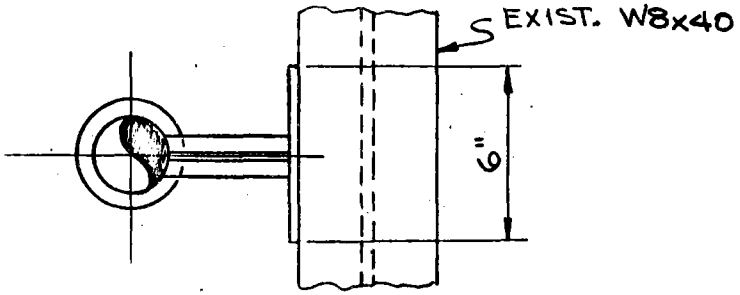
<p>NOTES</p> <p>① MIN. VERT. DISTANCE FROM BOTTOM OF STEEL TO C OF PIPE OR BOTTOM OF LUGS CORRESPONDING TO MAX. 4° SWING ANGLE FROM VERTICAL.</p> <p>② VSH VARIABLE SPRING HANGER, CSH CONSTANT SUPPCT HANGER, R RIGID, HYD HYDRAULIC SNUBBER, ANC ANCHOR, ODE GUIDE.</p> <p>③ K SPRING SCALE LBS./IN. (FOR VARIABLE SPRING HANGER).</p> <p>④ STYLE: S SINGLE ROD ASSY, T TRAPEZE ASSY, F FLOOR SUPPORT, D DUAL ROD ASSY.</p> <p>⑤ OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS.</p>	<p>ANALYSIS I.D. CODE</p> <p>T-VT-1.A-4/B-2</p> <p>H-VT-1.A-5</p>	<p>PIPE MATERIAL:</p> <p>ASTM A335 P22 EXCEPT PT. 145F ASTM A335 P11</p>	<p>PIPE HANGER SCHEDULE</p> <p>RECEIVER FLASH TANK VENT</p> <p>Stearns-Roger</p> <p>10 MME SOLAR PILOT PLANT DAGGETT, CALIFORNIA</p>	
	<p>REFERENCES</p> <p>PI3-6</p>	<p>FOR BID</p>	<p>CHECKED BY: <i>MJM</i></p> <p>APPROVED BY: <i>160</i></p>	<p>DATE: 4/1/80</p> <p>DATE: 9/1/80</p> <p>JOB N° C-21700</p>
	<p>NO REVISIONS</p>	<p>DATE BY SCH/DWG/ISO. LS.</p>	<p>SCHEDULE N° VT-1</p>	<p>SHEET N° 2 OF 2</p>



ELEVATION LOOKING EAST



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



PLAN VIEW

△ REVISED N-S PIPE LOCATION

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

Vol. P60-1

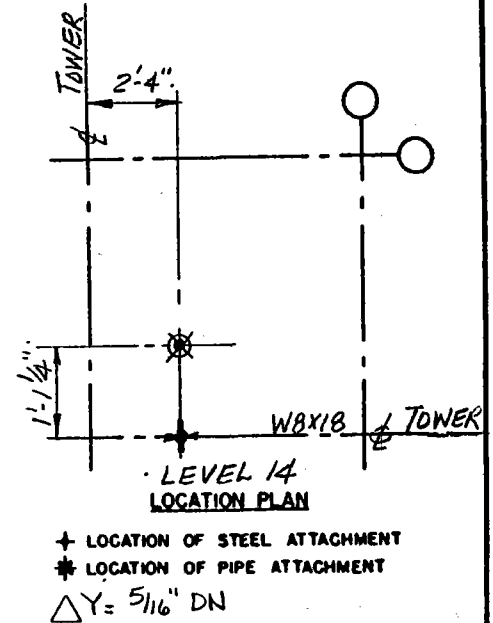
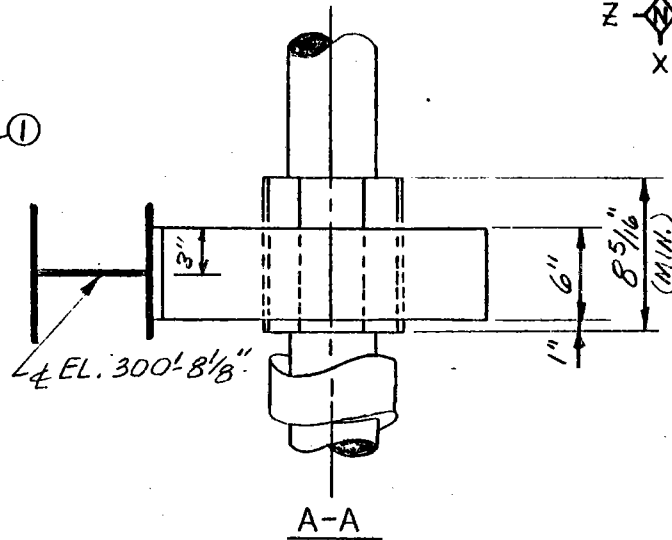
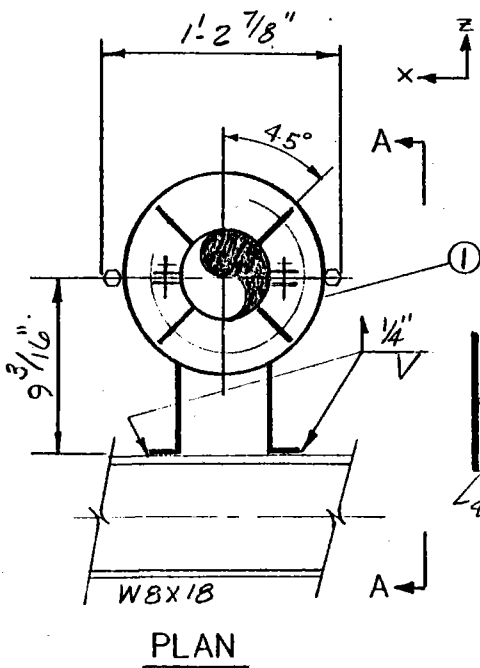
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3	1	1/2 x 6 x 9 C.S. P. (BY FAB.)	
2	2	1/2 x 2 x 6 7/16 C.S. P. (BY FAB.)	
1	1	3" XXS PIPE (BY FAB.)	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.1K$, $F_y = 6.5K$
 PIPE SIZE: 4.5" O.D. $F_2 = 0.1K$, $M_x = .1'K$
 PIPE INSULATION: 2 1/2" $M_y = .4'K$, $M_z = .2'K$
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD		5
DESIGNED	<i>M.P.</i>	4
DATE	5/19/80	3
REVIEWED	<i>M.P.</i>	2
DATE	5-19-80	1
PROJECT		
DATE		
ANALYSIS ID. CODE		REVISIONS

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO FW-2-11165 MARK NO H-FW-2-1



VOL. P60-1

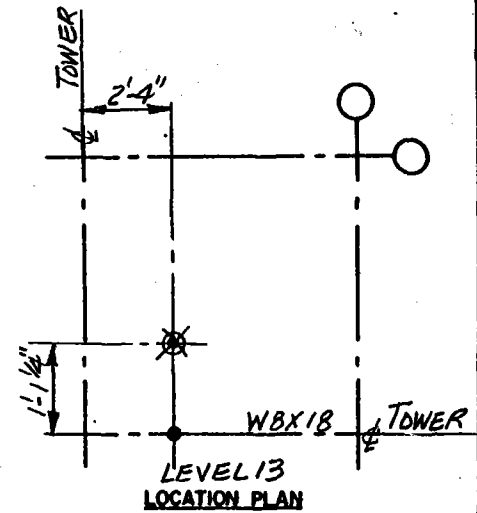
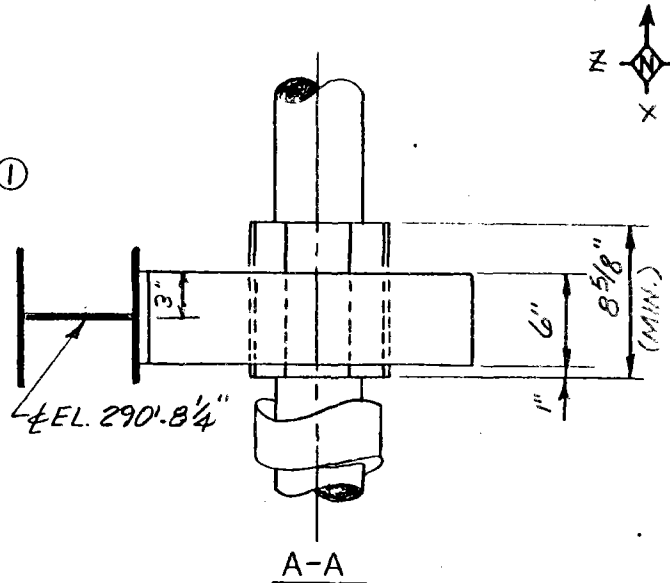
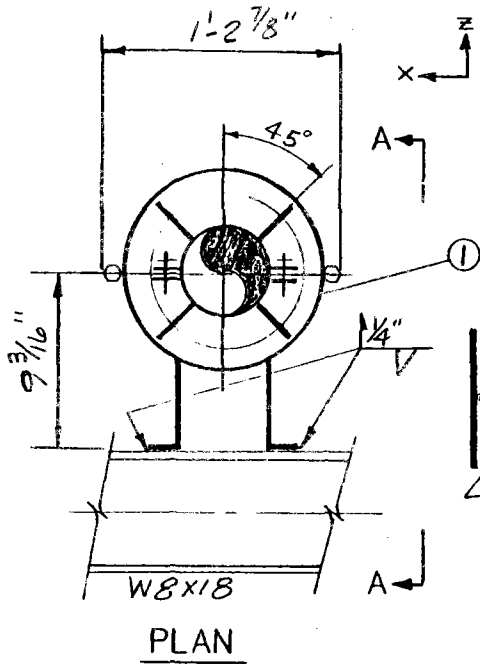
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1	1	PIPE ALIGNMENT GUIDE SIM-FIG. 256

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

NOTES:
 PIPE TEMPERATURE: 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			
DESIGNED	ALM	CHECKED	JR
DATE	4-21-80	DATE	5-11-80
REVIEWED	ALM	APPROVED	
DATE	5-29-80	DATE	
PROJECT	BDR		JR, JR, Y
DATE	6-12-80		6-12-80
ANALYSIS ID. CODE T/W-FW-01-A-2/2			

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"FW-2-116A MARK NO H-FW-2-2



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 5/8" \text{ DN}$

VOL. P60-1

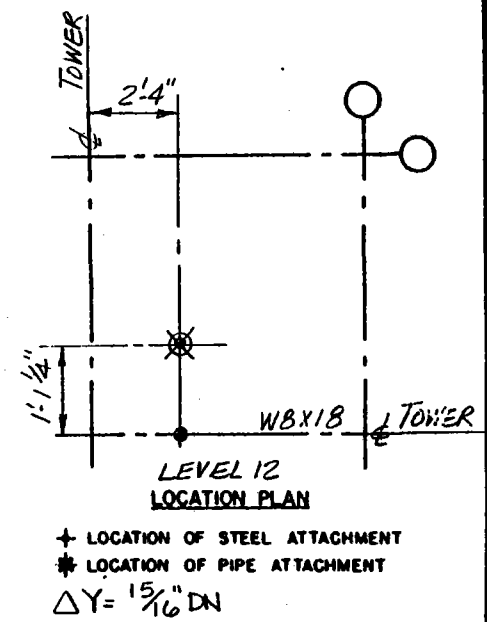
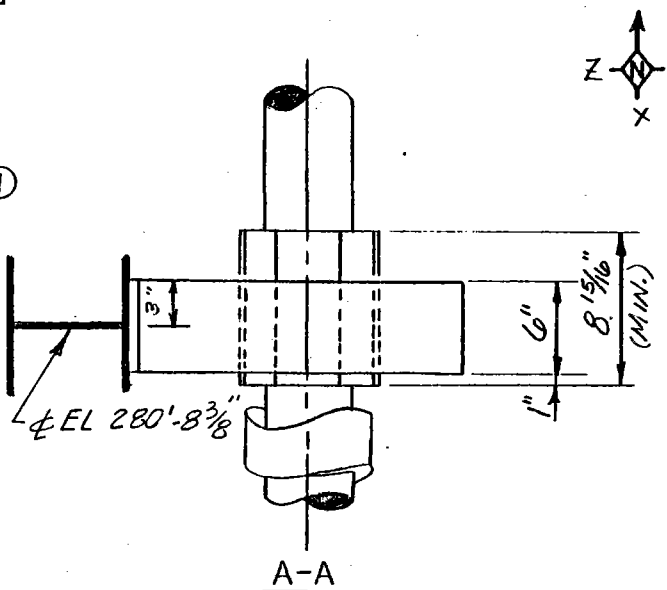
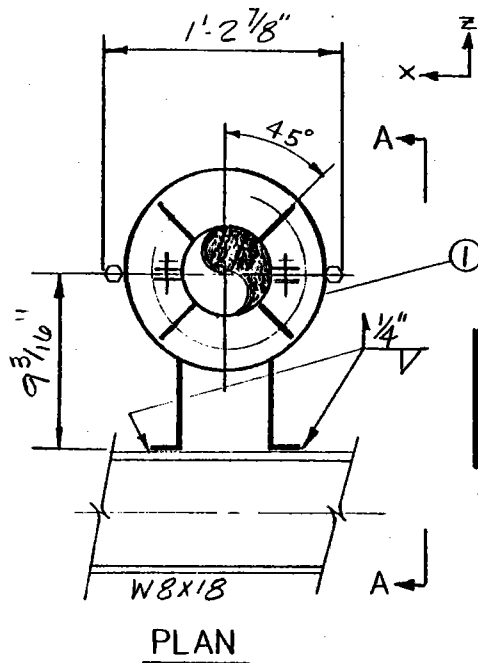
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1	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

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

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_y = .2K$ $F_z = .2K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: A37M A106 GR. B

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-21-80	DATE	
REVIEWED	HRW	APPROVED	
DATE	7-29-80	DATE	
PROJECT	BDR	BY	H. J. Y.
DATE	6-12-80	DATE	6-12-80
ANALYSIS ID. CODE	T/W-FW-DI-A-2/2		

REVISIONS	ITEM RECD	COMPONENT DESCRIPTION	REMARKS
5			
4			
3			
2			
1			
SCALE: NONE		Stearns-Roger	
		11165/8	
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT #	C-21700	LINE #	4"FW-2-MEA
MARK #	H-FW-2-3		



VOL. PG0-1

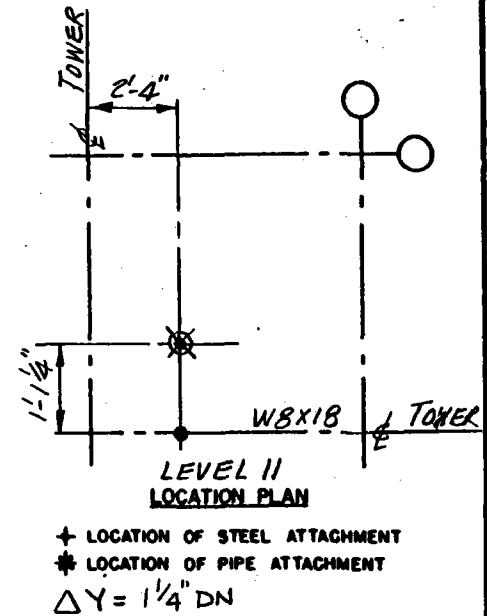
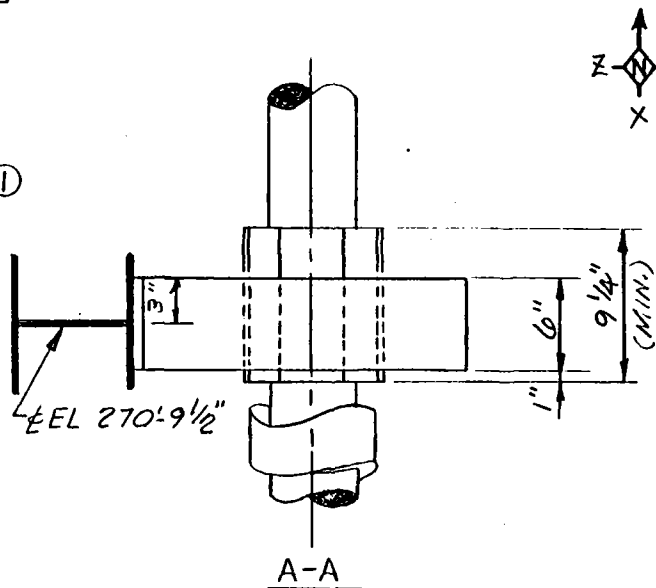
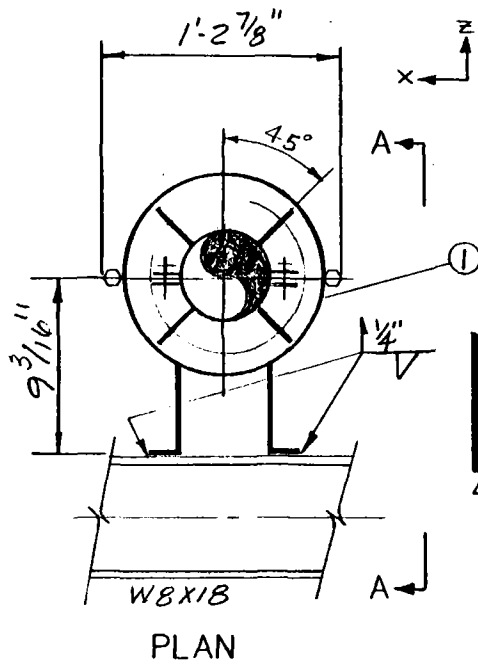
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3		
2		
1	/	PIPE ALIGNMENT GUIDE SIM.FIG. 256

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

NOTES:
 PIPE TEMPERATURE: 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	H.P.Y.	APPROVED	
DATE	6-12-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-FW-01-A-2/2		

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



VOL. P60-1

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1	PIPE ALIGNMENT GUIDE SIM.FIG. 256

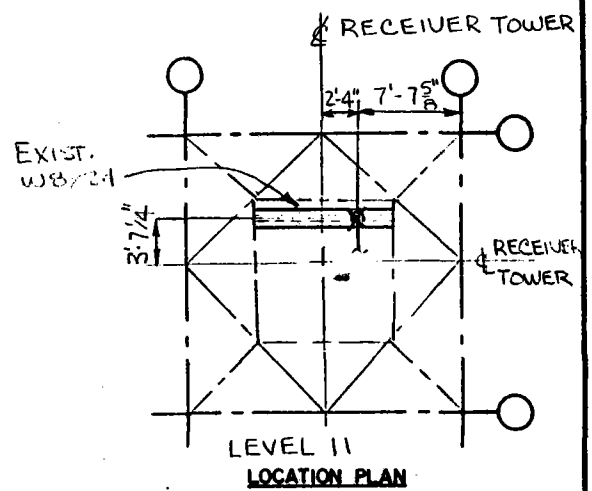
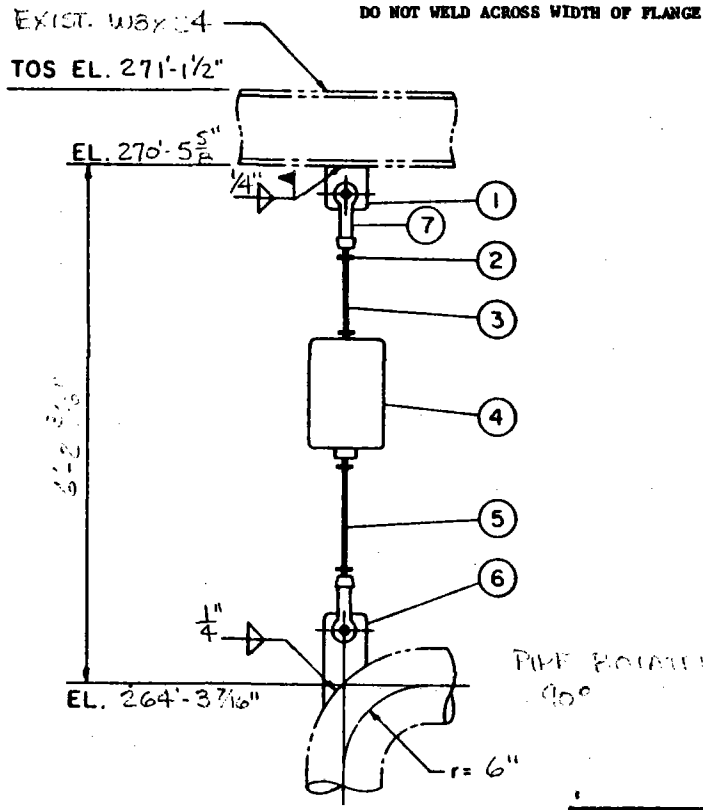
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-2	P4
D	STRUCTURAL S32-4	0
C	ELECTRICAL	
B		
A		

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	JBY
DATE	4-21-80	DATE	4-21-80
REVIEWED	RPM	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-FW-01-A-2/2		

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

170



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

VOL. PG0-1

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

SPRING DATA			14
FIG. NO.	TYPE	SIZE	
19	A	12	12
HOT LOAD		2246lb	11
COLD LOAD		1928lb	10
VERT. TRAVEL C. TO H.		1 7/8" W	9
T. T. CONST. SUPPORT		N.A.	8
VENDOR ENG. REV.			7 2
REFERENCE DRAWINGS			REV
E	PIPING	19-1	7 6
D	STRUCTURAL	S32-d	5 1
C	ELECTRICAL		4 1
B			3 1
A			2 4
			1 1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	19-1
D	STRUCTURAL	S32-d
C	ELECTRICAL	
B		
A		

ELEV. LOOKING NORTH

PIPE ROTATED 90°

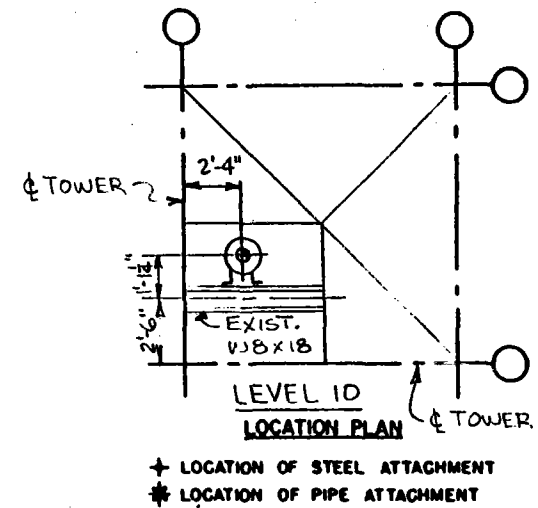
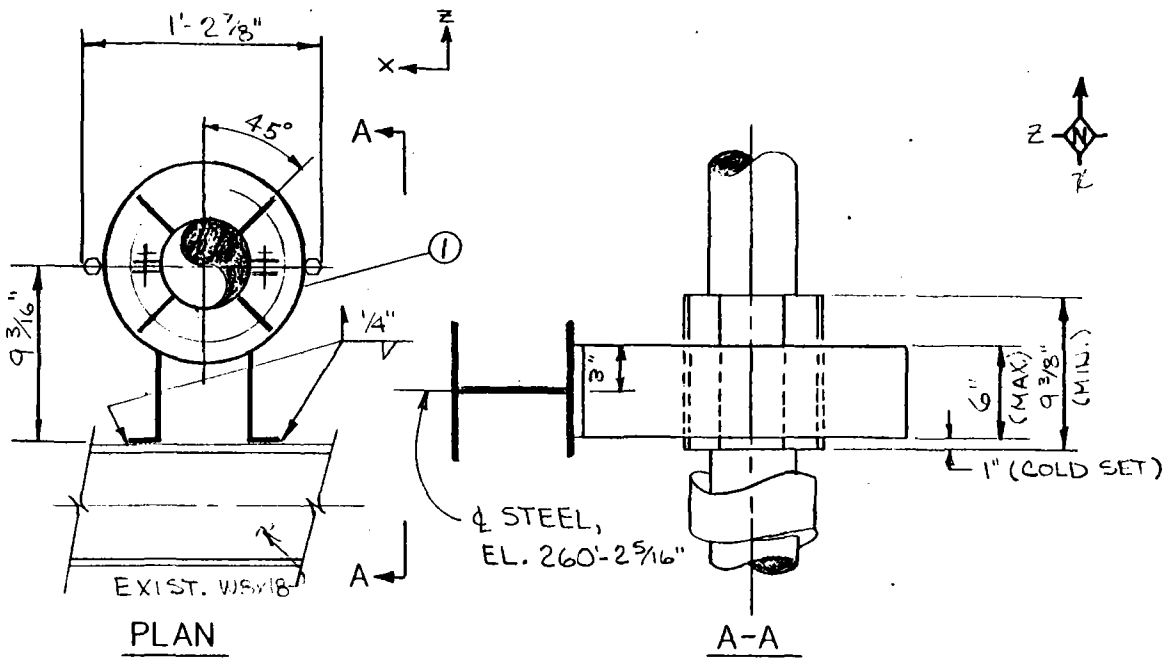
NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 2.5 Y.
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: A307M

ENGINEERING RECORD			
DESIGNED	7/18/80	CHECKED	KOR FWH
DATE	2/27/80	DATE	2/28-80 3/27/80
REVIEWED	MFM	APPROVED	[Signature]
DATE	3-9-80	DATE	3-11-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-FW-1-1-1-1/2		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
5		
4		
3		
2		
1		
SCALE: NONE		
Stearns-Roger <small>INCORPORATED</small>		11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO
		A-FW-2-11EA
MARK NO	H-FW-2-6	

FORM 877-1-6

171



14			
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2			
1			

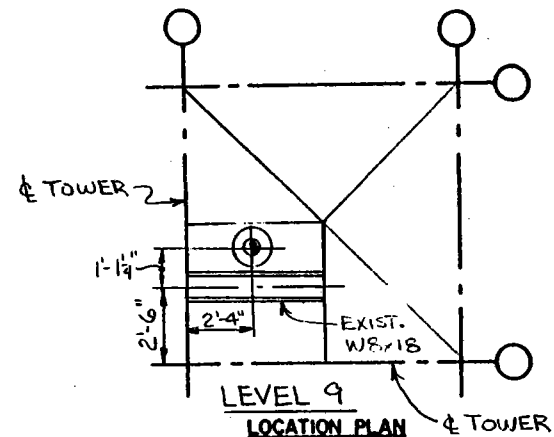
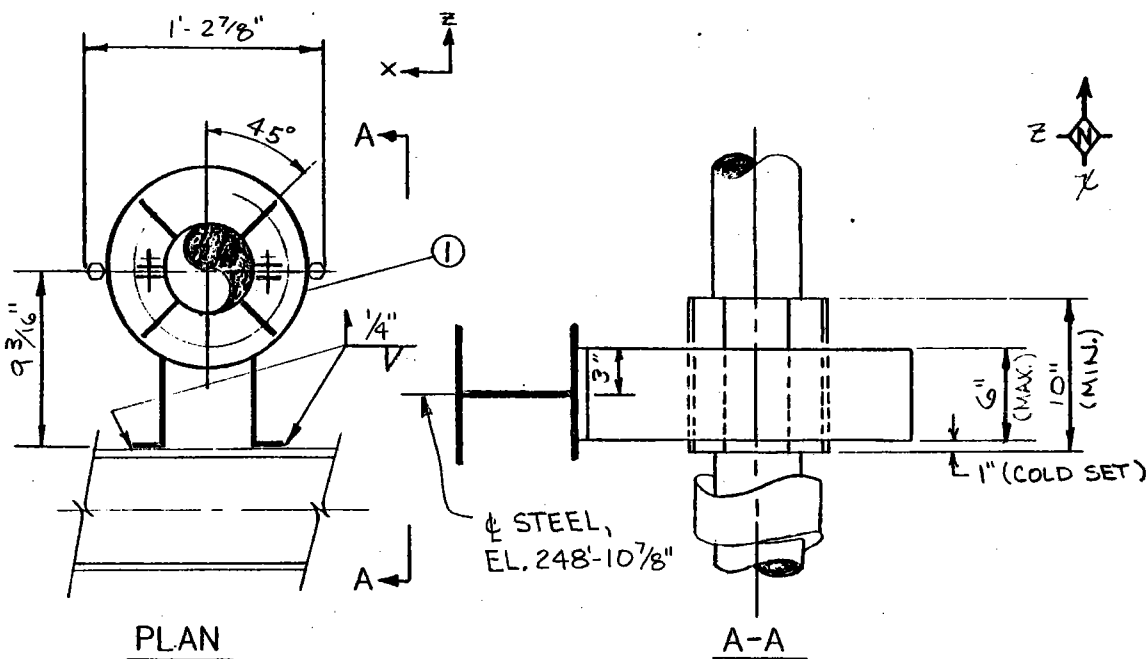
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P13-4	A
D	STRUCTURAL S32-4	O
C	ELECTRICAL	
B		
A		

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 1.25 K, E, D, SK
 PIPE SIZE: 4.0" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B.

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

REVISIONS	ITEM RECD	COMPONENT DESCRIPTION	REMARKS
5			
4			
3	SCALE:	Stearns-Roger	11165/8
2	NONE		
1		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	PROJECT NO	LINE NO	MARK NO
	C-21700	J-FW-2-115	H-FW-2-7

1-73-01



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT

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

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PIPE ALIGNMENT GUIDE SIM-FIG. 256		

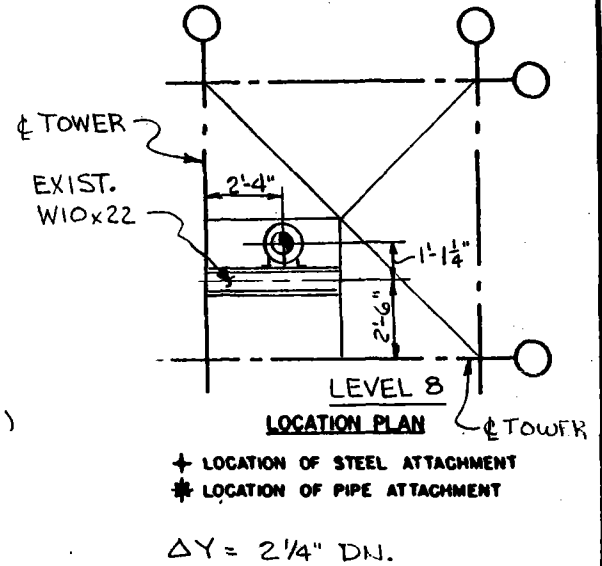
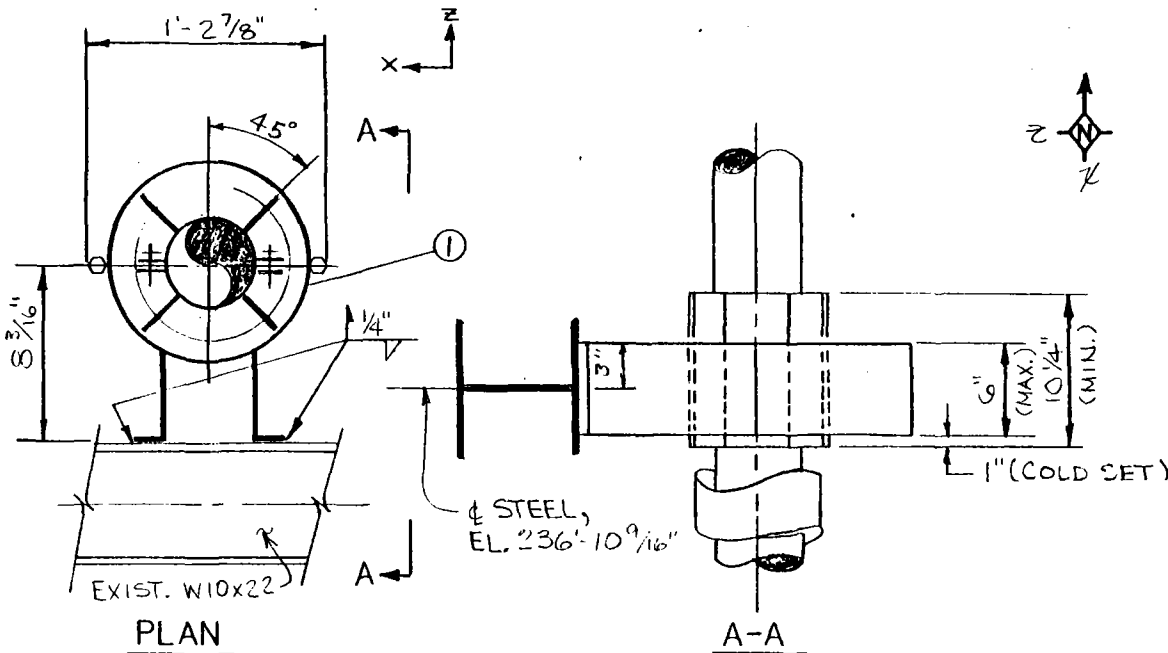
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.
E		PIPING	PI3-4	A
D		STRUCTURAL	S32-4	O
C		ELECTRICAL		
B				
A				

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.6K$, $F_y = 0.6K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR.B

ENGINEERING RECORD			
DESIGNED	4/27/80	CHECKED	4/27/80
DATE	4/27/80	DATE	4/27/80
REVIEWED	4/27/80	APPROVED	
DATE	4-30-80	DATE	
PROJECT	BDR	JK IP, Y.	
DATE	6-12-80	DATE	6-12-80
ANALYSIS ID. CODE	T/W-FW-01-A-2/2		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT #	C-21700	LINE # 4"-FW-2-NPA
MARK #	H-FW-2-8	

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VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P13-4	A 6
D	STRUCTURAL S32-4	O 5
C	ELECTRICAL	
B		4
A		3

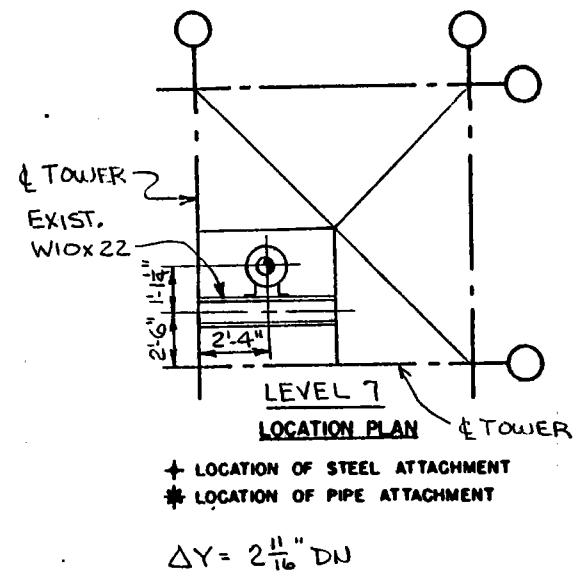
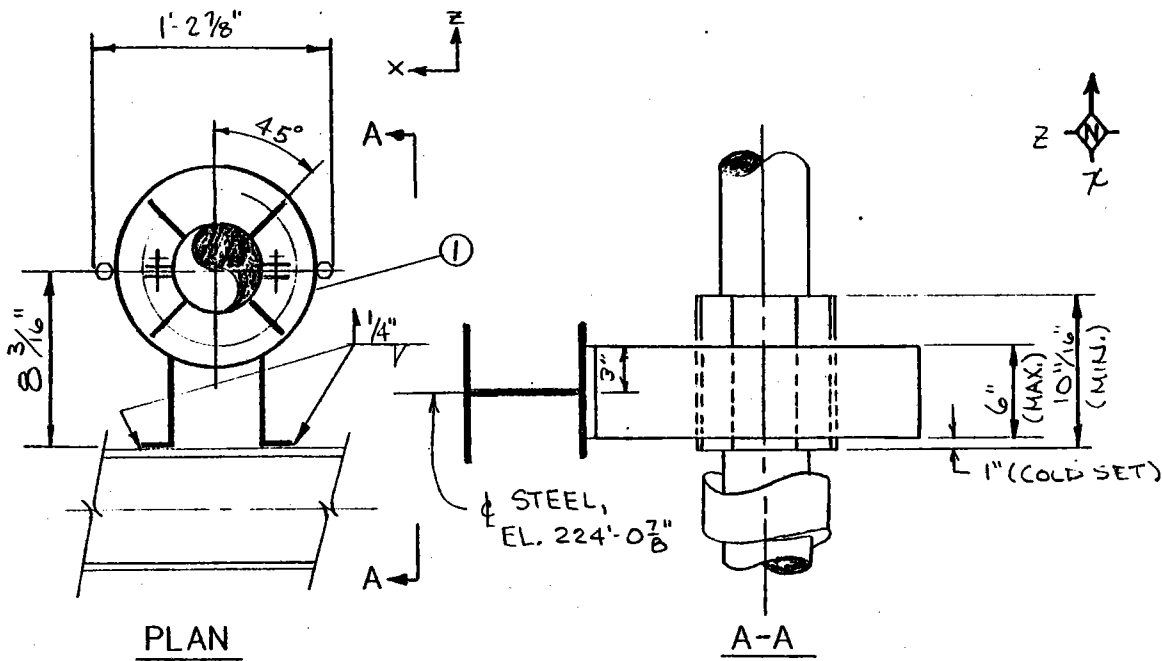
14		
13		
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11		
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4		
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2		
1		

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: F_x = 1.0K, F_y = 1.1K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD	
DESIGNED	CHECKED
DATE	DATE
REVIEWED	APPROVED
DATE	DATE
PROJECT	
DATE	
ANALYSIS ID. CODE	T/W-FW-01-A-2/2

5		
4	ITEM REQD	COMPONENT DESCRIPTION
3	SCALE:	REMARKS
2	NONE	
1		
REVISIONS	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT #	C-21700	LINE # 4"-FW-2-MPA
MARK #	H-FW-2-9	

1-12-80



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

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1			

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

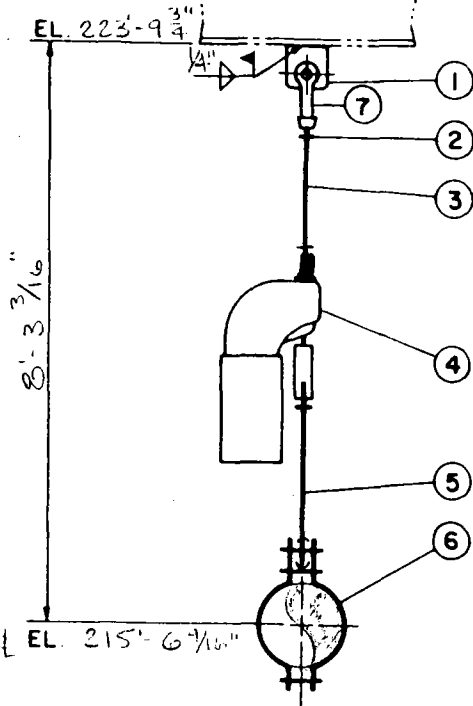
NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.4K$, $F_z = 1.5K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	T/W-FW-01-A-212		

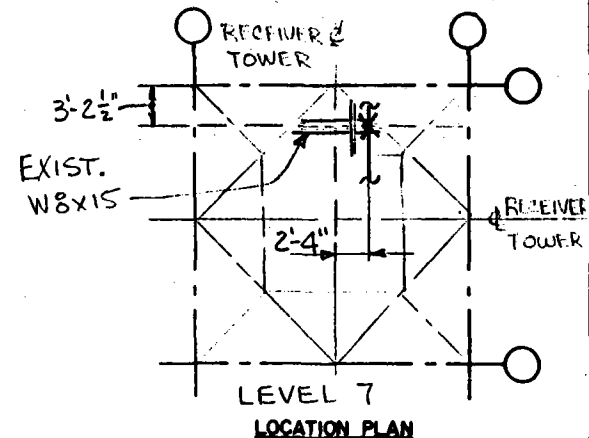
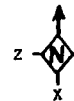
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/B
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 4-FW-2-MPA	MARK NO H-FW-2-10

EXIST. W8x15
TOS EL. 224'-5⁷/₈"

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



† LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

Δx = - 7/16"

Δz = 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" (±)		9
T.T. CONST. SUPPORT	4"		8
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7 2
E	PIPING	P4-2 P3	6 1
D	STRUCTURAL	S32-4	5 1
C	ELECTRICAL		4 1
B			3 1
A			2 3
			1 1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7 2	1/2" DIA. F.S. CLEVIS W/PIN FIG. 299
E	PIPING	P4-2 P3	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

NOTES

PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: 2500
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 2 1/2"
PIPE MATERIAL: A307 F.P.C.

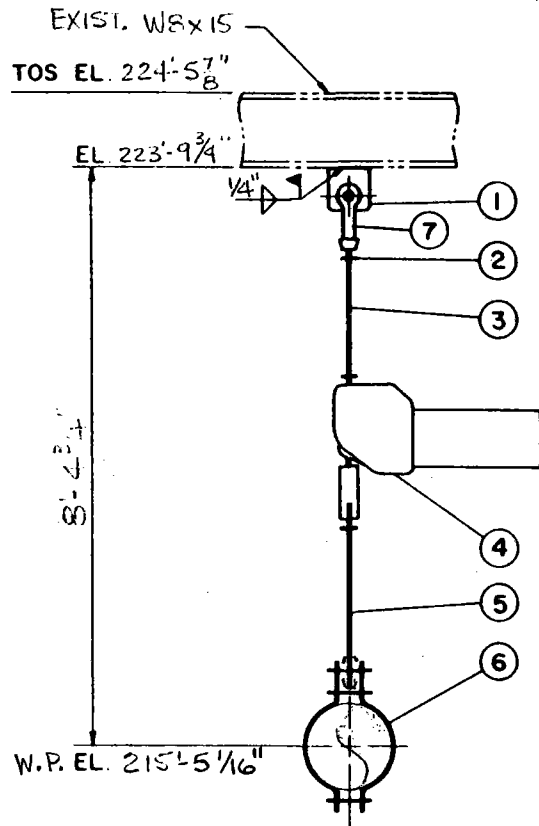
ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		

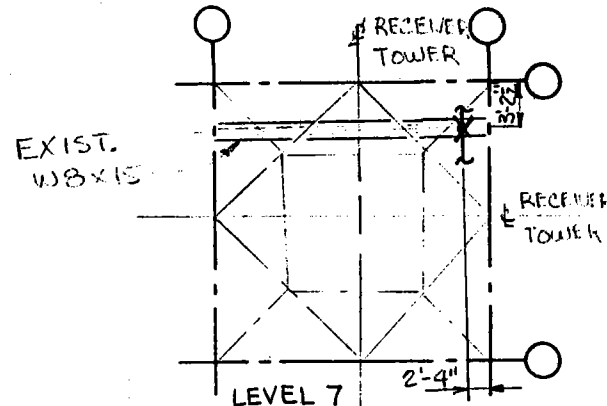
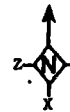
ITEM RECD	SCALE	COMPONENT DESCRIPTION	REMARKS
1	NONE	Stearns-Roger	11165/8

ANALYSIS ID. CODE	TT/W-FW-017-2/1	PROJECT NO	C-21700	LINE NO	4-FW-2-HBA	MARK NO	H-FW-2-11
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DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
- ★ LOCATION OF PIPE ATTACHMENT
- △ x = - 3/4"
- △ z = - 3/16"

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

VOL. P60-1

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 1/16" DIA.	9
T. T. CONST. SUPPORT		2 in.	8

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	DESCRIPTION
E	PIPING P9-2	P3	7 1 1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
D	STRUCTURAL S32-4	O	6 1 1/2" PIPE CLAMP FIG. 295
C	ELECTRICAL		5 1 1/2" DIA. R. H. THD. W. E. ROD FIG. 278
B			4 1 SPRING SEE DATA
A			3 1 1/2" DIA. R. H. THD. ROD FIG. 140
			2 3 1/2" DIA. R. H. HEX NUT
			1 1 1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55

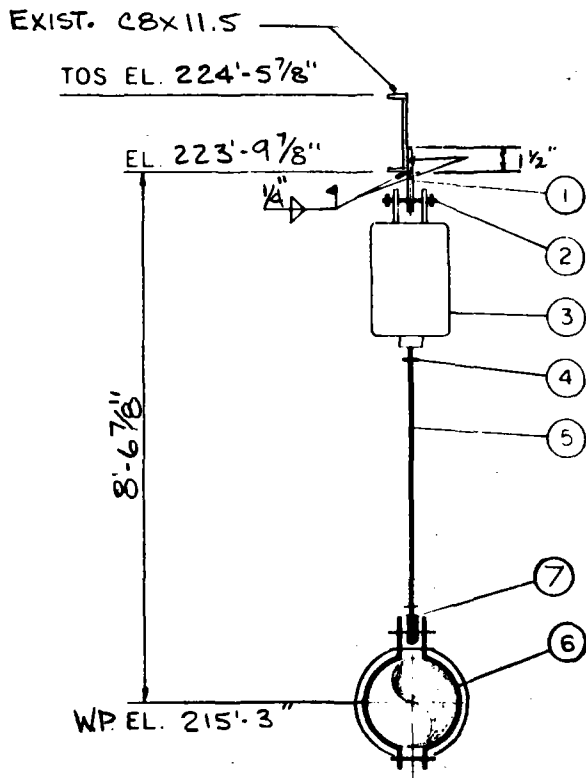
NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 0.4
 PIPE SIZE: 4.5" o.d.
 PIPE INSULATION: 2"
 PIPE MATERIAL: A311 A166 A352

ENGINEERING RECORD				5
DESIGNED	CHECKED	DATE	DATE	4
DATE	DATE	3-24-80	3/27/80	3
REVIEWED	APPROVED	DATE	DATE	2
DATE	DATE	3-9-80	3-27-80	1
PROJECT				REVISIONS
DATE				
ANALYSIS ID. CODE	T/WJ-1111-A-2/2		PROJECT NO	C-21700
			LINE NO	A-1-EQU-11PA
			MARK NO	H-FW-2-12

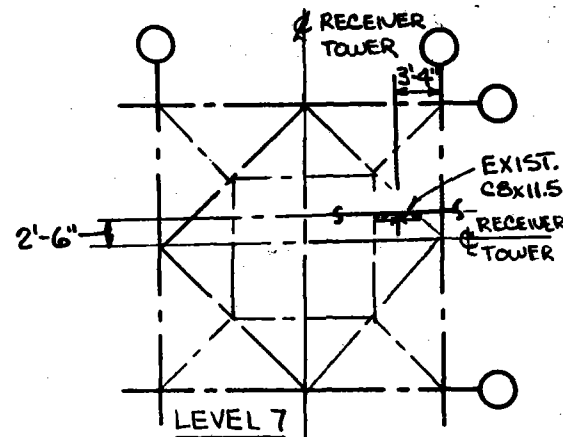
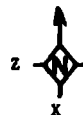
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δx = -1/2"
 Δz = -3/8"

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
9a	C	4	12
HOT LOAD		222 lb.	11
COLD LOAD		199 lb.	10
VERT. TRAVEL C. TO H.		1" (1)	9
T.Y. CONST. SUPPORT		N.A.	8

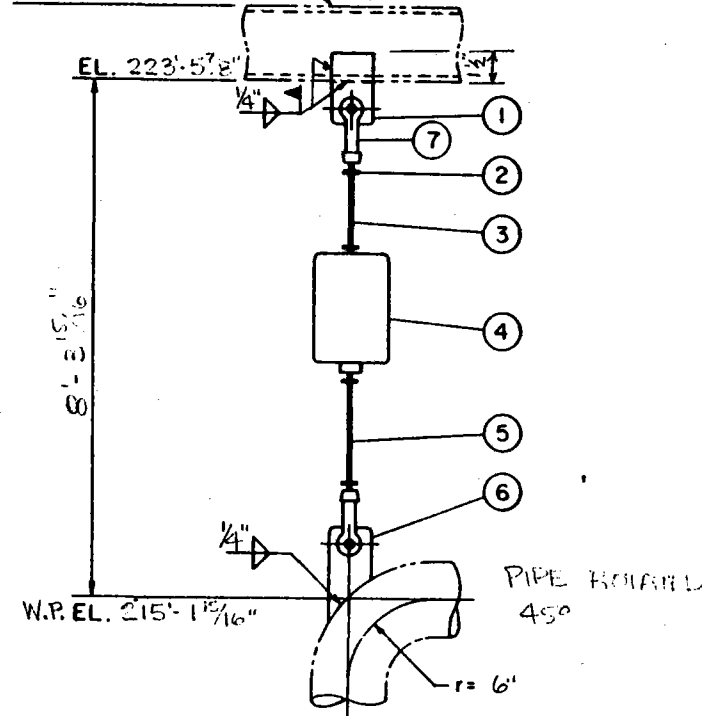
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7	1	1/2" DIA. WELDLESS EYENUT FIG. 290
E	PIPING	P2	6	1	1/2" PIPE CLAMP FIG. 295
D	STRUCTURAL	324	5	1	1/2" DIA. R. H. THD. ROD FIG. 140
C	ELECTRICAL		4	2	1/2" DIA. R. H. HEX NUT
B			3	1	SPRING
A			2	1	1/2" DIA. PIN W/COTTER PIN FIG. 291

△ REVISED ELEVATION
 △ REVISED ITEM 1 ADDED 1/2" DIA. ON LUG

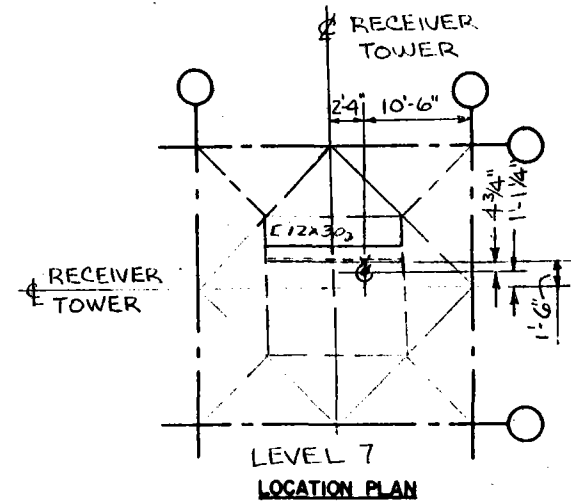
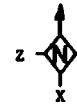
NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 0.3K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD				5	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	11165/8
DESIGNED	DATE	CHECKED	DATE	4	ITEM RECD.	COMPONENT DESCRIPTION	REMARKS
REVIEWED	DATE	APPROVED	DATE	3	SCALE:	Stearns-Roger INCORPORATED	11165/8
PROJECT	DATE	REVISIONS		1	NONE		
ANALYSIS ID. CODE	PROJECT NO C-21700			LINE NO 4-FW-2-11A		MARK NO 4-FW-2-13	

EXIST. 212x20
DO NOT WELD ACROSS WIDTH OF FLANGE
TOS EL. 224'-5 7/8"



ELEV. LOOKING NORTH



RECEIVER TOWER
RECEIVER TOWER
LEVEL 7
LOCATION PLAN
+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
△ x = -1/4"
△ z = -3/16"

VOL. P. 60-1

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

SPRING DATA			
FIG. N°	TYPE	SIZE	14
B-268	A	11	12
HOT LOAD		19716	11
COLD LOAD		172611	10
VERT. TRAVEL C. TO H.		3/16" DIA	9
T.T. CONST. SUPPORT		N.A.	8

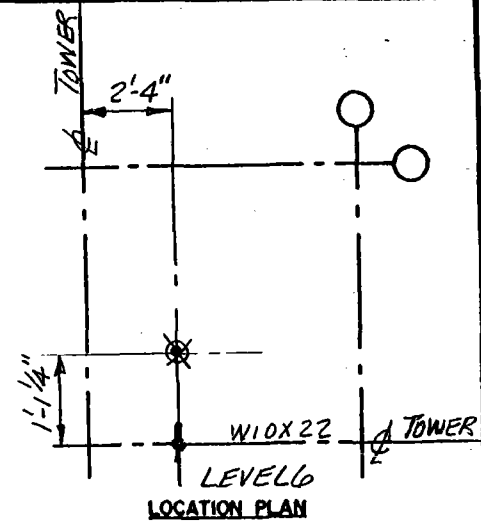
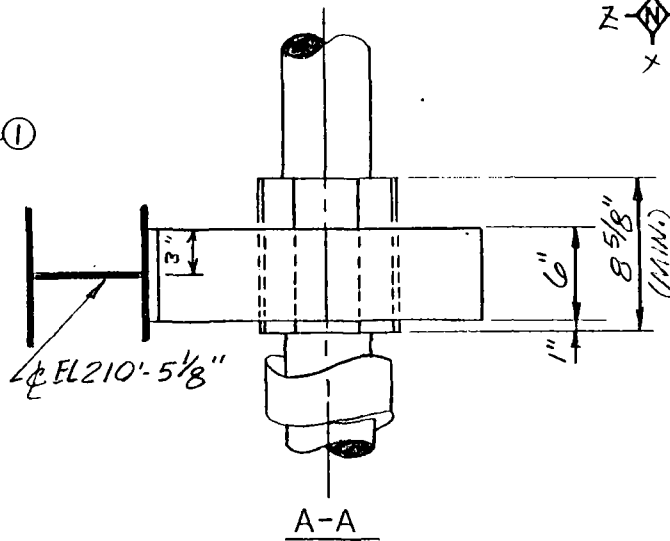
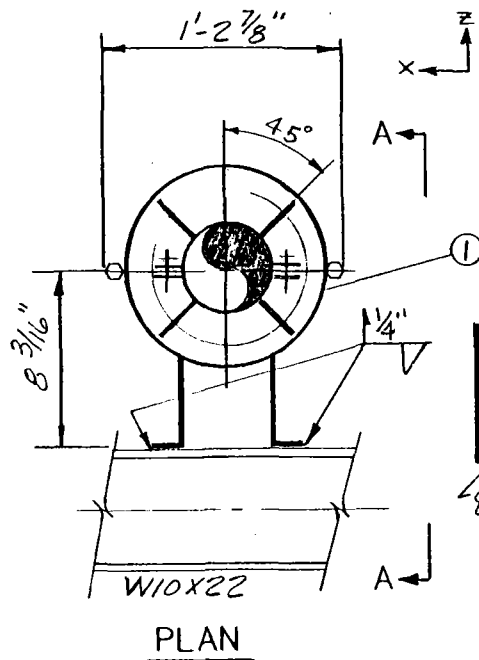
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7 2	7/8" DIA. F. S. CLEVIS W/PIN FIG. 299
E	PIPING	1	6 1	7/8" DIA. WELDING LUG C-73" H. S. 53 (BY FAB)
D	STRUCTURAL	2	5 1	7/8" DIA. R. H. THD. ROD FIG. 140
C	ELECTRICAL		4 1	SPRING SEE DATA
B			3 1	7/8" DIA. R. H. THD. ROD FIG. 140
A			2 4	7/8" DIA. R. H. HEX NUT

NOTES:
PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: 2.3K
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 2 1/2"
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	MLB	CHECKED	REB FULL
DATE	2/17/80	DATE	2-25-80 2/27/80
REVIEWED	JH/90	APPROVED	JH/90
DATE	3-9-80	DATE	3-27-80
PROJECT			
DATE			

5	1 1	7/8" DIA. STRUCT. WELDING LUG FIG. 55	LONG
4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3	SCALE:	NONE	
2	Stearns-Roger <small>INCORPORATED</small>		11165/8
1	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
REVISIONS	PROJECT N° C-21700	LINE N° 4"-FW-2-MPA	MARK N° H-FW-2-14

179



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 5/8" DN$

VOL. P60-1

14		
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	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

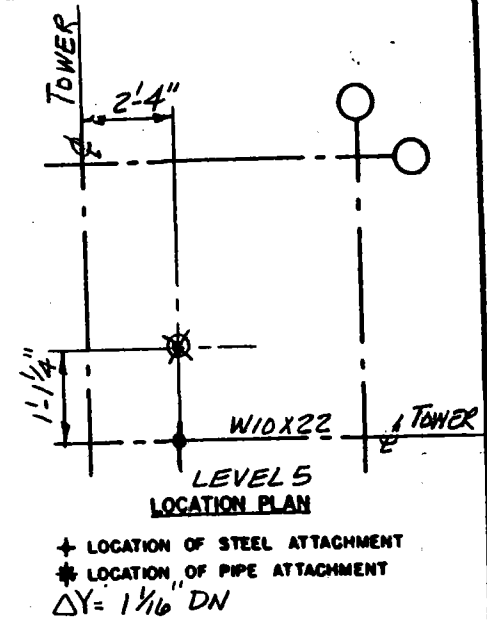
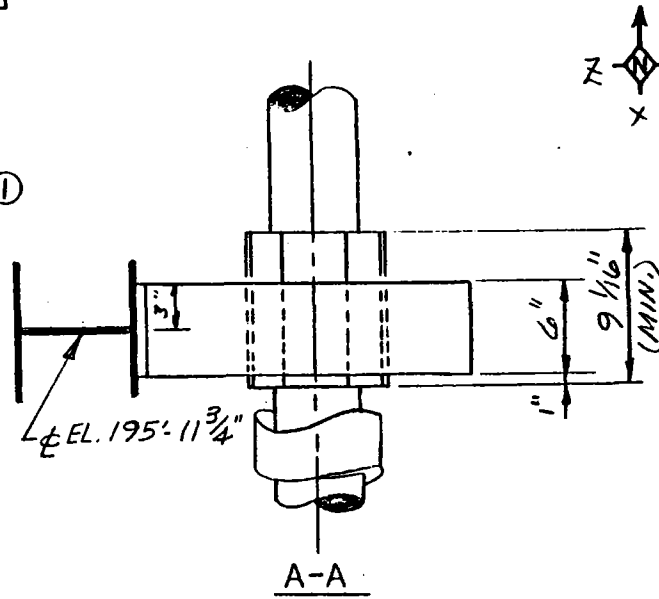
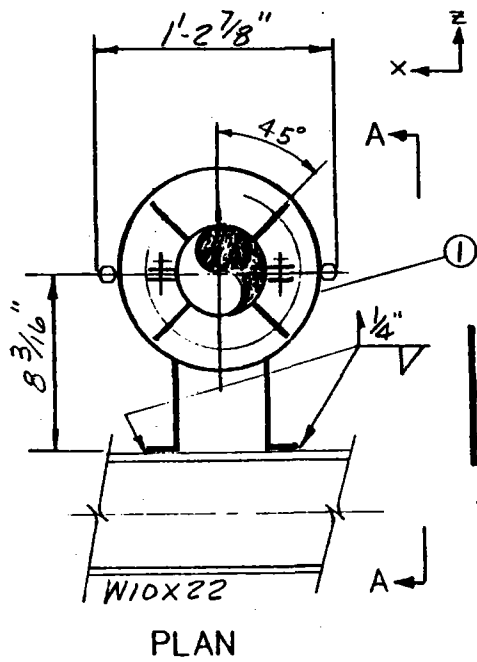
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL 932-3	0
C	ELECTRICAL	
B		
A		

NOTES:
 PIPE TEMPERATURE: 140°F
 STRUCTURAL DESIGN LOAD: $F_x = 2.5K$ $F_z = 3.0K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: A371M ALONG GR. B

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	V.S.
DATE	4-22-80	DATE	5-1-80
REVIEWED	Whit	APPROVED	
DATE	4-29-80	DATE	
PROJECT	RDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-3W-01-A-2/2		

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

179



VOL. P60-1

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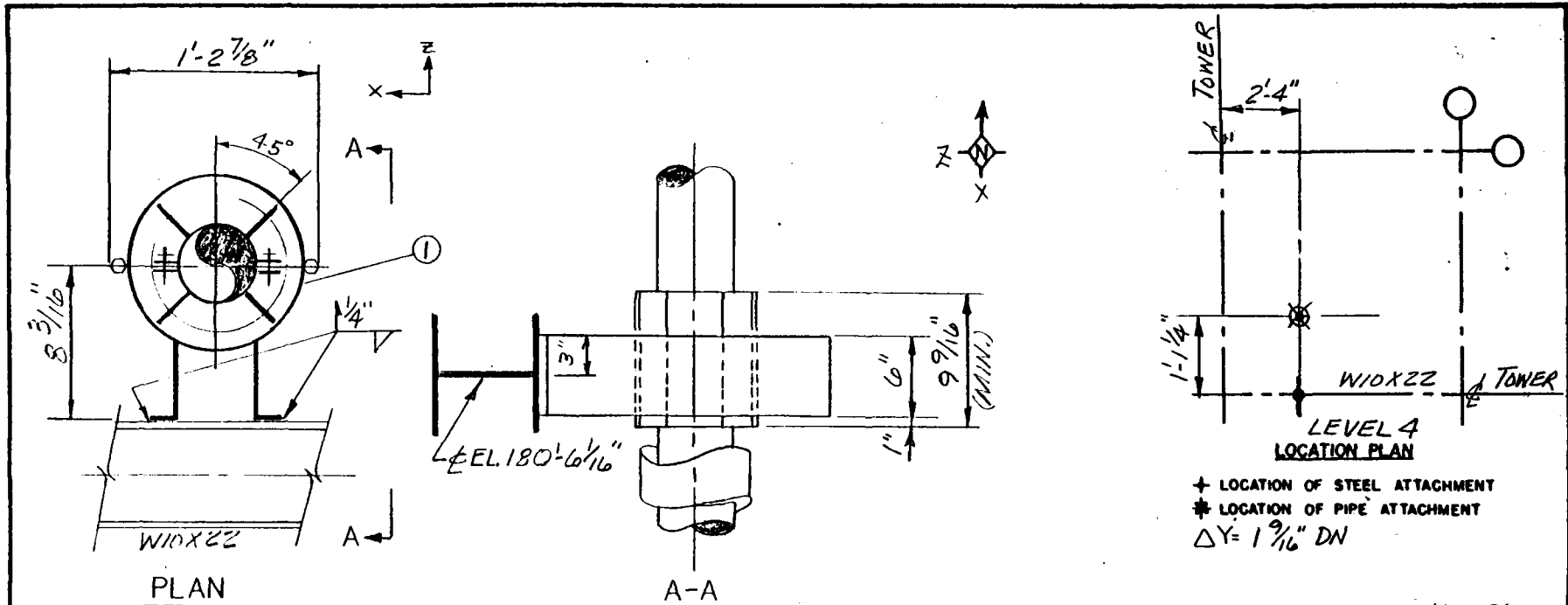
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

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 GR B

ENGINEERING RECORD			
DESIGNED	M.E.A.	CHECKED	
DATE	7-22-80	DATE	
REVIEWED		APPROVED	
DATE		DATE	
PROJECT	RDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-FW-01-A-212		

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"FW-2-MBA MARK NO H-FW-2-16



VOL. P00-1

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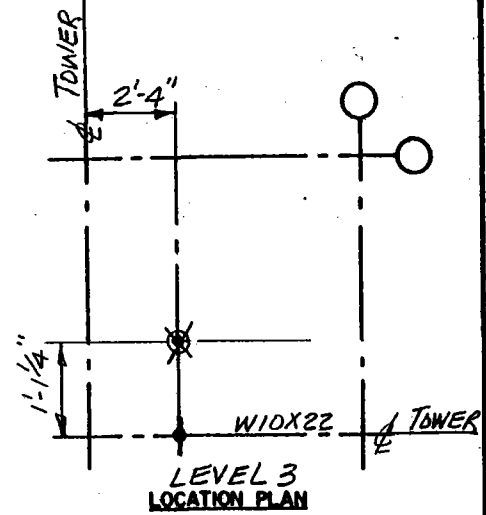
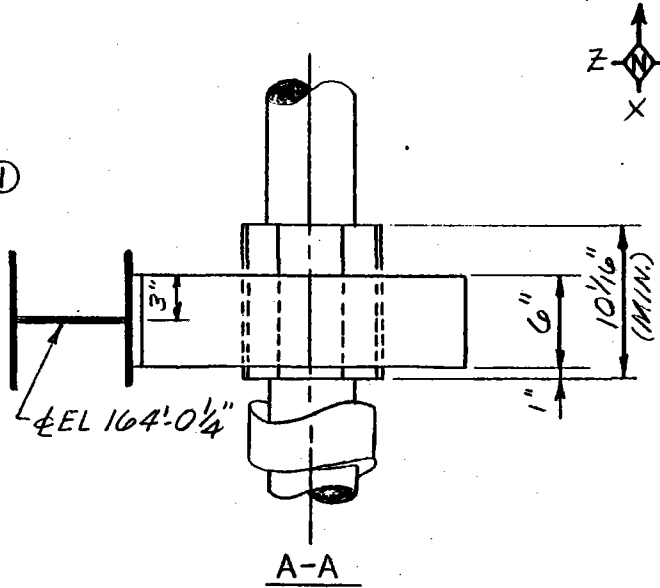
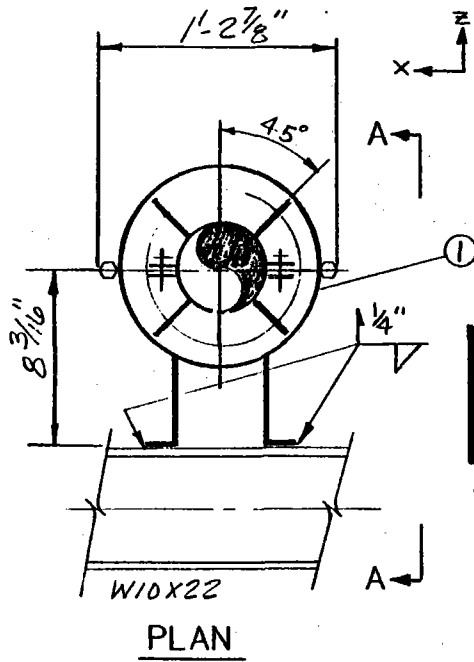
VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-3	P4
D		STRUCTURAL S32-3	D
C		ELECTRICAL	
B			
A			

1	PIPE ALIGNMENT GUIDE SIM.FIG. 256	
5		
4	ITEM REQD	COMPONENT DESCRIPTION
3	SCALE:	Stearns-Roger
2	NONE	11165/8
1		
REVISIONS		
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 4"FW-2-MBA
MARK NO	H-FW-2-17	

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: F_x = 2.3k F_z = 2.3k
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR B

ENGINEERING RECORD	
DESIGNED	MLM
DATE	4-22-80
REVIEWED	A.H.
DATE	11-30-80
PROJECT	BDR
DATE	6-12-80
ANALYSIS ID. CODE	T/W-FW-01-A-2/2

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REVISIONS
PROJECT NO
C-21700



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 2 \frac{1}{16}'' \text{ DN}$

VOL. P60-1

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1	1	PIPE ALIGNMENT GUIDE SIM.FIG. 256

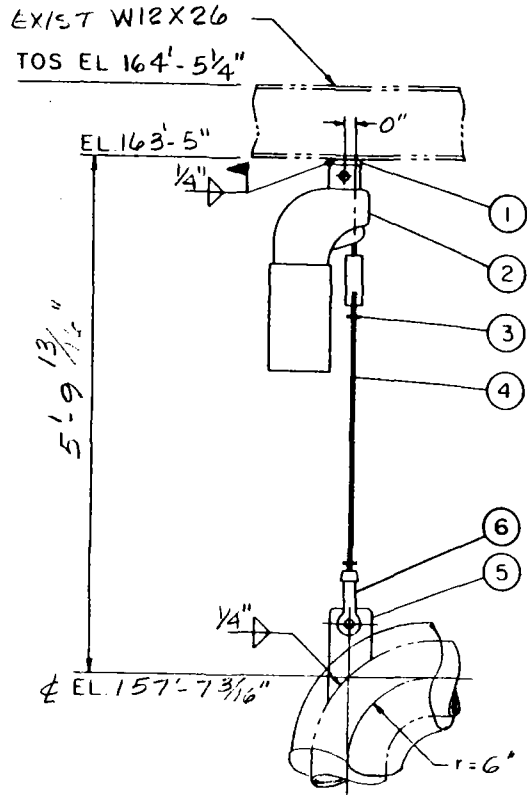
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S32-3	O
C		ELECTRICAL		
B				
A				

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

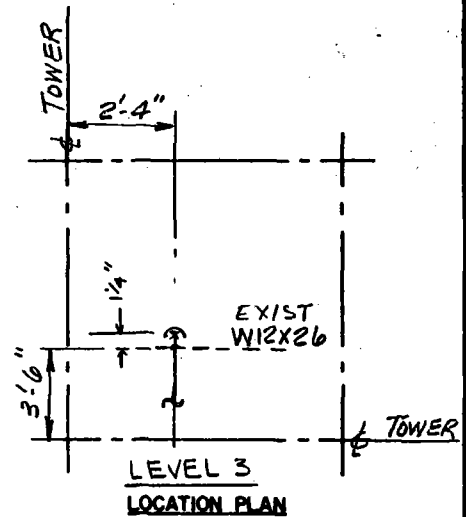
ENGINEERING RECORD			
DESIGNED	MM	CHECKED	
DATE	7-22-80	DATE	
REVIEWED	JR	APPROVED	
DATE	7-30-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T/W-FW-01-A-212		

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"FW-2-MBA MARK NO H-FW-2-18

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING SOUTH
PIPE ROTATED 90°



LEVEL 3
LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
LOCATION OF PIPE ATTACHMENT

Δ x = -1/8"
Δ z = 5/8"

VOL. P60-1

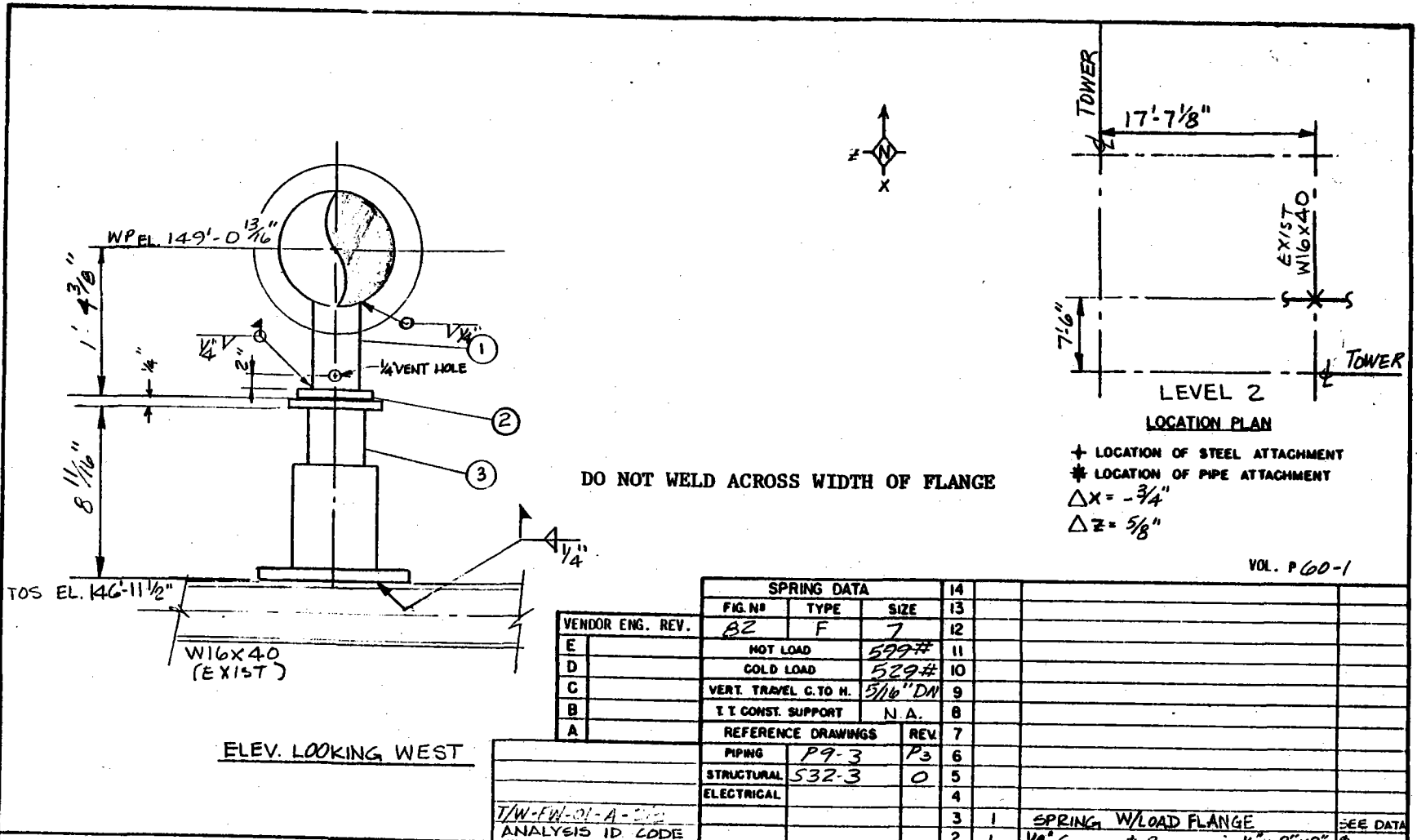
OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV.				
E		PIPING	P9-3	P3	6	1	5/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
D		STRUCTURAL	S32-3	0	5	1	5/8" DIA. WELDING LUG C-7/8" 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	SEE DATA

SPRING DATA			
FIG. NO	TYPE	SIZE	13
80V	C	1B	12
HOT LOAD		951#	11
COLD LOAD		N.A.	10
VERT. TRAVEL C. TO H.		2 1/4" L.W.	9
T.T. CONST. SUPPORT		3 1/2"	8

NOTES:
PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: 1.1K
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 2 1/2"
PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD				5	1	1	5/8" DIA. STRUCT. WELDING LUG FIG. 55	LONG	
DESIGNED	MCM	CHECKED	KER FVH	4	ITEM RECD		COMPONENT DESCRIPTION	REMARKS	
DATE	3-3-80	DATE	3-25-80	3	SCALE:	NONE	Stearns-Roger	11165/8	
REVIEWED	MCM	APPROVED	MCM	1	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
DATE	3-9-80	DATE	3-27-80	1					
PROJECT		DATE		REVISIONS					
ANALYSIS ID. CODE	T/W-FW-61-A-2/2			PROJECT NO	C-21700	LINE NO	4"FW-2-MBA	MARK NO	H-FW-2-19



DO NOT WELD ACROSS WIDTH OF FLANGE

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -3/4"$
 $\Delta Z = 5/8"$

VOL. P 60-1

ELEV. LOOKING WEST

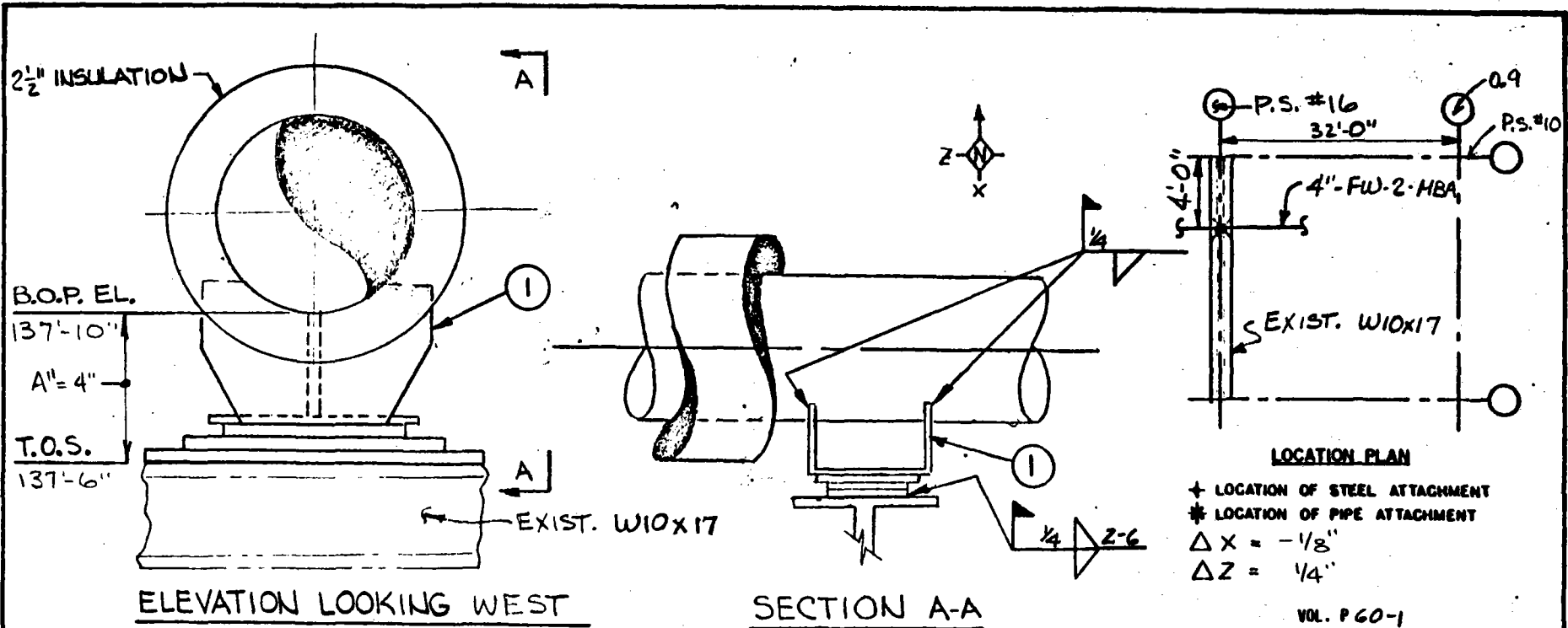
VENDOR ENG. REV.		SPRING DATA			
E	D	FIG. NO.	TYPE	SIZE	
		B2	F	7	14
					13
					12
			HOT LOAD	599#	11
			COLD LOAD	529#	10
			VERT. TRAVEL C.T.O.H.	5 1/16" DIA	9
			T.T. CONST. SUPPORT	N.A.	8
		REFERENCE DRAWINGS			REV. 7
		PIPING	P9-3	P3	6
		STRUCTURAL	S32-3	0	5
		ELECTRICAL			4
					3
					2
					1

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: .7K
 PIPE SIZE: 4.5"
 PIPE INSULATION: 2 1/2" THK.
 PIPE MATL: ASTM A196 GR B.

ENGINEERING RECORD				5	
DESIGNED	DATE	CHECKED	DATE	ITEM REQD	REMARKS
MLM	3-7-80	KEP	3-27-80	4	
		FVH	3/27/80	3	
REVIEWED	DATE	APPROVED	DATE	SCALE:	COMPONENT DESCRIPTION
				NONE	Stearns-Roger
PROJECT	DATE			REVISIONS	11165/8
				1	
				1	

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA
 PROJECT NO C-21700 LINE NO 4-FW-2-MBA MARK NO H-FW-2-20

185



DO NOT WELD ACROSS WIDTH OF FLANGE

- ⚠ REVISOR S.D. LOAD
- ⚠ REVISOR 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 17-3	P3
D	STRUCTURAL S33-4	
C	ELECTRICAL	
B		
A		

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1	1	4" PIPE SADDLE, FIG. 612

SCALE: NONE

Stearns-Roger

11165/8

ENGINEERING RECORD			
DESIGNED	4/12/80	CHECKED	RJA FVH
DATE	4/26/80	DATE	2-25-80 2/27/80
REVIEWED	4/27/80	APPROVED	RJA
DATE	5/12/80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/11165/8		

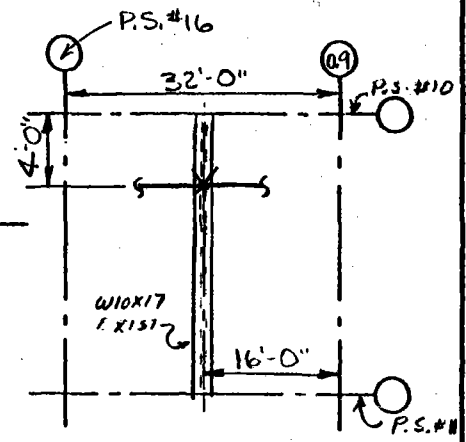
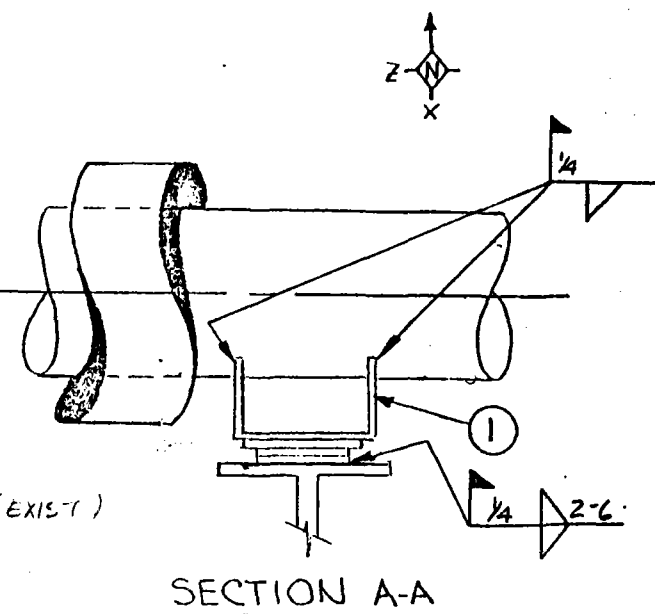
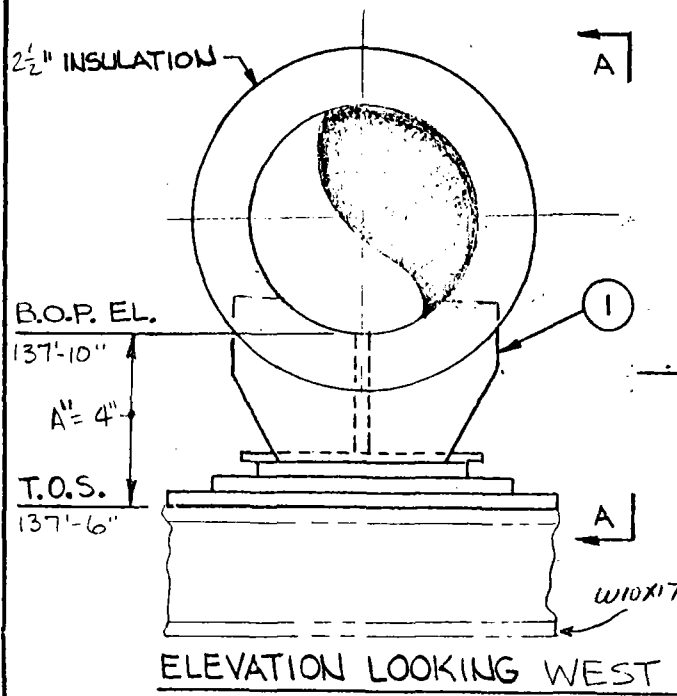
TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700

LINE NO 11165/8

MARK NO 11-FW-2-2

17 FEB 1981



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

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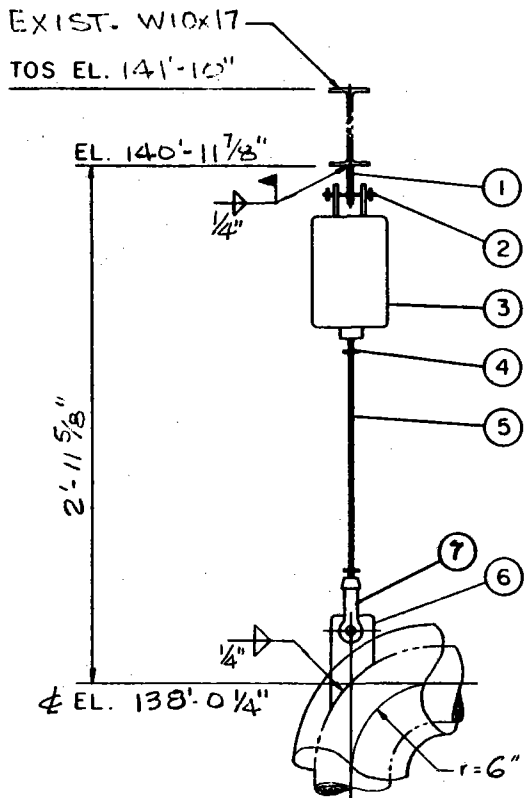
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	B
D	STRUCTURAL S33-4	
C	ELECTRICAL	
B		
A		

NOTES
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 160 LBS
 PIPE SIZE: 4" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: A307

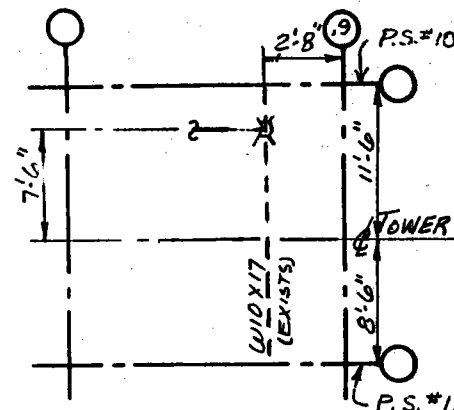
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DESIGNED	DATE	CHECKED	DATE
DATE	2/26/80	DATE	3-25-80 3-27-80
REVIEWED	DATE	APPROVED	DATE
DATE	3/10/80	DATE	3-27-80
PROJECT			
DATE			

ITEM	RECD	DESCRIPTION	REMARKS
1	1	4" Ø PIPE SADDLE, FIG. 6012	11165/8
SCALE: NONE			
10 Mc SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	4"-FW-2-MBA
MARK NO	14-FW-2-23		

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING SOUTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT

$\Delta x = -1/4"$
 $\Delta z = -1/16"$

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
82	C	10	12
HOT LOAD		1083#	11
COLD LOAD		1213#	10
VERT. TRAVEL C. TO H.		1/4" UP	9
T. I. CONST. SUPPORT		N.A.	8
VENDOR ENG. REV.			
	REFERENCE DRAWINGS	REV	
E	PIPING	P9-3 P3	6 1
D	STRUCTURAL	S33-4	5 1
C	ELECTRICAL		4 2
B			3 1
A			2 1

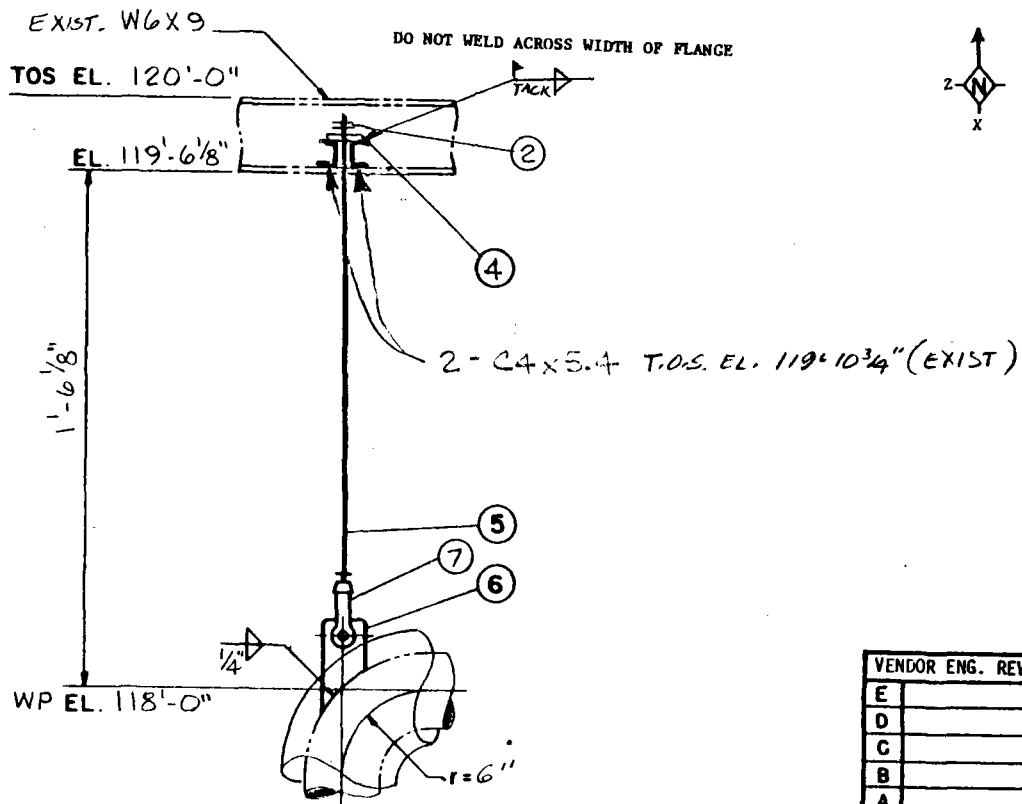
					3/4" DIA. F. S. CLEVIS W/PIN FIG. 299	
					4" DIA. WELDING LUG C-7/8" S. 53 BY FAB.	
					3/4" DIA. R. H. THD. ROD FIG. 140	
					3/4" DIA. R. H. HEX NUT	
					SPRING	SEE DATA
					3/4" DIA. PIN W/COTTER PIN FIG. 291	
					3/4" DIA. STRUCT. WELDING LUG FIG. 55	SHORT

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 1.3K
 PIPE SIZE: 4.5 O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GRB

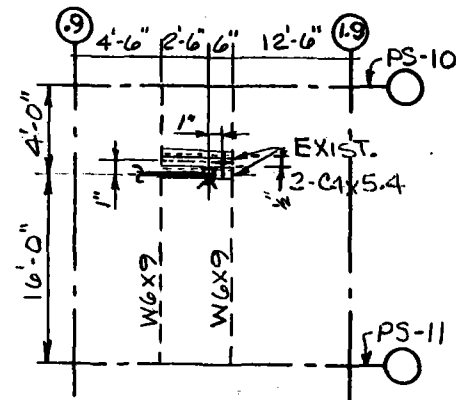
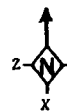
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	FW
DATE	3-11-80	DATE	3-27-80
REVIEWED	FW	APPROVED	FW
DATE	3-11-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-FW-Q2-A-4/3		

5	1	1	3/4" DIA. STRUCT. WELDING LUG FIG. 55	SHORT
4	1	1	ITEM REQD	COMPONENT DESCRIPTION
3	1	1	SCALE: NONE	11165/8
2	1	1	REVISIONS	
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO C-21700		LINE NO 4FW-2-MBA		MARK NO H-FW-2-24

Stearns-Roger
INCORPORATED



ELEV. LOOKING EAST
PIPE ROTATED 90°



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δx = -1 5/16"
- Δz = -1 3/16"

VOL. P60-1

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

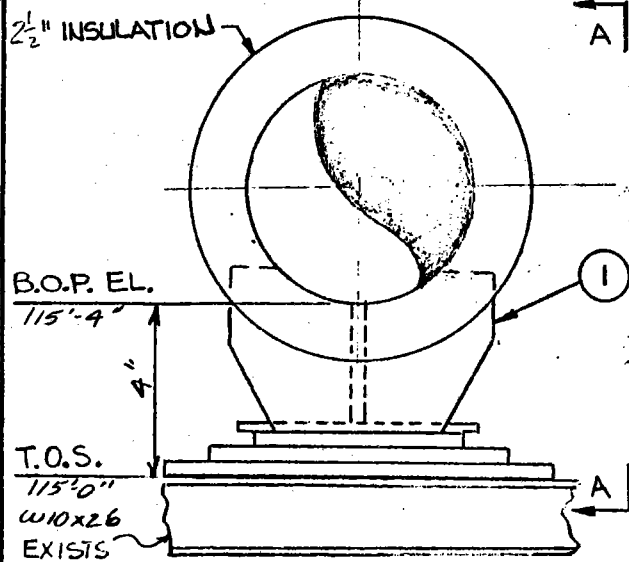
REFERENCE DRAWINGS	REV.	7	1	5/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
PIPING	P9-10	P3	6	1	4" DIA. WELDING LUG C-7 1/2 H.S. 53 BY FAB
STRUCTURAL	S33-1	-	5	1	5/8" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	1	5/8" DIA WASHER PLATE FIG 60
			3	-	
			2	3	5/8" DIA. R. H. HEX NUT
			1	-	

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

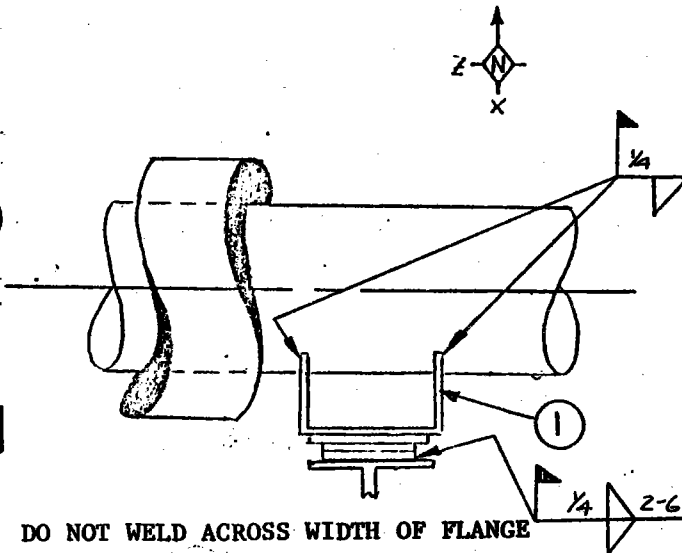
ENGINEERING RECORD			
DESIGNED	NLM	CHECKED	RED F/H
DATE	3-12-80	DATE	3-25-80 3-27-80
REVIEWED	NLM	APPROVED	NLM
DATE	3-12-80	DATE	3-27-80
PROJECT			
DATE			

5		ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4		SCALE:	Stearns-Roger	11165/8
3		NONE	INCORPORATED	
2			10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
1				
REVISIONS				

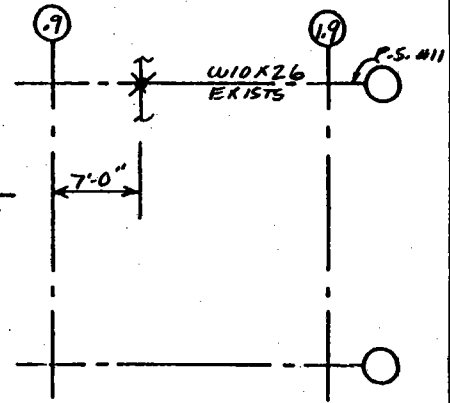
ANALYSIS ID. CODE	1-FW-02-A--1/3	PROJECT NO	C-21700	LINE NO	4-FW-2-MBA	MARK NO	1-FW-2-25
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ELEVATION LOOKING NORTH



SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/2"$
 $\Delta Z = -1/8"$

VOL. P 60-1

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

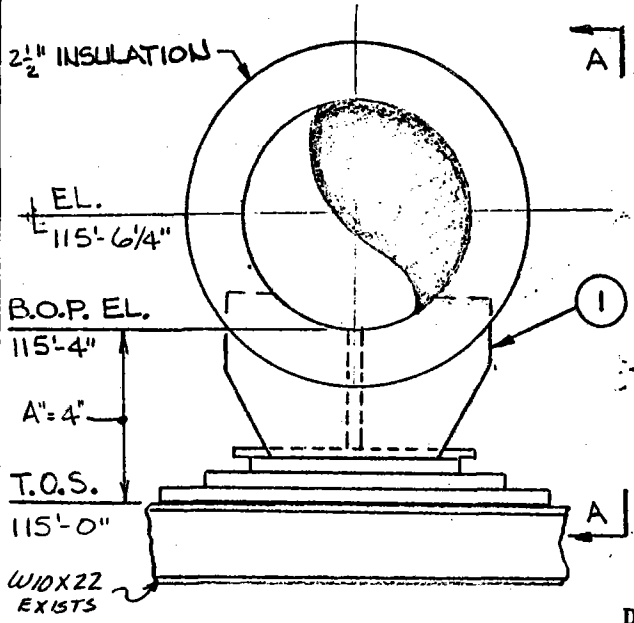
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NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: .9K
 PIPE SIZE: 4.50" O.D.
 PIPE INSULATION: 2 1/2" THICK
 PIPE MATERIAL: ASTM A106 GR. B

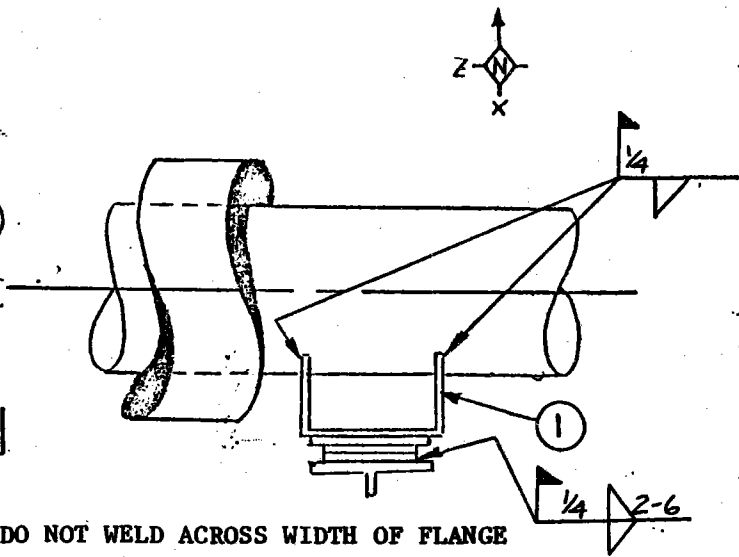
ENGINEERING RECORD			
DESIGNED	NIT	CHECKED	PHH
DATE	2/22/80	DATE	7-25-80 3-27-80
REVIEWED	GHC	APPROVED	N.W.
DATE	3/10/80	DATE	3-27-80
PROJECT			
DATE			

ITEM REQD	4" PIPE SADDLE FIG. 612 W/ STRAP	REMARKS	
SCALE:	NONE		
Stearns-Roger			11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
ANALYSIS ID. CODE	T/W-FW-02-A-413	PROJECT NO	C-21700
LINE NO	4 ² -FW-2-MBA	MARK NO	H-FW-2-26

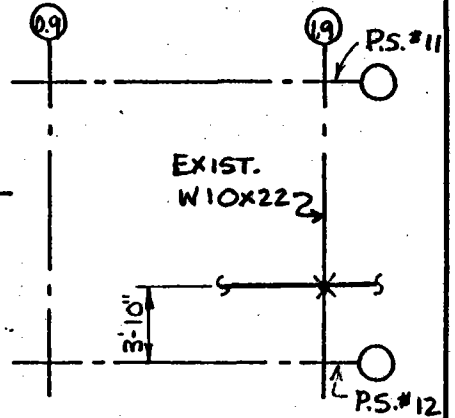
192



ELEVATION LOOKING EAST



SECTION A-A



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/2"$
 $\Delta Z = -1/16"$

VOL. P 60-1

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-10	P3
D		STRUCTURAL	533-1	5
C		ELECTRICAL		4
B				3
A				2

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5			
4			
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2			
1	1	4" ϕ PIPE SADDLE, FIG. 612	W/ 1/2 STRAP
ITEM REQD	COMPONENT DESCRIPTION	REMARKS	
	Stearns-Roger	11165/8	

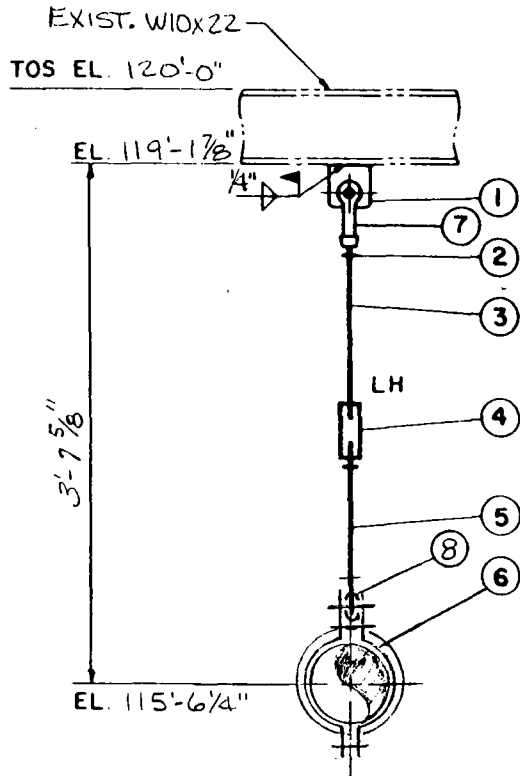
NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: 0.71K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A06 GR. B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
	3/20/80	FVH	3-27-80
REVIEWED	DATE	APPROVED	DATE
	3/23/80	GUY	3-27-80
PROJECT	DATE		

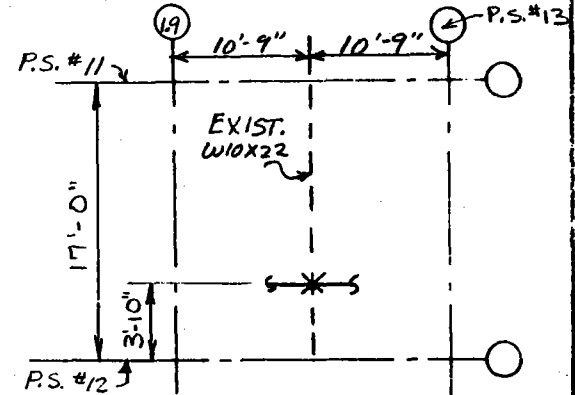
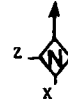
REVISIONS	PROJECT NO	LINE NO	MARK NO
1	C-21700	4-FW-2-NBA	H-FW-2-2B

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

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

VOL. P60-1

14		
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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 RECD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger <small>INCORPORATED</small>	11165/8

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

ENGINEERING RECORD

DESIGNED	<i>MJ</i>	CHECKED	<i>REN FVH</i>
DATE	2/22/80	DATE	3-25-80
REVIEWED	<i>JF</i>	APPROVED	<i>JF</i>
DATE	3/11/80	DATE	3-27-80
PROJECT			
DATE			

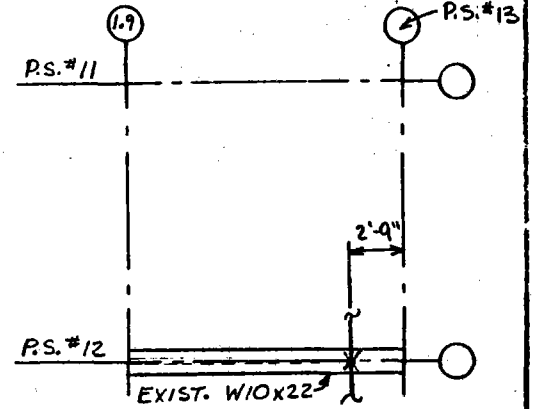
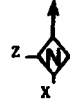
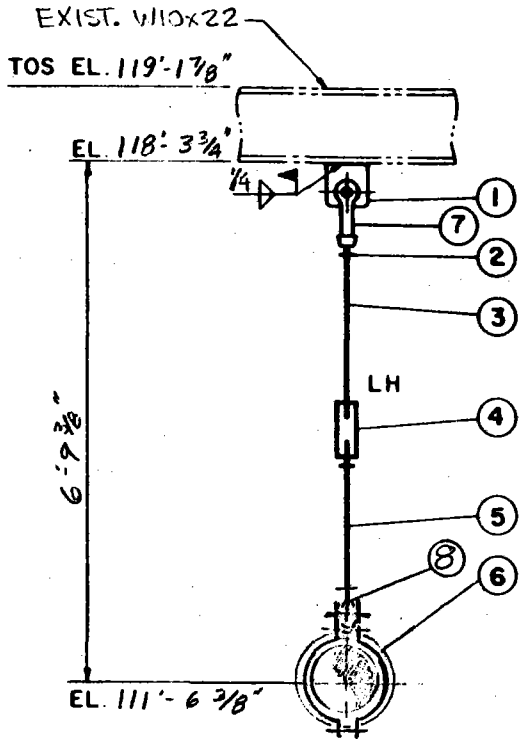
5
4
3
2
1
REVISIONS

NOTES

PIPE TEMPERATURE: 440°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-04-A-4/3	PROJECT NO	C-21700	LINE NO	4"-FW-2-MBA	MARK NO	H-FW-2-29
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DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

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

VOL. P60-1

HOLD

7-2-80 G.H. MAY

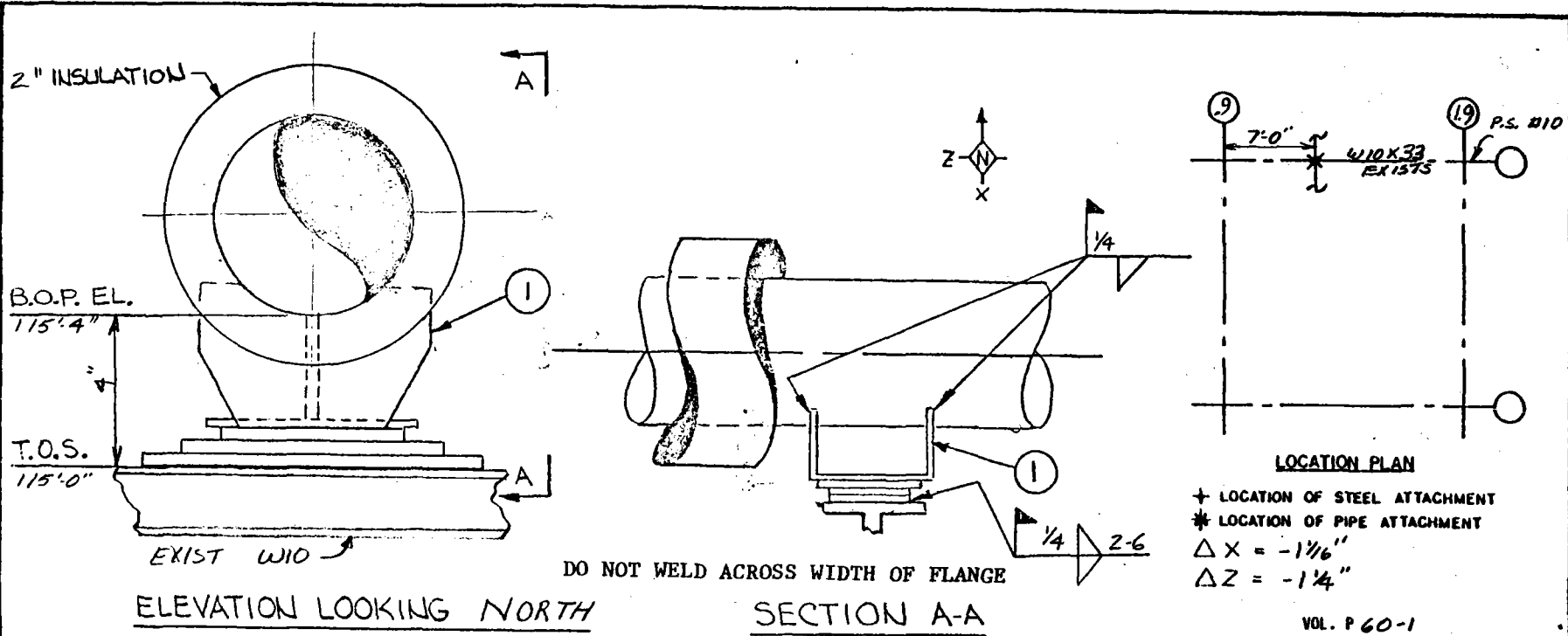
ELEV. LOOKING SOUTH

14			
13			
12			
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10			
9			
8	1	1/2" DIA. WELDLESS EYE BOLT	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:		Stearns-Roger <small>INCORPORATED</small>	11165/8
NONE			
10 MME SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
REVISIONS		PROJECT NO C-21700	LINE NO 4"-FW-2-11BA
ANALYSIS ID. CODE		T/W-FW-02-A-4/3	MARK NO H-FW-2-30

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

ENGINEERING RECORD			
DESIGNED	7/12/7	CHECKED	KEB FVH
DATE	2/22/80	DATE	3-24-80 3-27-80
REVIEWED	8/9/80	APPROVED	8/9/80
DATE	3-11-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-FW-02-A-4/3		

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: .9K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B



ELEVATION LOOKING NORTH

SECTION A-A

LOCATION PLAN

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

VOL. P 60-1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-10	P3
D	STRUCTURAL 533-3	
C	ELECTRICAL	
B		
A		

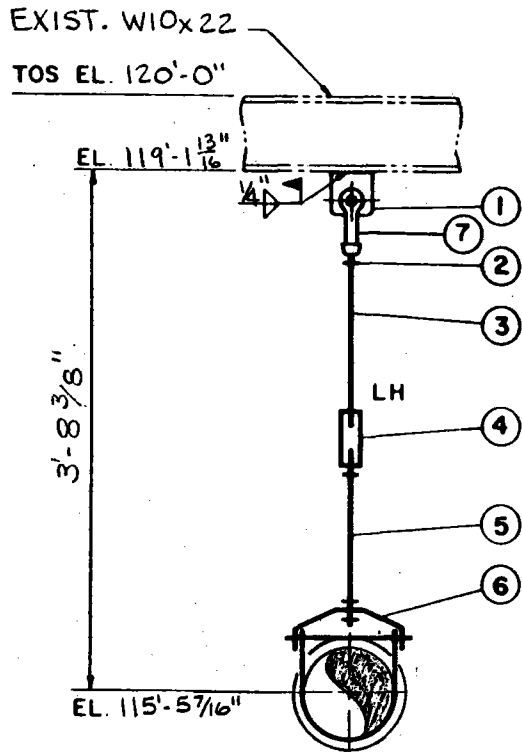
14		
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2		

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

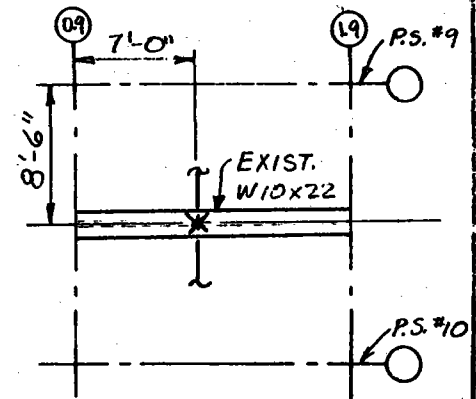
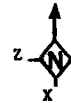
ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	T/W-FW-02-A 4/3		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	2 1/2" PIPE SADDLE & SLIDE FIG. 612	W/S TRA
SCALE: NONE		11165/8
10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT N°	C-21700	LINE N° 2 1/2"-FW-9-MBA
MARK N° H-FW-9-1		

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 = -1 5/16"

VOL. P 60-1

14	
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VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV	DESCRIPTION
E		PIPING	P9-10 P3	6 1 2 1/2" DIA. ADJUSTABLE CLEVIS FIG. 300
D		STRUCTURAL	S33-1	5 1 1/2" DIA. R. H. THD. ROD FIG. 140
C		ELECTRICAL		4 1 1/2" DIA. F. S. TURNBUCKLE FIG. 230
B				3 1 1/2" DIA. R. H. -L. H. THD. ROD FIG. 253
A				2 4 1/2" DIA. R. H. HEX NUT
				1 1 1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55

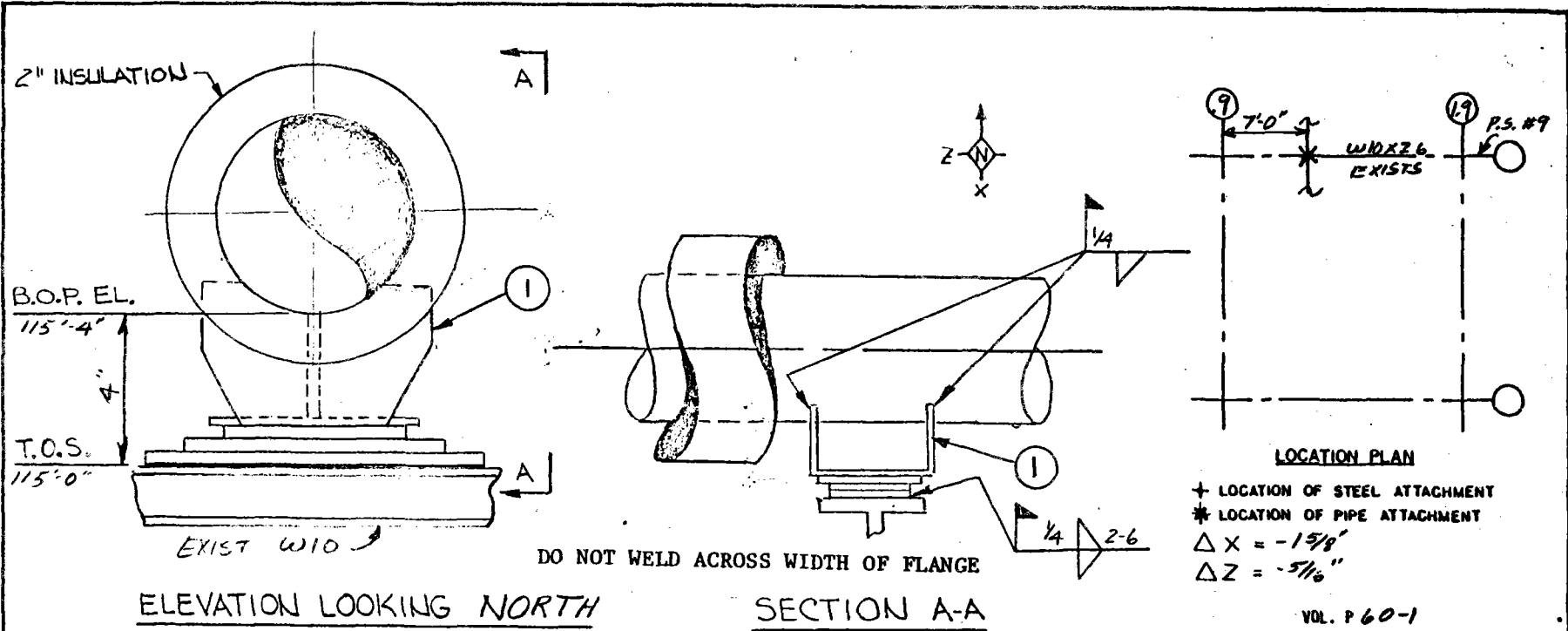
NOTES:

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	FOR FVH
DATE	2/21/80	DATE	3-27-80
REVIEWED	JYK	APPROVED	JYK
DATE	4-10-80	DATE	3-27-80
PROJECT			
DATE			

ITEM REQ'D	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger INCORPORATED	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
ANALYSIS ID. CODE	T/W-FW-02-A-4/3	PROJECT NO C-21700
		LINE NO 2 1/2"-FW-9-MPA
		MARK NO H-FW-9-2

197



ELEVATION LOOKING NORTH

SECTION A-A

LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -15/8"$
 $\Delta Z = -5/16"$

VOL. P 60-1

14		
13		
12		
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7		
6		
5		
4		
3		
2		
1	1	2 1/2 PRE SADDLES + SLIDE FIG. 612

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

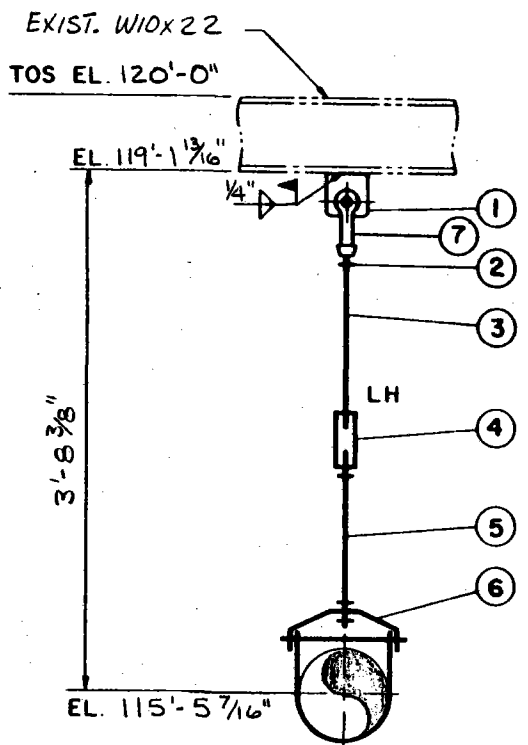
NOTES.
 PIPE TEMPERATURE: 440 °F
 STRUCTURAL DESIGN LOAD: .2K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 2" THICK
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	3/1/80	CHECKED	APR FVH
DATE	2/21/80	DATE	2-27-80
REVIEWED	3/11/80	APPROVED	APR 3-27-80
DATE	3-11-80	DATE	3-27-80
PROJECT			
DATE			

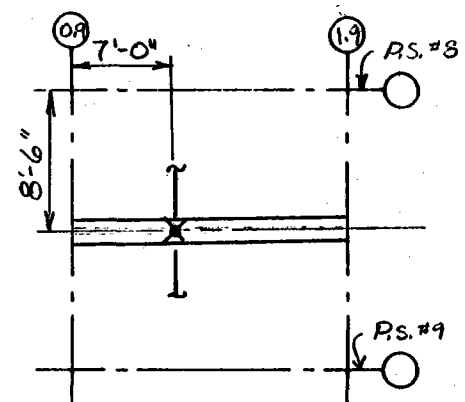
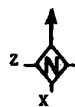
5			
4	ITEM REQD	SCALE: NONE	
3			
2			
1			
REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
ANALYSIS ID. CODE	TUV-PW-11A-1/3	PROJECT NO	C-21700
		LINE NO	2 1/2" FW-9-MBA
		MARK NO	H-FW-9-3

Form 873-1

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x = -1 7/8"
- △ 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
	NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 2 1/2" FW-9-MBA	MARK NO H-FW-9-4

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-10	P3
D	STRUCTURAL 533-1	
C	ELECTRICAL	
B		
A		

ENGINEERING RECORD			
DESIGNED	7/27	CHECKED	7/27 EVH
DATE	2/21/80	DATE	3-27-80
REVIEWED	7/27	APPROVED	7/27
DATE	2-10-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-FW-02-A-4/3		
REVISIONS	1 APP 3-27-80		

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

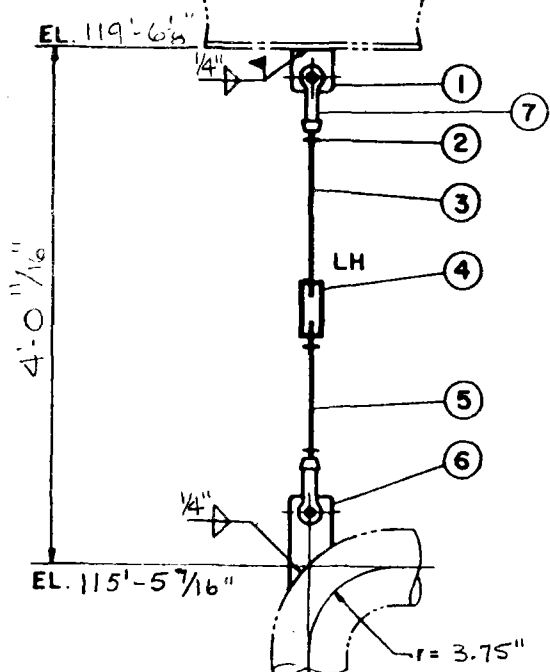
198

151-1-1-51

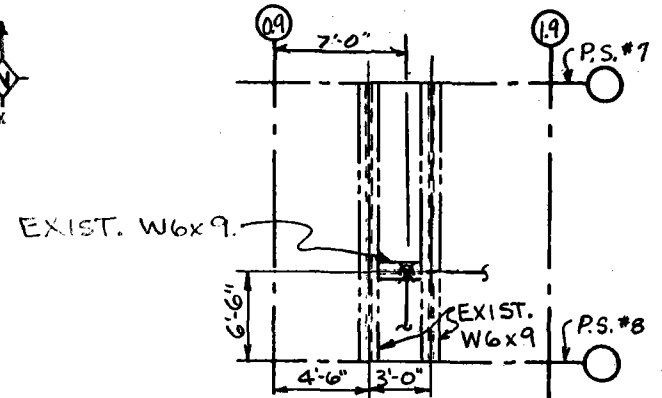
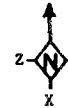
199

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

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

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
PIPE	Pg-10	6	1	1/2"	DIA. WELDING LUG C-7 5/16 H.S. 53 (FY FABR.)
STRUCTURAL	533-1	5	1	1/2"	DIA. R. H. THD. ROD FIG. 140
ELECTRICAL		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

NOTES:

PIPE TEMPERATURE: 440°F
STRUCTURAL DESIGN LOAD: 500 LB
PIPE SIZE: 2.875" O.D.
PIPE INSULATION: 2"
PIPE MATERIAL: ASTM A106 GR. B

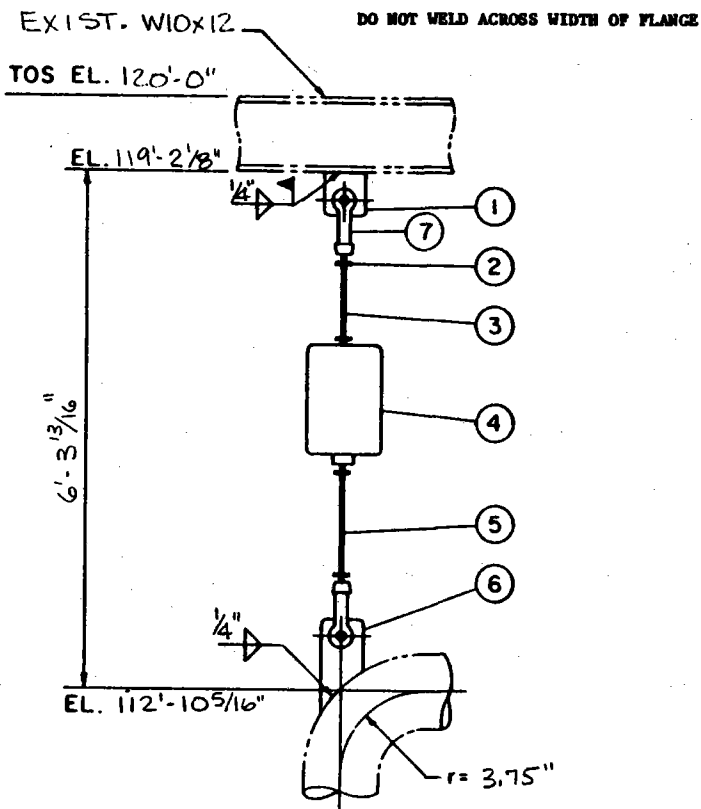
ENGINEERING RECORD

DESIGNED	YHX	CHECKED	REX	FVH
DATE	2/21/80	DATE	2-25-80	2-27-80
REVIEWED	YHX	APPROVED	YHX	
DATE	3-10-80	DATE	3-27-80	
PROJECT				
DATE				

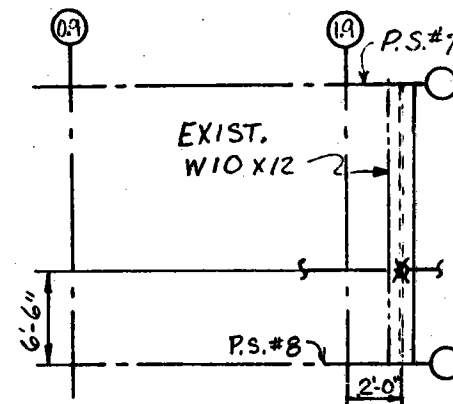
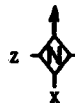
5	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4			
3	SCALE:		
2	NONE	Stearns-Roger INCORPORATED	11165/8
1	REVISIONS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	

ANALYSIS ID. CODE	T/W-FW-02-A-9/3	PROJECT NO	C-21700	LINE NO	2 1/2"-FW-9-116A	MARK NO	H-FW-9-5
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Form 873-1-11



ELEV. LOOKING SOUTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ x = -13/16"
- Δ z = 1/8"

VOL. P 60-1

OPERATIONAL (NOT) 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" LIP	9
T. Y. CONST. SUPPORT		N.A.	8
VENDOR ENG. REV.			7 2
E	PIPE	P9-B	6 1
D	STRUCTURAL	S33-1	5 1
C	ELECTRICAL		4 1
B			3 1
A			2 4

REV	DESCRIPTION	DATE
7 2	5/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
6 1	5/8" DIA. WELDING LUG C-7 5/16" H. S. 53 BY FAB	
5 1	5/8" DIA. R. H. THD. ROD FIG. 140	
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	
1 1	5/8" DIA. STRUCT. WELDING LUG FIG. 55	SHORT

NOTES:
 PIPE TEMPERATURE: 580°F
 STRUCTURAL DESIGN LOAD: .5K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 2"
 PIPE MATERIAL: 1018A PIPE GR.B.

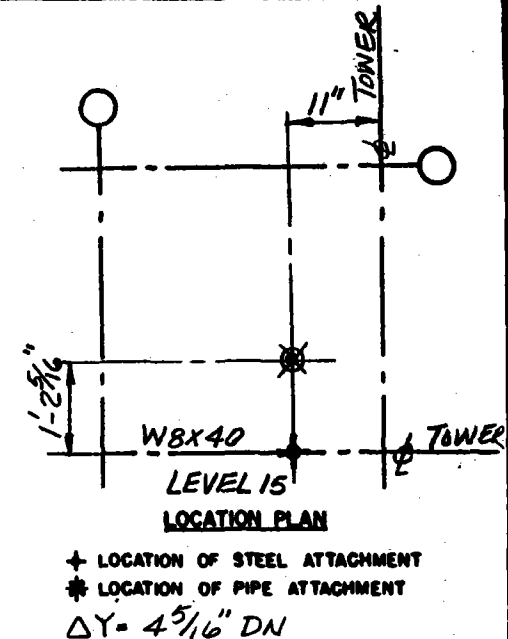
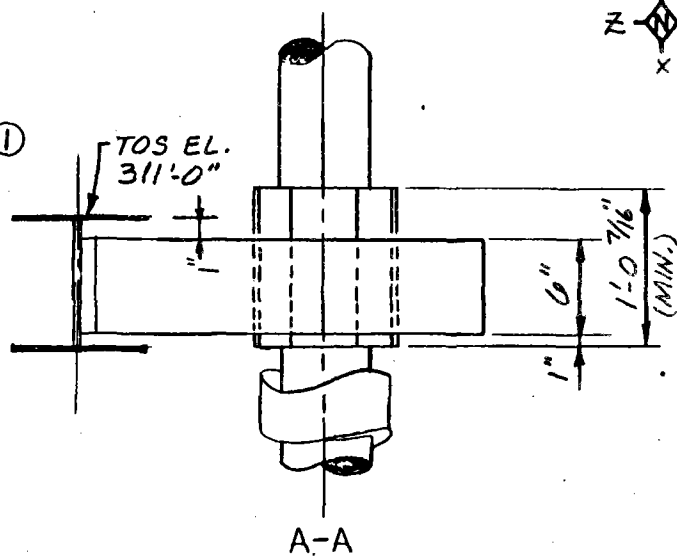
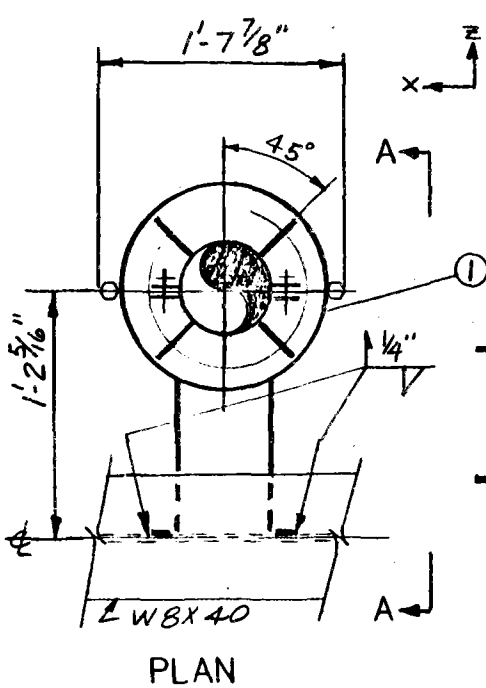
ENGINEERING RECORD				5	
DESIGNED	DATE	CHECKED	DATE	4	
REVIEWED	DATE	APPROVED	DATE	3	
PROJECT	DATE			2	
ANALYSIS ID. CODE	T/W-FW-02-A-4/3			1	
PROJECT NO	C-21700	LINE NO	2 1/2-FW-9-HRA	MARK NO	FW-9-6

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

Stearns-Roger

11165/8

201



VOL. P60-1

14	
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1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-2	P4
D	STRUCTURAL 332-5	0
C	ELECTRICAL	
B		
A		

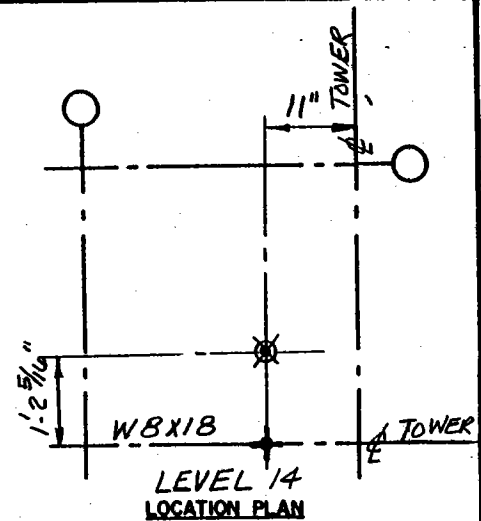
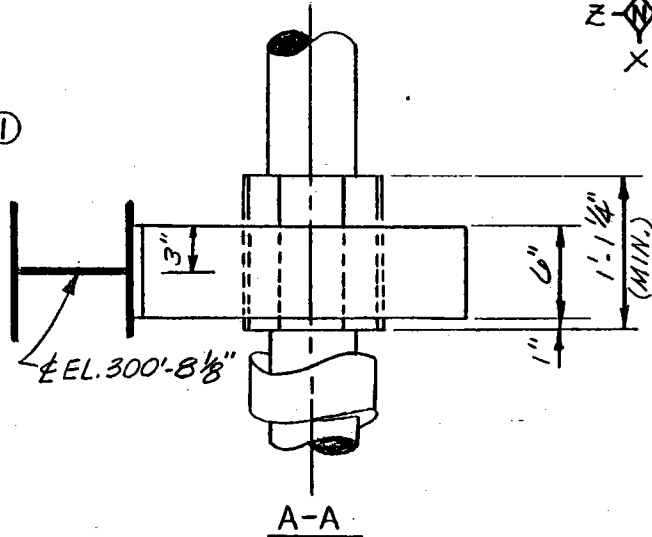
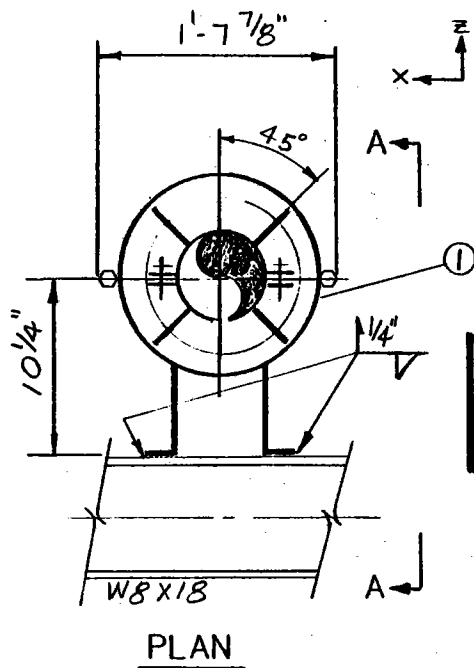
Δ REVISER PIPE MONT. Q.S.D. LOAD

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

ENGINEERING RECORD		5
DESIGNED	MLM	4
DATE	4-27-80	3
REVIEWED	MLM	2
DATE	4-27-80	1
PROJECT	BDR	
DATE	6-12-80	
ANALYSIS ID. CODE	TW-11-01-1316	

ITEM RECD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 6-MS-2-Q11	MARK NO H-MS-2-6

11165/8



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

VOL. P60-1

14		
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VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-2	P4 6
D	STRUCTURAL S32-5	0 5
C	ELECTRICAL	
B		
A		

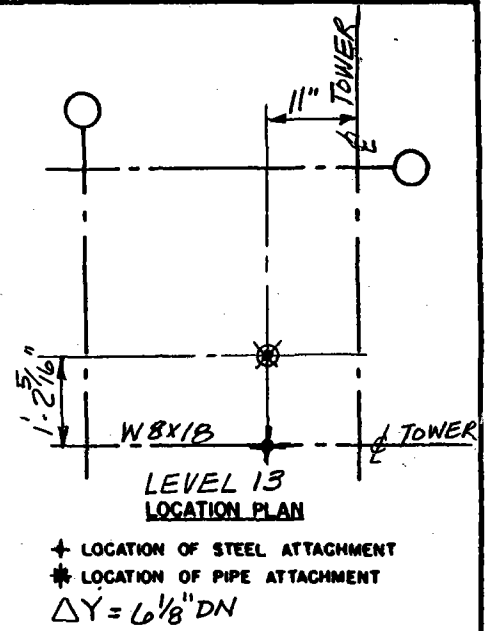
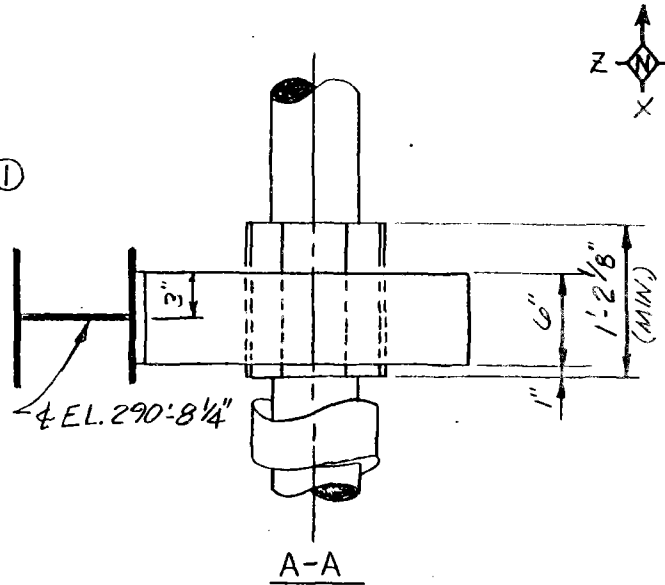
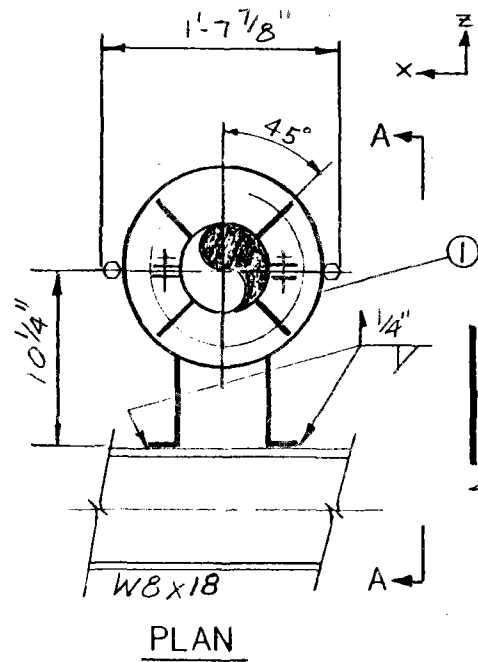
PIPE ALIGNMENT GUIDE SIM-FIG. 256

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	MM	CHECKED	JH
DATE	4-21-80	DATE	5/13/80
REVIEWED	MM	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		J.P.K.Y.
DATE	6-12-80		6-12-80
ANALYSIS ID. CODE	T/W-MS-01-A-12/5		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
5		
4		
3		
2		
1		
SCALE: NONE		11165/8
10 Me SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT #	C-21700	LINE # 6 MS-2-QEB
MARK #	H-MS-2-7	

203



VOL. P60-1

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

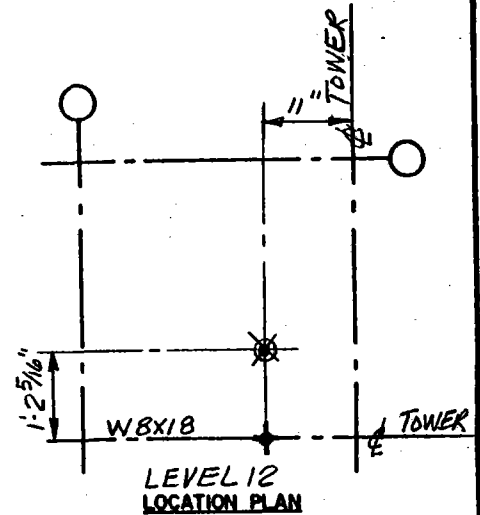
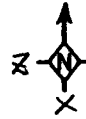
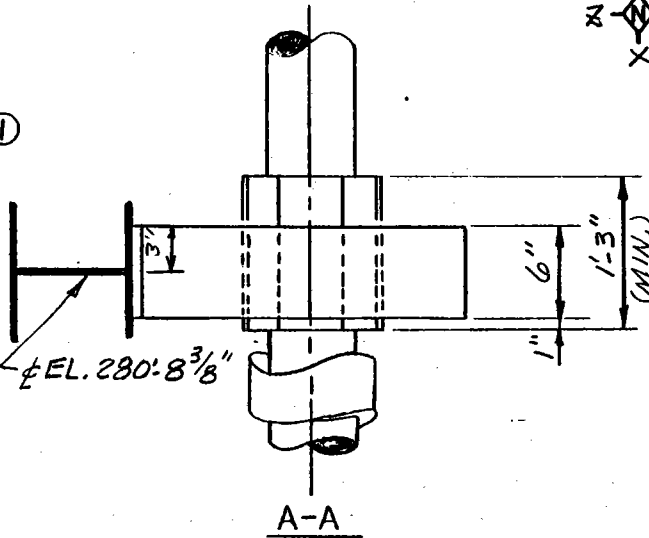
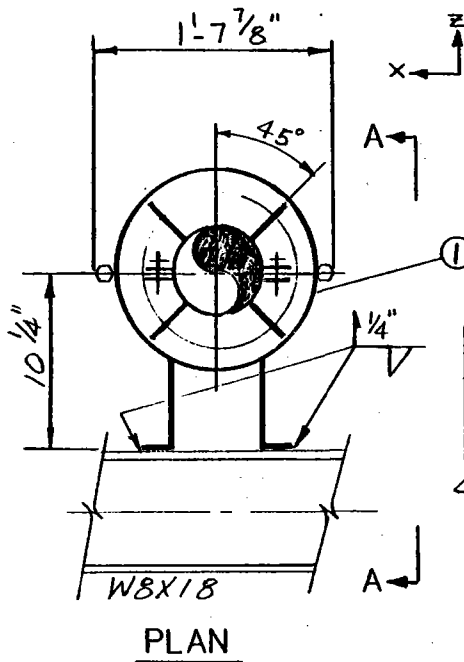
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-2	P4
D	STRUCTURAL S32-5	0
C	ELECTRICAL	
B		
A		

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

ENGINEERING RECORD	
DESIGNED: <i>AJM</i>	CHECKED: <i>JRM</i>
DATE: 4-21-80	DATE: 7/15/80
REVIEWED: <i>HMM</i>	APPROVED: <i>HMM</i>
DATE: 4-29-80	DATE: 6-12-80
PROJECT: BDR	DATE: 6-12-80
ANALYSIS ID. CODE: T/W-MS-01-A-12/5	

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

1-768-0003



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 7" DN$

VOL. P60-1

14			
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VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-2	P4
D		STRUCTURAL	S32-5	0
C		ELECTRICAL		
B				
A				

PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:

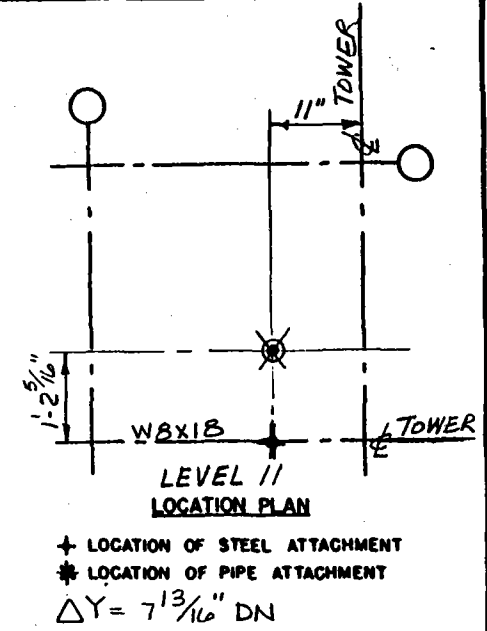
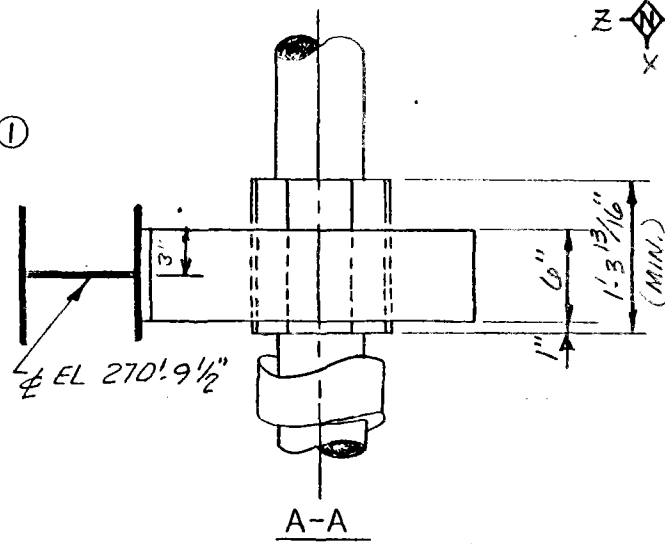
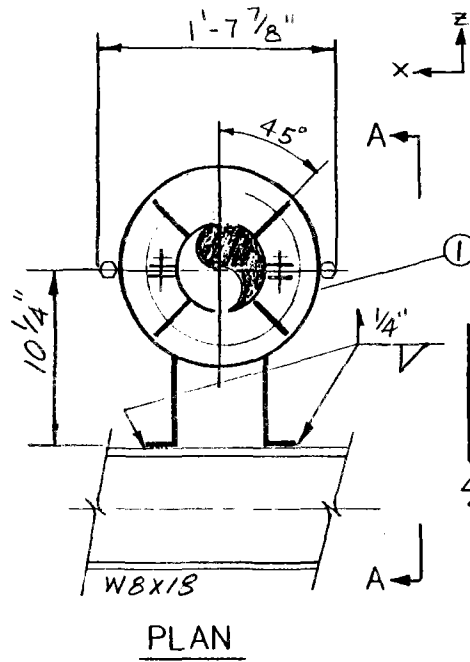
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.1k$ $F_z = .7k$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	2/12/80
DATE	4-21-80	DATE	2/12/80
REVIEWED	MLM	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR		IP. II. Y.
DATE	6-12-80		1-12-80

ITEM RECD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		

ANALYSIS ID. CODE	7/W-MS-01-A-12-5	PROJECT NO	C-21700	LINE NO	6"MS-2-QEB	MARK NO	H-MS-2-9
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205



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 7^{13/16}$ DN

VOL. P60-1

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1	PIPE ALIGNMENT GUIDE SIM.FIG. 256

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

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	MM	CHECKED	JH
DATE	4-21-80	DATE	2/13/80
REVIEWED	JH	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR	BY	J.P.Y.
DATE	6-12-80	DATE	6-13-80
ANALYSIS ID. CODE	T/W-MS-01-A-12-5		

ITEM RECD	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-2-10

1-558 Rev 03

DO NOT WELD ACROSS WIDTH OF FLANGE

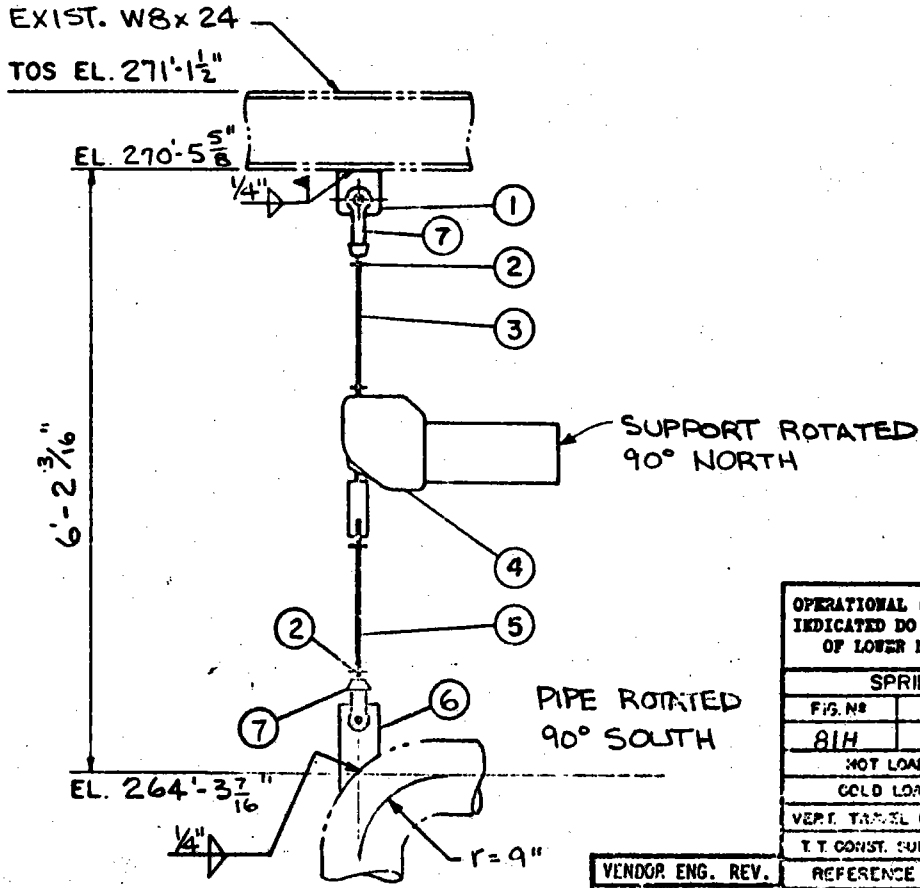
EXIST. W8x24
TOS EL. 271'-1 1/2"

EL. 270'-5 5/8"

6'-2 3/16"

EL. 264'-3 7/16"

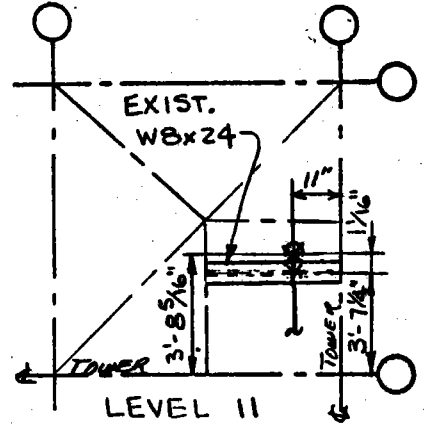
ELEV. LOOKING SOUTH



SUPPORT ROTATED
90° NORTH

PIPE ROTATED
90° SOUTH

r=9"



LEVEL II
LOCATION PLAN

+ 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	52	12
HOT LOAD		3174#	11
COLD LOAD		N.A.	10
VERT. TRAVEL C.T.O.H.		8 5/16"	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	1" DIA. WELDING LUG, C-7 7/16" H.S. 53 ALLOY (BY FAB)
D	STRUCTURAL	S3.2-4	Q	5	1	1" DIA. R. H. THD. W. E. ROD FIG. 278
C	ELECTRICAL			4	1	SPRING SEE DATA FOR SINGLE ROD
B				3	1	1" DIA. R. H. THD. ROD FIG. 140
A				2	4	1" DIA. R. H. HEX NUT
				1	1	1" DIA. STRUCT. WELDING LUG SHORT FIG. 55

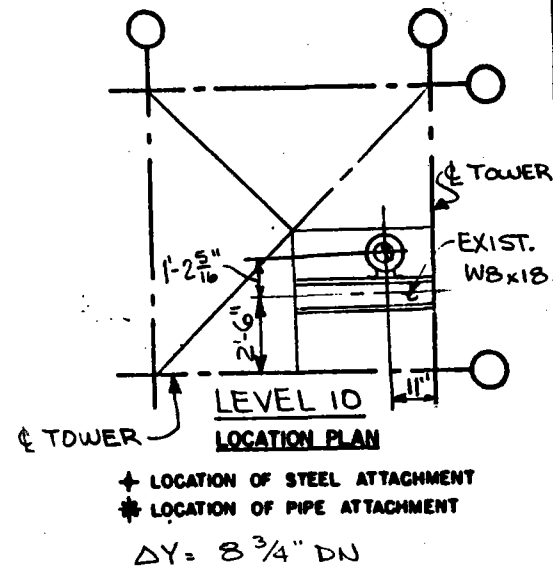
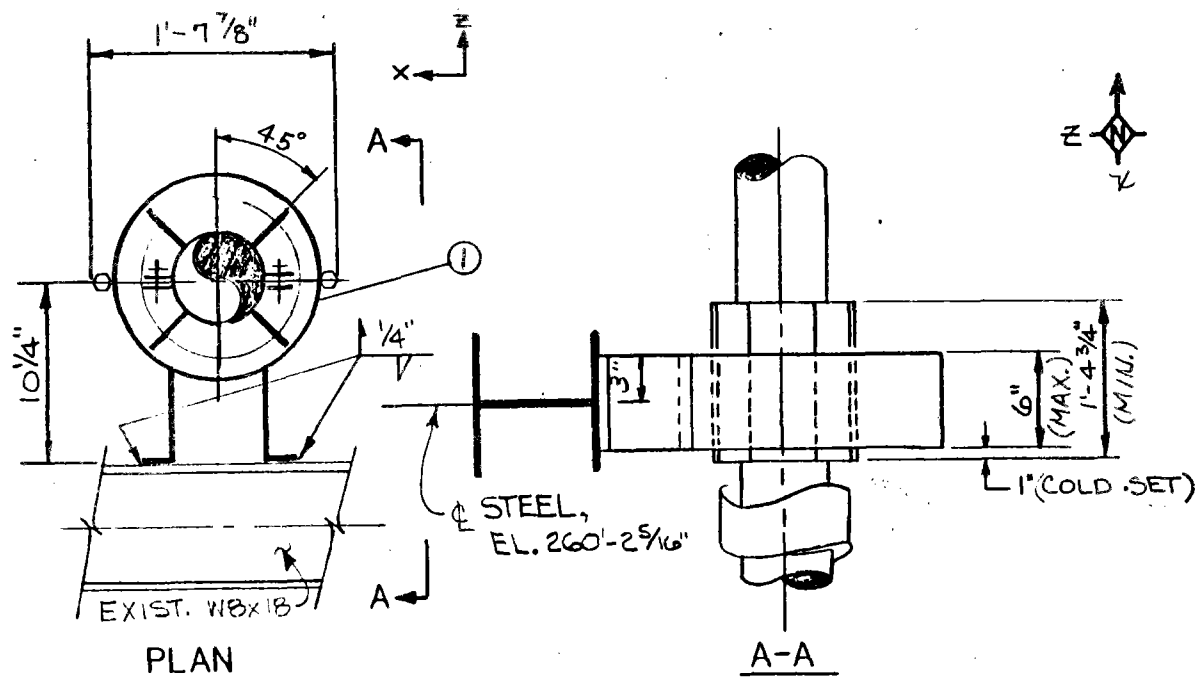
REUSED MOUNT, LOAD & CAV SIZE

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				5	1	1"	DIA. STRUCT. WELDING LUG SHORT FIG. 55		
DESIGNED	DATE	CHECKED	DATE	4		ITEM REQD	COMPONENT DESCRIPTION	REMARKS	
	3/29/80		3-27-80	3		SCALE:	Stearns-Roger	11165/8	
REVIEWED	DATE	APPROVED	DATE			NONE			
	3/19/80		3-27-80						
PROJECT							10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
DATE									
ANALYSIS ID. CODE	T/W-115-01-A-13/6					PROJECT NO	C-21700	LINE NO	6'-MS-2-DEB
								MARK NO	H-MS-2-11

206

207



△ REVISED S.D. LOAD & ANALYSIS NO.

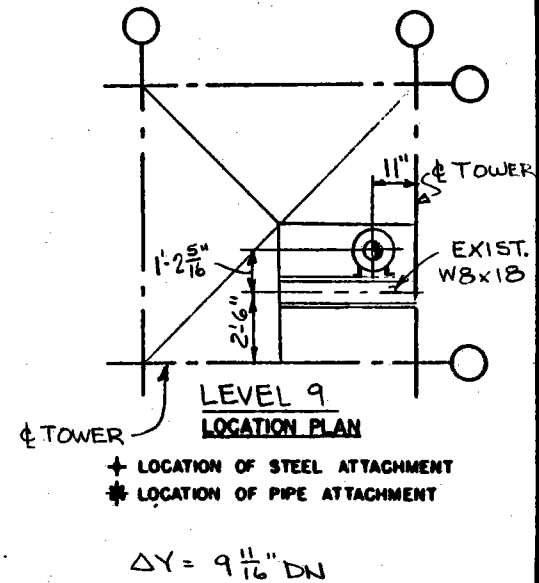
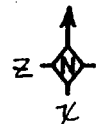
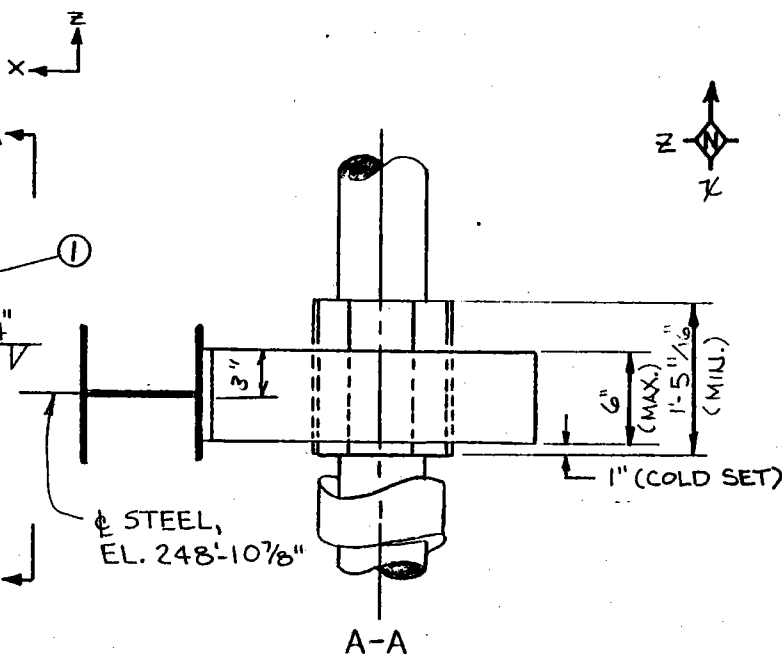
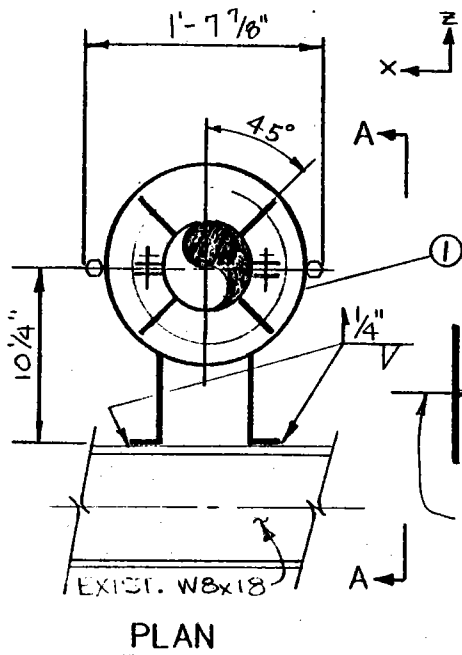
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 2.1K$, $F_z = 0.4K$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P13-1	A 6
D	STRUCTURAL S32-4	O 5
C	ELECTRICAL	
B		
A		

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ENGINEERING RECORD			
DESIGNED	9/10	CHECKED	
DATE	2/10	DATE	
REVIEWED	7/80	APPROVED	
DATE	7/80	DATE	
PROJECT	BDR	W.P.Y.	
DATE	6-12-80	6-12-80	
ANALYSIS ID. CODE	TWO 100-001-13/6		
	X-718-1-2-3		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO G-21700	LINE NO G-HS-2-SEP	MARK NO H-HS-2-12



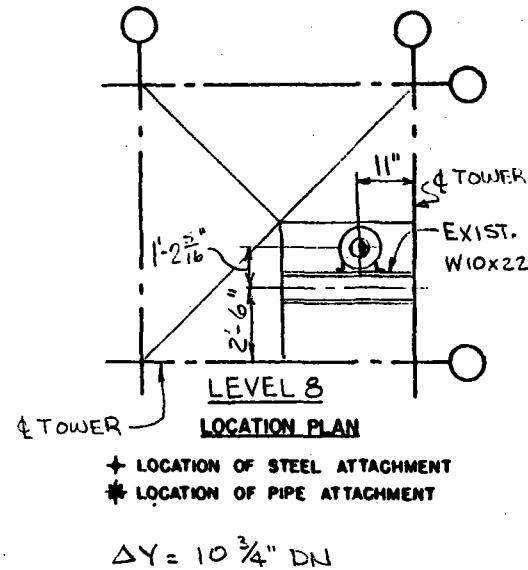
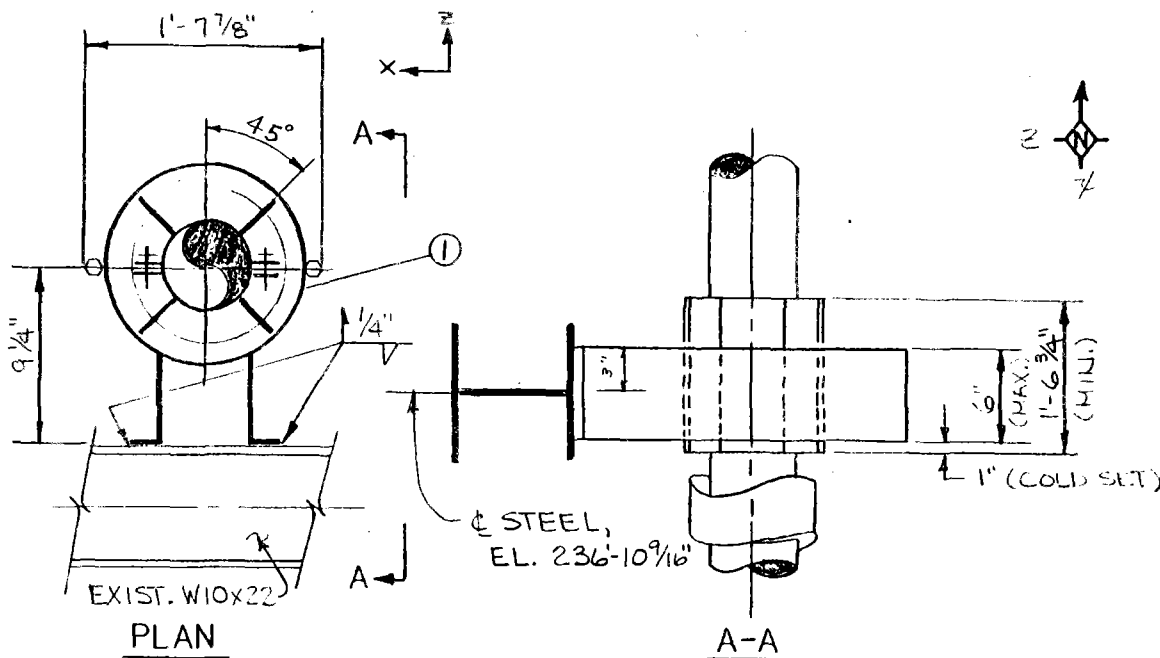
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VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P13-1	A
D		STRUCTURAL S32-4	O
C		ELECTRICAL	
B			
A			

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			
DESIGNED	4/23/80	CHECKED	2/2/80
DATE	4/23/80	DATE	12/21/80
REVIEWED	R/W	APPROVED	
DATE	4/23/80	DATE	
PROJECT	BDR		H. K. Y.
DATE	6-12-80		6-12-80
ANALYSIS ID. CODE	T/M-MS-2-01-1-1/15		

ITEM NO.	SCALE	COMPONENT DESCRIPTION	REMARKS
1	NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	6"-MS-2-01
MARK NO	H-MS-2-13		



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VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P12-1	A
D	STRUCTURAL 532-1	0
C	ELECTRICAL	
B		
A		

PIPE ALIGNMENT GUIDE SIM.FIG. 256

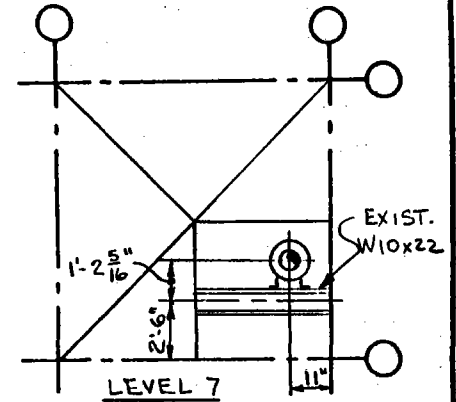
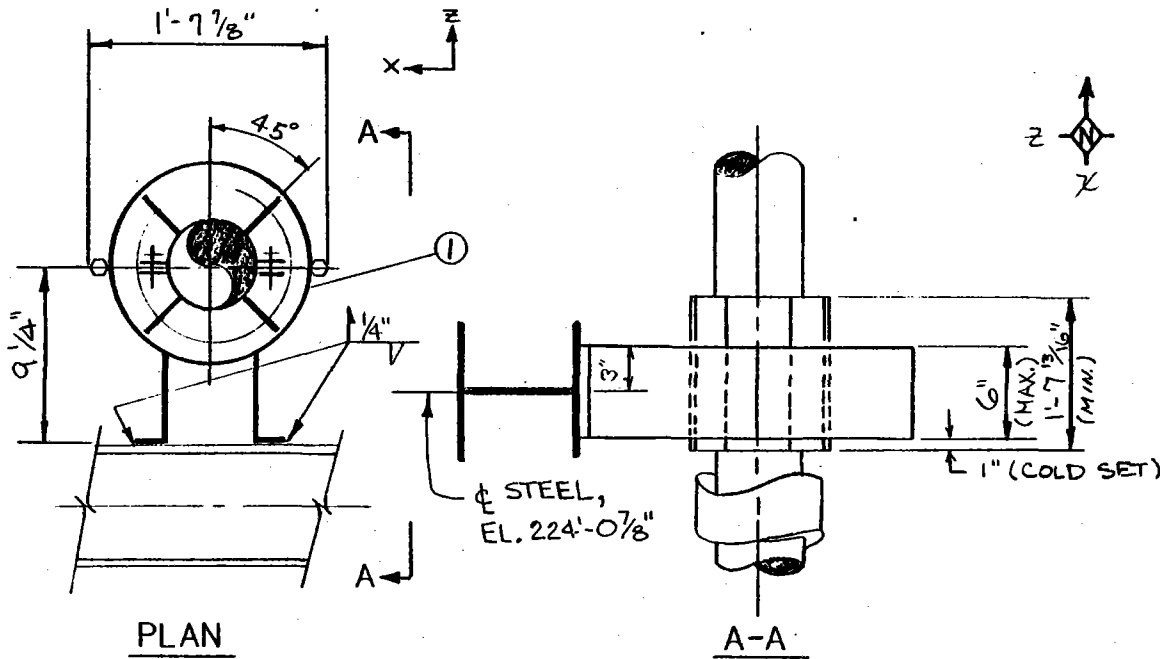
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 1.0K, F_z = 0.9K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD			
DESIGNED	4/12/80	CHECKED	7/2/80
DATE	4/22/80	DATE	5/13/80
REVIEWED	7/9/80	APPROVED	
DATE	4-30-80	DATE	
PROJECT	BDR		
DATE	6-12-80		

ITEM NO.	REVISIONS	COMPONENT DESCRIPTION	REMARKS
5			
4			
3			
2			
1			
REVISIONS		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
ANALYSIS ID. CODE		PROJECT NO	LINE NO
TAW-1115-2-A-1215		C-21700	6-115-2-01R
		MARK NO	H-MS-2-14

1-125 4093

210



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta Y = 11 \frac{13}{16}$ DU

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1			

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

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 L22

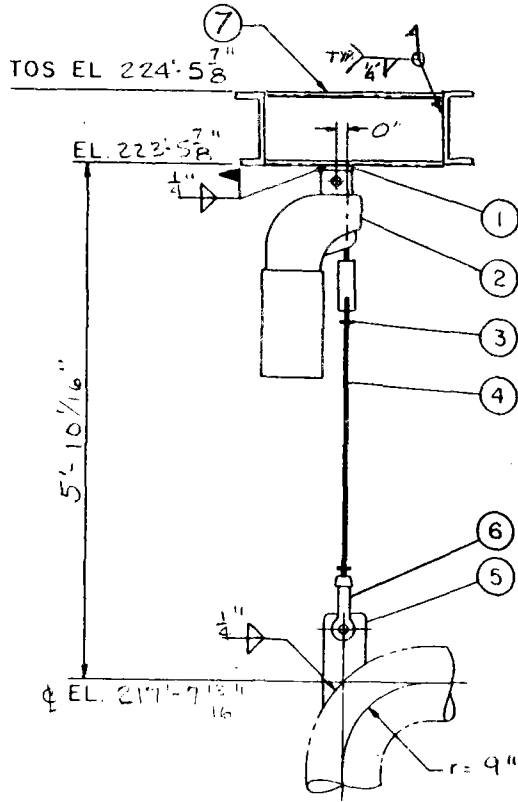
ENGINEERING RECORD			
DESIGNED	7/1/80	CHECKED	7/1/80
DATE	7/1/80	DATE	7/1/80
REVIEWED	7/1/80	APPROVED	
DATE	4-30-80	DATE	
PROJECT	BDR		V. H. Y.
DATE	6-12-80		6.12.80

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		

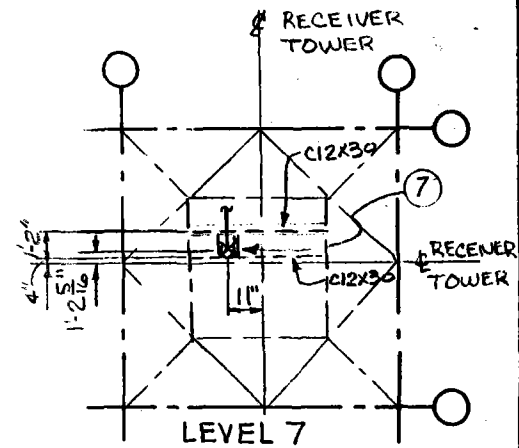
ANALYSIS ID. CODE T/W-HS-01-A-12/5 PROJECT NO C-21700 LINE NO 6"MS-2-01Y MARK NO H-HS-2-15

1-875-002

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST



LEVEL 7

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"Ø	12
HOT LOAD		6303 lb	11
COLD LOAD		N.A.	10
VERT. TRAVEL C.T.O. H.		12 7/8" (X)	9
T.T. CONST. SUPPORT		14 1/2"	8
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7
E	PIPING	P9-2 P3	6
D	STRUCTURAL	S32-A	5
C	ELECTRICAL		4
B			3
A			2

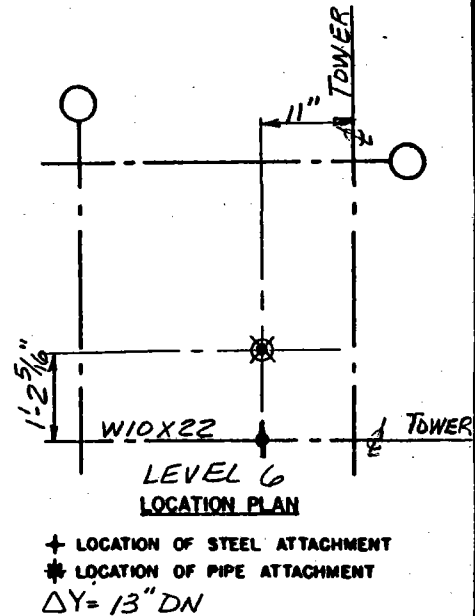
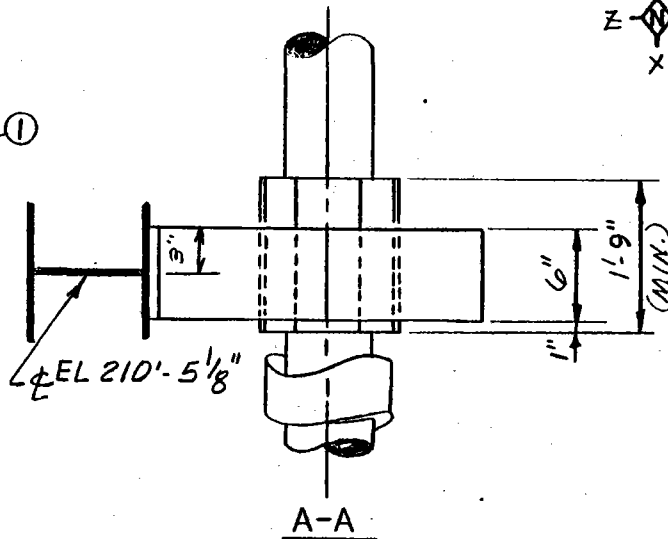
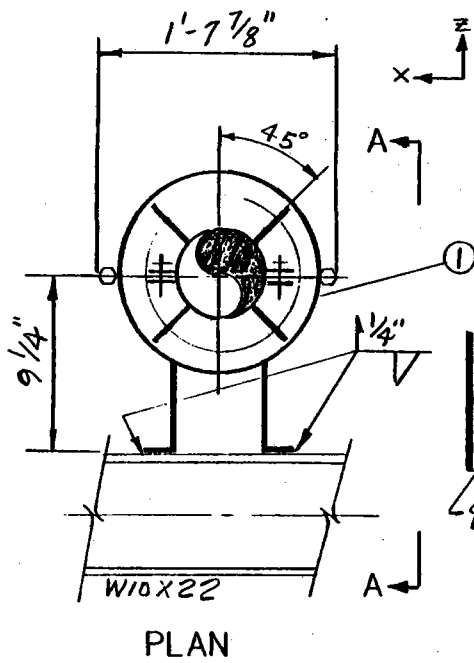
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7
E	PIPING	P9-2 P3	6
D	STRUCTURAL	S32-A	5
C	ELECTRICAL		4
B			3
A			2

F 12X30 1'2" LG
 1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
 1/2" DIA. WELDING LUG C-7 1/2" H. S. 53 BY FAB.
 1/2" DIA. R. H. THD. ROD FIG. 140
 1/2" DIA. R. H. HEX NUT
 SPRING
 1/2" DIA. STRUCT. WELDING LUG FIG. 55

NOTES:
 PIPE TEMPERATURE: 1000
 STRUCTURAL DESIGN LOAD: 8.0 K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A387 CLASS 2

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

ITEM RECD	SCALE	COMPONENT DESCRIPTION	REMARKS
1	NONE	1/2" DIA. STRUCT. WELDING LUG FIG. 55	LONG
2	NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	6-MS-2-QFB
MARK NO	H-MS-2-16		



VOL. P60-1

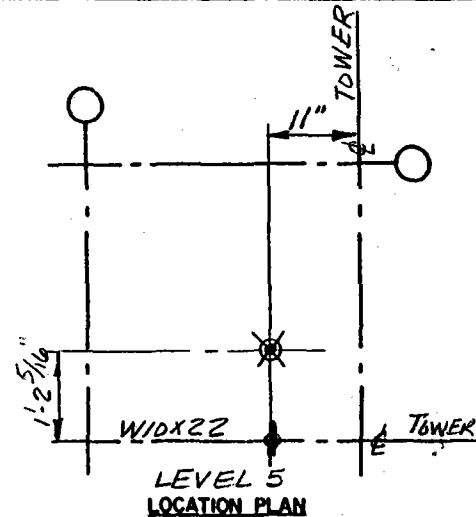
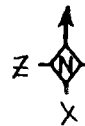
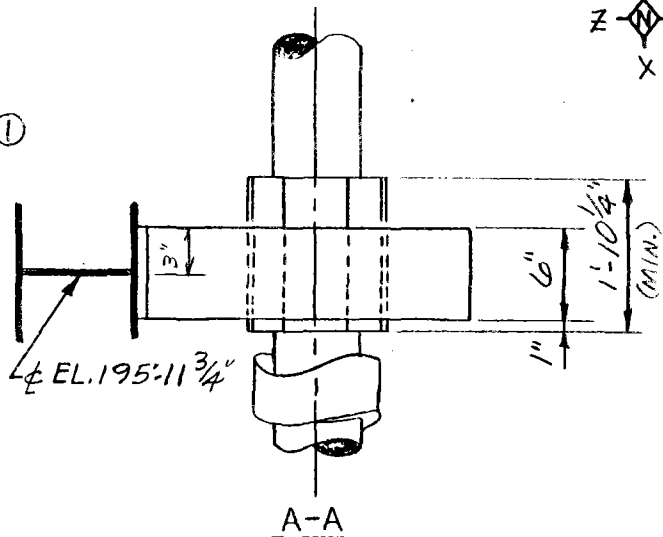
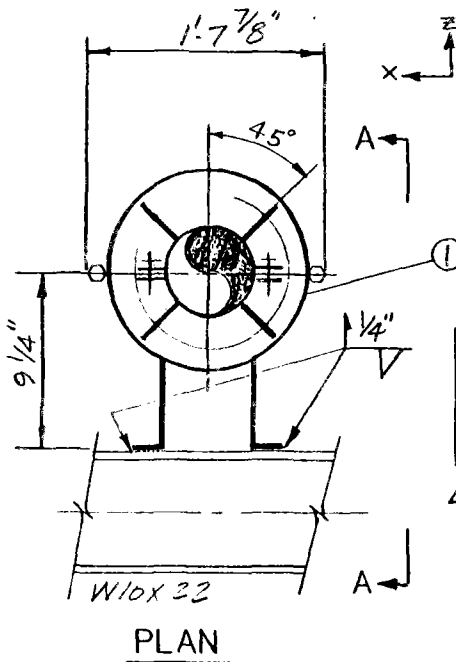
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VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P4
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

ITEM RECD	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-2-17		

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: Fx=2.2K Fz=1.3K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD		5
DESIGNED	MLM	4
DATE	4-22-80	3
REVIEWED	Y.H.W.	2
DATE	4-29-80	1
PROJECT	BDR	REVISIONS
DATE	6-12-80	
ANALYSIS ID. CODE	TW-MS-C-A-12/5	



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 14' 1/4" DN$

VOL. P60-1

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	1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

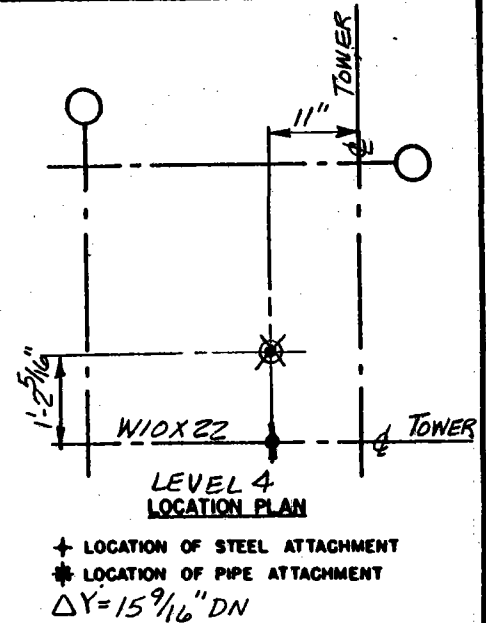
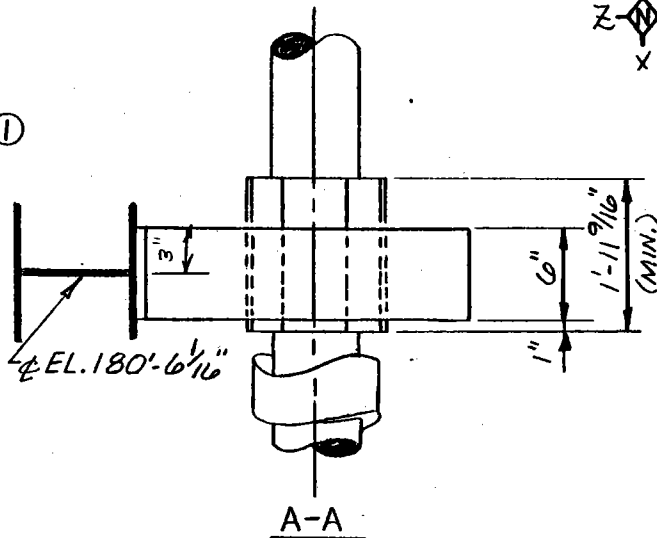
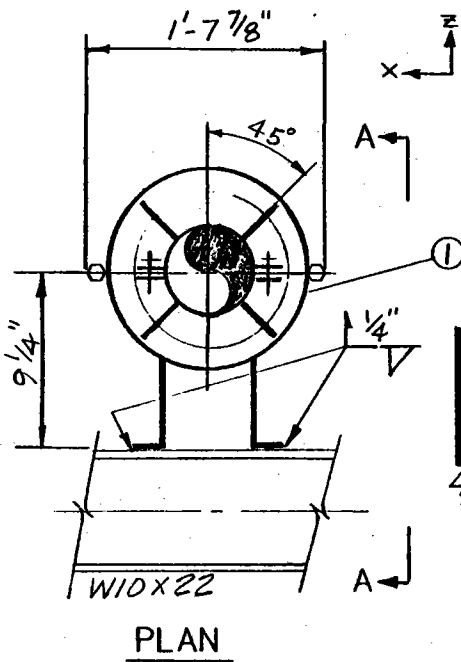
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	PL
D	STRUCTURAL S32-3	0
C	ELECTRICAL	
B		
A		

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.8k$ $F_z = 1.4k$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	PL
DATE	4-22-80	DATE	4-22-80
REVIEWED	R.N.	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR	BY	R.P.Y.
DATE	6-12-80	DATE	6-12-80
ANALYSIS ID. CODE	T/W-AL-1-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-2-9EB
		MARK NO
		H-MS-2-1B



VOL. P60-1

14	
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9	
8	

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

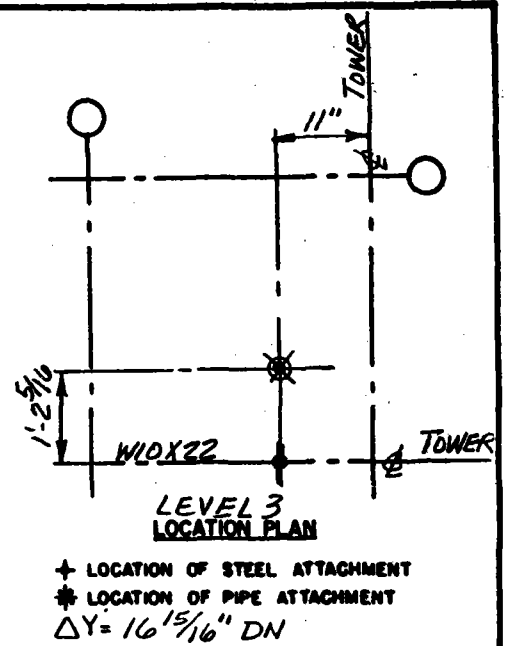
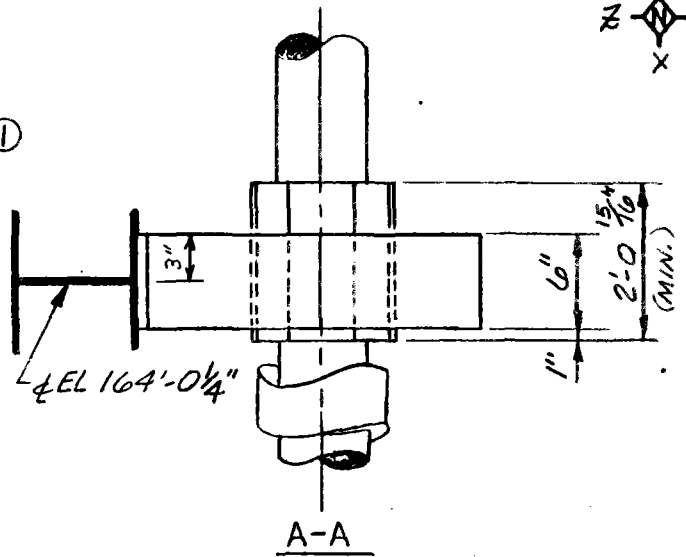
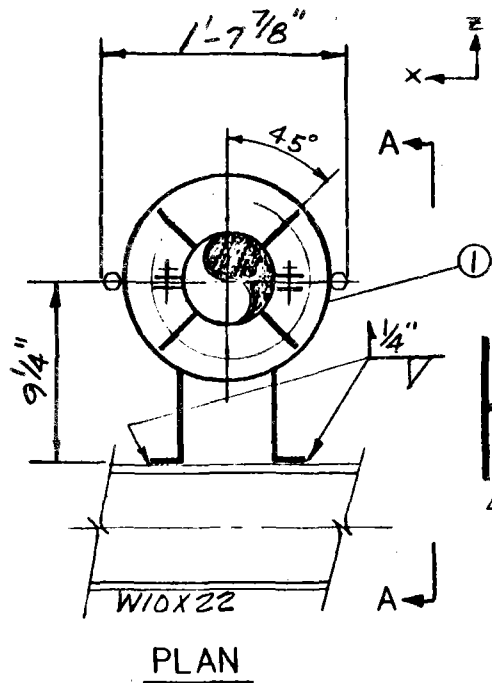
PIPE ALIGNMENT GUIDE SIM.FIG. 256

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.2K$ $F_z = 1.3K$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	MLM
DATE	1-22-80	DATE	1-22-80
REVIEWED	MLM	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR	W. H. Y.	
DATE	6-12-80	6-12-80	
ANALYSIS ID. CODE	T/W-MS-CI-A-1215		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
4		
3		
2		
1		
REVISIONS		
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	
LINE NO	6"MS-2-QEB	
MARK NO	H-MS-2-19	



VOL. P60-1

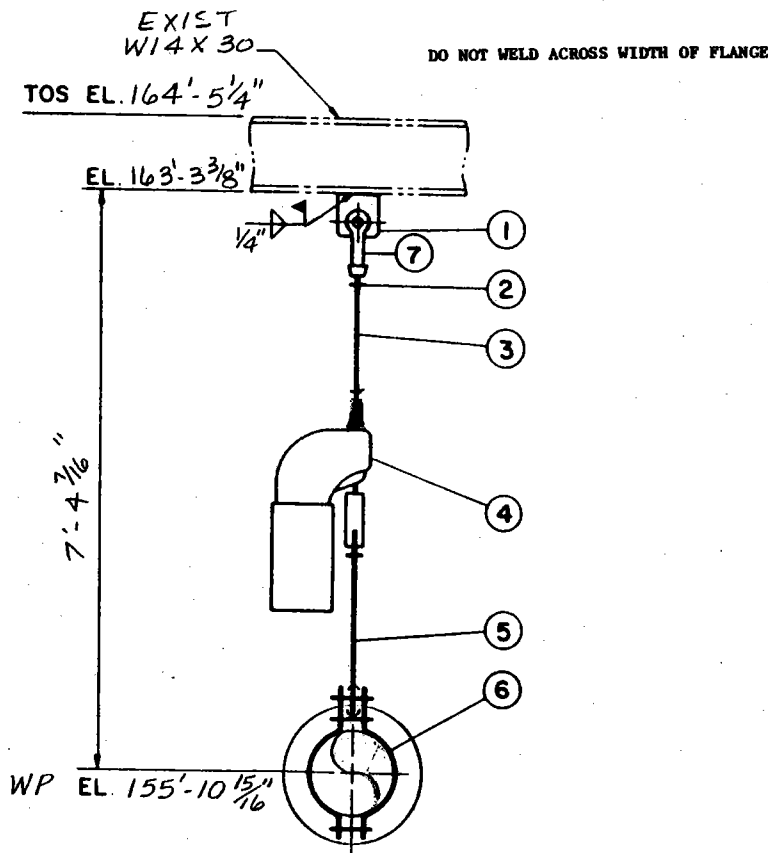
14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		
1	PIPE ALIGNMENT GUIDE SIM. FIG. 256	
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL S32-3	5
C	ELECTRICAL	4
B		3
A		

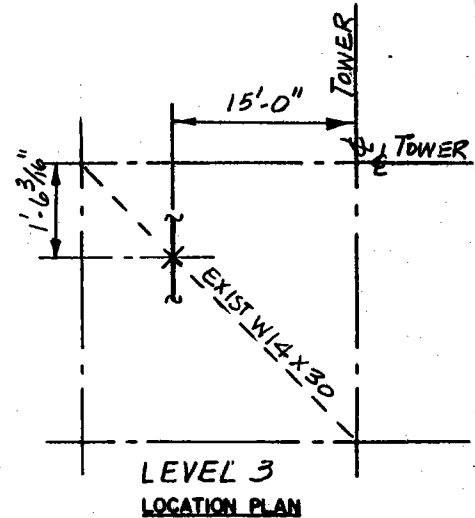
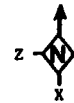
△ REVISED S.D. LOAD & ANALYSIS No.

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

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-22-85	DATE	7-1-85
REVIEWED	BDR	APPROVED	
DATE	4-29-85	DATE	
PROJECT	BDR		
DATE	6-12-85		
ANALYSIS ID. CODE	T10-11-C1-13/6		PROJECT NO C-21700
	X-0151-2-5		LINE NO 6-A13-292E
			MARK NO H-A13-2-30



ELEV. LOOKING SOUTHWEST
PIPE ROTATED 45°



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta x = 1/2"$
 $\Delta z = 1/4"$

VOL. P 60-1

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

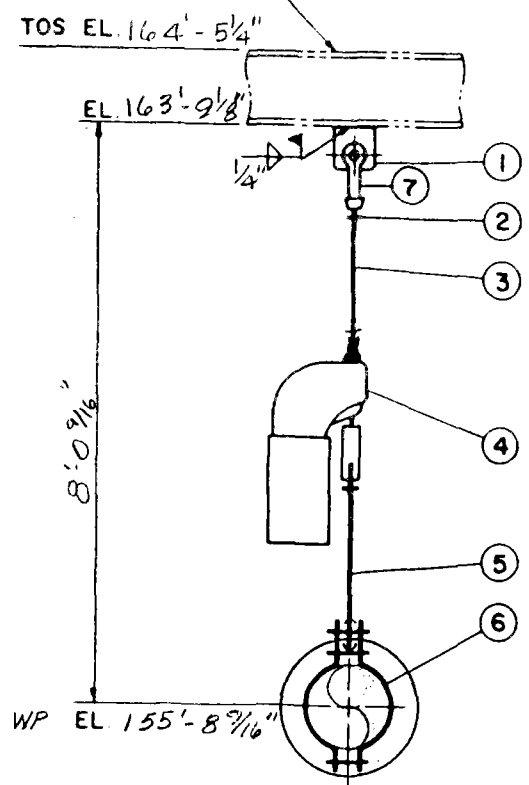
SPRING DATA			14
FIG. NO	TYPE	SIZE	13
80V	B	44	12
HOT LOAD		1083#	11
COLD LOAD		N.A.	10
VERT. TRAVEL C. TO H.		17 3/16" DN	9
T.T. CONST. SUPPORT		20"	8

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7	2	5/8" DIA. F.S. CLEVIS FIG. 299 W/PW
E	PIPING P9-3	P3	6	1	6" PIPE CLAMP FIG. 295A
D	STRUCTURAL S32-3	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

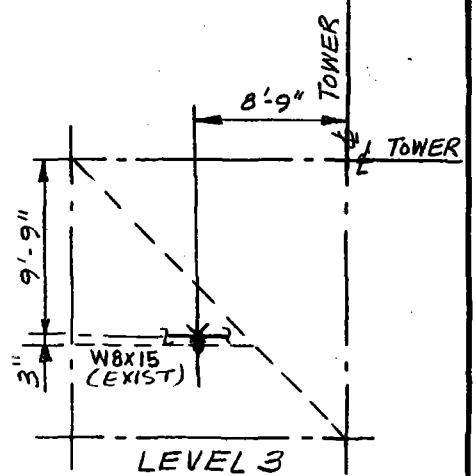
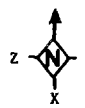
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.4 k
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTA1 A335 P22

ENGINEERING RECORD				5	1	1	1
DESIGNED	MLM	CHECKED	REN FVH	4	ITEM RECD	COMPONENT DESCRIPTION	REMARKS
DATE	3-4-80	DATE	3-24-80 3-27-80	3	SCALE:	Stearns-Roger	11165/8
REVIEWED	HJH	APPROVED	HJH	2	NONE		
DATE	3-9-80	DATE	3-27-80	1	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT				1	REVISIONS		
DATE					PROJECT NO	C-21700	LINE NO 6"MS-2-QEB
ANALYSIS ID. CODE	T/W-MS-01-A-12/5				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
Δx = 1"
Δz = 1/2"

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	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.	7 2
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

					5/8" DIA. F.S. LEVIS W/PW FIG. 299	
					6" PIPE CLAMP FIG. 295A	
					5/8" DIA. R. H. THD. W. E. ROD FIG. 278	
					SPRING W/EXTENDED LOAD ARM	SEE DATA
					5/8" DIA. R. H. THD. ROD FIG. 140	
					5/8" DIA. R. H. HEX NUT	
					5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55	

NOTES
PIPE TEMPERATURE: 760°F.
STRUCTURAL DESIGN LOAD: 1.4 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: ASTM A335 F112

ENGINEERING RECORD			
DESIGNED	AMM	CHECKED	KCK
DATE	3-4-80	DATE	3-27-80
REVIEWED	NH	APPROVED	NH
DATE	3-10-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-A15-01-A-13/5		

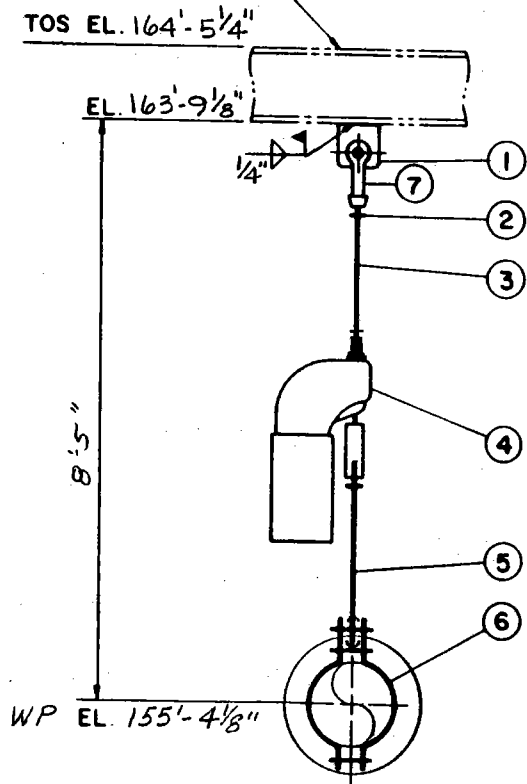
5		
4	ITEM RECD	COMPONENT DESCRIPTION
3	SCALE:	NONE
2		
1	REVISIONS	
	PROJECT NO	C-21700
	LINE NO	6"MS-2-GER
	MARK NO	H-MS-2-22
	REMARKS	11165/8

Stearns-Roger

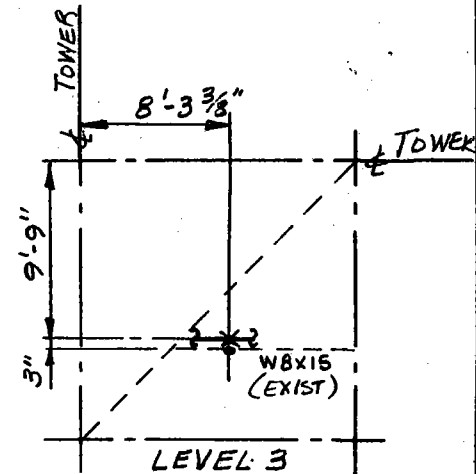
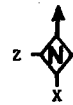
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

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 LF	11
COLD LOAD		N.A.	10
VERT. TRAVEL C. TO H.		1334" DN	9
T. T. CONST. SUPPORT		16"	8
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7 2
E	PIPING P9-3	P3	6 1
D	STRUCTURAL S32-3	0	5 1
C	ELECTRICAL		4 1
B			3 1
A			2 3

					5/8" DIA. F.S. CLEVIS W/ PIN FIG. 299
					6" PIPE CLAMP FIG. 295A
					5/8" DIA. R. H. THD. W. E. ROD FIG. 278
					SPRING W/ EXTENDED LOAD ARM SEE DATA
					5/8" DIA. R. H. THD. ROD FIG 140
					5/8" DIA. R. H. HEX NUT
					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

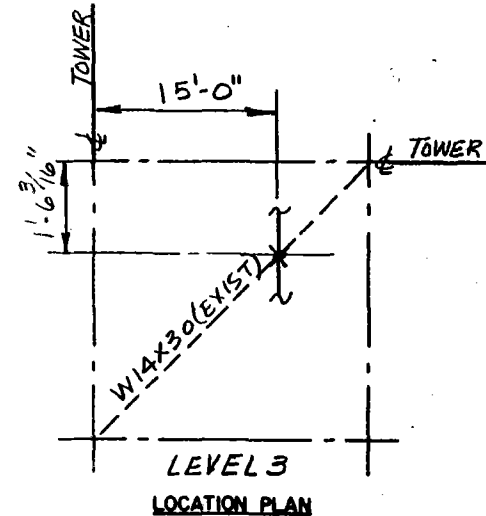
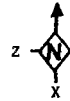
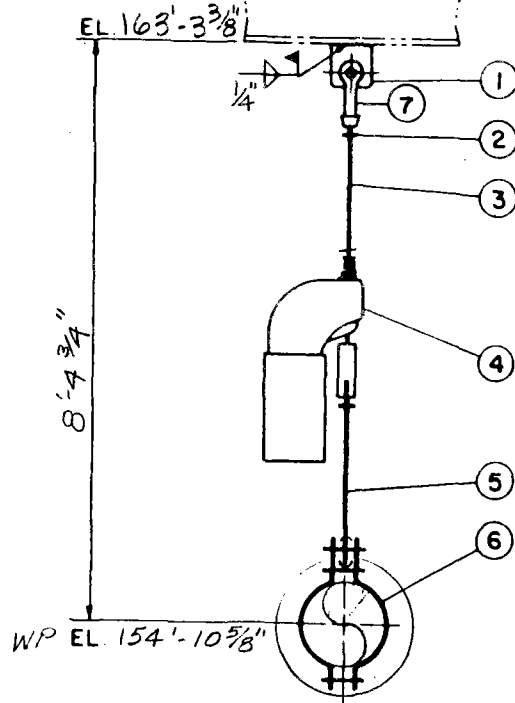
ENGINEERING RECORD

DESIGNED	MLM	CHECKED	HEU FVH
DATE	3-4-80	DATE	3-24-80 3-27-80
REVIEWED	HEU	APPROVED	HEU
DATE	3-10-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-MS-2-2-1-1215		

5	1	1	5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55
4	ITEM REQD		COMPONENT DESCRIPTION
3	SCALE:	NONE	REMARKS
2			11165/8
1	REVISIONS		
			10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA
	PROJECT NO	C-21700	LINE NO 6"MS-2-2EB
			MARK NO H-MS-2-23

EXIST W14x30
TOS EL. 164'-5 1/4"

DO NOT WELD ACROSS WIDTH OF FLANGE



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -1 \frac{9}{16}$ "
 $\Delta z = -1 \frac{1}{16}$ "

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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.	REFERENCE DRAWINGS	REV.	7
E	PIPING P9-3	P3	6
D	STRUCTURAL S32.3	0	5
C	ELECTRICAL		4
B			3
A			2

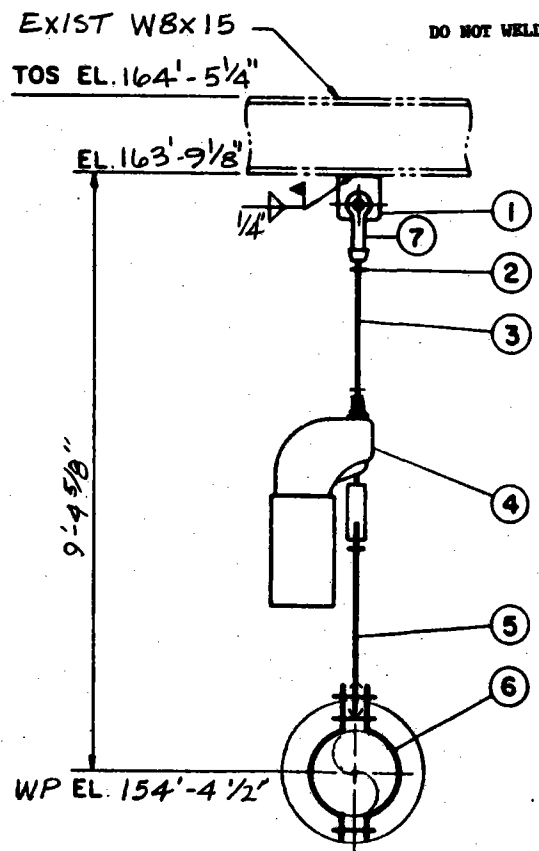
ELEV. LOOKING NORTHWEST
PIPE ROTATED 45°

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	MM	CHECKED	REN FVH
DATE	3-7-80	DATE	3-27-80
REVIEWED	REN	APPROVED	MM
DATE	3-9-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-A15-81-4-12/5		

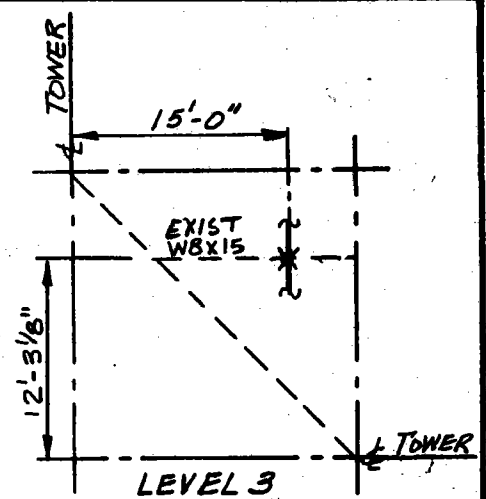
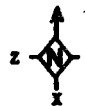
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55	
2	5/8" DIA. R. H. HEX NUT	
3	5/8" DIA. R. H. THD. ROD FIG 140	
4	SPRING	SEE DATA
5	6" PIPE CLAMP FIG. 295A	
6	5/8" DIA. R. H. THD. W. E. ROD FIG. 278	
7	5/8" DIA. F.S. CLEVIS W/ PIN FIG. 297	

SCALE: NONE
 PROJECT NO: C-21700
 LINE NO: 6" MS-2-QEB
 MARK NO: H-MS-2-24
 10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
 Stearns-Roger



ELEV. LOOKING NORTH

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 # LOCATION OF PIPE ATTACHMENT
 $\Delta x = 2' 3/16"$
 $\Delta z = 1"$

VOL. P 60-1

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

SPRING DATA			
FIG. NO	TYPE	SIZE	REV
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

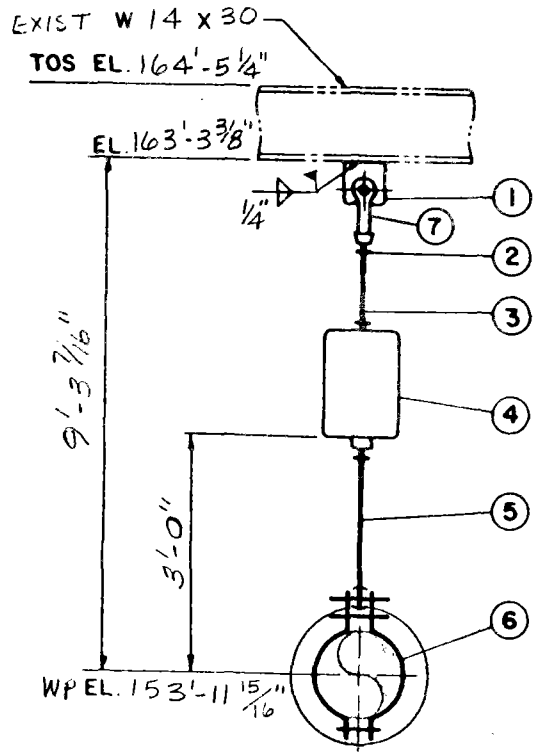
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	DESCRIPTION
E	PIPING PG-3	6	1 5/8" DIA. F.S. CLEVIS W/ PIN FIG. 299
D	STRUCTURAL 332-3	5	1 6" PIPE CLAMP FIG. 295 A
C	ELECTRICAL	4	1 5/8" DIA. R. H. THD. W. E. ROD FIG. 278
B		3	1 SPRING SEE DATA
A		2	3 5/8" DIA. R. H. THD. ROD FIG 140
		2	3 5/8" DIA. R. H. HEX NUT
		1	1 5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55

REVISOR PIPE ELEV.

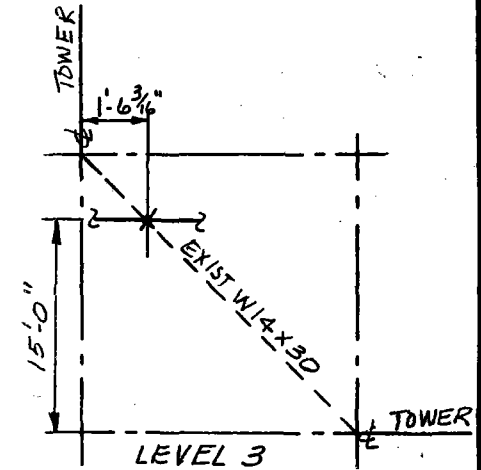
NOTES:
 PIPE TEMPERATURE: 760°F
 STRUCTURAL DESIGN LOAD: 1.2K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				ITEM RECD		SCALE:	COMPONENT DESCRIPTION	REMARKS
DESIGNED	CHECKED	DATE	DATE	NO.	DATE			
MLM	EVL	3-7-80	3-27-80	3		NONE	Stearns-Roger	11165/8
DATE	DATE	DATE	DATE	NO. <td>DATE</td>	DATE			
REVIEWED	APPROVED	DATE	DATE	NO. <td>DATE</td> <td></td> <td></td> <td></td>	DATE			
DATE	DATE	DATE	DATE	NO. <td>DATE</td> <td></td> <td></td> <td></td>	DATE			
PROJECT				NO. <td>DATE</td> <td></td> <td></td> <td></td>	DATE			
DATE				NO. <td>DATE</td> <td></td> <td></td> <td></td>	DATE			
ANALYSIS ID. CODE	T.W.-N-0-1-13-15			REVISIONS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
	PROJECT NO	C-21700	LINE NO	H-NS-2-25	MARK NO H-NS-2-25			

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTHEAST
PIPE ROTATED 45°



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = 1 3/16"
- Δ Z = 2 1/4"

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
9B	A	10	12
HOT LOAD		1252#	11
COLD LOAD		1057#	10
VENDOR ENG. REV.		VERT. TRAVEL C. TO H.	1 1/2" DN 9
		T. T. CONST. SUPPORT	N/A 8
REFERENCE DRAWINGS		REV.	7 1
PIPING		P9-3 P3	6 1
STRUCTURAL		S32-3 0	5 1
ELECTRICAL			4 1
			3 1
			2 3
			1 1

E	D	C	B	A

7/W-MS-01-A-1000
ANALYSIS I.D. CODE

NOTES:
PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: 1.0 K.
PIPE SIZE: 3/4" O.D.
PIPE INSULATION: 1/2" THK.
PIPE MATERIAL: ASTM A335 P22

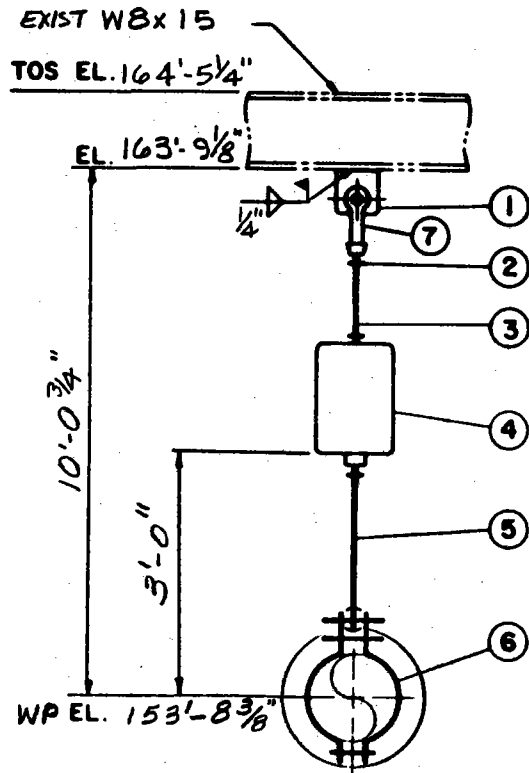
ENGINEERING RECORD			
DESIGNED	MAN	CHECKED	FS
DATE	3-7-80	DATE	4-24-80
REVIEWED	MAN	APPROVED	FS
DATE	3-9-80	DATE	4-27-80
PROJECT			
DATE			

5			
4		ITEM REQD	
3		SCALE:	
2		NONE	
1	APC		
REVISIONS		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO C-21700		LINE NO 6"MS-2-REB	MARK NO H-MS-2-26

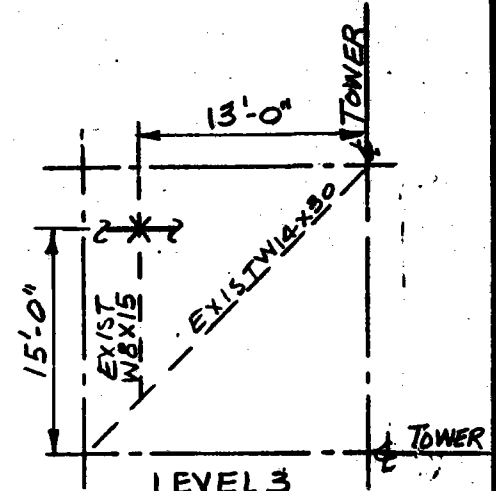
Stearns-Roger
INCORPORATED

REMARKS
11165/8

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST



LEVEL 3
LOCATION PLAN

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

VOL. P60-1

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

SPRING DATA			
FIG. NO	TYPE	SIZE	
98	A	9	12
HOT LOAD		979 #	11
COLD LOAD		1154 #	10
VENDOR ENG. REV.		VERT. TRAVEL C. TO H.	134" UP
T T CONST. SUPPORT		N/A.	8
REFERENCE DRAWINGS			
REV	7	1	3/4" DIA. F.S. CLEVIS FIG. 299
6	1	1	6" PIPE CLAMP FIG. 295A
5	1	1	3/4" DIA. R.H.WE. ROD FIG. 278
4	1	1	SPRING
3	1	1	3/4" DIA. R.H. THD ROD FIG. 140
2	1	1	3/4" DIA. HEX. NUT R.H.
1	1	1	3/4" DIA. WELD LUG SHRT FIG. 55

REVISIONS
 5
 4
 3
 2
 1

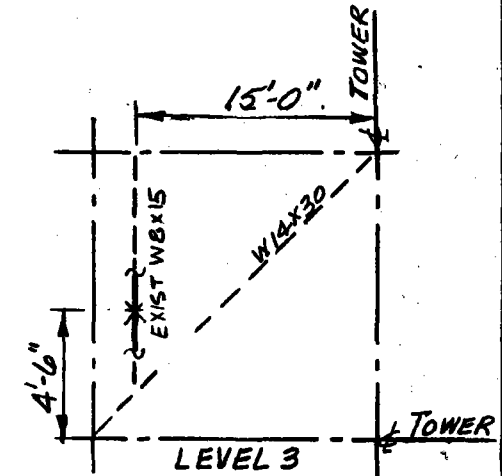
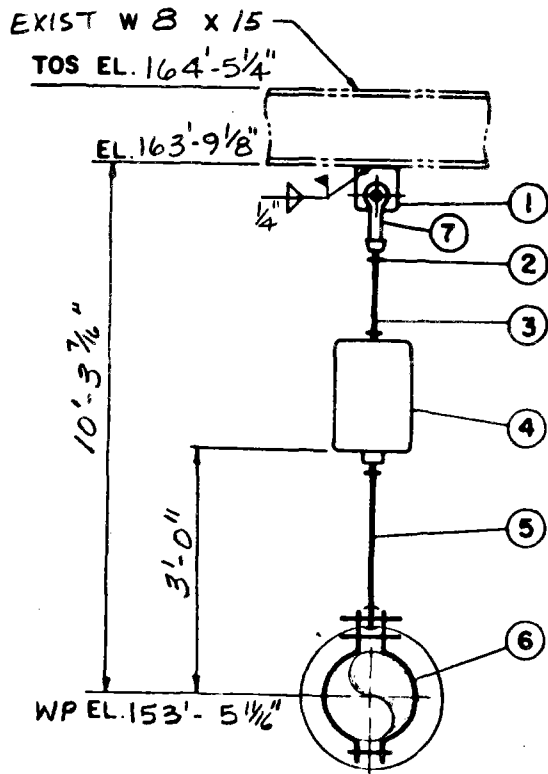
NOTES:
 PIPE TEMPERATURE: 960° F.
 STRUCTURAL DESIGN LOAD: 1.3 K.
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2" THK.
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
MLM	3-4-80	KEB	3-27-80
REVIEWED	DATE	APPROVED	DATE
	3-9-80		3-27-80
PROJECT	DATE		

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"AD-2-9EB	MARK NO H MS-2-27

222

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

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

VOL. P 60-1

ELEV. LOOKING NORTH
PIPE ROTATED 90°

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

VENDOR ENG. REV.		VERT. TRAVEL C.TO H.	T. T. CONST. SUPPORT	REFERENCE DRAWINGS	REV.	DESCRIPTION	REMARKS
E			N/A				
D							
C				PIPING P9-3	P3	5/8" DIA. F.S. CLEVIS FIG. 299	W/PIN
B				STRUCTURAL 232-3	0	6" PIPE CLAMP FIG. 295 A	
A				ELECTRICAL		5/8" DIA. R.H.WE. ROD FIG. 278	SEE DATA
						SPRING	
						5/8" DIA. R.H. THD ROD FIG. 140	
						5/8" DIA. HEX. NUT R.H.	
						5/8" DIA. WELD LUG SHRT FIG. 55	

T/W-MS-1-A-1215
ANALYSIS I.D. CODE

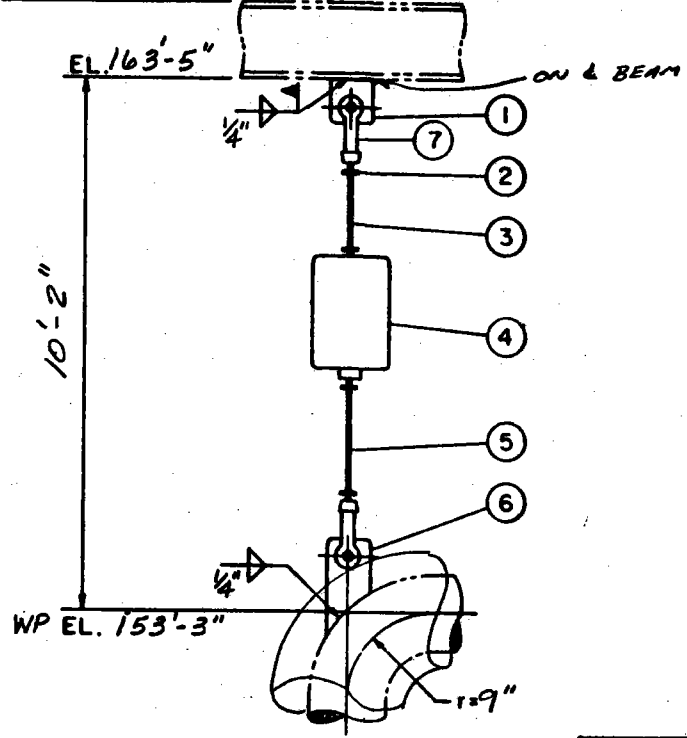
REVISD DIM. IN LOC. PLAN + PIPE ELEV.

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

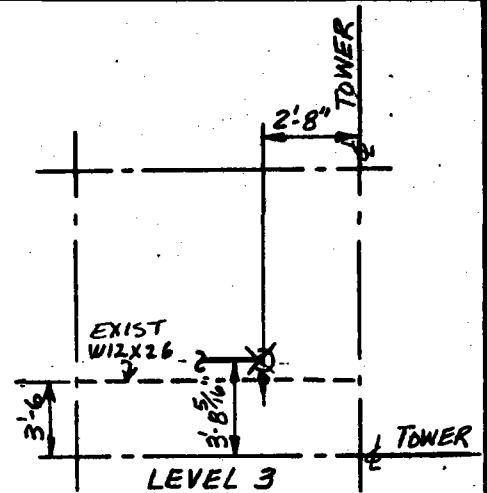
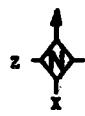
ENGINEERING RECORD				5	1	1	1	1
DESIGNED	ALM	CHECKED	FUH	4	ITEM RECD	COMPONENT DESCRIPTION	REMARKS	
DATE	3-1-80	DATE	6-7-80	3	SCALE:			
REVIEWED	JFM	APPROVED	JFM	2	NONE	Stearns-Roger	11165/8	
DATE	2-9-80	DATE	3-27-80	1				
PROJECT				REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
DATE								
PROJECT NO C-21700		LINE NO 6 MS-2 OEA		MARK NO 11 MS-2-28				

EXIST W12X26
TOS EL. 164'-5 1/4"

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING SOUTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x = -3/16"
- △ z = 2 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	A	12	12
HOT LOAD		2085#	11
COLD LOAD		2366*	10
VERT. TRAVEL C. TO H.		1/4" UP	9
T. I. CONST. SUPPORT		N.A.	8

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7	2	1" DIA. F. S. CLEVIS W/PIN FIG. 299
E	PIPING P9-3	P3	6	1	6" DIA. WELDING LUG C-7 9/16" H. S. 53
D	STRUCTURAL 32-3	0	5	1	1" DIA. R. H. THD. ROD FIG. 140
C	ELECTRICAL		4	1	SPRING
B			3	1	1" DIA. R. H. THD. ROD FIG. 140
A			2	4	1" DIA. R. H. HEX NUT
				1	1" DIA. STRUCT. WELDING LUG FIG. 55

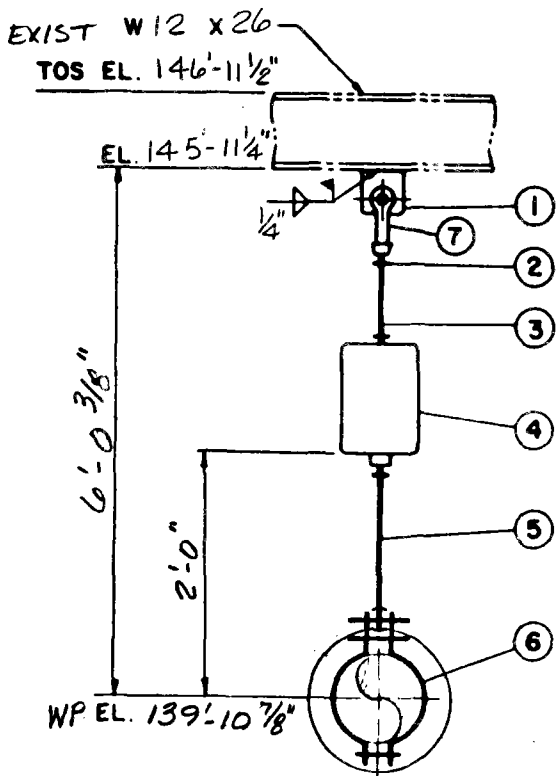
REVISOR HOT & COLD LOADS & ANALYSIS NO.

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

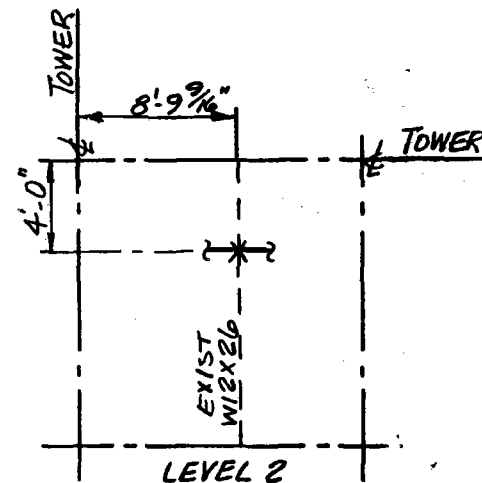
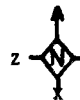
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	GEN
DATE	3-4-80	DATE	3-27-80
REVIEWED	MLM	APPROVED	MLM
DATE	3-9-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-MS-1-13/6		

5	1	1	1"	DIA. STRUCT. WELDING LUG FIG. 55
4	ITEM REQD			COMPONENT DESCRIPTION
3	SCALE:			NONE
1	REVISIONS			11165/8
10 Mm SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO	C-21700	LINE NO	6"MS-2-350	MARK NO
		HMS-2-29		

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST



LOCATION PLAN

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

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
B-268	A	9	12
HOT LOAD		1008#	11
COLD LOAD		1120#	10
VERT. TRAVEL C. TO H.		9 1/8" U	9
T. T. CONST. SUPPORT		N/A.	8
REFERENCE DRAWINGS		REV	7
C	PIPING	1-2-3 P3	6
B	STRUCTURAL	1-3-3 0	5
A	ELECTRICAL		4
			3
			2
			1

VENDOR ENG. REV.	REF. DRAWING	REV.
E		
D		
C		
B		
A		

T/W-MS-1-A-13/6

ANALYSIS ID. CODE

REVISED HOT & COLD LOAD & ANALYSIS NO.

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

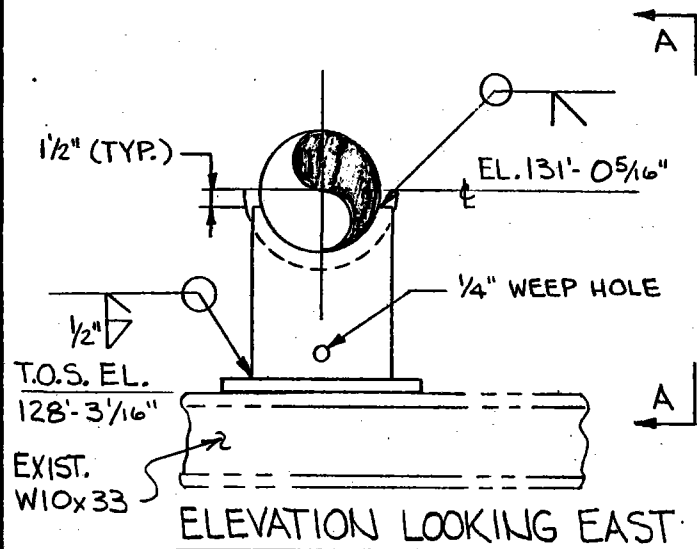
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	300 FUL
DATE	3-5-80	DATE	3-7-80 3-7-80
REVIEWED	MLM	APPROVED	MLM
DATE	3-9-80	DATE	3-27-80
PROJECT			
DATE			

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	3/4" DIA. WELD LUG SKRT FIG. 55	
2	3/4" DIA. HEX. NUT R.H.	
3	3/4" DIA. R.H. THD ROD FIG. 140	
4	SPRING	SEE DATA
5	3/4" DIA. F.S. CLEVIS FIG. 299	W/PIN
6	6" PIPE CLAMP FIG. 295 A	
7	3/4" DIA. R.H. WE. ROD FIG. 278	

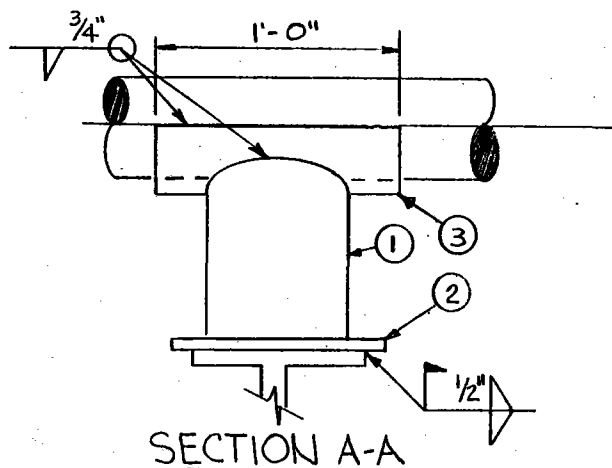
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT N° C-21700 LINE N° 6" MS-2-QFB MARK N° 11 MS-2-30

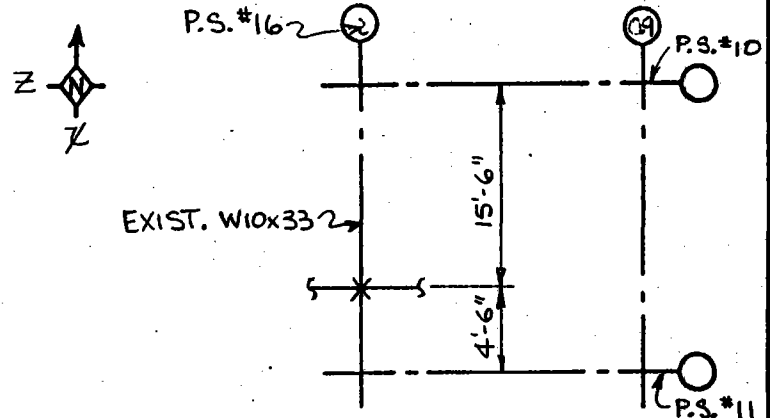
226



ELEVATION LOOKING EAST



SECTION A-A



LOCATION PLAN

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

* ALL ITEMS BY PIPE FABRICATOR

Vol. P60-1

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2	1	3/4" x 10 1/2" x 1'-0" PL, ASTM A-87 Gr. D *	
1	1	6" X 6" PIPE STALKHORN 1335 122"	

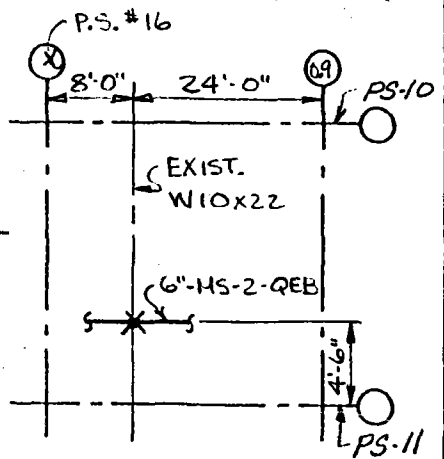
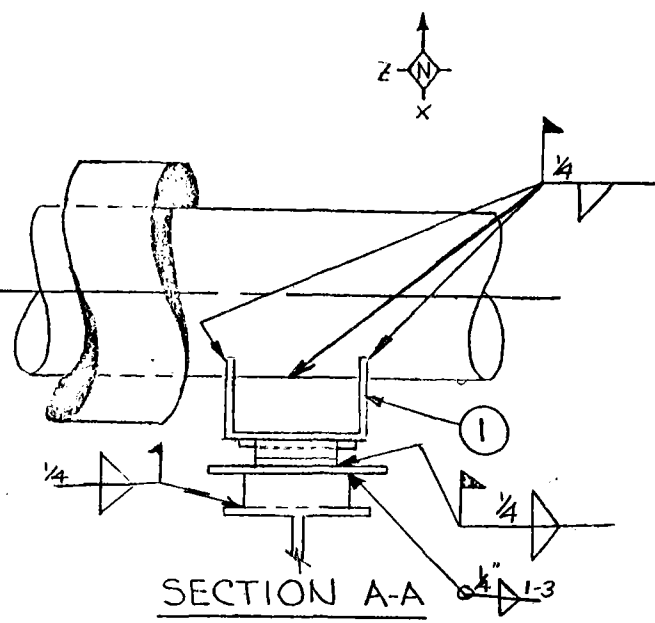
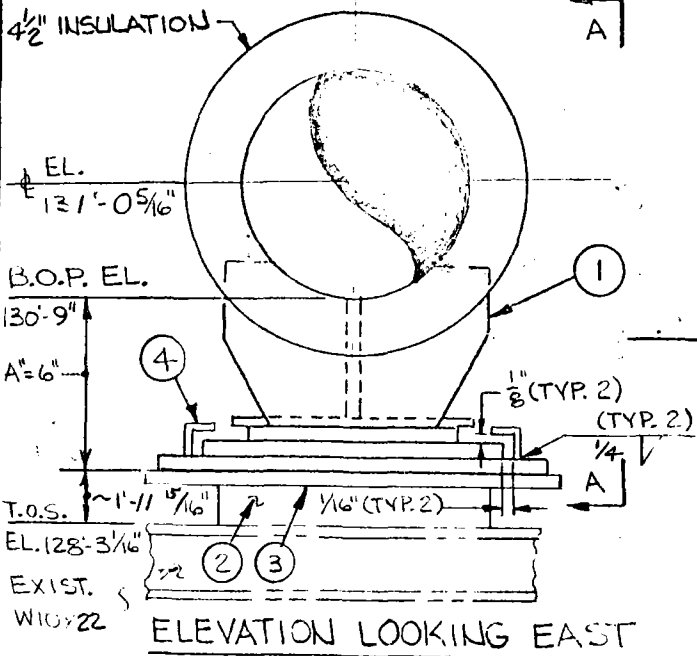
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL S33-4	1
C	ELECTRICAL	
B		
A		

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 7.65K$, $F_y = 4.45K$
 PIPE SIZE: 6.625" O.D. $F = 1.42K$, $M_x = 4.25K$
 PIPE INSULATION: 4 1/2" $M_y = 4.4K$, $M_z = 2.6K$
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	M27	CHECKED	5/15/80	4
DATE	5/15/80	DATE	5/15/80	3
REVIEWED	M27	APPROVED		2
DATE	5-19-80	DATE		1
PROJECT				
DATE				
ANALYSIS ID. CODE				REVISIONS

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700 LINE NO 61 MS-2-DEB MARK NO H-MS-2-31		

5-178 1000



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 0$
 $\Delta Z = -1/16$

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227

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4	2	2" x 1" x 1/4" 5" LONG (TRILL AS REQ'D.)
3	1	1'-3" x 6" x 1/4" C.S. PL
2	1	7' x 5" STRUCT. TUBING, 1-11 1/16" LG. x 1/4" THK.
1	1	A=6" (SPECIAL OF A335, P-1 ALLOY)

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-2	P2
D	STRUCTURAL S33-4	A
C	ELECTRICAL	
B		
A		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	6" DIA. PIPE SADDLE, FIG. 612	info STNR
Stearns-Roger		11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 6"-MS-2-QEB MARK NO 11-MS-2-322

NOTES

PIPE TEMPERATURE: 460°F
 STRUCTURAL DESIGN LOAD: Fx = 8.0K, Fz = 20K
 PIPE SIZE: 6" MS-2-QEB
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: A335, P22

ENGINEERING RECORD			
DESIGNED	11/8/80	CHECKED	PKR
DATE	3/10/85	DATE	3-27-80
REVIEWED	PKR	APPROVED	PKR
DATE	3-12-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-115 1-A-115		

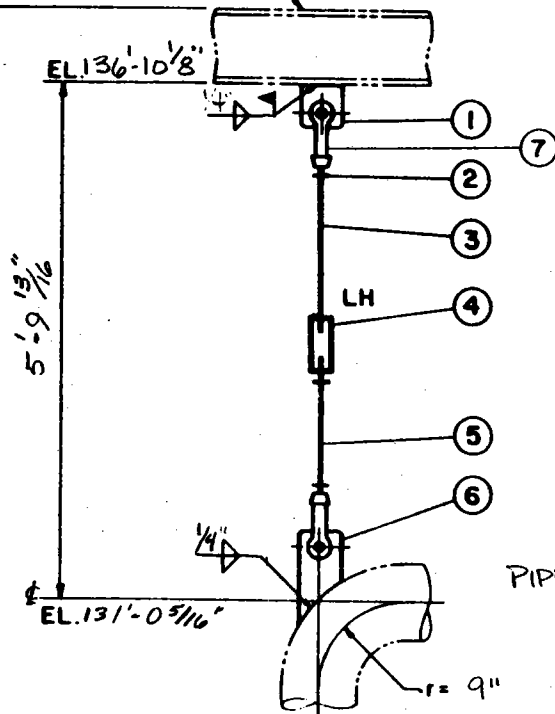
REVISIONS
5
4
3
2
1

11-578A

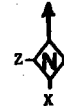
EXIST WBX10

TOS EL. 137'-6"

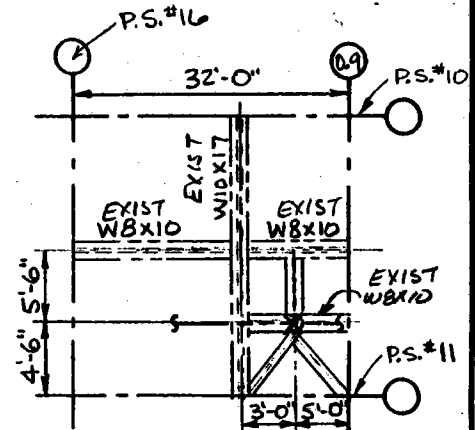
DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING SOUTH



NOTE: STEEL AT RIGHT REPRESENTS STEEL BETWEEN MAIN RACK AND RECEIVER TOWER. @ EL. T.O.S. 137'-6".



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			
REFERENCE DRAWINGS	REV.	7	2	5/8" DIA. F. S. CLEVIS W/PIN FIG. 299
PIPING	P9-3	P2	6	1 5/8" DIA. WELDING LUG C-7 1/16" S. 53 (BY FAB)
STRUCTURAL	523-4	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
			1	1 5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 2.9 K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A 335 102

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
	2/16/80	RER	2/24/80
REVIEWED	DATE	APPROVED	DATE
	2-10-80		2-27-80
PROJECT	DATE		

5	1	1	5/8" DIA. STRUCT. WELDING LUG SHORT FIG. 55
4			ITEM REQD
3			SCALE: NONE
2			COMPONENT DESCRIPTION
1			REVISIONS
ANALYSIS ID. CODE		T/W-MS-1-A-12/5	
PROJECT NO		C-21700	
LINE NO		6-MS-2-OFF	
MARK NO		H-MS-2-33	

Stearns-Roger

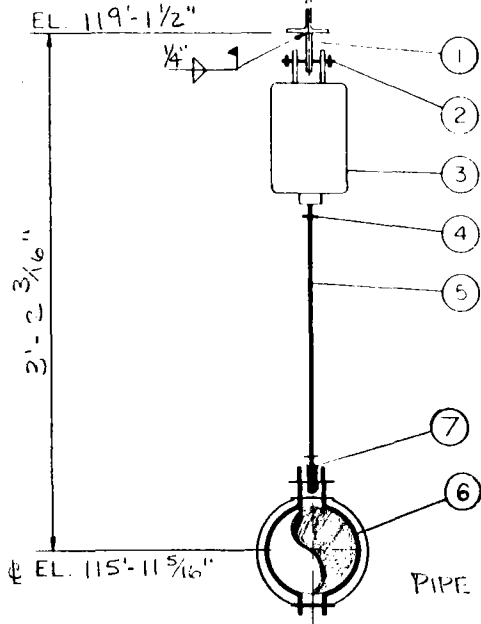
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

11165/8

11-1-828 MOD

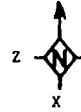
DO NOT WELD ACROSS WIDTH OF FLANGE

EXIST. WID x 30
TOS EL 120'-0"

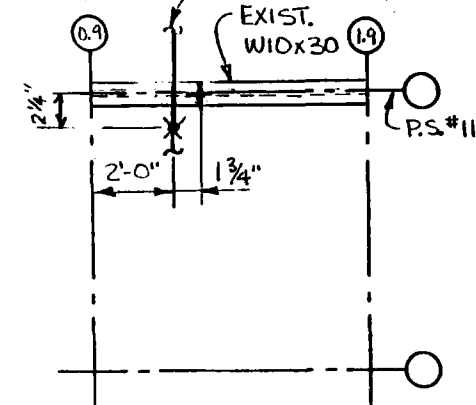


ELEV. LOOKING EAST

PIPE ROTATED 90°



6"-MS-2-QEB



LOCATION PLAN

- † LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δx = -4 5/8"
- Δz = -1 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		1278 lb	11
COLD LOAD		1107 lb	10
VERT. TRAVEL C. TO H.		1 5/16 IN	9
T. T. CONST. SUPPORT		N.A.	8
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	
E	PIPING P1-10 P3	6	1
D	STRUCTURAL S33-1 A	5	1
C	ELECTRICAL	4	2
B		3	1
A		2	1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	
E	PIPING P1-10 P3	6	1
D	STRUCTURAL S33-1 A	5	1
C	ELECTRICAL	4	2
B		3	1
A		2	1

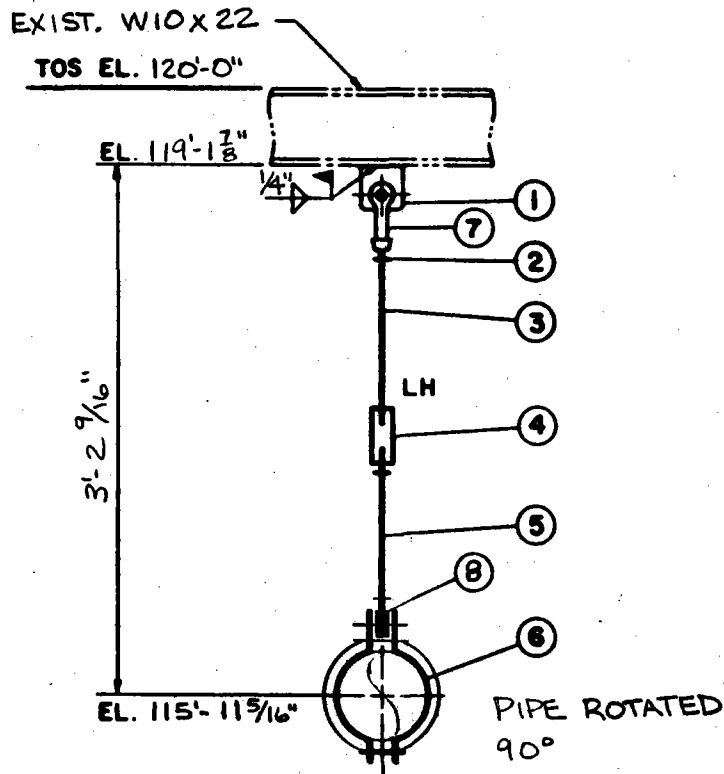
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.6 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2"
PIPE MATERIAL: A335 P22

ENGINEERING RECORD				5
DESIGNED	DATE	CHECKED	DATE	4
REVIEWED	DATE	APPROVED	DATE	3
PROJECT	DATE			2
ANALYSIS ID. CODE	T/W/V-115-A-1/5/3	PROJECT NO	C-21700	1
		LINE NO	6"-MS-2-QEB	REVISIONS
		MARK NO	H-MS-2-34	

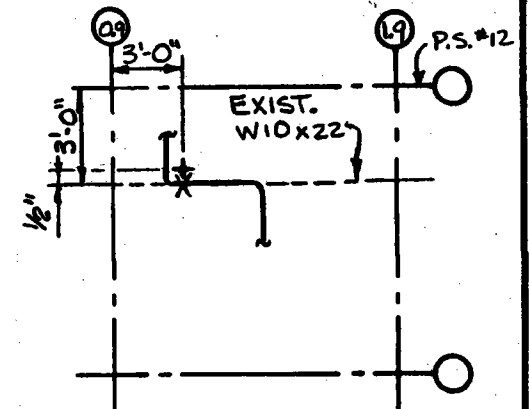
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
7	3/4" DIA. WELDLESS EYENUT FIG. 290	
6	6" PIPE CLAMP FIG. 295 A	
5	3/4" DIA. R. H. THD. ROD FIG. 140	
4	3/4" DIA. R. H. HEX NUT	
3	3/4" SPRING	SEE DATA
2	3/4" DIA. PIN W/COTTER PIN FIG. 291	
1	3/4" DIA. STRUCT. WELDING LUG FIG. 55	CLIENT

SCALE: NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING SOUTH



LOCATION PLAN

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

VOL. P60-1

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
	Stearns-Roger	11165/8
10 MME SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
ANALYSIS ID. CODE	TW/S-MS-3-A-717/5	PROJECT NO C-21700
LINE NO	6-MS-2-01	MARK NO H-MS-2-35

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING T-110	P3
D		STRUCTURAL 333-1	A
C		ELECTRICAL	
B			
A			

REVISD 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

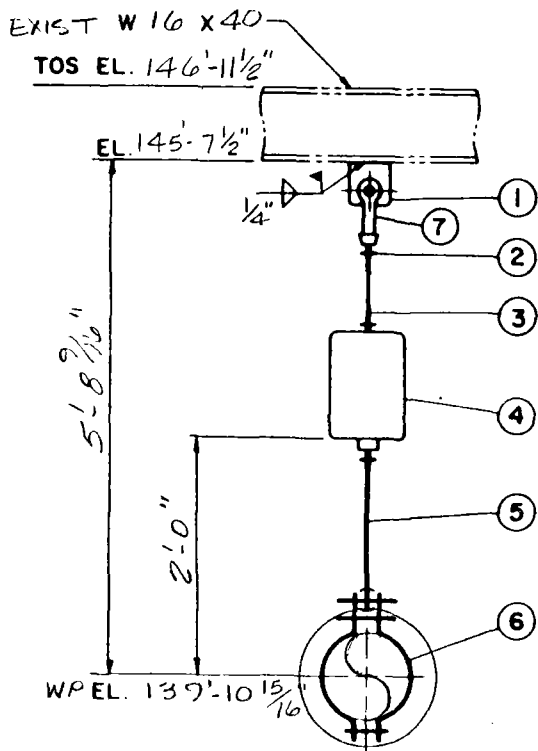
ENGINEERING RECORD	
DESIGNED	CHEKED
DATE	DATE
REVIEWED	APPROVED
DATE	DATE
PROJECT	
DATE	
ANALYSIS ID. CODE	TW/S-MS-3-A-717/5

REVISIONS
5
4
3
2
1

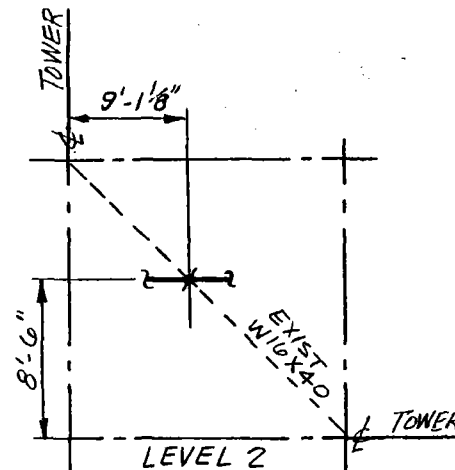
230

85-1-120 m 02

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTHEAST
PIPE ROTATED 4.5°



LOCATION PLAN

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

VOL. P60-1

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

SPRING DATA			14
FIG. N°	TYPE	SIZE	13
B-268	A	10	12
HOT LOAD		1122#	11
COLD LOAD		1252#	10
VENDOR ENG. REV.	VERT. TRAVEL C. TO H.	1/2" UP	9
E	T.T. CONST. SUPPORT	N/A	8
D	REFERENCE DRAWINGS	REV. 7	1
C	PIPING	P9-3 P3	6
B	STRUCTURAL	332-3 0	5
A	ELECTRICAL		4
			3
			2
			1

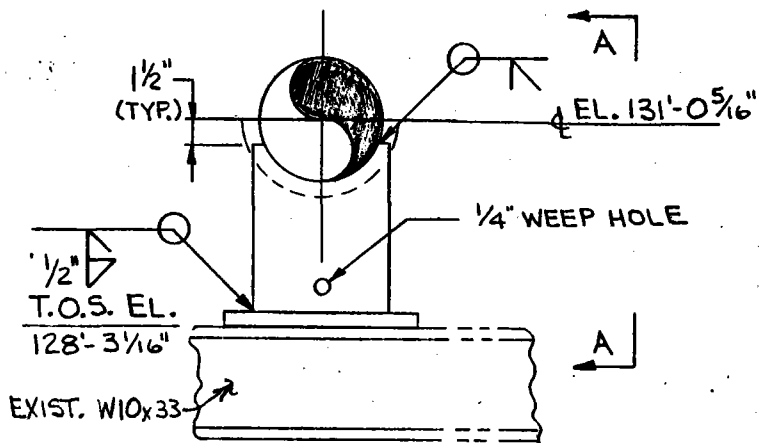
E	T.T. CONST. SUPPORT	N/A	8
D	REFERENCE DRAWINGS	REV. 7	1
C	PIPING	P9-3 P3	6
B	STRUCTURAL	332-3 0	5
A	ELECTRICAL		4

T/W/X-MS-3-A-3/3/1
ANALYSIS I.D. CODE

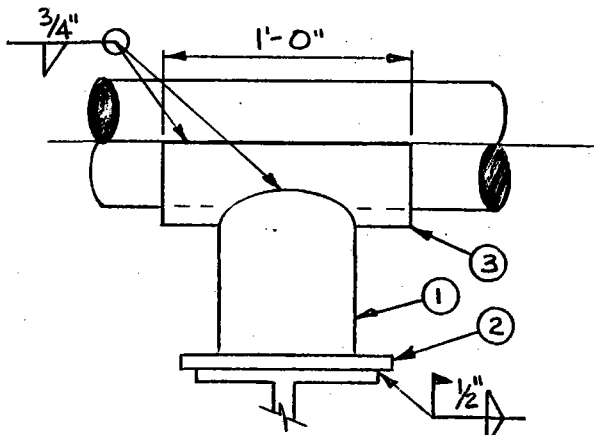
NOTES:
PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: 1.5 K.
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4 1/2 THK.
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	MLM
DATE	3-15-80	DATE	3-24-80
REVIEWED	JFM	APPROVED	JFM
DATE	3-9-80	DATE	3-27-80
PROJECT			
DATE			

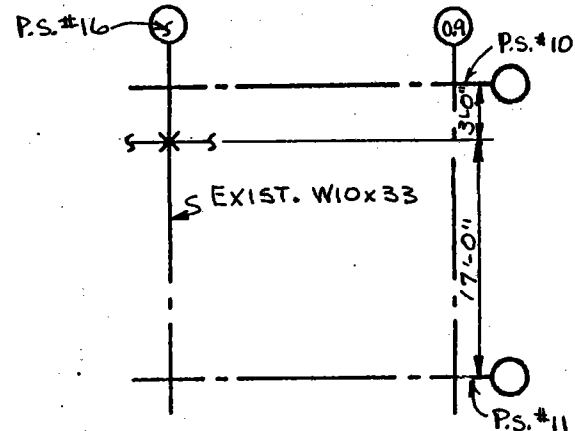
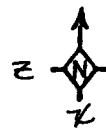
5	1	1	3/4" DIA. WELD LUG SHORT FIG. 55	
4			ITEM REQD	COMPONENT DESCRIPTION
3			SCALE:	NONE
2				Stearns-Roger INCORPORATED
1				11165/8
10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT N° C-21700		LINE N° 6"MS-3-QEB		MARK N° H-MS-3-1



ELEVATION LOOKING EAST



SECTION A-A



LOCATION PLAN

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

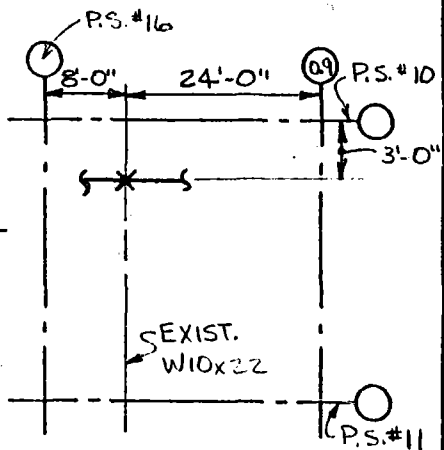
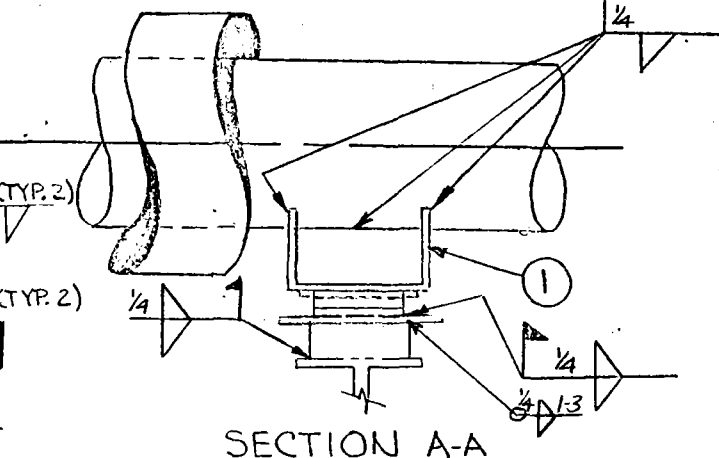
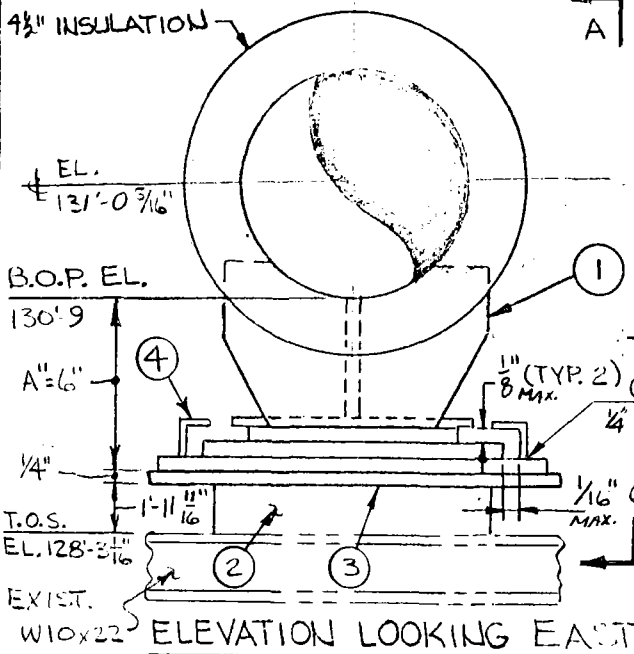
Vol. P60-1

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
3	1	SHAPED TO FORM PIPE SADDLE
2	1	3/4" x 10 1/2" x 1'-0" PL, ASTM A387 GR. D
1	1	1" x 9" x 9" PL

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

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 6.1K$, $F_y = 3.85K$
 PIPE SIZE: 6.625" O.D. $F_z = 1.43K$, $M_x = 4.7K$
 PIPE INSULATION: 4 1/2" $M_v = 8.2K$, $M_z = 200K$
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5	1	1	
DESIGNED	M.P.F.	CHECKED		4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
DATE	5/15/80	DATE		3	SCALE:	Stearns-Roger	11165/8
REVIEWED	J.P.M.	APPROVED		2	NONE		
DATE	5-19-80	DATE		1	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT				REVISIONS	PROJECT NO C-21700		
DATE					LINE NO 6'-HS-3-DEF MARK NO H'-HS-3-2		
ANALYSIS ID. CODE							



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 0$
 $\Delta Z = -1/16$

VOL. P60-1

DO NOT WELD ACROSS WIDTH OF FLANGE

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P1-3	1
D		STRUCTURAL S33-4	A
C		ELECTRICAL	
B			
A			

ITEM RECD	SCALE	COMPONENT DESCRIPTION	REMARKS
14			
13			
12			
11			
10			
9			
8			
7			
6			
4	2	4" x 1" x 1/4", 5" LONG (TRIM AS REQ'D)	
3	1	1'-2" x 6" x 1/4" C.S. TP	
2	1	7" x 5" SHEET, TYPING, 1'-11 1/16" W. x 1/4" THK.	
1	1	A 1/2" (SPECIAL) OF A321 (P22 ALLOY)	
1	1	6" DIA. PIPE SADDLE, FIG. 602	n/a 5/8"

NOTES:

PIPE TEMPERATURE: 100°

STRUCTURAL DESIGN LOAD: $F_x = 60 \text{ psf}$

PIPE SIZE: 6.625" O.D. $F_u = 4.0K$

PIPE INSULATION: 4 1/2"

PIPE MATERIAL: ASTM A321 P22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
	3/11/80	KEA	3-27-80
REVIEWED	DATE	APPROVED	DATE
	3-11-80		3-27-80
PROJECT	DATE		
ANALYSIS ID. CODE	T/W/10	3-A-3/3/1	

10 THE SOLAR PILOT PLANT DARGETT, CALIFORNIA

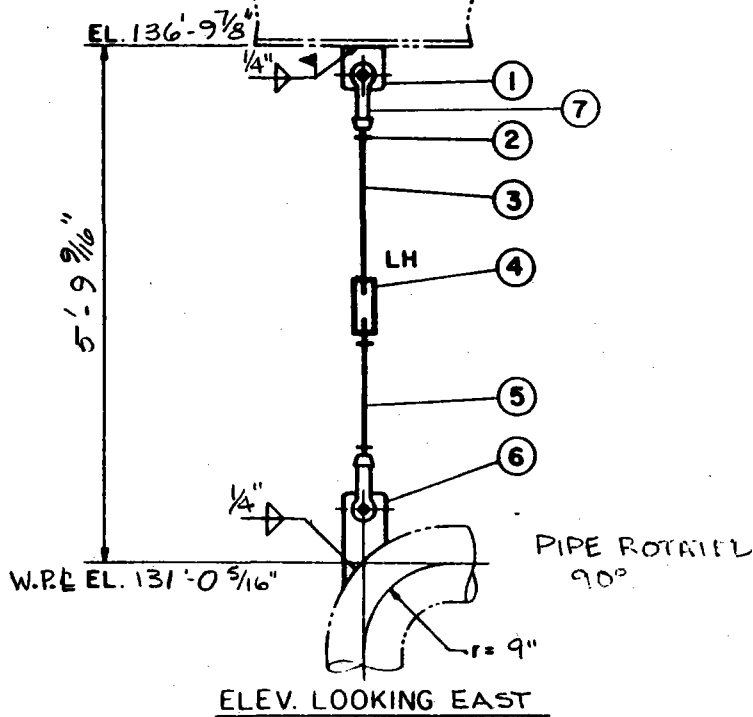
PROJECT NO C-21700 LINE NO 6" MS-3 OPT MARK NO 17-MS-3-3

233

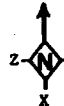
1-758-0001

EXIST
WB X 18
TOS EL. 137'-6"

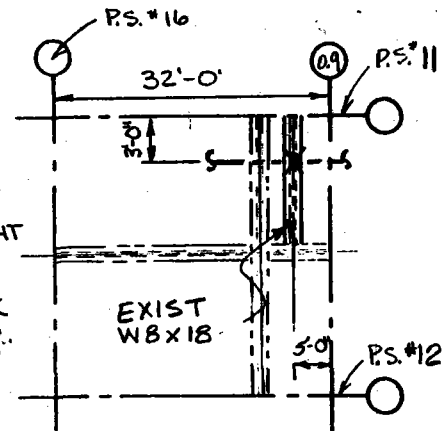
DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



NOTE: STEEL AT RIGHT
REPRESENTS STEEL
BETWEEN MAIN RACK
AND RECEIVER TOWER.
@ EL. T.O.S. 137'-6"



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = 1"$
 $\Delta z = -2 1/4"$

VOL. P60-1

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

REFERENCE DRAWINGS	REV		
PIPING	P9-3	P3	7 2 3/4" DIA. F. S. CLEVIS W/PIN FIG. 299
STRUCTURAL	S33-4	A	6 1 3/4" DIA. WELDING LUG C-7, H.S. 53 (BY FABR)
ELECTRICAL			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

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

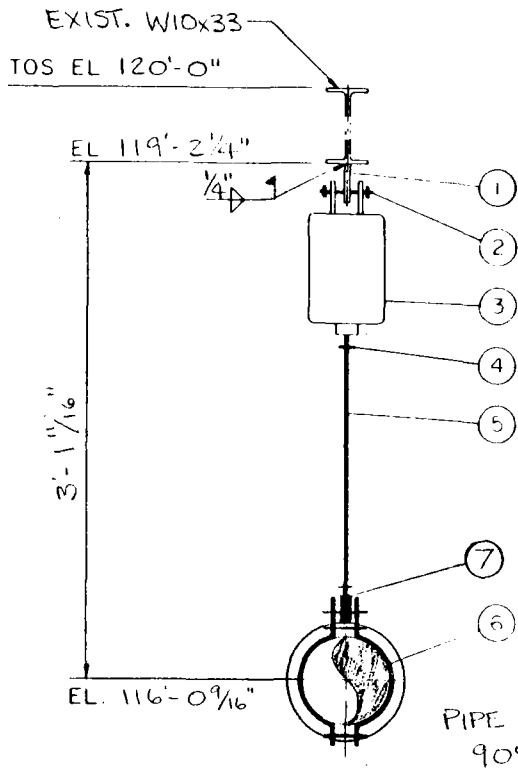
ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
DATE	3/27/80	DATE	3/27/80
REVIEWED	DATE	APPROVED	DATE
DATE	3/10/80	DATE	4/22/80
PROJECT			
DATE			

5			
4	ITEM RECD	COMPONENT DESCRIPTION	REMARKS
3	SCALE:	NONE	11165/8
2	Stearns-Roger		
1	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
REVISIONS			

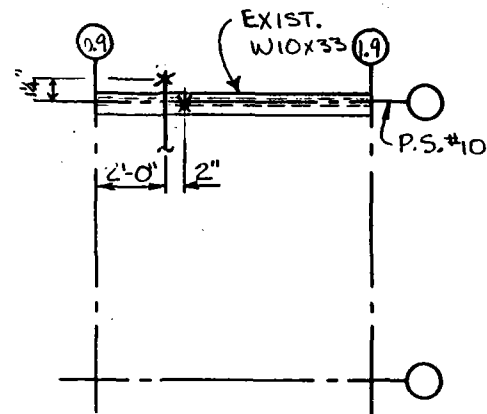
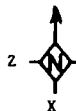
ANALYSIS ID. CODE T/W/X-MS-3-A-2/3/1 PROJECT NO C-21700 LINE NO 6-MS-3-QEB MARK NO H-MS-3-4

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST

PIPE ROTATED
90°



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta x = 1 7/16"$
 $\Delta z = -2 1/2"$

VOL. P60-1

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

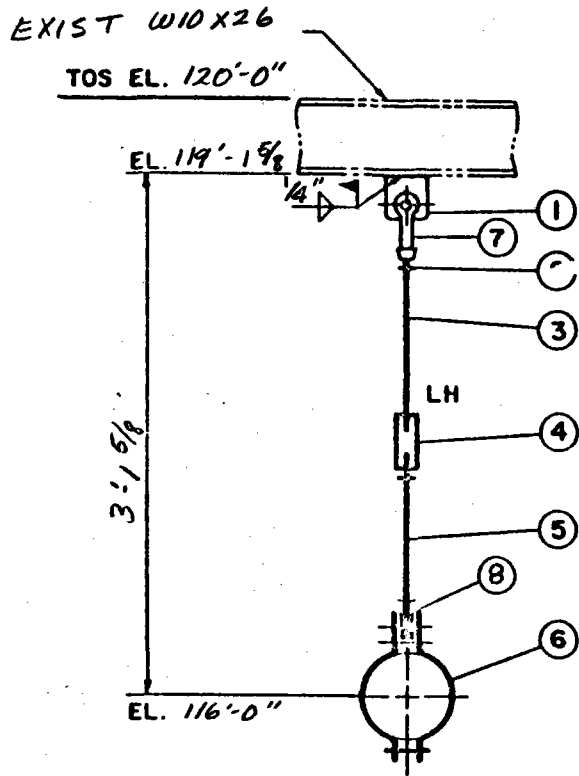
SPRING DATA			14
FIG. NO	TYPE	SIZE	13
B-268	C	9	12
HOT LOAD		923 lb.	11
COLD LOAD		755 lb.	10
VERT. TRAVEL C. TO H.		15/16" DIA	9
T. T. CONST. SUPPORT		N.A.	8
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7
E	PIPING	P9-10	6
D	STRUCTURAL	S22-1	5
C	ELECTRICAL		4
B			3
A			2
			1

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7	1	3/4" DIA. WELDLESS EYENUT FIG. 290	
E	PIPING	P9-10	6	1	6" ϕ PIPE CLAMP FIG. 295 A	
D	STRUCTURAL	S22-1	5	1	3/4" DIA. R. H. THD. ROD FIG. 140	
C	ELECTRICAL		4	2	3/4" DIA. R. H. HEX NUT	
B			3	1	3/4" SPRING	SEE DATA
A			2	1	3/4" DIA. PIN W/COTTER PIN FIG. 291	
			1	1	3/4" DIA. STRUCT. WELDING LUG FIG. 55	

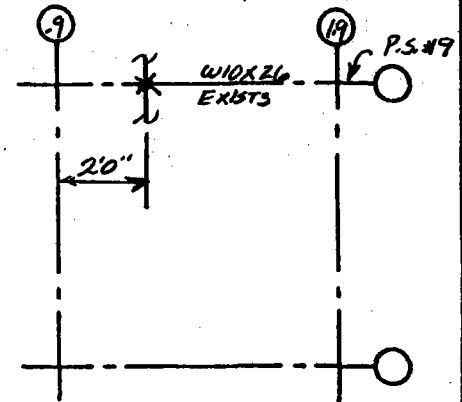
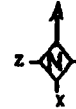
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.2 K
PIPE SIZE: 6.621" O.D.
PIPE INSULATION: 1 1/2"
PIPE MATERIAL: A36, P2

ENGINEERING RECORD				5	ITEM RECD	COMPONENT DESCRIPTION	REMARKS
DESIGNED	DATE	CHECKED	DATE	4			
	3/31/80	FVH	3-24-80	3	SCALE:	Stearns-Roger INCORPORATED	11165/8
REVIEWED	DATE	APPROVED	DATE	2	NONE		
	3/19/80			1		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	PROJECT NO C-21700
PROJECT	DATE			REVISIONS			
ANALYSIS ID. CODE	T/W/X-MS-3-A-3/3/1						

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = 0"$
 $\Delta z = -1/8"$

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. 295H ALLOY
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	1/4" DIA. STRUCT. WELDING LUG SHORT FIG. 55
ITEM RECD		COMPONENT DESCRIPTION
SCALE:	NONE	Stearns-Roger INCORPORATED
REVISIONS		REMARKS
		11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
ANALYSIS ID. CODE	T/WIX-MS-3-A-3/3/1	PROJECT NO C-21700
		LINE NO 6"MS-3-OEB
		MARK NO H-MS-3-6

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-10	5
D	STRUCTURAL 533-1	6
C	ELECTRICAL	7
B		8
A		9

ENGINEERING RECORD

DESIGNED	M.A.E.	CHECKED	R.D.	DATE	3-24-80
DATE	3-14-80	DATE	3-27-80		
REVIEWED	P.H.	APPROVED	M.H.	DATE	3-27-80
DATE	3-10-80	DATE	3-27-80		
PROJECT					
DATE					
ANALYSIS ID. CODE	T/WIX-MS-3-A-3/3/1				

NOTES:

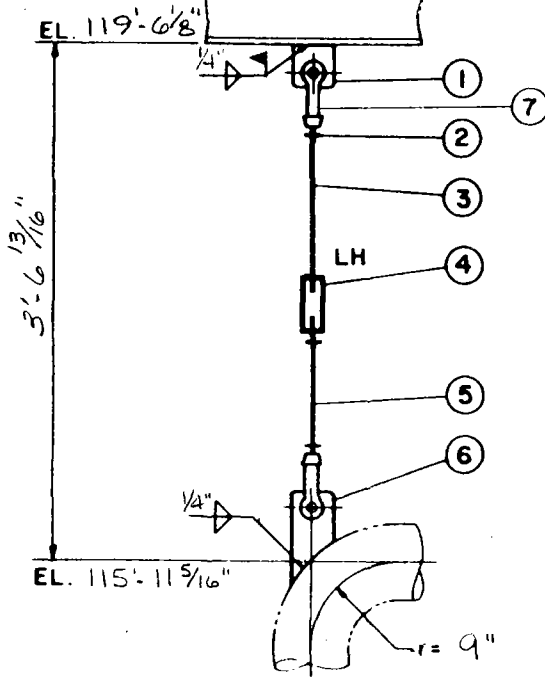
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 3.4K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2" THICK
 PIPE MATERIAL: ASTM A335 P22

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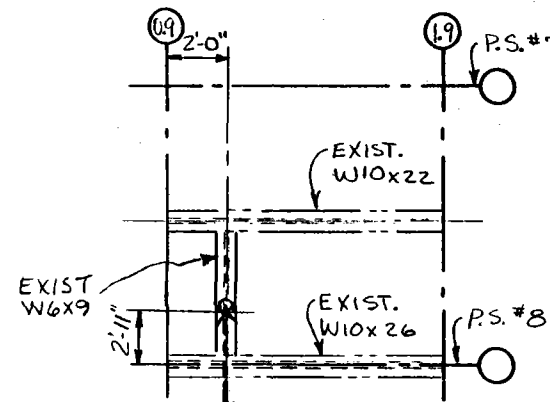
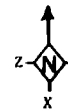
85-1-538 4/83

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

$\Delta x = -1 \frac{5}{8}''$

$\Delta z = 2 \frac{5}{16}''$

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	P1-10	P2	6	1	9/8"	DIA. WELDING LUG C=7 7/8" H. S. 53 (BY FRB) JR
STRUCTURAL	S33-1	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
			1	1	7/8"	DIA. STRUCT. WELDING LUG SHORT FIG. 55

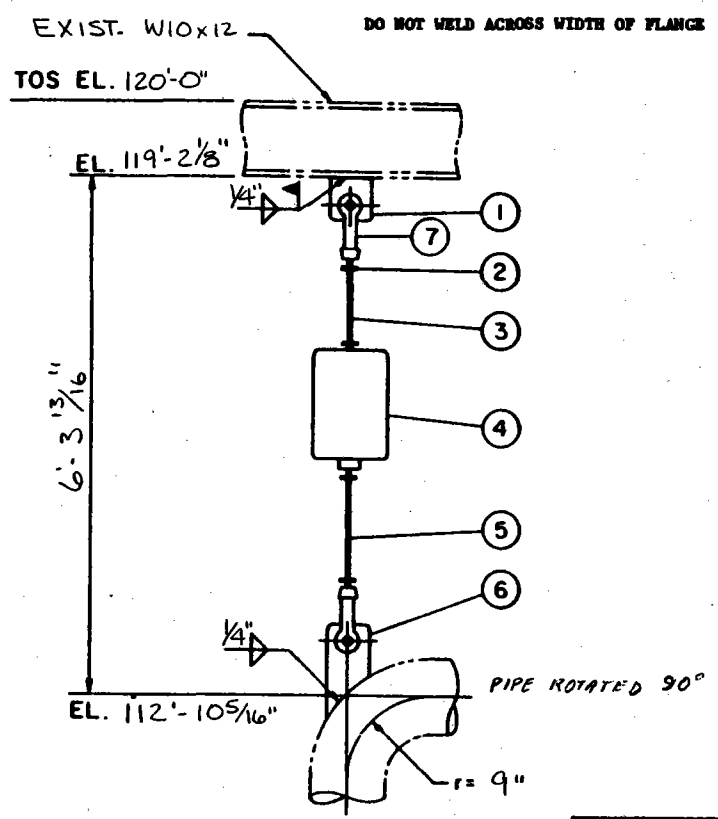
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 2.1 K
PIPE SIZE: 6.625" O.D.
PIPE INSULATION: 4" I
PIPE MATERIAL: A335 P22

ENGINEERING RECORD			
DESIGNED	3/10/80	CHECKED	EVH
DATE	3/10/80	DATE	3/27/80
REVIEWED	MM	APPROVED	MM
DATE	3-10-80	DATE	3-27-80
PROJECT			
DATE			

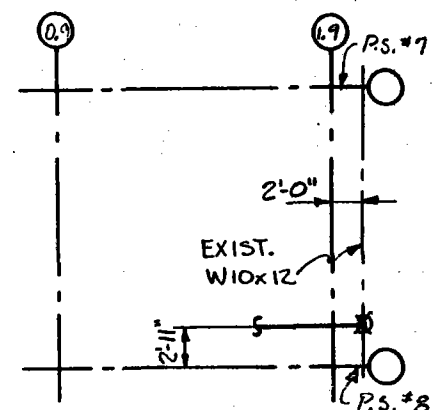
5	1	1	7/8"	DIA. STRUCT. WELDING LUG SHORT FIG. 55
4		ITEM REQD		COMPONENT DESCRIPTION
3		SCALE:	NONE	REMARKS
2		Stearns-Roger <small>INCORPORATED</small>		
1		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
REVISIONS				

ANALYSIS ID. CODE	77W/X-M-2-A-213/1	PROJECT NO	C-21700	LINE NO	6-MS-3-DEB	MARK NO	H-MS-3-7
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ELEV. LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x = 1/16"
- △ z = 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	A	12	12
HOT LOAD		2117 lb.	11
COLD LOAD		2511 lb.	10
VERT. TRAVEL C. TO H.		7/8" LIP	9
T. I. CONST. SUPPORT		N.A.	8

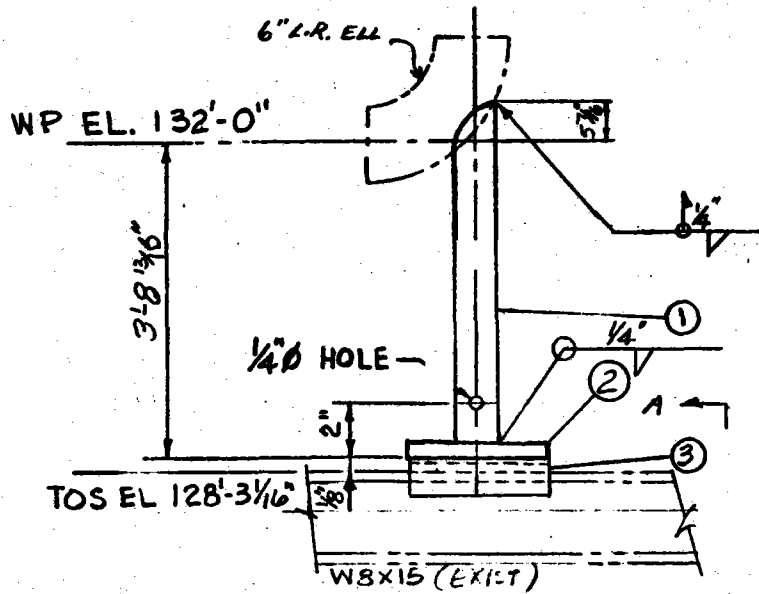
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7	2	1" DIA. F. S. CLEVIS W/PIN FIG. 299	
E	PIPING	P9-8	P.	6	1	1" DIA. WELDING LUG C-7 1/2 H. S. 53 (EX FRG TR)
D	STRUCTURAL	S33-1	A	5	1	1" DIA. R. H. THD. ROD FIG. 140
C	ELECTRICAL			4	1	SPRING
B				3	1	1" DIA. R. H. THD. ROD FIG. 140
A				2	4	1" DIA. R. H. HEX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

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

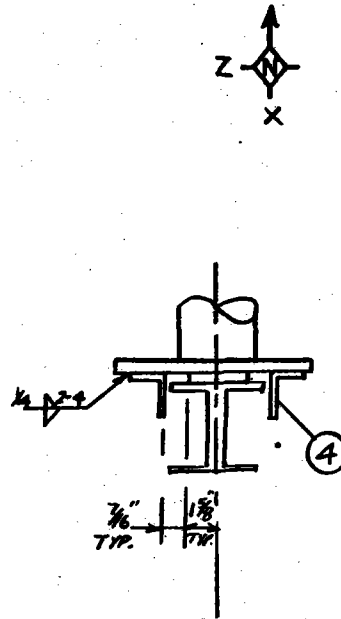
ENGINEERING RECORD				5	1	1	1" DIA. STRUCT. WELDING LUG FIG. 55	SHORT
DESIGNED	7/18/80	CHECKED	7/22/80	4	ITEM REQD	COMPONENT DESCRIPTION		REMARKS
DATE	3/11/80	DATE	3-27-80	3	SCALE:	NONE		
REVIEWED	12/1/80	APPROVED	12/1/80	2	Stearns-Roger <small>INCORPORATED</small> 11165/8			
DATE	3/11/80	DATE	3-27-80	1				
PROJECT				REVISIONS 10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
DATE				PROJECT NO C-21700 LINE NO 6" MS-3-GER MARK NO H-MS-3-8				
ANALYSIS ID. CODE	T/W/X-MS-3-A-3/31							

FORM MS-3-16

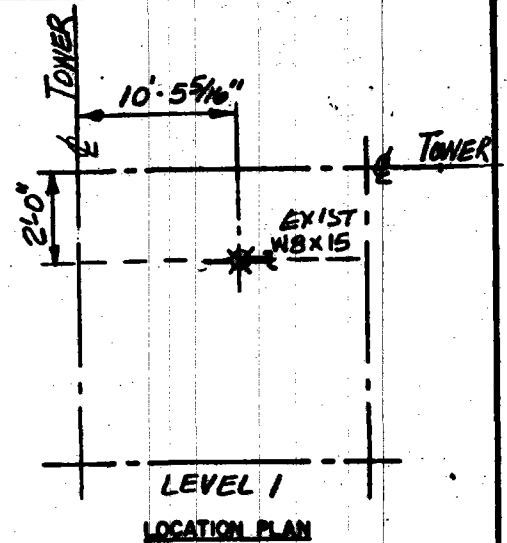
240



ELEVATION LOOKING SOUTH



SECTION A-A



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = 0"
- Δ Z = 1/16"

14					
13					
12					
11					
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PPRIG P9-3	P3 6
D	STRUCTURAL SB2-2	0 5
C	ELECTRICAL	
B		
A		

- △ ADDED GUIDE, REVISED ITEMS 1 & 3, S.D. LOAD, MOUNT., SECTN.
- △ REVISED WELD SYMBOLS
- △ REVISED ITEM 1

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: Fx=70K, Fy=55K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

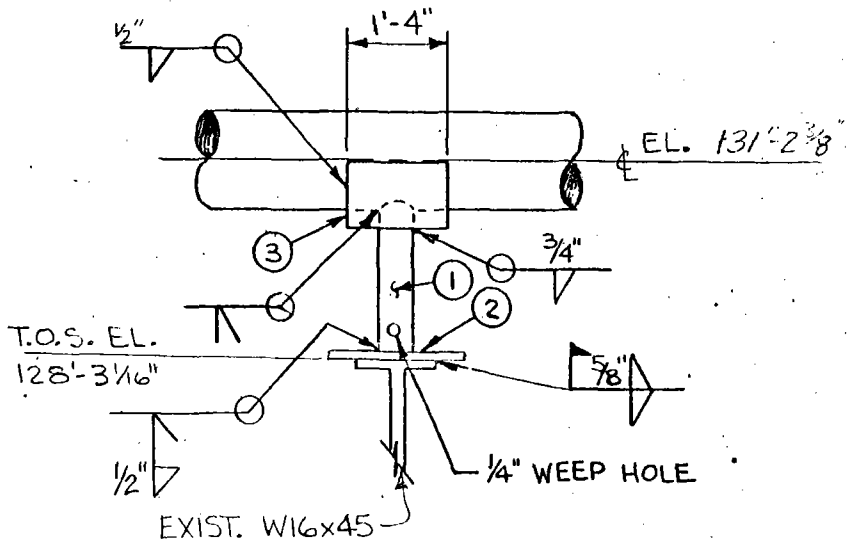
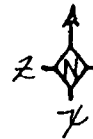
ENGINEERING RECORD			
DESIGNED	MLB	CHECKED	REL
DATE	3-10-81	DATE	2-24-81
REVIEWED	REL	APPROVED	
DATE	3/12/81	DATE	
PROJECT			
DATE			

REVISIONS	ITEM REQD	SCALE	COMPONENT DESCRIPTION	REMARKS
5	1	NONE	5" SCH. 80 PIPE A335 P22 CUT TO SUIT	
4	1		1 1/2" X 1 1/2" X 1/4" 7 B" LG.	
3	1		1/8" THK. 8" X 3 1/4" GALVANIZED L. BRACKET TO (2)	
2	1		8" X 8" X 3/8" C.S. PLATE	
1	1			

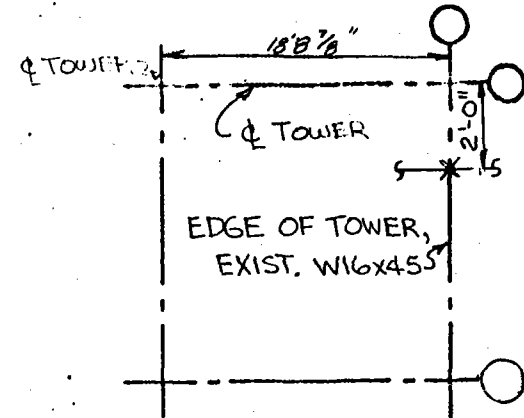
ANALYSIS ID. CODE	T/W-MS-1-A 13/6	PROJECT NO	C-21700	LINE NO	6"MS-6-DEB	MARK NO	H-MS-6-2
	X-MS-1-A-5						

11165/8

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEVATION LOOKING NORTH



LOCATION PLAN

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

VOL. F60-1

* ALL ITEMS BY PIPE FABRICATOR

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

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
3			
3	1	PL, SHAPED TO FORM PIPE SADDLE	
2	1	1/2" X 1'-4" X 1'-5" ASTM A307 GR. D *	
2	1	1" X 10' X 10' ASTM *	
1	1	8" XXS PIPE STANCHION A335 P11 *	

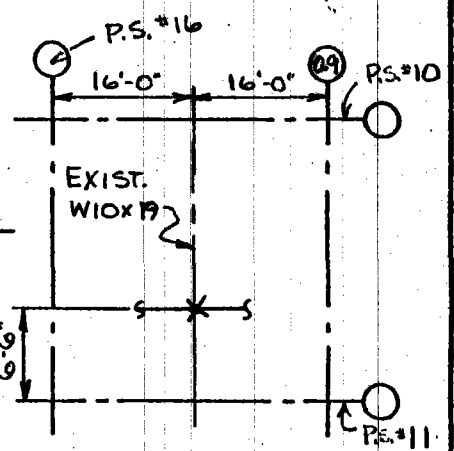
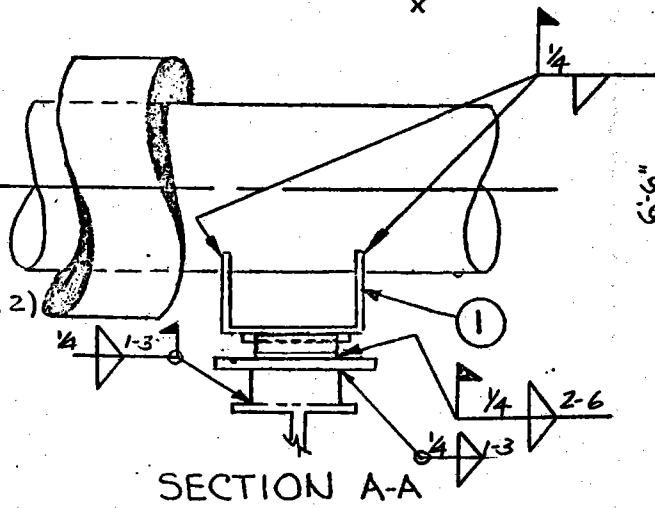
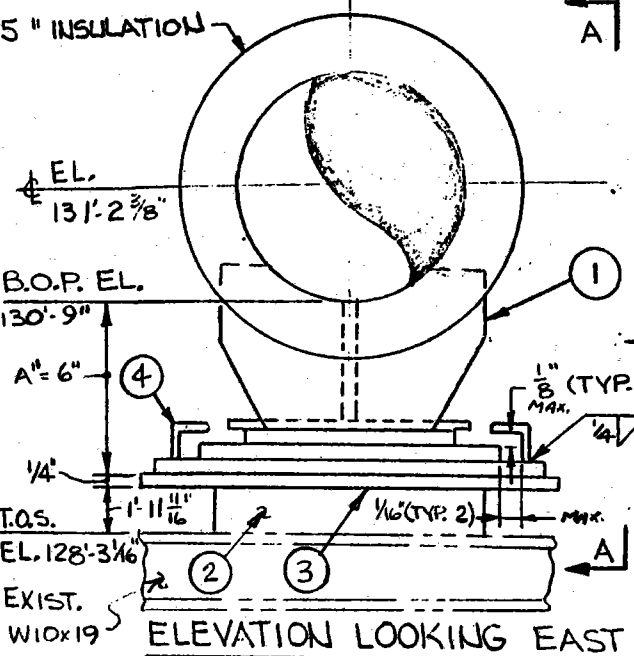
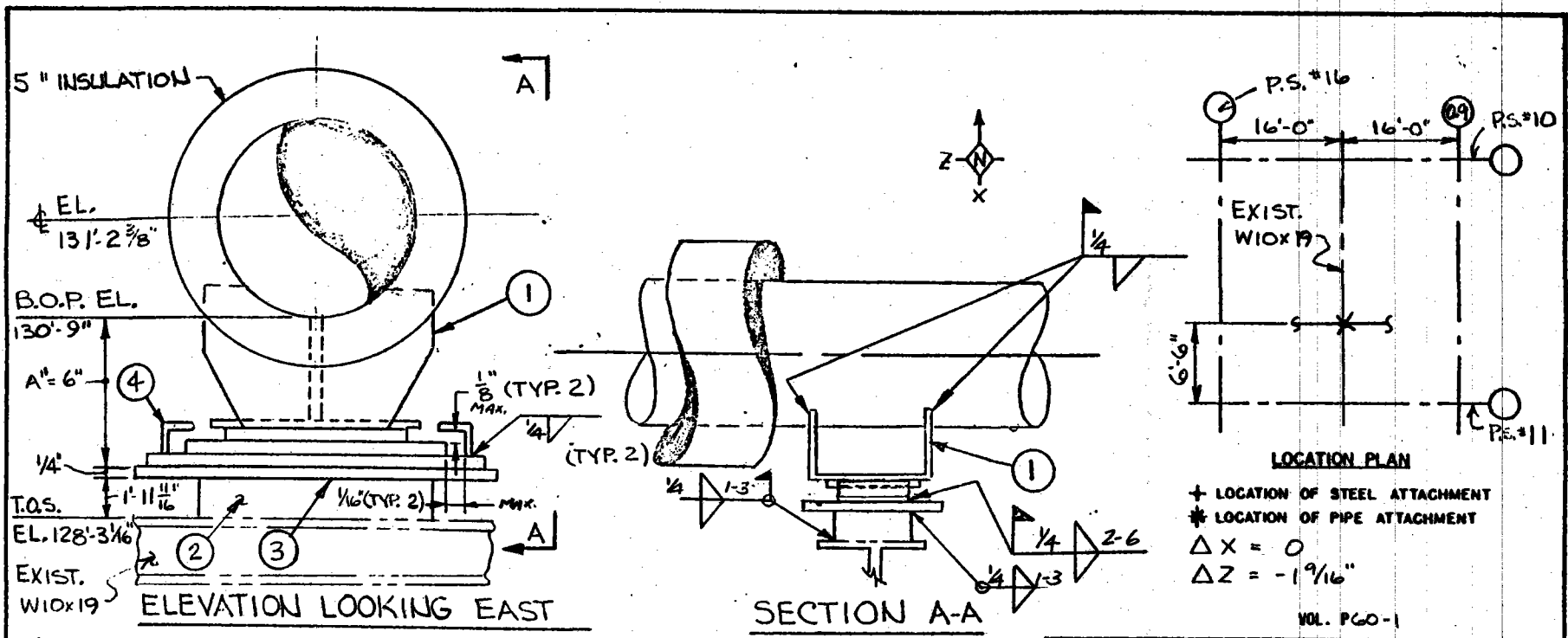
NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 29K, F_y = 38K,$
 PIPE SIZE: 10" O.D. $F_t = 6.5K, M_y = 210'K$
 PIPE INSULATION: $M_x = 13.9'K, M_z = 26.3'K$
 PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD				5	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
DESIGNED	DATE	CHECKED	DATE	4			
REVIEWED	DATE	APPROVED	DATE	3			
PROJECT	DATE			2	10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
ANALYSIS ID. CODE				1			
					REVISIONS		
					PROJECT NO C-21700	LINE NO 10'-HS-7-FTA	MARK NO H-MS-7-1

241

1-11-83

242



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 ΔX = 0
 ΔZ = -1 9/16"

VOL. PG0-1

DO NOT WELD ACROSS WIDTH OF FLANGE

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

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	2	4 1/2 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	
1	1	A" = 6" (SPECIAL OF A335 P11 ALLOY)	
		10" DIA. PIPE SADDLE, FIG. 612	Rev 3/20/80
		COMPONENT DESCRIPTION	REMARKS
		Stearns-Roger	11165/8
		10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
		PROJECT NO C-21700	LINE NO 10"-MS-7-FPA
		MARK NO H-MS-7-2	

NOTES:
 PIPE TEMPERATURE: 885°F
 STRUCTURAL DESIGN LOAD: Fx = 2.5K
 PIPE SIZE: 10.75" O.D. Fy = 2.2K
 PIPE INSULATION: 5"
 PIPE MATERIAL: A335 P11

ENGINEERING RECORD			
DESIGNED	7/1/80	CHECKED	YEU
DATE	3/10/80	DATE	2-27-80
REVIEWED	H 7/80	APPROVED	FVH
DATE	3/11/80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W/X-MS-1-A-5/3/1	PROJECT NO	C-21700
		LINE NO	10"-MS-7-FPA
		MARK NO	H-MS-7-2

1-728 4493

EXIST W8 X 10

DO NOT WELD ACROSS WIDTH OF FLANGE

TOS EL. 137'-6"

EL. 136'-10 1/8"

5'-7 3/4"

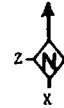
EL. 131'-2 3/8"

ELEV. LOOKING EAST

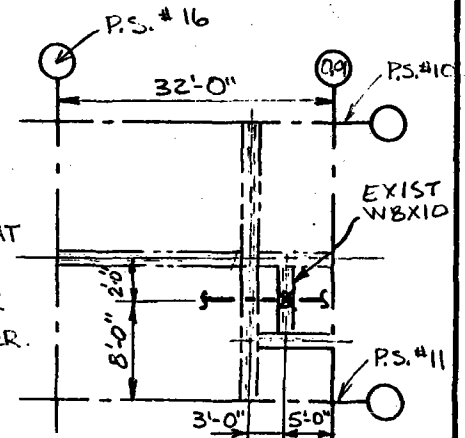
PIPE ROTATED 90°

LH

- ①
- ②
- ③
- ④
- ⑤
- ⑥
- ⑦



NOTE: STEEL AT RIGHT REPRESENTS STEEL BETWEEN MAIN RACK AND RECEIVER TOWER.



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △x = -1/8"
- △z = -2 5/16"

VOL. P60-1

VENDOR ENG. REV.	REV.	DESCRIPTION
E	12	
D	11	
C	10	
B	9	
A	8	
	7	2 3/4" DIA. F. S. CLEVIS W/PIN FIG. 299
	6	1 3/4" DIA. WELDING LUG C-9 5/16 H.S. 53 (HY FABR.)
	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

REFERENCE DRAWINGS	REV.	DESCRIPTION
PIPING	Pg-3	P3
STRUCTURAL	S33-4	A
ELECTRICAL		

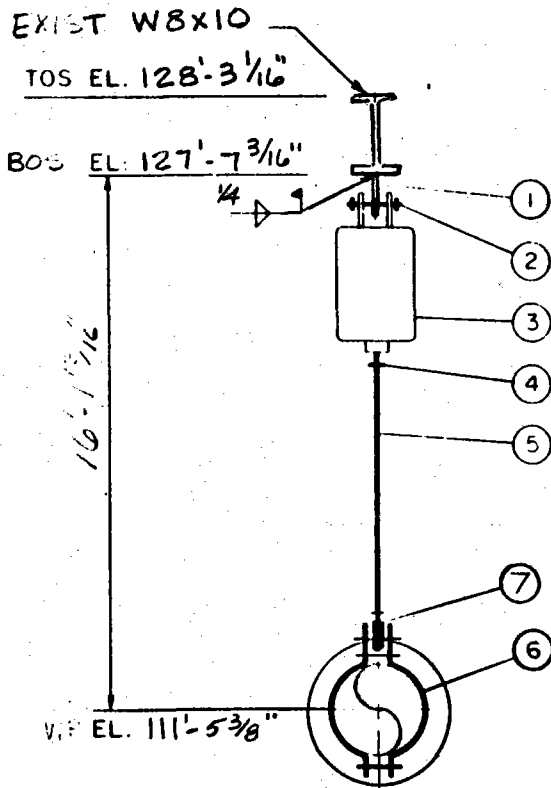
NOTES:
 PIPE TEMPERATURE: 885°F
 STRUCTURAL DESIGN LOAD: 2.9K
 PIPE SIZE: 10.75" O.D.
 PIPE INSULATION: 5"
 PIPE MATERIAL: ASTM A335 P1

ENGINEERING RECORD			
DESIGNED	MDJ	CHECKED	REV EVH
DATE	2/16/80	DATE	3-27-80
REVIEWED	EVH	APPROVED	EVH
DATE	3-20-80	DATE	3-27-80
PROJECT			
DATE			

REVISIONS	ITEM REQD	SCALE	COMPONENT DESCRIPTION	REMARKS
5	1	NONE	Stearns-Roger	11165/8
10 Mc SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT N° C-21700		LINE N° 10" MS-7-FFA		MARK N° H-MS-7-3

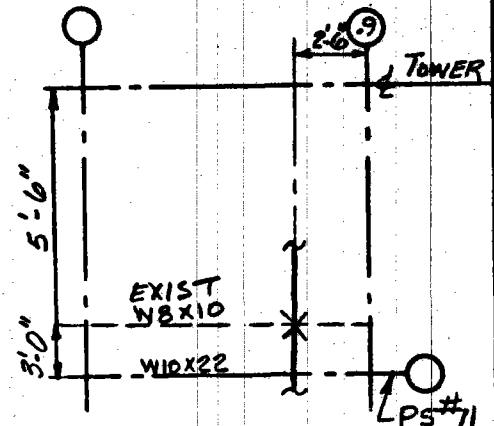
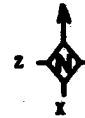
ANALYSIS ID. CODE T/W/Y-15-1-A-5/3/1

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST
PIPE ROTATED 90°

Δ REVISE HANGERS, HOT & COLD LOAD, PIPE EL. & ANALYSIS NO.
Δ REVISE ST. 1



LOCATION PLAN
 + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δx = -1 7/8"
 Δz = -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	B	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

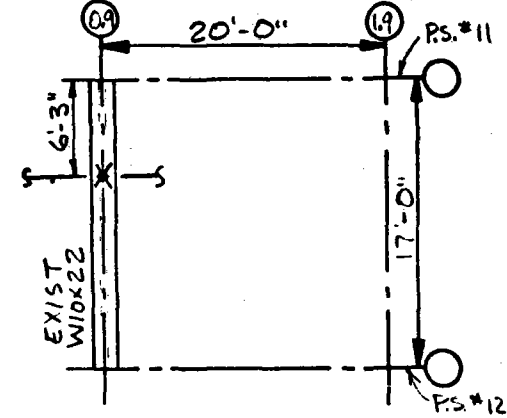
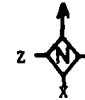
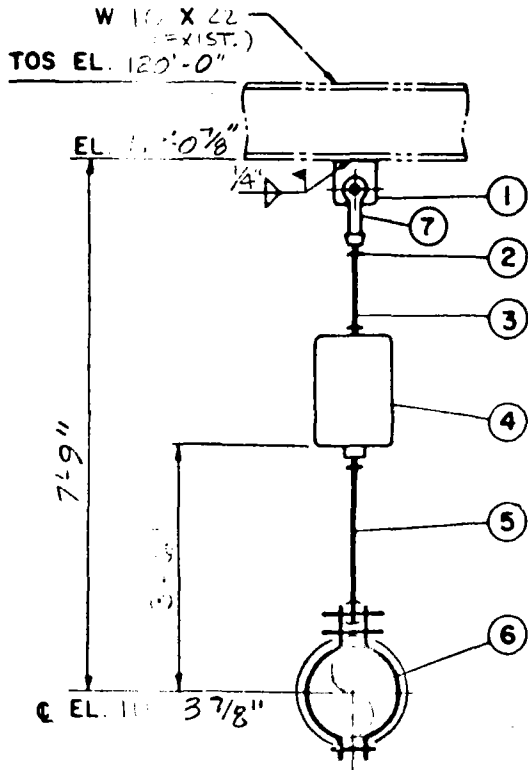
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7	1	5/8" DIA. WELDLESS EYENUT FIG. 290
E	PIPING P9-3	1	6	1	10" PIPE CLAMP FIG. 295A
D	STRUCTURAL 333-4	1	5	1	5/8" DIA. R. H. THD. ROD FIG. 140
C	ELECTRICAL		4	2	5/8" DIA. R. H. HEX NUT
B			3	1	SPRING
A			2	1	3/4" DIA. PIN W/COTTER PIN FIG. 291

NOTES:
 PIPE TEMPERATURE: 865°F
 STRUCTURAL DESIGN LOAD: 1.4k
 PIPE SIZE: 10" E"
 PIPE INSULATION: 5"
 PIPE MATERIAL: TM A335 P11

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	KEB EVH
DATE	3-11-80	DATE	3-24-80 3-27-80
REVIEWED	MLM	APPROVED	
DATE	3-11-80	DATE	3-27-80
PROJECT	EXM		
DATE	5-28-80		
ANALYSIS ID. CODE	T/W-AIS-1-A-14/9		

5	1	1	5/8" DIA. STRUCT. WELDING LUG FIG. 551G
4		ITEM RECD	COMPONENT DESCRIPTION
3		SCALE:	NONE
		Stearns-Roger	
		11165/8	
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 10"MS-7-FEA	MARK NO H/MS-7-4

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT*
- Δ X = -15/16"
- Δ Z = -15/16"

VOL. P60-1

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

SPRING DATA			14
FIG. N°	TYPE	SIZE	13
25	A	6	12
HOT LOAD		437#	11
COLD LOAD		387#	10

VENDOR ENG. REV.	VERT. TRAVEL C. TO H.	T. T. CONST. SUPPORT	REV.
	1 3/16 IN	N/A	9
E			8
D			7
C			6
B			5
A			4

Y/W/X-11-1-A/14/1/A
ANALYSIS ID. CODE

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	1 1/2" DIA. WELD LUG SKRT FIG. 55	
2	5/8" DIA. HEX. NUT R.H.	
3	5/8" DIA. R.H. THD ROD FIG. 140	
4	SPRING	SEE DATA
5	5/8" DIA. R.H. WE. ROD FIG. 278	
6	10" Ø PIPE CLAMP FIG. 295A	
7	5/8" DIA. F.S. CLEVIS FIG. 299	W/PIN

REVISE HOT/COLD LOADS, MOUNT, ANALYSIS NO.
REVISE LOADS

NOTES:
PIPE TEMPERATURE: 815°F
STRUCTURAL DESIGN LOAD: .8 K.
PIPE SIZE: 1 1/2" O.D.
PIPE INSULATION: 5" THK.
PIPE MATERIAL: ASTM A335 M1

ENGINEERING RECORD	
DESIGNED	CHECKED
DATE	DATE
REVIEWED	APPROVED
DATE	DATE
PROJECT	
DATE	

REVISIONS	SCALE	PROJECT NO	LINE NO	MARK NO
1	NONE	C-21700	101	11-115-7-5

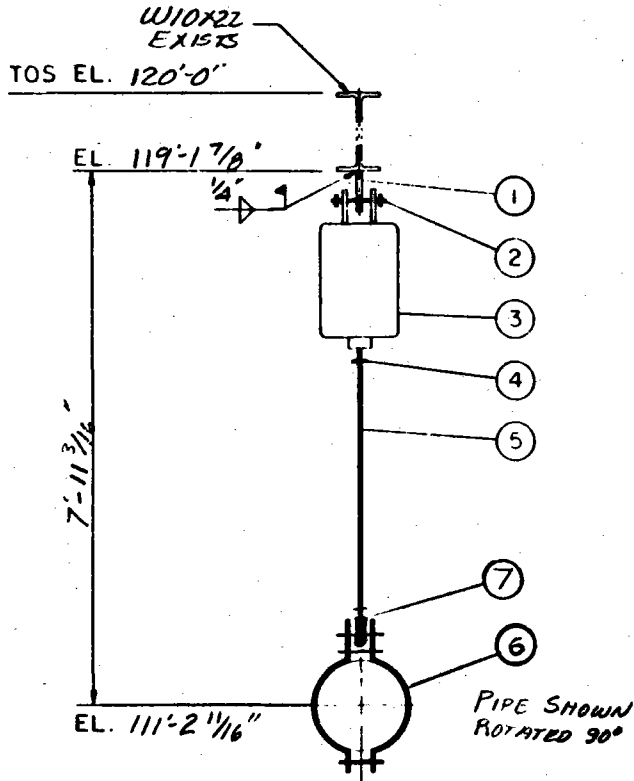
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

Stearns-Roger
INCORPORATED

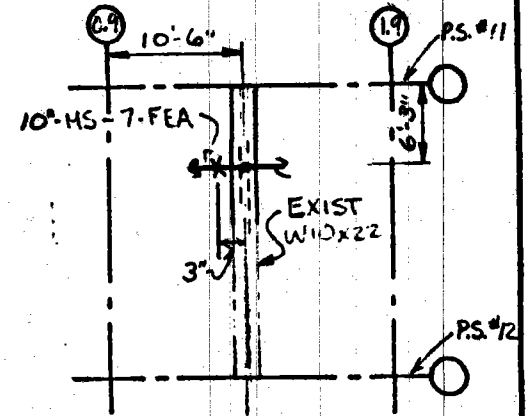
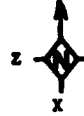
11165/8

245

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

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

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		508#
VERT. TRAVEL C.T.O.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		

ITEM NO	SCALE	COMPONENT DESCRIPTION	REMARKS
14			
13			
12			
11			
10			
9			
8			
7	1	5/8" Ø WELDLESS EYELET FIG. 210	
6	1	10" Ø PIPE CLAMP FIG. 295A	
5	1	5/8" Ø R.H. TND. ROD FIG. 140	
4	2	5/8" Ø R.H. HEX ANG	
3	1	SPRING SEE DATA	
2	1	3/4" Ø PIN W/ COTTER PIN FIG. 291	
1	1	5/8" Ø STREET WELDING LUG FIG. 55	

Δ REVISED FROM RIGID TO SLANG MOD.
 Δ REVISED WELD SYMBOL

NOTES
 PIPE TEMPERATURE: 880°F
 STRUCTURAL DESIGN LOAD: 1.2 K
 PIPE SIZE: 3" O.D.
 PIPE INSULATION: 5"
 PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		

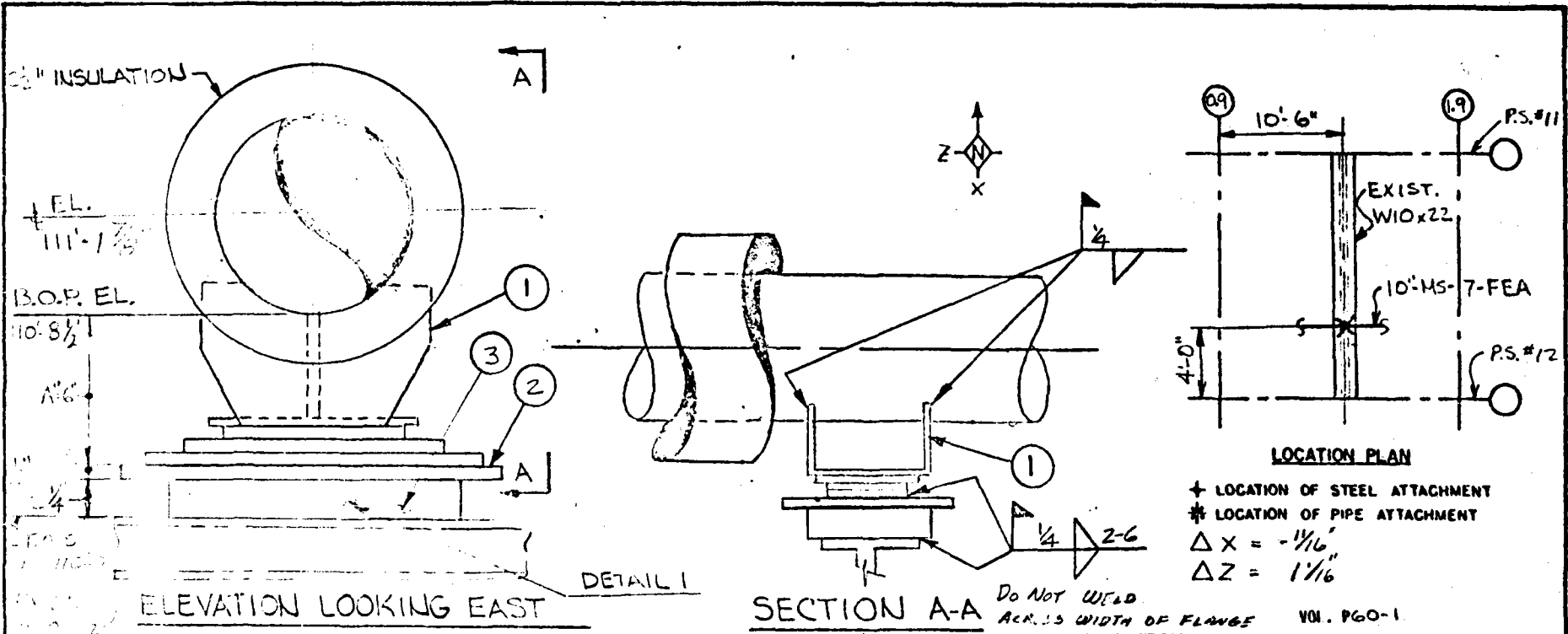
5	
4	
3	
2	
1	

ITEM NO	SCALE	COMPONENT DESCRIPTION	REMARKS
	NONE	Stearns-Roger	11165/8

10 Mw SOLAR PILOT PLANT BAGGETT, CALIFORNIA

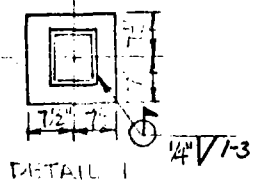
ANALYSIS ID. CODE T/101-111-A-14/9/4 PROJECT NO C-21700 LINE NO 10'-MS-7-FEA MARK NO 11-MS-7-6

247



REVISIONS
 1. 11/15/80
 2. 11/15/80

LOCATION PLAN
 + LOCATION OF STEEL ATTACHMENT
 # LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1/16"$
 $\Delta Z = 1/16"$
 Do NOT WELD ACROSS WIDTH OF FLANGE VOL. PG0-1



VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-8	P2
D	STRUCTURAL 232-2	A
C	ELECTRICAL	
B		
A		

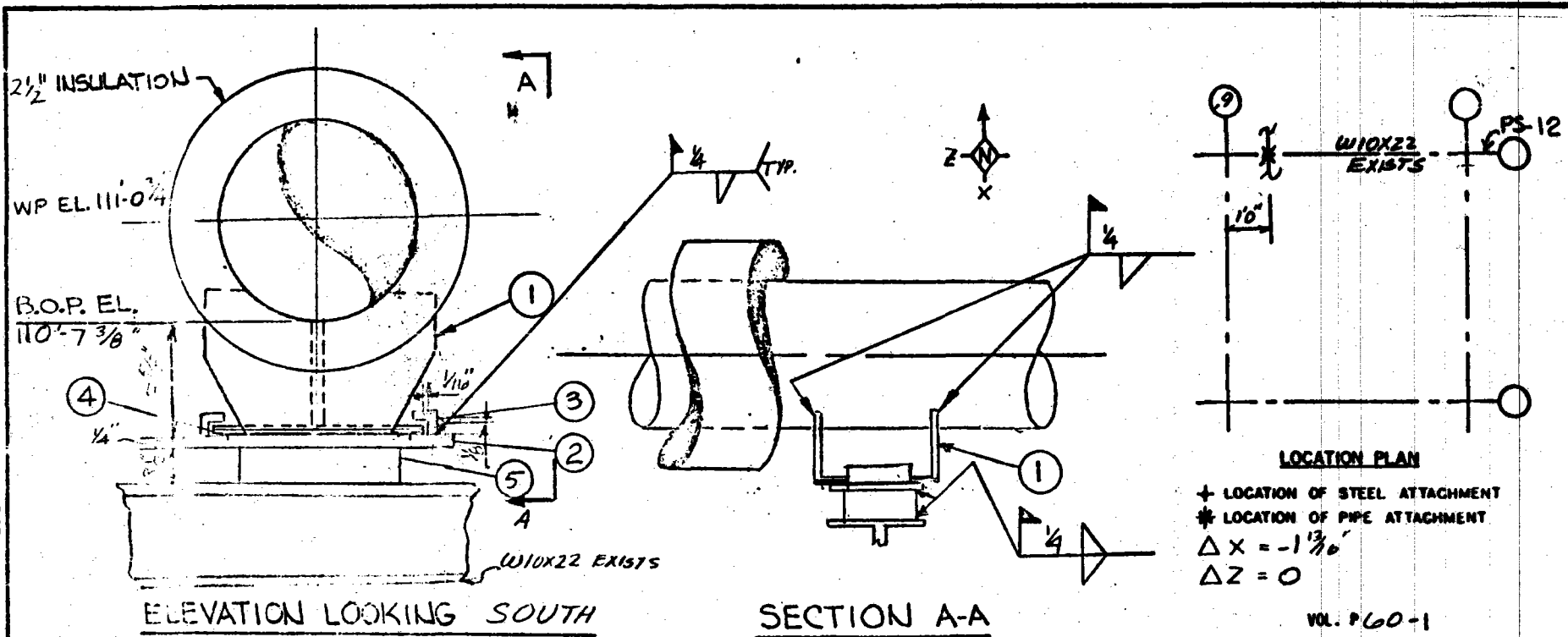
REVISIONS
 1. REVISION FOR LOAD, ELEV. & TEMP. ANALYSIS NO
 2. REVISION FOR ID SYMBOL

NOTES
 PIPE TEMPERATURE: 870 F
 STRUCTURAL DESIGN LOAD: 1.8K
 PIPE SIZE:
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: 304L A335 P1

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	T/W/S-10-A-A-14/19/4		

REVISIONS
5
4
3
2
1

ITEM RECD	COMPONENT DESCRIPTION	REMARKS
1	10" PIPE, FIG. 612	4/16 STAMP
	Stearns-Roger	11165/8
	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	PROJECT #	C-21700
	LINE #	10-10-2-11-A
	MARK #	11-MS-7-7



LOCATION PLAN
 + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -1 \frac{3}{8}$
 $\Delta Z = 0$

VOL. P60-1

14		
13		
12		
11		
10		
9		
8		
7		
6		
5	1	7" X 5" STRUCTURAL TUBING 3 1/2' L ₀
4	1	12" X 7 1/2" GRAPHITE R. BONDED TO ①
3	2	1" X 1 1/2" X 1/4" 5" L THIN AS A.S. 50
2	1	1/4" X 9" X 6" R.C.S.
1	1	PIPE SADDLE FIG. 605, 10" A387 Gr. D
ITEM RECD		COMPONENT DESCRIPTION
SCALE:	NONE	REMARKS
		Stearns-Roger
		11165/B
		10 Mc SOLAR PILOT PLANT BAGGETT, CALIFORNIA
		PROJECT NO C-21700 LINE NO 10" A387-7-FEA MARK NO H-MS-7-8

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-8	1
D		STRUCTURAL S33-2	1
C		ELECTRICAL	
B			
A			

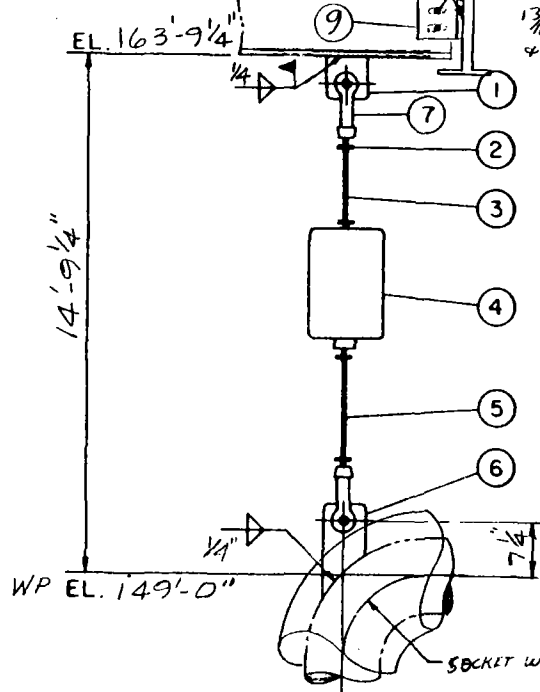
REVISOR: LOCAL, MOVIS, ITEMS 1, 2, 3 & 5

NOTES
 PIPE TEMPERATURE: $F_z = 2.5K$
 STRUCTURAL DESIGN LOAD: $F_x = 3.7K$
 PIPE SIZE: 10" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: A335 P11

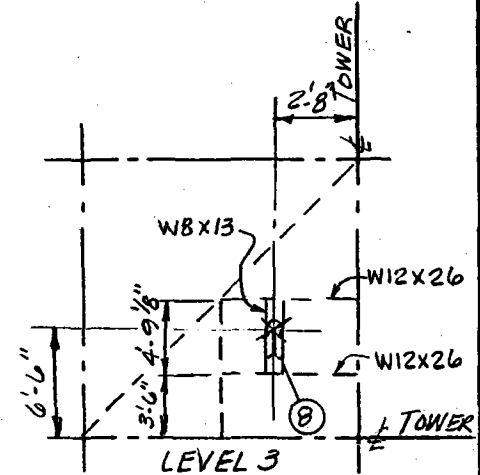
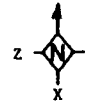
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	3/27/80 FVL
DATE	3-12-80	DATE	3-27-80
REVIEWED	JLH	APPROVED	JLH
DATE	3-12-80	DATE	3-27-80
PROJECT	RK III		
DATE	8-28-80		
ANALYSIS ID. CODE	T/W/K-115-A-A-14/94		

REVISIONS
5
4
3
2
1

NEW W8 X 13
TOS EL. 164'-5 1/4"



DO NOT WELD ACROSS WIDTH OF FLANGE
13/16" X 1 1/2" SCOTTED HOLE IN WEB OF W8
4 13/16" HOLE IN F FOR 3/4" A 325 BOLTS
TYP. CORN. TO END W8



LEVEL 3
LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
△ x = -7/16"
△ z = 2 1/16"

VOL. P 60-1

ELEV. LOOKING EAST

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		172#	11	
COLD LOAD		203#	10	4
VERT. TRAVEL C. TO H.		7/8" UP	9	4
T T CONST. SUPPORT		N.A.	8	1
REFERENCE DRAWINGS		REV	7	2
PIPING	P9-3	P3	6	1
STRUCTURAL	S32-3	0	5	1
ELECTRICAL			4	1
			3	1
			2	4
			1	1

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

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .3K
PIPE SIZE: 2.375" O.D.
PIPE INSULATION: 3/2"
PIPE MATERIAL: ASTM A335 P22

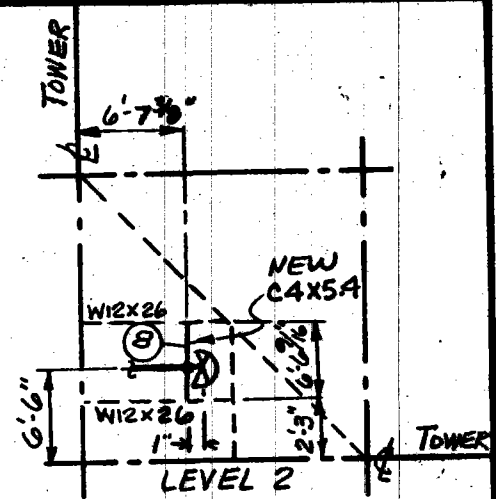
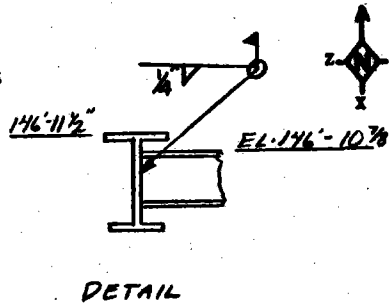
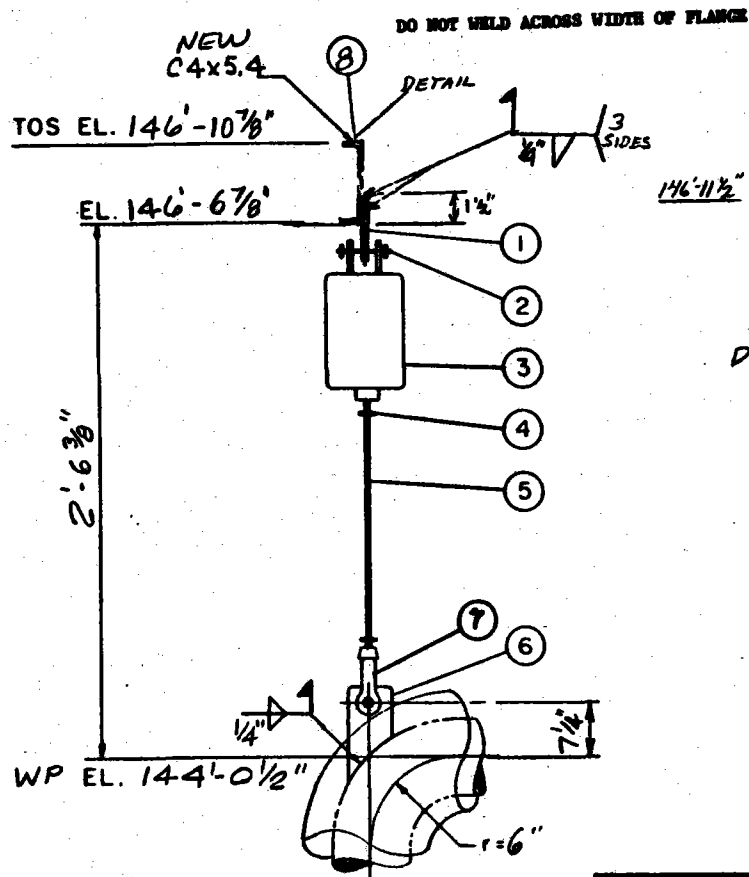
ENGINEERING RECORD

DESIGNED	MLM	CHECKED	ROB	FVH
DATE	9-5-80	DATE	8-24-80	3-27-80
REVIEWED	MLM	APPROVED	MLM	
DATE	3-27-80	DATE	3-27-80	
PROJECT				
DATE				

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	
2	1/2" DIA. R. H. THD. ROD FIG. 140	SEE DATA
3	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1/2" DIA. R. H. THD. ROD FIG. 140	
5	1/2" DIA. R. H. THD. ROD FIG. 140	
6	2" DIA. WELDING LUG	
7	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
8	W8 X 13 4'-8 1/2" LG	
9	4' X 3" X 3/8" X 5/16"	
10	3/4" X 3" A325 BOLTS	
11		
12		
13		
14		

10 MME SOLAR PILOT PLANT, DAGGETT, CALIFORNIA

ANALYSIS ID. CODE T/W-A15-1-A-12/5 PROJECT NO C-21700 LINE NO 2" A15-8-QE8 MARK NO H-MS-B-1



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

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	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	E 4 X 5.7 6'-6 1/2" 26
VENDOR ENG. REV.		REFERENCE DRAWINGS	REV	7	1 5/8" DIA. F. S. CLEVIS W/PIN FIG. 299
E		PIPING	Pa	6	1 5/8" DIA. WELDING LUG Alloy For S...
D		STRUCTURAL	a	5	1 5/8" DIA. R. H. THD. ROD FIG. 146
C		ELECTRICAL		4	2 5/8" DIA. R. H. HEX NUT
B				3	1 SPRING SEE DATA
A				2	1 7/8" DIA. PIN W/COTTER PIN FIG. 291
				1	1 5/8" DIA. STRUCT. WELDING LUG FIG. 55 LONG

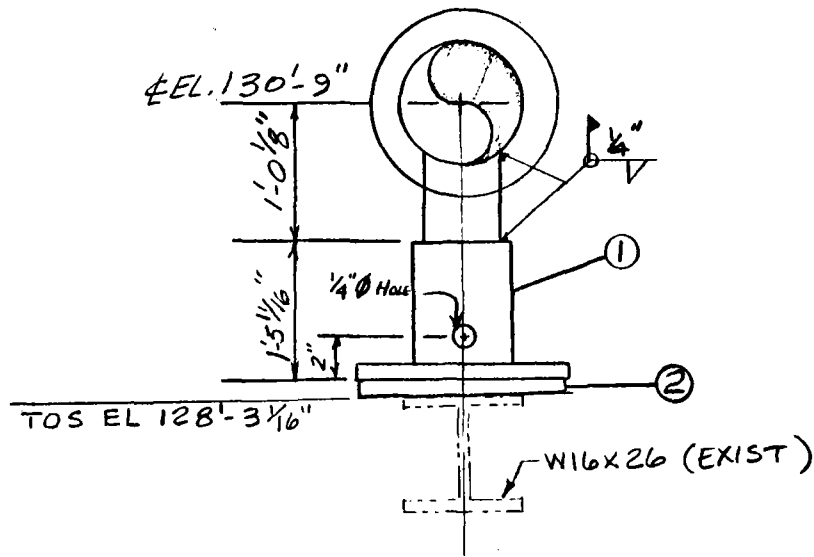
ELEV. LOOKING SOUTH

REVISD HOT & COLD LOAD & ANALYSIS N6

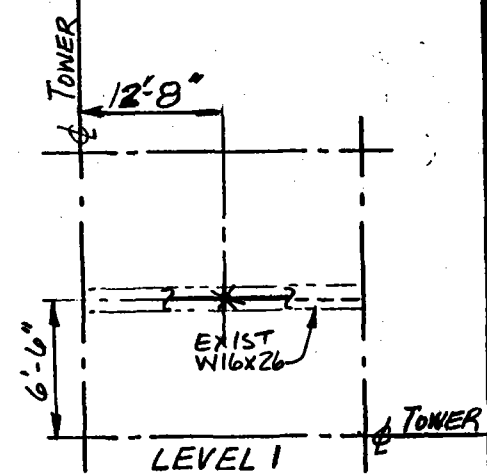
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .5K
 PIPE SIZE: 2.375" O.D.
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	REV EDH
DATE	3-5-80	DATE	APPRO 3-27-80
REVIEWED	MLM	APPROVED	
DATE	3-10-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-MS-1-A-15.6		

REV	REVISIONS	SCALE	COMPONENT DESCRIPTION	REMARKS
5				
4				
3				
1		NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO C-21708		LINE NO 27MS-R-278		PIPE NO H-MS-R-2



ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = 0
- △ Z = 1/2"

VOL. P 60-1

- △ LOC. PLAN, S.D. LOAD, ITEM 1 & ANALYSIS NO.
- △ WELD SYMBOLS

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P3-3	P3
D	STRUCTURAL S32 2	
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
2	1	1/8" X 10" X 10" GRADUATE R. BOWDED TO ①
1	1	TOP POSITION A 335 P 22 MAT'L.
1	1	# 4 ADJ. PIPE STANCHION TYPE C H.S. 62

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 3.7K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A 335 P 22

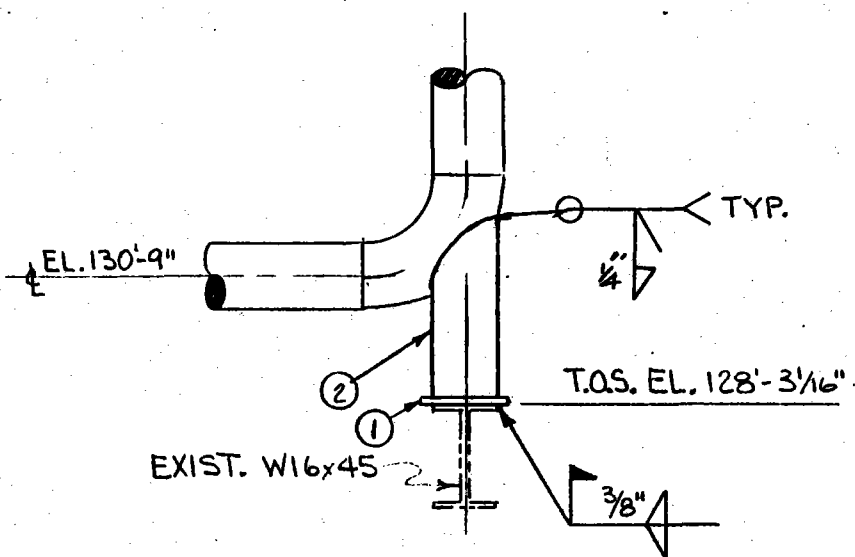
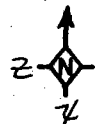
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DESIGNED	MLM	4
DATE	3-27-80	3-27-80
CHECKED	600 FUH	3-27-80
DATE	3-27-80	3-27-80
REVIEWED	11/1/80	2
DATE	3-27-80	3-27-80
APPROVED		1
DATE	3-1-80	
PROJECT		REVISIONS
DATE		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

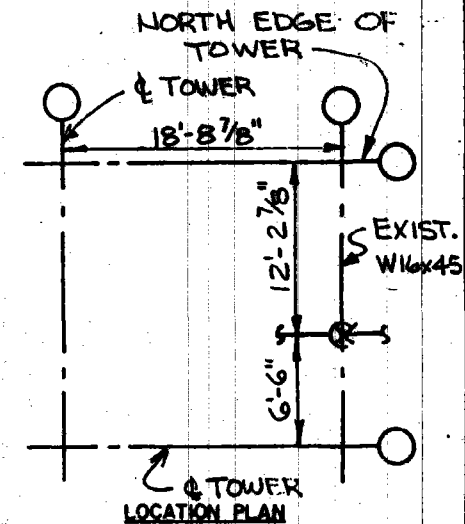
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE	17W-211-A-13/6	PROJECT NO	C-21700	LINE NO	60-1-5-468	MARK NO	H-MS-B-3
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X-A-1-1-1-5



ELEVATION LOOKING NORTH



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

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2	1	6" STD. ASTM A335 P11 PIPE	BY FAB
1	1	12" X 8" X 8" A307 GA. D R	BY FAB

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

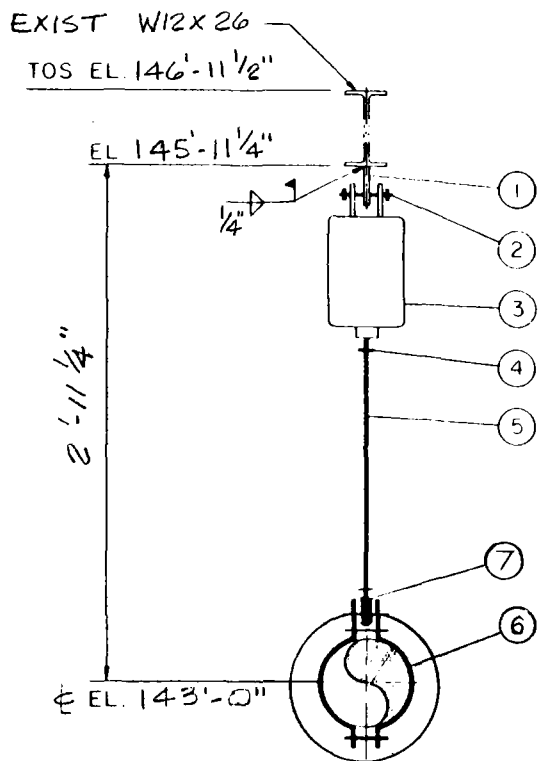
NOTES:
 PIPE TEMPERATURE: 865 °F
 STRUCTURAL DESIGN LOAD: $F_x = 1.6 K$, $F_y = 1.5 K$,
 PIPE SIZE: 6.625" O.D. $F_z = 0.96 K$, $M_x = .8 K$,
 PIPE INSULATION: 4 1/2" $M_y = 5.9 K$, $M_z = 40 K$
 PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD			
DESIGNED	5/23/80	CHECKED	11/11/80
DATE		DATE	
REVIEWED		APPROVED	
DATE		DATE	
PROJECT			
DATE			

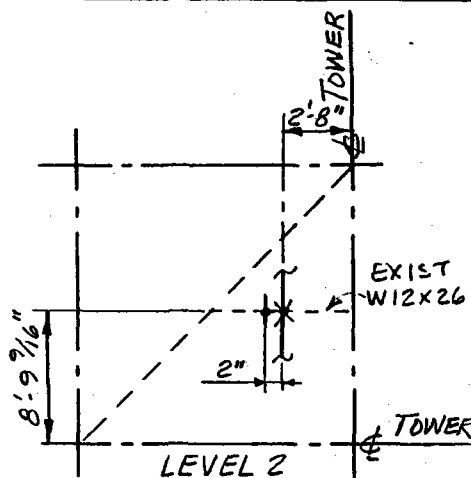
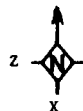
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4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3	SCALE:	Stearns-Roger	11165/8
2	NONE		
1	REVISIONS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	

ANALYSIS ID. CODE: N.A. PROJECT NO: C-21708 LINE NO: 6"-HS-9-FEA MARK NO: H-15-9-

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV LOOKING EAST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -1/16"$
 $\Delta z = 2 3/8"$

VOL. P60-1

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

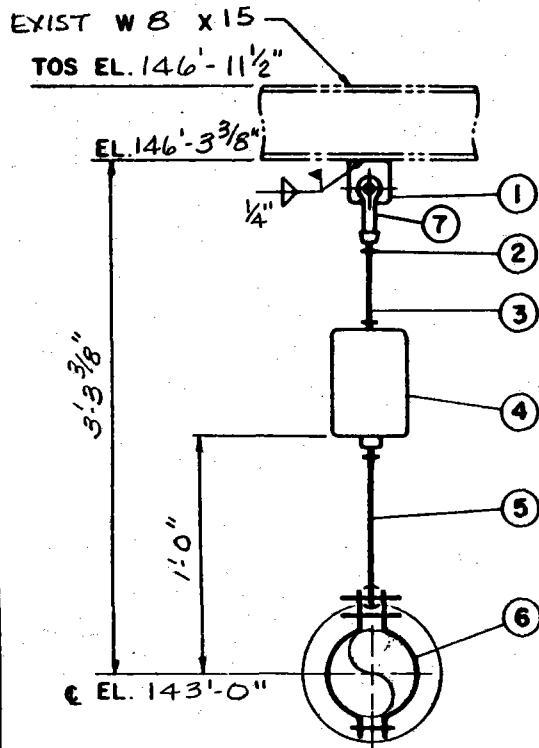
SPRING DATA			14
FIG. NO	TYPE	SIZE	
B-268	C	1	
HOT LOAD		85#	11
COLD LOAD		96#	10
VERT. TRAVEL C. TO H.		1/2" UP	9
T. T. CONST. SUPPORT		N.A.	8
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	
E	PIPING P9-3	P3	7 1 1/2" DIA. WELDLESS EYENUT FIG. 290
D	STRUCTURAL S32-3		6 1 2" PIPE CLAMP FIG. 295 A
C	ELECTRICAL		5 1 1/2" DIA. R. H. THD. ROD FIG. 140
B			4 2 1/2" DIA. R. H. HEX NUT
A			3 1 SPRING SEE DATA
			2 1 1/2" DIA. PIN W/COTTER PIN FIG. 291
			1 1 1/2" DIA. STRUCT. WELDING LUG FIG. 55

NOTES:
 PIPE TEMPERATURE: 900°F.
 STRUCTURAL DESIGN LOAD: .2K
 PIPE SIZE: 2.375" O.D.
 PIPE INSULATION: 3/8"
 PIPE MATERIAL: ASTM A335 P22

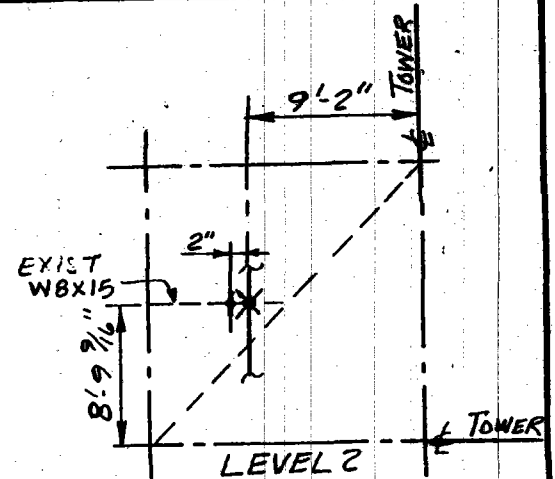
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DESIGNED	MLM	CHECKED	RCR FVH
DATE	3-10-80	DATE	1-24-80 3-17-80
REVIEWED	HMM	APPROVED	JJH
DATE	3-12-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-ST-13-A-1/1		

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

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1/16"
- Δ Z = 2 5/16"

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
B-268	A	1	12
HOT LOAD		76#	11
COLD LOAD		87#	10
VENDOR ENG. REV.		VERT. TRAVEL G. TO H.	1/2" UP
I.T. CONST. SUPPORT		N/A.	8
D	REFERENCE DRAWINGS	REV	7 1
C	PIPING	P9-3 P3	6 1
B	STRUCTURAL	332-3 0	5 1
A	ELECTRICAL		4 1
			3 1
			2
			1

VENDOR ENG. REV.	VERT. TRAVEL G. TO H.
E	I.T. CONST. SUPPORT N/A.
D	REFERENCE DRAWINGS REV
C	PIPING P9-3 P3
B	STRUCTURAL 332-3 0
A	ELECTRICAL

T/W-ST-13-A-1/1
ANALYSIS ID. CODE

NOTES:

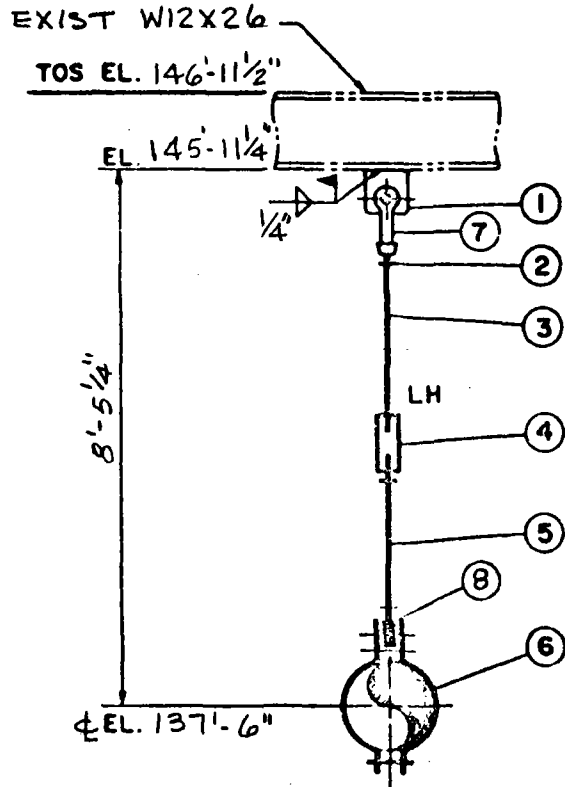
PIPE TEMPERATURE: 960° F.
STRUCTURAL DESIGN LOAD: .2 K.
PIPE SIZE: 2.3750 D. 4
PIPE INSULATION: 3 1/2 THK.
PIPE MATERIAL: ASTM-A335 P-1B

ENGINEERING RECORD

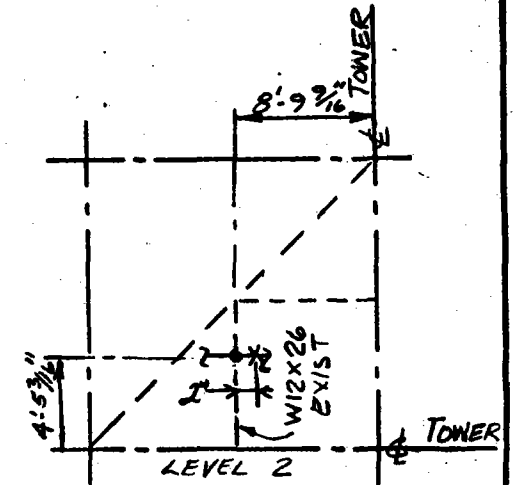
DESIGNED	DATE	CHECKED	DATE
MLM	3-10-80	KBL	3-27-80
REVIEWED	DATE	APPROVED	DATE
JWM	3-12-80	[Signature]	3-27-80
PROJECT	DATE		

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

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT

$\Delta x = -7/16"$
 $\Delta z = 23/4"$

VOL. P60-1

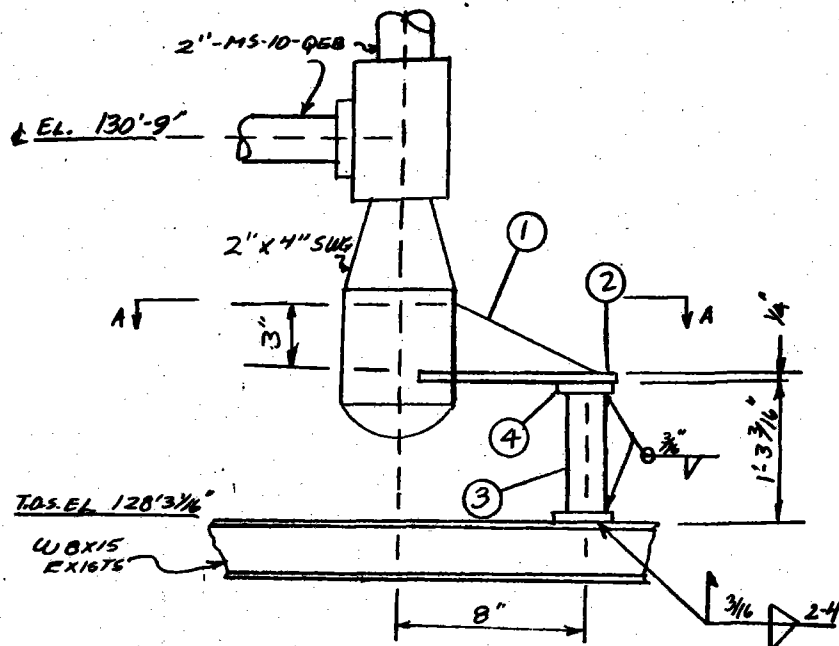
14		
13		
12		
11		
10		
9		
8	1	1/2" DIA. WELDLESS EYENUT FIG. 290
7	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
6	1	2" PIPE CLAMP FIG. 295A
5	1	1/2" DIA. R. H. THD. ROD FIG. 140
4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230
3	1	1/2" DIA. R. H. - L. H. THD. ROD FIG. 253
2	3	1/2" DIA. R. H. HEX NUT
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-3	R3
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
D			
A			

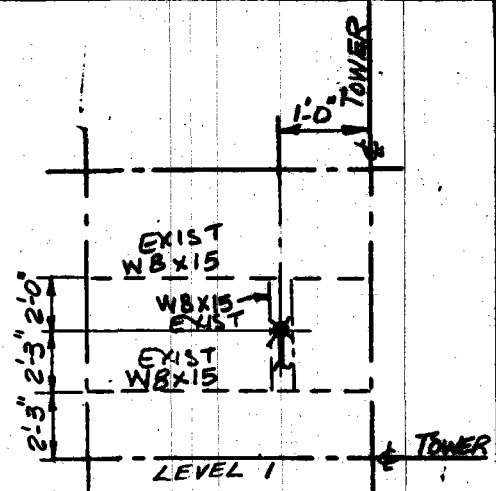
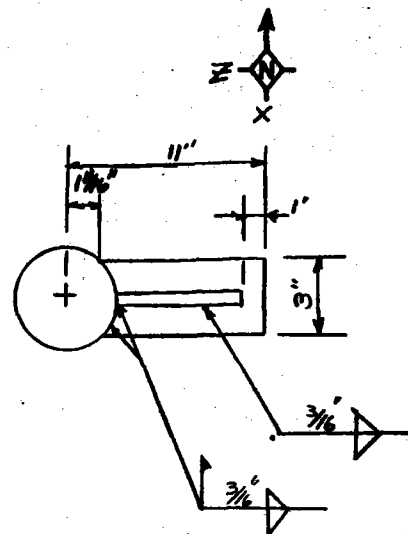
△ REVISED LOCATION PLAN DIM.

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

ENGINEERING RECORD				5	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
DESIGNED	MLM	CHECKED	RJR	4		Stearns-Roger	11165/8
DATE	3-10-50	DATE	3-27-50	3	SCALE:		
REVIEWED	JYH	APPROVED	MLM	2	NONE		
DATE	3-12-50	DATE	3-27-50	1		10 MHe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT				REVISIONS		PROJECT #	C-21700
DATE						LINE #	2413-10-VEE
ANALYSIS ID. CODE	TW-13-A-1/1					MARK #	1MS-10-3



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -1"
- △ Z = 1 13/16"

VOL. P60-1

14	
13	
12	
11	
10	
9	
8	

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7
E	PIPING P9-3	R3	6
D	STRUCTURAL S32-2	0	5
C	ELECTRICAL		4
B			3
A			2

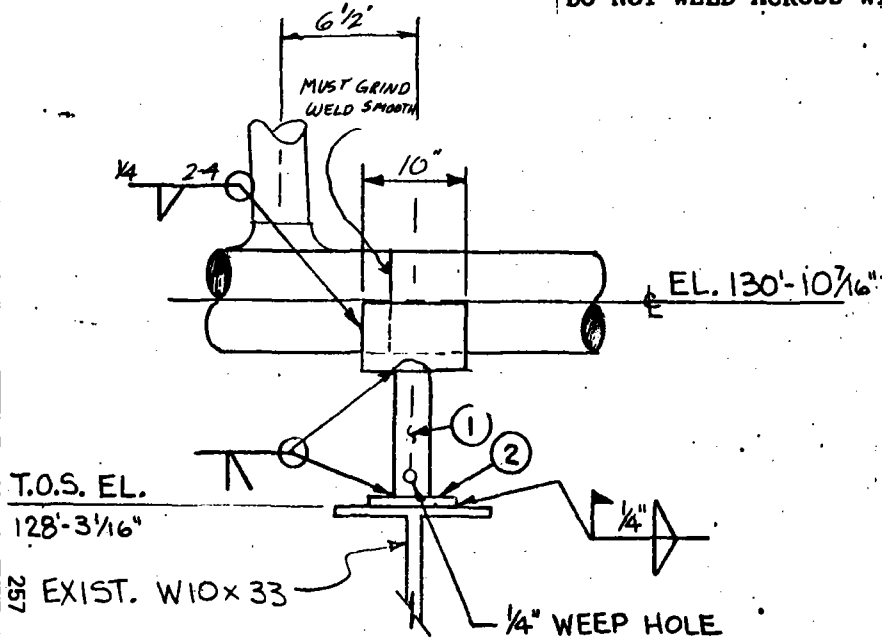
△ COMPLETELY REVISED EXCEPT LOAD

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .7K
 PIPE SIZE: 4.50" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

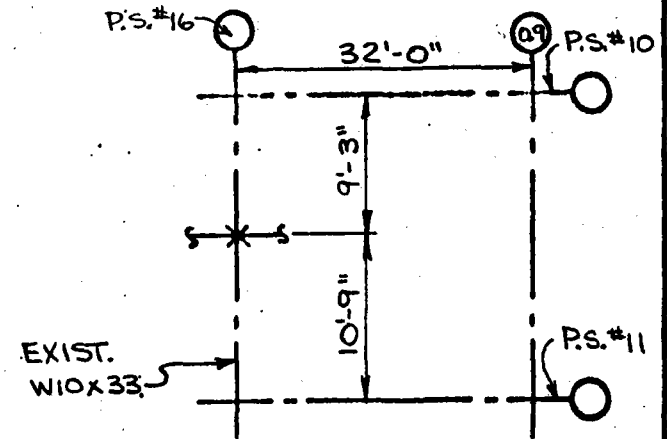
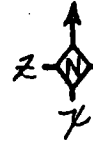
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DESIGNED	MLM	CHECKED	RDB FVH
DATE	3-10-80	DATE	3-27-80 3-27-81
REVIEWED	A/RYHL	APPROVED	RYHL
DATE	3-12-80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/W-ST-13-A-1/1		

ITEM NO.	REVISIONS	SCALE:	COMPONENT DESCRIPTION	REMARKS
5				
4				
3		NONE	Stearns-Roger	11165/8
2				
1			10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO C-21700		LINE NO 2"MS-10-Q58	MARK NO H-MS-10-4	

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEVATION LOOKING NORTH



LOCATION PLAN

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

Vol. P60-1

△ REVISED PIPE SIZE, MARK NO. (FORMERLY H-ST-6-1), ITEMS 62+3 & WELD SYMBOLS

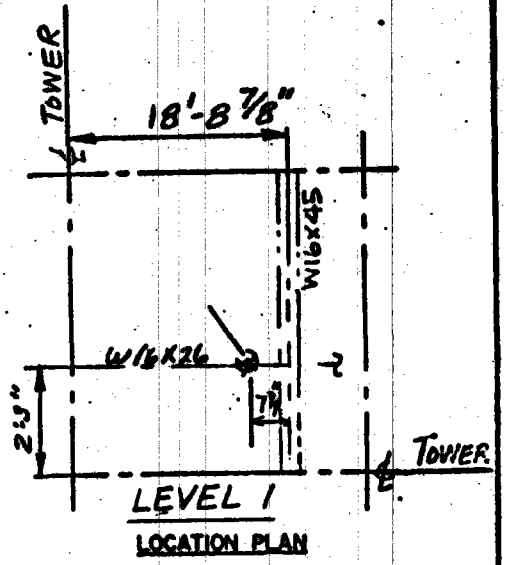
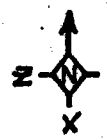
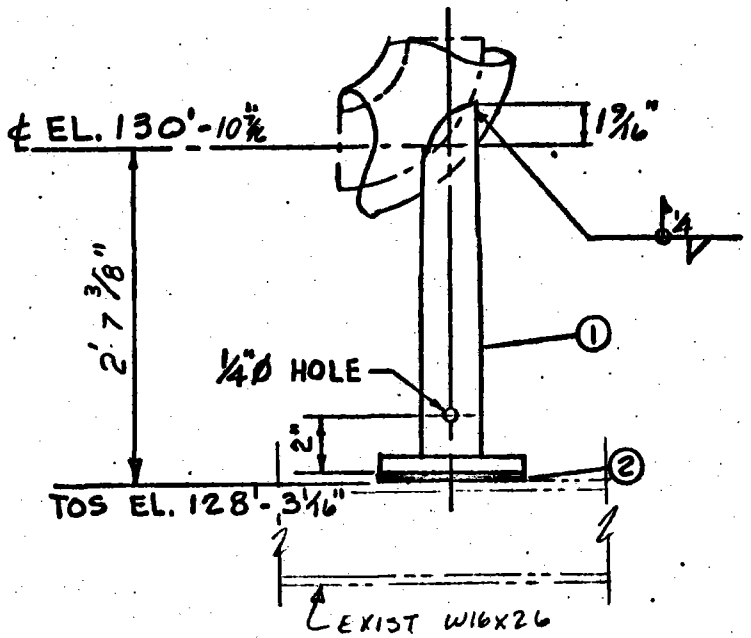
VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	P4
D		STRUCTURAL	S33-4	J
C		ELECTRICAL		
B				
A				

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
3			
3	1	TO FORM PIPE SADDLE	
2	1	1/4" x 4 1/2" x 10" C.S. IP, SHALED	
1	1	1/2" x 5" x 5" C.S. IP	
1	1	3" XS PIPE	

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 = -3K
 PIPE INSULATION: 2 1/2" M_y = -1K M_z = -3K
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

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



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

ELEVATION LOOKING SOUTH

VOL. P60-1

14	
13	
12	
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8	
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6	
5	
4	
3	
2	
1	
ITEM REQD	3" PIPE STANCHION 'A'
COMPONENT DESCRIPTION	8" X 8" X 1/4" GRAPHITE PLATE BONDED TO
REMARKS	HS-63
SCALE:	NONE
Stearns-Roger	
10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO C-21799 LINE NO 4" ST-9-FAA MARK NO 11-57-9-1	

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P3
D	STRUCTURAL 532-2	0
C	ELECTRICAL	
B		
A		

- △ REVISED ELEV.
- △ REVISED ELEVATION & LOAD

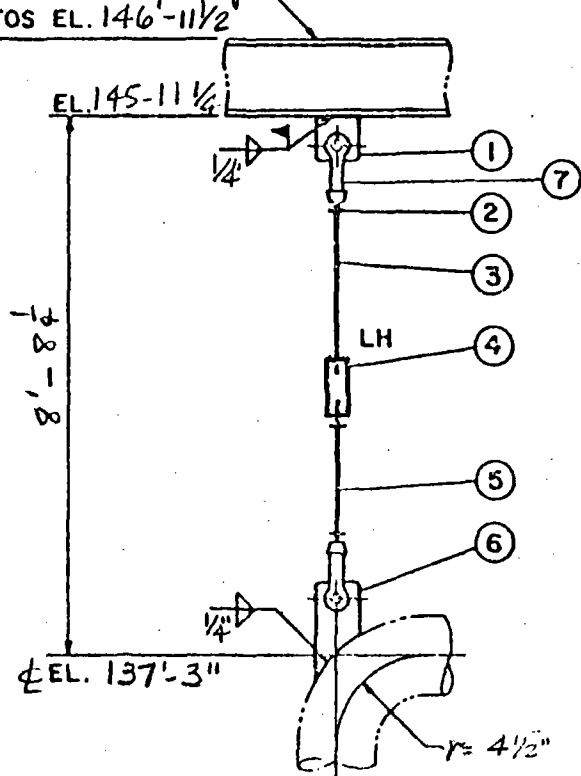
NOTES:
 PIPE TEMPERATURE: 865°F.
 STRUCTURAL DESIGN LOAD: 1.0 K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD				5
DESIGNED	MCA	CHECKED	APL	4
DATE	3-7-80	DATE	3-27-80	3
REVIEWED	XPL	APPROVED	XPL	2
DATE	3-7-80	DATE	3-27-80	1
PROJECT				REVISIONS
DATE				
ANALYSIS ID. CODE T/W-A15-1-A-13/4				PROJECT NO C-21799

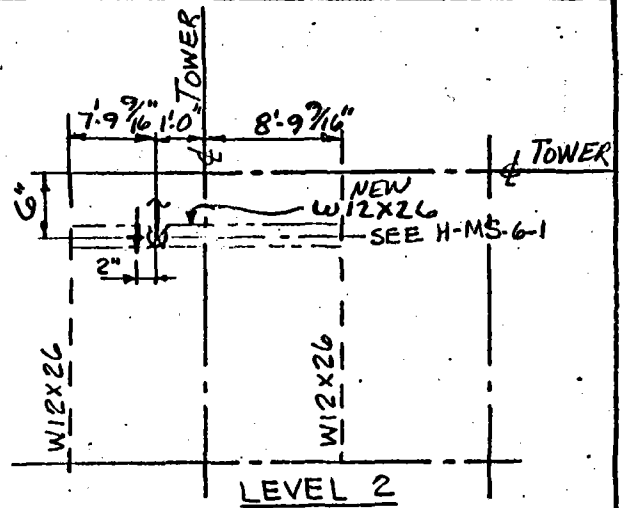
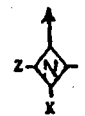
258

1-11-80

SEE H-MS-6-1
NEW W12X26
TOS EL. 146'-11 1/2"
DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH
PIPE ROTATED 90°



LEVEL 2
LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta x = -3/16"$
 $\Delta z = 2 1/16"$

VOL. P60-1.

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

REFERENCE DRAWINGS	REV		
PIPING P9-3	P3	6	1 1/2"
STRUCTURAL S32-3	0	5	1 1/2"
ELECTRICAL		4	1 1/2"
		3	1 1/2"
		2	3 1/2"
		1	1 1/2"

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: .4K.
PIPE SIZE: 3.5" O.D.
PIPE INSULATION: 3 1/2"
PIPE MATERIAL: ASTM A335 P11

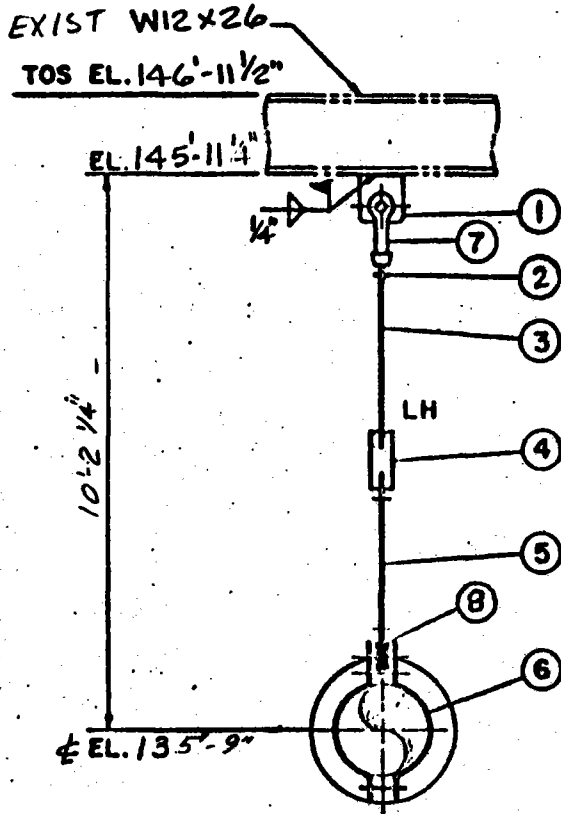
ENGINEERING RECORD			
DESIGNED	MM	CHECKED	AEV
DATE	3-10-80	DATE	2-24-80
REVIEWED	MM	APPROVED	AEV
DATE	3/12/80	DATE	3-27-80
PROJECT			
DATE			

REVISIONS	5	
	4	ITEM REQD
	3	SCALE: NONE
	1	REVISIONS
ANALYSIS ID. CODE		T/W-ST-13-A-1/1
PROJECT NO		C-21700
LINE NO		3 ST-13-FEA
MARK NO		H-ST-13-1

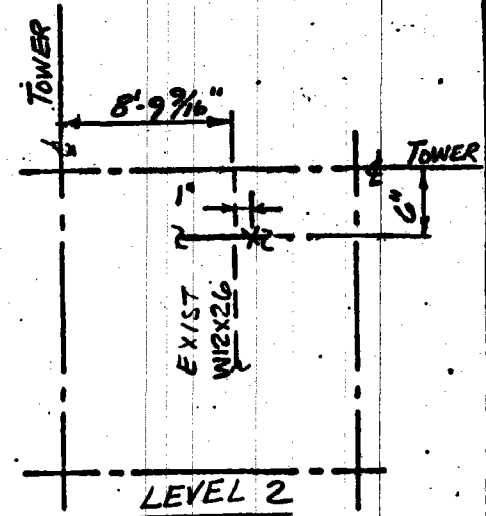
Stearns-Roger

10 Mc SOLAR PILOT PLANT DAGGETT, CALIFORNIA

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LEVEL 2
LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
Δx=0
Δy=1 1/8"

VOL. PG0-1

260

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING PD-3	P3
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
B			
A			

REV	QTY	DESCRIPTION	REMARKS
14			
13			
12			
11			
10			
9			
8	1	1/2" DIA. WELDLESS EYELET 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. THD. ROD FIG. 253	
2	3	1/2" DIA. R. H. HEX NUT	
1	1	1/2" DIA. SHRINK WELDING LING SHRINK FIG. 55	

SCALE:	COMPONENT DESCRIPTION	REMARKS
NONE	Stearns-Roger	111165/H

PROJECT	DATE	REVISIONS
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		

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

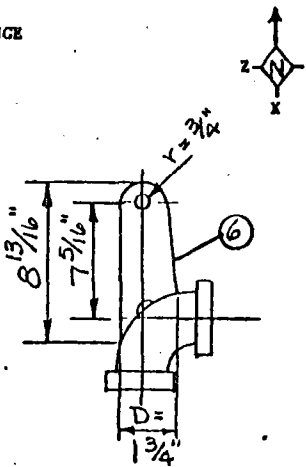
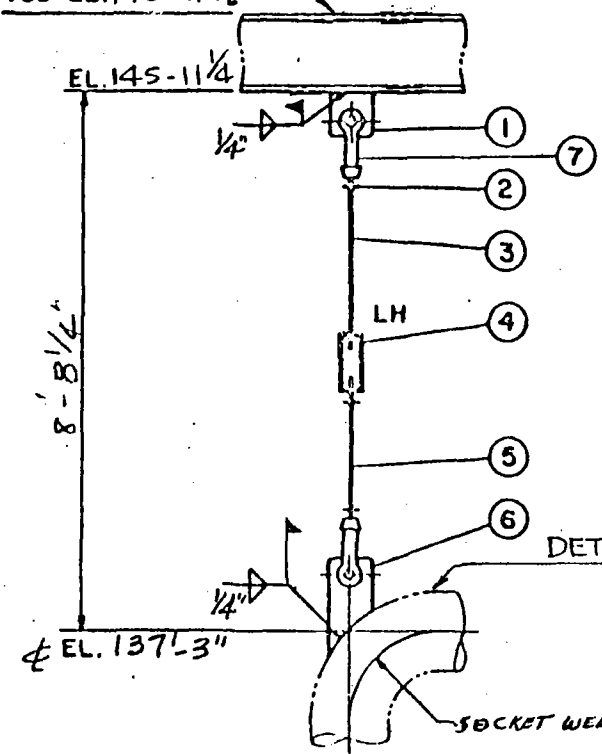
ENGINEERING RECORD			
DESIGNED	MLM	DECID	LEX
DATE	3-10-80	DATE	3-12-80
REVIEWED	NH	APPROVED	NH
DATE	3-12-80	DATE	3-22-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T/VI-ST-13-A-1/1		

REVISIONS
5
4
3
2
1

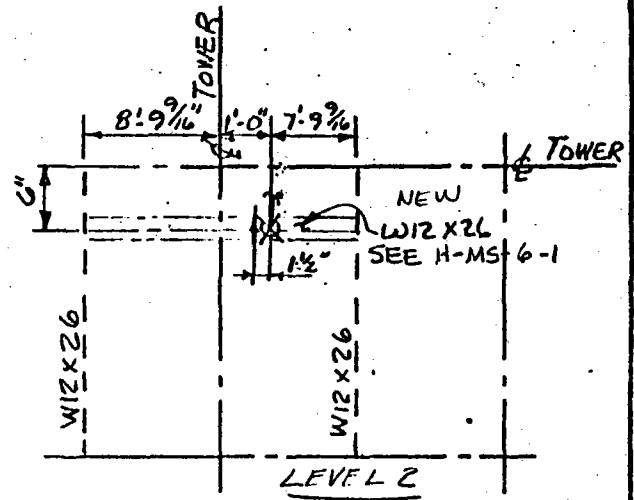
11-1-1980

SEE H-MS-6-1
 NEW W12 X 26
 TOS EL. 146'-11 1/2"

DO NOT WELD ACROSS WIDTH OF FLANGE



DETAIL 1



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 # LOCATION OF PIPE ATTACHMENT
 $\Delta x = 1/8"$
 $\Delta z = 1 7/8"$

ELEV. LOOKING NORTH
 PIPE ROTATED 90°

VOL. P60-1.

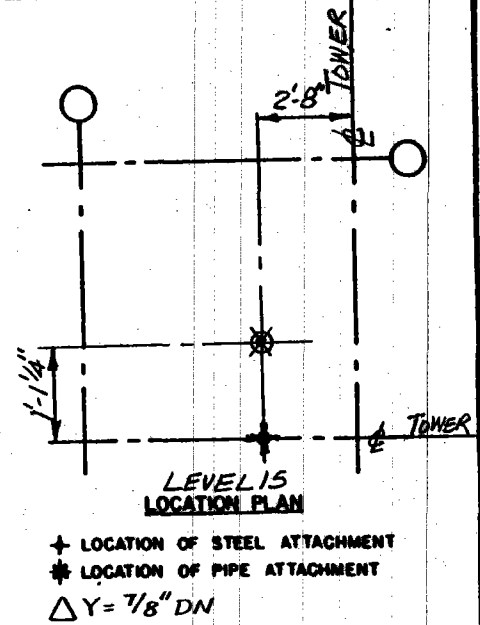
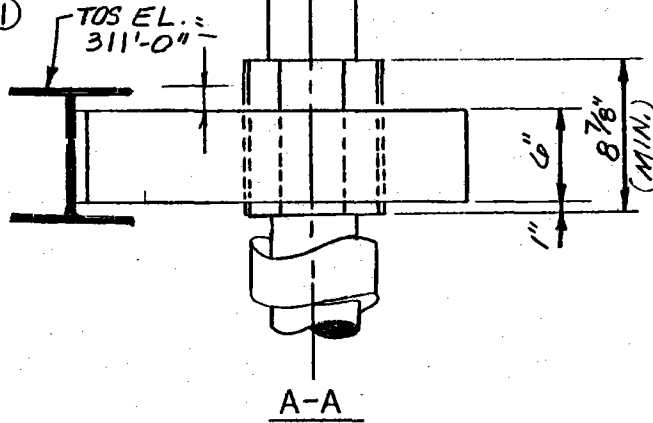
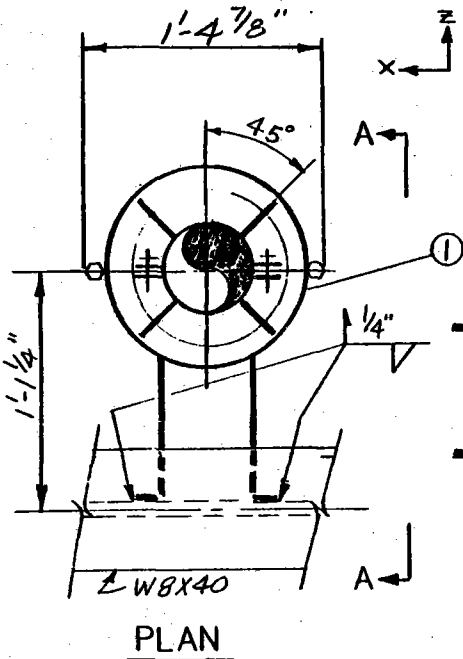
VENDOR ENG. REV.	REV	DATE	DESCRIPTION
E	14		
D	13		
C	12		
D	11		
D	10		
A	9		
	8		
	7	2 1/2"	DIA. F. S. CLEVIS W/PIN FIG. 299
	6	1 2"	DIA. WELDING LUG ALLOY STEEL DETAIL
	5	1 1/2"	DIA. R. H. THD. ROD FIG. 140
	4	1 1/2"	DIA. F. S. TURNBUCKLE FIG. 270
	3	1 1/2"	DIA. R. H. - L. H. THD. ROD FIG. 253
	2	3 1/2"	DIA. R. H. HEX NUT
	1	1 1/2"	DIA. STRUCT. WELDING LUG SHORT FIG. 55

REFERENCE DRAWINGS	REV	DATE	DESCRIPTION
PIPING	P9-3	P3	
STRUCTURAL	S32-3		
ELECTRICAL			

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .8K
 PIPE SIZE: 2.375 O.D.
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P11

ENGINEERING RECORD	
DESIGNED BY: <i>MM</i>	CHECKED BY: <i>EVH</i>
DATE: 3-10-80	DATE: 3-27-80
REVIEWED BY: <i>MM</i>	APPROVED BY: <i>MM</i>
DATE: 2-12-80	DATE: 2-27-80
PROJECT:	
DATE:	
ANALYSIS ID. CODE: T/W-ST-13-A-1/1	

REVISIONS	SCALE	COMPONENT DESCRIPTION	MARKS
5			
4			
3			
2	NONE	Stearns-Roger	11165/8
1		10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
		PROJECT NO C-21700	LINE NO 2"ST-14-FEA
			MARK NO H-ST-14-1



VOL. P60-1

14			
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8			
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6			
5			
4			
3			
2			
1			

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-2	P2 6
D	STRUCTURAL S32-5	O 5
C	ELECTRICAL	
B		3
A		1

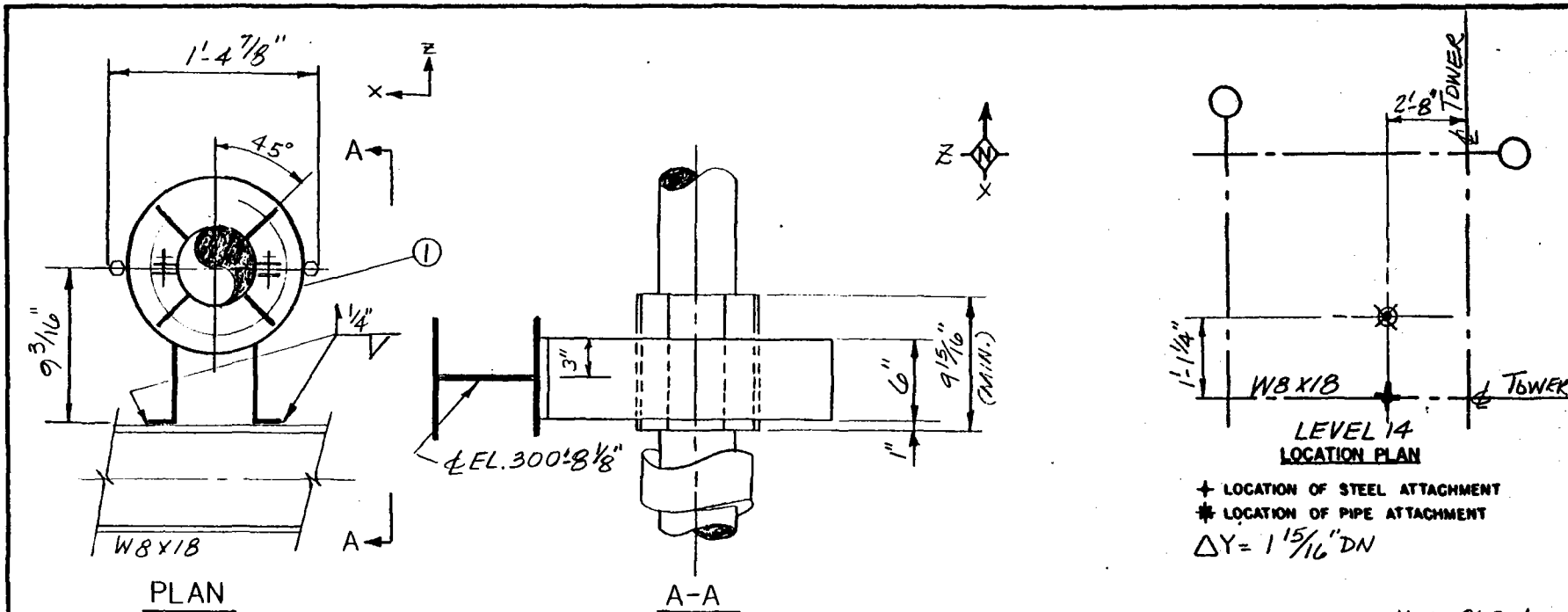
PIPE ALIGNMENT GUIDE SIM. FIG. 256

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			
DESIGNED	MLM	CHECKED	WJM
DATE	4-21-80	DATE	6/13/80
REVIEWED	WJM	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		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21780	LINE NO 4"VT-1-KEB	MARK NO H-VT-1-2

FORM 872-B



VOL. P60-1

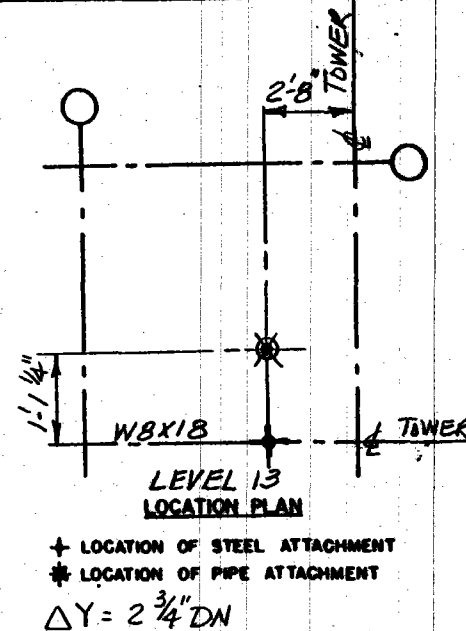
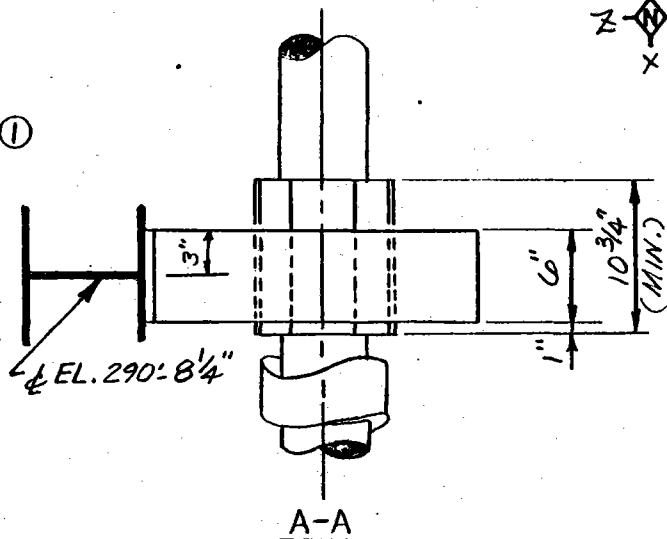
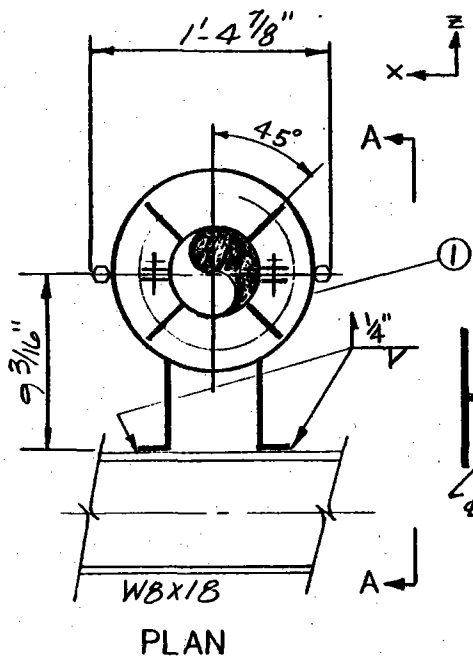
14	
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5	
4	
3	
2	
1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-2	P4
D	STRUCTURAL S32-5	D
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: ASTM A335 P22

ENGINEERING RECORD	
DESIGNED	MLM
DATE	4-21-80
REVIEWED	W.T.M.
DATE	4-27-80
PROJECT	BDR
DATE	6-12-80
ANALYSIS ID. CODE	T-VT-1-A-1/B-2, W-VT-1-A-5

REVISIONS	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
5			
4			
3			
2	SCALE: NONE	Stearns-Roger <small>INCORPORATED</small>	11165/8
1		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	PROJECT NO C-21700	LINE NO 4"VT-1-KEE	MARK NO H-VT-1-3



VOL. P60-1

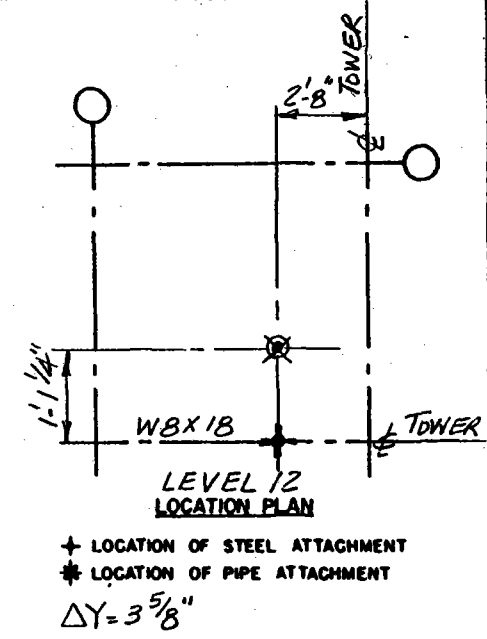
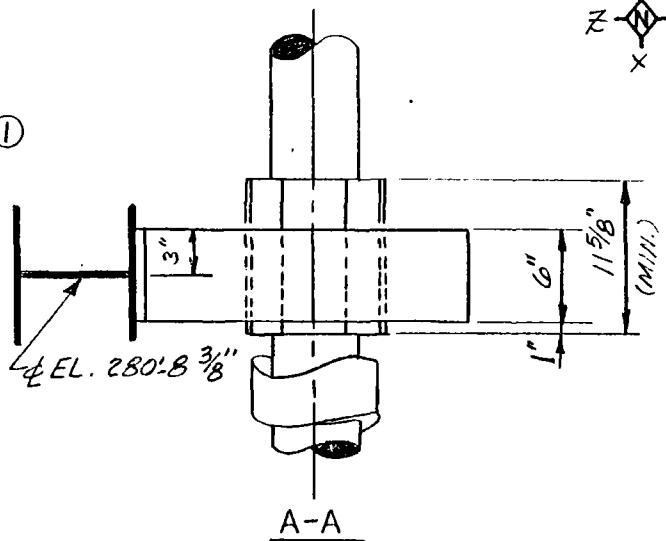
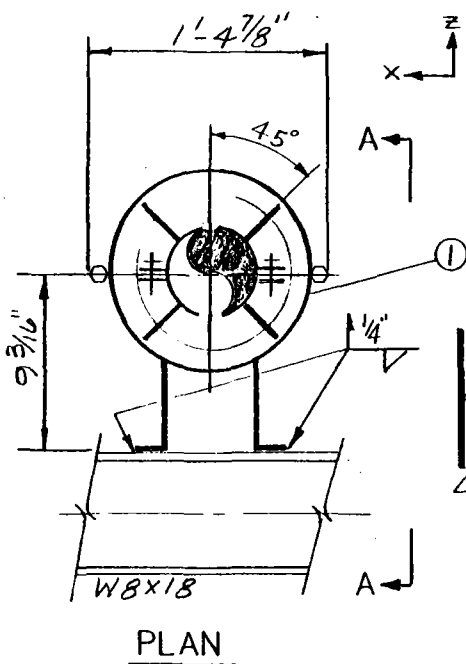
VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-2	P4
D		STRUCTURAL 532-5	0
C		ELECTRICAL	
B			
A			

14		
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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 = .2k F_z = .2k
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P32

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	Y.Y.
DATE	4-21-80	DATE	5-1-80
REVIEWED	RDR	APPROVED	
DATE	7-27-80	DATE	
PROJECT	RDR		H. R. Y.
DATE	6-12-80		6-13-80
ANALYSIS ID. CODE	T-VT-1-A-4/B-2, W-VT-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"VT-1-KEB
MARK NO	H-VT-1-4	



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 3 \frac{5}{8}''$

VOL. P60-1

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

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-2	P4
D	STRUCTURAL S 32-5	O
C	ELECTRICAL	
B		
A		

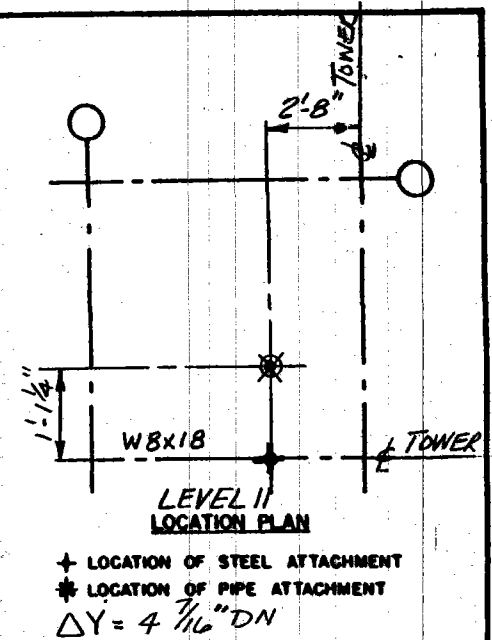
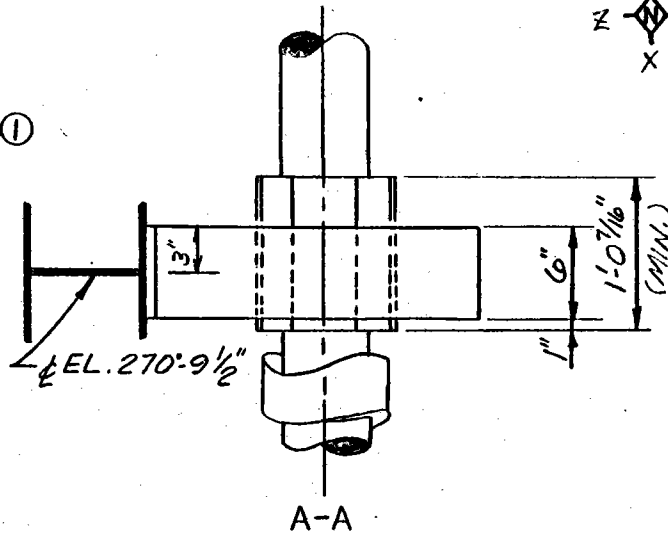
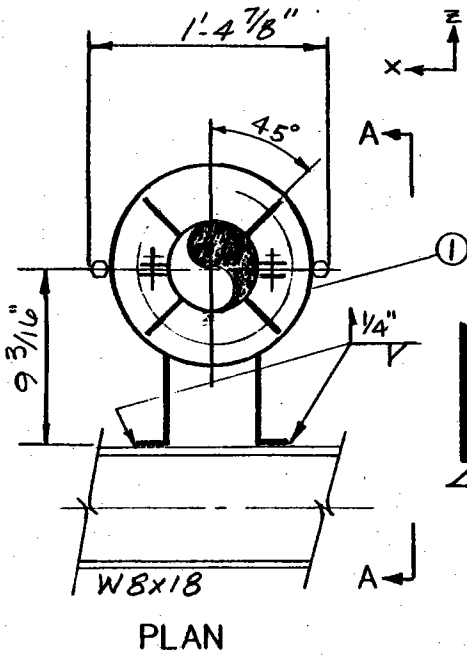
NOTES:
 PIPE TEMPERATURE: 960°F.
 STRUCTURAL DESIGN LOAD: $F_x = .3K, F_z = .3K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 1"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	NGH	CHECKED	W.S.
DATE	4-21-80	DATE	4-21-80
REVIEWED	W.H.M.	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR	BY	H.H.Y.
DATE	6-12-80	DATE	6-12-80
ANALYSIS ID. CODE	FV1-A-4/B-3, W-VT-1-A-5		

5			
4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3	SCALE:	Stearns-Roger	11165/8
2	NONE		
1	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
REVISIONS	PROJECT #	LINE #	MARK #
	C-21700	4-VT-1-KEB	H-VT-1-5

265

1:528 mm



VOL. P60-1

14			
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9			
8			
7			
6			
5			
4			
3			
2			
1			

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

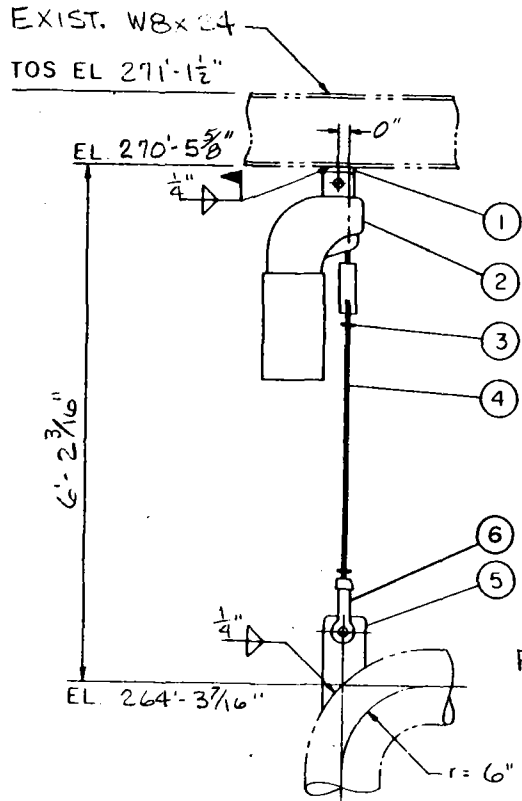
PIPE ALIGNMENT GUIDE SIM. FIG. 256

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .6k F_z = .7k
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 1"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	ATB
DATE	7-21-80	DATE	6-12-80
REVIEWED	9/8/80	APPROVED	
DATE	11-29-80	DATE	
PROJECT	BDR		
DATE	6-12-80		
ANALYSIS ID. CODE	T-VT-1-A-1/B-2, W-VT-1-A-5		

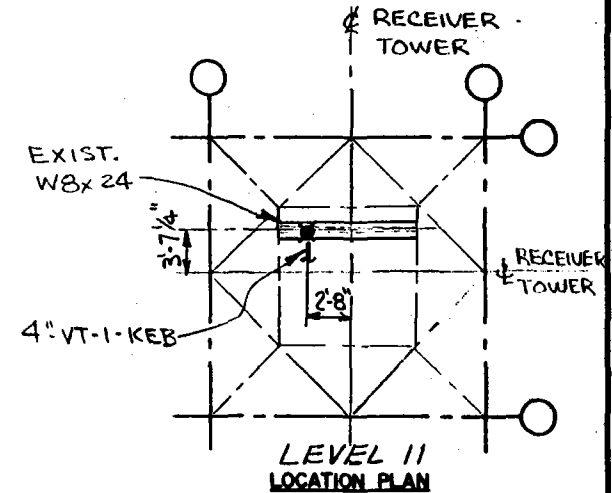
REVISIONS	ITEM REQ'D	COMPONENT DESCRIPTION	REMARKS
5			
4			
3	SCALE:	Stearns-Roger	11165/8
2	NONE		
1		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	PROJECT NO	C-21700	LINE NO 4-VT-1-KEB MARK NO H-VT-1-6

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH

PIPE ROTATED
90° SOUTH



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
Δx = -1/16"
Δz = 0"

VOL. PG0-1

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

SPRING DATA		14
FIG. NO.	TYPE	SIZE
80V	C	26
HOT LOAD		9811b
COLD LOAD		N.A.
VERT. TRAVEL C. TO H.		5 1/16" DN
T. T. CONST. SUPPORT		6 1/2"
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P1-2	P3
D	STRUCTURAL S32-4	O
C	ELECTRICAL	
B		
A		

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	DESCRIPTION
E	PIPING P1-2	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

NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: 1.5 K
PIPE SIZE: 4" STD.
PIPE INSULATION: 4"
PIPE MATERIAL: ASTM A335 GR. P22

ENGINEERING RECORD

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

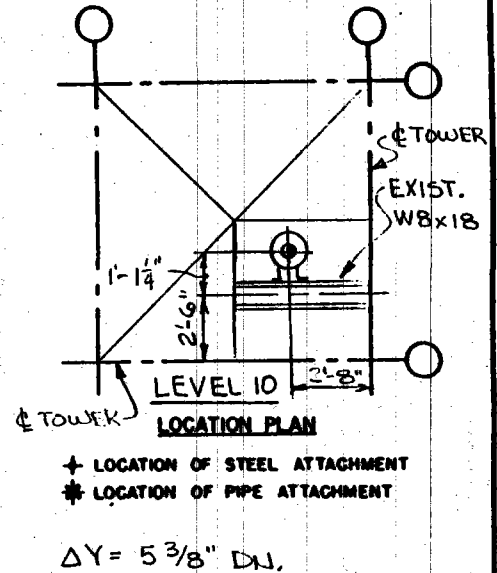
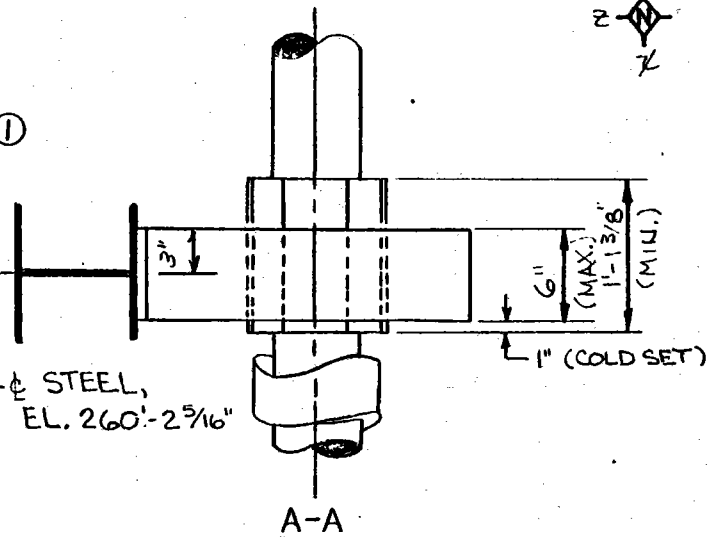
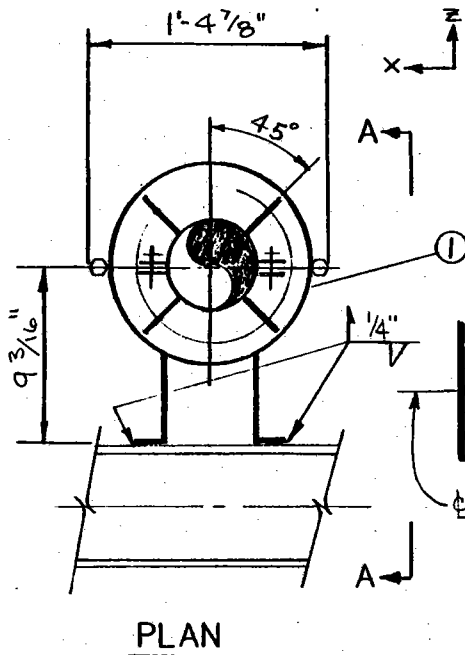
ITEM NO.	REVISIONS	DESCRIPTION
5	1	5/8" DIA. STRUCT. WELDING LUG FIG. 55
4	1	5/8" DIA. STRUCT. WELDING LUG FIG. 55
3	1	5/8" DIA. STRUCT. WELDING LUG FIG. 55
2	1	5/8" DIA. STRUCT. WELDING LUG FIG. 55
1	1	5/8" DIA. STRUCT. WELDING LUG FIG. 55

SCALE: NONE

11165/8

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE T-VT-1-A-4/1-5, W-VT-1-A-5 PROJECT NO C-21700 LINE NO 4"-VT-1-KEB MARK NO H-VT-1-7



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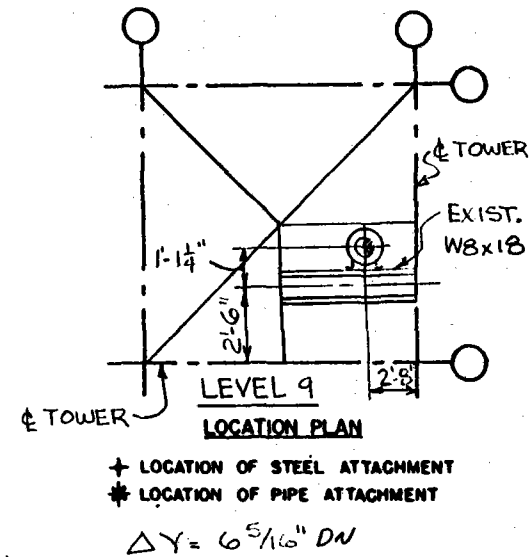
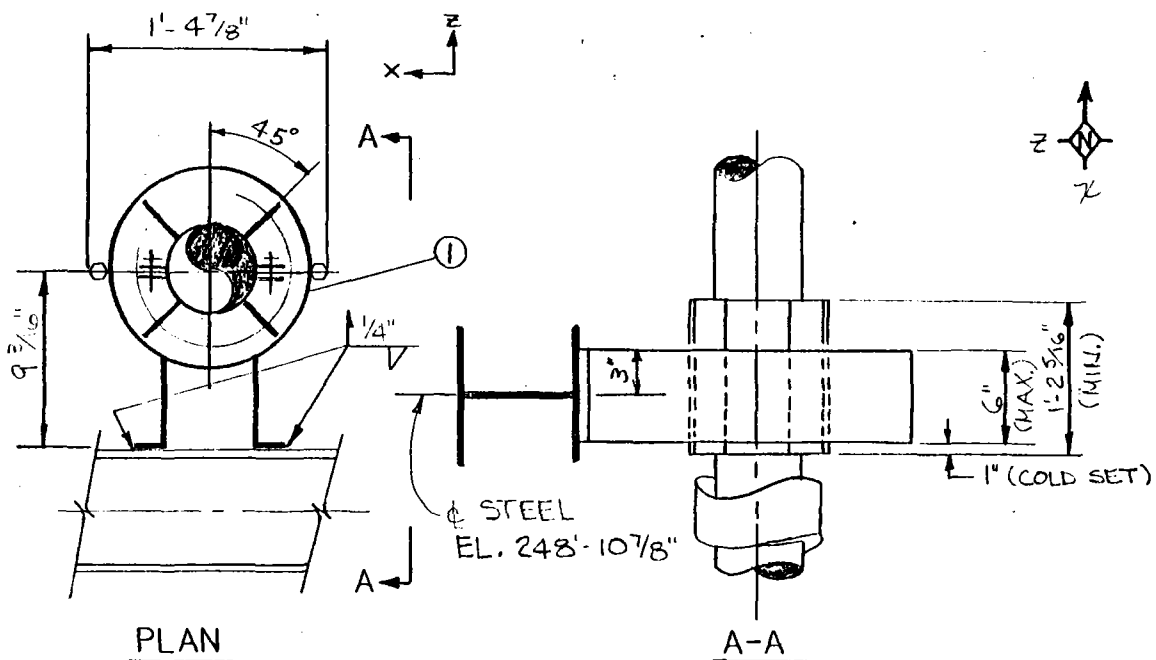
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P13-6	A
D	STRUCTURAL S37-4	0
C	ELECTRICAL	
B		
A		

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 0.8K, F_z = 0.5K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5	ITEM RECD	COMPONENT DESCRIPTION	REMARKS
DESIGNED	4/27/80	CHECKED	9/2/80	4	SCALE: NONE	Stearns-Roger	11165/8
DATE	2/27/80	DATE	5/13/80	3			
REVIEWED	NR	APPROVED		2			
DATE	11/20/80	DATE		1			
PROJECT	BDR		W. W. Y.				
DATE	6-12-80		6-13-80				
ANALYSIS ID. CODE	T-VT-1-A-4/R-2, W-VT-1-A-5	PROJECT NO C-21700		LINE NO 4"-VT-1-KEP		MARK NO H-VT-1-B	

PIPE ALIGNMENT GUIDE SIM-FIG. 256

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA



VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P13-6	A 6
D	STRUCTURAL S32-4	O 5
C	ELECTRICAL	
B		3
A		1

14		
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6		
5		
4		
3		
2		
1		

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 0.5K, F_y = 0.7K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: A307

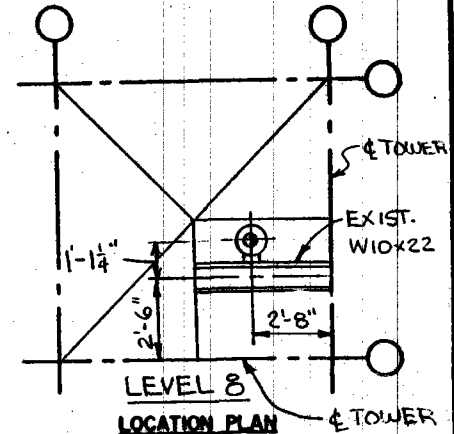
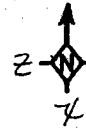
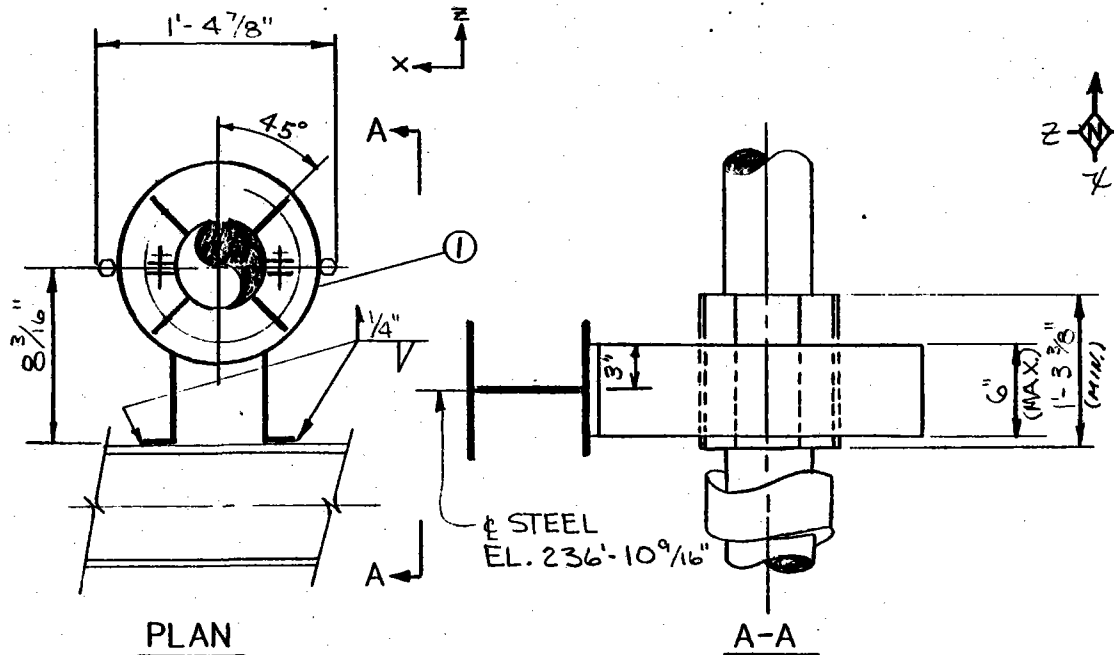
ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

5		
4	ITEM REQD	COMPONENT DESCRIPTION
3	SCALE:	NONE
2		
1		
REVISIONS	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700	LINE NO 4"-VT-1-KFB
MARK NO	H-VT-1-9	REMARKS
		11165/8

PIPE ALIGNMENT GUIDE SIM.FIG. 256

Stearns-Roger

270



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta Y = 7 \frac{3}{8}"$ DN

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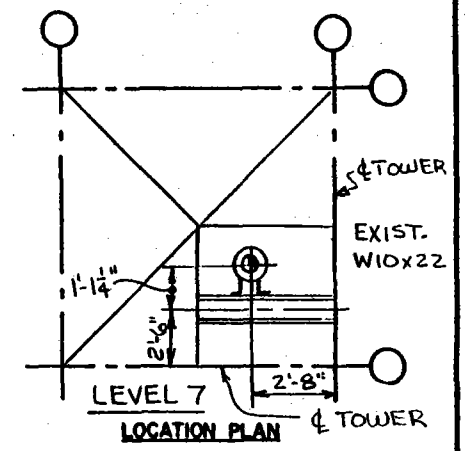
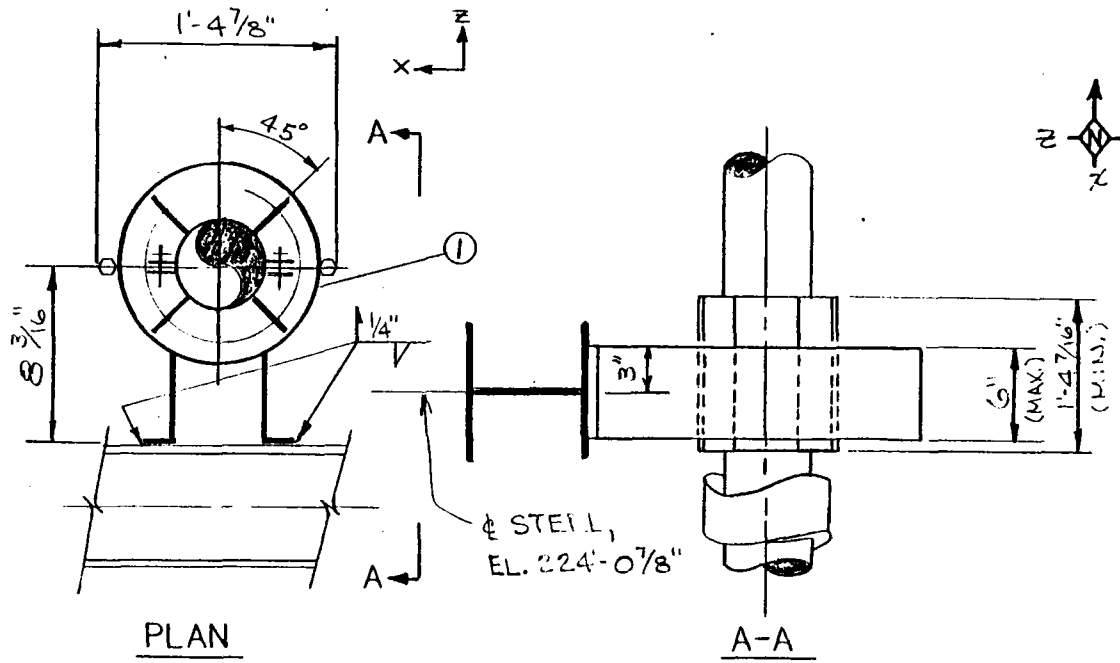
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING 173-116	A 6
D	STRUCTURAL S32-4	O 5
C	ELECTRICAL	
B		3
A		1

PIPE ALIGNMENT GUIDE SIM. FIG. 25/6

NOTES:
 PIPE TEMPERATURE: 700°F
 STRUCTURAL DESIGN LOAD: 1/2 WIND, 1/2 OSC
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A336 TP316

ENGINEERING RECORD				5	ITEM REQD	COMPONENT DESCRIPTION	REMARKS	
DESIGNED	DATE	CHECKED	DATE	4	SCALE:	Stearns-Roger <small>INCORPORATED</small>	11165/8	
DATE	4/22/80	DATE	6/13/80	3	NONE			
REVIEWED	DATE	APPROVED	DATE	2				
DATE	4/30/80	DATE		1				
PROJECT	BDR			REVISIONS	TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
DATE	6-12-80							
ANALYSIS ID. CODE	T-VT-1-A-4-1-2	W-VT-1-A-5	PROJECT NO	C-21700	LINE NO	4"-VT-1-KEP	MARK NO	H-VT-1-10

1-678 0001



+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT

$\Delta Y = 8 \frac{7}{16}$ DN

271

14			
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4			
3			
2			
1			

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P13-16	A
D	STRUCTURAL S32-4	D
C	ELECTRICAL	
B		
A		

PIPE ALIGNMENT GUIDE SIM. FIG. 256

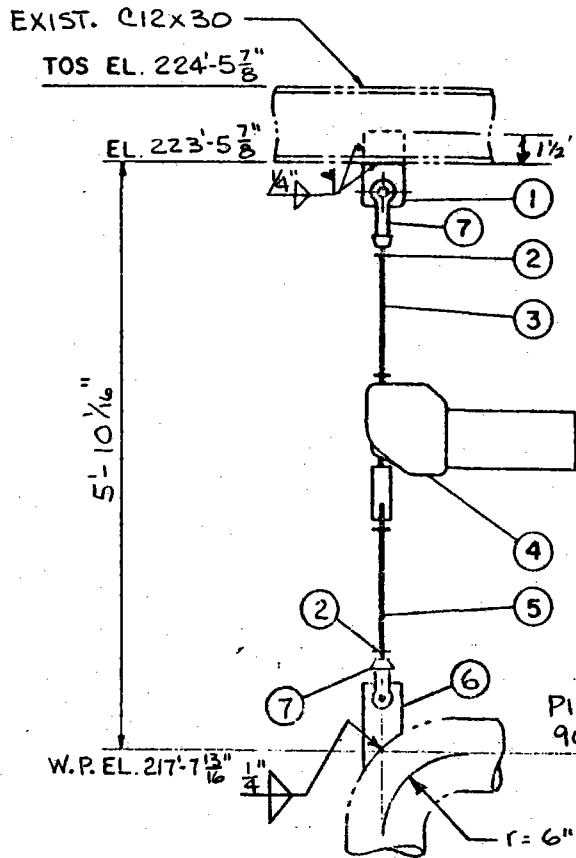
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.1K$, $F_z = 0.9K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: A515-70

ENGINEERING RECORD		5
DESIGNED	DATE	4/22/80
CHECKED	DATE	5/1/80
REVIEWED	DATE	4/30/80
APPROVED	DATE	6/12/80
PROJECT	DATE	6-12-80

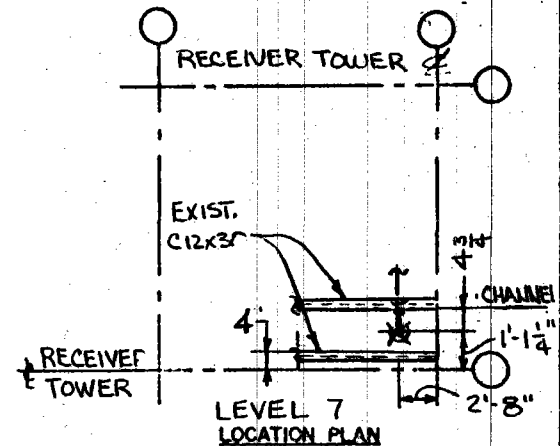
ITEM REQ'D	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
REVISIONS	PROJECT NO C-21700	LINE NO 4"-VT-1-KER MARK NO H-VT-1-11

1-128 Rev. 94

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING SOUTH



† LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = 1/8"$
 $\Delta z = -1/16"$

VOL. P60-1

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

SPRING DATA			14
FIG. NO.	TYPE	SIZE	
91H	A	33	12
HOT LOAD		1152.1b	11
COLD LOAD		N.A.	10
VERY. TRAVEL C.T.O.H.		9/16" DJ	9
T.T. CONST. SUPPORT		11"	8

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7	2	7/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
E	PIPING	P9-2	P3	6	1	7/8" DIA WELD ANG. C-7 1/2" H-5.53 BY PAR
D	STRUCTURAL	S32-4	O	5	1	7/8" DIA. R. H. THD. W. E. ROD FIG. 278
C	ELECTRICAL			4	1	SPRING SEE DATA Single Row SUSP.
B				3	1	7/8" DIA. R. H. THD. ROD FIG. 140
A				2	1	7/8" DIA. R. H. HEX NUT
				1	1	7/8" DIA. STRUCT. WELDING LUG LONG FIG. 55

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7	2	7/8" DIA. F. S. CLEVIS W/PIN FIG. 299	
E	PIPING	P9-2	P3	6	1	7/8" DIA WELD ANG. C-7 1/2" H-5.53 BY PAR
D	STRUCTURAL	S32-4	O	5	1	7/8" DIA. R. H. THD. W. E. ROD FIG. 278
C	ELECTRICAL			4	1	SPRING SEE DATA Single Row SUSP.
B				3	1	7/8" DIA. R. H. THD. ROD FIG. 140
A				2	1	7/8" DIA. R. H. HEX NUT
				1	1	7/8" DIA. STRUCT. WELDING LUG LONG FIG. 55

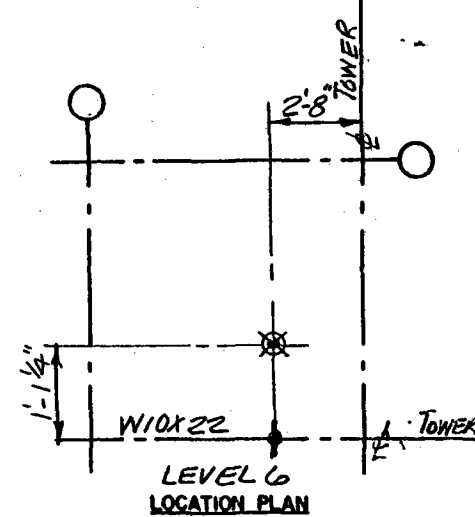
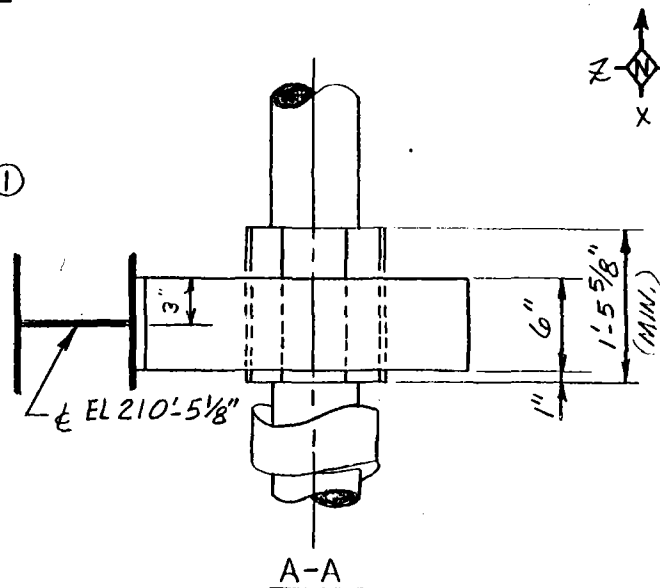
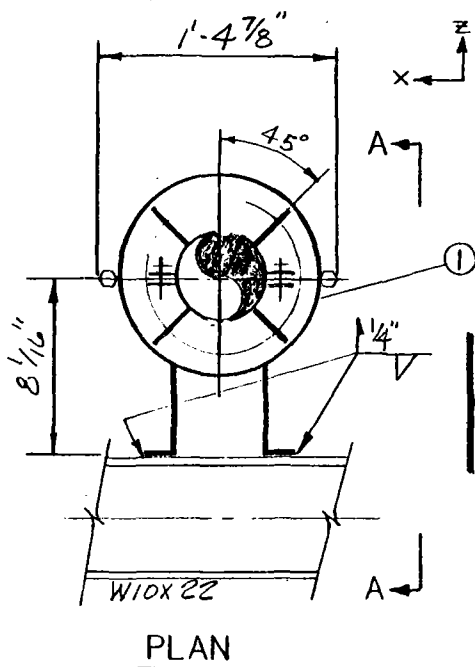
NOTES

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 1.7K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD

DESIGNED	DATE	CHECKED	DATE	REVIEWED	DATE	APPROVED	DATE	REVISIONS	ITEM RECD	SCALE:	COMPONENT DESCRIPTION	REMARKS							
JT	2/28/80	WJ	2-27-80	JT	3-9-80	WJ	3-27-80	1	1	NONE	Stearns-Roger	11/65/8							
										10 Mm SOLAR PILOT PLANT	DAGGETT, CALIFORNIA								
ANALYSIS ID. CODE				T-VT-1-A-4/1-2, W-A-5				PROJECT NO		C-21700		LINE NO		4-VT-1-KFB		MARK NO		H-VT-1-12	

273



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 9 \frac{5}{8} \text{ "DN}$

Vol. P60-1

14	
13	
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11	
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3	
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1	PIPE ALIGNMENT GUIDE SIM. FIG. 256

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

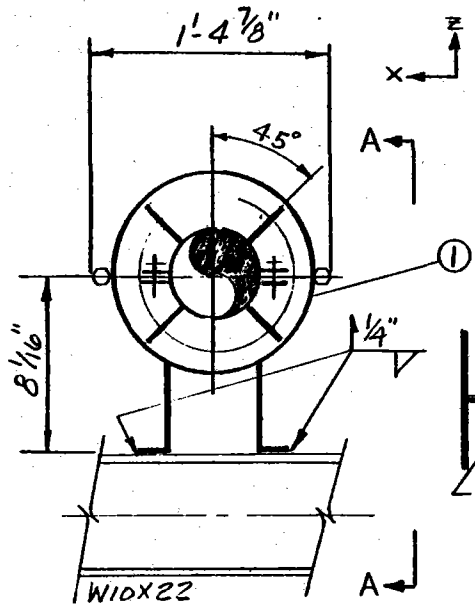
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.0K$ $F_z = 1.0K$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5
DESIGNED	MLM	CHECKED	VJW	4
DATE	4-22-80	DATE	3-11-80	3
REVIEWED	JFM	APPROVED		2
DATE	4-27-80	DATE		1
PROJECT	BDR		W. P. Y.	
DATE	6-12-80		6-12-80	
REVISIONS				
ANALYSIS ID. CODE	T-VT-1-A-4/5-2	W-VT-1-A-5	PROJECT NO	C-21700

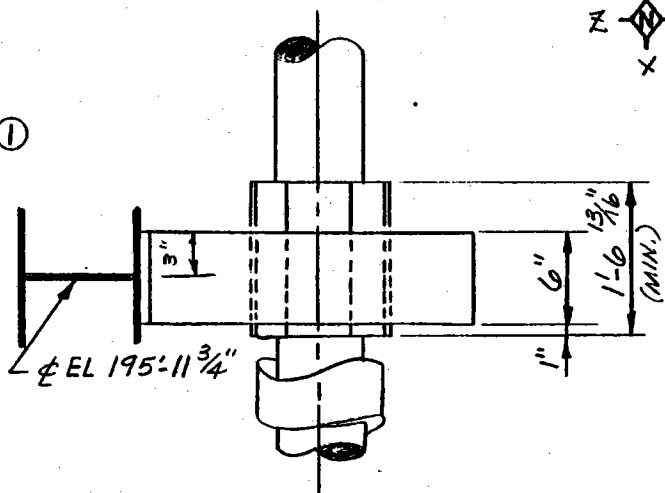
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
LINE NO	4"VT-1-KEB	MARK NO H-VT-1-13

1-728 2003

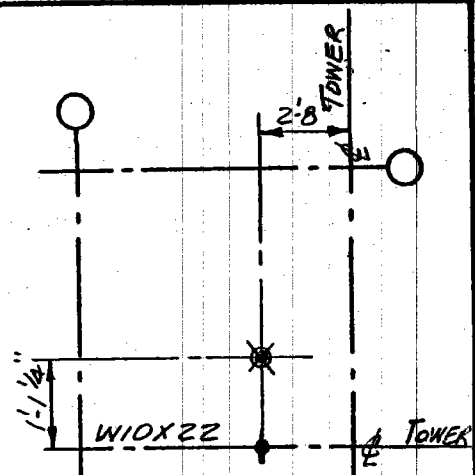
274



PLAN



A-A



LEVEL 5 LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 10' 13/16" DN$

VOL. P60-1

14	
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1	PIPE ALIGNMENT GUIDE SIM-FIG. 256

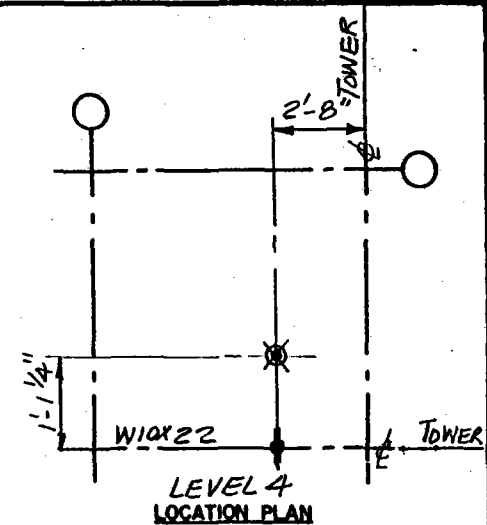
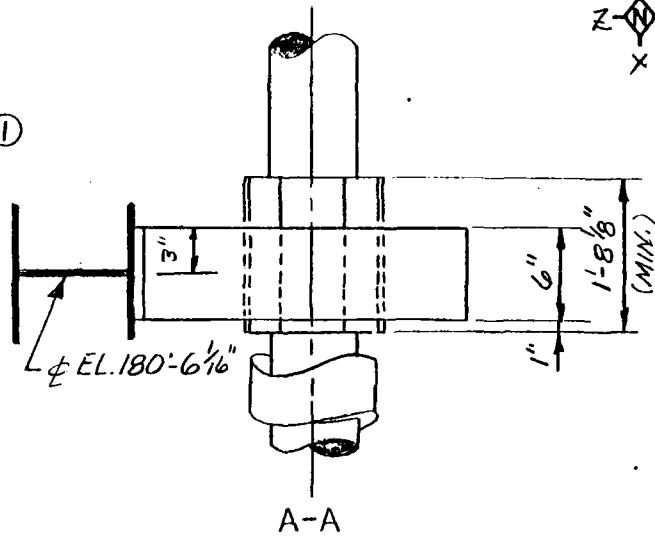
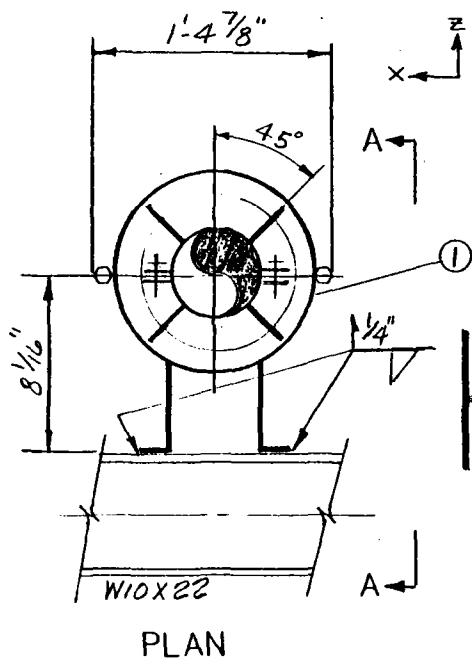
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1.0k$ $F_z = 1.0k$
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	W.B.M.
DATE	4-21-80	DATE	4-21-80
REVIEWED	X.B.M.	APPROVED	
DATE	4-21-80	DATE	
PROJECT	BDR	BY	J.P.Y.
DATE	6-12-80	DATE	6-12-80

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8
10 Mc SOLAR PILOT PLANT DAGGETT, CALIFORNIA		

ANALYSIS ID. CODE T-VT-1-A--1/8-2 W-VT-1-A-5 PROJECT NO C-21700 LINE NO 4"VT-1-REB MARK NO H-VT-1-14



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 12 1/8" DN$

VOL. P60-1

14	
13	
12	
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3	
2	
1	PIPE ALIGNMENT GUIDE SIM.FIG. 256

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

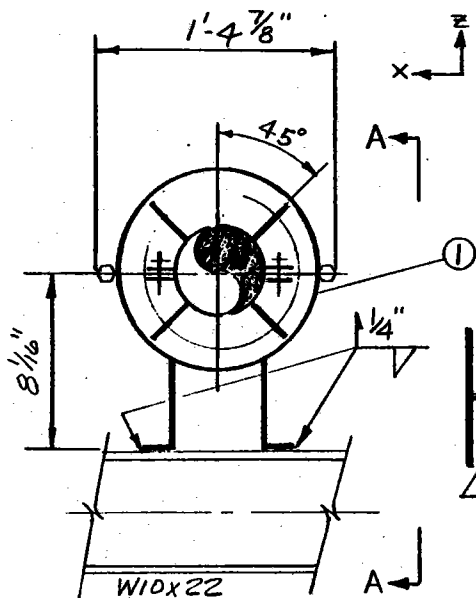
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: Fx. 9K Fz. 9K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	WMM
DATE	4-21-80	DATE	6-12-80
REVIEWED	HJH	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	

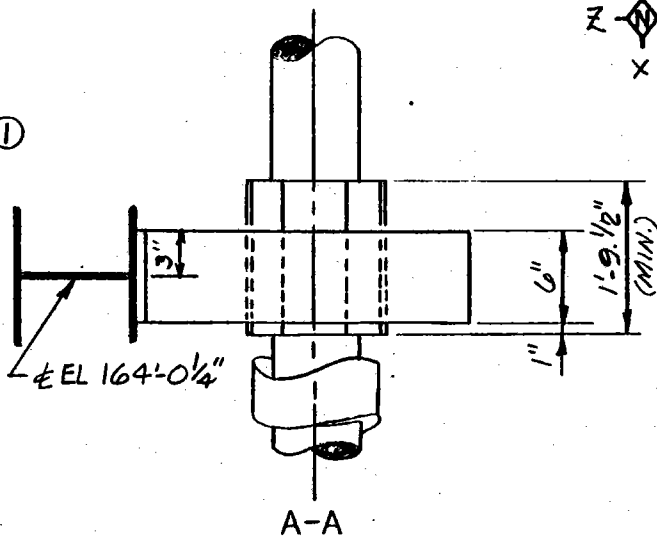
REVISIONS	ITEM RECD	COMPONENT DESCRIPTION	REMARKS
5			
4			
3	SCALE:	Stearns-Roger	11165/8
2	NONE		
1		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO C-21700		LINE NO 4"VT-1-KEE	MARK NO H-VT-1-15

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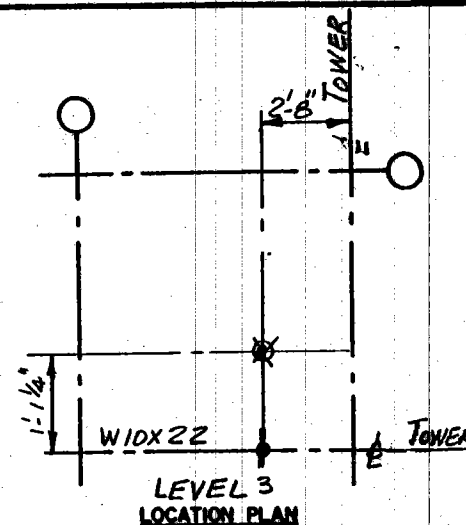
1/8" = 0.125"



PLAN



A-A



LEVEL 3
LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
* LOCATION OF PIPE ATTACHMENT
 $\Delta Y = 13\frac{1}{2}''$ DN

VOL. P60-1

14		
13		
12		
11		
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4		
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2		
1		

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P4
D	STRUCTURAL 332-3	O
C	ELECTRICAL	
B		
A		

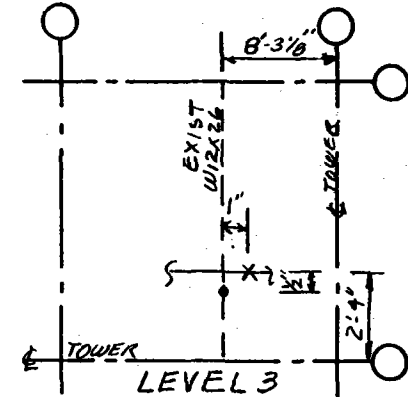
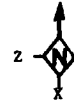
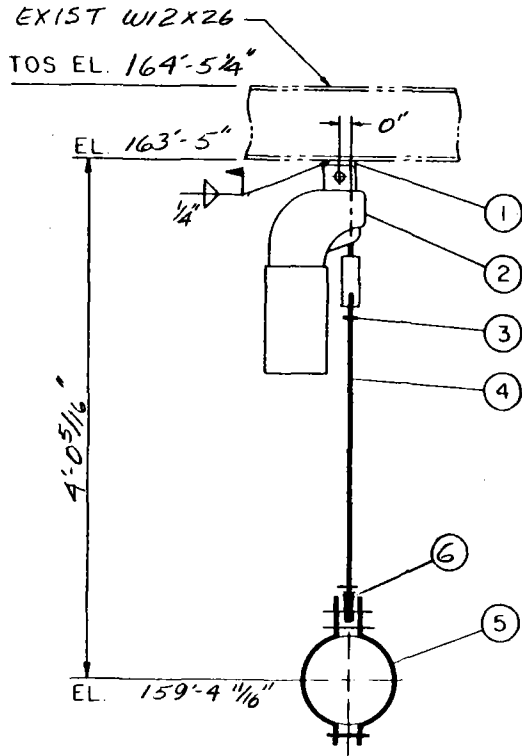
PIPE ALIGNMENT GUIDE SIM.FIG. 256

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	M/W
DATE	4-21-80	DATE	5-13-80
REVIEWED	T/W	APPROVED	
DATE	4-29-80	DATE	
PROJECT	BDR	BY	R.P.Y.
DATE	6-12-80	DATE	6-12-80
ANALYSIS ID. CODE	T-VT-1-A-4/B-2	W-VT-1-A-5	

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-KEB	MARK NO H-VT-1-16

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

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

VOL. P60-1

ELEV. LOOKING NORTH
PIPE ROTATED 90°

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			REV
PIPING	P3-3	P3	6
STRUCTURAL	532-3	0	5
ELECTRICAL			4
			3
			2
			1

VENDOR ENG. REV.	
E	
D	
C	
B	
A	

ITEM RECD	COMPONENT DESCRIPTION	REMARKS
1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	LONG
SCALE:	NONE	
Stearns-Roger INCORPORATED		11165/8

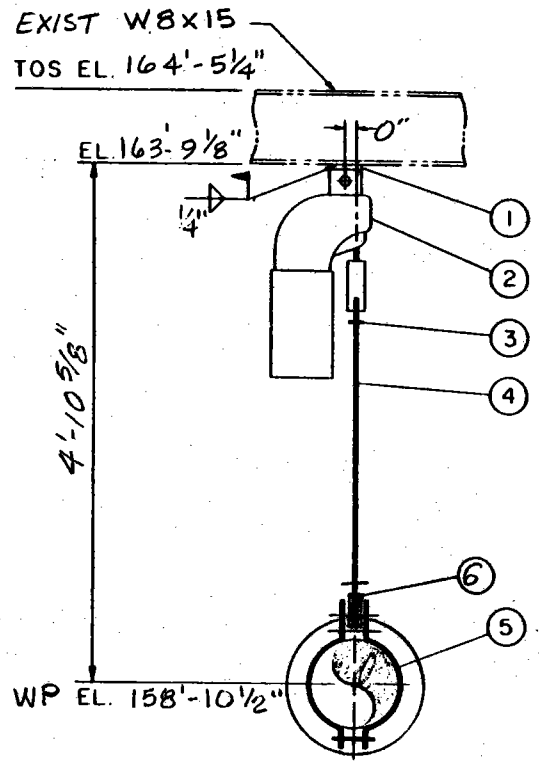
NOTES:
PIPE TEMPERATURE: 960°F
STRUCTURAL DESIGN LOAD: -5K
PIPE SIZE: 4.5" O.D.
PIPE INSULATION: 4" THICK
PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	KER
DATE	2-29-80	DATE	3-27-80
REVIEWED	MLM	APPROVED	KER
DATE	3-7-80	DATE	3-27-80
PROJECT			
DATE			

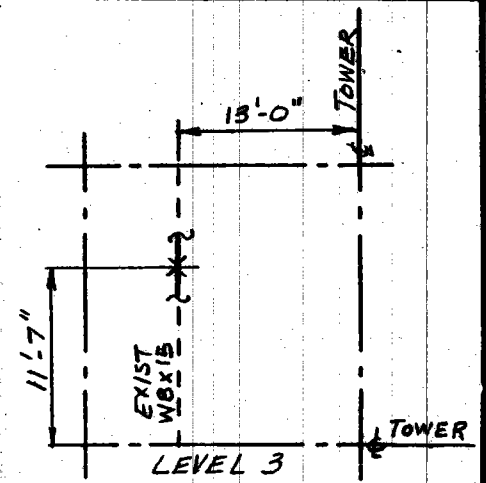
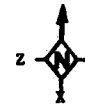
ANALYSIS ID. CODE	T-VT-1-A-4/11-2	W-A-5	PROJECT NO	C-21700	LINE NO	4-VT-1-KEB	MARK NO	H-VT-1-17
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DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST
PIPE ROTATED 90°



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δx = 3/16"
- Δz = 3 9/16"

VOL. P60-1

OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS		
SPRING DATA		
FIG. NO	TYPE	SIZE
80V	C	16
HOT LOAD		206#
COLD LOAD		N.A.
VERT. TRAVEL C. TO H.		10 3/16" DIA
T T CONST. SUPPORT		12 1/2"

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7
E	PIPING P9-3	P9	6 1
D	STRUCTURAL S32-3	0	5 1
C	ELECTRICAL		4 1
B			3 2
A			2 1

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
1	1/2" DIA. WELDLESS EYE NUT FIG. 290	
1	4" DIA. PIPE CLAMP FIG. 295A	
1	1/2" DIA. R. H. THD. ROD FIG. 140	
2	1/2" DIA. R. H. HEX NUT	
1	SPRING W/ EXTENDED LOAD ARM	SEE DATA
1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	LOWE

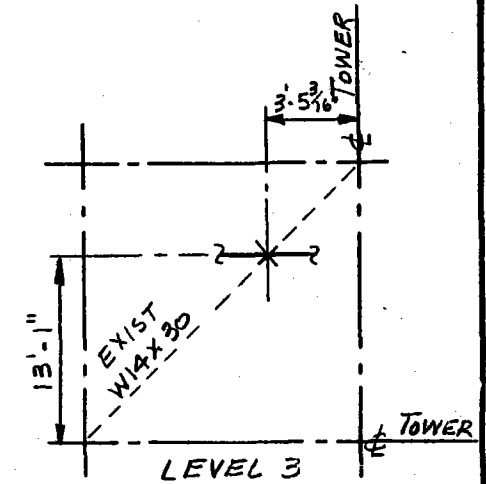
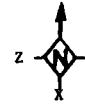
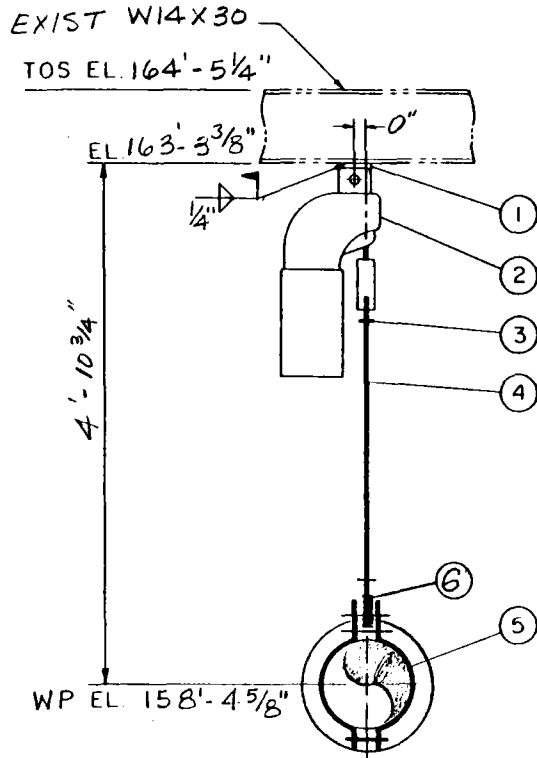
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .4K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	RFB
DATE	2-29-80	DATE	3-23-80
REVIEWED	RH/ML	APPROVED	YH/ML
DATE	3-9-80	DATE	3-27-80
PROJECT			
DATE			

ANALYSIS ID. CODE T-VT-1-A-4/13-2 W-VT-1-A-5 PROJECT NO C-21700 LINE NO 4 "VT-1-K55 MARK NO H-VT-1-18

FORM 973-2-55

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN
 + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -7/8"$
 $\Delta z = 3 1/16"$

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	1/2	12
HOT LOAD			2,387#
COLD LOAD			N.A.
VERT. TRAVEL C. TO H.			8" DN
T. I. CONST. SUPPORT			10"

ELEV. LOOKING NORTHWEST
 PIPE ROTATED 45°

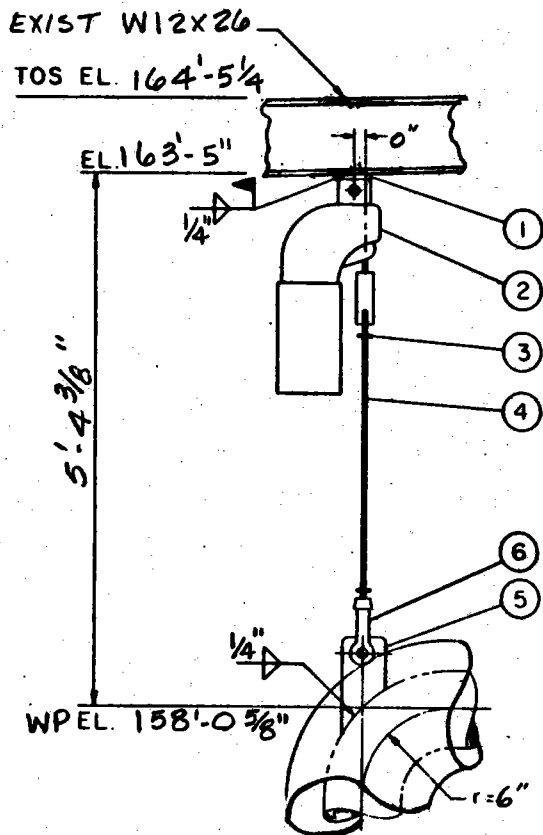
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	7
E	PIPING P9-3	P3	6
D	STRUCTURAL S32-3	O	5
C	ELECTRICAL		4
B			3
A			2

NOTES:
 PIPE TEMPERATURE: 760 °F
 STRUCTURAL DESIGN LOAD: 7K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 F22

ENGINEERING RECORD			
DESIGNED	M.M.	CHECKED	R.S.
DATE	8-29-80	DATE	8-25-80
REVIEWED	R.S.	APPROVED	J.P.H.
DATE	8-9-80	DATE	8-27-80
PROJECT			
DATE			

5	1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	SEE DATA
4	ITEM RECD		COMPONENT DESCRIPTION	REMARKS
3	SCALE:	NONE	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
ANALYSIS ID. CODE T-VT-1-A-4-5-2 W-VT-1-A-5 PROJECT NO C-21700 LINE NO 4"VT-1-KEB MARK NO H-VT-1-19				

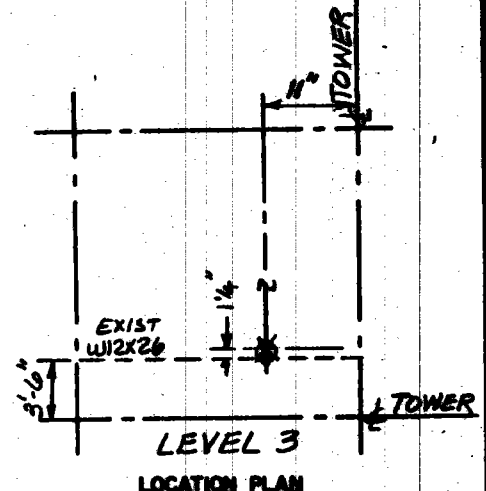
DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING WEST
(STEEL ROTATED 90°)

⚠️ 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



✦ LOCATION OF STEEL ATTACHMENT
 ✦ LOCATION OF PIPE ATTACHMENT
 $\Delta x = -5/16"$
 $\Delta z = 2 1/2"$

VOL. P60-1

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

SPRING DATA						
FIG. NO	TYPE	SIZE	14			
81H	C	17	13			
HOT LOAD		387#	12			
COLD LOAD		N.A.	11			
VERT. TRAVEL C. TO H.		6 3/4" DN	10			
Y. T. CONST. SUPPORT		4 1/2"	9			
			8			
			7			
REFERENCE DRAWINGS			REV			
E	PIPING	P9-3	P3	6	1	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
D	STRUCTURAL	332-3	0	5	1	1/2" DIA. WELDING LUG C-7 1/2" H. S. 53 BY FAB.
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 W/EXTENDED LOAD ARM SEE DATA
				1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 54

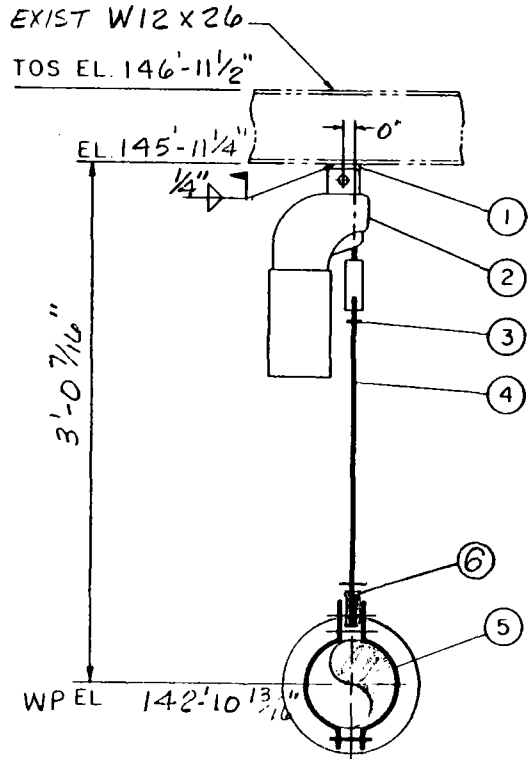
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	JRP EVH
DATE	2-29-80	DATE	2-25-80 2-27-80
REVIEWED	JRP	APPROVED	JRP
DATE	2-9-80	DATE	2-1-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T-VT-1-6		N-VT-1-A-7

ITEM	RECD	SCALE	REVISIONS	REMARKS
1	1	NONE		
Stearns-Roger INCORPORATED				11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA				
PROJECT NO	C-21700	LINE NO	4"VT-1-REB	DRAWN NO
			H-VT-1-20	

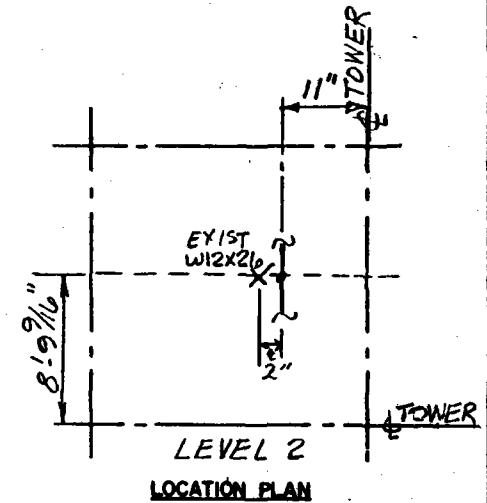
280

FORM 973-2-68

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV LOOKING NORTH



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -3/16"$
 $\Delta z = 2 1/2"$

VOL. P60-1

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

SPRING DATA		14		
FIG. NO	TYPE	SIZE		
80V	C	17	12	
HOT LOAD		296#	11	
COLD LOAD		N.A.	10	
VERT. TRAVEL C TO H.		8 1/2" DN	9	
T.T. CONST. SUPPORT		10"	8	
REFERENCE DRAWINGS		REV	7	
PIPING	P9-3	P3	6	1 1/2" DIA. WELDLESS EYEBOLT 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.	REFERENCE DRAWINGS	REV	7
E			
D			
C			
B			
A			

NOTES:

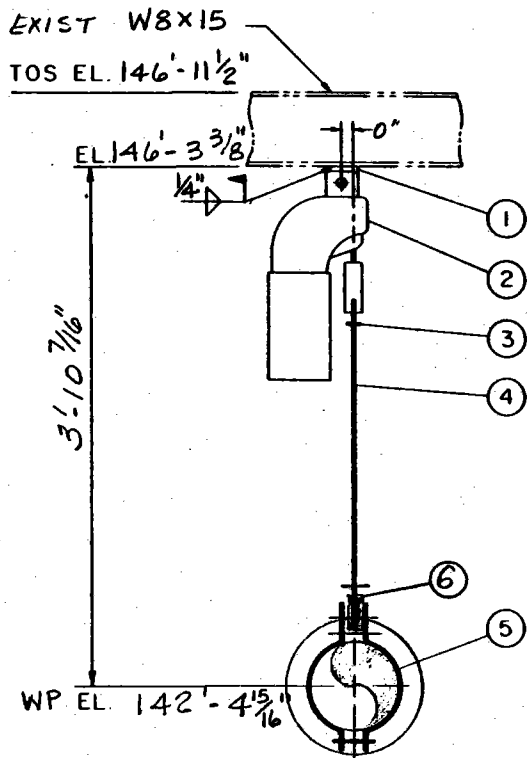
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .5R
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: .1"
 PIPE MATERIAL: ASTM A335 GR P22

ENGINEERING RECORD

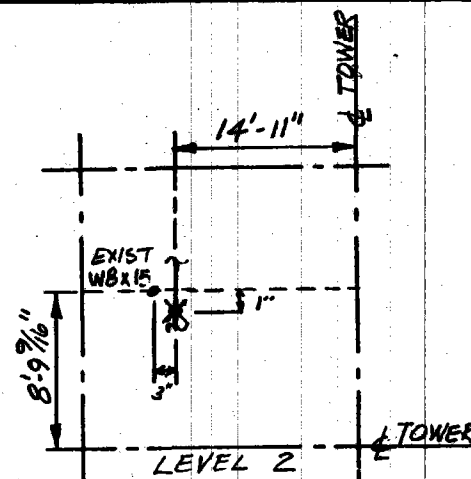
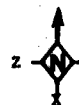
DESIGNED	DATE	CHECKED	DATE
MM	2-28-80	FVH	3-27-80
REVIEWED	DATE	APPROVED	DATE
	3-7-80		3-21-80
PROJECT	DATE		
ANALYSIS ID. CODE	T-VT-1-A-4/1-2		W-VT-1-A-5

ITEM RECD	SCALE:	COMPONENT DESCRIPTION	REMARKS
5	NONE	1 1/2" DIA. WELDLESS EYEBOLT FIG. 290	
4		4" DIA. PIPE CLAMP FIG. 295A	
3		1 1/4" DIA. R. H. THD. ROD FIG. 140	
2		2 1/2" DIA. R. H. HEX NUT	
1		SPRING W/EXTENDED LOAD ARM	SEE DATA
		1 1/2" DIA. STRUCT. WELDING LUG FIG. 55	
REVISIONS		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700	LINE NO	T-VT-1-KEB
MARK NO	H-VT-1-21		

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



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 5/16" DN	9
I T. CONST. SUPPORT		7 1/2"	8
VENDOR ENG. REV.			7
REFERENCE DRAWINGS			REV
E	PIPING	P9-3 P3	6 1
D	STRUCTURAL	S32-3 O	5 1
C	ELECTRICAL		4 1
B			3 2
A			2 1
			1 1

ITEM NO	DESCRIPTION	REMARKS
1	1/2" DIA. WELDLESS EYENUT FIG. 290	
2	4" DIA. PIPE CLAMP FIG. 295A	
3	1/2" DIA. R. H. THD. ROD FIG. 140	
4	1/2" DIA. R. H. HEX NUT	
5	SPRING SINGLE ROD SUSP.	SEE DATA
6	1/2" DIA. STRUCT. WELDING LUG FIG. 55	LONG

NOTES:

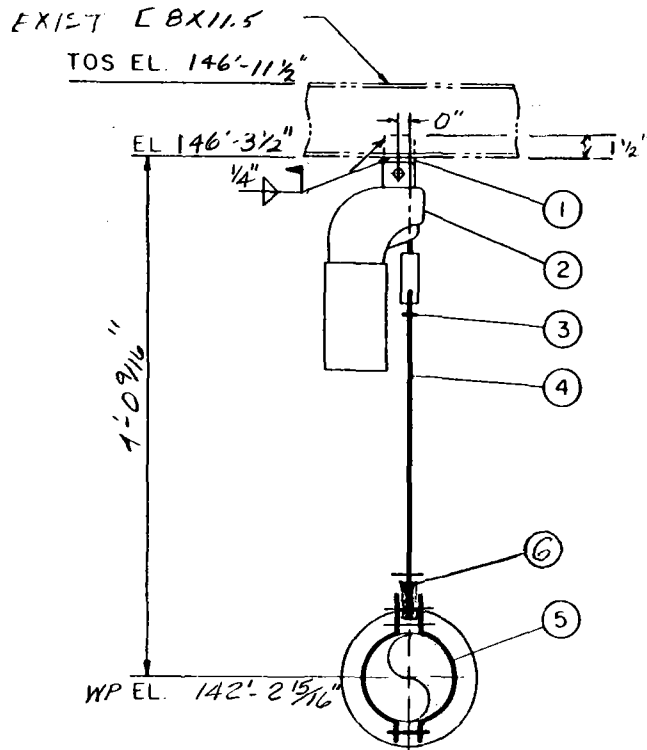
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .4K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 GR P12

ENGINEERING RECORD

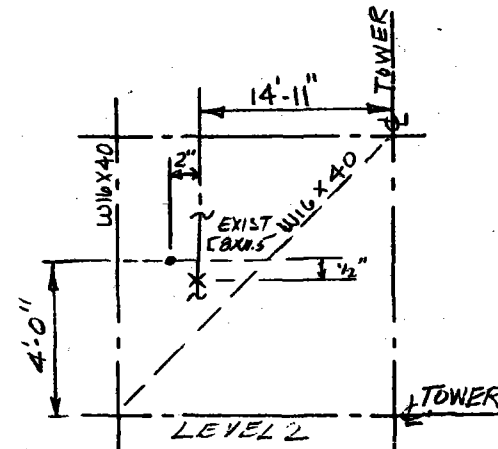
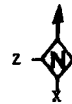
DESIGNED	MLM	CHECKED	FCM	DATE	2-29-80
REVIEWED	JBR	APPROVED	R. G. W.	DATE	3-9-80
PROJECT					
DATE					
ANALYSIS ID. CODE	T-VT-1-A-4/B-2		W-VT-1-A-5		

5	1	1	1/2" DIA. STRUCT. WELDING LUG FIG. 55	SEE DATA
4			ITEM REQ	COMONENT DESCRIPTION
3			SCALE: NONE	11165/8
2			Stearns-Roger	
1			10 Mile SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
			REVISIONS	
			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
- △ x = -3/4"
- △ 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
E	PIPING	P9-3 P3	6
D	STRUCTURAL	S32-3 O	5
C	ELECTRICAL		4
B			3
A			2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P9-3 P3
D	STRUCTURAL	S32-3 O
C	ELECTRICAL	
B		
A		

ITEM NO	REVISION	DESCRIPTION	REMARKS
1	1	1/2" DIA WELDLESS EYEOUT	FIG. 290
2	1	4" DIA. PIPE CLAMP	FIG. 295A
3	2	1/2" DIA. R. H. THD. ROD	FIG. 140
4	1	1/2" DIA. R. H. HEX NUT	
5	1	SPRING	SEE DATA
6	1	1/2" DIA. STRUCT. WELDING LUG	FIG. 55

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .5 K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 1"
 PIPE MATERIAL: ASTM A335 GR 92C

ENGINEERING RECORD

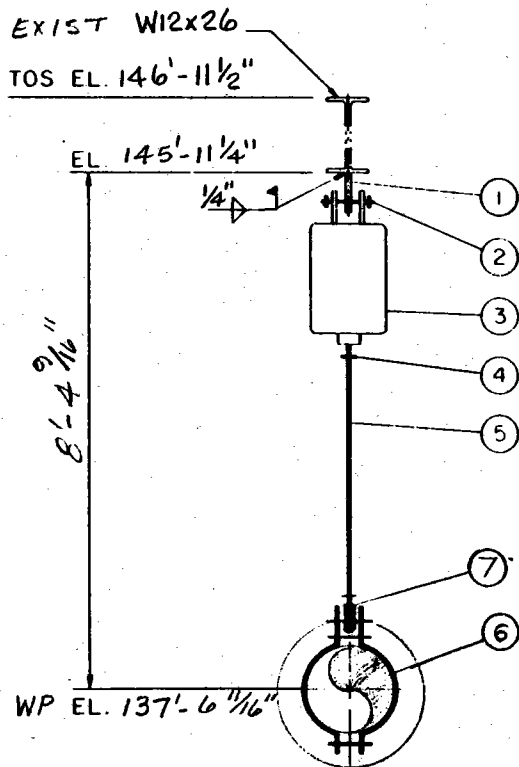
DESIGNED	MLM	CHECKED	YEA	FVH
DATE	2-28-80	DATE	2-27-80	2-27-80
REVIEWED	MLM	APPROVED	YEA	
DATE	3-9-80	DATE	3-27-80	
PROJECT				
DATE				

REVISIONS	SCALE:	COMPONENT DESCRIPTION	REMARKS
1	NONE	Stearns-Roger	11165/8

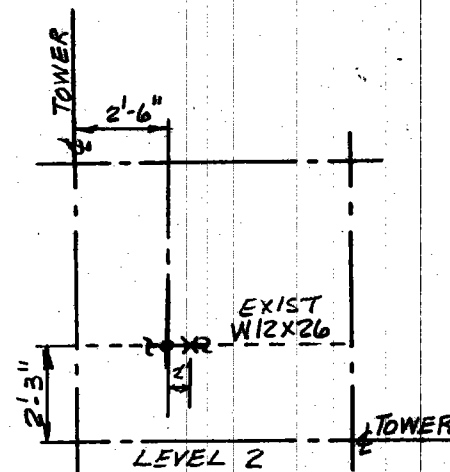
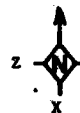
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

ANALYSIS ID. CODE T-VT-1-A-1-2 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. P60-1

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
I. T. CONST. SUPPORT		N.A.	8
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7 1
E	PIPING P9-3	P3	6 1
D	STRUCTURAL S32-3	0	5 1
C	ELECTRICAL		4 2
B			3 1
A			2 1

					5/8" DIA. WELDLESS EYEBUT FIG. 290	
					4" PIPE CLAMP FIG. 295A	
					3/8" DIA. R. H. THD. ROD FIG. 140	
					5/8" DIA. R. H. HEX NUT	
					SPRING	SEE DATA
					5/8" DIA. PIN W/COTTER PIN FIG. 291	
					5/8" DIA. STRUCT. WELDING LUG FIG. 55	SHOW

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .9K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 JR P22

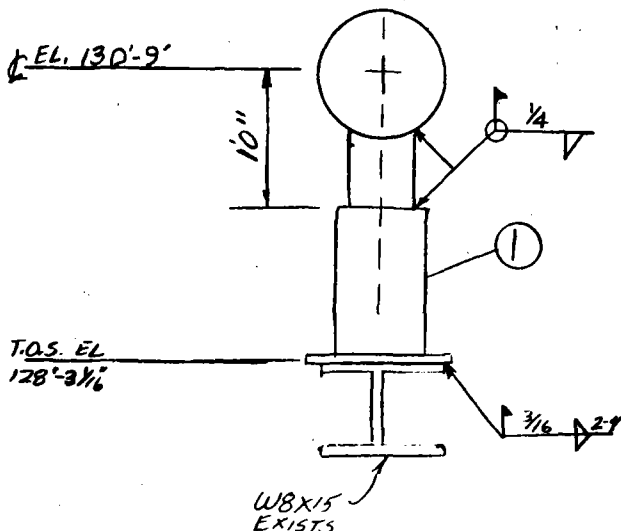
ENGINEERING RECORD

DESIGNED	MLM	CHECKED	FPV	REV	5
DATE	2-28-80	DATE	2-28-80	ITEM REQD	4
REVIEWED	J. P. H.	APPROVED	J. P. H.	SCALE:	3
DATE	3-9-80	DATE	3-27-80	NONE	2
PROJECT					1
DATE					REVISIONS

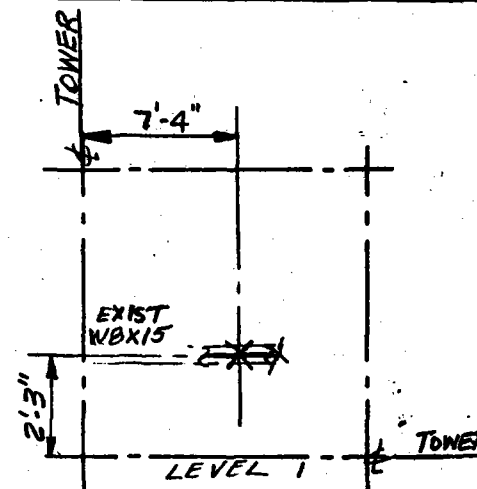
COMPONENT DESCRIPTION	REMARKS
Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	

ANALYSIS ID. CODE T-VT-1-A-4/B-2 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



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ x = -1/4"
- Δ z = 3/4"

VOL. P60-1

VENDOR ENG. REV.

E	
D	
C	
B	
A	

REFERENCE DRAWINGS	REV
PIPING P9.3	P3
STRUCTURAL S32-3	0
ELECTRICAL	

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

△ REVISED FROM SPRING ROD TO RIGID FLOOR SUPPT.

△ ADDED ITEMS B99.

T-VT-1-A-6 W-VT-1-A-7
ANALYSIS ID. CODE

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

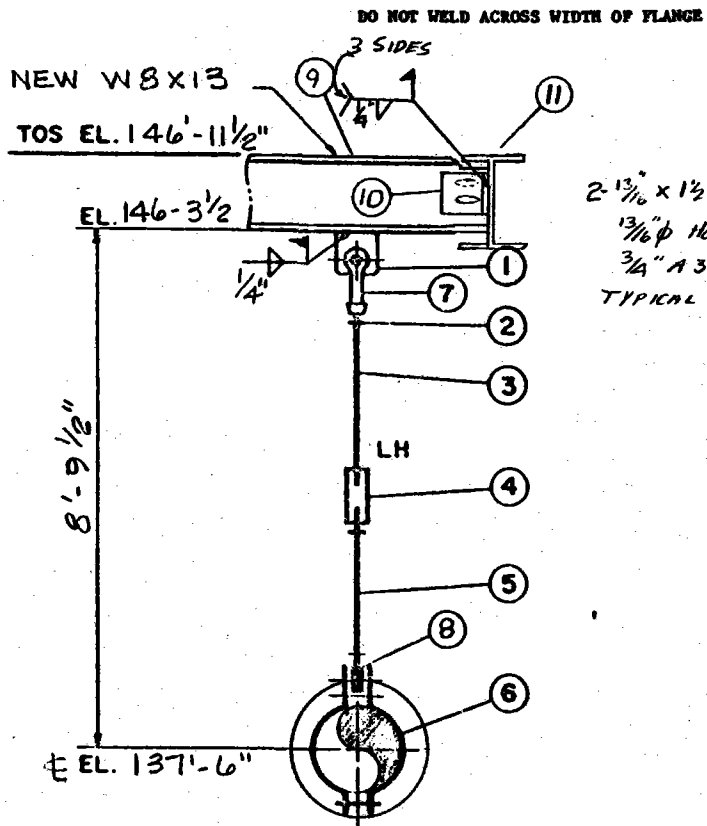
ENGINEERING RECORD

DESIGNED	M.M.	CHECKED	R.P.	EVH
DATE	2-2-80	DATE	2-2-80	2-2-80
REVIEWED	J.P.	APPROVED	J.P.	
DATE	3-9-80	DATE		11-80
PROJECT				
DATE				

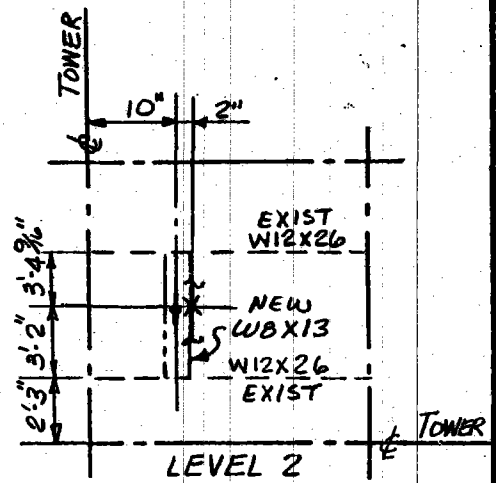
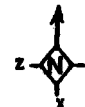
5
4
3
2
1

ITEM RECD	1	COMP. NR ADJ. PIPE STAIN H.S. 62, 10" X 10" X 1/2"	REMARKS
SCALE:	NONE		
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700			LINE NO 4"VT-1-KEB
			MARK NO H-VT-1-25

2 1/2" SCH. 40 A335 P22, 3" SCH. 40 C.S. TYPE C
 STEARNS-ROGER



DO NOT WELD ACROSS WIDTH OF FLANGE
 3 SIDES
 2 13/16 X 1 1/2 SLOTTED HOLES IN W8
 1 3/16 DIA HOLE IN F'S FOR
 3/4" A 325 BOLTS
 TYPICAL BOTH ENDS W8



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δx = - 1/2"
 Δz = 2 7/16"

VOL. P60-1

ELEV. LOOKING EAST
 PIPE ROTATED 90°

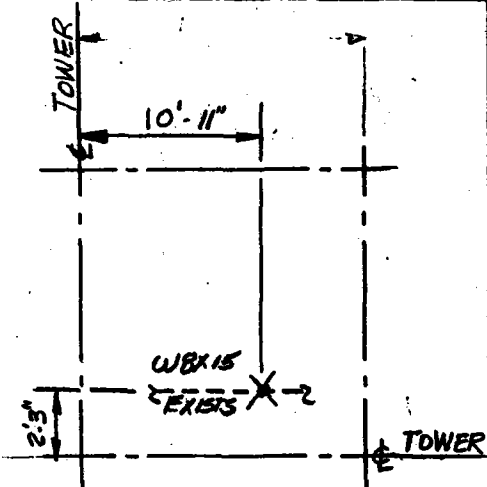
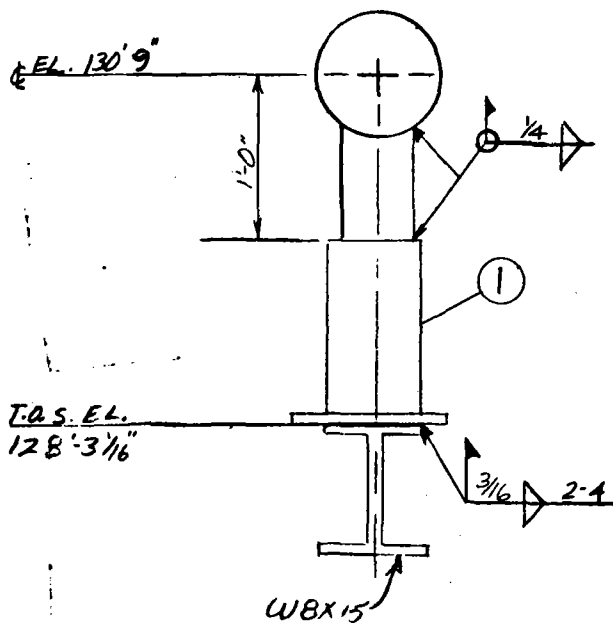
VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-3	R3
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
B			
A			

14		
13		
12		
11	4	3/4" X 3" LG A325 BOLTS
10	4	2 1/2" X 3" X 3/8" X 5" LG
9	1	W8X13 6'-5 1/2" LG
8	1	1/2" DIA. WELDLESS EYENUT FIG. 290
7	1	1/2" DIA. F. S. CLEVIS W/YIN 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. 233
2	3	1/2" DIA. R. H. HEX NUT
1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .7K
 PIPE SIZE: 2.375" O.D.
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5	1	1	1
DESIGNED	MLM	CHECKED	REP EVH	4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
DATE	3-10-50	DATE	8-25-80 3-27-80	3	SCALE:	Stearns-Roger	11165/8
REVIEWED	By: ml	APPROVED	4/7/11	2	NONE		
DATE	3/12/80	DATE	3-27-80	1			
PROJECT				REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
DATE							
ANALYSIS ID. CCCE	TW-S7-13-A-1/1			PROJECT NO	C-21700	LINE NO	2"YT-1-KEB MARK NO
							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. P60-1

287

ELEV. LOOKING EAST

REVISD FROM SPRING HGR. TO RIGID FLOOR SUPPORT

REVISD STEEL DETAIL

T-VT-1A-6 W-VT-1A-7

ANALYSIS ID. CODE

VENDOR ENG. REV.

REV	DESCRIPTION	DATE
E		
D		
C	REFERENCE DRAWINGS	REV
	PIPING	P9-3 P3
B	STRUCTURAL	S32-3 0
A	ELECTRICAL	

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

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

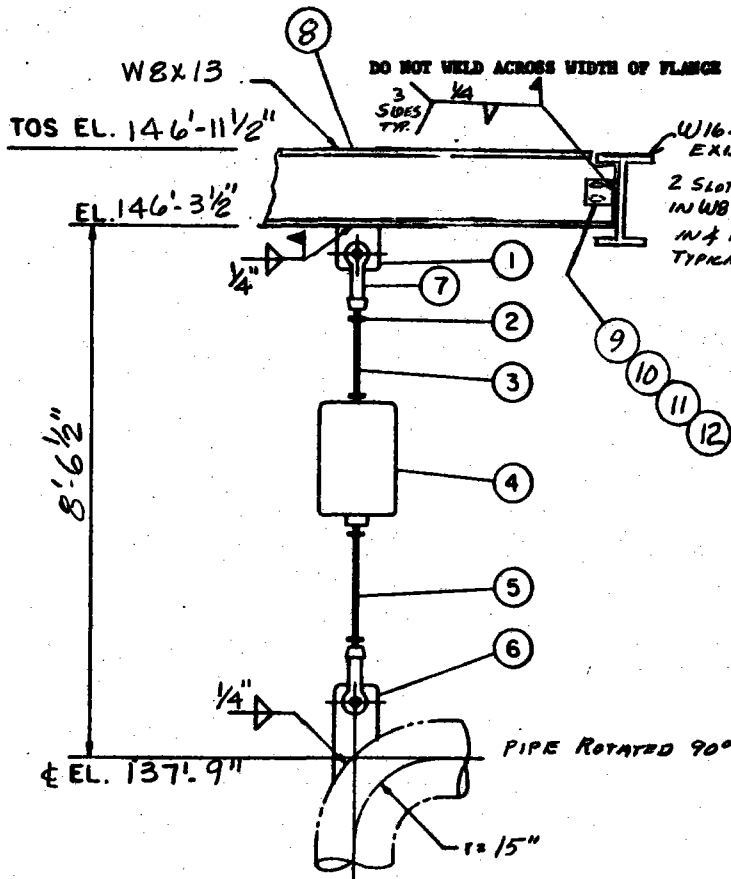
ENGINEERING RECORD	
DESIGNED	CHEKED
DATE	DATE
REVIEWED	APPROVED
DATE	DATE
PROJECT	
DATE	

5
4
3
2
1
REVISIONS

ITEM REQD	SCALE	COMPONENT DESCRIPTION	REMARKS
1 1	NONE	5" SCH 40 A335 P11, 6" SCH 80 C.S., 10' X 10' X 3/4" R	
		COMB. #5 ADT. PIPE STAY H.S. 62 TYPE C	
		Stearns-Roger	11165/8

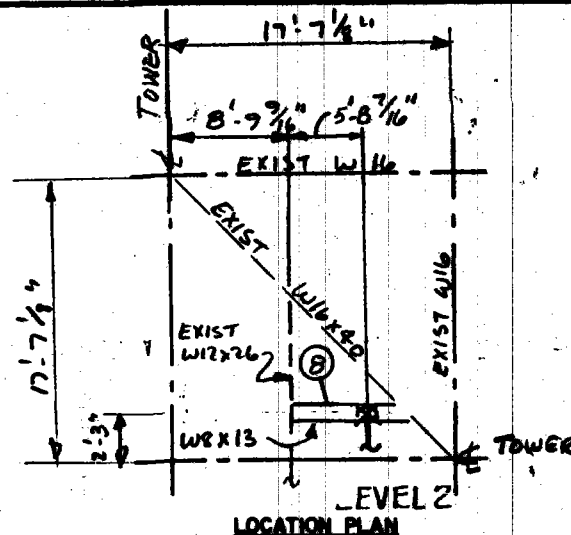
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 10-VT-11-177A MARK NO H VT-11-1



ELEV. LOOKING NORTH

REVISOR HOT & COLD LOADS, SPRING & ROD SIZES. ADDED STEEL. STEEL FORMERLY ON H-VT-11-1.



LOCATION PLAN
 + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δ x = -1/4"
 Δ z = 3/8"

VOL. P60-1

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

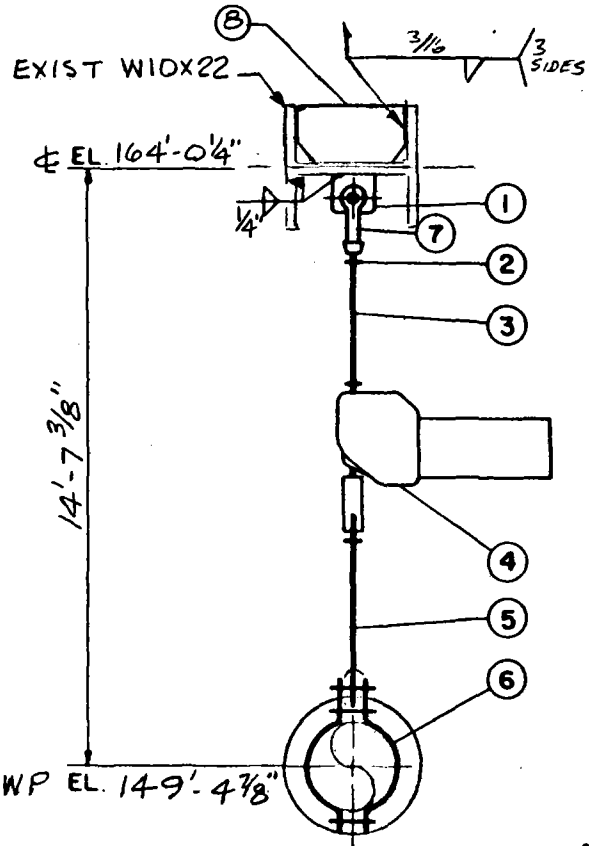
SPRING DATA		14		
FIG. NO	TYPE	SIZE	REV	
B-268	A	11	12	4 3/4" X 3" A325 BOLTS W/ NUTS
	HOT LOAD	1605 #	11	2 44 X 3 X 3/8, 5" LG @ 90°
	COLD LOAD	1796 #	10	1 44 X 3 X 3/8, 5" LG @ 135°
	VERT. TRAVEL C. TO H.	9/16" UP	9	1 44 X 3 X 3/8, 5" LG @ 45°
	T. T. CONST. SUPPORT	N.A.	8	1 W8X13, 6'-5 1/2" LG TRIM AS REQ'D.
	REFERENCE DRAWINGS	REV	7	2 7/8" DIA. F. S. CLEVIS W/ PIN FIG. 299
E	PIPING	P2-3	R3	6 1 1/8" DIA. WELDING LUG C-7 1/16" S. 53
D	STRUCTURAL	S32-3	0	5 1 7/8" DIA. R. H. THD. ROD FIG. 140
C	ELECTRICAL			4 1 SPRING
B				3 1 7/8" DIA. R. H. THD. ROD FIG. 140
A				2 4 7/8" DIA. R. H. HEX NUT
				1 1 7/8" DIA. STRUCT. WELDING LUG FIG. 55

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	P2-3 R3
D	STRUCTURAL	S32-3 0
C	ELECTRICAL	
B		
A		

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 3.2K
 PIPE SIZE: 10.75" O.D.
 PIPE INSULATION: 5"
 PIPE MATERIAL: ASTM A335 GR P-11

ENGINEERING RECORD				5	1	1
DESIGNED	DATE	CHECKED	DATE	ITEM	REQD	REMARKS
MLM	3-3-80	BEEL	3-25-80	4	7/8" DIA. STRUCT. WELDING LUG FIG. 55	SHORT
				3	SCALE: NONE	
REVIEWED	DATE	APPROVED	DATE	1	COMPONENT DESCRIPTION	
X/MLM	3-9-80		3-27-80	1	Stearns-Roger	
PROJECT	DATE			REVISIONS	10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
					11165/8	
ANALYSIS ID. CODE	T-VT-1-A-6	W-VT-1-A-7	PROJECT NO	C-21700	LINE NO	10"VT-11-FEA

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST

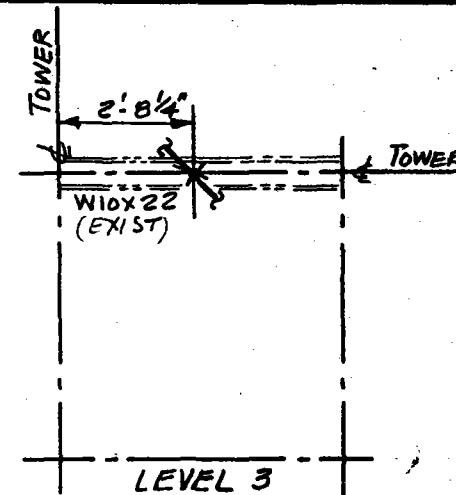
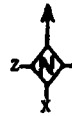
PIPE ROTATED 45°

△ REVISED HOT LOAD & SPRING SIZE & ANALYSIS NO.

△ 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



LOCATION PLAN

✦ LOCATION OF STEEL ATTACHMENT
 ✦ LOCATION OF PIPE ATTACHMENT
 Δ x = 5/8"
 Δ z = 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
81H	A	10	12
HOT LOAD		141#	11
COLD LOAD		N.A.	10
VERT. TRAVEL C. TO H.		6 1/8" DN	9
T. T. CONST. SUPPORT		7 1/2"	8 1
		3/8" STIFF. PL	
VENDOR ENG. REV.		REV	7 1
E	PIPING	P3	6 1
D	STRUCTURAL	0	5 1
C	ELECTRICAL		4 1
B			3 1
A			2 3
		1/2" DIA. F. S. CLEVIS W/PIN FIG. 299	
		2 1/2" PIPE CLAMP FIG. 295A	
		1/2" DIA. R. H. THD. W. E. ROD FIG. 278	
		SPRING SEE DATA	
		1/2" DIA. R. H. THD. ROD FIG. 140	
		1/2" DIA. R. H. HEX NUT	
		1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55	

VENDOR ENG. REV.

REV	DESCRIPTION
E	PIPING P3
D	STRUCTURAL 0
C	ELECTRICAL
B	
A	

ENGINEERING RECORD

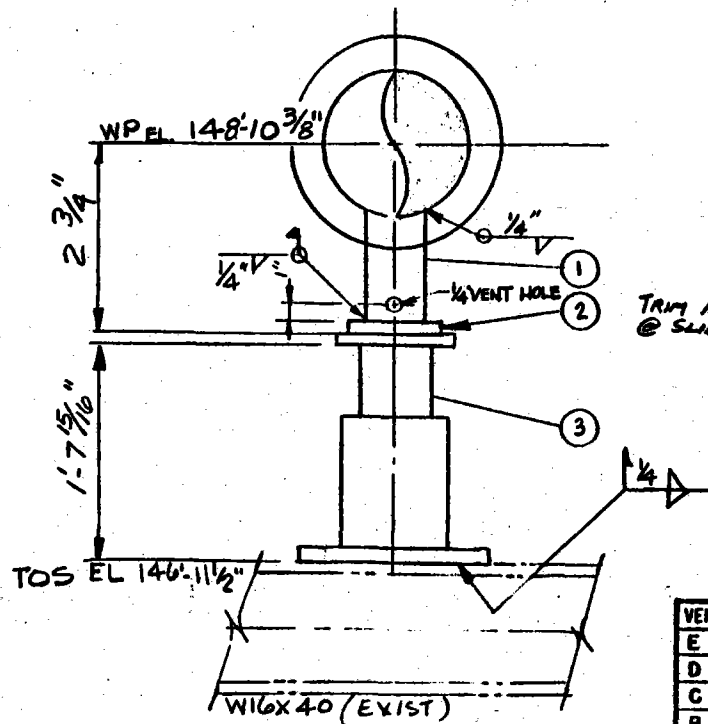
DESIGNED	MLM	CHECKED	JVS
DATE	3-7-80	DATE	1-27-80
REVIEWED	NMM	APPROVED	JVS
DATE	3-9-80	DATE	3-27-80
PROJECT			
DATE			

5	1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55
4			ITEM REQD
3			SCALE: NONE
2			REVISIONS
ANALYSIS ID. CODE		T-VT-1-A 6	U-VT-1-A 7
PROJECT NO		C-21700	LINE NO 2 1/2" VT-12-R22
MARK NO		H-VT-12-1	

Stearns-Roger

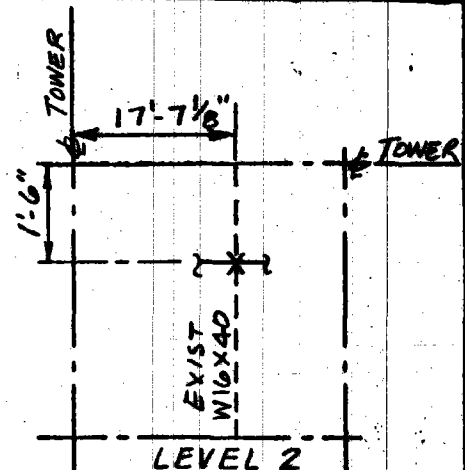
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

11165/8



ELEV. LOOKING EAST

TRIM INSULATION @ SLIDE PLATE



LOCATION PLAN

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

VOL. P60-1

VENDOR ENG. REV.		SPRING DATA			
		FIG. NO	TYPE	SIZE	
E		98	F	2	14
D					13
C					12
B					11
A					10
					9
					8
					7
					6
					5
					4
					3
					2
					1

REFERENCE DRAWINGS		REV
PIPING	P9-3	P3
STRUCTURAL	S32-3	0
ELECTRICAL		

W-VT-1-A-7	T-VT-1-A-6	ANALYSIS ID. CODE

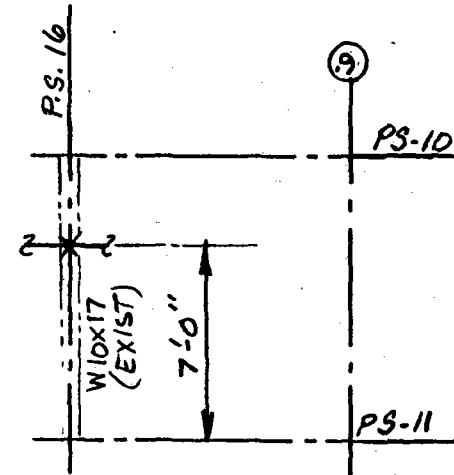
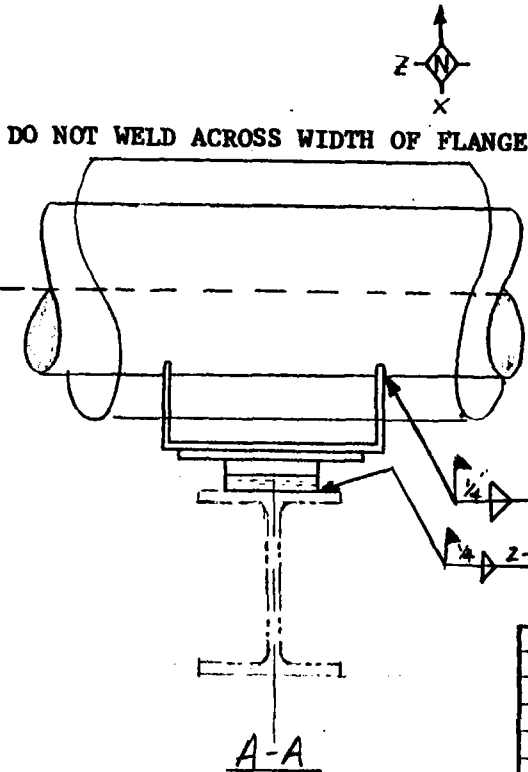
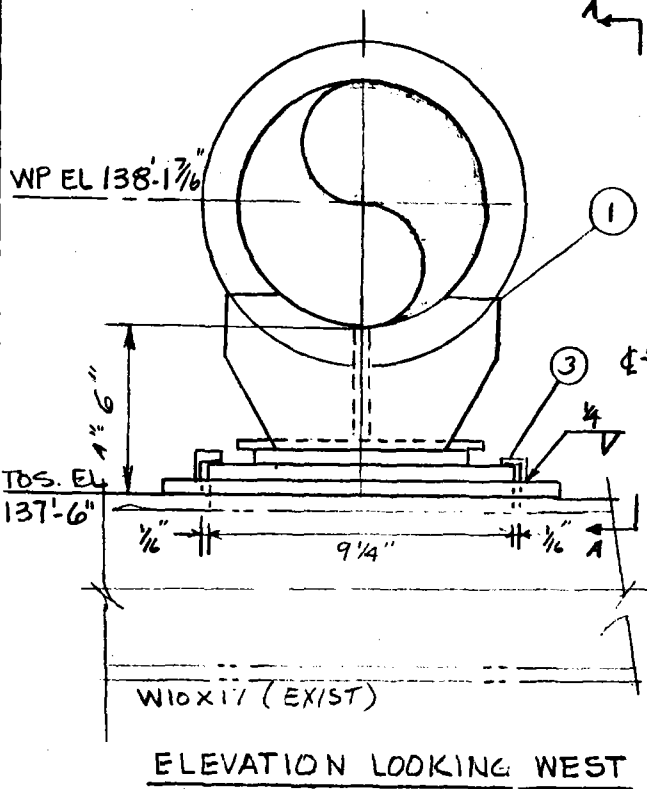
Δ REVISED HOT & COLD LOAD & ANALYSIS NO.
 Δ REVISED WELD SYMBOL

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	ITEM RECD	SCALE:	REVISIONS
DESIGNED	M.A.	CHECKED	REN	1/11		NONE	1
DATE	3-2-80	DATE	3-2-80	3-2-80			2
REVIEWED	J.P.	APPROVED	H.P.				1
DATE	3-9-80	DATE	3-2-80				
PROJECT							
DATE							

COMPONENT DESCRIPTION	REMARKS
10 Mtb SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
5" X 5" X 1/4" R BARS TO 1/8" THICK GROUND ANCHORS & 1 1/2" PIPE SCH. 80 (BY FR&B)	SEE DATA
Stearns-Roger	11165/8

FORM 100-1



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

VOL. P60-1

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3	2	4" X 1" X 5"	
1		A387 GR. D MAT'L. A"=6"	
1	1	2 1/2" Ø PIPE SADDLE FIG. C-12	subst
ITEM RECD		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
ANALYSIS ID. CODE	T-VT-1-A-6	T-VT-1-A-7	PROJECT NO C-21700
LINE NO	21-VT-12-REF	MARK NO	11-VT-12-3

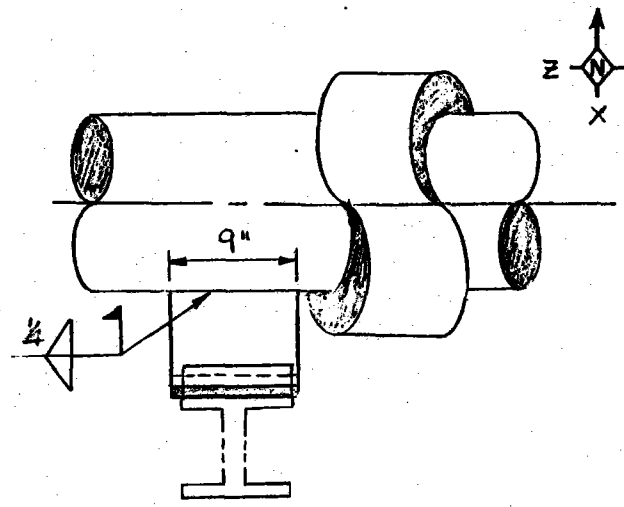
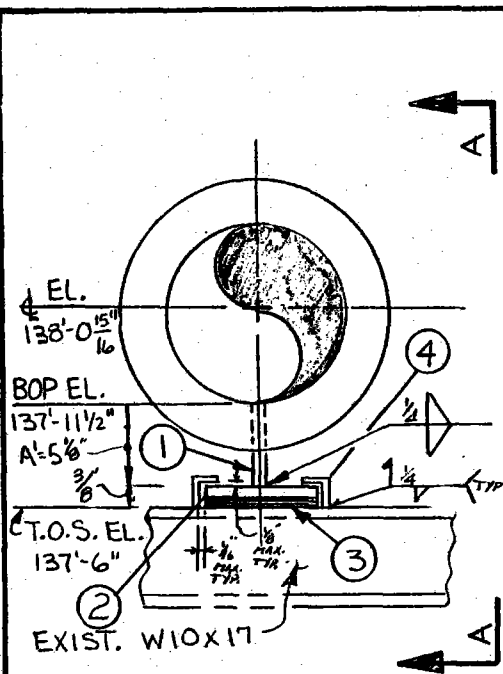
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P3
D	STRUCTURAL S33-4	0
C	ELECTRICAL	
B		
A		

- △ REVISED S.D. LOAD & ANALYSIS No.
- △ ADDED GUIDE (ITEM 3)

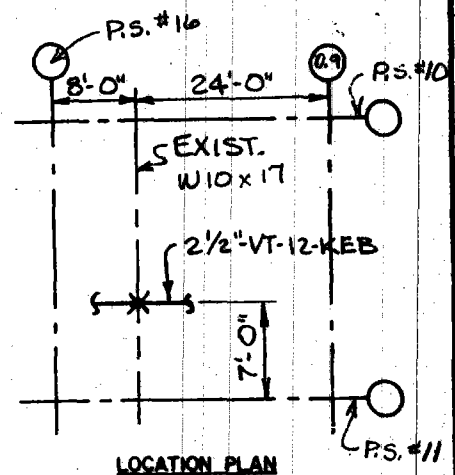
NOTES:
 PIPE TEMPERATURE: 760°
 STRUCTURAL DESIGN LOAD: $F_x = -1K$, $F_y = .5K$
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	KEA FVH
DATE	3-7-80	DATE	3-27-80
REVIEWED	RD	APPROVED	RD
DATE	3-9-80	DATE	3-27-80
PROJECT DATE			
ANALYSIS ID. CODE	T-VT-1-A-6	T-VT-1-A-7	

REVISIONS
5
4
3
2
1



SECTION A-A



LOCATION PLAN
 + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 0$
 $\Delta Z = -1 \frac{11}{16}$ "

VOL. P60-1

ELEVATION LOOKING EAST

14	
13	
12	
11	
10	
9	
8	

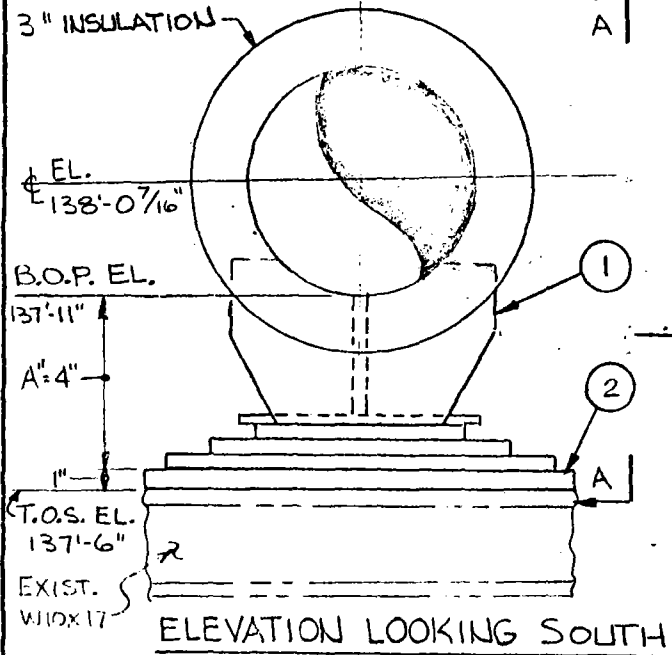
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7
E	PIPING P9-3	P3	6
D	STRUCTURAL S33-4	A	5
C	ELECTRICAL		4
B			3
A			2

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
2	1"X1"X1/4" X 4" LONG TRIM LEE AS REQD	
3	1 9"X6"X1/8" GRAPHITE R. ROUNDED TO (2)	
2	1 9"X6"X1/4" ASTM A387 GR.D #	
1	1 9"X5 1/2"X1/4" ASTM A387 GR.D #	

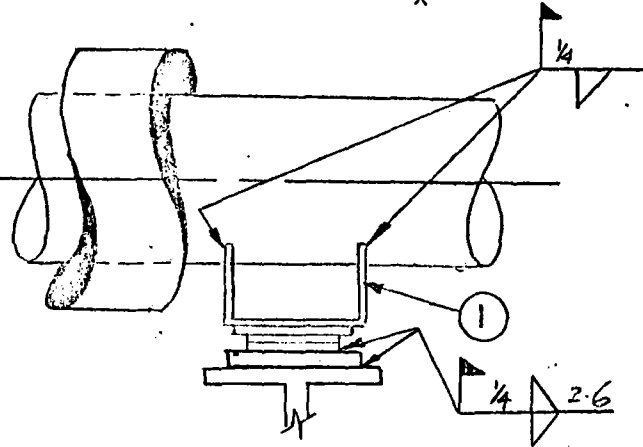
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 1K$
 $F_y = .5K$
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	YMT	CHECKED	REN
DATE	3/10/80	DATE	2-24-80
REVIEWED	YMT	APPROVED	REN
DATE	3/12/80	DATE	3-27-80
PROJECT			
DATE			

5	1	1	9"X5 1/2"X1/4" ASTM A387 GR.D #
4	ITEM REQD		COMPONENT DESCRIPTION
3	SCALE:		NONE
2	Stearns-Roger		INCORPORATED
1	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 NO	G-21700
LINE NO	2 1/2"-VT-12-KEE	MARK NO	M-VT-12-4

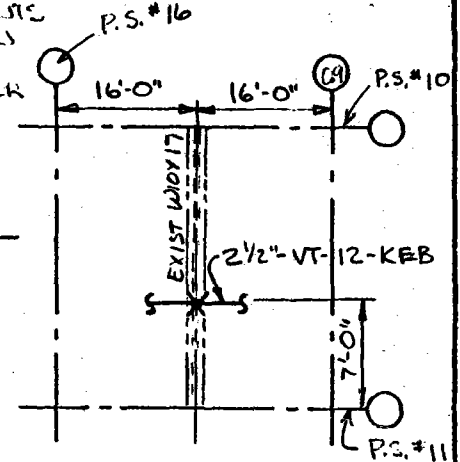
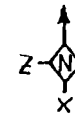


ELEVATION LOOKING SOUTH



SECTION A-A

NOTE: STEEL AT RIGHT REPRESENTS STEEL BETWEEN MAIN RACK AND RECEIVER TOWER.



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 0$
 $\Delta Z = -2 1/8$

VOL. P60-1

DO NOT WELD ACROSS WIDTH OF FLANGE

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING 727-2	P3
D	STRUCTURAL 523-4	A
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2	1	1'-2" x 5" x 1" C.S. TE
1	1	A=4" (MADE OF A387 GR. D TE)
1	1	2 1/2" PIPF SADDLE FIG. 612
14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

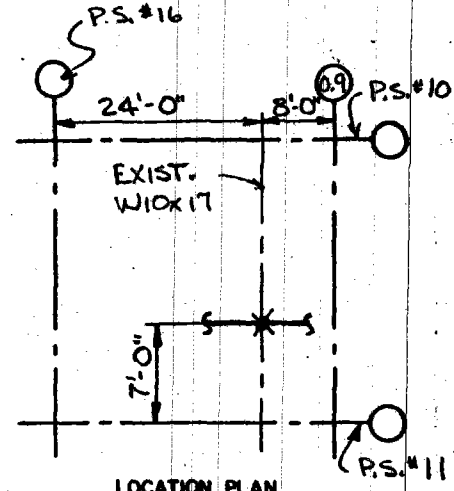
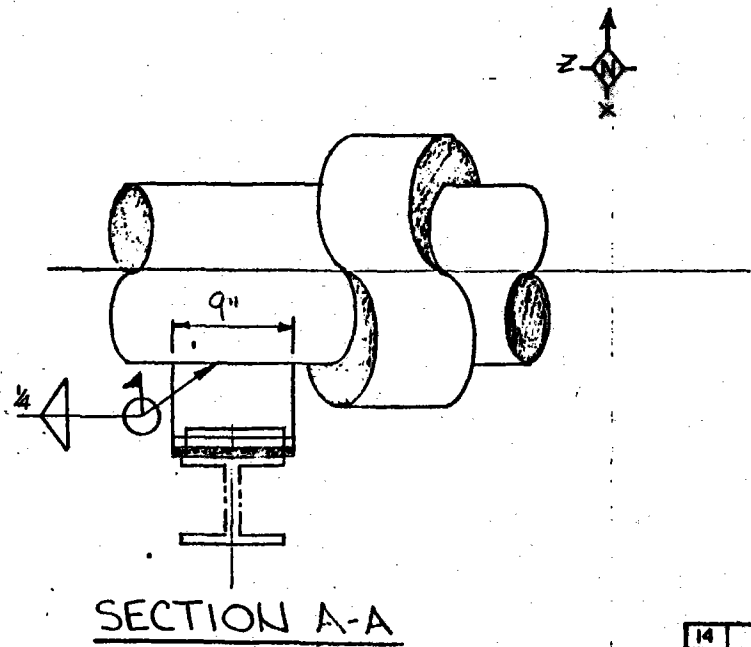
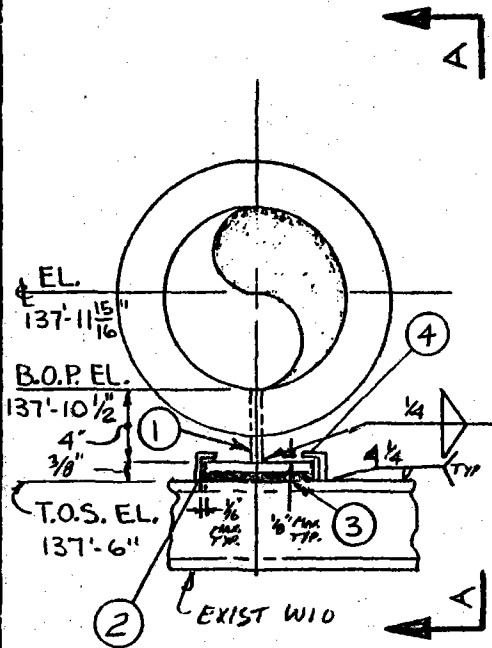
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT # C-21700 LINE # 2 1/2" VT-12-KEB MARK # H-VT-12-5

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .3K
 PIPE SIZE: 2.875"
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 T22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
	3/7/80	AEK	1/11/80
REVIEWED	DATE	APPROVED	DATE
	3-20-80		3-27-80
PROJECT	DATE		
ANALYSIS ID. CODE	T-VT-1-A-4/1, W-VT-1-A-5		

5
4
3
2
1
REVISIONS



† LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 0$
 $\Delta Z = -2\frac{1}{2}"$

ELEVATIONAL LOOKING EAST

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1			

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P3 6
D	STRUCTURAL S33-4	A 5
C	ELECTRICAL	
B		
A		

2	1" x 1" x 1/4" 4' LG TRIM LEG AS REQ'D	
3	1 9" x 6" x 1/8" GRAPHITE R. LINED 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	

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	CHECKED	EVH
DATE	3/11/80	DATE	2-25-80 3-27-80
REVIEWED	AKW	APPROVED	AKW
DATE	3/12/80	DATE	3-27-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T-VT-1-A-4/R-2, W-VT-1-A-5	PROJECT NO	C-21700

5		
4	ITEM REQ'D	REMARKS
3	SCALE: NONE	
2		
1		
REVISIONS		
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
LINE NO 2 1/2-VT-12-KET		MARK NO H-VT-12-6

Stearns-Roger

11165/8

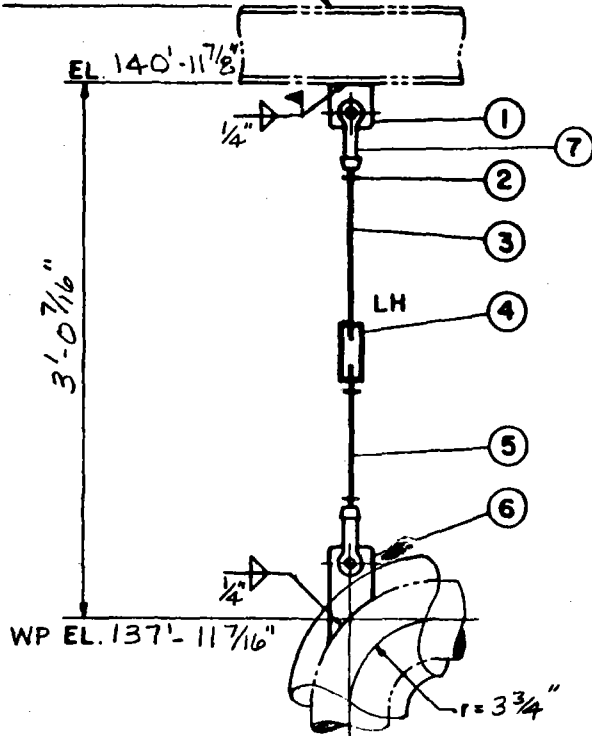
294

1-78-003

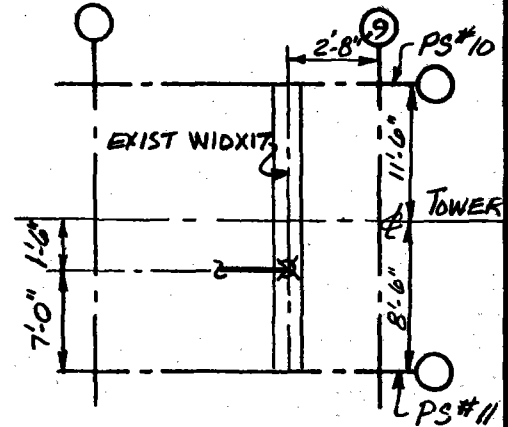
EXIST WID X 17

TOS EL. 141'-10"

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING SOUTH



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT

* LOCATION OF PIPE ATTACHMENT

$\Delta x = 1/16"$

$\Delta z = -2 3/4"$

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	P2-3	P3	6	1	2 1/2" DIA. WELDING LUG C-7 3/4" S. 53 BY FAB.
STRUCTURAL	S23-4	-	5	1	1/2" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	1	1/2" DIA. F. S. TURNBUCKLE FIG. 230
			3	1	1/2" DIA. R. H. - L. H. THD. ROD FIG. P53
			2	3	1/2" DIA. R. H. HEX NUT
			1	1	1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55

REVISD S.D. LOAD

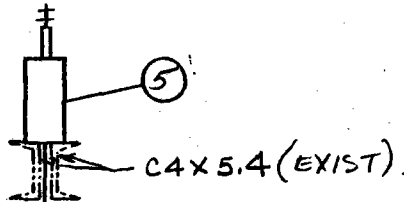
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: 1.0K
 PIPE SIZE: 2.075" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MEM	CHECKED	AW
DATE	3-11-80	DATE	3-11-80
REVIEWED	MEM	APPROVED	AW
DATE	3-11-80	DATE	3-11-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T-VT-1-A-5/11-82 W.VT-1-A-5		

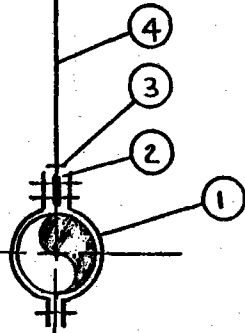
5		
4		
3	ITEM REQD	
	SCALE:	NONE
	Stearns-Roger	
	10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	PROJECT NO	C-21700
	LINE NO	21-VT-12-7
	MARK NO	H-VT-12-7

T.O.S. EL. 128'-3 1/16"

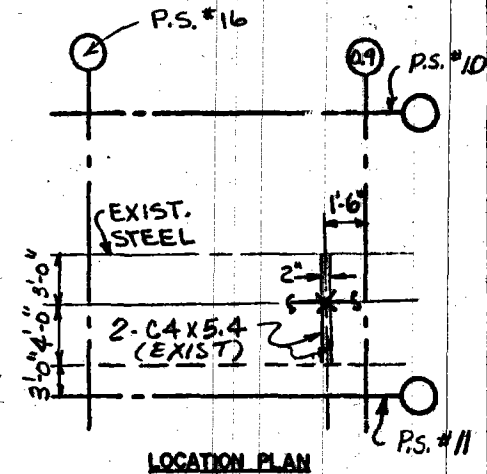
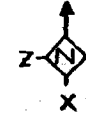
EL. 127'-11 1/16"



EL. 118'-27/16"



ELEVATION LOOKING NORTH
PIPE ROTATED 90°



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -2 5/8"
- Δ Z = -1 1/2"

VOL. P60-1

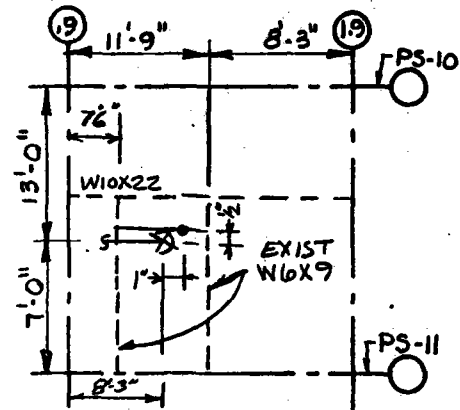
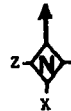
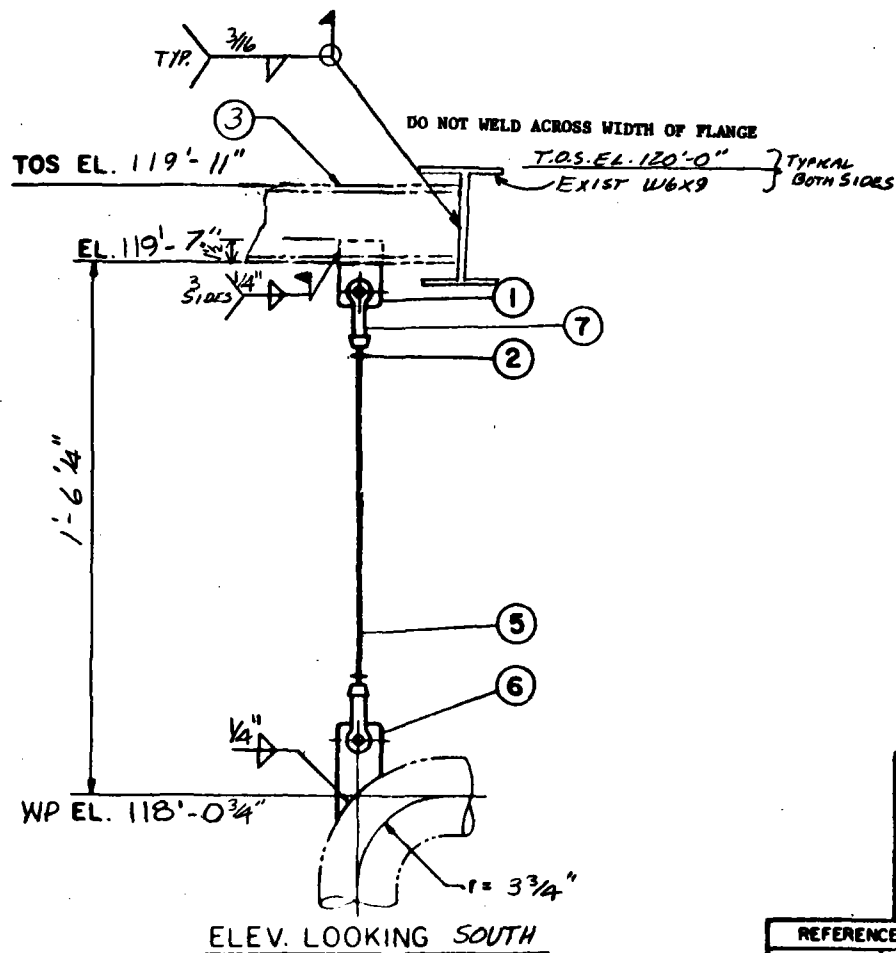
OPERATIONAL (HOT) AND COLD LOADS INDICATED DO NOT INCLUDE WEIGHT OF LOWER HANGER COMPONENTS

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		
VENDOR ENG. 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: 2.875" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD				5		
DESIGNED	7/12/79	CHECKED	KEN	4	ITEM REQD	COMPONENT DESCRIPTION
DATE	3/12/80	DATE	3-27-80	3	SCALE:	REMARKS
REVIEWED	H. R. W.	APPROVED	J. H. W.	2	NONE	11165/8
DATE	3-12-80	DATE	3-27-80	1		
PROJECT						
DATE						
ANALYSIS ID. CODE	T-VT-1-A--/P-2, W-VT-1-A-5	PROJECT NO	C-21700			
		LINE NO	2 1/2" VT-12-KEB			
		MARK NO	H-VT-12-8			

10 Mc SOLAR PILOT PLANT DAGGETT, CALIFORNIA



LOCATION PLAN

+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta x = -1/4"$
 $\Delta z = -2 1/4"$

VOL. P60-1

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

REFERENCE DRAWINGS	REV	7	2	1/2"	DIA. F. S. CLEVIS W/PIN FIG. 299
PIPING	PD-10	PS	6	1	1/2" DIA. WELDING LUG C-7 1/2 H.S. 53 BY FIG.
STRUCTURAL	S33-1	-	5	1	1/2" DIA. R. H. THD. ROD FIG. 140
ELECTRICAL			4	-	
			3	1	E4X5.4 4'-2 7/8" LG
			2	2	1/2" DIA. R. H. HEX NUT
			1	1	1/2" DIA. STRUCT. WELDING LUG LONG FIG. 55

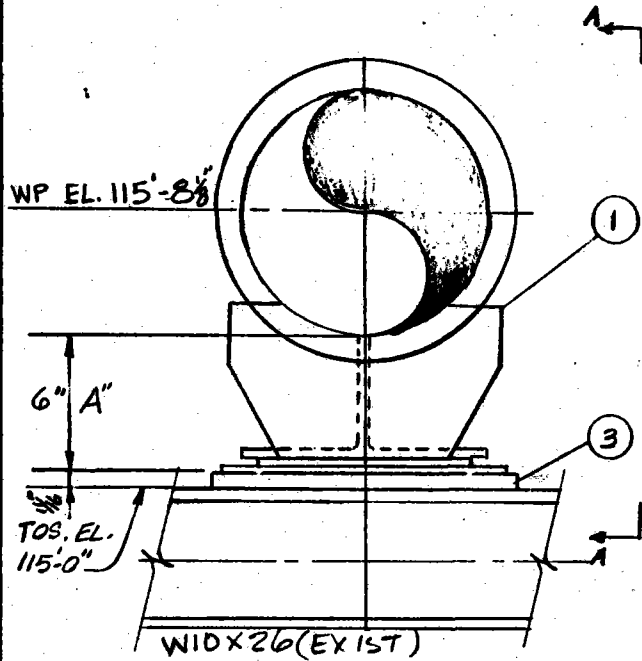
△ ADD E4X5.4, RELOCATE PIPE, REVISE ELEVS. 9 ITEM 1

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .2K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335

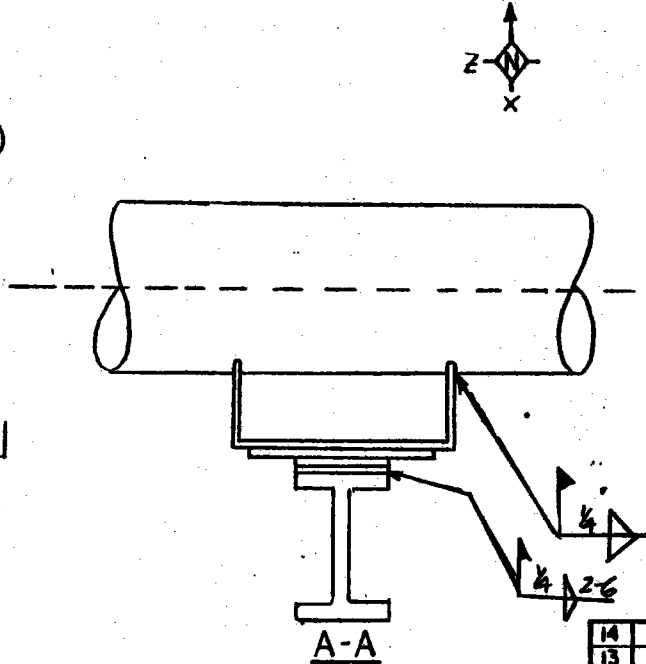
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	BY P.V.H.
DATE	2-20-80	DATE	2-20-80 3/27/80
REVIEWED	J.P.H.	APPROVED	J.P.H.
DATE	3-10-80	DATE	3-17-80
PROJECT			
DATE			
ANALYSIS ID. CODE	T-VT-1-A-6		N-VT-1-A-7

5	1	1	1/2"	DIA. STRUCT. WELDING LUG LONG FIG. 55
4			ITEM REQD	COMPONENT DESCRIPTION
3			SCALE:	NONE
2				Stearns-Roger
1				INCORPORATED
				11165/8
				10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
				PROJECT NO C-21700
				LINE NO 2 1/2" VT-12-FEB
				MARK NO H-VT-12-9

298

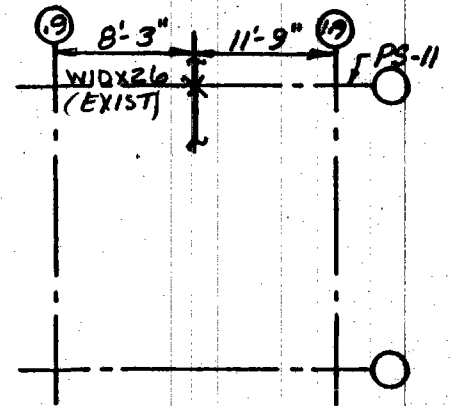


ELEVATION LOOKING NORTH



A-A

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

14			
13			
12			
11			
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9			
8			
7			
6			
5			
4			
3	1	1'-2" x 5" x 1/4" C.S. P	
2	1	SPECIAL A387 GR D R	
1	1	26" PIPE SADDLE FIG. 612	ANDSON
ITEM RECD		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT BAGGETT, CALIFORNIA			
ANALYSIS ID. CODE	T-VT-1-A-6	3-W-VT-1-A-7	PROJECT NO C-21700
LINE NO	2-W-VT-12-K	MARK NO	11-VT-12-10

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-10	P2
D	STRUCTURAL S33-3	
C	ELECTRICAL	
B		
A		

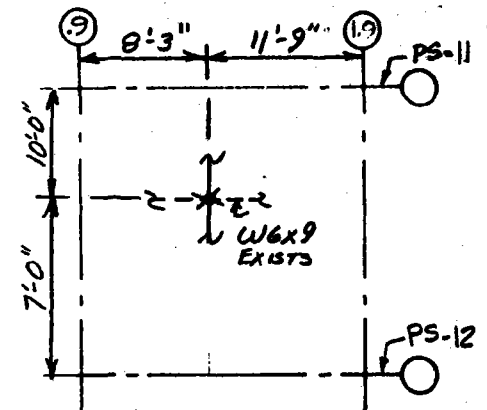
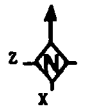
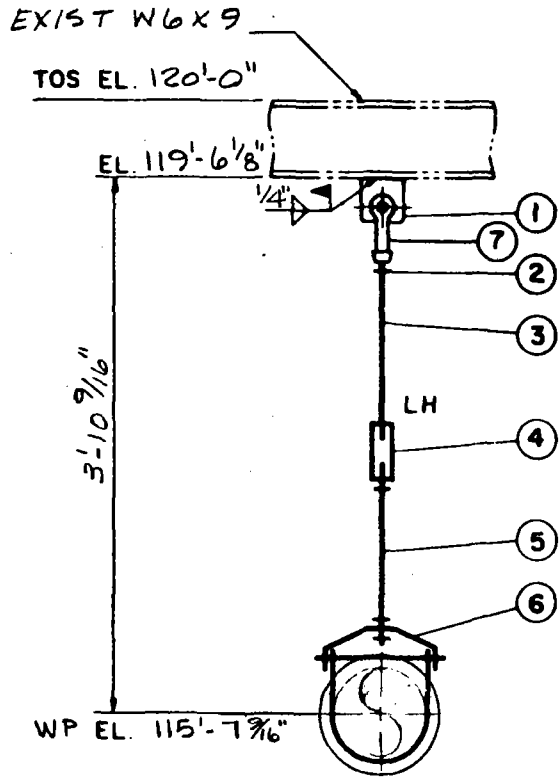
REVISED ELEV., ITEM 3 & LOC. PLAN & ANALYSIS NO.

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	MLM	CHECKED	REB FVB
DATE	2-27-80	DATE	2-25-80 3-27-80
REVIEWED	JSM	APPROVED	JSM
DATE	3-10-80	DATE	3-10-80
PROJECT			
DATE			

REVISIONS
5
4
3
2
1

DO NOT WELD ACROSS WIDTH OF FLANGE



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x = -1/2"
- △ z = 1/4"

VOL. P60-1

ELEV. LOOKING NORTH

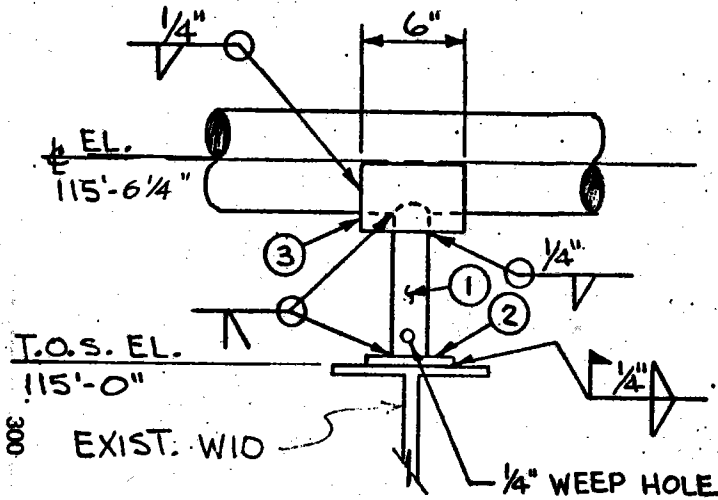
VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.	DESCRIPTION
E		PIPING P9-10	P3	1/2" DIA. F. S. CLEVIS W/PIN FIG. 299
D		STRUCTURAL S33-1	-	2 1/2" DIA. ADJUSTABLE CLEVIS FIG. 300A
C		ELECTRICAL		1/2" DIA. R. H. THD. ROD FIG. 140
B				1/2" DIA. F. S. TURNBUCKLE FIG. 230
A				1/2" DIA. R. H. -L. H. THD. ROD FIG. 253
				2 4 1/2" DIA. R. H. HEX NUT
				1 1 1/2" DIA. STRUCT. WELDING LUG SHORT FIG. 55

△ REVISE LOCATION PLAN & ANALYSIS NO.

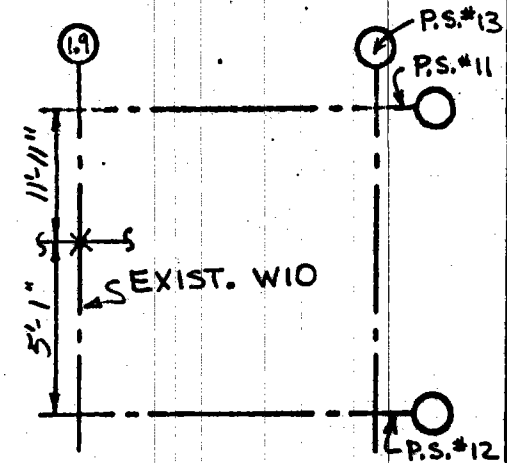
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .2K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335 122

ENGINEERING RECORD				5	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
DESIGNED	MLM	CHECKED	REV EVH	4		Stearns-Roger INCORPORATED	11165/8
DATE	2-26-80	DATE	2-27-80	3	SCALE:		
REVIEWED	REV	APPROVED	1/27/80	1	NONE		
DATE	3-1-80	DATE	3-17-80	1	REVISIONS	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT							
DATE							
ANALYSIS ID. CODE	VT-1-A-6		W-VT-1-1-7		PROJECT NO	C-21700	LINE NO 2 1/2" VT-12-KEB
							MARK NO H-VT-12-11

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEVATION LOOKING NORTH



LOCATION PLAN

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

* ALL ITEMS BY
PIPE FABRICATOR

Vol. P60-1

VI	OR	ENG.	REV.	REFERENCE DRAWINGS	REV
E				PIPING P2-10	P5
D				STRUCTURAL S23-3	1
C				ELECTRICAL	
B					
A					

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		
ITEM RECD	TO FORM PIPE SADDLE A387GA-U	*
	1/4" x 4 1/2" x 6" C.S. PL. SHAPED	*
	1/4" x 4" x 4" C.S. PL	*
	2" X S PIPE STATIONARY	A 335 P2
SCALE:	NONE	11165/8

△ REVISE LOCATION PLAN & PIPE ELEV.

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.1K$, $F_y = 0.14K$
 PIPE SIZE: 3.5" O.D. $F_z = 0.16K$ $M_x = .25K$
 PIPE INSULATION: 3" $M_y = .28K$ $M_z = .21K$
 PIPE MATERIAL: A335 P22

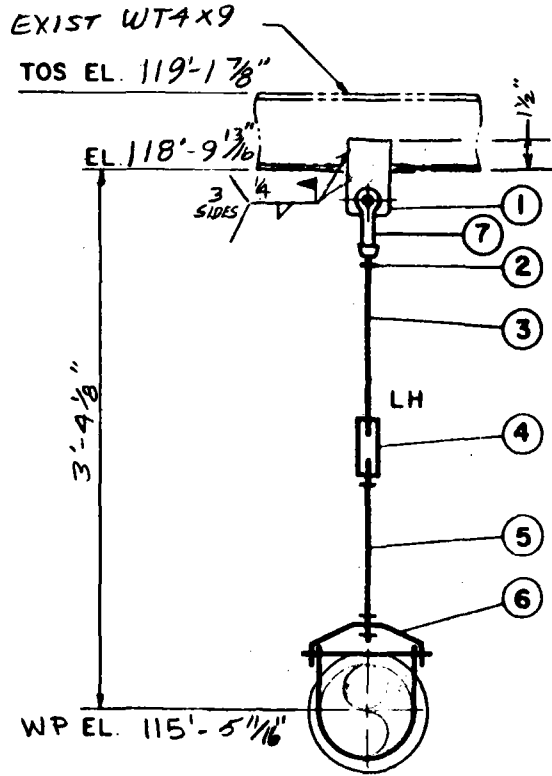
ENGINEERING RECORD			
DESIGNED	WJC	CHECKED	WJC
DATE	5/21/80	DATE	6/11/80
REVIEWED	WJC	APPROVED	
DATE	5/21/80	DATE	
PROJECT			
DATE			

5	
4	
3	
2	
REVISIONS	

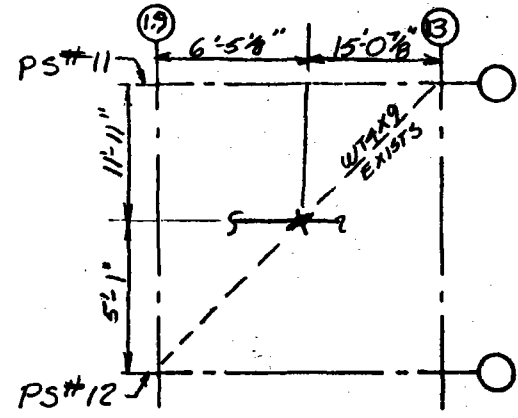
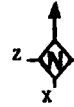
ANALYSIS ID. CODE	WJC-11-1-11-80	PROJECT NO	C-21700	LINE NO	111	MARK NO	11-11-80
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10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ x - 5/16"
- △ z - 9/16"

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301

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 LONG FIG. 55	

△ REVISED LOCATION PLAN & PIPE ELEV. & ANALYSIS NO.

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: .2 K
 PIPE SIZE: 2.875" O.D.
 PIPE INSULATION: 3"
 PIPE MATERIAL: ASTM A335

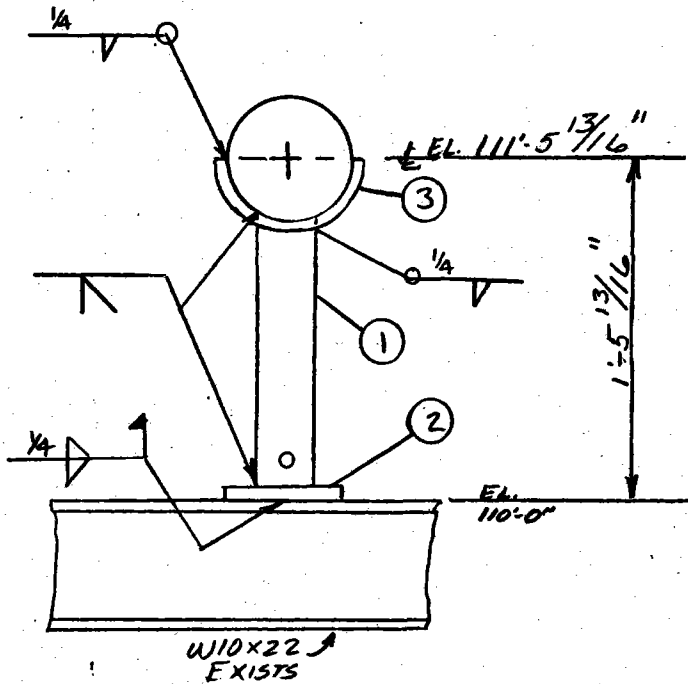
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-10	P3
D	STRUCTURAL S33-1	-
C	ELECTRICAL	
B		
A		

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	RW E.V.I.
DATE	3-26-80	DATE	3-27-80
REVIEWED	N.P.	APPROVED	
DATE	3-10-80	DATE	3-1-80
PROJECT			
DATE			
ANALYSIS ID. CODE	VT-1-A-6	VT-1-A-7	

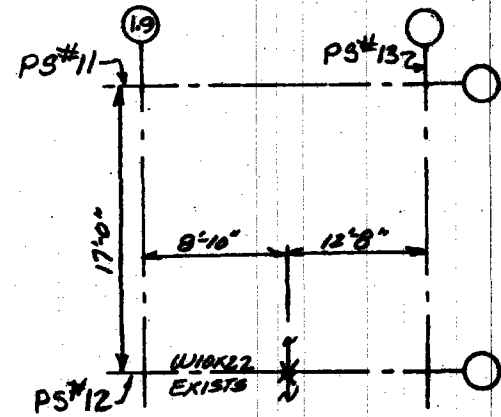
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
3	SCALE: NONE	
2	Stearns-Roger	11165/8
1	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
REVISIONS		
PROJECT #	C-21700	LINE # 2 1/2" VT-13-KEB
MARK #	H-VT-12-13	

FORM 873-1-51

DO NOT WELD ACROSS WIDTH OF FLANGE



ELEV. LOOKING NORTH



LOCATION PLAN

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

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14			
13			
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2			
1			

ITEM RECD	COMPONENT DESCRIPTION	REMARKS
1	5 1/2" X 6" 1/4" R A387 GR. D SHAP RD	
2	4" X 4" X 3/8" C.S. R BY PIPE FAB	
3	2 1/2" SCH. 80 PIPE STN. A335 P32. PIPE FAB	

SCALE:	REVISIONS
NONE	1 ALL 8/20
	2 8/20

ANALYSIS ID. CODE	PROJECT NO	LINE NO	MARK NO
T-VT-1-A-6	C-21700	3	VT-12-KEB

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

△ 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_u = .6K, M_y = .16K, M_z = .5K
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	KEP FVH
DATE	2-26-80	DATE	3-27-80
REVIEWED	X 7/1/80	APPROVED	X 7/1/80
DATE	5-10-80	DATE	5-27-80
PROJECT			
DATE			

302

15-00000-5

June 11, 1980

(For Bids)

September 26, 1980

(For Purchase)

SPECIFICATION

SR-E8

D.O.E. NO. 40 P 700 - 32S

for

PIPE SUPPORT SNUBBERS

for

10MW_e SOLAR PILOT PLANT

SOLAR - ONE

DAGGETT, CA.

Prepared by:

Stearns-Roger
ENGINEERING CORP.

PROJECT NO. C-21700

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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

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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.

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2. Type, Quantities and Quality of Copies	1
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STEARNS-ROGER ENGINEERING CORP.
DENVER, COLORADO

PROJECT NO. C-21700

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.

*
*

Stearns-Roger

Page

4

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.

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

Page
7
Final

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

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

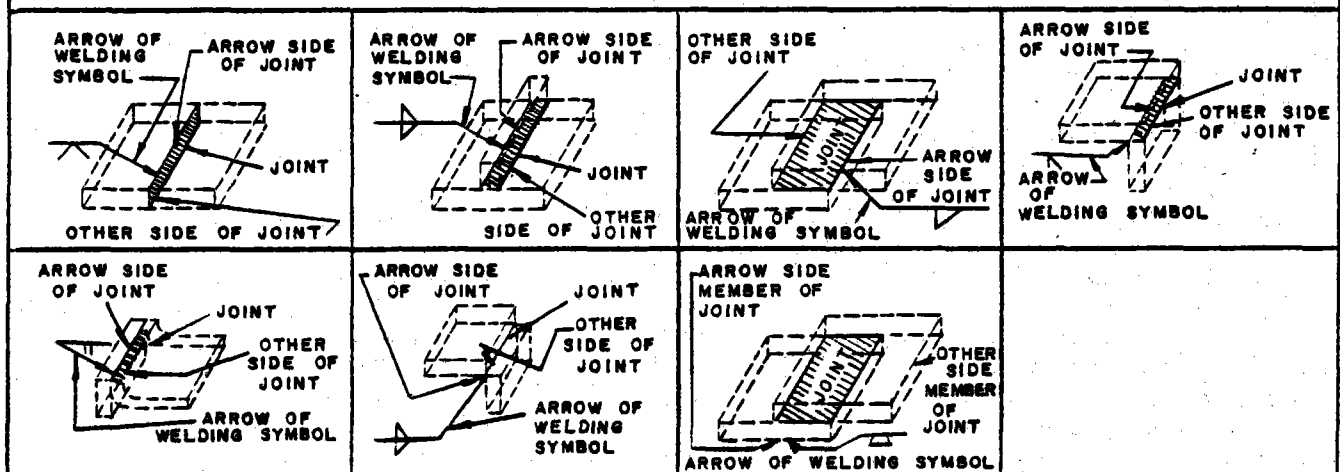
- A. It is understood that upon delivery of Seller's documentation without any restrictive notations concerning such work, they shall become Buyer's property and may be used in any manner desired for obtaining replacements, repairs and spare parts.
- B. Seller's final invoice will not be paid by Buyer 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. Sect. <i>[Signature]</i> Sect. Supv. <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 NO. OF COPIES	WEEKS AFTER AWARD*	FINAL NO. OF COPIES	"X" IF REQ'D	REVIEW REQ'D BEFORE FAB.**	CFY. 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	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.								

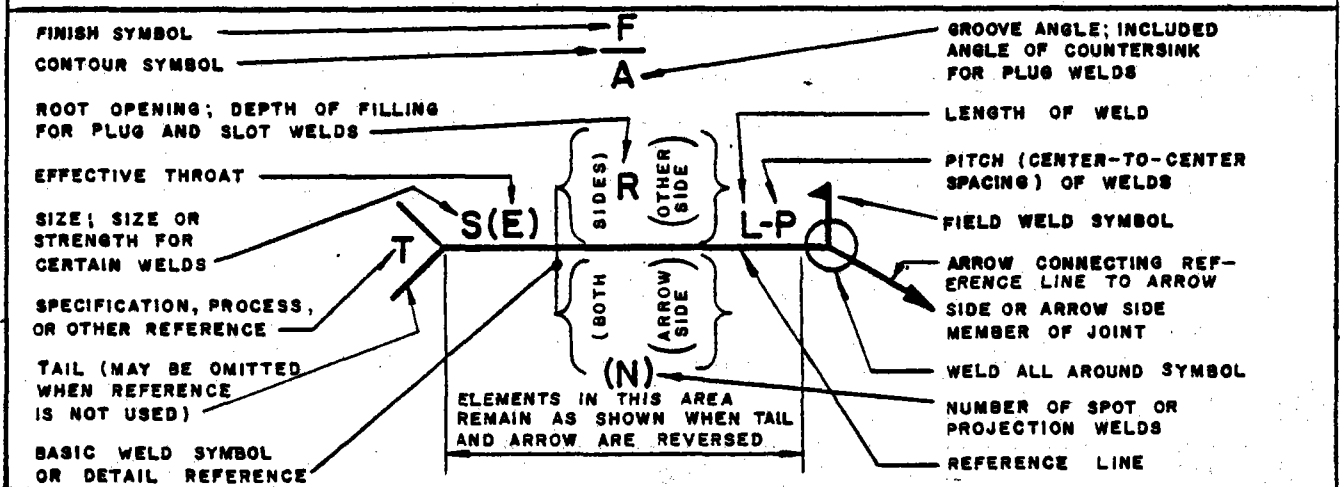
DIVISION USAGE						Stearns-Roger ENGINEERING STANDARD	STANDARD NUMBER
MM	P	PP	SH	FI	SP		EJ 14.37.1
	X						PAGE 1 OF 1
APPROVALS						WELDING SYMBOLS	ISSUED 5/5/78
Des. Sect. _____							REVISED
Sect. Supv. _____							
Div. <i>[Signature]</i>							

LOCATION SIGNIFICANCE	ARC AND GAS WELDING SYMBOLS							
	BEAD	FILLET	PLUG OR SLOT	GROOVE				
				SQUARE	V	BEVEL	U	J
ARROW SIDE								
OTHER SIDE								
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



FORM 02 224 REV 11-76

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						SUPPLEMENTARY STEEL SIZES AND END CONNECTIONS DETAILS FOR PIPE SUPPORTS IN FOSSIL FUEL POWER PLANTS	ISSUED 11-24-75
Des. Sect.	<i>[Signature]</i>						REVISED 12-15-77
Sect. Supv.	<i>[Signature]</i>						
Div.	<i>[Signature]</i>						

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)

HANGER VOLUME

E60-2

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					
MM	P	PP	SH	FI	SP

Stearns-Roger

INCORPORATED
ENGINEERING STANDARD

STANDARD NUMBER
FE03.0

APPROVALS
 Sect. *[Signature]*
 Supt. *[Signature]*
 Div. *[Signature]*

PIPE HANGER INDEX

VOL. P60-2 PIPE SUPPORT SNUBBERS

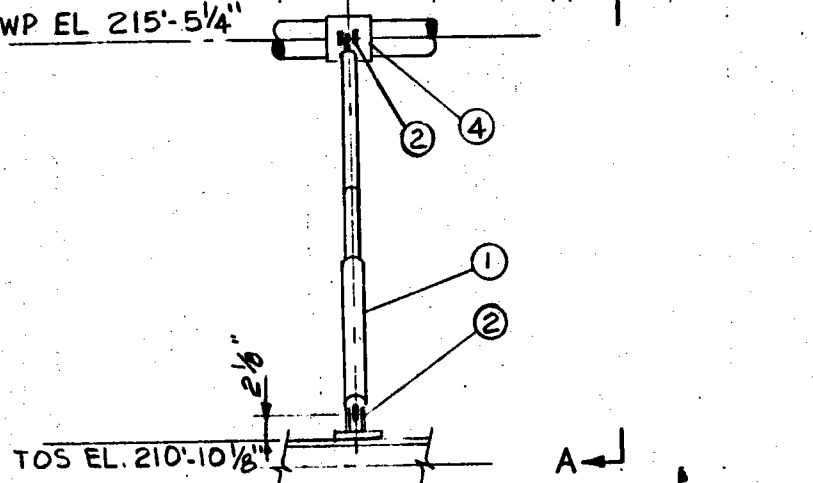
PAGE 1 OF 1
 ISSUED 2-14-75
 REVISED

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-TO-3-6	1*						
H-TO-3-7	1*						
H-TO-21-16	1*						
H-TO-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*						

*Indicates Revised this issue.

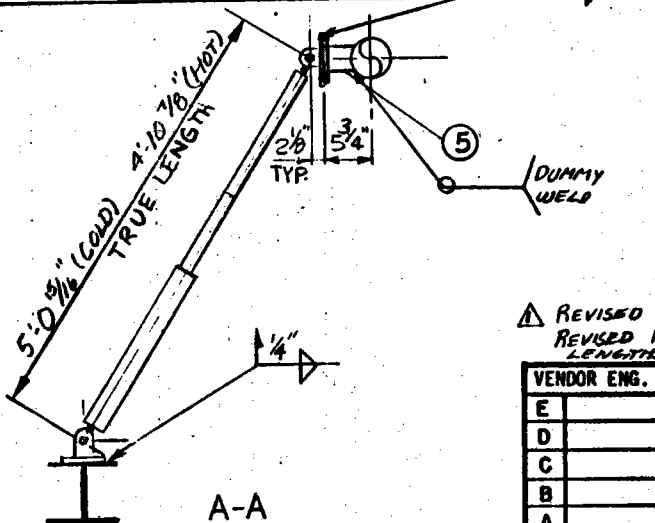
PROJECT NO. C-21700

WP EL 215'-5 1/4"

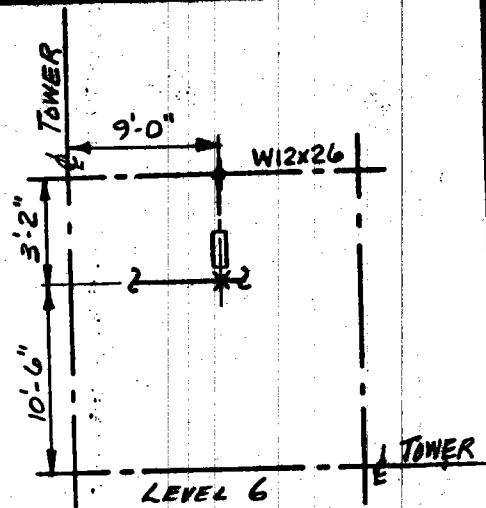


ELEVATION LOOKING SOUTH

TOS EL. 210'-10 1/8"



A-A



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- # LOCATION OF PIPE ATTACHMENT
- Δ X = -3/4"
- Δ Z = -1/8"
- Δ Y = 2" DN

VOL. P60-2

Δ REVISED ITEMS 1&2, DELETED ITEMS 3
REVISED REAR BRACKETS, WELDS AND
LENGTHS

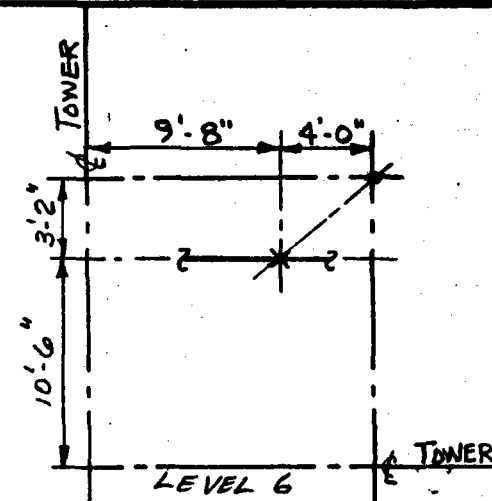
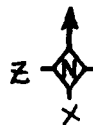
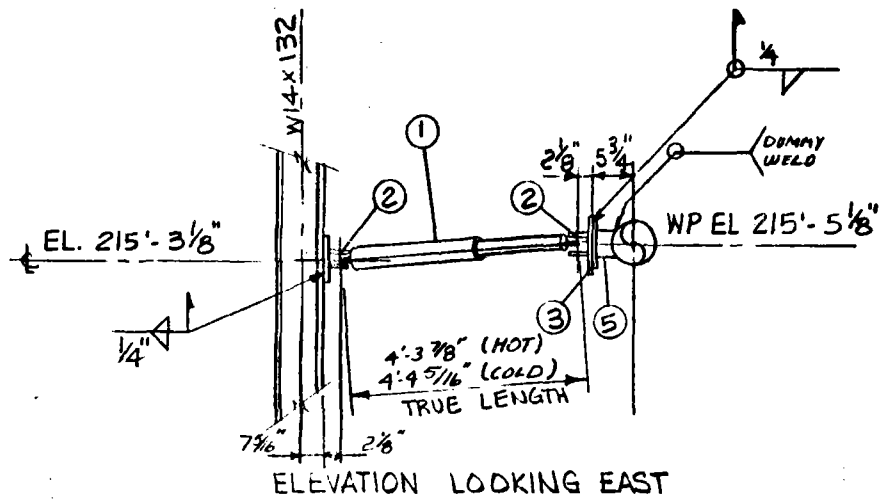
VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-2	A
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
B			
A			

14		
13		
12		
11		
10		
9		
8		
7		
6		
5	1	3" X S PIPE STANCHION BY PIPE FAB
4	1	4 1/2" X 4 1/2" X 1/2" C.S. PL BY PIPE FAB.
3		
2	2	REAR BRACKET SIZE 3
1	1	MECHANICAL SHUDDER SIZE 3 FR 307

NOTES:
 PIPE TEMPERATURE: 440°F.
 STRUCTURAL DESIGN LOAD: Fx=1.2K Fy=2.1K
 FTOTAL = 2.5K
 PIPE SIZE: 4.5" O.D.
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR B

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	3-28-80	DATE	
REVIEWED	GJM	APPROVED	
DATE	7-7-80	DATE	
PROJECT	FW-2		
DATE			
ANALYSIS ID. CODE	X-FW-1-1-61C-4		

5	1	MECHANICAL SHUDDER SIZE 3 FR 307	REMARKS
4		ITEM REQD	
3		SCALE:	
2		NONE	
REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700	LINE NO	4 FW-2-MBA
MARK NO	H-FW-2-34		



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -3/4"
- △ Z = -1/8"
- △ Y = 2"DN

VOL. P60-2

14					
13					
12					
11					
10					
9					
8					
7					
6					
5	1	3" X 5 PIPE STANCHION BY PIPE FAB.			
4					
3	1	4 1/2" X 4 1/2" X 1/2" C.S. R BY PIPE FAB.			
2	2	REAR BRACKET SIZE 3			
1	1	MECHANICAL SNUBBER SIZE 3 FIG 307			
ITEM RECD		COMPONENT DESCRIPTION			
SCALE:	NONE	REMARKS			
Stearns-Roger		11165/8			
10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA					
PROJECT NO	C-21700	LINE NO	4" FW-2-MBA	MARK NO	H-FW-2-35

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P60-2	A
D	STRUCTURAL S32-1	0
C	ELECTRICAL	
B		
A		

△ REVISE ITEMS 1, 2, 4, REVISE LENGTHS + BRACKET ATTACH.

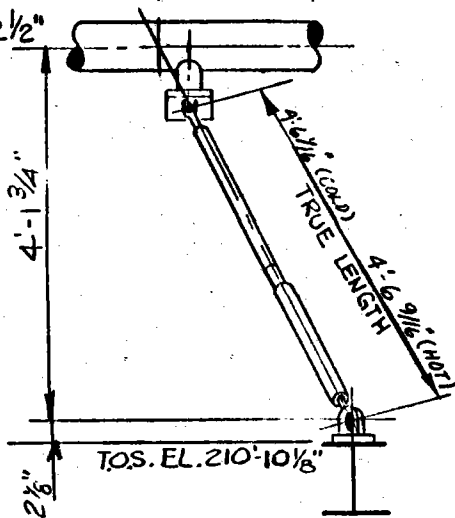
NOTES:

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

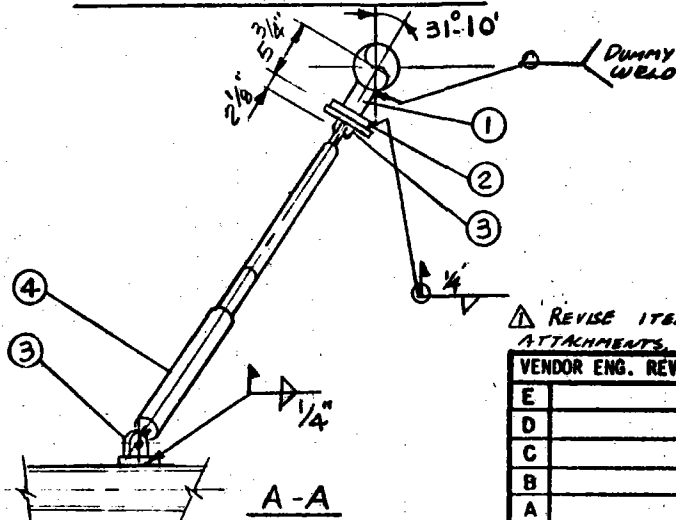
ENGINEERING RECORD	
DESIGNED	MLM
DATE	3-31-80
REVIEWED	
DATE	
PROJECT	
DATE	
ANALYSIS ID. CODE	X-FW-2-A-6/C-4

5	
4	
3	
2	
1	
REVISIONS	

W.P. EL. 215'-2 1/2"

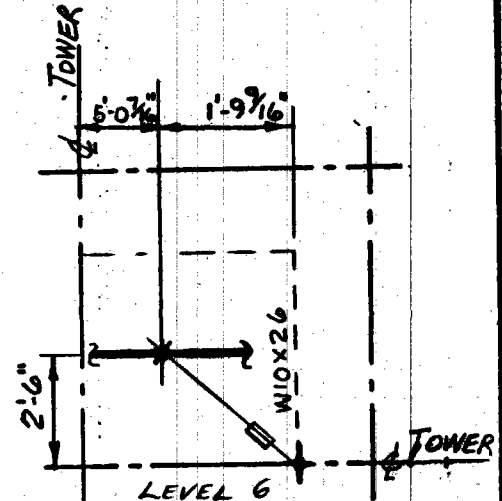
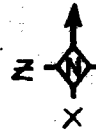


ELEVATION LOOKING NORTH



⚠ REVISIONS 3, 4 AND 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		



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- # LOCATION OF PIPE ATTACHMENT
- △ X = -5/16"
- △ Z = -3/16"
- △ Y = 1/16" DN

VOL P60-2

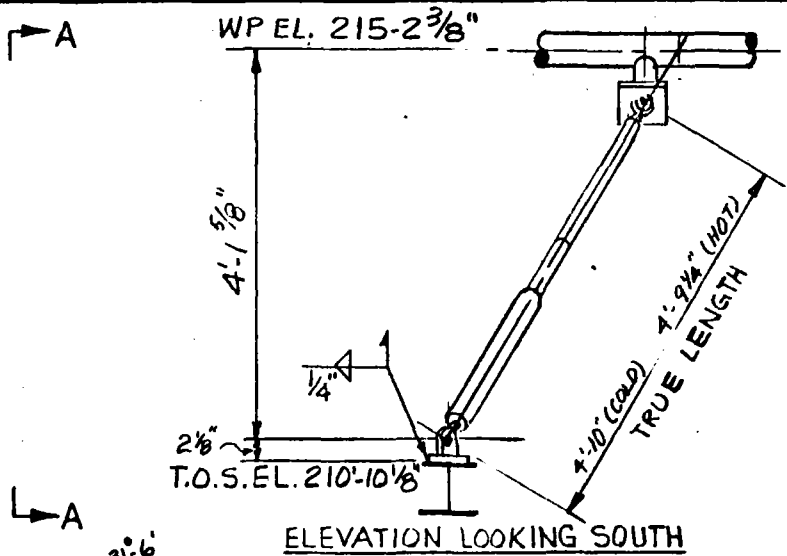
14		
13		
12		
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10		
9		
8		
7		
6		
5		
4	1	MECHANICAL SHOWER SIZE 3 FG 307
3	2	REAR BRACKET SIZE 3
2	1	4 1/2 x 4 1/2 x 1/2" P.C.S. BY PIPE FAB.
1	1	3" XS PIPE STANCHION BY PIPE FAB.

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

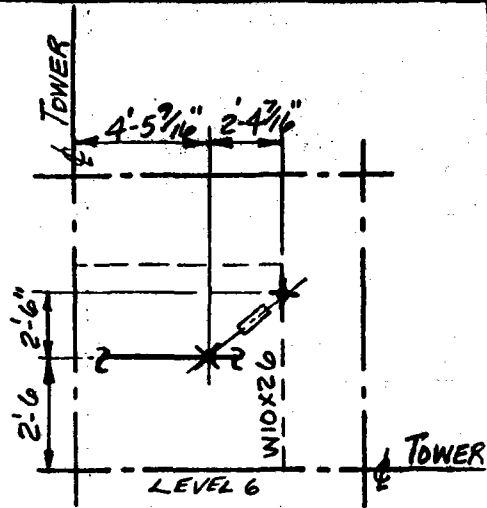
ENGINEERING RECORD

DESIGNED	MLM	CHECKED	
DATE	3-27-80	DATE	
REVIEWED	GIM	APPROVED	
DATE	4-7-80	DATE	
PROJECT	BOR		
DATE	1-23-80		
ANALYSIS ID. CODE	X-FW-1-A-6/8-4		

5		
4	ITEM REQD	COMPONENT DESCRIPTION
3	SCALE:	NONE
2		Stearns-Roger
1		11165/8
		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
	PROJECT No C-21700	LINE No 4-FW-2-MEA MARK No H-FW-2-36



ELEVATION LOOKING SOUTH

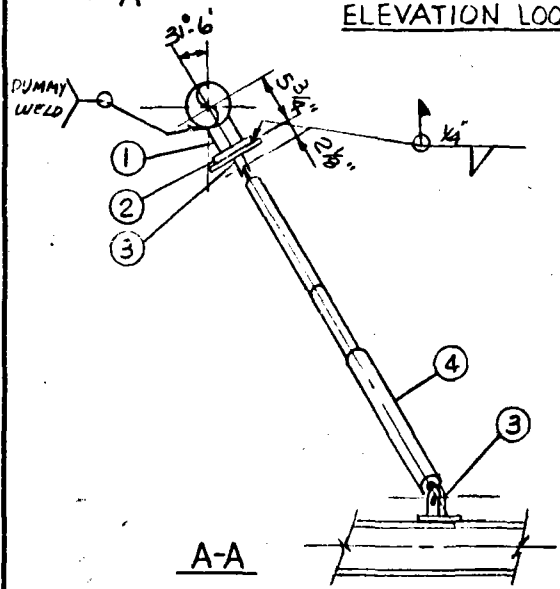


LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -5/16"
- △ Z = -3/16"
- △ Y = 1/16" DN

VOL. P60-2

339



A-A

△ REVISE ITEMS 3,4,5, REVISE REAR BRACKET ATTACHMENTS & WELDS. REVISE LENGTHS

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-2	P3 6
D	STRUCTURAL S33-3	1 5
C	ELECTRICAL	
B		
A		

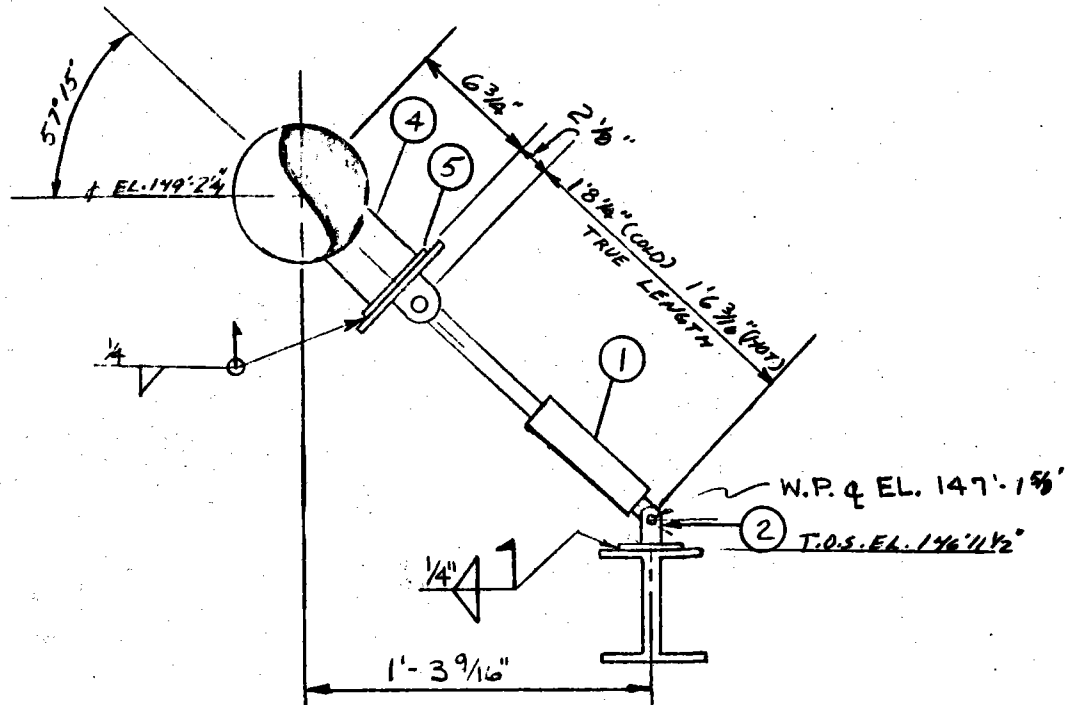
14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4	1	MECHANICAL SNUBBER SIZE 3 FR. 307
3	2	REAR BRACKET SIZE 3
2	1	4 1/2" x 4 1/2" x 1/2" F.L.C.S. BY PIPE FAB.
1	1	3" X S PIPE STANCHION BY PIPE FAB.

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

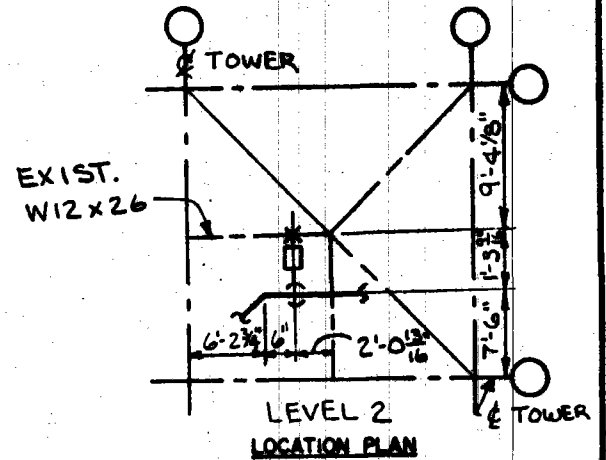
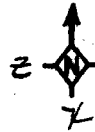
ENGINEERING RECORD		5
DESIGNED	MLM	4
DATE	3-27-8	3
REVIEWED		2
DATE		
PROJECT	FW-1-A-6/2-4	
DATE	6-17-80	

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	SCALE: NONE	11165/8
	REVISIONS	
	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
	PROJECT NO C-21700	
	LINE NO 4" FW-2-MB	
	MARK NO H-FW-2-37	

FORM 873-1



ELEVATION LOOKING WEST



- + 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	

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

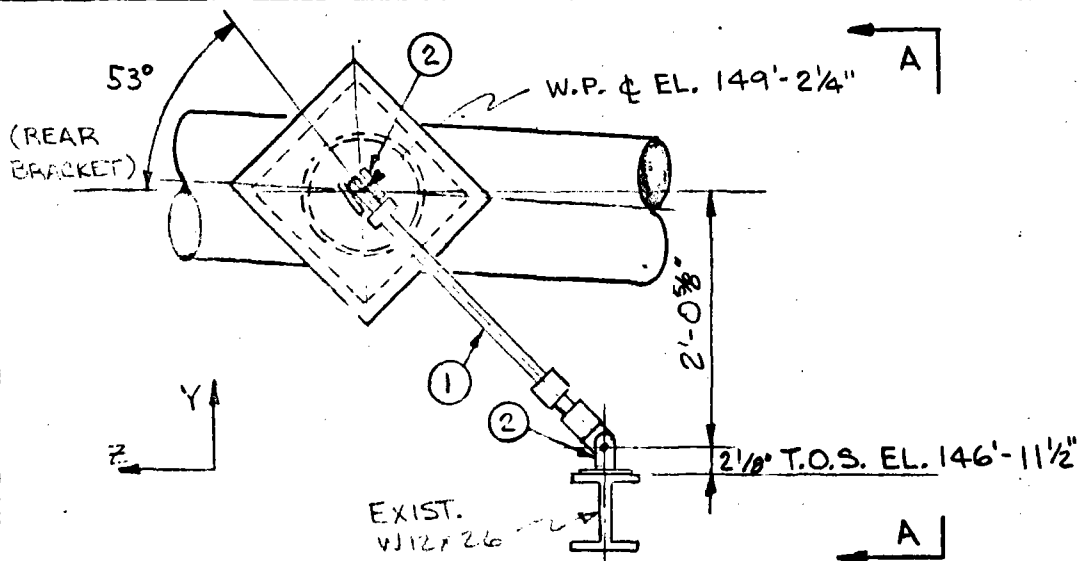
⚠ REVERSE STANCHION, REAR BRACKET ATTACH, WELD SYMBOLS LENGTHS, ITEMS 142, DELETED ITEM 3

ITEM NO.	REVISION	DESCRIPTION	REMARKS
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" X 5 PIPE STANCHION BY PIPE FAB.	
3			
2	2	REAR BRACKET, SIZE 3	
1	1	MECHANICAL SNIFFER, SIZE 3	FIG. 306

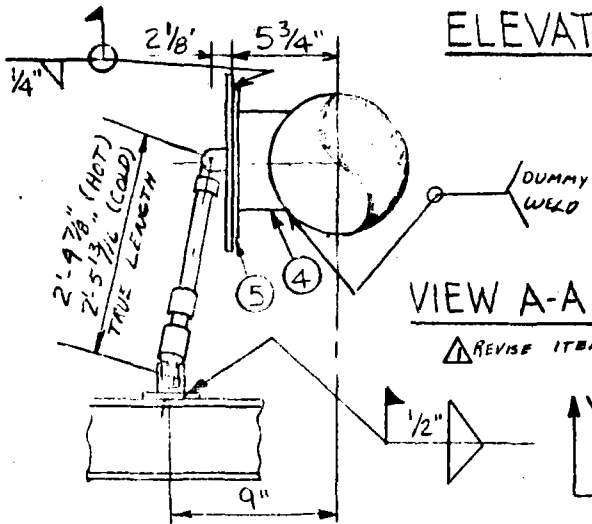
NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: F_x = 1.7K, F_y = 1.7K
 PIPE SIZE: 4" O.D. F_{TOTAL} = 2.4K
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD	
DESIGNED	CHEKED
DATE	DATE
REVIEWED	APPROVED
DATE	DATE
PROJECT	
DATE	
ANALYSIS ID. CODE	X-FW-1-A-6/C-4

REVISIONS	SCALE:	COMPONENT DESCRIPTION	REMARKS
5			
4			
3	NONE	Stearns-Roger	11165/8
2			
1			
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	4-FW-2-MFA
MARK NO	H-FW-2-2R		

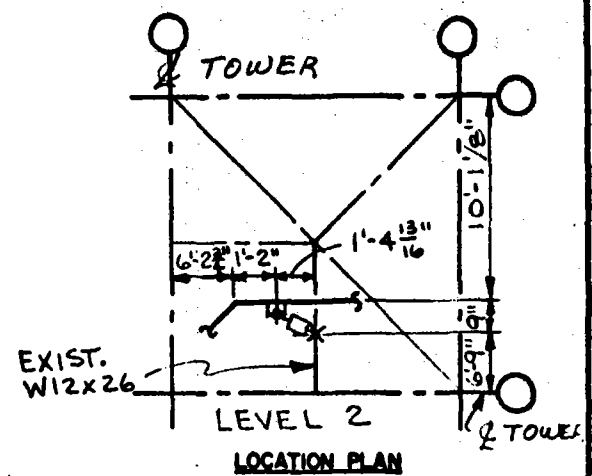
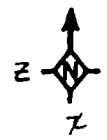


ELEVATION LOOKING NORTH



VIEW A-A-ELEVATION LOOKING WEST

△ REVISE ITEMS 1,2,3 LENGTHS, REAR BRACKET ATTACHMENTS



- ✦ LOCATION OF STEEL ATTACHMENT
- ✦ LOCATION OF PIPE ATTACHMENT
- △ X = -3.4"
- △ Y = 2" DN
- △ Z = 1"

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14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	4 1/2" x 4 1/2" x 1/2" FR BY PIPE FAB.	
4	1	3" XS PIPE STAINLESS BY PIPE FAB.	
3			
2	2	REAR BRACKET, SIZE 3	
1	1	INCORPORATE SNUBBER, SIZE 3, FIG 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
			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" MIN
 PIPE MATERIAL: A312 TP304

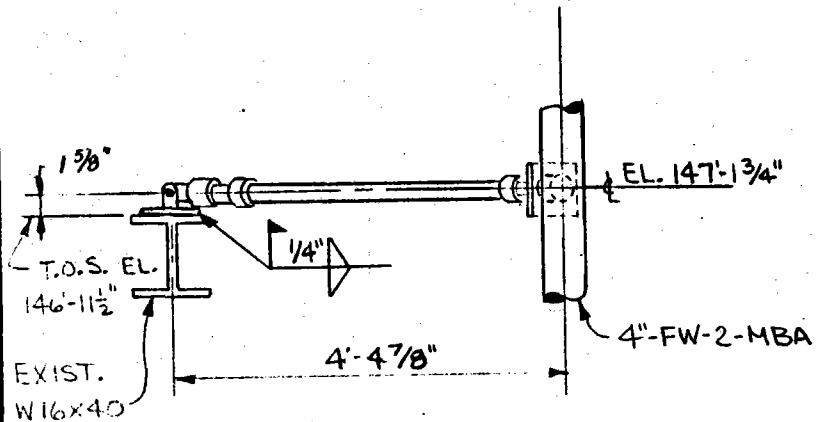
ENGINEERING RECORD		5
DESIGNED	DATE	CHECKED
DATE	DATE	DATE
REVIEWED	DATE	APPROVED
DATE	DATE	DATE
PROJECT	DATE	DATE
DATE	DATE	DATE
ANALYSIS ID. CODE		

REVISIONS	1	1	INCORPORATE SNUBBER, SIZE 3, FIG 307
REVISIONS	2	2	REAR BRACKET, SIZE 3
REVISIONS	3	3	
REVISIONS	4	4	
REVISIONS	5	5	
REVISIONS	6	6	
REVISIONS	7	7	
REVISIONS	8	8	
REVISIONS	9	9	
REVISIONS	10	10	
REVISIONS	11	11	
REVISIONS	12	12	
REVISIONS	13	13	
REVISIONS	14	14	
PROJECT NO	C-21700	LINE NO	1-1-11-11
MARK NO	H-FU-2-20		

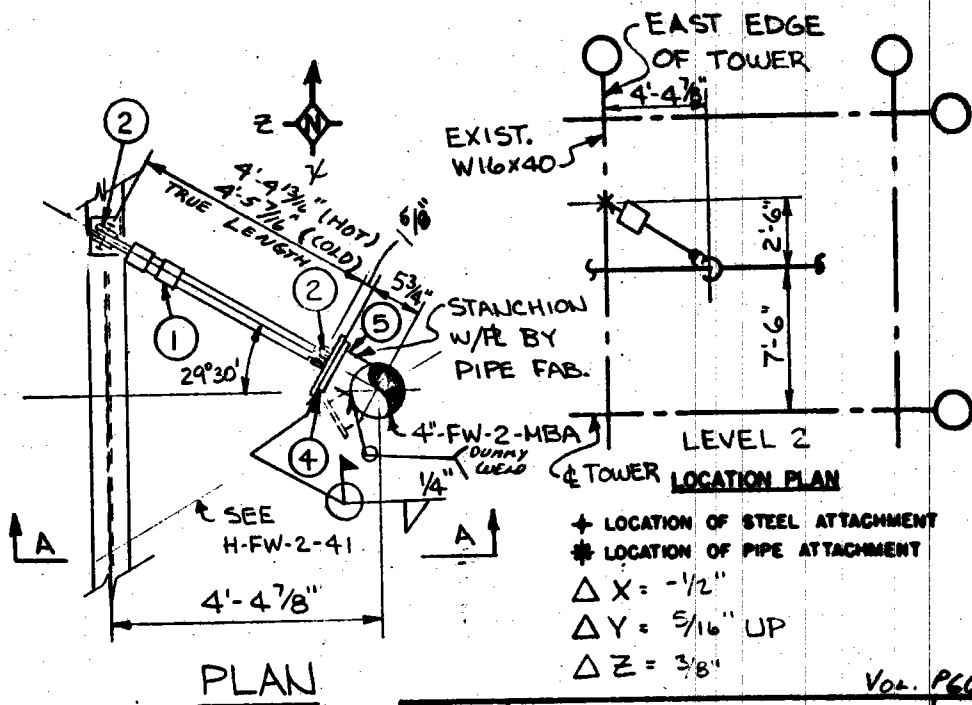
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

341

1000 873-1



A-A ELEVATION LOOKING NORTH



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

14	
13	
12	
11	
10	
9	
8	

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	7
E	PIPING P9-3	P3	6
D	STRUCTURAL S32-3	O	5
C	ELECTRICAL		4
B			3
A			2

REVISIONS: 1 ITEMS 1, 2, 3, LENGTHS & REAR BRACKET ATTACH.

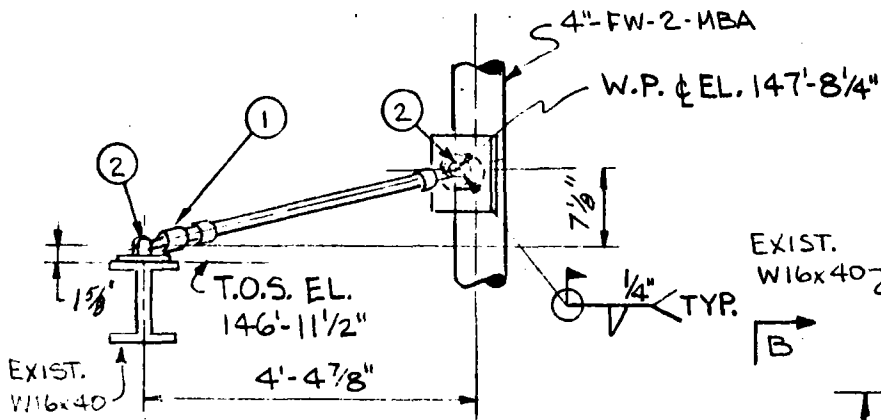
NOTES:
 PIPE TEMPERATURE: 140°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.6K, F_z = 1.0K$
 PIPE SIZE: 4.5 O.D. $F_{TODAL} = 1.3K$
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR B

ENGINEERING RECORD				5	1	NEW REQD	SCALE: NONE	COMPONENT DESCRIPTION	REMARKS
DESIGNED	DATE	CHECKED	DATE	4	1				
REVIEWED	DATE	APPROVED	DATE	3	1				
PROJECT	DATE			2	1			10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
ANALYSIS ID. CODE				1	1				

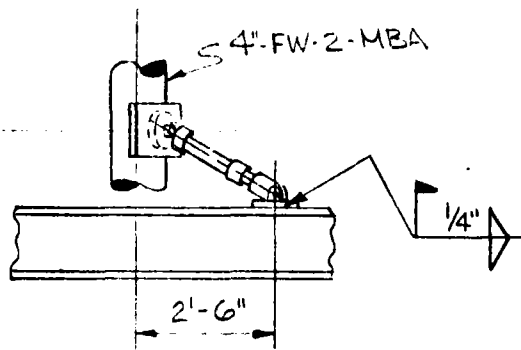
PROJECT NO C-21700 LINE NO MARK NO H-FV-2-40

342

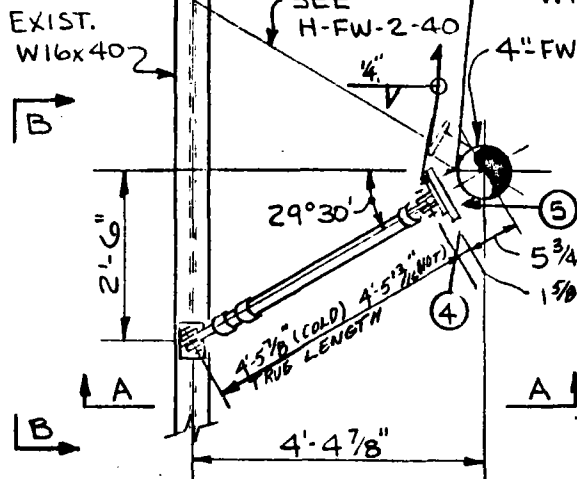
1" = 6" (AS SHOWN)



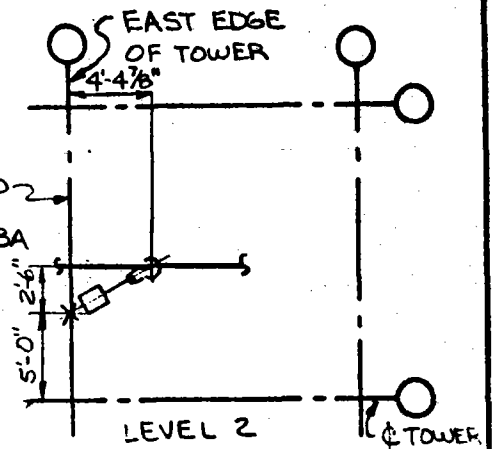
A-A ELEVATION LOOKING NORTH



B-B ELEVATION LOOKING EAST



PLAN



LEVEL 2 LOCATION 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

△ REVISE ITEMS 1,2,4,3, LENGTH & REAR BRACKET ATTACHMENTS

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P9-3	P2
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
B			
A			

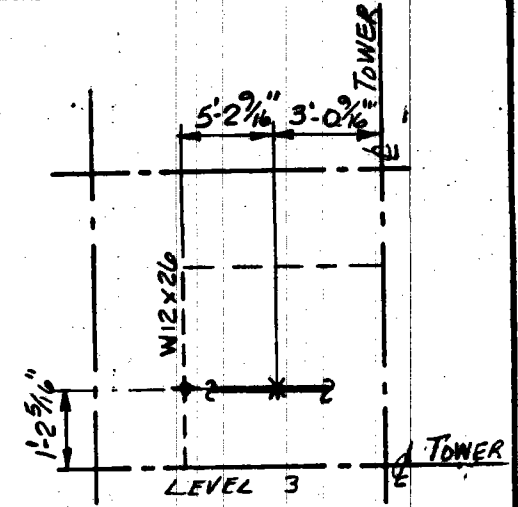
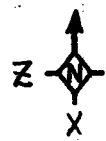
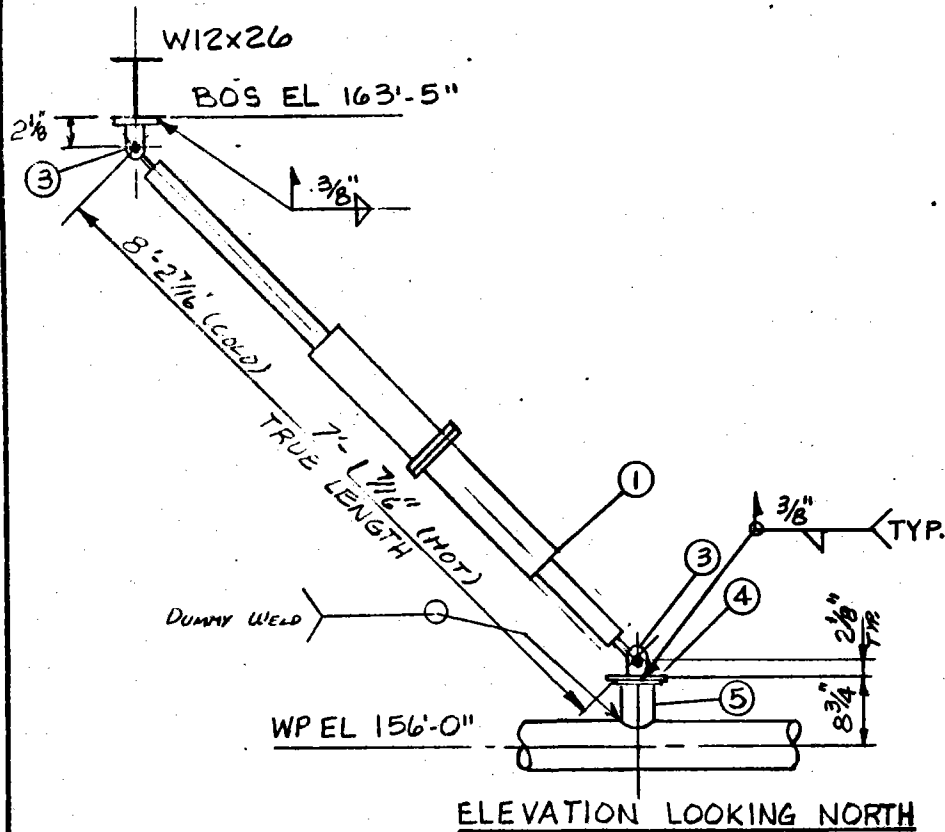
ITEM RECD	SCALE	COMPONENT DESCRIPTION	REMARKS
14			
13			
12			
11			
10			
9			
8			
7			
6			
5		3" X S PIPE STANCHION BY PIPE FAB.	
4		4 1/2 x 4 1/2 x 1/2 IR BY PIPE FAB.	
3			
2		REAR PERMIT, SIZE 1	
1		MECHANICAL SNUBBER SIZE 1 FIG. 307	
	NONE	Stearns-Roger	11165/8

NOTES:
 PIPE TEMPERATURE: 440°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.6K, F_z = 1.2K$
 PIPE SIZE: 4.5" O.D. $F_{TOTAL} = 1.3K$
 PIPE INSULATION: 2 1/2"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	9/25	CHECKED	
DATE	3/31/78	DATE	
REVIEWED	GNA	APPROVED	
DATE	7/10/78	DATE	
PROJECT	11165	PROJECT	11165
DATE	1/25/80	DATE	1/25/80
ANALYSIS ID. CODE	X-FW-1-A		R-4

REVISIONS	PROJECT NO	LINE NO	MARK NO
5	C-21700	4'-FW-2-MBA	H-FW-2-41
4			
3			
2			
1			

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LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- # LOCATION OF PIPE ATTACHMENT
- △ X = 0"
- △ Z = 3/16"
- △ Y = 17 5/8" DN

VOL P60-2

14		
13		
12		
11		
10		
9		
8		
7		
6		
5	1	4" XXS PIPE STANCHION BY PIPE FAB.
4	1	5/8" x 5/8" x 1/2" C.S.R. BY PIPE FAB.
3	2	REAR BRACKET SIZE 3
2		
1	2	MECHANICAL SNIFFER SIZE 3L FIG. 307

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

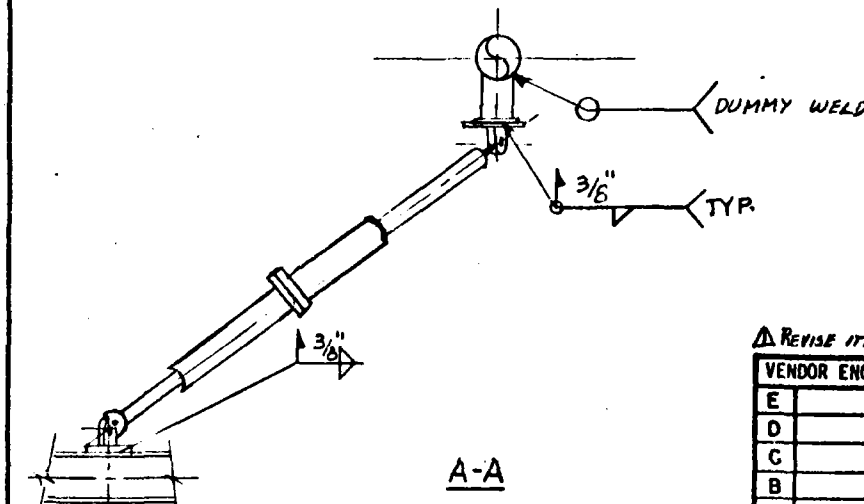
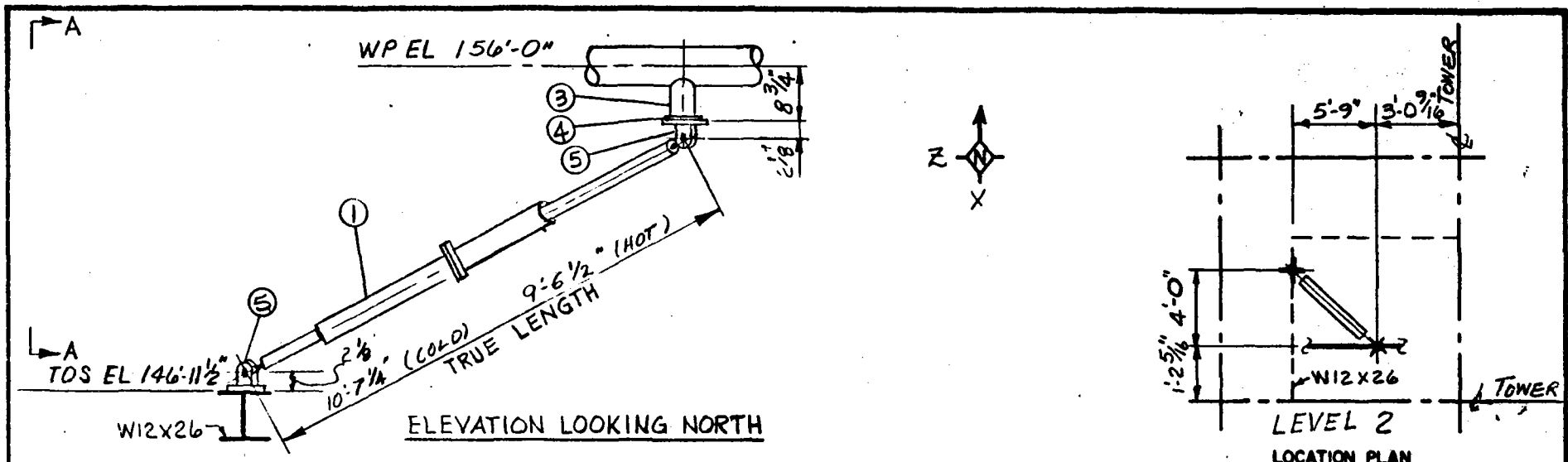
▲ REVISE ITEMS 1,2,3, LENGTHS & REAR BRACKET ATTACHMENTS

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	MLM
DATE	3-31-80
REVIEWED	[Signature]
DATE	4-1-80
PROJECT	HTP
DATE	6-12-80
ANALYSIS ID. CODE	X-MS-1-A-4

5		1	2	MECHANICAL SNIFFER SIZE 3L FIG. 307	
4		1	2	COMPONENT DESCRIPTION	REMARKS
3		1	2	SCALE: NONE	
2		1	2	Stearns-Roger	
10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA					
PROJECT NO C-21700		LINE NO 6"MS-2-QEB		MARK NO H-MS-2-35	

1-728 2084



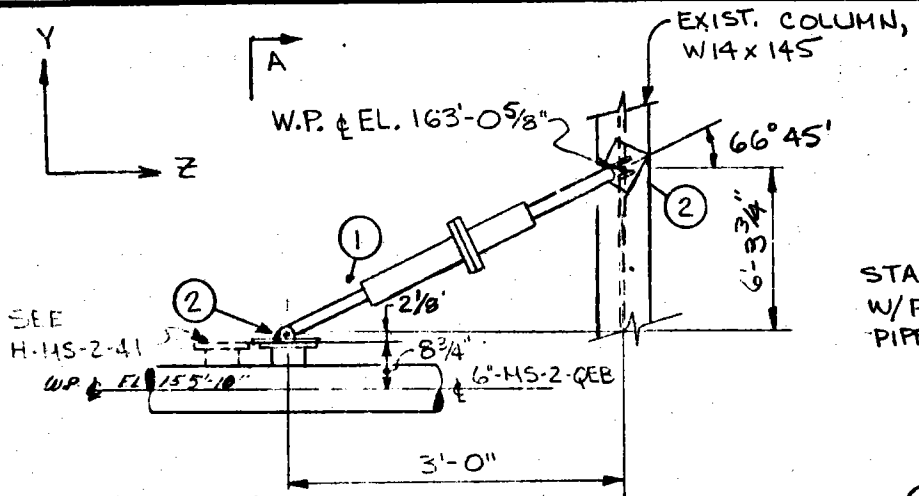
Δ REVISE ITEMS, L245, LENGTHS & REAR BRACKETS

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

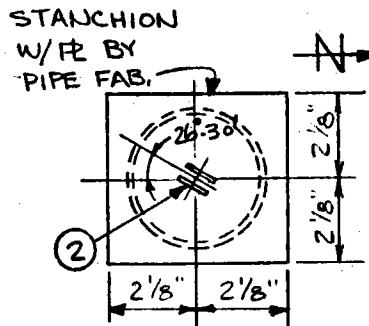
14		
13		
12		
11		
10		
9		
8		
7		
6		
5	2	REAR BRACKET SIZE 3
4	1	5 1/2" x 5 1/2" x 3/4" R BY PIPE FAB
3	1	4" X XS PIPE STANCHION BY PIPE FAB.
2		
1	2	MECHANICAL SNUBBER SIZE 3L FIG 307
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 6"MS-2-QEB
MARK NO	H-MS-2-39	

NOTES:
 PIPE TEMPERATURE: 960°
 STRUCTURAL DESIGN LOAD: $F_x = 1.8K$ $F_y = 2.8K$
 PIPE SIZE: 5.625" O.D. $F_z = 23K$ $F_{TOTAL} = 4.0K$
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

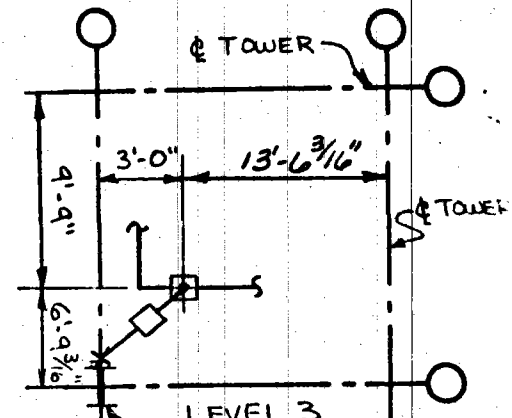
ENGINEERING RECORD		5
DESIGNED	MLM	4
DATE	3-31-80	3
REVIEWED	JH/K	2
DATE	4-16-80	
PROJECT	11165	
DATE	3-31-80	
ANALYSIS ID. CODE	X-MS-1-A-4	



ELEVATION LOOKING SOUTH



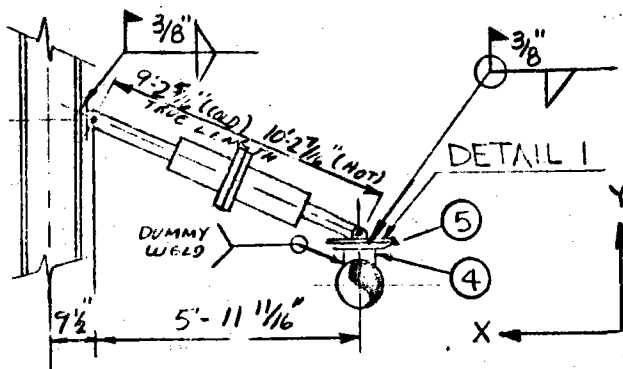
DETAIL I



LEVEL 3 LOCATION PLAN

EXIST. COL. W14x145 + LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 1 \frac{3}{16}$ "
 $\Delta Y = 13$ " DN
 $\Delta Z = 15 \frac{1}{16}$ "

VOL. P60-2



VIEW A-A - ELEVATION LOOKING WEST

Δ REVISE ITEMS 1,2,3, LENGTHS & REAR BRACKET

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-3	P2
D		STRUCTURAL S32-3	O
C		ELECTRICAL	
B			
A			

14			
13			
12			
11			
10			
9			
8			
7			
6			
5	1	5 1/2" X 5 1/2" X 3/4" C.S. R. PY PIPE FAB.	
4	1	4" X 4S PIPE STANCHION BY PIPE FAB.	
3			
2	2	HTAN H-11117, SIZE 3	
1	2	HTAN H-11117, R SIZE 3L FIG 307	

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_1 = 2.3K$ $F_2 = 3.1K$
 PIPE SIZE: 6.625" O.D. $F_2 = 1.2K$ $F_{TOTAL} = 4.0K$
 PIPE INSULATION: 1.2"
 PIPE MATERIAL: A106 B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-M-1-A-7		

REVISIONS	DESCRIPTION	REMARKS
5		
4	HEAT REQ	
3	SCALE: NONE	
2		
1		

11165/8

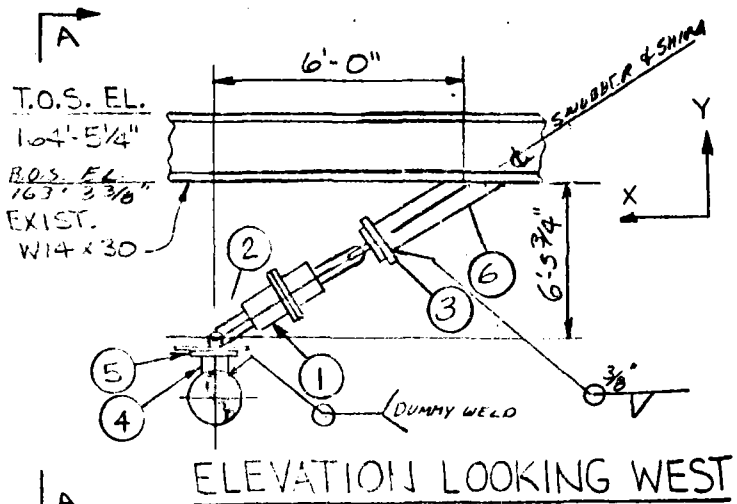
Stearns-Roger

10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

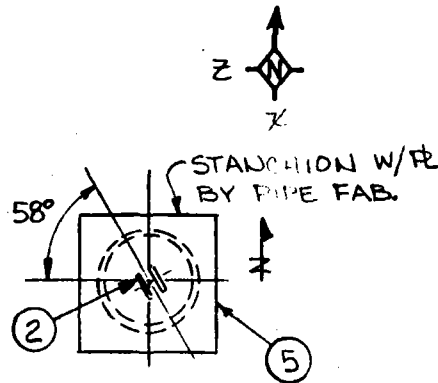
PROJECT NO C-21700 LINE NO MARK NO H-MS-2-40

346

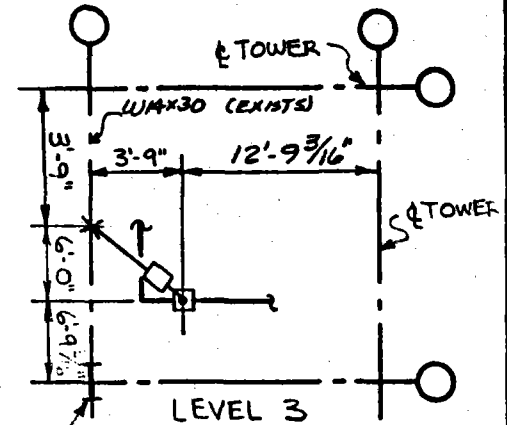
FORM 873-1



ELEVATION LOOKING WEST



DETAIL 1

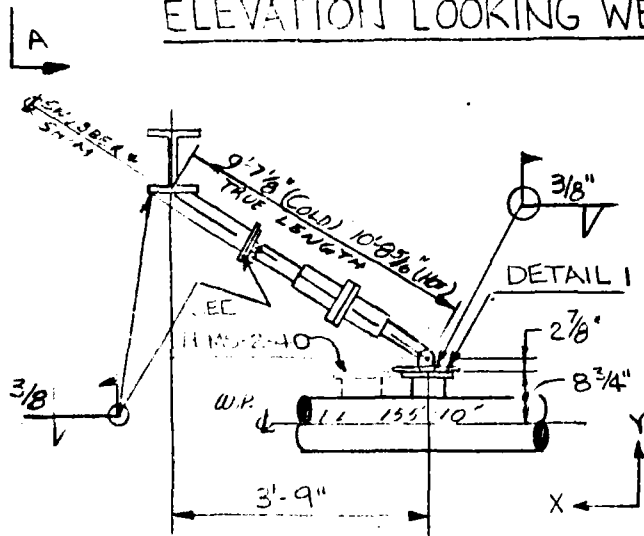


LOCATION PLAN

EXIST. W14 x 145

- ✦ LOCATION OF STEEL ATTACHMENT
- ✦ LOCATION OF PIPE ATTACHMENT
- $\Delta X = 1 \frac{3}{16}''$
- $\Delta Y = 18'' \text{ DU}$
- $\Delta Z = 1 \frac{5}{16}''$

VOL. P60-2



VIEW A-A- ELEVATION LOOKING NORTH

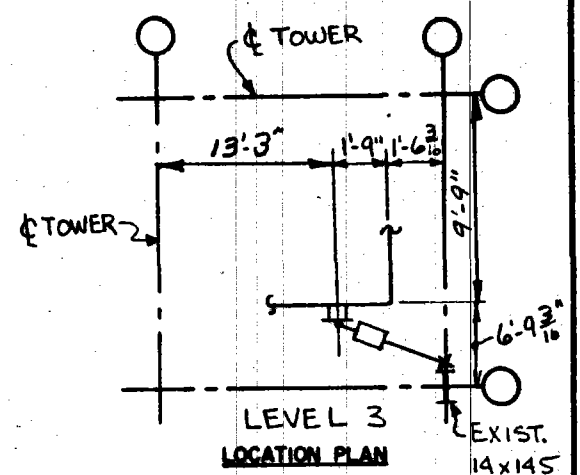
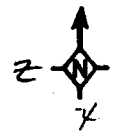
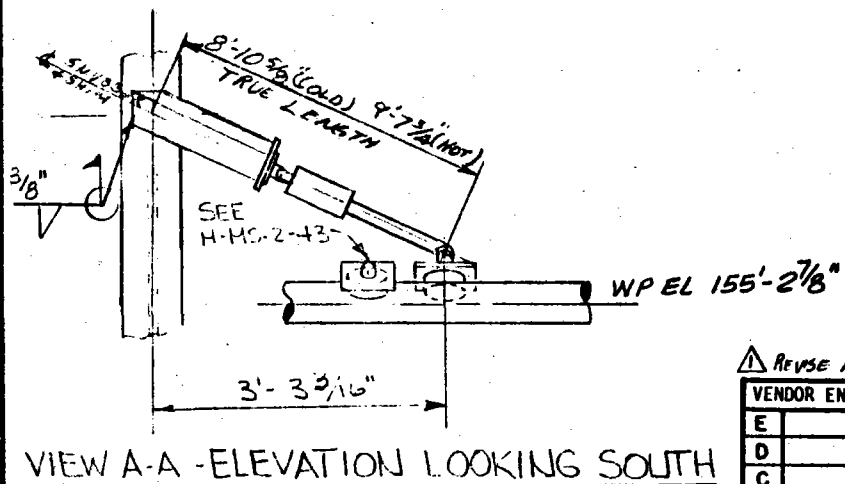
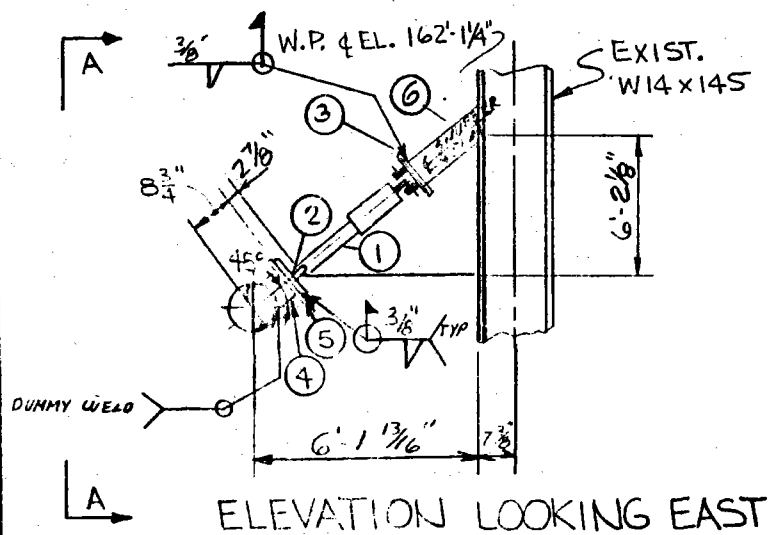
REVISE ITEMS 1, 2, 3 & 6. ADD SHIM REV. REAR BRACKET

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.	REV.	DESCRIPTION
E	PIPING PA-3	P.	6	1 4" X 4" X 3/8" STRUCTURAL TUBS
D	STRUCTURAL 932-3	O	5	1 4 1/2" X 9 1/2" X 3/4" C.S. IR. BY PIPE FAB.
C	ELECTRICAL		4	1 4" X 5" PIPE STANCHION BY PIPE FAB.
B			3	1 5" X 5" X 1/2" C.S. IR.
A			2	2 REAR BRACKET, SIZE 3
			1	2 MECHANICAL SCAFFOLD SIZE 3L FR. 307

NOTES:

PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_d = 2.3K$, $F_t = 3.0K$
 PIPE SIZE: 6" O.D. $F_d = 1.4K$ $F_{TOTAL} = 4.0K$
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A325 10.2

ENGINEERING RECORD				5	1	2	MECHANICAL SCAFFOLD SIZE 3L FR. 307	REMARKS
DESIGNED	DATE	QUOTED	DATE	4	ITEM REQD	SCALE:	COMPONENT DESCRIPTION	
REVIEWED	DATE	APPROVED	DATE	3		NONE	Stearns-Roger	11165/8
PROJECT	DATE			2				
ANALYSIS ID. CODE	X-MS-1-1-1			1	REVISIONS		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700	LINE NO					MARK NO	H-MS-2-41



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -3/4"$
 $\Delta Y = 12 3/4" DN$
 $\Delta Z = -1/2"$
 VOL. P60-2

▲ REVISE ITEMS 1, 2, 3, 4, REAR BRACKET, & ADD SHIM

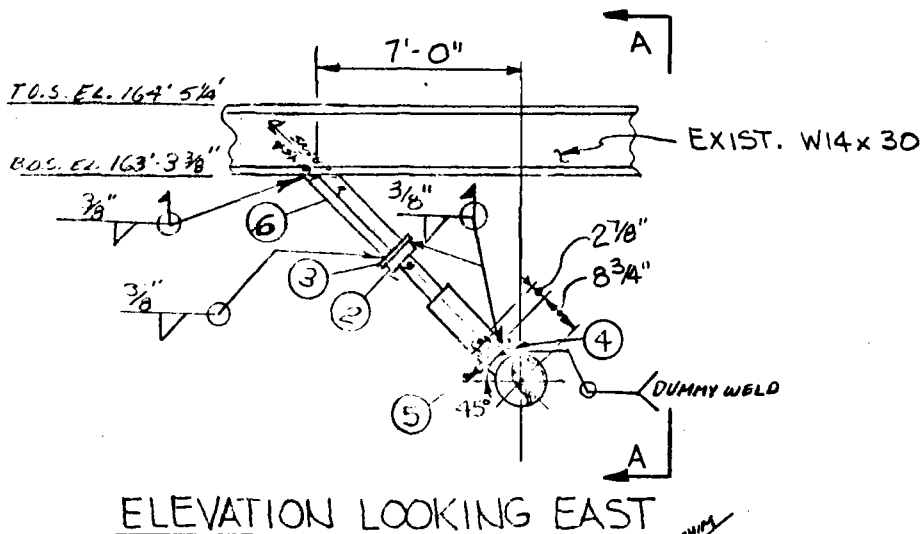
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	DESCRIPTION
E	PIPING P9-3	P3	4"X4" X 3/8" STRUCTURAL TUBING
D	STRUCTURAL S32-2	0	5 1/2" X 5 1/2" X 3/4" S. PL. BY PIPE FAB.
C	ELECTRICAL	4	4" X X S. PIPE STANCHION BY PIPE FAB.
B		3	5" X 5" X 1/2" C.S. PL.
A		2	PIPE FITTING SIZE 10
		1	MECHANICAL FITTING R. SIZE 10L

14			
13			
12			
11			
10			
9			
8			
7			
6	1		
5	1		
4	1		
3	1		
2	2		
1	1		

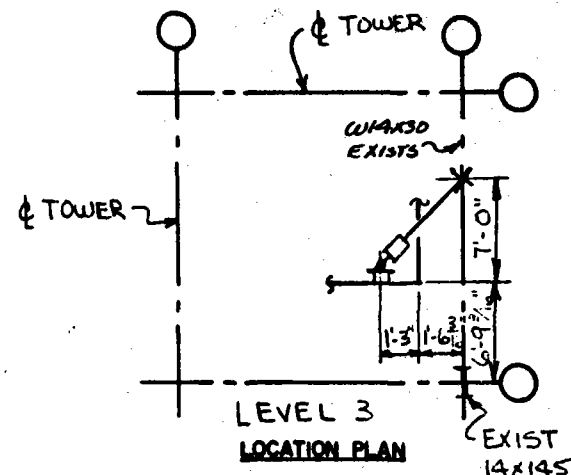
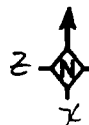
NOTES:
 PIPE TEMPERATURE: 460°F
 STRUCTURAL DESIGN LOAD: $F_x = 3.3K$, $F_y = 4.5K$
 PIPE SIZE: 4" X 4" X 3/8"
 PIPE INSULATION: 1/2"
 PIPE MATERIAL: A335 F12

ENGINEERING RECORD			
DESIGNED	DATE	DESIGNED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-111-A-7		

5			
4			
3			
2			
1			
SCALE:	NONE		
Stearns-Roger			
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	
MARK NO	HMS-2-42		



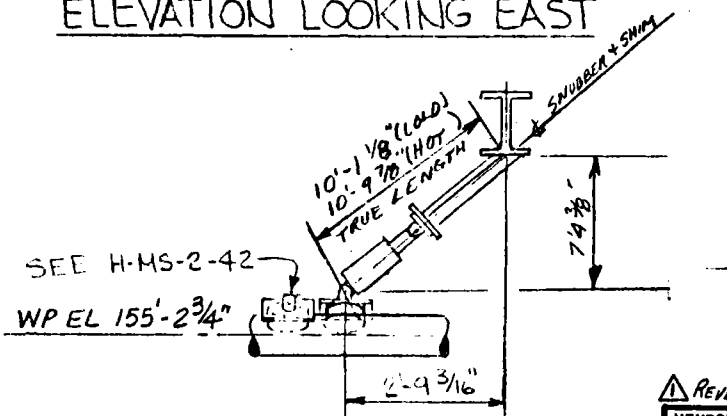
ELEVATION LOOKING EAST



LEVEL 3
LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
- ✦ LOCATION OF PIPE ATTACHMENT
- △ X = -3/4"
- △ Y = 12 3/4" DN.
- △ Z = -1/2"

VOL. P60-2



VIEW A-A - ELEV. LOOKING NORTH

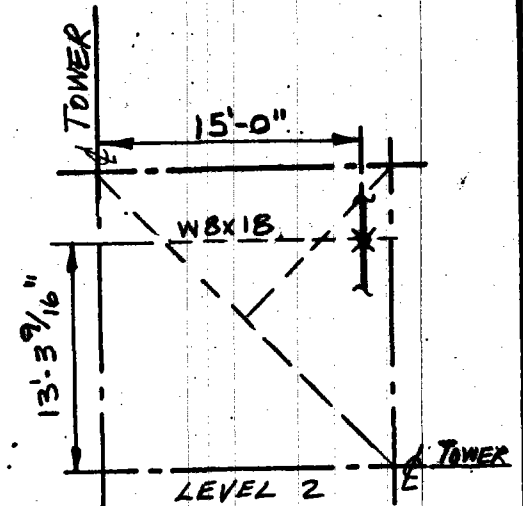
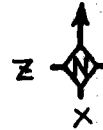
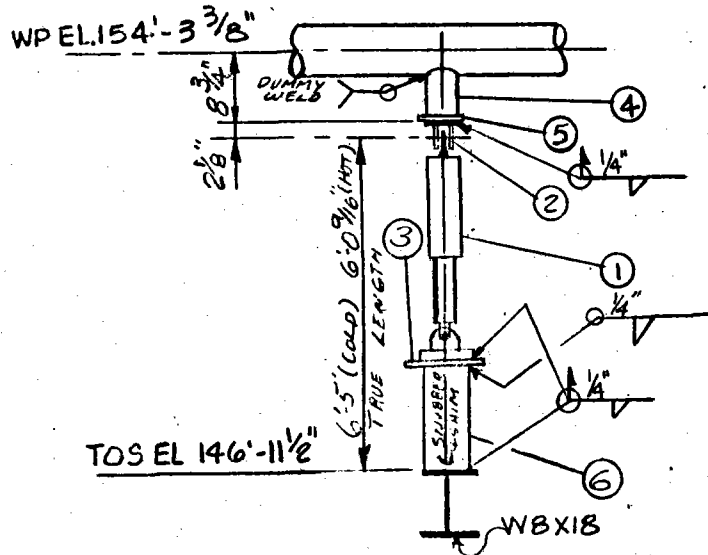
△ REVISE ITEMS 1, 2, 3, 6, ADD SNUBB, REVISE BEAR BRG

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV	DESCRIPTION
E	PIPING P9-3	P3	6 1 4" X 4" X 3/8" STRUCTURAL TUBING
D	STRUCTURAL 532-3	O	5 1/2 X 5 1/2 X 3/8 C.S. P. BY PIPE FAB.
C	ELECTRICAL		4 1 4" X 5, PIPE STANCHION, BY PIPE FAB.
B			3 1 5" X 5" X 1/2 C.S. TL
A			2 2 BEAR BRACKET, SIZE 10
			1 1 MECHANICAL STOP END, SIZE 10L FIG. 307

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 3.5 K, F_y = 4.6 K
 PIPE SIZE: 6.625" O.D. F₂ = 1.5 K F_{TOTAL} = 6.0 K
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: 10114 A335 V02

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	X-MS-1-A-4		

ITEM RECD	SCALE	COMPONENT DESCRIPTION	REMARKS
5			
4			
3	NONE	Stearns-Roger	11165/8
2			
1			
REVISIONS			
10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	11165-2-1001
MARK NO	H-MS-2-43		



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -2³/₁₆"
- Δ Z = 1"
- Δ Y = 4¹/₂" DN

VOL. P60-2

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

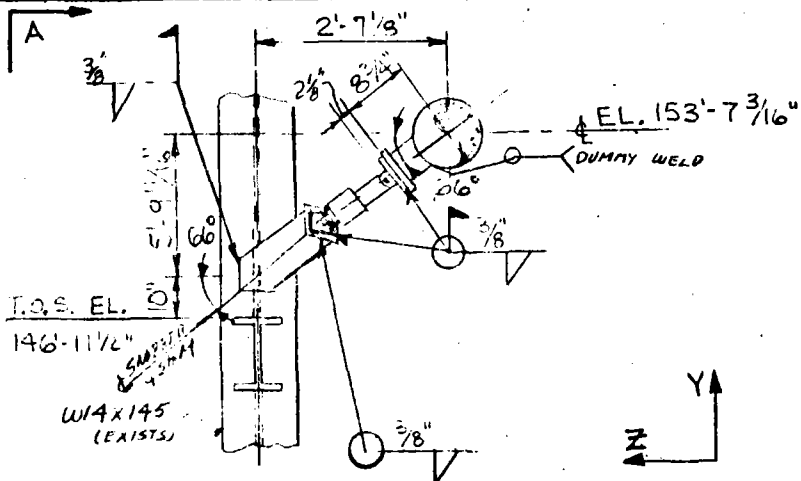
14		
13		
12		
11		
10		
9		
8		
7		
6	1	4'x4'x3/8" STRUCTURAL TUBING
5	1	5 1/2'x5 1/2'x3/4" C.S.P. BY PIPE FAB.
4	1	4"X5" PIPE STANCHION BY PIPE FAB.
3	1	5'X5'X1/2" C.S.P.
2	2	REAR BRACKET SIZE 3
1	1	MECHANICAL SNUBBER SIZE 3L FIG. 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	Stearns-Roger	
NONE		11165/8
TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO G'MS-2-QEB
MARK NO	H'MS-2-44	

REVISE ITEMS 12, 34. ADD SHIM. REVISE REAR BRACKETS

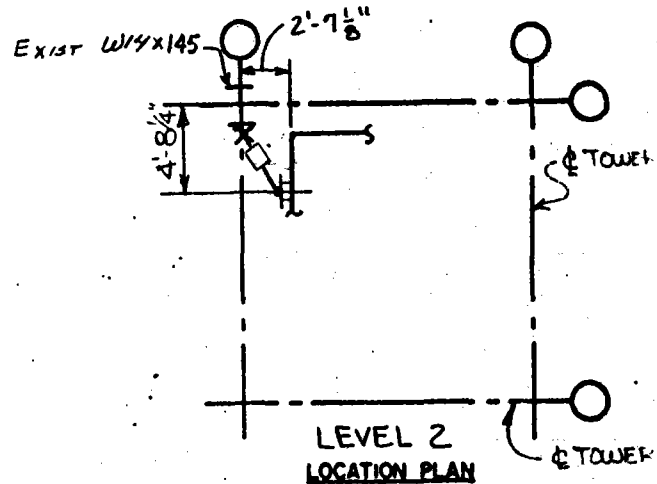
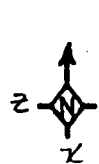
NOTES.
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_y = 2.3K
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-3-80	DATE	
REVIEW'D	H.M.	APPROVED	
DATE	4-10-80	DATE	
PROJECT	RDR	DATE	12.12.80
DATE			
ANALYSIS ID. CODE	4-MS-2-A-1		

5
4
3
2
1
REVISIONS



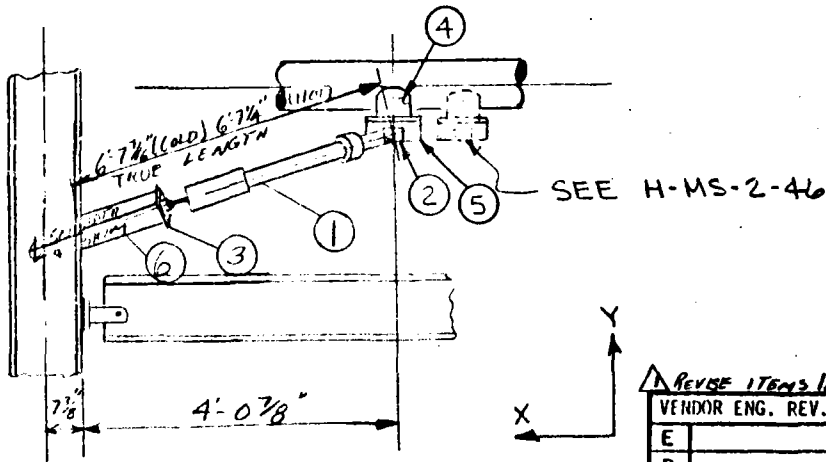
ELEVATION LOOKING NORTH



LEVEL 2 LOCATION PLAN

- ✦ LOCATION OF STEEL ATTACHMENT
- ✦ LOCATION OF PIPE ATTACHMENT
- Δ X = -1"
- Δ Y = 1 1/16" UP
- Δ Z = 3 5/8"

Vol. P60-2



VIEW A-A - ELEVATION LOOKING EAST

REVERSE ITEMS 1, 2, 3, 6, REAR BRACKETS & ADD SHIM

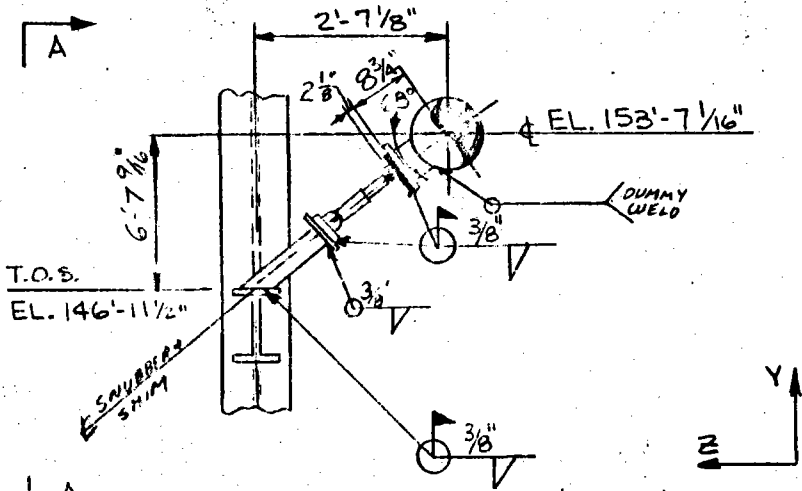
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING PA-3	PA
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

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 3/8" C.S. T. BY PIPE FAB.	
4	1	4" X 5" PIPE STALK (HOLD) BY PIPE FAB.	
3	1	5" X 5" X 1/2" C.S. W.	
2	2	REAR BRACKET, SIZE 3	
1	1	MECHANICAL SNUBBER, SIZE 3 FIG. 307	

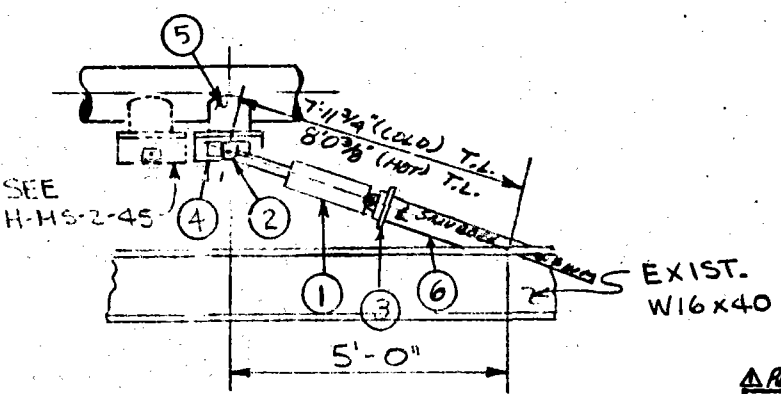
NOTES
 PIPE TEMPERATURE: 1100°F
 STRUCTURAL DESIGN LOAD: $F_x = 2.5K$, $F_y = 3.4K$
 PIPE SIZE: 2.000" O.D., $F_2 = 1.3K$, $F_3 = 4.5K$ TOTAL
 PIPE INSULATION: 1 1/2"
 PIPE MATERIAL: A307 (CS) WEL

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEW'D	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

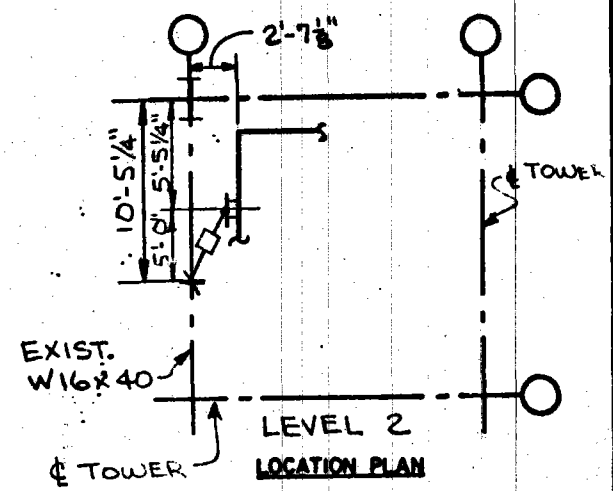
ITEM NO.	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	
Stearns-Roger		
11165/8		
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO
MARK NO	H-MS-2-45	



ELEVATION LOOKING NORTH



VIEW A-A - ELEVATION LOOKING EAST



- ✦ LOCATION OF STEEL ATTACHMENT
- ✦ LOCATION OF PIPE ATTACHMENT
- Δ X = -1"
- Δ Y = 1 1/16" UP
- Δ Z = 3 5/8"

VOL. P60-2

Δ REVISE ITEMS 1,2,3,6, REAR BRACKETS + ADD SHIM

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING Pa-3	P3
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6	1	4"X4"X3/8" STRUCTURAL TUBING
5	1	5/2"X5/2"X3/4" FR BY PIPE FAB.
4	1	4"XNS PIPE STATIONARY BY PIPE FAB.
3	1	5" X 5" X 1/2" C.S. FR
2	2	REAR BRACKET, SIZE 3
1	1	MECHANICAL SLIPPER, SIZE 3 FIG 307
	ITEM RECD	COMPONENT DESCRIPTION
	SCALE: NONE	REMARKS: 11165/8

NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 2.5K, F_y = 2.8K
 PIPE SIZE: 3.5" O.D. F_z = 1.0K, F_T = 3.9K
 PIPE INSULATION: 4 1/2" TOTAL
 PIPE MATERIAL: ASTM A325 P22

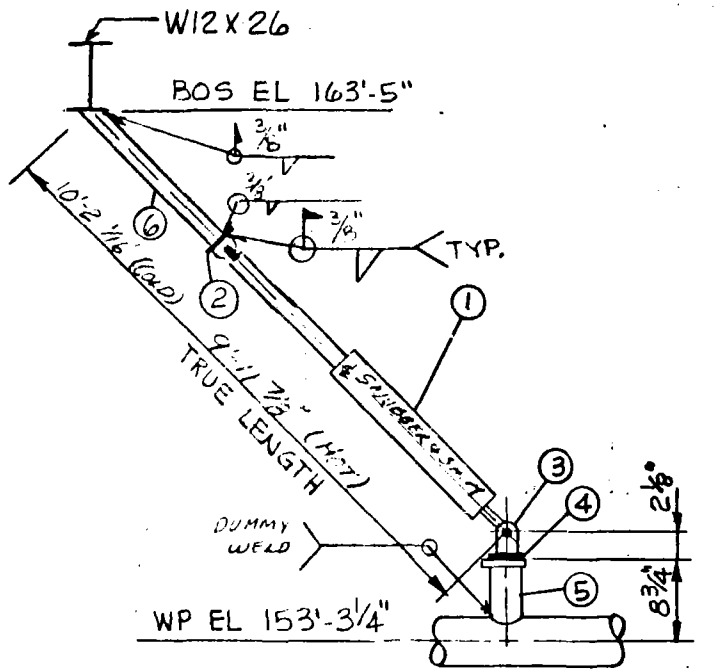
ENGINEERING RECORD	
DESIGNED	DATE
REVIEWED	DATE
PROJECT	DATE
ANALYSIS ID. CODE	X-115-1-A-4

5	
4	
3	
2	
1	
REVISIONS	
PROJECT NO C-21700	LINE NO 6"-MS-2-GE
MARK NO H-MS-2-46	

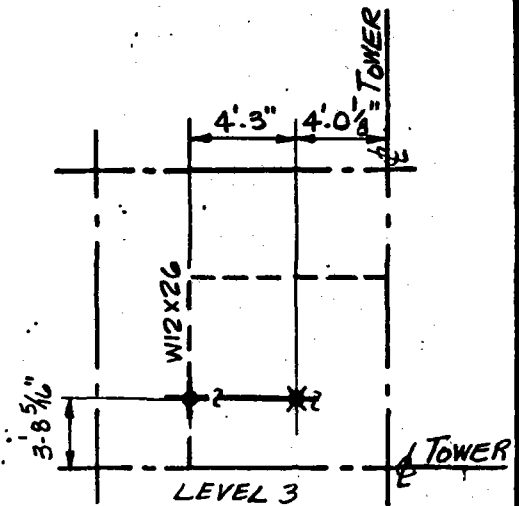
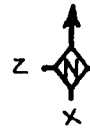
10 Mile SOLAR PILOT PLANT DAGGETT, CALIFORNIA

352

11-73



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1/4"
- Δ Z = 2 1/2"
- Δ Y = 1/4" UP

VOL. P60-2

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P3
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6	1	4"X4"X 3/8" STRUCTURAL TUBING
5	1	4" XXS PIPE STANCHION BY PIPE FAB.
4	1	5 1/2" X 5 1/2" X 3/4" TE BY PIPE FAB.
3	2	REAR WHEEL, SIZE 3
2	1	5" X 5" X 1/2" C.S. TE
1	1	MECHANICAL SNIPPER, SIZE 3 FIG. 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

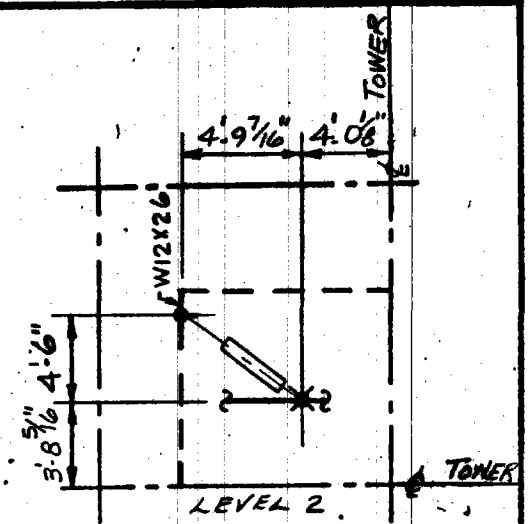
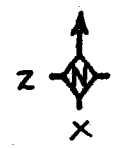
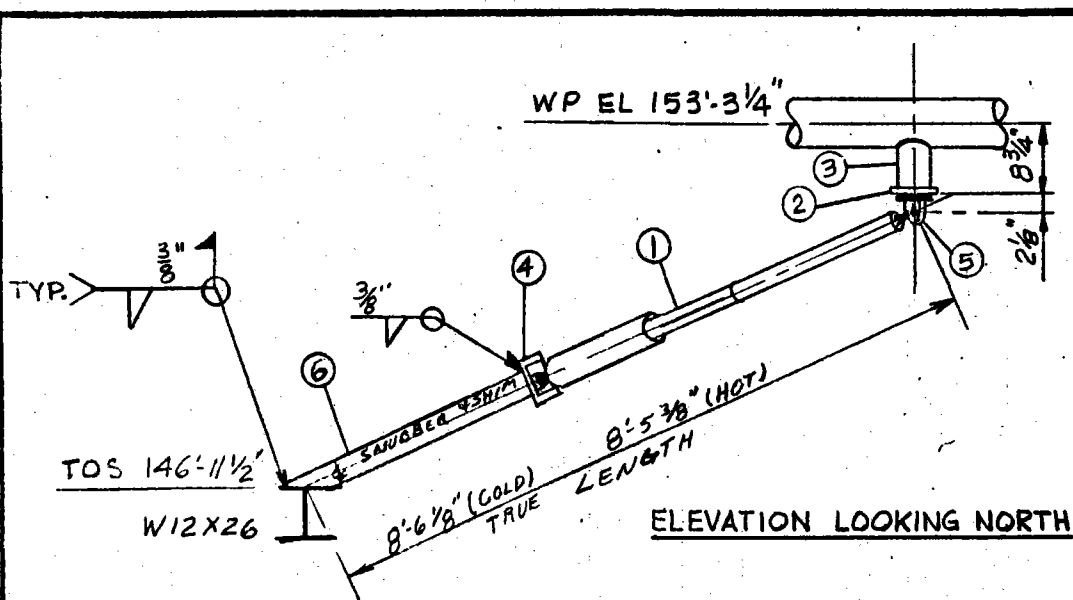
ENGINEERING RECORD

DESIGNED	MLM	CHECKED	
DATE	4-1-80	DATE	
REVIEWED	RJK	APPROVED	
DATE	4-16-80	DATE	
PROJECT	117K		
DATE			
ANALYSIS ID. CODE	X-11-1-A		

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

10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 6"MS-2-QFB MARK NO H-MS-2-47



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1/4"
- Δ Z = 2 1/2"
- Δ Y = 1/4" UP

VOL. P60-2

354

14			
13			
12			
11			
10			
9			
8			

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

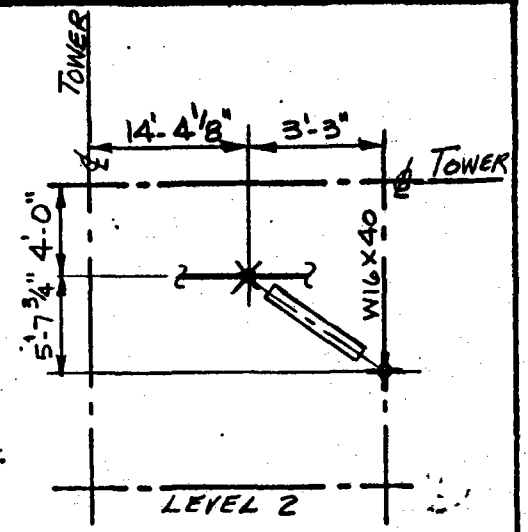
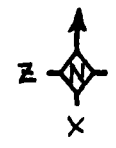
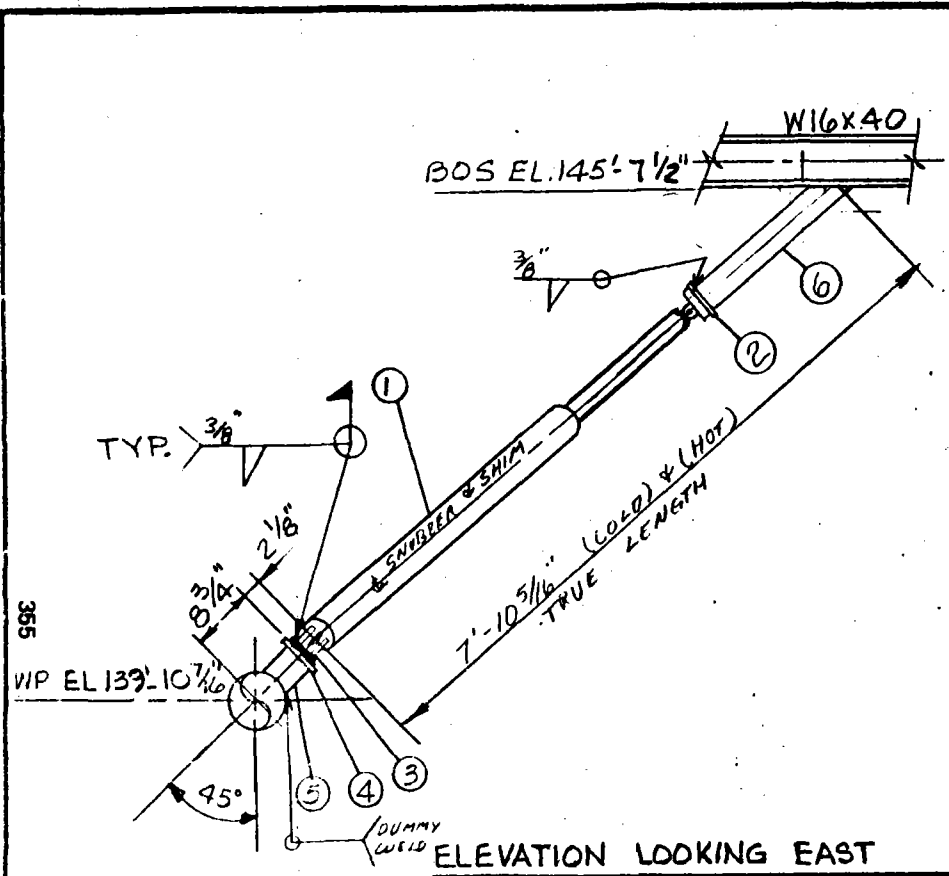
REVISIONS: REVISE ITEMS 1, 3, 4, 5, 6, REAR BRACKETS & ADD SHIM

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 1.9K, F_y = 2.3K
 PIPE SIZE: 6.625" O.D. F₂ = 2.0K F₁ = 3.6K TOTAL
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-1-80	DATE	
REVIEWED	MLM	APPROVED	
DATE	4-16-80	DATE	
PROJECT	BLR		
DATE			
ANALYSIS ID. CODE	X-111-1-1-1		

NO.	REVISIONS	DESCRIPTION	DATE	REMARKS
1	1	MECHANICAL SAWBEER SIZE 3		FIG. 37
2	1	5 1/2" x 5 1/2" x 1/2" R BY PIPE FAB.		
3	1	4" X 5" PIPE STANCHION BY PIPE FAB.		
4	1	5" X 5" X 1/2" C.S. PL.		
5	2	REAR BRACKET SIZE 3		
6	1	4" X 4" X 3/8" STRUCTURAL TUBING		

SCALE: NONE
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-2-4B



LOCATION PLAN

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

VOL. P60-2

365

ELEVATION LOOKING EAST

REVISE ITEMS 1,2,3,4, 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. F₂ = 1.8K, F₃ = 4.4K TOTAL
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

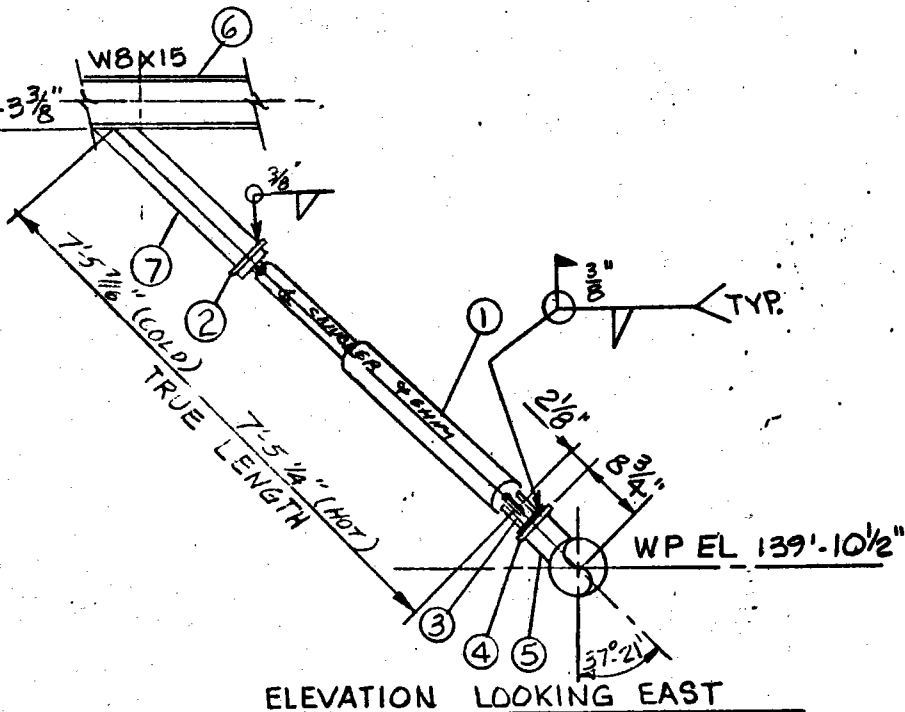
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	MPIRG P9-3	P3
D	STRUCTURAL S32-3	0
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6	1	4"x4"x3/8" STRUCTURAL TUBING
5	1	4" X XS PIPE STAYCHORD BY PIPE FAB.
4	1	5/2" x 5/2" x 3/4" RB BY PIPE FAB.
3	2	REAR BRACKET, SEE 3
2	1	5" x 5" x 1/2" C.S. TB
1	1	MECHANICAL SNUBBER SIZE 3 FIG. 307

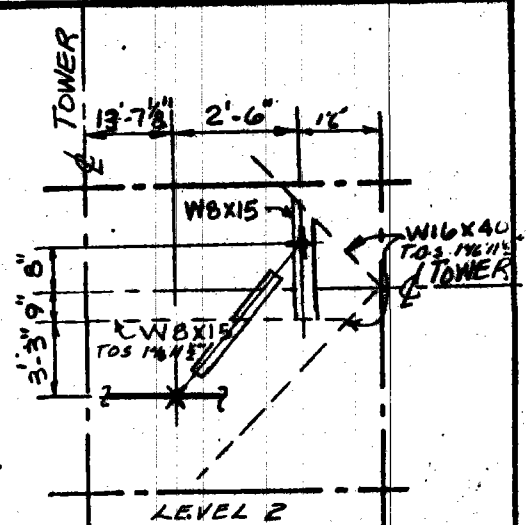
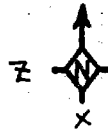
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-3-50	DATE	4/25/50
REVIEWED	MLM	APPROVED	
DATE	4-10-50	DATE	
PROJECT	BDR		
DATE	4-10-50		
ANALYSIS ID. CODE			

ITEM NO.	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	
Stearns-Roger		11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
REVISIONS	PROJECT NO C-21700	LINE NO 6"MS-2-QEB MARK NO H-MS-2-49

BOS EL 146'-3 3/8"



ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = 1/4"
- △ Z = 3/4"
- △ Y = 3/4" UP

VOL. P60-2

VENOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-3	P3
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
B			
A			

14		
13		
12		
11		
10		
9		
8		
7	1	4"X4"X3/8" STRUCTURAL TUBING
6	1	WBX15 2-1 LG PER A STD EEB 31.9
5	1	4" XYS PIPE (FLUORINUM) BY PIPE FAB
4	1	5 1/2" X 5 1/2" X 3/4" HL BY PIPE FAB
3	2	REAR BRACKET, SIZE 3
2	1	5" X 5" X 1/2" C.S. HL
1	1	MECHANICAL SWEEPER, SIZE 3

REVISE ITEMS 1, 2, 3 & 7, REAR BRACKETS & ADD SHIM

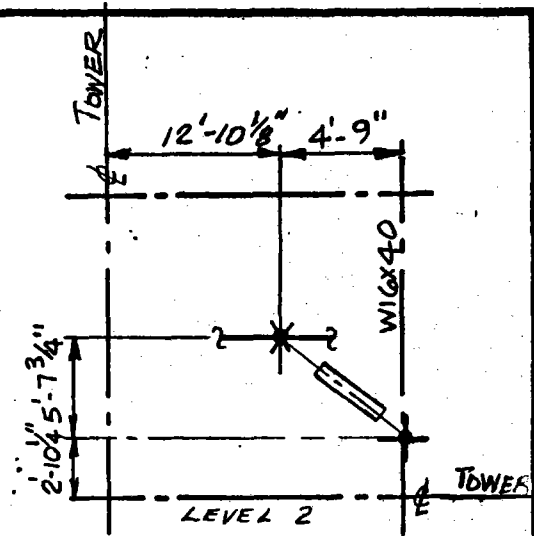
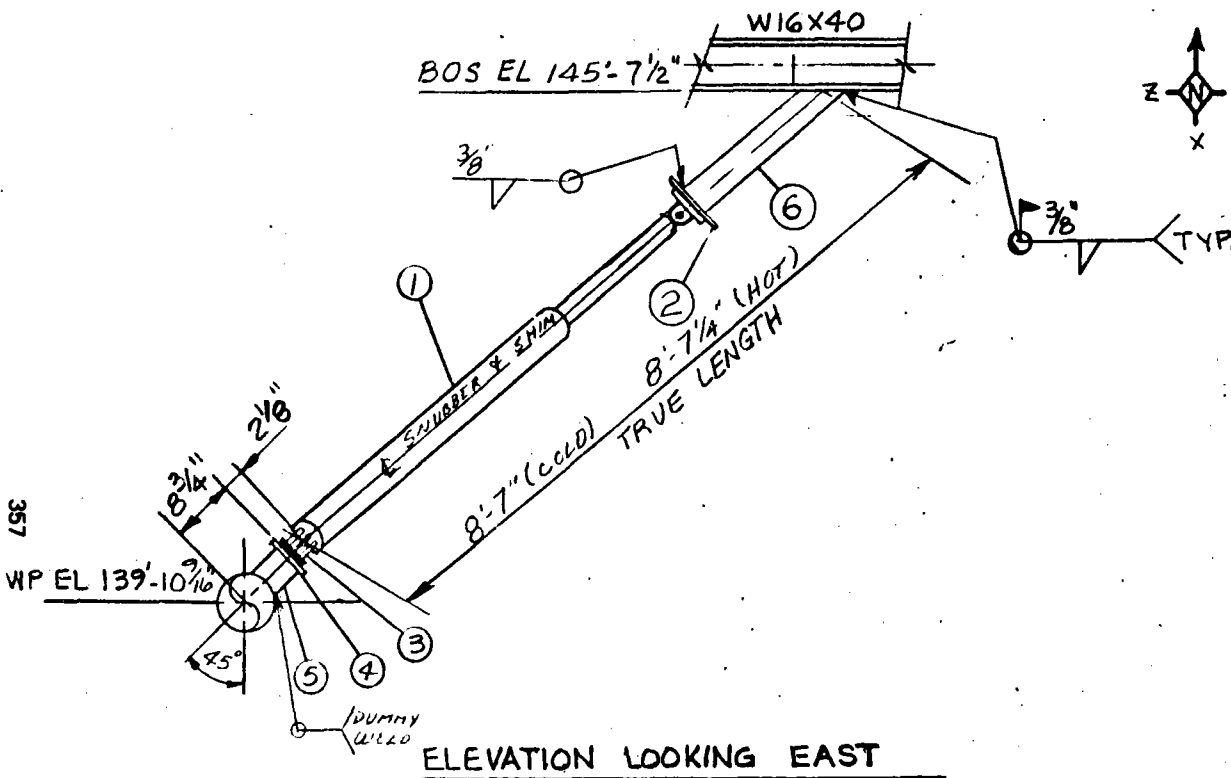
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 3K, F_y = 4K, F_z = 1.9K
 PIPE SIZE: 6.625" O.D. F_{TOTAL} = 5.3K
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-3-80	DATE	
REVIEWED	MLM	APPROVED	
DATE	4-16-80	DATE	
PROJECT	EDP	BY	H. H. Y.
DATE	4-16-80	DATE	6-12-80
ANALYSIS ID. CODE	X-110-1-2-1		

ITEM RECD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	71165/8
TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700	LINE NO 6"MS-2-GE8	MARK NO H-MS-2-50

356

357



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = - 3/8"
- Δ Z = 3/4"
- Δ Y = 5/8" UP

VOL. P60-2

REVISIONS 1, 2, 3 & 6, REAR BRACKETS & ADD SHIM

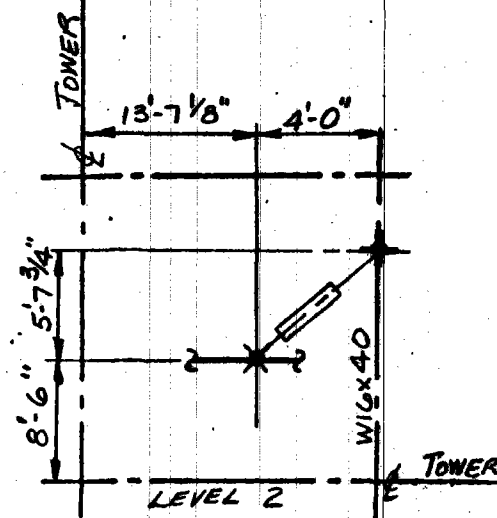
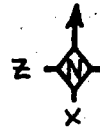
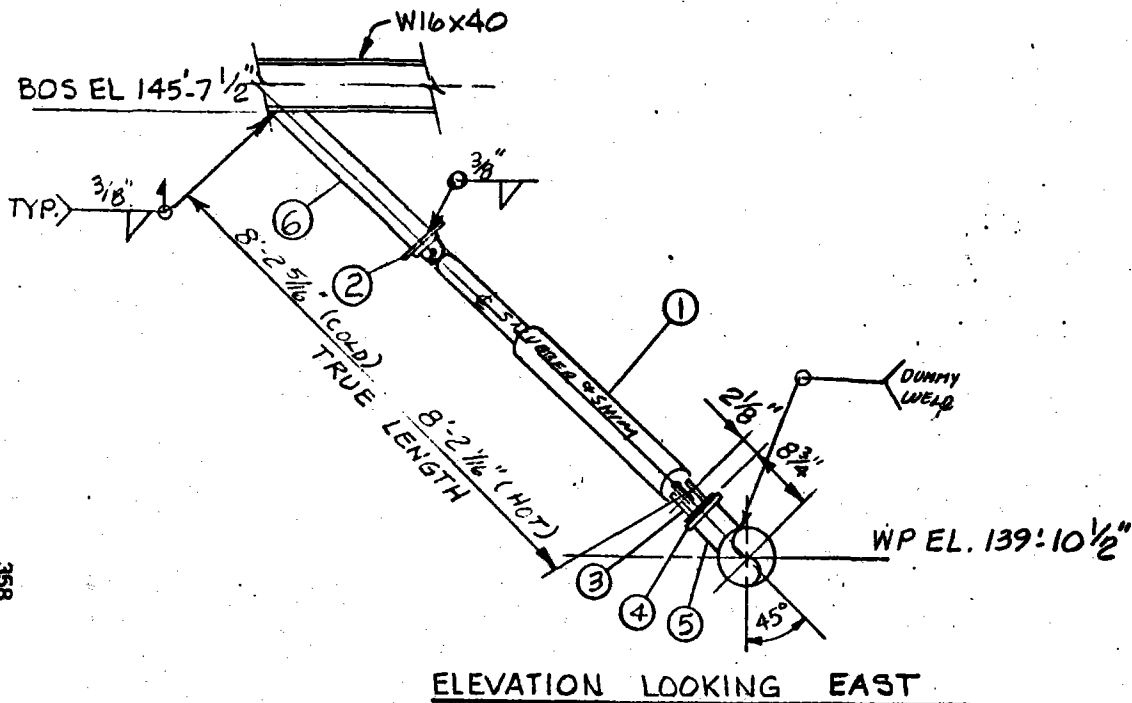
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 3.6K, F_y = 3.5K
 PIPE SIZE: 6.625" O.D. F₂ = 3.4K, F_{TOTAL} = 6K
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

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

14		
13		
12		
11		
10		
9		
8		
7		
6	1	4" X 4" X 3/8" STRUCTURAL TUBING
5	1	4" XXS 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

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-2-80	DATE	
REVIEWED		APPROVED	
DATE	4-16-80	DATE	
PROJECT	EDP	PROJECT	P.P.P.Y.
DATE		DATE	12-80
ANALYSIS ID. CODE	X-14		

ITEM NO.	RECD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 6"MS-3-01EB	MARK NO H-MS-3-9



+ 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

358

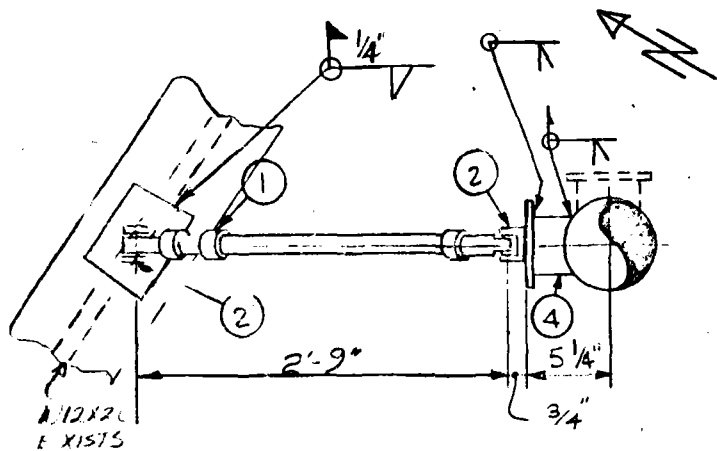
VENOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING P9-3	P3
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
B			
A			

REVISE ITEMS 1, 2, 3 & 6, REAR BRACKETS & ADD SHM

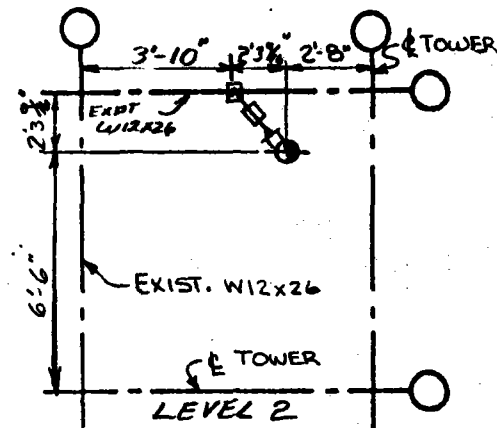
NOTES:
 PIPE TEMPERATURE: 960° F.
 STRUCTURAL DESIGN LOAD: $F_x = 3.7k$, $F_y = 3.7k$
 $F_z = 3k$, $F_{TOTAL} = 6k$
 PIPE SIZE: 6.625" O.D.
 PIPE INSULATION: 4 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-2-80	DATE	
REVIEWED	R.P.Y.	APPROVED	
DATE	7-16-80	DATE	
PROJECT	EDR		
DATE			
ANALYSIS ID. CODE	X-MS-1-A-4		

14			
13			
12			
11			
10			
9			
8			
7			
6	1	4" x 4" x 3/8" STRUCTURAL TUBING	
5	1	4" XYS PIPE STANCHION BY PIPE FAB.	
4	1	5 1/2" x 5 1/2" x 3/4" C.S.F. BY PIPE FAB.	
3	2	REAR BRACKET, SIZE 3	
2	1	5" x 5" x 1/2" C.S.F.	
1	1	MECHANICAL SNUBBER, SIZE 3	3C7
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-QCE
MARK NO	MS-3-10		



PLAN VIEW

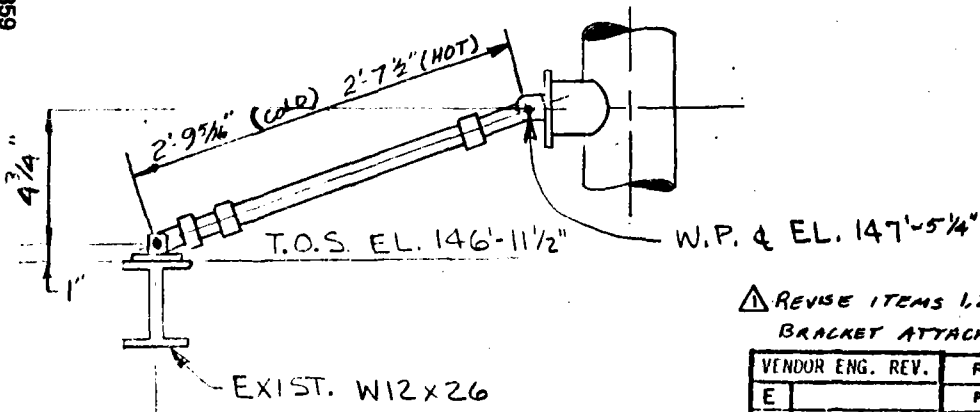


LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1/2"
- Δ Y = 1/2" UP
- Δ Z = 2 1/4"

VOL. P60-2

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ELEVATION LOOKING EAST.

Δ REVISE ITEMS 1, 2 & 3, LENGTHS, & REAR BRACKET ATTACHMENTS

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P9-3	P3
D		STRUCTURAL S32-3	O
C		ELECTRICAL	
B			
A			

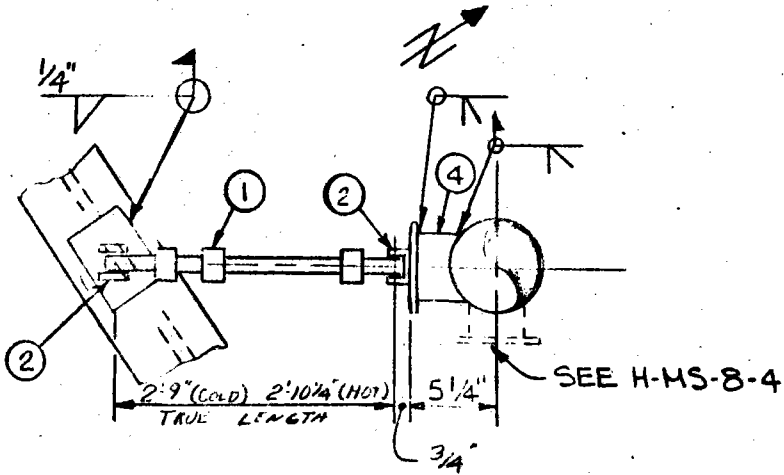
14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4	1	1/2" XS PIPE STANCHION A335P22
3		
2	2	REAR BRACKET, SIZE 1/2
1	1	HEAVY DUTY SNUBBER SIZE 1/2 FN 307

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = F_z = .3K$
 PIPE SIZE: 2.315" O.D. $F_{TOTAL} = .4K$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335, P22

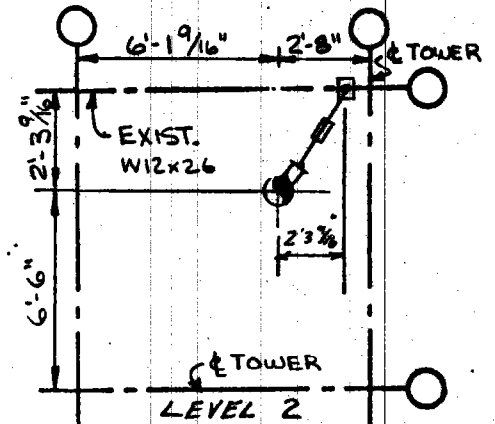
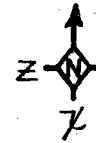
ENGINEERING RECORD		5
DESIGNED	DATE	4
CHECKED	DATE	3
REVIEWED	DATE	2
APPROVED	DATE	
PROJECT	DATE	
ANALYSIS ID. CODE	X-MS-1-A-4	

ITEM NO.	RECD	COMPONENT DESCRIPTION	REMARKS
1		SCALE: NONE	
Stearns-Roger			11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	2-MS-B-GER
MARK NO	H-MS-B-4		

FORM 873-1



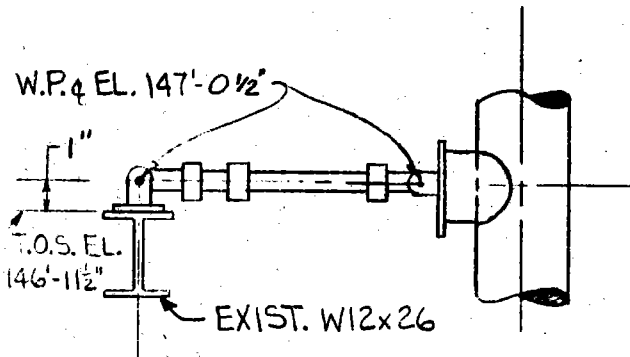
PLAN VIEW



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1/2"
- Δ Y = 1/2" LP
- Δ Z = 2/4"

YOL. P60-2



ELEVATION LOOKING EAST

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	0
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4	1	1 1/2" x S PIPE STANCHION A335 P22
3		
2	2	REAR BRACKET, SIZE 1/2
1	1	MECHANICAL SNIFFER, SIZE 1/2, FIG. 307

NOTES

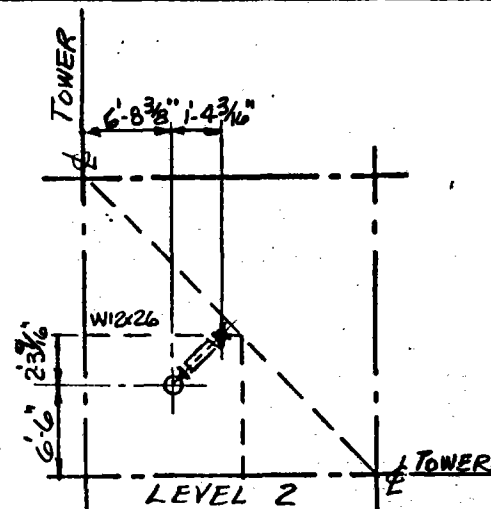
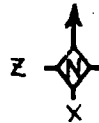
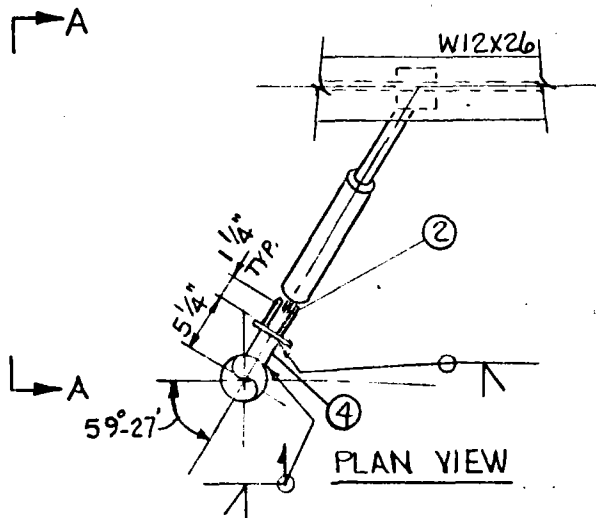
PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .3K, F_z = .3K$
 PIPE SIZE: 2 3/8" O.D. $F_{total} = .4K$
 PIPE INSULATION: 1"
 PIPE MATERIAL: A335, P22

ENGINEERING RECORD

DESIGNED	4/1/80	CHECKED	
DATE	4/1/80	DATE	
REVIEWED	5/20/80	APPROVED	
DATE	4/18/80	DATE	
PROJECT	BDR		
DATE	5/20/80		
ANALYSIS ID. CODE	X-MS-1-A-3		

5		
4	ITEM RECD	COMPONENT DESCRIPTION
3	SCALE:	NONE
2	Stearns-Roger	
1	10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
REVISIONS	PROJECT NO C-21700	LINE NO 2-MS-A-01B MARK NO H-MS-B-5

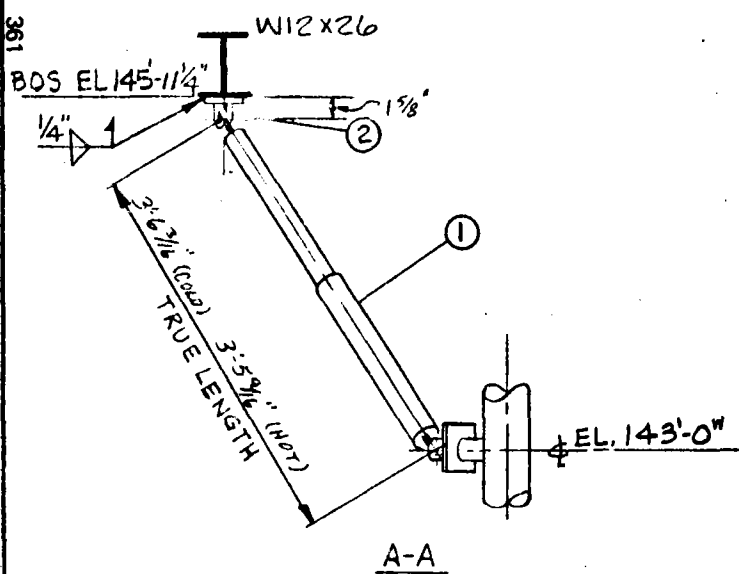
11165/8



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -5/16"
- Δ Z = 1 3/8"
- Δ Y = 1 1/8" UP

VOL. P60-2



Δ REVISE ITEMS 1,2,3, LENGTHS, REAR BRACKET ATTACHMENTS

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

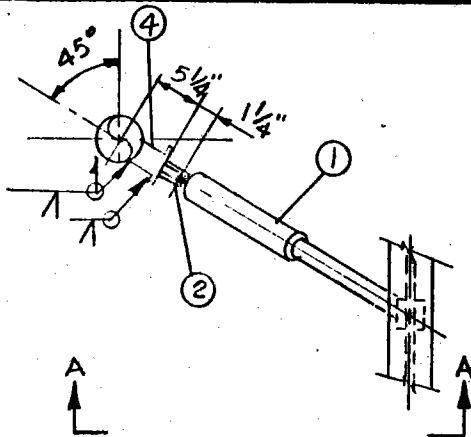
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	1	1 1/2" XS PIPE STANCHION A335 P22	
3			
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNUBBER, SIZE 1 FIG. 307	
ITEM REQD	COMPONENT DESCRIPTION	REMARKS	

NOTES:
 PIPE TEMPERATURE: 900° F.
 STRUCTURAL DESIGN LOAD: Fx = .5K, Fy = .7K
 PIPE SIZE: 2.375" O.D. Fz = .2K, F_{TOTAL} = .9K
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

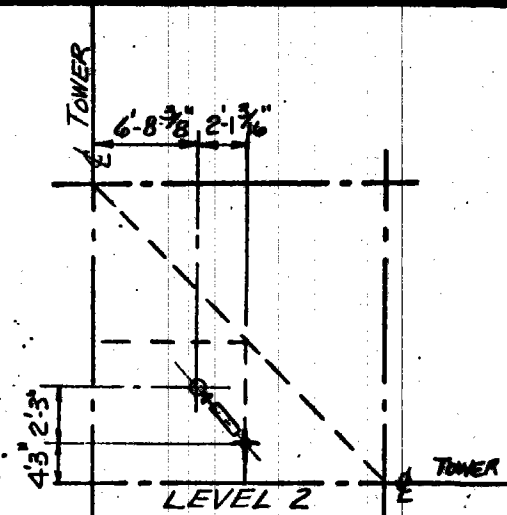
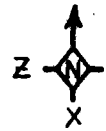
ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-8-80	DATE	
REVIEWED		APPROVED	
DATE	4-16-80	DATE	
PROJECT	RDP		
DATE			
ANALYSIS ID. CODE	X-M3-1-A-4		

5			
4			
3			
2			
1			
SCALE: NONE		Stearns-Roger	
10 Mile SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT #	C-21700	LINE #	2"MS-8-QEB
MARK #	H-MS-B-6		

FORM 873-1



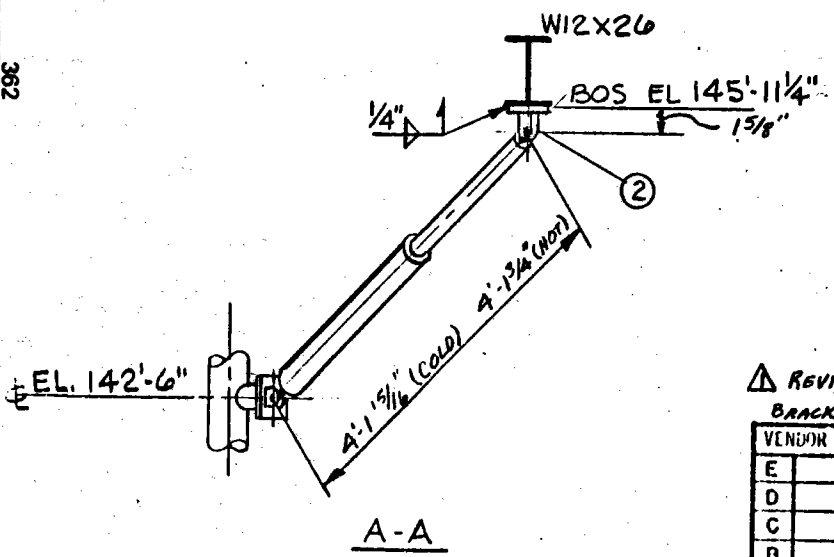
PLAN VIEW



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -5/16"
- △ Z = 1 3/8"
- △ Y = 1/8" 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	0
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 FIS 307
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

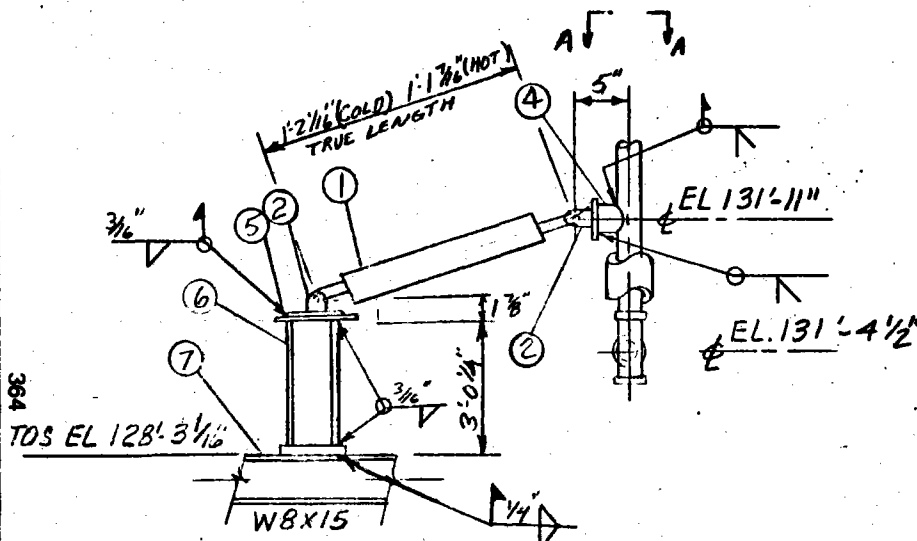
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .5K F_y = .9K
 PIPE SIZE: 2.375" O.D. F_R = .5K F_{TOTAL} = 1.1K
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	X
DATE	4-8-80	DATE	
REVIEWED	WJZ	APPROVED	
DATE	4-16-80	DATE	
PROJECT	MLP	DATE	10-12-80
ANALYSIS ID. CODE	X-118-1-A-4		

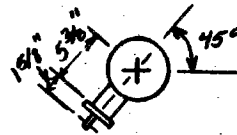
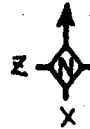
5		
4		
3		
2		
1	APC	
	REVISIONS	
PROJECT NO C-21700		LINE NO 2" MS - 5-0EB MARK NO H-MS-8-7

362

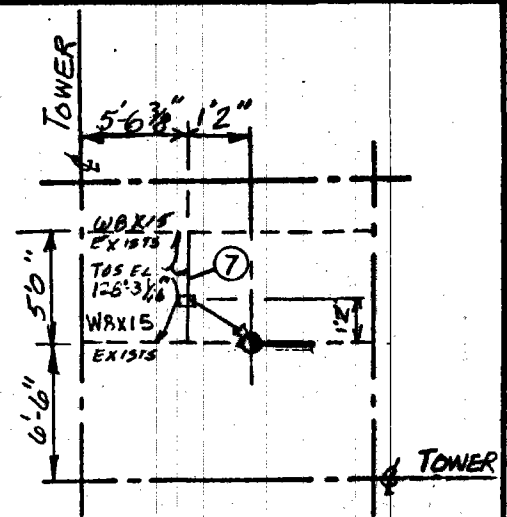
364



ELEVATION LOOKING EAST.



SECTION A-A



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -1/16"
- △ Z = 1"
- △ Y = 1/8" UP

VOL. P60-2

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

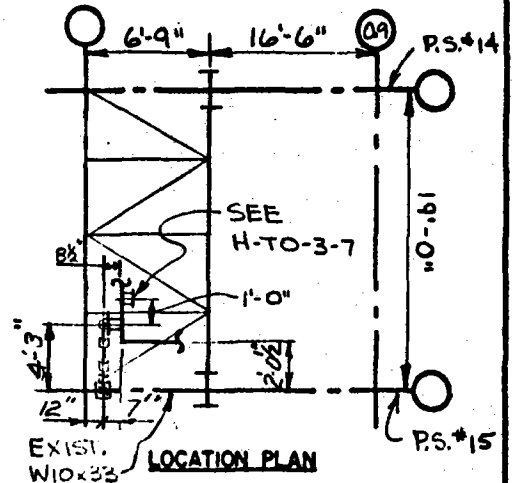
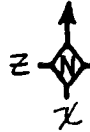
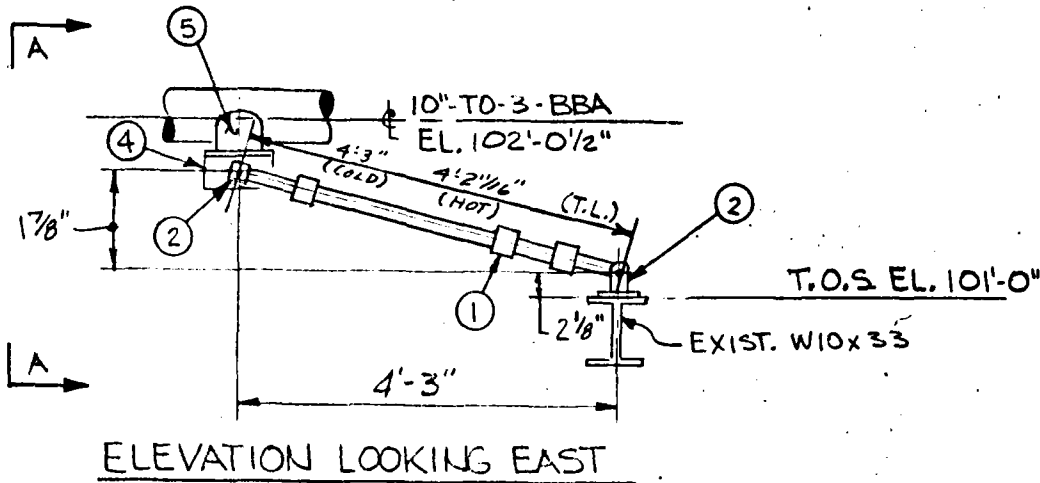
REVISOR: REVISE ITEMS 1,2,3,5,6, LENGTHS & REAR BRACKET ATTACH

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .4K, F_y = .3K
 PIPE SIZE: 2.375" O.D., F_z = .4K, F_{total} = .7K
 PIPE INSULATION: 3/4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-23-80	DATE	
REVIEWED	HJM	APPROVED	
DATE	4-23-80	DATE	
PROJECT	BDR		
DATE	11-20-80		
ANALYSIS ID. CODE	7/11/1-1-1-1		

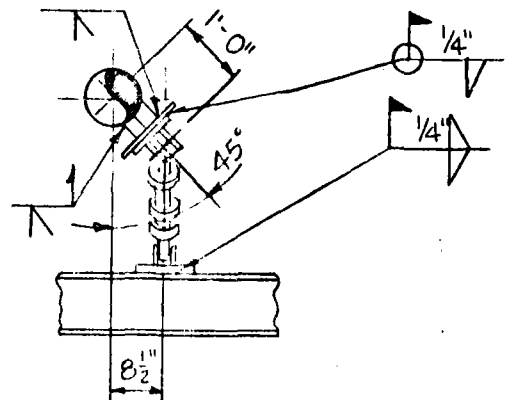
14		
13		
12		
11		
10		
9		
8		
7	1	WBX15, 4'-10 LG, PER S-R STA (E/K/G)
6	1	U4X13, 3'-0" LG
5	2	4 3/4 X 4 3/4 X 1/4 C.S. PL
4	1	1/2 X S PIPE STANCHION (BY SNUBBER VENDOR) A335 P22
3		
2	2	REAR BRACKET SIZE 1
1	1	MECHANICAL SNUBBER SIZE 1 FIG. 306
ITEM REQD		COMPONENT DESCRIPTION
SCALE:	NONE	REMARKS
		11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 2/11/85-GFB
MARK NO	H-11	1-9-80

Stearns-Roger



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 5/16"$
- $\Delta Y = 1/4"$ UP TO $1 5/8"$ DIA.
- $\Delta Z = -1/4"$

VOL. P60-2



⚠ REVISE ITEMS 1, 2, 3, LENGTHS, REAR BRACKET ATTACHMENTS

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV
E		PIPING PA-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 VEN.)	A/D6
4	1	10" x 10" x 1/2" FE (BL SNUBBER VEN.)	C.S.
3			
2	2	REAR BRACKET, SIZE 3	
1	1	MECHANICAL SNUBBER, SIZE 3	FIG. 307

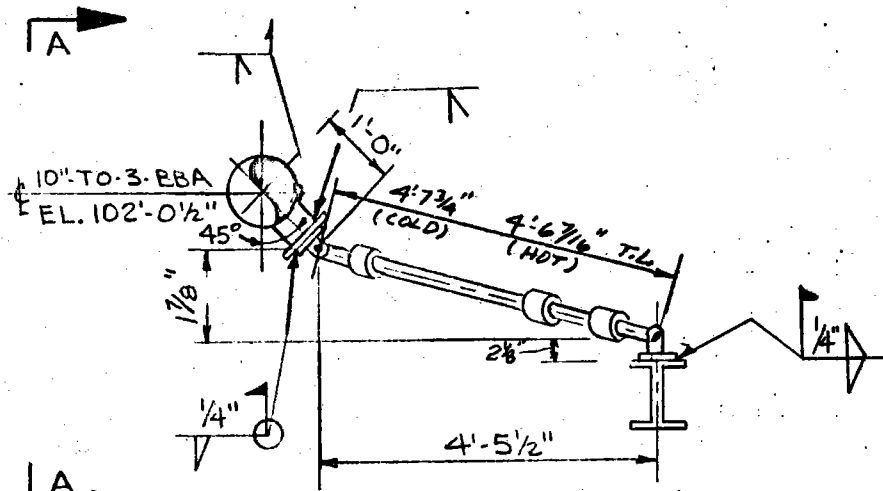
NOTES:
 PIPE TEMPERATURE: 525°F
 STRUCTURAL DESIGN LOAD: $F_x = 3K$
 PIPE SIZE: 10.75" O.D.
 PIPE INSULATION: 3/8"
 PIPE MATERIAL: ASTM A106 GR. B

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

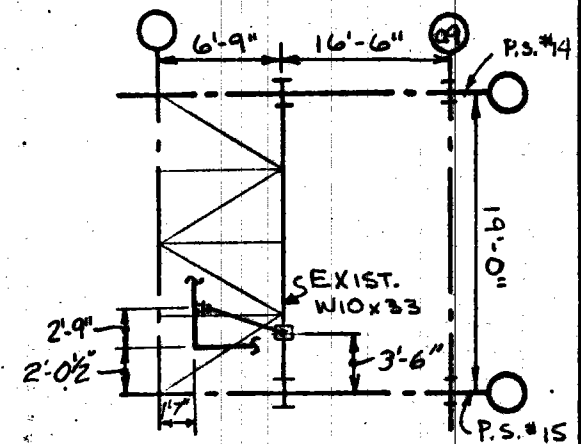
5		
4	ITEM HEAD	COMPONENT DESCRIPTION
3	SCALE:	NONE
2		Stearns-Roger
1		11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO
MARK NO	H-T03-7	

365

200 873.1



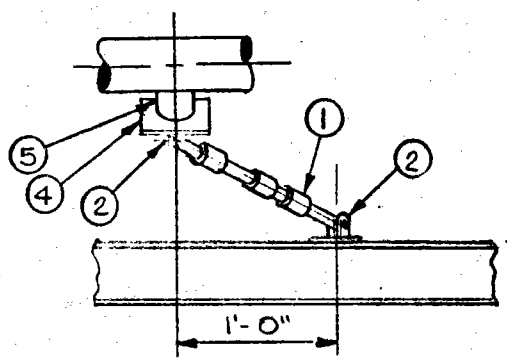
ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = 5/16"
- Δ Y = 1/4" UP TO 1 5/8" DN.
- Δ Z = -1/4"

VOL. P60-2



VIEW A-A-ELEVATION LOOKING EAST

T.O.S. EL. 101'-0"

Δ 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		
12		
11		
10		
9		
8		
7		
6		
5	1	8" STD. STANCHION A106 GR. B (BY SNEEGER VEN)
4	1	1 1/2" X 10" X 1/2" TB (BY SNEEGER VEN)
3		
2	2	REAR BRACKET, SIZE 3
1	1	MECHANICAL SHEET SIZE 3 FIG. 307

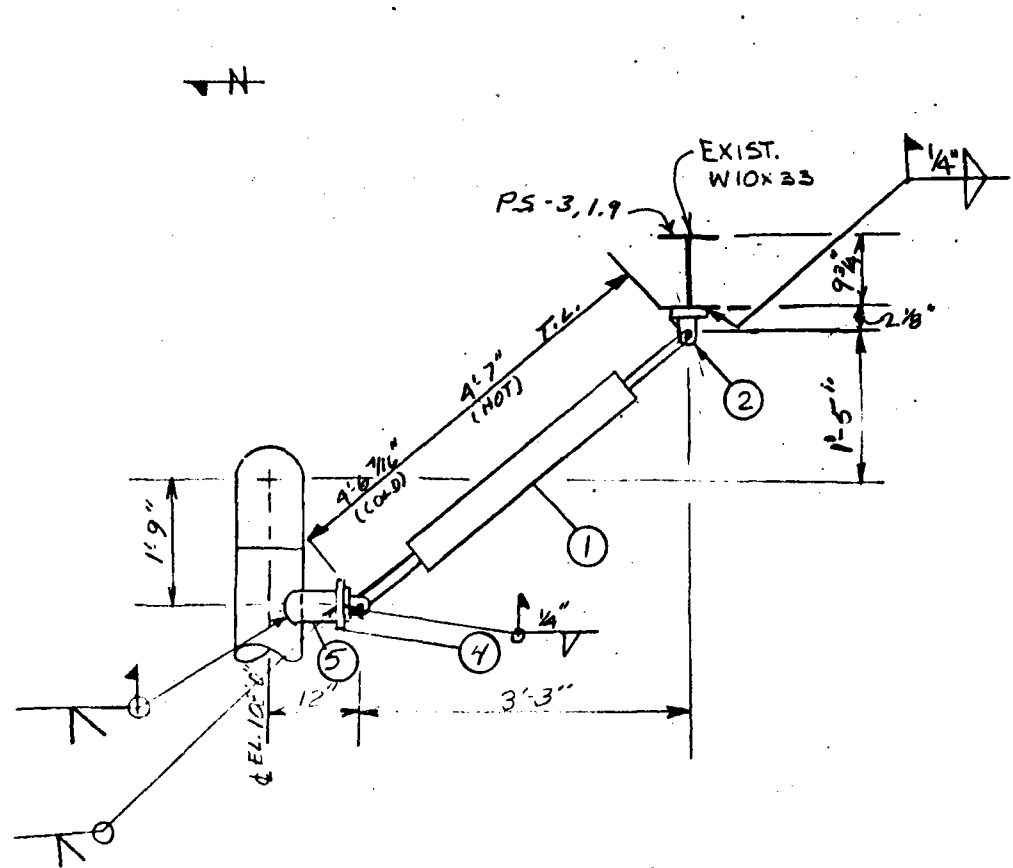
NOTES:
 PIPE TEMPERATURE: 525°F
 STRUCTURAL DESIGN LOAD: F_x = .6k, F_z = 2.5k
 PIPE SIZE: 10.75" O.D. F_{TOTAL} = 2.6k
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: A106 GR. B

ENGINEERING RECORD				5	1	MECHANICAL SHEET SIZE 3 FIG. 307
DESIGNED	DATE	CHECKED	DATE	4	ITEM REQD	COMPONENT DESCRIPTION
REVIEWED	DATE	APPROVED	DATE	3	SCALE:	Stearns-Roger
PROJECT	DATE			2	NONE	
ANALYSIS ID. CODE					REVISIONS	11165/8
						10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
						PROJECT NO C-21700
						LINE NO H-TO-3-4
						MARK NO H-TO-3-7

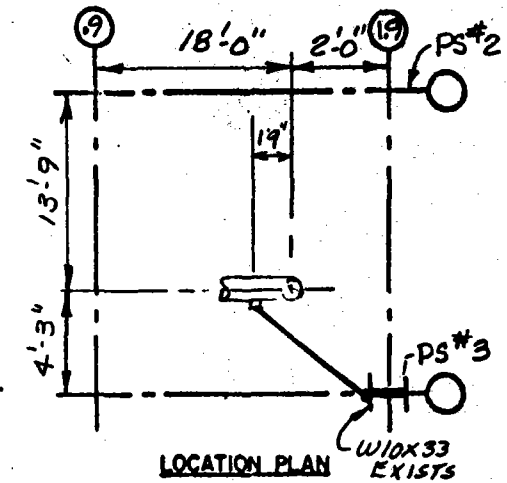
366

1000 473.1

367



PLAN VIEW



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -5/16"$
 $\Delta Y = 1/8" \text{ UP}$
 $\Delta Z = 1/2"$

VOL. PG 0-2

△ REVISE ITEMS 1, 2 & 3, LENGTHS & REAR BRACKET ATTACH.

NOTES
 PIPE TEMPERATURE: 580 °F
 STRUCTURAL DESIGN LOAD: $F_x = 2.5 \text{ K}$, $F_z = 2.4 \text{ K}$
 PIPE SIZE: 10.75" O.D. $F_{TOT} = 3.4 \text{ K}$
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: ASTM A106 GR. B

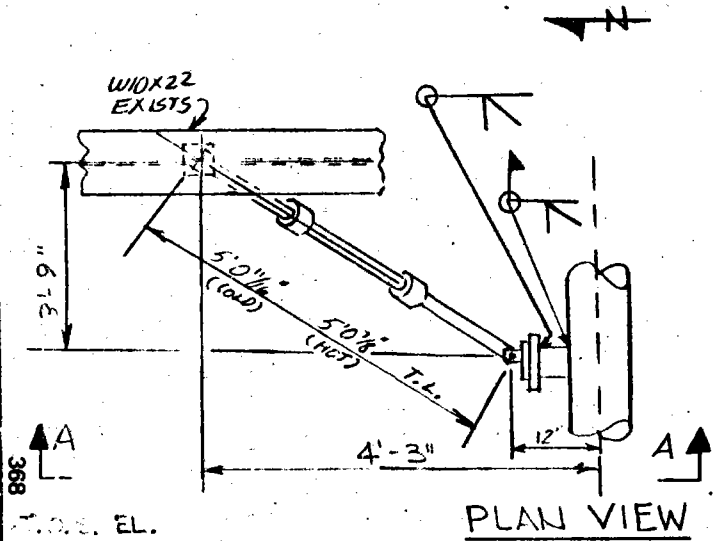
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING	PA-7 B
D	STRUCTURAL	S33-2 1.
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
9		
8		
7		
6		
5	1	8" STD. PIPE STANCHION ALONG GRB (BY SNUBBER VEN.)
4	1	10" X 10" X 1/2" PL (BY SNUBBER VEN.)
3		
2	2	REAR BRACKET, SIZE 3
1	1	MECHANICAL SNUBBER, SIZE 3 F6 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger	11165/8

ENGINEERING RECORD	
DESIGNED	DATE
REVIEWED	DATE
PROJECT	DATE
ANALYSIS ID. CODE	

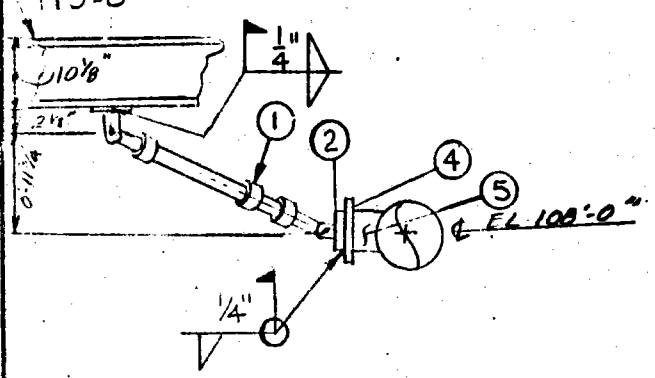
5	REVISIONS
4	
3	
2	
1	
PROJECT NO C-21700	
LINE NO 101 TO 216	MARK NO H-TO-21-16

10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

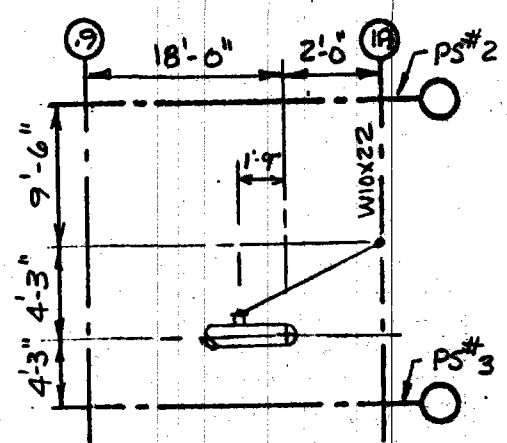
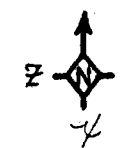


PLAN VIEW

368
A
100% EL.
110'-0"



VIEW A-A - ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -5/16"
- Δ Y = 1/8" UP
- Δ Z = 1/2"

VOL. P60-2

Δ REVISE ITEMS 1, 2, 3, LENGTHS
& REAR BRACKET ATTACHMENTS

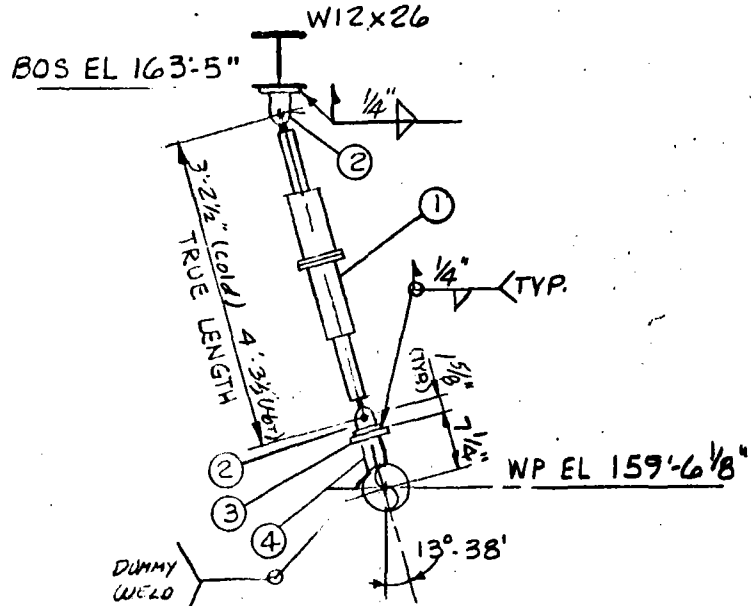
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-7	B
D	STRUCTURAL S33-2	1
C	ELECTRICAL	
B		
A		

14		
13		
12		
11		
10		
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8		
7		
6		
5	1	8" STD. PIPE STANCHION ALONG GRB (BY STUBBER VENDOR)
4	1	10" X 10" X 1/2" PL (BY STUBBER VENDOR)
3		
2	2	REAR BRACKET, SIZE 3
1	1	MECHANICAL SNIBBER SIZE 3 FIG. 307
ITEM REQD		COMPONENT DESCRIPTION
		REMARKS
		Stearns-Roger
		11165/B

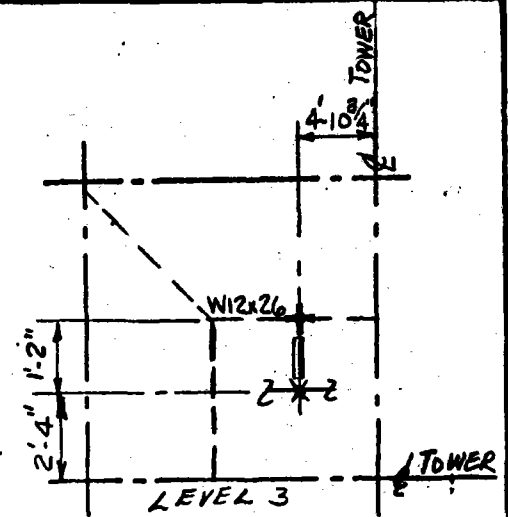
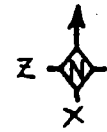
NOTES
 PIPE TEMPERATURE: 530°F
 STRUCTURAL DESIGN LOAD: F_x = 2.4K, F_y = 0.7K,
 PIPE SIZE: 10" O.D. F_x = 22K, F_y = 3.0K
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: A106 GR B

ENGINEERING RECORD		5
DESIGNED	DATE	4
CHECKED	DATE	3
REVIEWED	DATE	2
APPROVED	DATE	
PROJECT	BDR	
DATE	1-2-80	
ANALYSIS ID. CODE		

TO THE SOLAR PILOT PLANT, DAGGETT, CALIFORNIA
 PROJECT NO C-21700
 LINE NO
 MARK NO 10 01-17



ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -3/16"
- Δ Z = 1/16"
- Δ Y = 13 9/16" DN

VOL. P60-2

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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8		
7		
6		
5		
4	1	3" STD PIPE STANCHION BY PIPE FAB.
3	1	1/2" x 1/2" x 1/2" C.S. PL BY PIPE FAB.
2	2	REAR BRACKET SIZE
1	2	MECHANICAL SNUBBER SIZE 1/2" FIG. 306

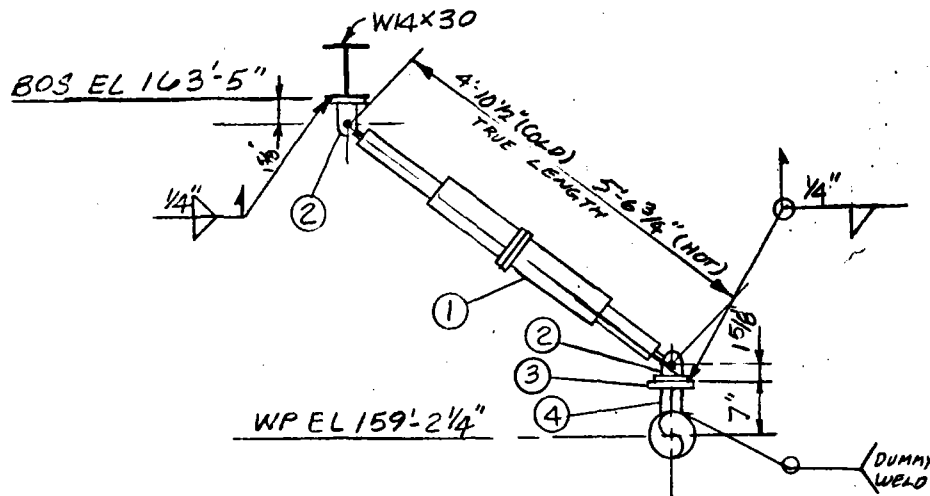
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .3K F_y = 1.4K
 PIPE SIZE: 4.5" O.D. F_{TOTAL} = 1.5K
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-11-80	DATE	
REVIEW'D	JRM	APPROVED	
DATE	4-29-80	DATE	
PROJECT	EPK		
DATE			
ANALYSIS ID. CODE	H-VT-1-A-9		

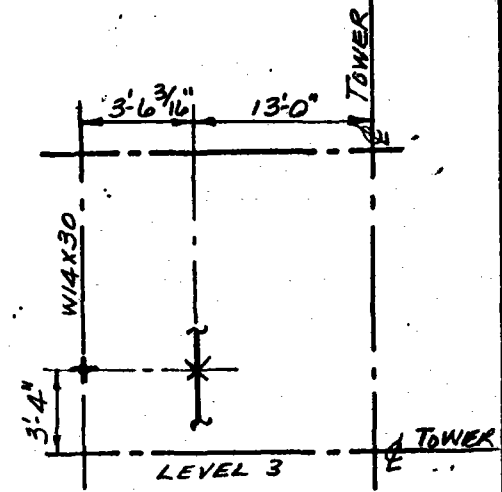
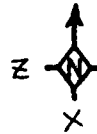
5		
4	ITEM REQ'D	COMPONENT DESCRIPTION
3	SCALE:	NONE
2		
1	REVISIONS	
		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA
PROJECT NO	C-21700	LINE NO
		H-VT-1-KEB
MARK NO	H-VT-1-27	

Stearns-Roger

11165/8



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = 1 \frac{9}{16}''$
- $\Delta Z = 1 \frac{9}{16}''$
- $\Delta Y = 12 \frac{7}{16}'' \text{ DN}$

VOL. P60-2

37

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

REVISE ITEMS L245, 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

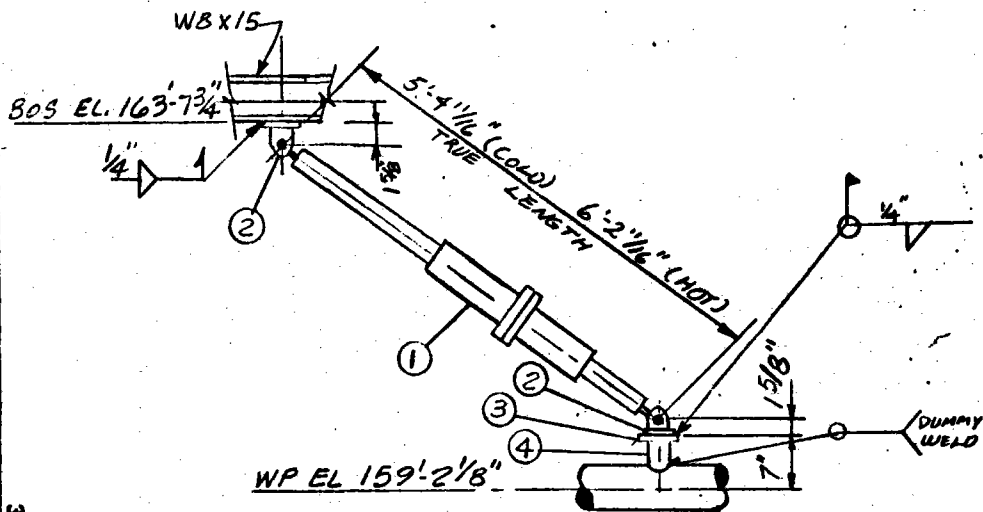
ENGINEERING RECORD		5
DESIGNED	MLM	4
DATE	4-14-80	3
REVIEWED	[Signature]	2
DATE	4-24-80	1
PROJECT	RTD	REVISIONS
DATE	5-16-80	
ANALYSIS ID. CODE	X-VT-1-A-5	

14		
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6		
5		
4	1	3" STD PIPE STANCHION BY PIPE FAB.
3	1	4 1/2" x 4 1/2" ACS.R BY PIPE FAB.
2	2	REAR BRACKET SIZE 1
1	2	MECHANICAL SNUBBER SIZE 1L FIG. 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	11165/8

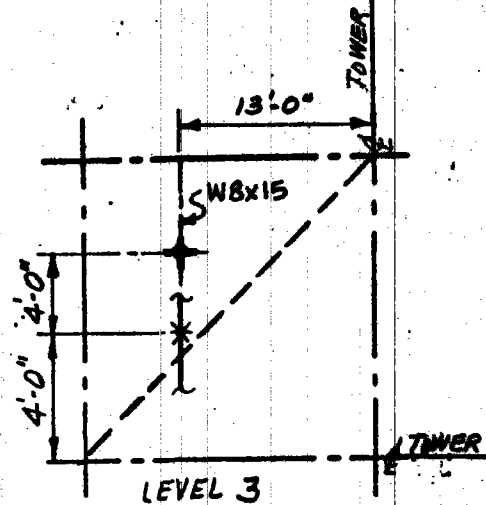
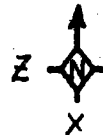
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700 LINE NO 4-VT-1-1-F-5 MARK NO H-VT-1-29

PLATE 077-1



ELEVATION LOOKING EAST



LEVEL 3
LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = 1 7/16"
- △ Z = 1 7/16"
- △ Y = 12 7/16" DN

VOL. P60-2

372

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P93	P4
D		STRUCTURAL	S32-3	0
C		ELECTRICAL		
B				
A				

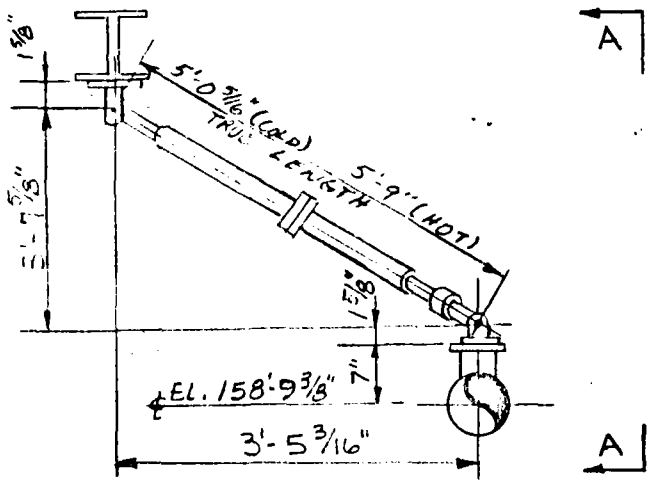
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	1	3" STD. PIPE STANCHION BY PIPE FAB.	
3	1	44X44X 1/4" C.S.P. BY PIPE FAB.	
2	2	REAR BRACKET SIZE 1	
1	2	MECHANICAL SNUBBER FIG. 1L FIG. 307	
ITEM NO.	REVISION	COMPONENT DESCRIPTION	REMARKS
		SCALE: NONE	11165/8
		Stearns-Roger	
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 4-VT-1-REB	DRAWING NO H-VT-1-30

REVISE ITEMS 1,2,4,5, LENGTHS & REAR BRACKET ATTACH.

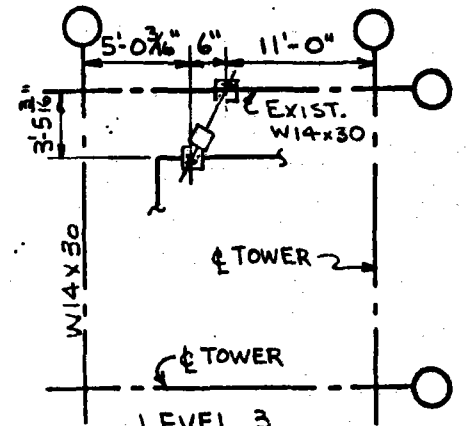
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_y = .3K F_y = .3K
 PIPE SIZE: 4.5" O.D. F_{TOTAL} = .4K
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	[Signature]
DATE	4-14-80	DATE	6/1/80
REVIEWED	H4	APPROVES	[Signature]
DATE	4-22-80	DATE	
PROJECT	SOLAR		
DATE	6-2-80		
ANALYSIS ID. CODE	X-VT-1-A-6		

5	
4	
3	
2	
1	



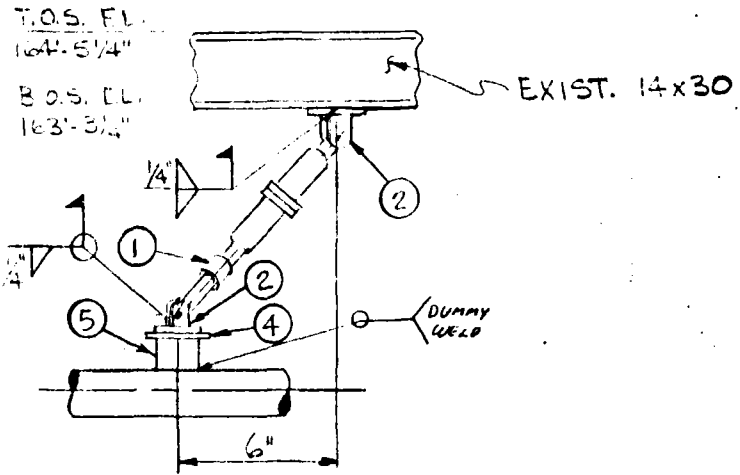
ELEVATION LOOKING EAST



LEVEL 3
LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = 9/16"
- Δ Y = 9 3/4" DN.
- Δ Z = 3 7/8"

VOL. P60-2



VIEW A-A - ELEVATION LOOKING NORTH

Δ REVISE ITEMS 1, 2, 3, LENGTHS & REAR BRACKET

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	1	3" STD. PIPE SMOOTH (BY PIPE FAB.)
4	1	4 1/4" x 4 1/4" x 1/4" C.S. TB (BY PIPE FAB.)
3		
2	2	REAR BRACKET, SIZE 1
1	2	MECHANICAL SNIPPER, SIZE 1L FIG. 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	SCALE: NONE	11165/8

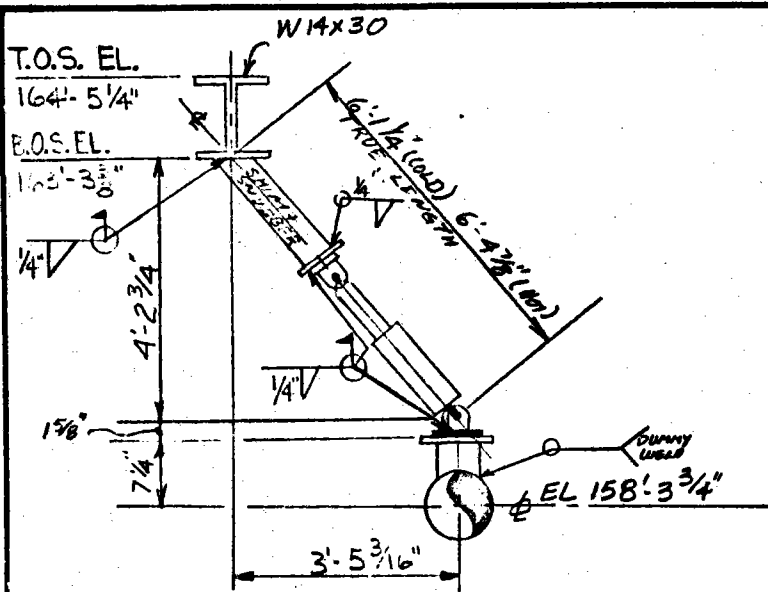
NOTES:
 PIPE TEMPERATURE: 400°F
 STRUCTURAL DESIGN LOAD: F_x = .4k, F_y = .5k
 PIPE SIZE: 3" STD. F_x = .1k, F_y = .6k
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	DATE	DESIGNED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE	XV.1-1		

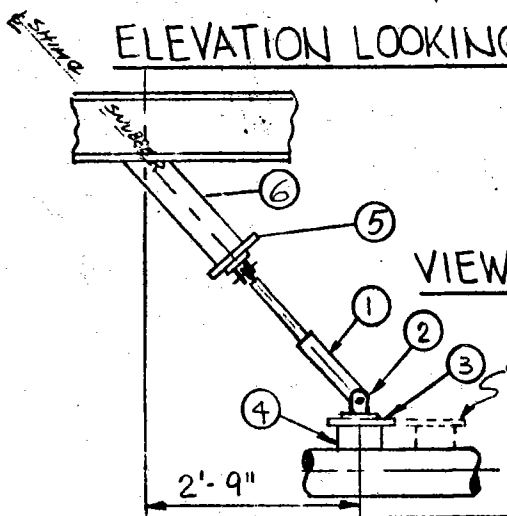
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
 PROJECT # C-21700
 LINE # 1-VT-1-31
 MARK # H-VT-1-31

373

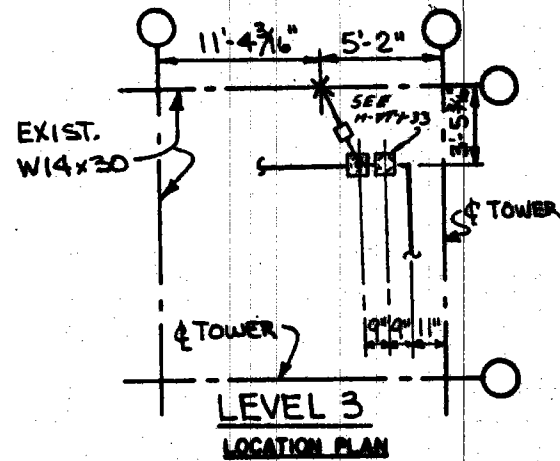
15-00000



ELEVATION LOOKING EAST



VIEW A-A-ELEVATION LOOKING NORTH



- ◆ LOCATION OF STEEL ATTACHMENT
- ◆ LOCATION OF PIPE ATTACHMENT
- △ X = -1/8"
- △ Y = 7 9/16" DN.
- △ Z = 2 15/16"

VOL. P60-2

△ REVISE ITEM 5, 1, 2, 546 REAR BRACKETS & ADD SHM

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P4
D	STRUCTURAL 532-3	O
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" X 5" X 1/2" R. C.S.	
4	1	3" STD. PIPE STALKHION, BY PIPE FAB.	
3	1	4 1/4" X 4 1/4" X 1/4" C.S. R. BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNIPPER, SIZE 1 1/2" E16.307	
ITEM RECD	COMPONENT DESCRIPTION	REMARKS	
	Stearns-Roger	11165/8	

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .2K$, $F_y = .3K$
 PIPE SIZE: 4.5" O.D. $F_2 = .2K$, $F_{TOTAL} = .35K$
 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-A-5		

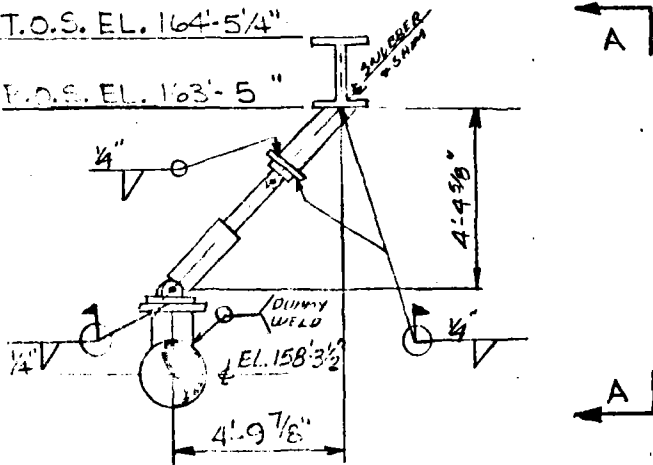
SCALE: NONE
 REVISIONS
 10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA
 PROJECT NO C-21700 LINE NO 4-VT-1-KFF MARK NO H-VT-1-32

374

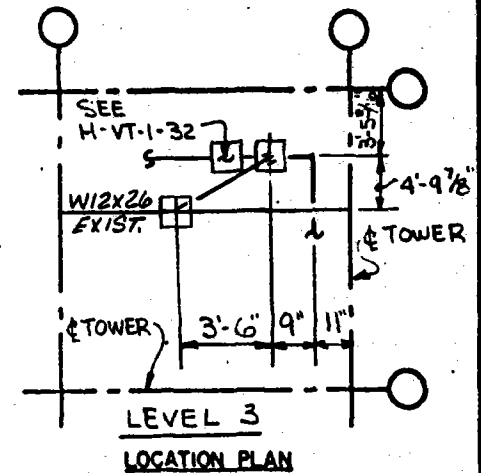
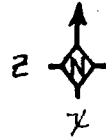
FORM 87-1

T.O.S. EL. 164'-5 1/4"

P.O.S. EL. 163'-5"

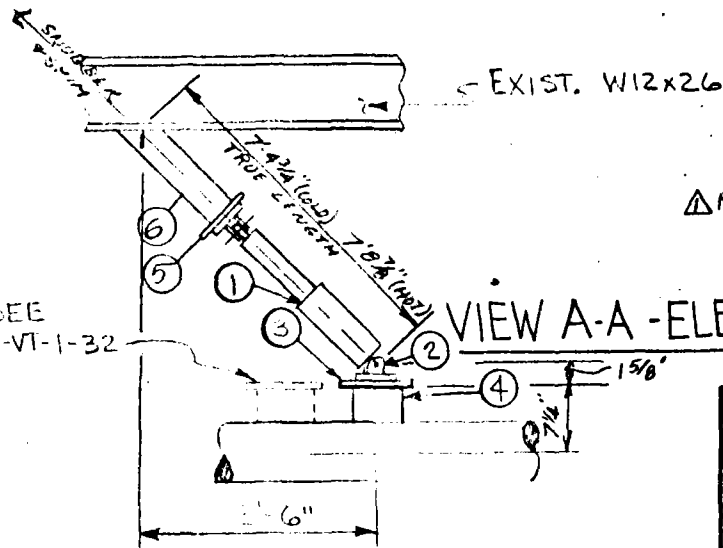


ELEVATION LOOKING EAST



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1 1/8"
- Δ Y = 7 9/16" DIA
- Δ Z = 2 15/16"

VOL. P60-2



VIEW A-A - ELEVATION LOOKING NORTH

△ REVEAL ITEMS 1, 2, 5 & 6, REAR BRACKETS & ADD SHM

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P9-3	1
D		STRUCTURAL 32-3	0
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" X 5" X 3/8" C.S. R
4	1	4" X 4" X 1/4" X 1/4" C.S. R, BY P.T.E. F.F.
3	1	3" STD. PIPE STRAP, BY P.T.E. F.F.
2	2	REAR BRACKET, SIZE!
1	1	MECHANICAL STUD, SIZE 1L F6 307
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

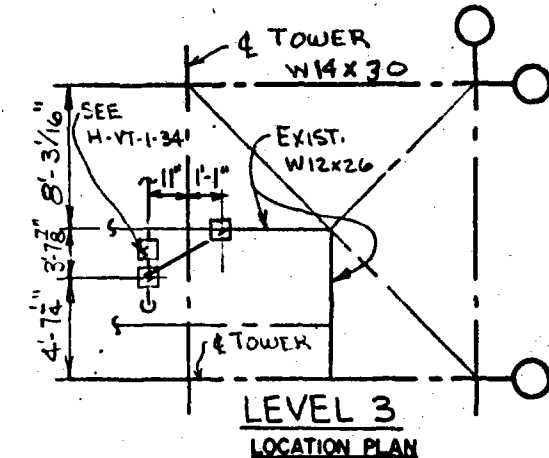
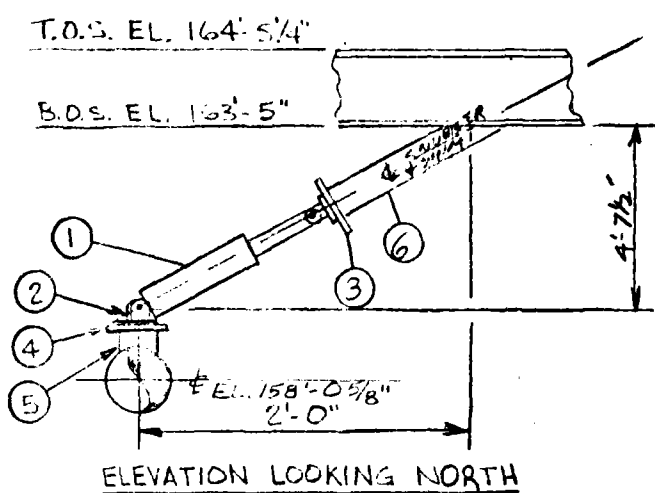
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .2K, F_y = .2K
 PIPE SIZE: 4.5" O.D. F_z = .2K, F_{TOTAL} = .3K
 PIPE INSULATION: A
 PIPE MATERIAL: ASTM A335, P22

ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID. CODE			

5	
4	
3	
2	
1	
SCALE:	NONE
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO	C-21700
LINE NO	4" VT-1-KFB
MARK NO	H-VT-1-33

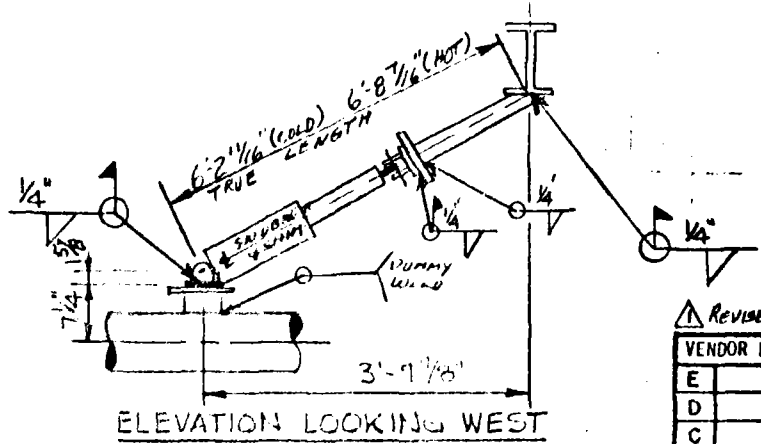
375

11-68



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = -7/16"$
 $\Delta Y = 6 3/4" DN$
 $\Delta Z = 2 3/16"$

VOL. P00-2



△ REVISE ITEMS 1, 2, 3, 6, REAR BRACK. & ADD SHM

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P9
D	STRUCTURAL S20-3	O
C	ELECTRICAL	
B		
A		

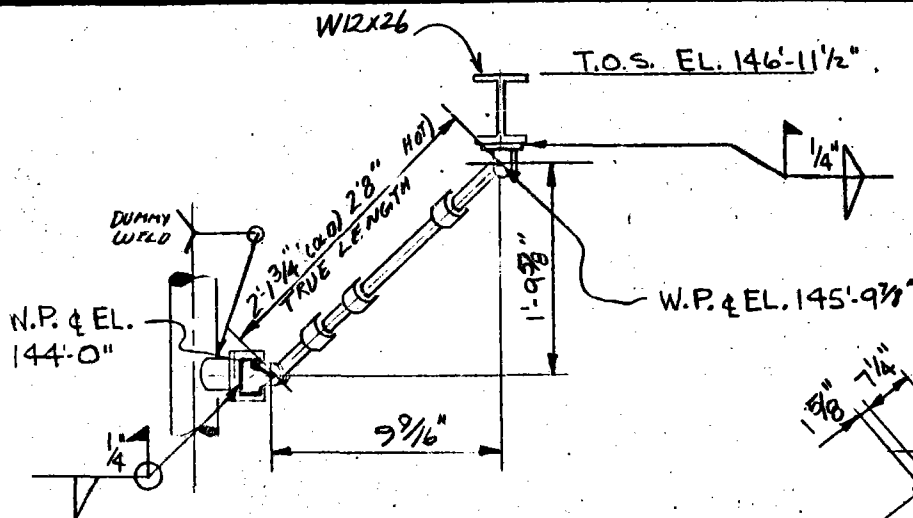
14		
13		
12		
11		
10		
9		
8		
7		
6	1	4"x4"x3/8" STRUCTURAL TUBING
5	1	3xSTD. FIT. - ALL TYPES (FOR PIPE FAB.)
4	1	4/4"x1/4"x1/2" G.S. PL. (FOR PIPE FAB.)
3	1	5"x5"x1/2" G.S. PL.
2	2	FLAT IRON BRACKET, SIZE 1
1	1	PIPE ATTACHMENT SUPPLIER SIZE 1/2 FIG. 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

NOTES:
 PIPE TEMPERATURE: 800°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.6k$, $F_y = 0.8k$
 PIPE SIZE: 4" O.D. $F_x = 0.4k$, $F_y = 0.6k$
 PIPE INSULATION: 1"
 PIPE MATERIAL: ASTM A335 100

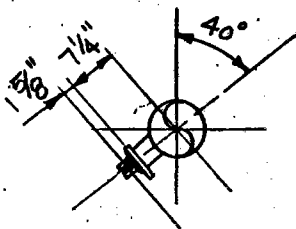
ENGINEERING RECORD				5
DESIGNED	DATE	APPROVED	DATE	4
REVIEWED	DATE	APPROVED	DATE	3
PROJECT	DATE			2
ANALYSIS ID. CODE	X-VT-1-34			REVISIONS
PROJECT # C-21700				10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
LINE # H-VT-1-34				MARK # H-VT-1-35

377

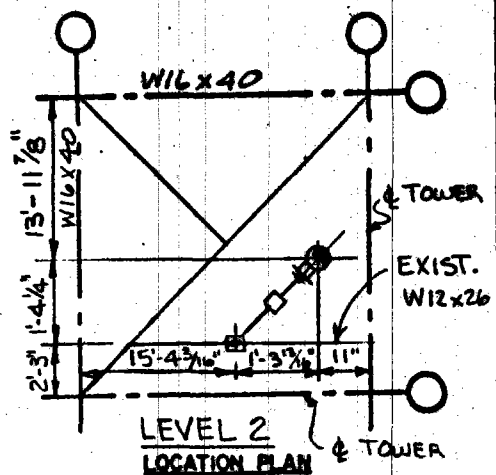
1-7-78 5003



ELEVATION LOOKING EAST



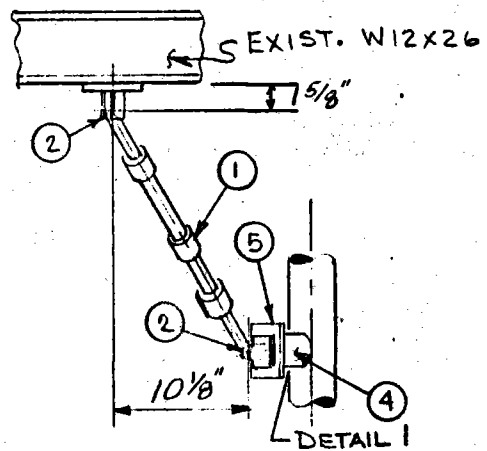
DETAIL 1
PLAN VIEW



LEVEL 2
LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = 1/4"
- Δ Y = 8" DN
- Δ Z = 2 1/2"

VOL. P60-2



ELEVATION LOOKING NORTH

LENGTHS
REVISE ITEMS 42+3 & REAR BRACKET ATTACH.

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P9-3	P3
D		STRUCTURAL S52-2	0
C		ELECTRICAL	
B			
A			

14		
13		
12		
11		
10		
9		
8		
7		
6		
5	1	4 1/4 x 4 1/4 x 1/2 R. BY PIFF FAB.
4	1	3" STD. PIPE STANCHION, BY PIFF FAB.
3		
2	2	REAR BRACKET, SIZE 1
1	1	MECHANICAL SNIFFER, SIZE 1/2, FIG. 307
ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	11165/8

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .3K, F_y = .9K,
 PIPE SIZE: 4" O.D. F_c = .3K F_{DN} = 1.0K
 PIPE INSULATION: 4"
 PIPE MATERIAL: A311 A305 P22

ENGINEERING RECORD	
DESIGNED	DATE
DATE	DATE
REVIEWED	APPROVAL
DATE	DATE
PROJECT	
DATE	
ANALYSIS ID. CODE	X-VI-1-A-8

5		
4		
3		
2		
REVISIONS		
PROJECT NO	C-21760	LINE NO
DATE		

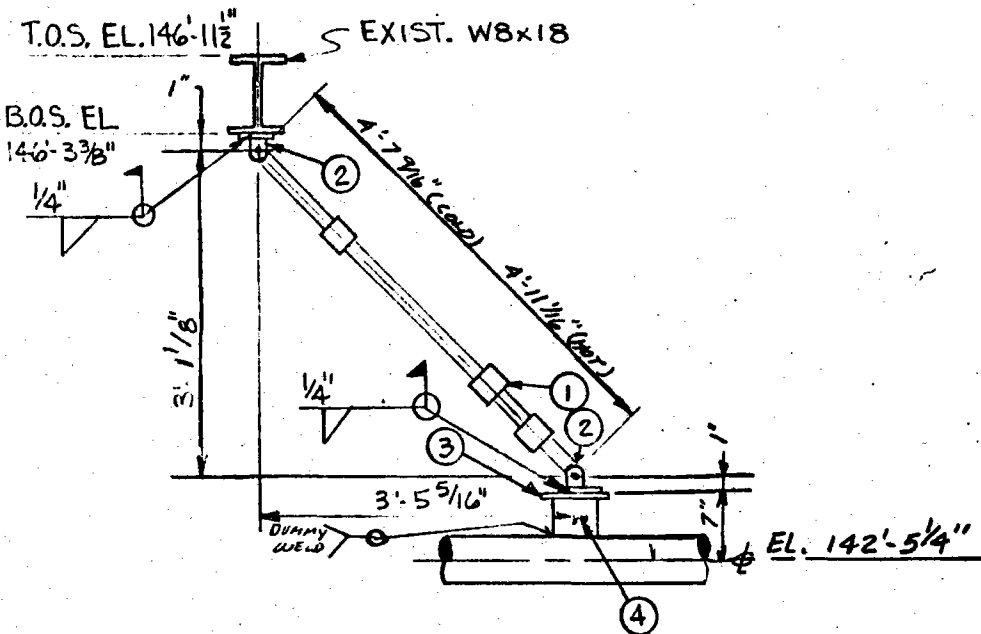
10 Mw SOLAR PILOT PLANT BAGGETT, CALIFORNIA

Stearns-Roger

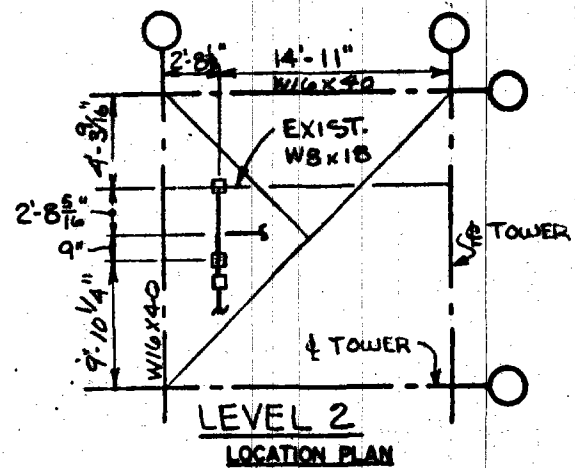
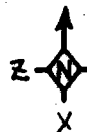
378

1-528 200

380



ELEVATION LOOKING EAST



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1/4"
- Δ Y = 6/8" LN
- Δ Z = 3 5/8"

VOL. P60-2

14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	1	3" STD. PIPE STANCHION, BY PIPE FAB.	
3	1	4/4" x 4/4" x 1/4" R. BY PIPE FAB.	
2	2	REAR BRACKET, SIZE 1/4"	
1	1	HIERARCHICAL SUPPORT SIZE 1/4" FIG. 307	
ITEM REQD		COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	Stearns-Roger	
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	4"-VT-1-H
MARK NO	H-VT-1-32		

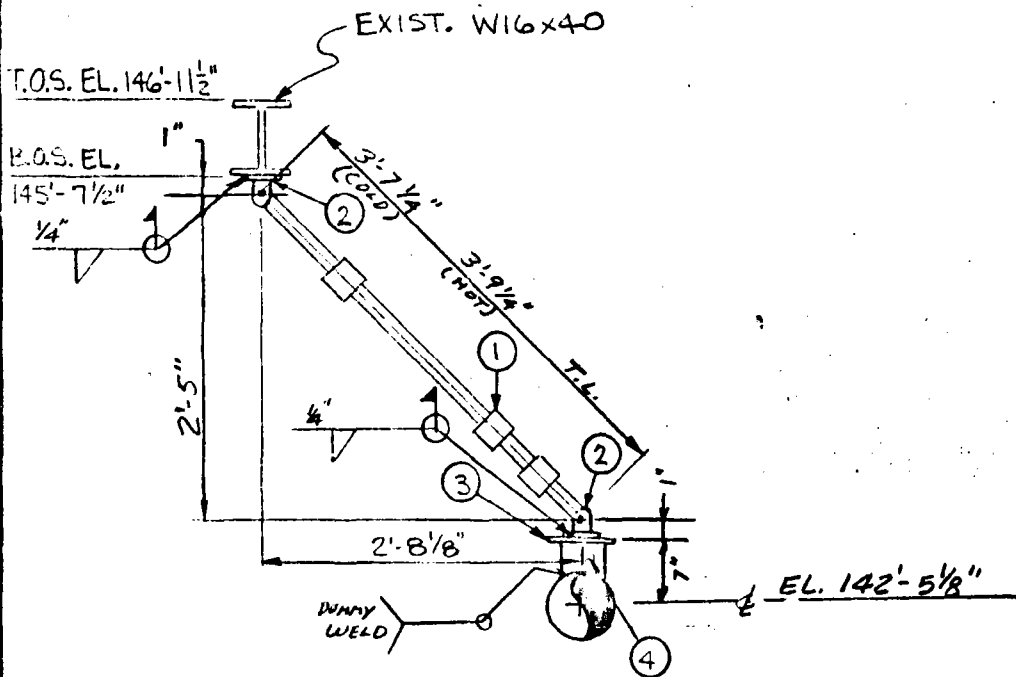
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL S32-3	O
C	ELECTRICAL	
B		
A		

△ REVISE ITEMS 142, LENGTHS & REAR BRACKET ATTACH.

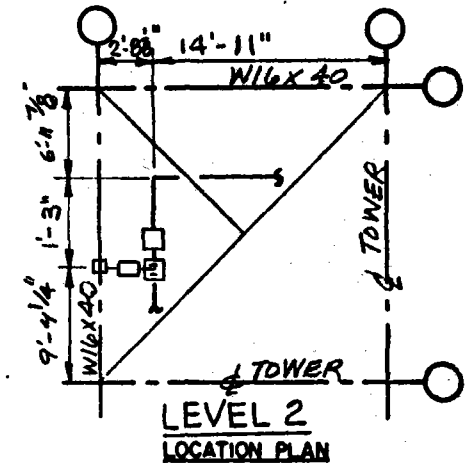
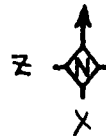
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_y = .25k$, $F_x = .25k$
 PIPE SIZE: O.D. $F_{TOTAL} = .35k$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD		5
DESIGNED	4/17	4
DATE	4/17	3
REVIEWED	R.P.P.	2
DATE	4-21	1
PROJECT		REVISIONS
DATE		
ANALYSIS ID. CODE	Y-VT-1-A	PROJECT NO

381



ELEVATION LOOKING NORTH



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- $\Delta X = -1\frac{1}{4}"$
- $\Delta Y = 6\frac{1}{8}"$ DN
- $\Delta Z = 35\frac{1}{8}"$

VOL. P60-2

14			
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5			
4	1	3" STD. PIPE STAINLESS, RV HIF 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" FIB 307	
ITEM RECD		COMPONENT DESCRIPTION	REMARKS
		Stearns-Rogor	11165/8
10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 4	MARK NO H-11-1-29

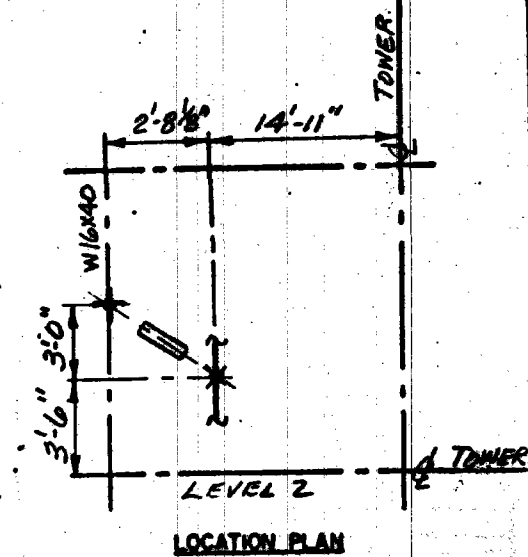
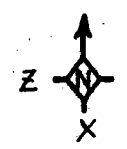
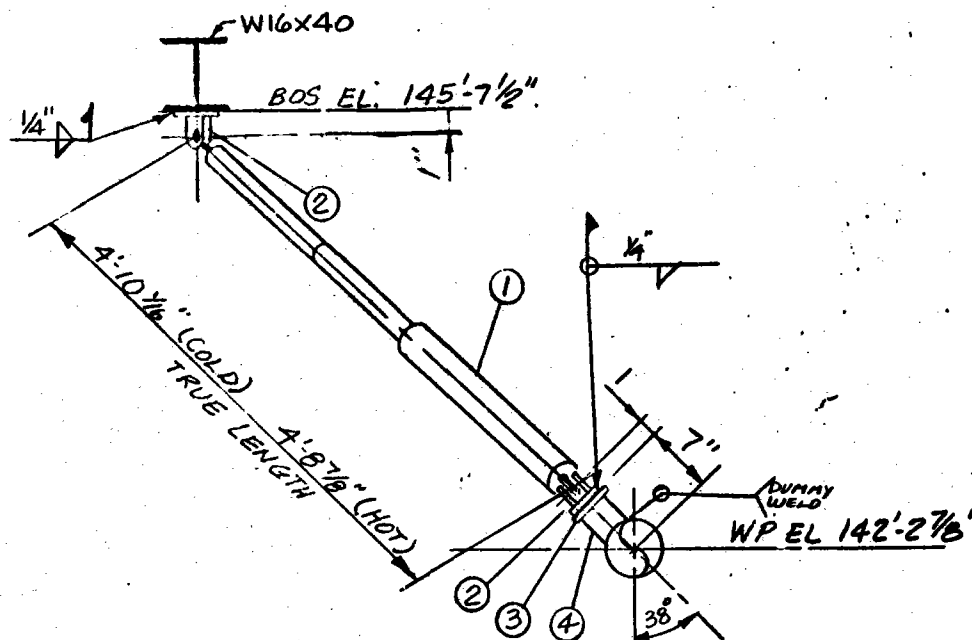
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV.
E	PIPING P9-3	P1
D	STRUCTURAL S32-3	0
C	ELECTRICAL	
B		
A		

△ REVISE ITEMS 142, WELD SYMBOLS, LENGTHS & PIPE ORIENTATION ON ELEV. VIEW

NOTES:
 PIPE TEMPERATURE: 965°F
 STRUCTURAL DESIGN LOAD: $F_y = 25k$, $F_x = 25k$
 PIPE SIZE: 4" O.D. $F_{TENS} = 35k$
 PIPE INSULATION: 4"
 PIPE MATERIAL: A315 307

ENGINEERING RECORD		5
DESIGNED	DATE	4
DATE	APPROVED	3
REVIEWED	DATE	2
DATE		
PROJECT		
DATE		
ANALYSIS ID. CODE		

11-15-80



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 Δ X = -5/8"
 Δ Z = 4 3/16"
 Δ Y = 4 7/8" DN

ELEVATION LOOKING NORTH

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

14		
13		
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5		
4	1	3" STD. PIPE STANCHION BY PIPE FAB.
3	1	4 1/2 X 4 1/2 X 1/4 CS. PL. BY PIPE FAB.
2	2	REAR BRACKET SIZE 1/2
1	1	MECHANICAL SNUBBER SIZE 1/2 FIG. 307
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

REVISE ITEMS 1, 2, 4, 5, LENGTHS & REAR BRACKET ATTACH.

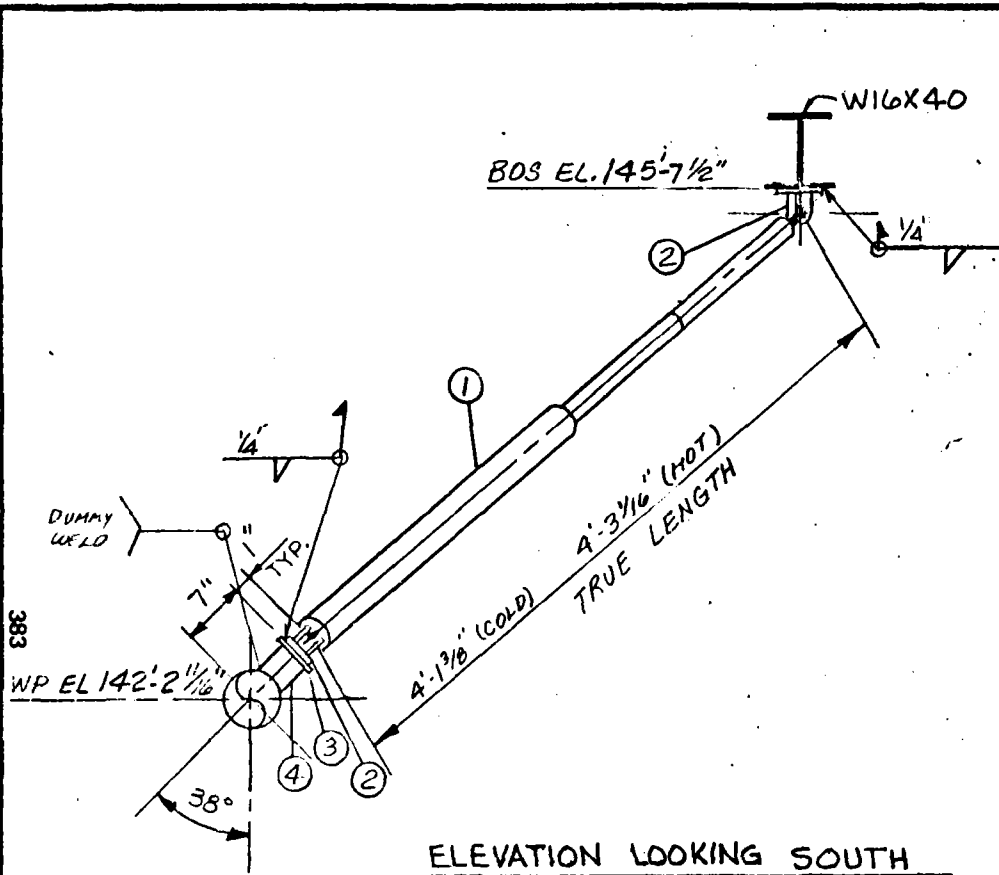
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .23K, F_y = .23K,
 PIPE SIZE: 4.5" O.D. F_z = .15K, F_{TOTAL} = .4K
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD		5
DESIGNED	MLM	4
DATE	4-15-80	3
REVIEW'D	NHML	2
DATE	4-29-80	1
PROJECT	RDR	
DATE	4-29-80	
ANALYSIS ID. CODE	X-VT-1-A-E	

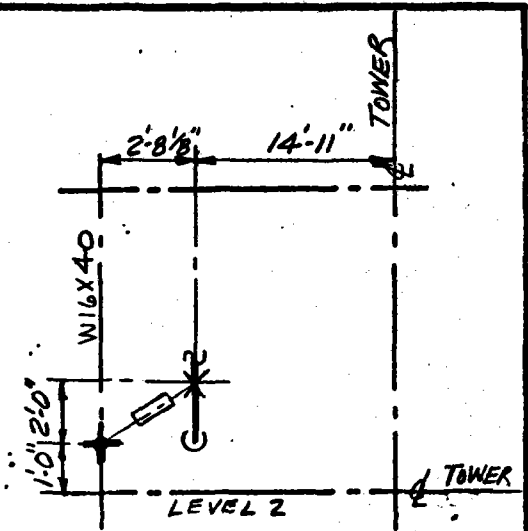
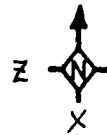
PROJECT NO C-21700
 LINE NO 4-VT-1-KAS
 MARK NO X-VT-1-40
 10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

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Vol. P60-2



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

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

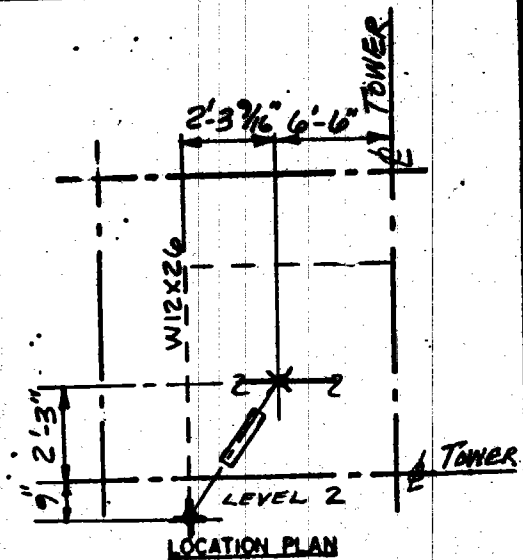
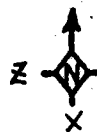
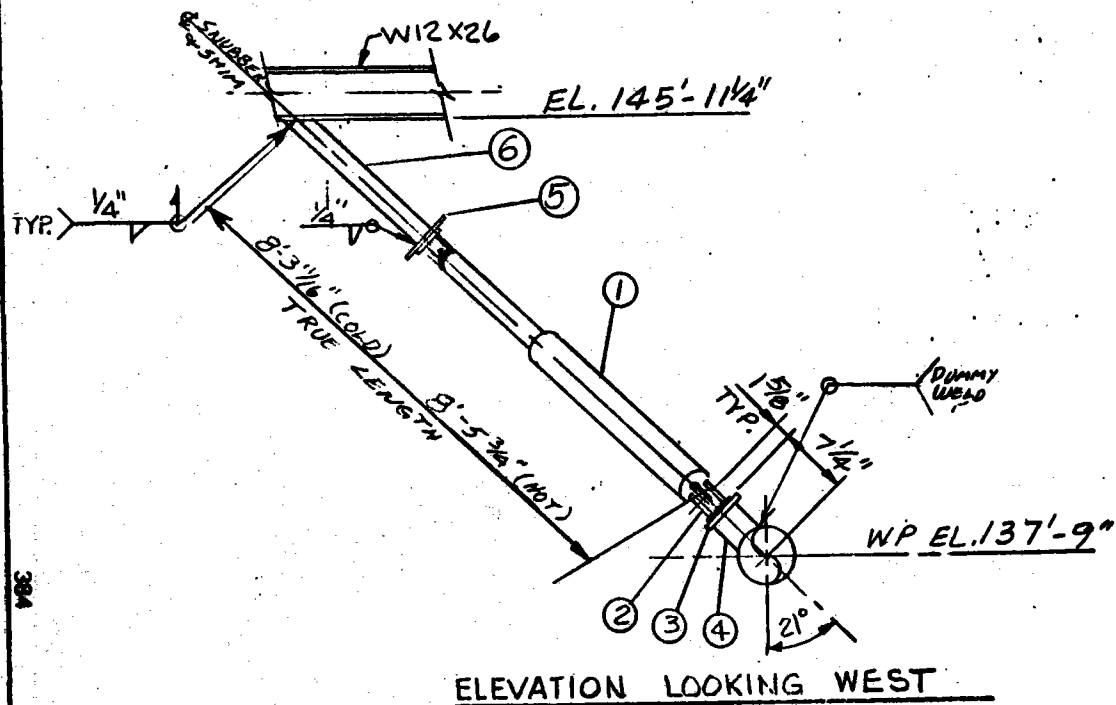
△ REVISE ITEMS 1, 2, 4, 5, LENGTHS & REAR BRACKET ATTACHMENTS

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .23 K, F_y = .33 K$
 PIPE SIZE: 4.5" O.D. $F_z = .2 K, F_{TOTAL} = .5 K$
 PIPE INSULATION: 4"
 PIPE MATERIAL: A37M A335 P22

ENGINEERING RECORD			
DESIGNED	MEM	CHECKED	7/1/80
DATE	4-16-80	DATE	7/1/80
REVIEWED	JRM	APPROVED	
DATE	4-24-80	DATE	
PROJECT	PIR		
DATE	7-24-80		
ANALYSIS ID. CODE	X-VT-1-A-5		

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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.P. RY 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	
10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO	C-21700	LINE NO	4"VT-1-KEB
MARK NO	H-VT-1-41		

DATE 873.1



+ 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

VENDOR ENG. REV.		REFERENCE DRAWINGS		REV
E		PIPING	P9-3	PA
D		STRUCTURAL	532-3	D
C		ELECTRICAL		
B				
A				

14		
13		
12		
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9		
8		
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 SWIBBER, SIZE 1 FIG. 307
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

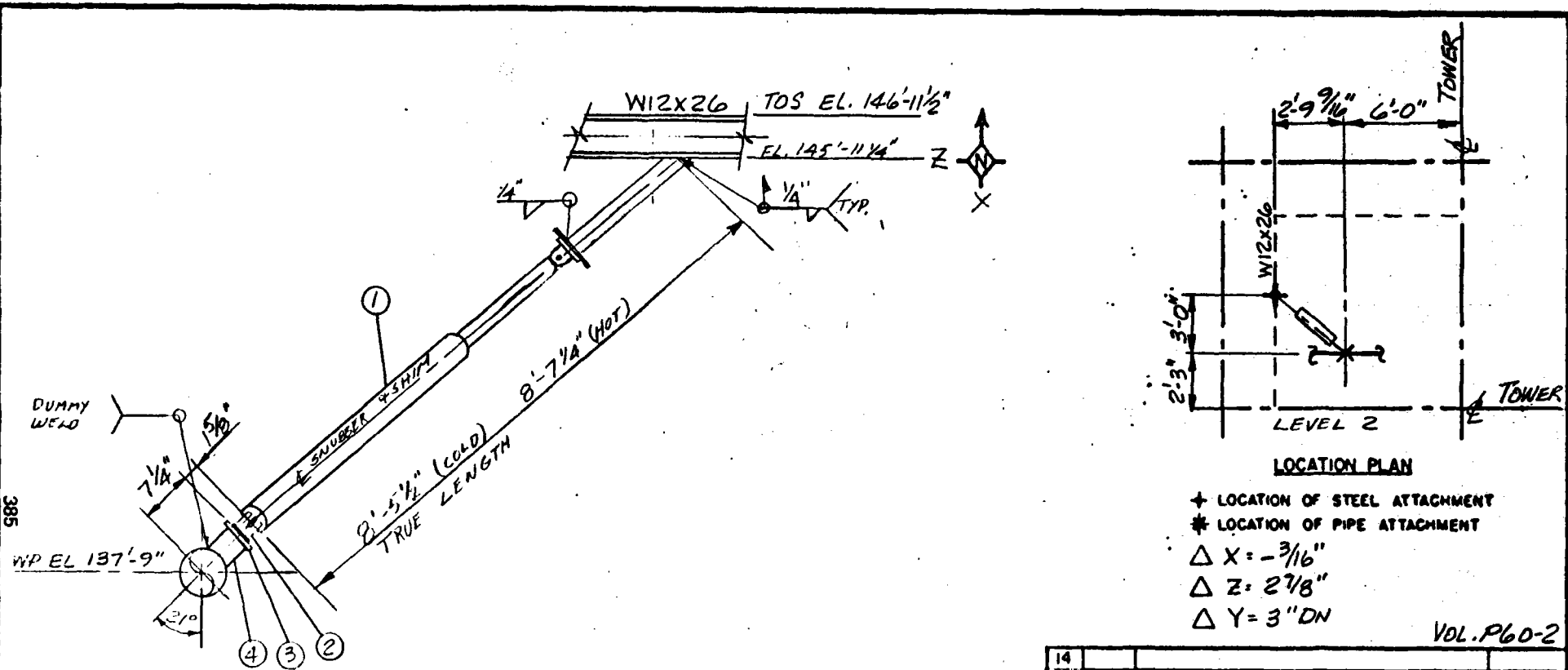
REVISE ITEMS 1,2,586, REAR BRACKETS & ADD SWIB

NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = .3K$, $F_y = .7K$
 PIPE SIZE: 4.5" O.D. $F_z = .3K$, $F_{TOTAL} = .8K$
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	MLM
DATE	4-16-80	DATE	5/21/80
REVIEWED	HYP	APPROVED	
DATE	11-29-80	DATE	
PROJECT	BLUR		
DATE	6-27-80		
ANALYSIS ID. CODE	X-VT-1-A-8		

5
4
3
2
1
REVISIONS

10 Mile SOLAR PILOT PLANT DAGGETT, CALIFORNIA
 PROJECT NO C-21700
 LINE NO 4-VT-1-KEB
 MARK NO 4-VT-1-42



ELEVATION LOOKING WEST

LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -3/16"
- Δ Z = 2 1/8"
- Δ Y = 3" DN

VOL. P60-2

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

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
14		
13		
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8		
7		
6	1	4" X 4" X 3/8" STRUCTURAL TUBING
5	1	5 X 5 X 1/2" C.S. TB
4	1	3 STD PIPE STANCHION BY PIPE FAB.
3	1	4 1/2 X 4 1/2 X 1/2" C.S. TB BY PIPE FAB.
2	2	REAR BRACKET SIZE 1
1	1	MECHANICAL SNUBBER SIZE 1 FIG. 307

REVISED ITEMS 1, 2, 5 & 6 LENGTHS, REAR BRACKET & ADD SHIM

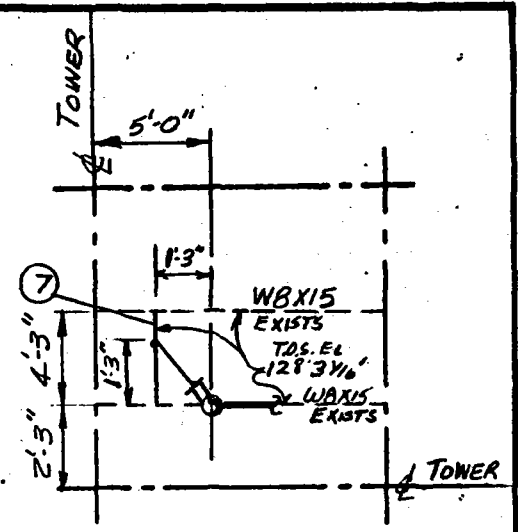
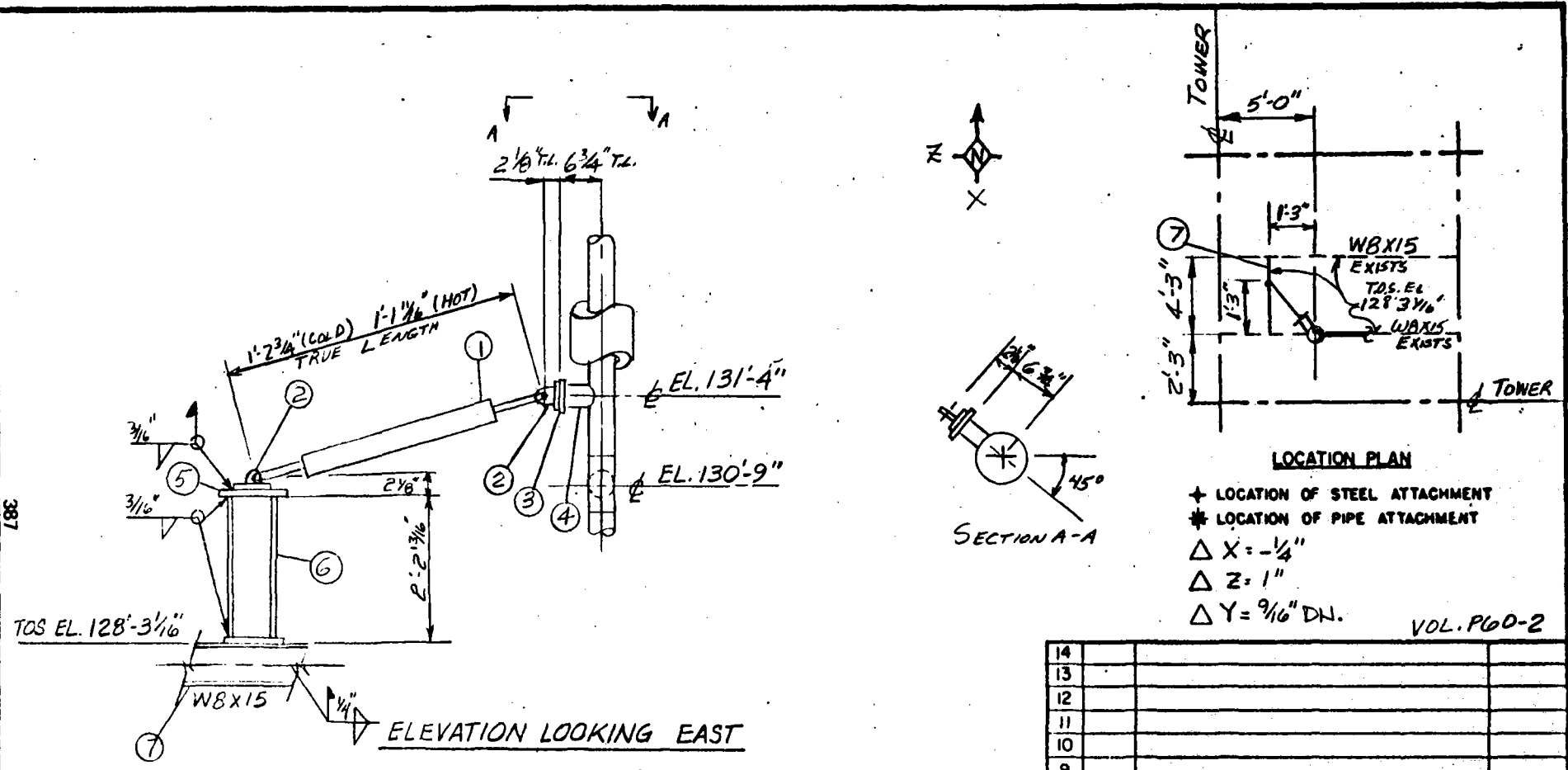
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .3K, F_y = .7K
 PIPE SIZE: 7.5" O.D. F_L = .3K F_{TOTAL} = .8K
 PIPE INSULATION: 4"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	NICAI	DRAWN	
DATE	4-11-78	DATE	4-11-78
REVIEWED		APPROVED	
DATE	4-29-78	DATE	
PROJECT	HEPR		
DATE			
ANALYSIS ID. CODE	X-VT-1-A-3		

SCALE:	REVISIONS
NONE	
Stearns-Roger	
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO C-21700	LINE NO 4"VT-1-KEB MARK NO H-VT-1-43

11165/8

387



LOCATION PLAN

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

VOL. PGD-2

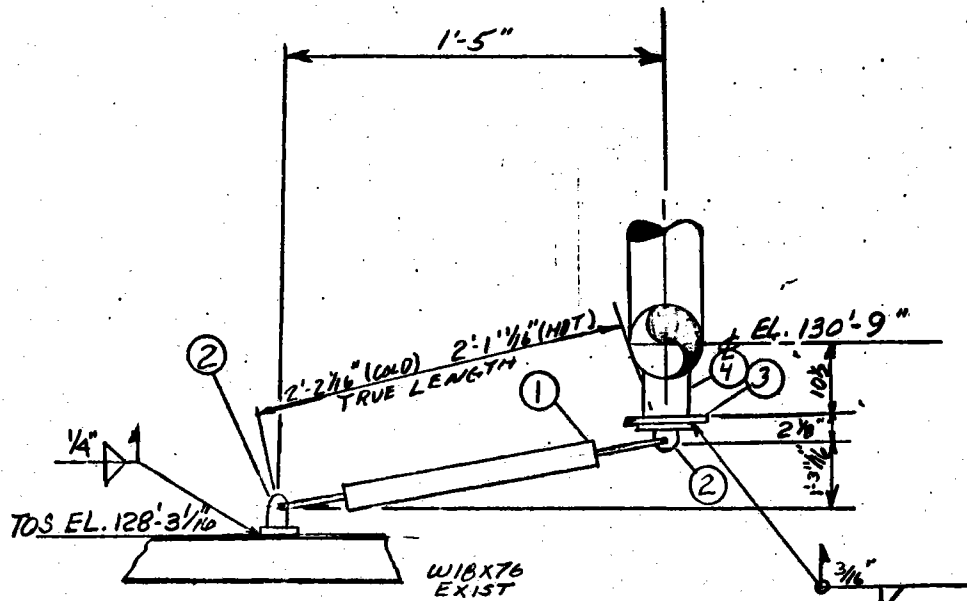
△ REVISE ITEMS 1, 2, 5 & 6, LENGTHS + REAR BRACKET ATTACH.

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

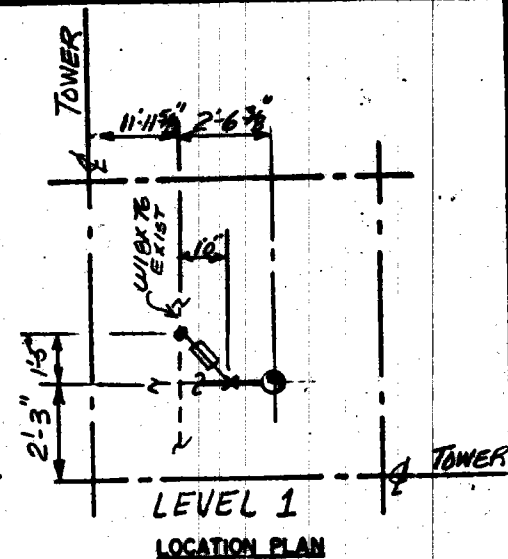
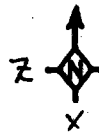
ENGINEERING RECORD				5	1	MECHANICAL SNUBBER, SIZE 1	FIG. 306
DESIGNED	MLM	DRAWN		4	ITEM REQD	COMPONENT DESCRIPTION	REMARKS
DATE	7-28-77	DATE	7/28/77	3	SCALE:	Stearns-Roger	11165/8
REVIEWED	N/A	APPROVED		2	NONE		
DATE	4/24/77	DATE		10 Mwe SOLAR PILOT PLANT DAGGETT, CALIFORNIA PROJECT NO C-21700 LINE NO 4-VT-1-KEB MARK NO H-VT-1-45			
PROJECT							
DATE							
ANALYSIS ID. CODE	H-VT-1-KEB-VT-1-A-5			REVISIONS			

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VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.	DESCRIPTION
E		PIPING P9-3	P4	W8X15 4'-1" LG PER S-R STD. EE16019
D		STRUCTURAL S32-2	1	W4X13 2'-2 3/16" LG.
C		ELECTRICAL		4 3/4" X 4 3/4" X 1/2" C.S. PL.
B				2" STD. PIPE STANCHION BY PIPE FAB
A				3 1/2" X 1 1/2" X 1/2" C.S. PL. BY PIPE FAB.
				2 REAR BRACKET SIZE 1



ELEVATION LOOKING EAST



LOCATION PLAN

- + 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			

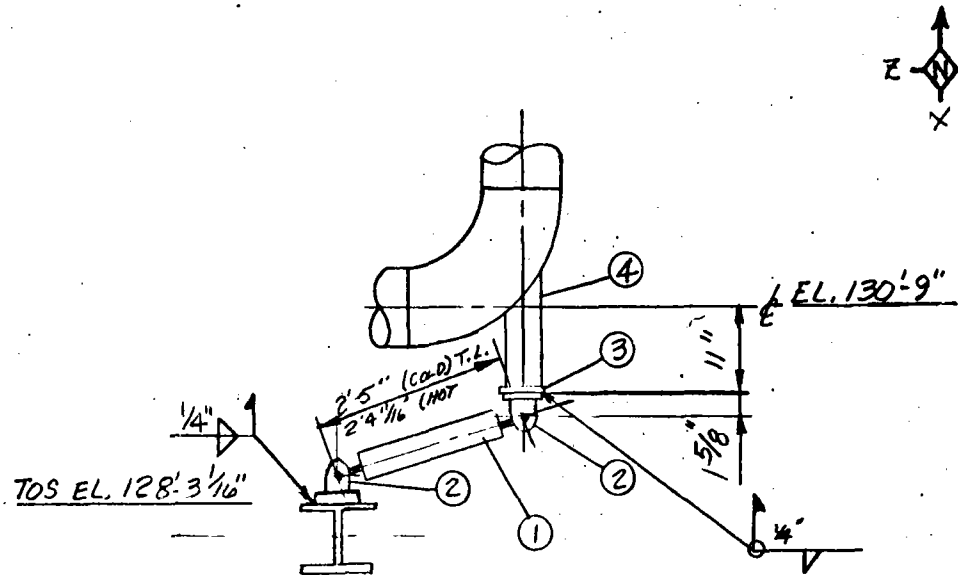
14		
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5		
4	1	4" XS PIPE STANCHION BY PIPE FAB
3	1	5" X 5" X 1/2" C.S. PLATE BY PIPE FAB
2	2	REAR BRACKET, SIZE 1
1	1	MECHANICAL SNUBBER, SIZE 1

REVISE ITEMS 1, 2, 4, 5, LENGTHS + REAR BRACKET ATTACH.

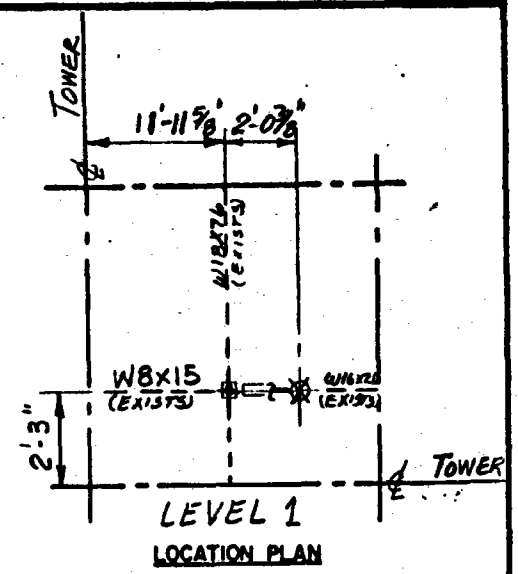
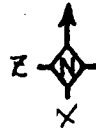
NOTES:
 PIPE TEMPERATURE: 900°F
 STRUCTURAL DESIGN LOAD: F_x = 1.0K, F_y = 0.9K
 PIPE SIZE: 10.75" O.D. F_z = 0.7K F_{TOTAL} = 1.5K
 PIPE INSULATION: 5"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	ALM	CHECKED	
DATE	4-24-80	DATE	
REVIEWED		APPROVED	
DATE	1-29-81	DATE	
PROJECT			
DATE			
ANALYSIS ID. CODE	VT-11-FA-1000-1-A-5		

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 MW SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO C-21700 LINE NO 10-VT-11-FA MARK NO H-VT-11-3		



ELEVATION LOOKING NORTH



- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -1/4"
- △ Z = 1/4"
- △ Y = 1/8" DN

VOL P60-2

14		
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4	1	4" XS PIPE STANCHION BY PIPE FAB.
3	1	5" X 5" X 1/2 C.S. PLATE BY PIPE FAB.
2	2	REAR BRACKET, SIZE 1
1	1	MECHANICAL SNUBBER SIZE 1 FB 307
ITEM RECD		COMPONENT DESCRIPTION
SCALE:	NONE	Stearns-Roger
		11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
ANALYSIS ID. CODE	PROJECT NO C-21700	LINE NO 10"VF-11-FEA
		MARK NO M-VF-11-4

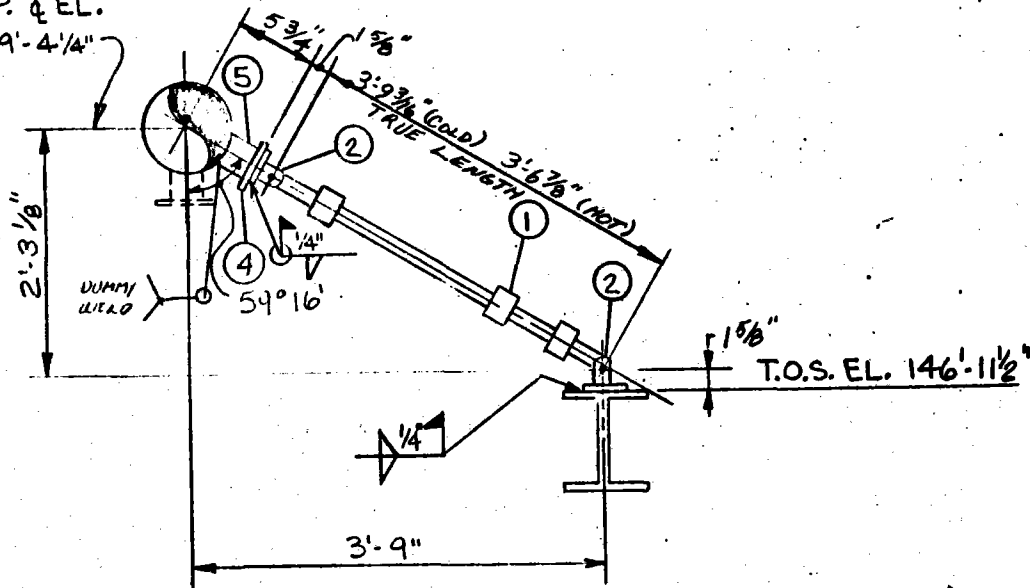
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-3	P4
D	STRUCTURAL S32-2	1
C	ELECTRICAL	
B		
A		

△ REVISE ITEMS 1, 2 & 5, LENGTHS & REAR BRACKET ATTACHS.

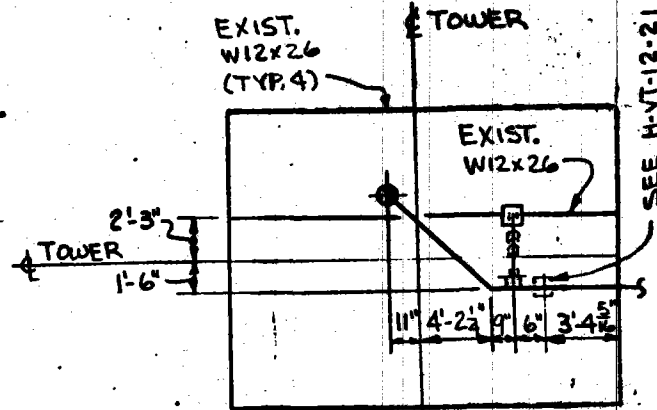
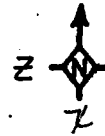
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_y = 0.6K, F_t = 0.9K
 PIPE SIZE: 10.75" O.D. TOTAL = 1.1K
 PIPE INSULATION: 5"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-24-00	DATE	
REVIEWED		APPROVED	
DATE		DATE	
PROJECT			
DATE			
ANALYSIS ID. CODE	10-11-11-4	PROJECT NO	C-21700
		LINE NO	10"VF-11-FEA
		MARK NO	M-VF-11-4

W.P. & EL.
149'-4 1/4"



ELEVATION LOOKING WEST



LEVEL 2
LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = 5/8"
- Δ Y = 6 3/8" CW
- Δ Z = 2"

VOL. P60-2

14			
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6			
5	1	2" XS PIPE, STANCHION (BY FAB.)	
4	1	3" x 3" x 1/4" C.S. PL (BY FAB.)	
3			
2	2	REAR BRACKET, SIZE 1	
1	1	MECHANICAL SNUBBER, SIZE 1 FIG. 307	

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING Pa-3	1
D		STRUCTURAL S32-3	0
C		ELECTRICAL	
B			
A			

REVISIONS: 1, 2, 3, LENGTHS, & REAR BRACKET ATTACHMENTS

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = 0.7K, F_y = 0.3K
 PIPE SIZE: 2.315" O.D. F_{total} 0.8K
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: ASTM A335 P22

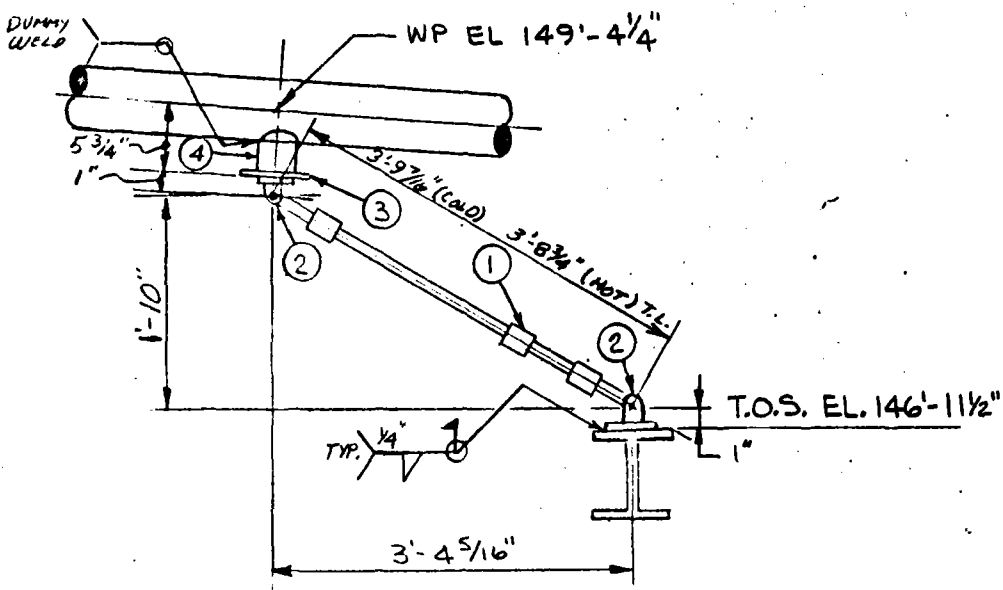
ENGINEERING RECORD	
DESIGNED	CHECKED
DATE	DATE
REVIEWED	APPROVED
DATE	DATE
PROJECT	DATE
DATE	
ANALYSIS ID. CODE	X-VT-1-A

5	1	MECHANICAL SNUBBER, SIZE 1 FIG. 307	
4		ITEM RECD	REMARKS
3		SCALE:	
2		NONE	
REVISIONS		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA	
PROJECT NO C-21700		LINE NO 21700-1	MARK NO H-VT-12-20

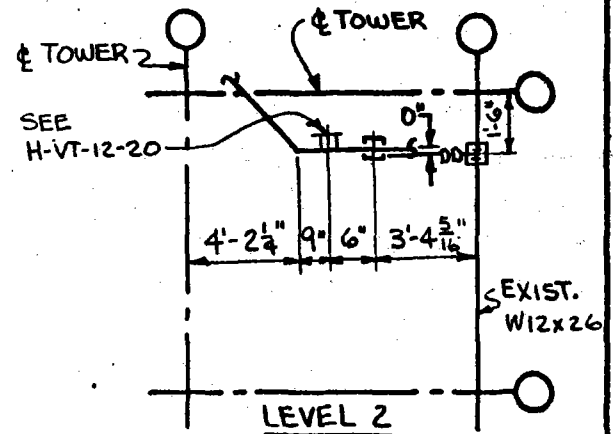
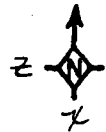
11165/B

Stearns-Roger

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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			
A			

14		
13		
12		
11		
10		
9		
8		
7		
6		
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 1/4"
1	1	MECHANICAL SHIMMERS, SIZE 1/4" FIG. 307

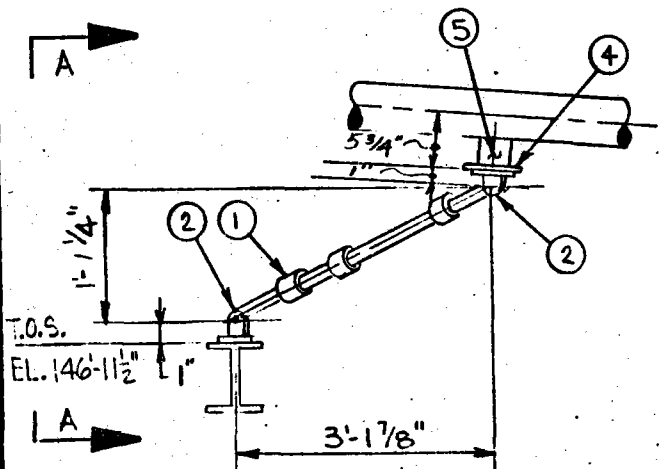
REVISIONS: REVISE ITEMS 1 & 2, LENGTHS & REAR BRACKET ATTACHMENTS

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_y = 0.1K$, $F_z = 0.24K$
 PIPE SIZE: 2.625" O.D. $F_{TOTAL} = 0.25K$
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: ASTM A335 P22

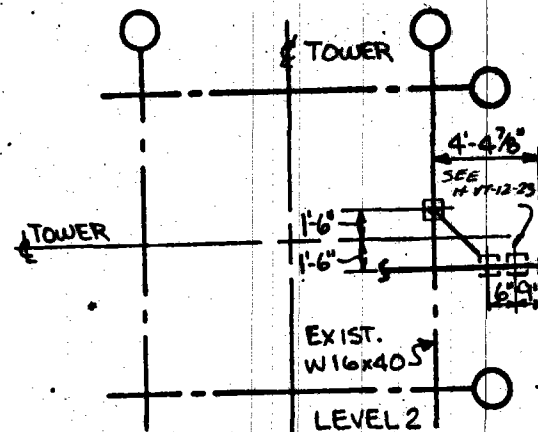
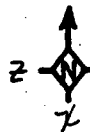
ENGINEERING RECORD			
DESIGNED	DATE	CHECKED	DATE
REVIEWED	DATE	APPROVED	DATE
PROJECT	DATE		
ANALYSIS ID.	CODE		

5		
4	ITEM RECD	COMPONENT DESCRIPTION
3	SCALE:	NONE
2		Stearns-Roger
1		10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA
	PROJECT NO	C-21700
	LINE NO	H-VT-12-111
	MARK NO	H-VT-12-21

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ELEVATION LOOKING NORTH

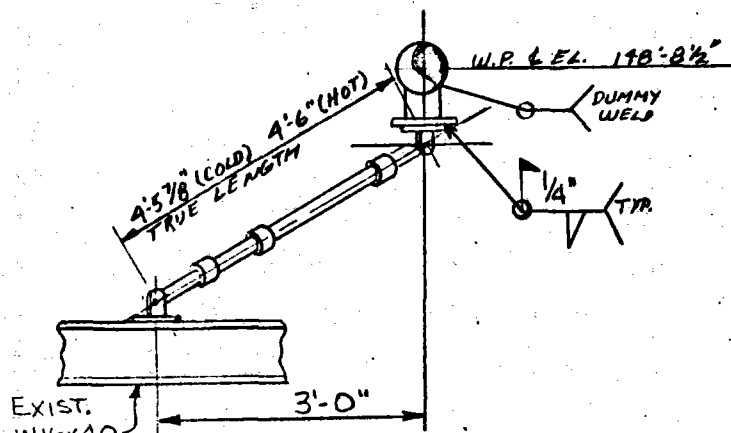


LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = 9/16"
- △ Y = 1/2" UP
- △ Z = 9/16"

VOL. P60-2

302



VIEW A-A - ELEVATION LOOKING EAST

△ REVISE ITEMS 1, 2, 3, LENGTHS & REAR BRACKET ATTACHMENTS

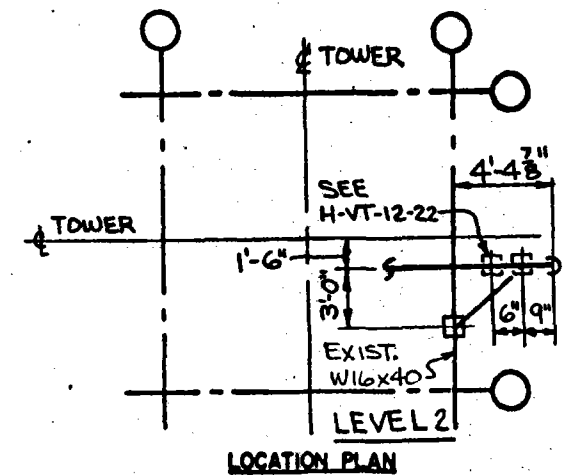
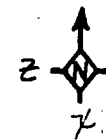
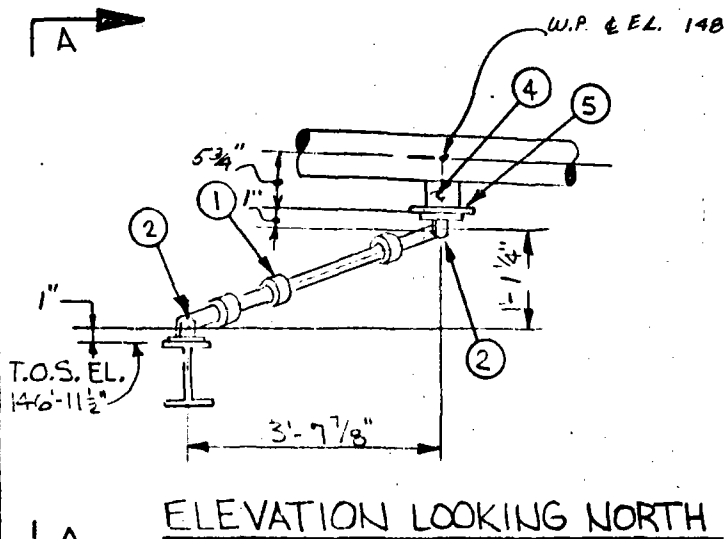
VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING Pg-3	1
D	STRUCTURAL S32-3	0
C	ELECTRICAL	4
B		3
A		2

14		
13		
12		
11		
10		
9		
8		
7		
6		
5	1	2" X 5. PIPE BRACKET (BY FAB.)
4	1	3" X 3" X 1/4" C.S. IR (BY PIPE FAB.)
3		
2	2	PFAB BRACKET, SIZE 1/2
1	1	MECHANICAL SNIFFER, SIZE 1/2 FIS 307

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.4K$, $F_y = 0.13K$
 PIPE SIZE: 2.5" O.D. $F_x = 0.4K$, $F_y = 0.6K$ TOTAL
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: ASTM A335 P22

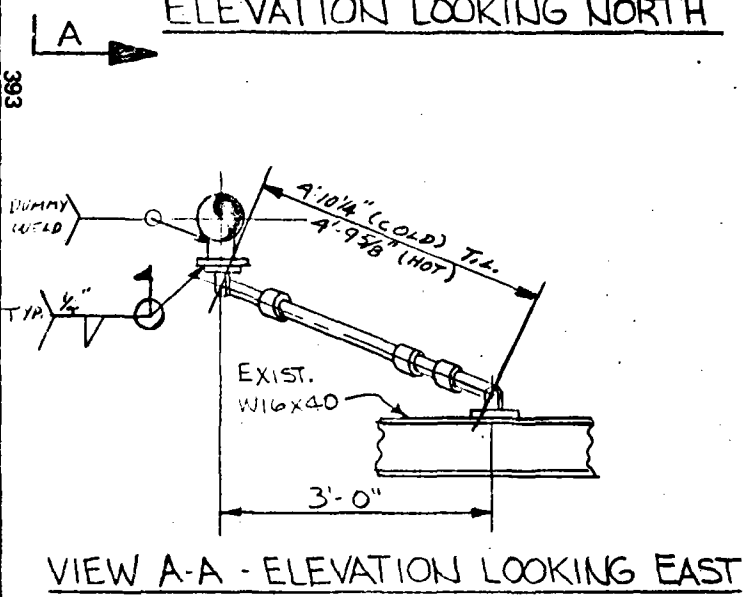
ENGINEERING RECORD	
DESIGNED	CHECKED
DATE	DATE
REVIEWED	APPROVED
DATE	DATE
PROJECT	
DATE	
ANALYSIS ID. CODE	X-VT-1-A-2

ITEM NO.	COMPONENT DESCRIPTION	REMARKS
SCALE: NONE	Stearns-Roger 10 MW SOLAR PILOT PLANT BAGGETT, CALIFORNIA	
REVISIONS		
PROJECT NO C-21700	LINE NO	DRAWING NO H-VT-12-22



+ LOCATION OF STEEL ATTACHMENT
 * LOCATION OF PIPE ATTACHMENT
 $\Delta X = 9/16"$
 $\Delta Y = 1/2" \text{ LIP}$
 $\Delta Z = 9/16"$

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	0
C	ELECTRICAL	
B		
A		

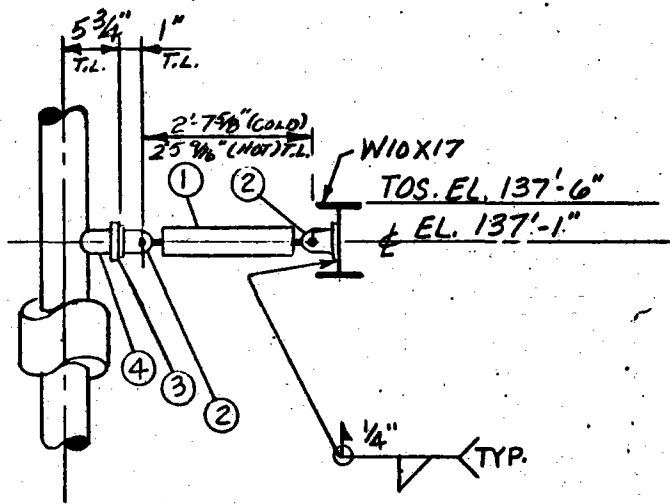
14		
13		
12		
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8		
7		
6		
5	1	3" x 3" x 1/4" PL (BY PIPE FAB.)
4	1	2" XS PIPE STALK HORN (BY PIPE FAB.)
3		
2	2	REAR BRACKET, SIZE 1/2
1	1	MECHANICAL SINKER, SIZE 1/2 #16 307

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: $F_x = 0.4 \text{ K}$, $F_y = 0.13 \text{ K}$
 PIPE SIZE: $F_z = 0.5 \text{ K}$, $F_{\text{TOTAL}} = 0.6 \text{ K}$
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: ASTM A333 TYPE 2

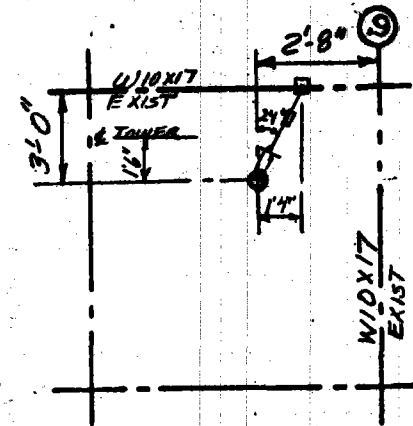
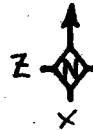
ENGINEERING RECORD		5
DESIGNED	Y.M.F.	4
DATE	4/25/80	3
REVIEWED		2
DATE		
PROJECT		
DATE		
ANALYSIS ID. CODE	X-VT-12-23	

ITEM REQ'D	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
PROJECT NO	C-21700	LINE NO 2 1/2" - VT-12-23
MARK NO	H-VT-12-23	

FORM 873-1



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -1"
- △ Z = -2 7/8"
- △ Y = 5/8" DN

VOL. P60-2

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

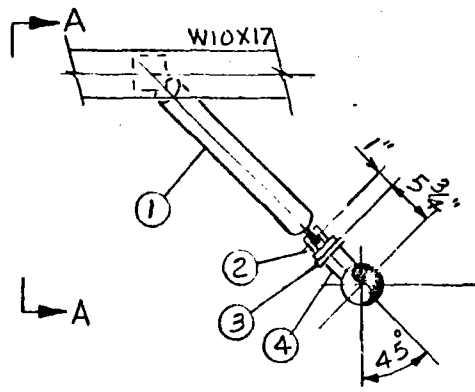
14		
13		
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5		
4	1	2"XS PIPE STANCHION BY PIPE FAB
3	1	3'x 3'x 1/4"CS. R BY PIPE FAB
2	2	REAR BRACKET SIZE 1/4"
1	1	MECHANICAL SNUBBER SIZE 1/4" FIG. 307
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/B

△ REVERSE ITEMS IN Z, LENGTHS, ΔX MOUNT. & REAR BRACKET ATTACH.

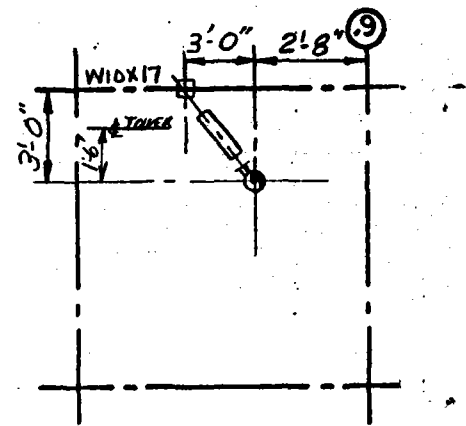
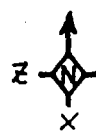
NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_X = .3K, F_Z = .15K
 PIPE SIZE: 2.875" O.D. F_{TOTAL} = .35K
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-25-80	DATE	7/1/80
REVIEWED	J.Y.M.	APPROVED	
DATE	4/25/80	DATE	
PROJECT	BDR		
DATE	5-22-80		
ANALYSIS ID. CODE	X-VT-1-A 9		

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4		
3		
2		
1	AE	
REVISIONS		
PROJECT NO	C-21700	LINE NO 20/VT-12-KEE
		MARK NO H-VT-12-24



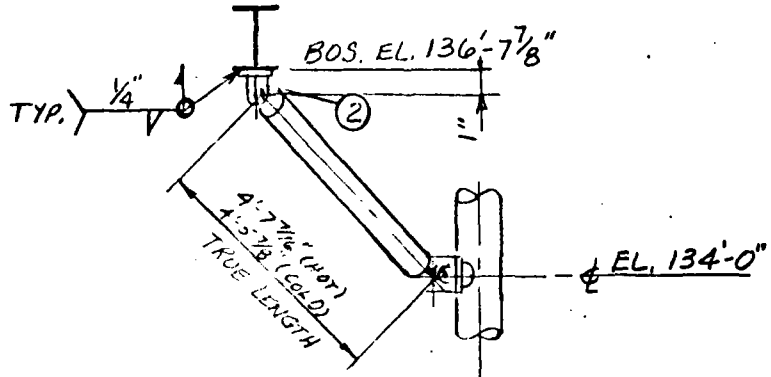
PLAN



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -1"
- △ Z = -2 7/8"
- △ Y = 5/8" DN

VOL. P60-2



A-A

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△ REVISE ITEMS 1, 2, 4, 5, LENGTHS & REAR BRACKET ATTACH.

VENDOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P9-3	R4
D		STRUCTURAL S33-4	1
C		ELECTRICAL	
B			
A			

14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4	1	2"XS PIPE STANCHION BY PIPE FAB
3	1	3" X 3" X 1/4" C.S. PL. BY PIPE FAB
2	2	REAR BRACKET, SIZE 1/2
1	1	MECHANICAL SNUBBER SIZE 1/2 FIG. 307

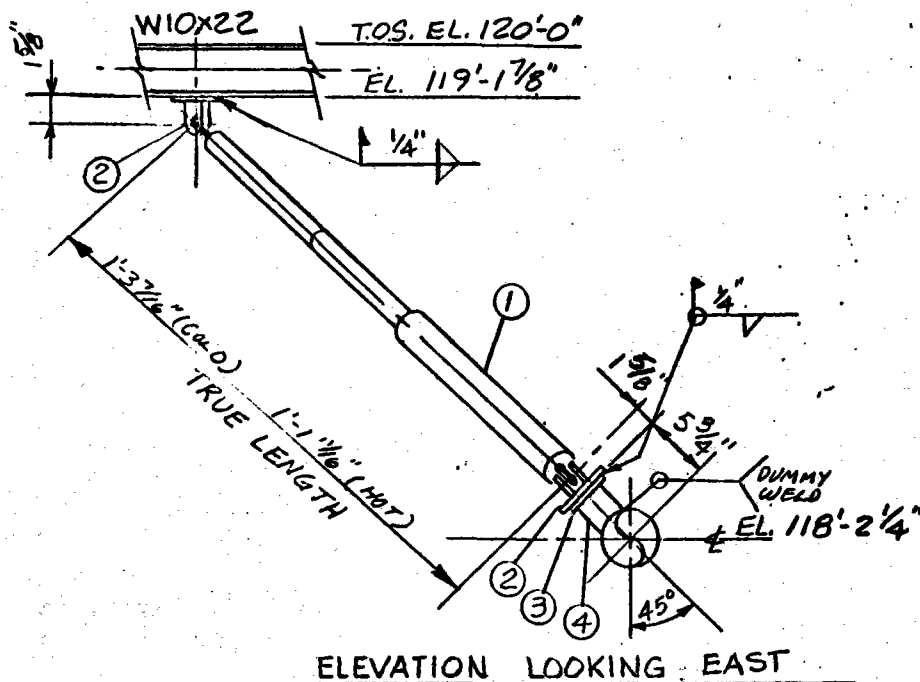
NOTES:
 PIPE TEMPERATURE: 900°F
 STRUCTURAL DESIGN LOAD: F_x = .2K, F_y = .5K
 PIPE SIZE: 2.875" DD, F_z = .25K F_{TOTAL} = .60K
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	
DATE	4-25-57	DATE	
REVIEWED		APPROVED	
DATE		DATE	
PROJECT			
DATE			
ANALYSIS ID. CODE	X-27-1-A		

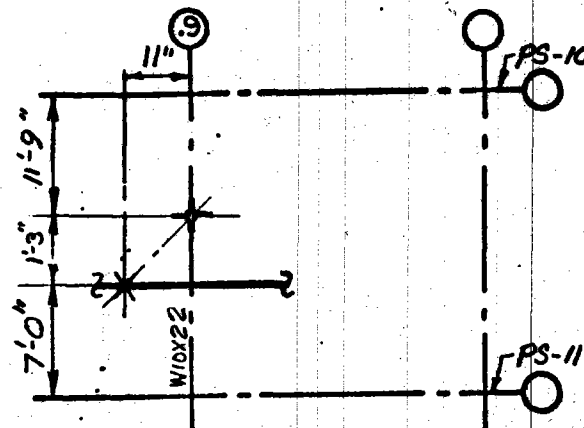
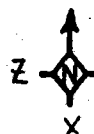
5		
4	ITEM REQD	COMPONENT DESCRIPTION
3	SCALE:	NONE
2		
1	REVISIONS	
		10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA
PROJECT NO	C-21700	LINE NO 21057-13AEB
		MARK NO H-VT-12-25

Stearns-Roger

11165/8



ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -3 7/8"
- Δ Z = -1 1/16"
- Δ Y = 1 1/16" DN

PL0-2

VENOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		PIPING P9-10	P4
D		STRUCTURAL S33-1	1
C		ELECTRICAL	
B			
A			

14			
13			
12			
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10			
9			
8			
7			
6			
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	
1	1	MECHANICAL SNUBBER, SIZE 1, FR. 306	
ITEM RECD	COMPONENT DESCRIPTION	REMARKS	
	Stearns-Roger	11165/8	
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700			

REAR BRACKET ATTACHMENTS
 Δ REVISE ITEMS 1, 2, 4, 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 F_{TOTAL} = .56K
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: A3TM A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	J.P.R.
DATE	4-25-80	DATE	5/11/80
REVIEWED	J.P.R.	APPROVED	
DATE	4/25/80	DATE	
PROJECT	BDR		
DATE	5-27-80		
ANALYSIS ID. CODE	X-VT-1-A		

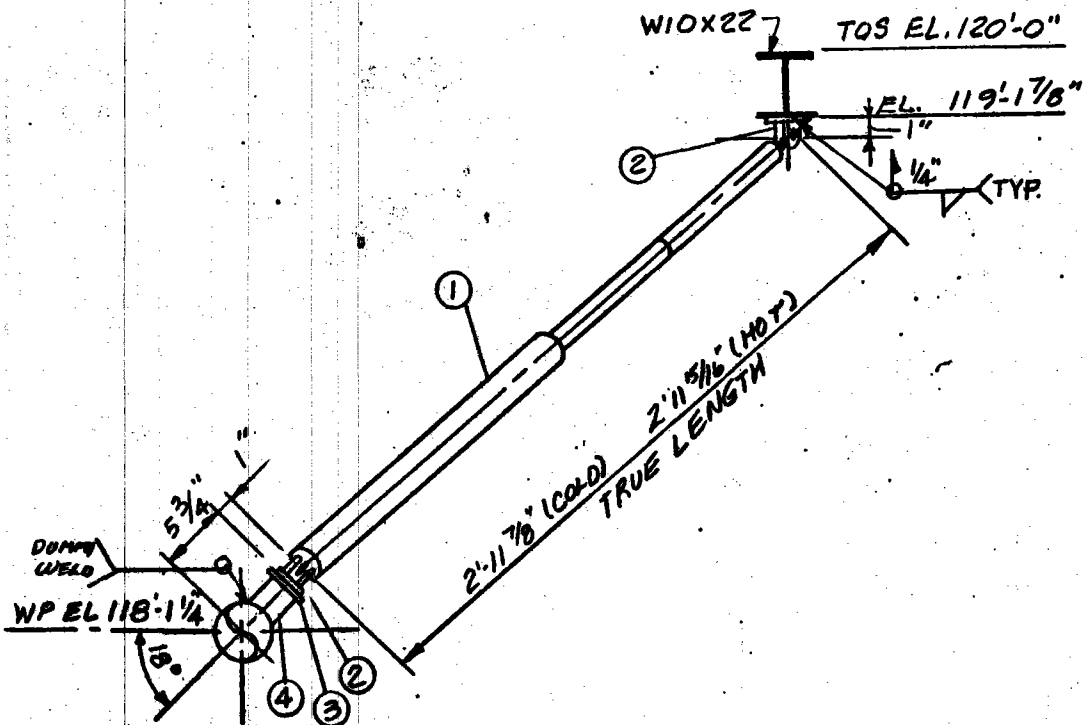
5
4
3
2
1
REVISIONS

SCALE: NONE

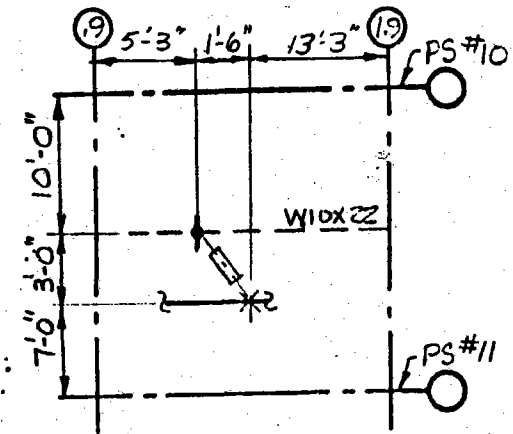
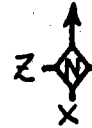
10 Mw SOLAR PILOT PLANT DAGGETT, CALIFORNIA

PROJECT NO C-21700

LINE NO 210-VT-12-RIB MARK NO M-VT-12-26



ELEVATION LOOKING WEST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1¹⁵/₁₆"
- Δ Z = -2⁷/₈"
- Δ Y = 1¹/₁₆" DN

VOL. P&ID-2

VENOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-10	P4
D	STRUCTURAL S33-1	1
C	ELECTRICAL	
B		
A		

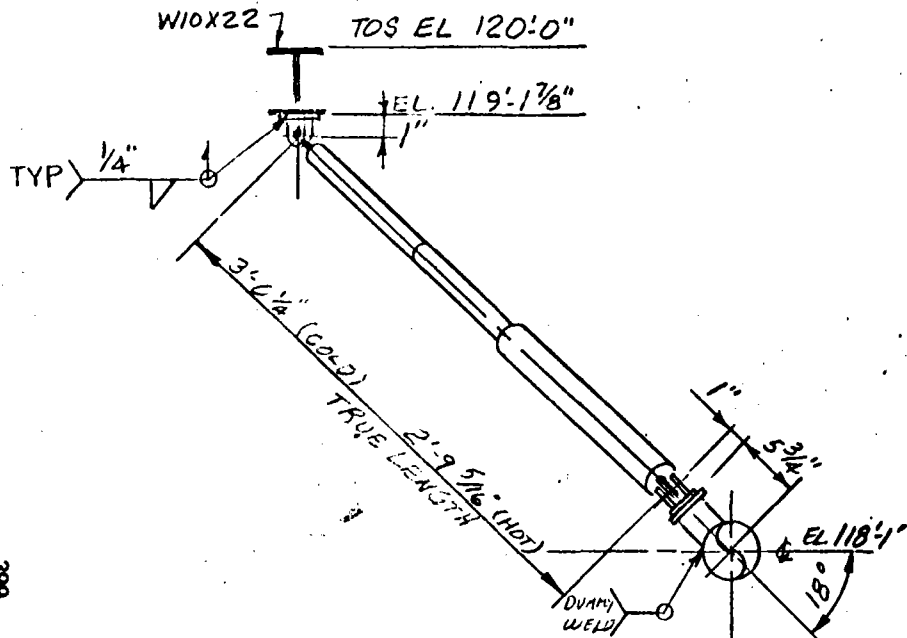
△ REVISE ITEMS 1 & 2, LENGTHS, LOCATION, REAR BRACKET ATTACH

NOTES:
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .15k, F_y = .06k,
 PIPE SIZE: 2.875" O.D., F₂ = .12k, F_{TOTAL} = .2k
 PIPE INSULATION: 3/2"
 PIPE MATERIAL: 3TM A335 P22

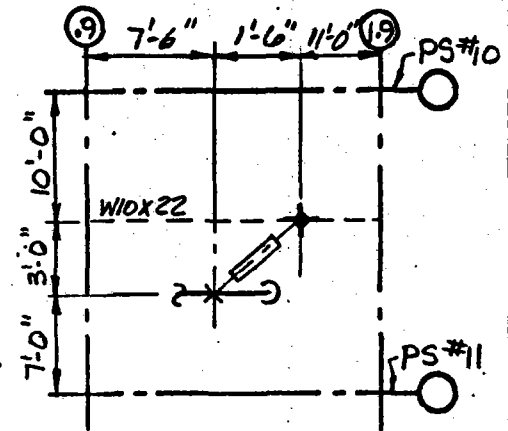
ENGINEERING RECORD			
DESIGNED	MM	DRAWN	MM
DATE	7-28-80	DATE	6/11/80
REVIEWED	J.M.	APPROVED	J.P.V.
DATE	11-30-80	DATE	11-12-80
PROJECT	BLR		
DATE	5-24-80		
ANALYSIS ID. CODE	X-VT-1-A-8		

14			
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7			
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5			
4	1	2" X 5" 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 SNIPPETS SIZE 1/4" FIG. 30.7	
ITEM RECD		COMPONENT DESCRIPTION	REMARKS
		Stearns-Roger	11165/8
TO THE SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
REVISIONS		PROJECT NO C-21700	LINE NO 2 1/2 VT-12-KEE MARK
			1-VT-12-25

FORM 672-1



ELEVATION LOOKING EAST



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1 15/16"
- Δ Z = -2 7/8"
- Δ Y = 1/16" DN

VOL. P60-2

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SENIOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-10	P4
D	STRUCTURAL S33-1	1
C	ELECTRICAL	
B		
A		

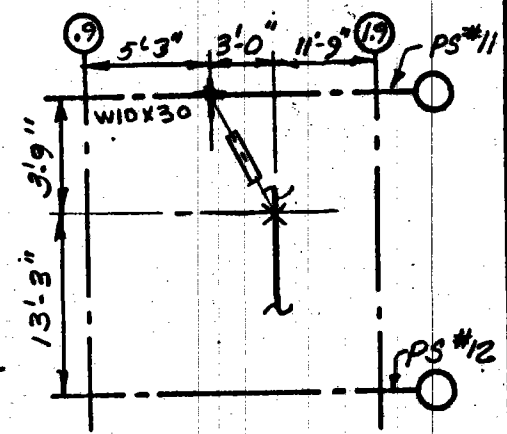
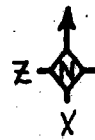
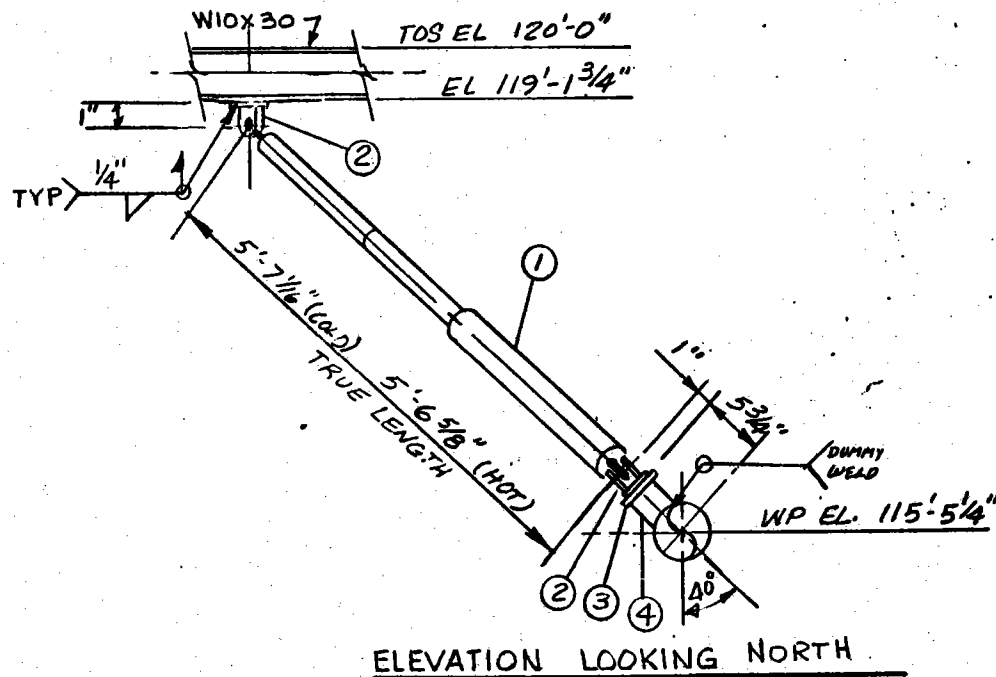
14		
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7		
6		
5		
4	1	2"XS PIPE STANCHION BY PIPE FAB.
3	1	3"X 3" X 1/4 CS.R BY PIPE FAB.
2	2	REAR BRACKET, SIZE 1/4
1	1	MECHANICAL SNUBBER, SIZE 1/4 FX. 307

REVISE ITEMS 142, 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_L = .08K, F_{TOTAL} = .2K
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: ASTM A335 P22

ENGINEERING RECORD			
DESIGNED	ALM	DRAWN	ALM
DATE	4-28-80	DATE	4-28-80
REVIEWED	ALM	APPROVED	
DATE	4-28-80	DATE	
PROJECT	HDR	PROJECT	ALM
DATE	4-28-80	DATE	4-28-80
ANALYSIS ID. CODE	2-VF-178	PROJECT NO	C-21700

ITEM REQD	COMPONENT DESCRIPTION	REMARKS
SCALE:	NONE	
Stearns-Roger		11165/8
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA		
LINE NO.	VT-12-11	MARK NO. H-VT-12-22



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- Δ X = -1"
- Δ Z = -1/2"
- Δ Y = 0

VOL. P60-2

400

VENDOR ENG. REV.	REFERENCE DRAWINGS	REV
E	PIPING P9-10	P4
D	STRUCTURAL S33-1	1
C	ELECTRICAL	
B		
A		

14		
13		
12		
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8		
7		
6		
5		
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" FIBER 302
ITEM RECD	COMPONENT DESCRIPTION	REMARKS
	Stearns-Roger	11165/8

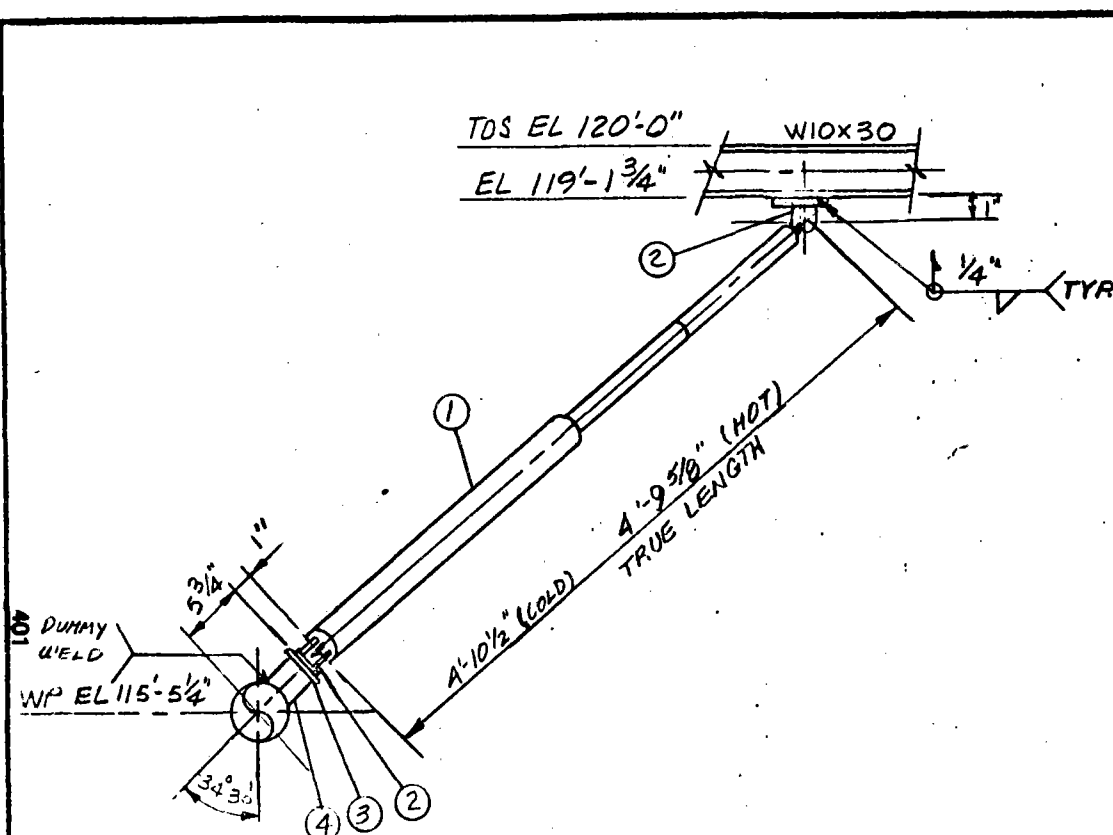
Δ REVISE ITEMS 1 & 2, LOCATION, LENGTH & REAR BRACKET ATTACH.

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

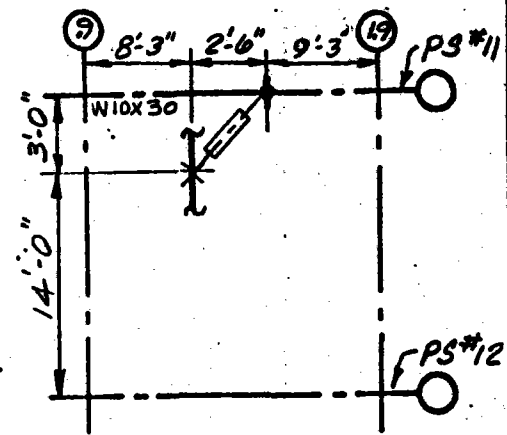
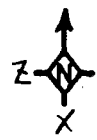
ENGINEERING RECORD	
DESIGNED: MLM	CHECKED: MW
DATE: 4-28-80	DATE: 5/11/80
REVIEWED:	APPROVED:
DATE:	DATE:
PROJECT: BNP	DATE: 6-12-80
DATE:	
ANALYSIS ID. CODE: V-VT-1-1-8	

5		
4		
3		
2		
1		
SCALE: NONE		
REVISIONS		
PROJECT # C-21700	LINE # 2 1/2" VT-12-KED	MARK # H-VT-12-30

10 Mw SOLAR PILOT PLANT BAGGETT, CALIFORNIA



ELEVATION LOOKING NORTH



LOCATION PLAN

- + LOCATION OF STEEL ATTACHMENT
- * LOCATION OF PIPE ATTACHMENT
- △ X = -1"
- △ Z = -1/2"
- △ Y = 0"

VOL. PG0-2

14			
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9			
8			
7			
6			
5			
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" FIG. 307	
ITEM NO	RECD	COMPONENT DESCRIPTION	REMARKS
		SCALE: NONE	11165/8
Stearns-Roger			
10 MWe SOLAR PILOT PLANT DAGGETT, CALIFORNIA			
PROJECT NO C-21700		LINE NO 217-VT-12-KEB	MARK NO H-VT-12-31

VEHICOR	ENG. REV.	REFERENCE DRAWINGS	REV.
E		SPRING P9-10	P4
D		STRUCTURAL S33-1	1
C		ELECTRICAL	
B			
A			

NOTES
 PIPE TEMPERATURE: 960°F
 STRUCTURAL DESIGN LOAD: F_x = .1K, F_y = .1K
 PIPE SIZE: 2.875" O.D. F₂ = .07K, F_{TOTAL} = .16K
 PIPE INSULATION: 3 1/2"
 PIPE MATERIAL: A335 P22

ENGINEERING RECORD			
DESIGNED	MLM	CHECKED	11/1/77
DATE	4-29-78	DATE	6/11/78
REVIEWED		APPROVED	
DATE		DATE	
PROJECT	10 MWe	DATE	11/1/77
DATE			
ANALYSIS ID. CODE	X-VT-1-1		

REVISIONS
5
4
3
2
1

11/1/77

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) 756-1122 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

ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
		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. 40P700-16I, 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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<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
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. 4	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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<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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<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
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. 6	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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<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.
		SCHEDULE MS-9	
94	1	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.
		SCHEDULE VT-1	
98	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. 7	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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<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. 8	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
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. 9	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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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.

1
P.O. 3002

PIPE SUPPORT SNUBBERS

(Not available at time of issue)

Stearns-Roger

Changes are identified in their left margin by the letter designator of the supplement. Pages changed by this supplement are reissued herewith. Remove the previous issue of these pages and replace them with current issue. All other terms and conditions of the original order and previous supplements, if any, remain unchanged.

PAGE NO. 1 of 9	DATE Jul 23/80	REQUISITION E3 REV 3	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 TELETYPE 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	
a	Supp. No. 1 - Oct 29/80 - Rev. pgs. 1-9 to revise hanger drawings and add items 138-140
PREVIOUS SUPPLEMENT SUMMARIES, IF ANY, ARE RECOUNTED ON THE LAST NUMBERED PAGE OF THIS ORDER.	

CONFIRMING ORDER - DO NOT DUPLICATE

ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
		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. 40P700-16I, dated Sep 02/80 (Rev. 5) which are in your possession.	

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.
 VIS #4017

BUYER
 STEARNS-ROGER ENGINEERING CORPORATION

BY [Signature]
 THIS DOCUMENT CONSISTS OF 9 PAGE(S) NOT INCLUDING REFERENCED ATTACHMENTS.
 1521p/ANM/sf/sf

Stearns-Roger

PURCHASE ORDER

PAGE NO. 2	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
		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.
a 12	1	H-FW-2-13, <u>Rev. 3</u>	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.
a 20	1	H-FW-2-21, <u>Rev. 3</u>	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.
		SCHEDULE MS-2	
a 38	1	H-MS-2-6, <u>Rev. 1</u>	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.
a 43	1	H-MS-2-11, <u>Rev. 2</u>	1,240.52 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO. 4	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
---------------	---------------	----------	--------------------------

	ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
a	44	1	H-MS-2-12, <u>Rev. 1</u>	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.
a	52	1	H-MS-2-20, <u>Rev. 1</u>	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.
a	57	1	H-MS-2-25, <u>Rev. 2</u>	558.46 Ea.
	58	1	H-MS-2-26	187.24 Ea.
a	59	1	H-MS-2-27, <u>Rev. 2</u>	188.42 Ea.
a	60	1	H-MS-2-28, <u>Rev. 2</u>	153.51 Ea.
a	61	1	H-MS-2-29, <u>Rev. 2</u>	258.44 Ea.
a	62	1	H-MS-2-30, <u>Rev. 2</u>	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
---------------	---------------	---------	-------------------------

	ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
a	66	1	H-MS-2-35, <u>Rev. 2</u>	\$66.30 Ea.
	67	1	H-MS-2-36	93.98 Ea.
	68	1	H-MS-2-37	Advise
			SCHEDULE MS-3	
	69	1	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.
			SCHEDULE MS-6	
a	76	1	H-MS-6-1, <u>Rev. 3</u>	548.89 Ea.
a	77	1	H-MS-6-2, <u>Rev. 4</u>	109.07 Ea.
	78	1	H-MS-8-1	86.26 Ea.
a	79	1	H-MS-8-2, <u>Rev. 2</u>	160.59 Ea.
a	80	1	H-MS-8-3, <u>Rev. 3</u>	127.55 Ea.
	81	1	H-MS-10-1	70.36 Ea.
	82	1	H-MS-10-2	75.98 Ea.
a	83	1	H-MS-10-3, <u>Rev. 2</u>	36.87 Ea.
a	84	1	H-MS-10-4, <u>Rev. 2</u>	158.91 Ea.
			SCHEDULE MS-7	
	85	1	H-MS-7-2	116.39 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO. 6	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
	1	H-MS-7-3	\$51.92 Ea.
a	1	H-MS-7-4, <u>Rev. 2</u>	184.98 Ea.
a	1	H-MS-7-5, <u>Rev. 2</u>	170.22 Ea.
a	1	H-MS-7-6, <u>Rev. 3</u>	61.03 Ea.
a	1	H-MS-7-7, <u>Rev. 3</u>	61.11 Ea.
a	1	H-MS-7-8, <u>Rev. 2</u>	93.98 Ea.
	1	H-MS-7-9	66.30 Ea.
	1	H-MS-7-10	51.92 Ea.
		SCHEDULE MS-9	
a	1	H-ST-9-1, <u>Rev. 3</u>	189.48 Ea.
	1	H-ST-13-1	34.26 Ea.
a	1	H-ST-13-2, <u>Rev. 2</u>	41.11 Ea.
	1	H-ST-14-1	27.47 Ea.
		SCHEDULE VT-1	
	1	H-VT-1-2	127.91 Ea.
	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. 7	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C2:700
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ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
	1	H-VT-1-11	\$127.91 Ea.
	1	H-VT-1-12	760.58 Ea.
	1	H-VT-1-13	127.91 Ea.
	1	H-VT-1-14	127.91 Ea.
	1	H-VT-1-15	127.91 Ea.
	1	H-VT-1-16	127.91 Ea.
	1	H-VT-1-17	779.34 Ea.
	1	H-VT-1-18	660.66 Ea.
	1	H-VT-1-19	440.17 Ea.
a	1	H-VT-1-20, <u>Rev. 2</u>	474.56 Ea.
	1	H-VT-1-21	436.71 Ea.
	1	H-VT-1-22	399.54 Ea.
	1	H-VT-1-23	427.13 Ea.
	1	H-VT-1-24	104.37 Ea.
a	1	H-VT-1-25, <u>Rev. 3</u>	91.86 Ea.
	1	H-VT-1-26	116.79 Ea.
a	1	H-VT-11-1, <u>Rev. 3</u>	164.12 Ea.
a	1	H-VT-11-2, <u>Rev. 2</u>	166.77 Ea.
a	1	H-VT-12-1, <u>Rev. 3</u>	389.27 Ea.
a	1	H-VT-12-2, <u>Rev. 3</u>	92.80 Ea.
a	1	H-VT-12-3, <u>Rev. 3</u>	56.15 Ea.
	1	H-VT-12-4	42.25 Ea.

Stearns-Roger

PURCHASE ORDER

PAGE NO. 8	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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	<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
	129	1	H-VT-12-5	62.71 Ea.
	130	1	H-VT-12-6	46.84 Ea.
a	131	1	H-VT-12-7, <u>Rev. 2</u>	32.03 Ea.
	132	1	H-VT-12-8	112.34 Ea.
a	133	1	H-VT-12-9, <u>Rev. 2</u>	29.60 Ea.
a	134	1	H-VT-12-10, <u>Rev. 2</u>	64.50 Ea.
a	135	1	H-VT-12-11, <u>Rev. 2</u>	33.97 Ea.
a	136	1	H-VT-12-13, <u>Rev. 2</u>	32.59 Ea.
a	137	1	H-VT-12-14, <u>Rev. 2</u>	32.75 Ea.
a	<u>138</u>	1	H-ST-8-1, Rev. 1	Advise
a	<u>139</u>	1	H-FW-2-1, Rev. 1	Advise
a	<u>140</u>	1	H-VT-12-12, Rev. 1	Advise

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.

Stearns-Roger

PURCHASE ORDER

PAGE NO. 9	F & S CENTRAL	REL. NO.	ORDER NO. 3001 C21700
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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.

CONFIRMING ORDER

a This confirms verbal order of Jul 14/80, Aug 28/80 and
a Sep 16/80 to your Mr. Gary E. Morgan by our Mr. A. N. Mullins.

REFERENCE

a For reference purposes only and not by way of incorporating
a the same in this Purchase Order, see your written quotation
a 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. Also see telephone quotation
of Oct 27/80 by Mr. Gary H. Morgan, to be confirmed in
writing.

Stearns-Roger

PURCHASE ORDER

PAGE NO 1 of 5	DATE Oct 17/80	REQUISITION E4 Rev. 1	ACCOUNT X73400	REL NO	ORDER NO 3002 C21700
REQUIRED AT DESTINATION Feb 01/81			SELLER'S SHIPPING PROMISE See Below		
F.O.B. POINT Jobsite, Daggett, CA			SHIPPING POINT Warren, OH		
SELLER ITT GRINNELL CORPORATION Pipe Hanger Division 260 West Exchange St. Providence, RI 02901 Attn: Mr. F. P. Jachem (401) 831-7000			TERMS OF PAYMENT AND INVOICING INSTRUCTIONS AS STATED AFTER LAST NUMBERED ITEM OF THIS ORDER DIRECT CORRESPONDENCE TO: STEARNS-ROGER BOX 5888, DENVER, CO 80217 Attn: Mr. A. N. Mullins PHONE (303) 758-1122 TWX 910-931-0453 TELEEX 045-5		
CONSIGN TO: TOWNSEND AND BOTTOM, INC., c/o J. M. Abram, Construction Manager, Solar-One, Pilot Plant, Daggett, 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>
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This Purchase Order incorporates the provisions of Stearns-Roger Advance Authorization sent via Federal Express to Mr. F. P. Jachem by Mr. A. N. Mullins on Oct 03/80.

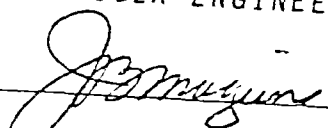
This Purchase Order is the entire agreement and supersedes the Advance Authorization.

PRIMARY PIPE SUPPORT SNUBBERS, furnished to meet the requirements and specifications of Stearns-Roger Specification SR-E8, D.O.E. No. 40 P 700-32S, dated Sep 26/80 (for purchase) and Stearns-Roger Hanger Volume P60-2, D.O.E. No. 40 P 700-171 dated Sep 26/80 (for purchase) which are in your possession.

GENERAL CONDITIONS FOR JOB C21700 ATTACHED
TERMS AND CONDITIONS FORM TC 5-76 ATTACHED

APPROX TOTAL VALUE OF ORDER \$103,839.00
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 5 PAGE(S) NOT INCLUDING REFERENCED ATTACHMENTS.
4145p/ANM/sf

Stearns-Roger

PURCHASE ORD

PAGE NO 2	ITT GRINNELL CORPORATION	REL. NO	ORDER NO 3002 C21700
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<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
1	1	H-FW-2-34, Rev. 1	\$1,401.86 E
2	1	H-FW-2-35, Rev. 1	1,401.86 E
3	1	H-FW-2-36, Rev. 1	1,401.86 E
4	1	H-FW-2-37, Rev. 1	1,401.86 E
5	1	H-FW-2-38, Rev. 1	1,382.86 E
6	1	H-FW-2-39, Rev. 1	1,401.86 E
7	1	H-FW-2-40, Rev. 1	1,136.86 E
8	1	H-FW-2-41, Rev. 1	1,136.86 E
9	1	H-MS-2-38, Rev. 1	6,008.86 E
10	1	H-MS-2-39, Rev. 1	2,145.34 E
11	1	H-MS-2-40, Rev. 1	2,101.60 E
12	1	H-MS-2-41, Rev. 1	2,109.70 E
13	1	H-MS-2-42, Rev. 1	2,124.28 E
14	1	H-MS-2-43, Rev. 1	2,163.16 E
15	1	H-MS-2-44, Rev. 1	1,610.88 E
16	1	H-MS-2-45, Rev. 1	1,450.46 E
17	1	H-MS-2-46, Rev. 1	1,489.34 E
18	1	H-MS-2-47, Rev. 1	1,562.24 E
19	1	H-MS-2-48, Rev. 1	1,508.78 E
20	1	H-MS-2-49, Rev. 1	1,502.30 E
21	1	H-MS-2-50, Rev. 1	1,504.16 E
22	1	H-MS-3-9, Rev. 1	1,471.52 E
23	1	H-MS-3-10, Rev. 1	1,497.44 E

Stearns-Roger

PURCHASE ORDER

PAGE NO. 3	ITT GRINNELL CORPORATION	REL NO	ORDER NO 3002 021700
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ITEM	QUANTITY	DESCRIPTION	UNIT PRICE
24	1	H-MS-8-4, Rev. 1	\$763.62 Ea
25	1	H-MS-8-5, Rev. 1	763.62 Ea
26	1	H-MS-8-6, Rev. 1	1,149.50 Ea
27	1	H-MS-8-7, Rev. 1	1,149.50 Ea
28	1	H-MS-8-8, Rev. 1	1,225.00 Ea
29	1	H-MS-8-9, Rev. 1	1,225.00 Ea
30	1	H-TO-3-6, Rev. 1	1,437.50 Ea
31	1	H-TO-3-7, Rev. 1	1,437.50 Ea
32	1	H-TO-21-16, Rev. 1	1,437.50 Ea
33	1	H-TO-21-17, Rev. 1	1,437.50 Ea
34	1	H-VT-1-27, Rev. 1	6,008.86 Ea
35	1	H-VT-1-28, Rev. 1	1,976.86 Ea
36	1	H-VT-1-29, Rev. 1	1,573.38 Ea
37	1	H-VT-1-30, Rev. 1	1,973.62 Ea
38	1	H-VT-1-31, Rev. 1	1,573.62 Ea
39	1	H-VT-1-32, Rev. 1	1,419.68 Ea
40	1	H-VT-1-33, Rev. 1	1,466.66 Ea
41	1	H-VT-1-34, Rev. 1	1,588.20 Ea
42	1	H-VT-1-35, Rev. 1	1,607.64 Ea
43	1	H-VT-1-36, Rev. 1	1,557.86 Ea
44	1	H-VT-1-37, Rev. 1	1,565.96 Ea
45	1	H-VT-1-38, Rev. 1	1,397.00 Ea
46	1	H-VT-1-39, Rev. 1	747.00 Ea
47	1	H-VT-1-40, Rev. 1	763.62 Ea
48	1	H-VT-1-41, Rev. 1	763.62 Ea

Stearns-Roger

PURCHASE ORD

PAGE NO. 4	ITT GRINNELL CORPORATION	REL NO	ORDER NO 3002 021700
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<u>ITEM</u>	<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>
49	1	H-VT-1-42, Rev. 1	\$1,247.02 E
50	1	H-VT-1-43, Rev. 1	1,253.50 E
51	1	H-VT-1-44, Rev. 1	1,214.14 E
52	1	H-VT-1-45, Rev. 1	1,214.14 E
53	1	H-VT-11-3, Rev. 1	1,133.86 E
54	1	H-VT-11-4, Rev. 1	1,136.86 E
55	1	H-VT-12-20, Rev. 1	1,133.62 E
56	1	H-VT-12-21, Rev. 1	1,397.00 E
57	1	H-VT-12-22, Rev. 1	763.62 E
58	1	H-VT-12-23, Rev. 1	763.62 E
59	1	H-VT-11-24, Rev. 1	747.00 E
60	1	H-VT-12-25, Rev. 1	763.62 E
61	1	H-VT-12-26, Rev. 1	755.96 E
62	1	H-VT-12-27, Rev. 1	755.96 E
63	1	H-VT-12-28, Rev. 1	747.00 E
64	1	H-VT-12-29, Rev. 1	747.00 E
65	1	H-VT-12-30, Rev. 1	747.00 E
66	1	H-VT-12-31, Rev. 1	747.00 E
67	1	FREIGHT CHARGE	7,645.65

FIRM PRICES

TAX

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.

Stearns-Roger

PURCHASE ORD

PAGE NO. 5	ITT GRINNELL CORPORATION	REL. NO.	ORDER NO. 3002 C21700
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TERMS OF PAYMENT:

Net 30 days

INVOICING INSTRUCTIONS:

Mail original and 4 copies with original shipping documents to:

STEARNS-ROGER ENGINEERING CORP.
P. O. Box 5888
Denver, CO 80217

SELLER'S SHIPPING DATE:

Complete shipment by Seller is to be made in 12 to 14 weeks after ITT Grinnell's drawings are approved for construction.

REFERENCE

For reference purposes only and not by way of incorporating the same in this Purchase Order, see your written quotation numbered 80079 of Jul 16/80 and quotation supplements No. 1 of Aug 07/80, No. 2 of Sep 19/80 and No. 3 of Sep 22/80 by Mr. F. P. Jachem.

STMPD - 222

①



Department of Energy
San Francisco Operations Office
1333 Broadway
Oakland, California 94612

Reply To: DOE Solar One Project Office
P.O. Box 366
Daggett, CA 92327

Mr. Robert L. Gervais
Solar One Project Office
McDonnell Douglas Astronautics Corp.
P.O. Box 366
Daggett, CA 92327

SEP 26 1984

Subject: Clearance of Contract DE-AC03-79SF10499
Solar One Reports for DOE/TIC Submission.

Dear Bob:

Enclosed are copies of covers and title pages of eight reports prepared by McDonnell Douglas Astronautics Corporation for the Solar One Project under the above referenced contract. In preparation for delivery of these documents to DOE/TIC, I have prepared a SAN form 70 "Request for Patent Clearance" and a DOE form RA-426 "Recommendations for Announcement and Distribution of Documents" for each document.

Please have the appropriate MDAC personnel complete and sign these forms. As agreed, SAN form 70 should be forwarded to SAN/OPC by your office with copies of the completed SAN form 70 and the transmittal letter being sent to me. The completed DOE form RA-426 should be sent directly back to me.

The documents covered by this letter are:

<u>Primary Document No.</u>	<u>Secondary No.</u>	<u>Brief Title</u>
DOE/SF/10499-T19 REV	STMPD 212	Plant Support Subsystem Procurement
DOE/SF/10499-T9 REV	STMPD 214	Purchased Demineralized Water
DOE/SF/10499-T45 REV	STMPD 122	Receiver Feedwater Pump and Drive
DOE/SF/10499-T13 REV	STMPD 222	Plant Support Subsystem Procurement
DOE/SF/10499-T27 REV	STMPD 127	Master Control Subsystem Hardware
DOE/SF/10499-T25 REV 2	STMPD 206	System Integration Lab Test Plan
MDC-G-8591 REV	STMPD 220	Plant Support Subsystem Procurement
MDC-G-8575 REV	STMPD 218	Plant Support Subsystem Procurement

Note that only the updates, revisions or additions need to be reviewed; the basic documents are already on file at TIC.

If you should have any questions or concerns please do not hesitate to contact me by telephone at (619) 254-2672.

Sincerely,



S.D. Elliott, Jr., Director
DOE Solar One Project Office

SDE/aks
Project File: CCC001.RNO(SDO)

Encl: Eight Document Covers W/forms 70 and RA-426

cc: Robert G. Riedesel, MDAC
Roger Gaither, SAN/OPC
W.D. Matheny, DOE/TIC
Mike Lopez, DOE/SAN (FGS)
Mary Soderstrum, B&McD



DEPARTMENT OF ENERGY
SAN FRANCISCO OPERATIONS OFFICE

CONTRACTOR REQUEST FOR PATENT CLEARANCE
FOR RELEASE OF UNCLASSIFIED DOCUMENT

Prime Contract No.
DE-AC03-79SF10499
Subcontract No.
(N/A)
Report No.
(STMPO 222)
DOE/SF/10499-T13 Rev.
Date of Report
September 1980
Name & Phone No. of DOE Technical Representative
S.D. Elliott, Jr. (619) 254-2672

TO: Roger S. Gaither, Asst. Chief for Prosecution
Office of Patent Counsel/Livermore Office
P.O. Box 808, L-376
Livermore, California 94550

FROM: McDonnell Douglas Corporation
3855 Lakewood Blvd.
Long Beach, CA 90846

- Document Title: Plant Support Subsystem Procurement Documentation (Update) (RADL 7-44c)
- Type of Document: Technical Report, Conference Paper, Journal Article, Abstract or Summary, Copy of Oral Presentation, Other (please specify): _____
- In order to meet a publication schedule or submission deadline, patent clearance by (Routine) would be desired.

SENDER IS TO CHECK BOX #4 OR #5 BELOW.

- I have reviewed (or have had reviewed by technically knowledgeable personnel) this document for possible inventive subject matter (Subject Inventions) and that no inventions or discoveries (Subject Inventions) are deemed to be disclosed in this document except as stated below:
 - Attention should be directed to pages _____ of this document.
 - This document describes matter relating to an invention:
 - Contractor Invention Docket No. _____
 - A disclosure of the invention was submitted to DOE on _____ (date)
 - A disclosure of the invention will be submitted shortly _____ (approximate date)
 - A waiver of DOE's patent rights to the contractor:
 has been granted, has been applied for; or will be applied for _____ (date)
 - This document is being submitted, but no review has been made of this document for possible inventive subject matter.
- Provide copy of clearance to Solar One Project Office
P.O. Box 366, Daggett, CA 92327

Reviewing/Submitting Official: Name (Print/Type) _____
Title _____
Signature _____ Date _____

TO: INITIATOR OF REQUEST
FROM: ASSISTANT CHIEF FOR PROSECUTION
Office of Patent Counsel/Livermore Office

- No patent objection to above-identified release.
- Please defer release until advised by this office.

Signed _____ Date Mailed _____

DOE AND MAJOR CONTRACTOR RECOMMENDATIONS FOR
ANNOUNCEMENT AND DISTRIBUTION OF DOCUMENTS

See Instructions on Reverse Side

1. DOE Report No. (STMPO 222) DOE/SF/10499-T13 Rev	2. Contract No. DE-AC03-79SF10499	3. Subject Category No. UC-62, 62c, 62d
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4. Title
Plant Support Subsystem Procurement Documentation (Update)

5. Type of Document ("x" one)
 a. Scientific and technical report
 b. Conference paper: Title of conference _____

_____ Date of conference _____

Exact location of conference _____ Sponsoring organization _____

c. Other (specify planning, educational, impact, market, social, economic, thesis, translations, journal article manuscript, etc.)

6. Copies Transmitted ("x" one or more)
 a. Copies being transmitted for standard distribution by DOE-TIC.
 b. Copies being transmitted for special distribution per attached complete address list.
 c. Two completely legible, reproducible copies being transmitted to DOE-TIC. (Classified documents, see instructions)
 d. Twenty-seven copies being transmitted to DOE-TIC for TIC processing and NTIS sales.

7. Recommended Distribution ("x" one)
 a. Normal handling (after patent clearance): no restraints on distribution except as may be required by the security classification. Make available only b. To U.S. Government agencies and their contractors. c. within DOE and to DOE contractors.
 d. within DOE. e. to those listed in item 13 below.
 f. Other (Specify) Archive/Issue on request

8. Recommended Announcement ("x" one)
 a. Normal procedure may be followed. b. Recommend the following announcement limitations:

9. Reason for Restrictions Recommended in 7 or 8 above.
 a. Preliminary information. b. Prepared primarily for internal use. c. Other (Explain)

10. Patent, Copyright and Proprietary Information
Does this information product disclose any new equipment, process or material? No Yes If so, identify page nos. _____
Has an invention disclosure been submitted to DOE covering any aspect of this information product? No Yes
If so, identify the DOE (or other) disclosure number and to whom the disclosure was submitted.
Are there any patent-related objections to the release of this information product? No Yes If so, state these objections.
Does this information product contain copyrighted material? No Yes
If so, identify the page number _____ and attach the license or other authority for the government to reproduce.
Does this information product contain proprietary information? No Yes If so, identify the page numbers _____
("x" one a. DOE patent clearance has been granted by responsible DOE patent group.
 b. Document has been sent to responsible DOE patent group for clearance.

11. National Security Information (For classified document only; "x" one)
Document a. does b. does not contain national security information

12. Copy Reproduction and Distribution
Total number of copies reproduced _____ Number of copies distributed outside originating organization _____

13. Additional Information or Remarks (Continue on separate sheet, if necessary)

14. Submitted by (Name and Position) (Please print or type)
S.D. Elliott, Jr., Director, DOE Solar One Project Office
Organization

P.O. Box 366, Daggett, CA 92327 (619) 254-2672
Signature

_____ Date

H009-M-840

SAN FORM 70 10/80



DEPARTMENT OF ENERGY
SAN FRANCISCO OPERATIONS OFFICE

CONTRACTOR REQUEST FOR PATENT CLEARANCE
FOR RELEASE OF UNCLASSIFIED DOCUMENT

TO: Roger S. Gaither, Asst. Chief for Prosecution
Office of Patent Counsel/Livermore Office
P.O. Box 808, L-376
Livermore, California 94550

FROM: McDonnell Douglas Corporation
3855 Lakewood Blvd.
Long Beach, CA 90846

Prime Contract No.
DE-AC03-79SF10499
Subcontract No.
(N/A)
Report No.
(STMPO 222)
DOE/SF/10499-T13 Rev.
Date of Report
September 1980
Name & Phone No. of DOE Technical Representative
S.D. Elliott, Jr. (619) 254-2672

- Document Title: Plant Support Subsystem Procurement Documentation (Update)
(RADL 7-44c)
- Type of Document: Technical Report, Conference Paper, Journal Article, Abstract or Summary,
 Copy of Oral Presentation, Other (please specify): _____
- In order to meet a publication schedule or submission deadline, patent clearance by (Routine)
would be desired.

SENDER IS TO CHECK BOX #4 OR #5 BELOW.

- I have reviewed (or have had reviewed by technically knowledgeable personnel) this document for possible inventive subject matter (Subject Inventions) and that no inventions or discoveries (Subject Inventions) are deemed to be disclosed in this document except as stated below:
 - Attention should be directed to pages _____ of this document.
 - This document describes matter relating to an invention:
 - Contractor Invention Docket No. _____
 - A disclosure of the invention was submitted to DOE on _____ (date)
 - A disclosure of the invention will be submitted shortly _____ (approximate date)
 - A waiver of DOE's patent rights to the contractor:
 has been granted, has been applied for; or will be applied for _____ (date)

5. This document is being submitted, but no review has been made of this document for possible inventive subject matter.

Provide copy of clearance to Solar One Project Office
6. Remarks: P.O. Box 366, Daggett, CA 92327

Reviewing/Submitting Official: Name (Print/Type) Donald L. Royer
Title Asst. Chief Patent Counsel, MDC (MS 122-23)
Signature *Donald L. Royer* Date 8 October 1984

TO: INITIATOR OF REQUEST
FROM: ASSISTANT CHIEF FOR PROSECUTION
Office of Patent Counsel/Livermore Office

No patent objection to above-identified release.

Please defer release until advised by this office.

DOE Form RA-426
(10/80)

U.S. DEPARTMENT OF ENERGY

OMB NO. 038-R0190

DOE AND MAJOR CONTRACTOR RECOMMENDATIONS FOR
ANNOUNCEMENT AND DISTRIBUTION OF DOCUMENTS

See Instructions on Reverse Side

1. DOE Report No. (STMPO 222) DOE/SF/10499-T13 Rev		2. Contract No. DE-AC03-79SF10499	3. Subject Category No. UC-62, 62c, 62d
---	--	--------------------------------------	--

4. Title
Plant Support Subsystem Procurement Documentation (Update)

5. Type of Document ("x" one)
 a. Scientific and technical report
 b. Conference paper: Title of conference _____
 _____ Date of conference _____
 Exact location of conference _____ Sponsoring organization _____
 c. Other (specify planning, educational, impact, market, social, economic, thesis, translations, journal article manuscript, etc.) _____

6. Copies Transmitted ("x" one or more)
 a. Copies being transmitted for standard distribution by DOE-TIC.
 b. Copies being transmitted for special distribution per attached complete address list.
 c. Two completely legible, reproducible copies being transmitted to DOE-TIC. (Classified documents, see instructions)
 d. Twenty-seven copies being transmitted to DOE-TIC for TIC processing and NTIS sales.

7. Recommended Distribution ("x" one)
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